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Factors Leading to Construction Project Delays in Addis Ketema Sub City Government Construction Office

BY

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FACTORS LEADING TO CONSTRUCION PROJECTS DELAY IN ADDIS KETEMA SUB CITY GOVERNMENT CONSTRUCTION OFFICE

A THESIS SUBMITTED TO PROJECT MANAGMENT SCHOOL OF GRADUATE STUDIE ST. MARY'S UNIVERSITY IN PARTIAL FULLFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER PROJECT MANAGEMENT

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DEPAREMENT OF PROJECT MANAGEMENT

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I declare that this MA. Thesis is my original work, has never been presented for a degree in this or any other university and that all sources of materials used for the thesis have been duly acknowledged.

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

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Contents

ABSTRACT

The number of building construction projects is increasing from time to time. However, it becomes difficult to complete projects in the allocated cost, budget, time, resource and others. Taking this into consideration, delay is one of the major problems in the building construction projects. Therefore, this research is carried out to make assessment on the factors leading to construction project delay in Addis Ketema Sub City Construction Office. This study conducted on the whole Addis Ketema Sub City Construction Office stakeholders. The research takes all Engineering teams, finance teams, contractors and consultants who are actively participating found in Addis Ketema Sub City Construction Office. Both primary and secondary data are collected to achieve the intended research objectives. Questionnaires were distributed to the whole employee of the office and actively participating contractors and consultants8 project sites. The data were analysed using SPSS. The finding of this study indicate that the top major factors that leads to construction project delay in Addis Ketema Sub City Construction Office were inflation in currency rate, payment is not provided on time for contractors and consultants, design change, conflict of the drawing and specification mistakes and delay in producing design documents and small number of architect and structural designer.

Key words**; **Construction, Project, Construction Project, Design, Project Delay

LIST OF ACRONYMS AND ABBREVIATIONS

AKSCGCO	Addis Ketema Sub City Government Construction Office
PMBOK	Project Management Body of Knowledge
RII	Relative Importance Index
SD	Standard Deviation
SPSS	Statistical Package for Social Science
IPMA	International Project Management Association

CHAPTER ONE

1.0 INTRODUCTION

1.1. Background of the study

Construction projects play a great role in the economic development of nation. The construction industry is the tool through which a society achieves its aim of urban and rural area development. However, the current practice of construction industry faces a lot of problem and a rare event are completed on the scheduled time, budget and desired quality of the stakeholders. Construction projects are successful, when it is completed on schedule with in the agreed budget, expected quality level according to the specification. (Serani and Wodaje, 2020).

Construction delay are situations where project events occur at a later time than expected due to cause related to the client, consultant, and contractor etc. Sanni- Anbire, Zin, at el, (2020).

In Ethiopia, the construction industry is the highest recipient of government budget in terms of government development programs. Even though Ethiopian building construction industry is growing and many domestic and international contractors are involved, completion of the project as per the contract is still an issue. There are many problems and conflicts that inevitably occur frequently which contribute negatively to the completion of the project as per the intended completion time stipulated in the applicable contract agreements. The time overrun in building construction projects has become one of the most common problems in the industry that cause multitude of negative effects on the projects and its stakeholders. (MoWUD, 2006).

The effect of delay may include time overrun, cost overrun, disputes, litigation and total abandonment (Murali & Yau, 2006). Some studies directly examine delays, attempt to identify their causes and recommend ways to avoid them. Construction project delays have a weakening effect on parties (Owner, Contractor, and Consultant) to a contract in terms of a growth in adversarial relationships, distrust, litigation, arbitration, cash-flow problems, and a general feeling of apprehension towards each other (Assaf & Al-hejji, 2002).

Therefore, this aspect has been constantly investigated by the researchers across the world with a great enthusiasm. Failure to deliver these projects on time discomfort both clients and end users who expect to benefit from them. This is totally undesirable to the concerned parties (clients,

consultants and contractors) as it is costly for clients and contractors and has the potential to trigger disputes whose resolution is expensive.

This thesis examines factors of delay in an integrated manner and determines how critical delay causes are most influential in project performance. On how to avoid delays can be developed in the future. This thesis will be focuses on Addis Ketema Sub City Construction Office. The building construction projects found in Addis Ababa, Addis Ketema Sub City which will assess for delay causes and examines the corresponding solution to minimize delay and provide recommendation based on the findings to improve project performance within the projects of the company as well as the general public building construction projects.

1.2. Statement of the problem

Delays in construction projects are more likely to happen in almost all projects due to the miscommunication between contractors, subcontractors, property owners or any other reasons. Delays are constantly occurring in construction projects and they could cause great impact on economic growth. It is one of the common problems that upset the construction companies in terms of competitiveness and long term sustainable in the global market Sweis *et al., (*2008), Construction projects are delayed because of several reasons. The problem of project delay still not solved even today when the technology is advanced and project management practices are more common than before Yang *et al., (*2013).

Delay in a construction projects is counted as a common problem and became a main cause for projects to be extremely high cost, extended completion time and inferior quality deliverables. Building construction projects are exposed to many problems during construction that lead to the unnecessary delay and unable meet the contract time of the projects. (wei, 2010)

Delays and cost overruns are the most common problems causing delay in the construction industry in both developed and developing countries Enshassi *et al, (*2009). Delays occur in every construction project and the magnitude of these delays varies significantly from project to project and country to country Wael *et al, (*2007). Cost and time overruns are the key problems of any construction projects. These issues are causing the negative impact on the development of country economic growth and prosperity (Shah, 2016).

(Aziz, 2013) also identifies high-impact value of delay causes in Egypt as: Funding problems, different strategies patterns for bribes, Shortage of equipment, Ineffective project planning and scheduling, Poor site management and investigation, Poor monetary control on site, Rework,

Selecting non-skilled contractors, Sudden Accidents, poor planning, low-skilled working team, Inadequate contractor experience, Frequent equipment breakdowns, Global financial crisis, Complexity of the work (project type, project scale, etc.), Project Legal arguments between project stakeholders, disagreement between joint-ownership variation, poor construction method, non-skilled labour, and Conflicts.

According to (Mahamid, 2013) the top risks causing time overrun in building construction projects in Palestine are: financial status of the contractors, payment delays by the owner, the political situation, poor communication between construction parties, lack of equipment efficiency and high competition in bids. Study in Zambia also indicate that; delayed payments, financial processes and difficulties on the part of contractors and clients, contract modification, economic problems, materials procurement, changes in drawings, staffing problems, equipment unavailability, poor supervision, construction mistakes, poor coordination on site, changes in specifications and labour disputes and strikes were found to be the major causes of schedule delays in building construction projects, Kaliba *et al*.,(2009).

(Koshe & Jha, 2016), studies investigating the causes of construction delay in Ethiopia, showed that only 8.55% projects have been finished to the original targeted completed date and the remaining 91.75% delayed 352% of its contractual time. Construction project is considered one of the most common use problems causing a multitude negative effect on the project and its participating partied.

Research gap

Construction projects have been consistently increasing in Ethiopia. Nevertheless, few studies were conducted as country and project level and as perception of the researcher in the area of study, so this shows that as per the researcher's awareness there is insufficient research which was conducted in the study area. The statistical abstract document of GZFED (2009 E.C) showed that only 15% of the project were completed based on agreed time schedule. So, delay of construction project is critical and serious problem in Ethiopia.

Even though a number of studies have been carried out previously on the subject under current study focuses, the previous study does not fully address all possible delay attributed to project delay. Because of the unique features of projects, the causes of project delay may vary for specific project from country to country, region to region, office to office and even project to

project. Therefore, further study can be also undertaken to investigate major causes and the magnitude of their effect on project.

Therefore, this study tried to assess the factor of delay in construction projects in Addis Ketema Sub City Construction Office. Because the researcher need to know the reason of the delay and to improve the productivity of the organization, to eliminate the wastage correlated with construction delay.

1.3. Research objectives

1.3.1. General objective

Assessing the factors leading to construction projects delay in Addis Ketema Sub City Construction Office will be the General objective of the study.

1.3.2 Specific objective

To meet the general objective, the study will be focus on the following specific objectives:

- To explore the factors leading to construction projects delay in Addis Ketema Sub City Construction Office.
- To improve the productivity of Addis Ketema Sub City Construction Office
- To eliminate the wastage correlated with construction delay Addis Ketema Sub City Construction Office
- To recommend the methods of minimizing the factors that leads to construction projects delays in Addis Ketema Sub City Construction Office.

1.4. Research Questions

- What are the factors of project delay in construction projects in Addis Ketema Sub City Construction Office?
- What are critical factors that cause construction project delay in Addis Ketema Sub City Construction Office?

1.5. Scope of the Study and Limitation of the study

(Koshe and Jha, 2016), explained that construction delays are occurring in every phase of a construction project and are common problems in all construction projects in Ethiopia. This research focused on factor of delay in Addis Ketema Sub City Construction Office construction projects and it is carried out particularly on projects constructed under the supervision of Addis ketema sub city construction office then I chose all projects that are under construction, employees in the office, all contractors and consultants on work for the respondents of the questioner who are located in Addis Ketema Sub City Construction Office. Therefore, the data for this study gather through detailed literature Review, questionnaire survey with key professionals and case studies.

The scope of this project is to carry out the assessment on causes of delay in on-going/active construction projects in Addis Ketema Sub City Construction office. This study focused on the construction projects in Addis Ketema Sub City Construction office projects.

A limitation of a research study identifies potential gaps or problems in the research. In conducting the research, there are limitations that challenge the collection of data from respondents. The busy schedule of the respondents in connection with different assignment made the collection of data hard. It extends the time of data collection through questionnaires and interview. Some respondents were hesitant to tell the truth, about the cause of delay in building construction project. The research is also limited to construction projects only takeover in Addis ketema sub city.

1.7. Significance of the Study

The significance of the study is nothing; it is a rationale that describes why the study is conducted. This research is so significant that it contributes in improving the project management in general and particular to the construction management.

The findings and recommendations of this research will be useful evidences and resources to overcome challenges in the construction management process. It also helps in citing factors that contribute to project delay in Addis Ketema Sub City Construction office and other projects too. The research also identifies the challenges that make construction projects to delay and to manage them in order to finish projects on time in Addis ketema sub city construction office.

CHAPTER TWO

LITERATURE REVIEW

2.0. INTRODUCTION

This chapter presents review of various literatures, both theoretical and empirical frame work to assess factors that leads to construction delay, their effect on the time performance, cost performance. Academic studies, websites of implementing organization and the like are considered to be sources of data. It shall also put forward a conceptual framework of the study based on the review.

2.1 Theoretical Framework

2.1.1 What is Project?

According to (PMBOK 4th edition), the definition of "project is a temporary endeavour undertaken to create a unique product, service, or result." The temporary nature of projects indicates that a project has a definite beginning and end. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists. Projects can also have social, economic, and environmental impacts that far outlive the projects themselves (PMBOK 5th edition). (IPMA) defines a project as a time and cost constrained operation to realize a set of defined deliverables up to quality standards and requirements.

According to Robert k.Wysocki, (2014) definition Project is a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification. A Business focused definition of a Project by the same author Robert k.Wysocki, (2014)is a sequence of finite dependent activities whose successful completion results in the delivery of the expected business value that validated doing the project. Levy S. M. (2006). Also defines a project as a temporary endeavour undertaken to achieve a particular aim. A project is actually the response to a need, the solution to a problem. Further, it's a solution that promises a benefit typically a financial benefit. The fundamental purpose for most projects is to either make money or save money.

By definition, a project is temporary in nature; that means that it has a specific start and finish. A project consists of a well-defined collection of small jobs tasks and ordinarily culminates in the

creation of an end product or products deliverables. There will be a preferred sequence of execution for the project‘s tasks (the schedule). A project is a unique, one-time undertaking; it will never again be done exactly the same way, by the same people, and within the same environment Levy S. M. (2006).

2.1.2. Definition of Delay

Delays in construction projects are considered one of the most common problems causing a multitude of negative effects on the project and its participating parties. Along with delay, the frequently faced consequences are project failure, reduction of profit margin, and loss of belief of citizen in government funded projects, etc. When delays do occur, they are either accelerated or have their duration extended beyond the scheduled completion date. These are not without some cost consequences. Delays also give rise to disruption of work and loss of productivity, late completion of project increased time related costs; third party claims, abandonment and termination of contract (Abdul-Rahman, 2006). Another definition is by (Aibinu & Odeyinka, 2016) who defines delay as a situation where the contractor and the project owner jointly or severally contribute to the non-completion of the project within the agreed contract period. Likewise, Sanders and Eagles also define delay as an event that causes extended time to complete all or part of a project.

2.1.3. Classification of project delay

Delays in construction projects have been put in various classifications by several authors but most of these classifications have a lot in common in terms of their fundamentals. Although various types of delays have been put in several studies, they are somewhat linked to one another. Delays can be seen in these four major categories as explained by Theodore, Trauner et al, (2009); explained types of construction delay in to Critical or Non critical; Excusable of Non excusable; Compensable or Non compensable and Concurrent or Non concurrent.

2.1.3 (A) Critical or Non Critical Delays

Delays that affect the project completion or in some cases a milestone date are considered as critical delays and delays that do not affect the project completion or a milestone date are considered as noncritical delays. If these activities are delayed, the project completion date or a

milestone later will be delayed. The determining which activities truly control the project completion date depends on the following:

- The project itself
- The contractor`s plan and schedule (particularly the critical path)
- The requirement of the contract for sequence and phasing
- The physical constraint of the project, i.e. how to build the job from a practical perspective. Hamzah et al.,(2011)

2.1.3 (B) Excusable or Non-Excusable Delays

An excusable delay is a delay that is due to an unforeseeable event beyond the contractor's or the subcontractor's control. Delay to be excusable or non-excusable depends on the clauses incorporated in the contract. The authors note that standard construction contracts specify types of delay that will allow the contractor to an extension of time.

Many researchers give list of excusable delay in a project. Normally, based on common general provisions in public agency specifications, delays resulting from the following events would be considered as excusable:

- General labour strikes
- Fires
- Floods
- Owner-directed changes
- Errors and omissions in the plans and specifications
- Differing site conditions or concealed conditions
- Uncommon severe weather
- Intervention by outside agencies
- Epidemics and quarantine restrictions.

Non-excusable delays are events that are within the contractor's control or that are foreseeable. Non-excusable delays are delays that are either caused by the contractor or not caused by the contractor but should have been foreseen by the contractor. Also non-excusable delay does not entitle the contractor to either a time extension or monetary compensation. Some examples of non-excusable delays are:

- Late performance of sub-contractors

- Untimely performance by suppliers
- Faulty workmanship by the contractor or sub-contractors
- A project-specific labour strike caused by either the contractor's unwillingness to meet with labour representative or by unfair labour practices. Hamzah et al.,(2011).

2.1.3(C) Compensable or Non-Compensable delay

Compensable delays are caused by the owner or the owner's agents. Hamzah et al.,(2011). A compensable delay where the contractor is entitled to a time extension and to additional cost compensations. Relating back to the excusable and non-excusable delays, only excusable delays can be compensable. An example of non-completion of drawings in the required time by the architect of the owner and it leads to the extension of the schedule and it imposes economic damages to the owner by the contractor. In this condition, the contractor will have to face extra indirect costs for both extended field office and home office.

A non-compensable delay is a delay which is caused by third parties or incidents beyond the control of both the owner and the contractor. These delays are commonly called "acts of God" because they are not the responsibility or fault of any particular party. Non-compensable delays mean that although an excusable delay may have occurred, the contractor is not entitled to any added compensation resulting from the excusable delay. Thus, the question of whether a delay is compensable must be answered. Examples include natural calamity, unhealthy weather and wrong doing by masses (strikes, fires, acts of government in its sovereign capacity, etc.). Due to this, contractor gets extension in tie and does not pay any compensation to the owner and contractor for delay damages. Hamzah et al.,(2011)

2.1.3(D) Concurrent or Non-concurrent parallel delay

Concurrent or parallel delays occur when there are two or more independent delays during the same time period. Concurrent delays are significant when one is an employer risk event and the other a contractor risk event, the effects of which are felt at the same time. When two or more delay events arise at different times, but the effects of the mare felt (in whole or in part) at the same time, this is more correctly termed 'concurrent effect' of sequential delay events. Hamzah et al.,(2011) Concurrent delays occur when both owner and the contractor are responsible for the delay. Generally, if the responsible parties of the delays are intertwined, neither the contractor can be held responsible for the delay (force to accelerate, or be liable for liquidated damages) nor

can he recover the delay damages from the owner. Until the development of CPM schedule analysis, there was no reliable method to differentiate the impact of contractor caused delays from owner caused delays. Hamzah et al.,(2011)

Concurrent delays arise when one event causes a delay simultaneously with another event. For example, if an owner denies access to a project site for two weeks, and a severe storm prevents a contractor from working on the project for one of two weeks as well, there will be a concurrent delay of one week. The contractor will be able to recover for delay damages for one week, as a severe storm is not a cause of delay that is compensable and would have prevented the contractor from performing even if the owner did not deny access to the site. Hamzah et al.,(2011)

Concurrent delays are often more complex. Delays are categorized into 'excusable compensable', 'excusable and non-compensable and non-excusable delays. More often, the excusable and non-excusable delays occur on separate but parallel chains of activities. When there are overlapping causes for the delay, the following principles usually are applied. Hamzah et al., (2011)

2.2 Empirical Literature Review

2.2.2 Delay factors in construction projects

A large number of delay factors may lead to project delays in construction projects, arising from different parties and resources. These delay factors are countless, since each construction project has its own characteristics and environment. Efforts have therefore been made by many researchers to identify the most significant factors of delay in construction projects, which are discussed in the next section. The literature review was conducted through published books, articles related to the research area and e- resources. In the next step, all the delay factors that may be encountered in a construction project were listed through a detailed review of the literature, and the possible delay factors recognized in practice were identified. These delay factors were grouped into four major categories as follows: Contractor-related factors, Consultant-related factors, Owner-related factors and others (Shi & Arditi, 2001).

a) Delay factors related to contractor

Among all the construction parties, a contractor has the major responsibility to carry out most of the project activities. Similarly, if the project is not finished on time and within the allocated

budget then the contractors is blamed. In reality, the contracting business is a challenging and demanding profession that contains many complex activities, and, to avoid project delays, the main contractor often holds full responsibility for the work of sub-contractors as well as his own. Basically, how the contractor deals with particular situations depends on the nature of the work and the type of contract (Shi & Arditi, 2001). The capability of the contractor to finish the project according to the planned schedule mainly depends on two things: availability of resources (incorporating money, manpower, materials, and equipment and machinery) and managerial competence. There are two types of sources from which the contractor hires manpower: sub-contract and direct hire. If the sub-contractor causes delay to the construction project then both the owner and the main contractor have the responsibility to look for a solution to the problem. Therefore, it is essential for the contractor to constantly supervise the work performance of sub-contractors in order to maintain a balance between construction activities (Abdul-kadir & Price, 1995).

b) Consultant-related delay factors

The client may consult with other professionals who can assist him in organizing the entire construction project. These professionals are called consultants. The main duties and responsibilities of a consultant may be to design the infrastructure of the project, which includes architectural, mechanical, structural, and electrical designs. Some other responsibilities may include the preparation of project related documents such as bills, drawings, specifications, and tender documents (Long et al, 2004). Furthermore, in some cases, consultants also conduct project planning, cost control and estimation, and quality control. In normal circumstances, consultant-related delays occur during preparation of drawings, during the adoption of design drawings, while taking design approvals from contractors and client, and when performing inspection procedures. There are many possible reasons behind these types of delays; prominent factors include inexperienced consultancy staff, poor qualifications, inadequate communication and coordination skills, and improper planning (Gunlana & Krit, 1996). Odeh & Battaineh (2002) believe that during the construction processes, the enquiries and inspections of the consultant may slow down the progress of the work. In response, the contractor may come up with solutions to the problems; however, these solutions may not satisfy the consultant, and could result in the work having to be redone. Effective control and command over production on

the construction site is a major element that contributes to the success of implementing the project; conversely, hindrances in performing these activities can have severe impacts on a construction project.

c) Owner-related delay factors

The owner or client is the key participant during the entire construction process. Kwakye (1998) mentioned that the owner's duties and responsibilities are onerous, and that he or she needs other knowledgeable parties to manage or organize the construction project. In a few cases, owners have in-house project management teams that participate in the construction process, but most of the time, owners hire a project manager and external parties to handle the project (Odeh & Battaineh, 2002). One of the most crucial decisions that owners need to take at the beginning of the project is to determine the duration of the contract. Many owners prefer fast completion of work but thorough investigations should be conducted to decide the contract duration. Another major factor that delays the initialization of the project is the owner‟s failure to hand over the site to the contractor. Therefore, the personal involvement and quick decision-making on various matters by the owner in the initial phases of the project may accelerate the project‟s progress. Kimmons & Loweree (1989) observed that "the working relationship between an owner and a contractor is one of the most crucial determinants of project success and this relationship also develops trust between the two parties". The owner must participate in the construction project horizontally and vertically, but without interrupting the contractor's project plan. In addition, financial matters should also be taken into account, and the owner must ensure the on-time availability of funds; lack of financial stability may cause many problems, such as extensive delays due to labour strikes or material mismanagement (Chan & Kumaraswamy, 1997).

d) External factors

Some factors are outside the control of construction participants. For instance, the weather conditions in Libya in the summer are very hot, and the temperature normally exceeds 40 degrees Celsius. On the other hand, the weather conditions in the United Kingdom are worst in the winter season, when the temperature can typically fall to -5 or - 8. In such intense conditions, contractors may face many difficulties that normally result in either slowdown of the construction process or, sometimes, a complete stoppage of works. These difficulties may include disruption to utility lines such as gas, electricity or water. Ogunlana & Krit (1996)

mentioned that social and cultural festivals and celebrations may also affect the time it takes labour to reach the job site, negatively affecting the productivity of the construction project and potentially resulting in minor delays. As discussed earlier, increases in the prices of raw materials can also have a significant impact on a construction project, yet is a factor also beyond the control of the owner and contractor. This is evidenced by the recent case in Libya, when many projects were stopped due to the prices of steel doubling in 2011. These external factors may also create clashes or disputes between the construction participants, which will further increase the product cost and duration (Odeh & Battaineh, 2002).

2.4. Related studies

Related studies have been carried out by number researchers to determine the causes of delay in construction project: Anyman (2000) conducted studies on the causes of delays on 130 public projects in Jordan. The study was carried out on the following buildings: residential, office and administration buildings, school building, communication facilities and medical centers. The outcome of the result showed that the main causes of delay in construction of public are projects related to designers, economic conditions, user changes, weather, site conditions, late deliveries and increases in quantity. Related studies have revealed that the causes of delay vary from country to country. Al-Kharashi & skitmore (2009) identified leading causes of construction project delay in Saudi Arabia by conducting questionnaire survey administered to contractors, consultants and clients. They conclude that the most two significant causes of project delay are lack of finance to complete the work by the client and delay in progress payment by owners. Haseeb et al. (2011) conduct a research on the causes of delay in large construction project in Pakistan, where the following factors are reported to be the most influential; natural disaster, financial and payment problem, improper planning and poor site management. Doloi et al. (2012) report the factors affecting project delay in Indian construction projects by surveying construction professionals. After the factor analysis the most influential factors of delay were identified as follow; lack of commitment, inefficient site management, poor site coordination and lack of clarity in project scope. The study carried out by Sunjka & Jacob (2013) revealed that the ten (10) most common causes of project delays in the Niger Delta region in Nigeria includes youth commotion, communal catastrophes, lack of proper planning, poor contract management, late identification and resolution of drawing and specification errors. Ibrahim (2006) worked on

finding out the causes of delay in construction projects and their severity according to contractors and consultants and stated that cost, time and quality have proven their importance as the main measures for construction project success. A similar study in Malaysia by Alaghbariet et al., (2007) also revealed that financial problems were the main factors based on a list of thirty-one (31), factors like clients, contractors, consultant and coordination problems were the second most important factors causing delay in construction. In the kingdom of Saudi Arabia, a research conducted by Albogamyet al., (2012) on solvin

According to different studies which are carried out by different scholar's study about causes of delay in construction projects for years in the past, many researches advanced and modified various factors and groups that result for causing delays into several groups. It is normal for construction projects to face problems during the project implementation, and delay is one of the major problems. Delay is a problem that should be addressed properly before it grows and sincerely affects project time, cost and cause dispute & claim.

According to Akram et al. (2017) Construction works involve huge amounts of money and most of the contractors find it very difficult to bear the heavy daily construction expenses when the payments are delayed. Work progress can be delayed due to the late payments from the clients because there is inadequate cash flow to support construction expenses especially for those contractors who are not financially sound. And they also argue that Contract-related factors such as change orders (changes in the deliverables and requirements) and mistakes and discrepancies in the contract document result in cost overrun. Mistakes and discrepancies in the contract document can be in scope, deliverables, resources available and allocated, payment terms, achievement of various milestones, and the project duration. In most of the instances, time overrun leads to cost overrun.

According to Yogeswaran et al, (1997), construction delays are occurring in every phase of a construction project and are common problems in construction projects. The actors in the industry (i.e. consultants, clients and contractors) have their own share in the process. There are also other factors that are external to these parties.

Construction delay is considered to be one of the most recurring problems in the construction industry and it has an adverse effect on project success in terms of cost, time, quality, and safety.

There are several factors that cause delay in construction. Delay may be caused by Clients, Users, Consultants, Designers, Owners, Contractors and Suppliers. Yogeswaran et al, (1997) Construction delay is a common problem in construction projects in Ethiopia and occurring in every type and phase of a construction projects. In Ethiopia, the construction industry is blooming and the building construction increasing from time to time all over the country. However, the historical data of completed building projects shows that, none of the projects was completed as planned and within the estimated cost (Zack, 2003).

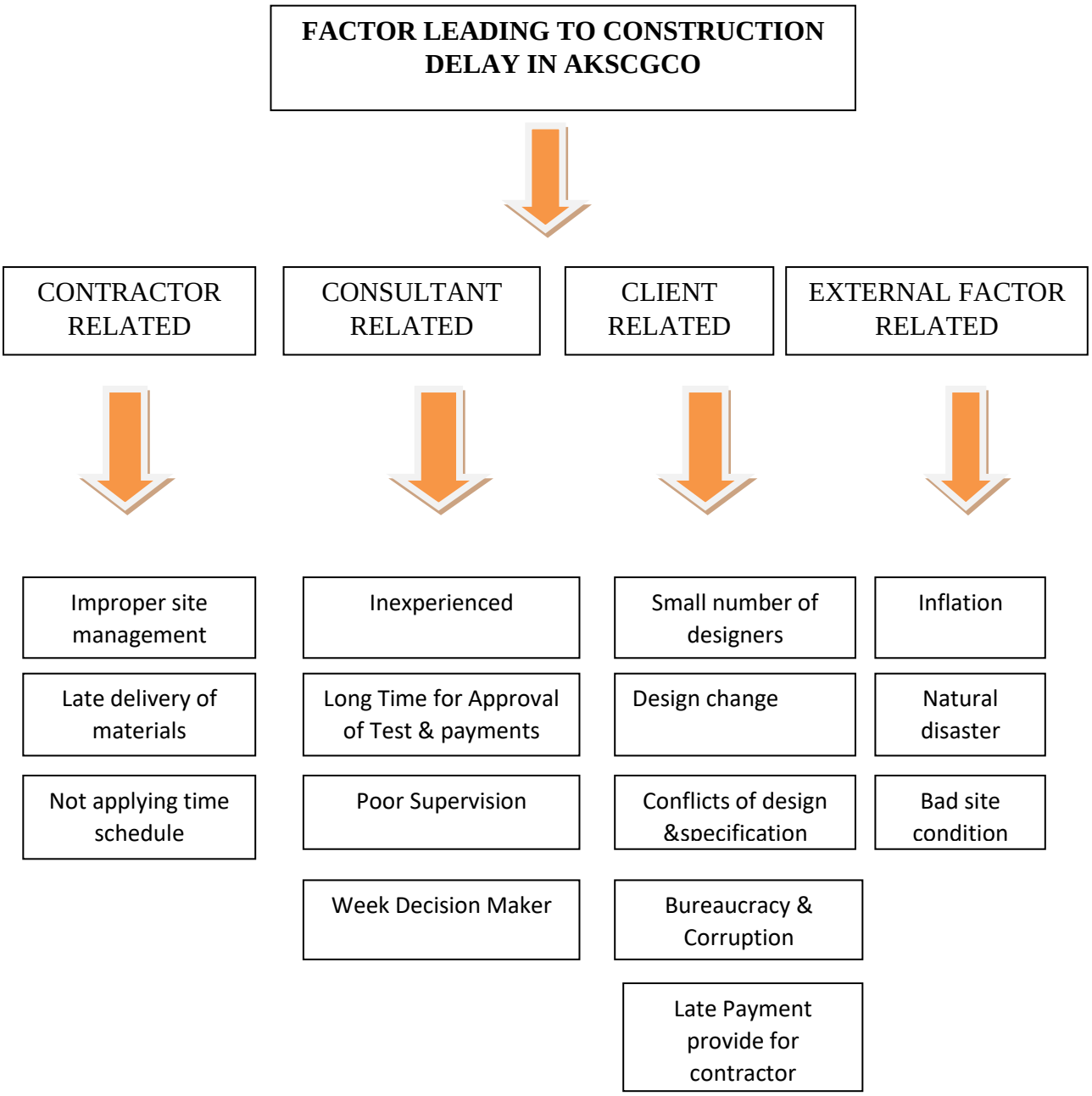
According to (Faradi and El-Sayegh, 2006), Construction delays are occurring in every phase of a construction project and are common problems in construction projects in Ethiopia, and this is the major causes of project failure. Traditional contractual approach is still dominant in Ethiopia construction sector and this may likely continue to be a trend. Ethiopian construction sector comprises the clients or project owners, contractors, subcontractors, suppliers, and others key professional actors responsible for design and supervision of projects. These professionals include architects, engineers and quantity surveyors. Due to this mixed variety of parties involves in projects, they often encounter difficult situations and some degree of pressures.

(Majid, 2006) identified causes of delay related to owners, consultants, contractors, Labour, Equipment, and external factors. According to their study Owner related causes include (slow decision making, delay in delivering the site, payment delay, improper planning and scheduling, owner interference, change in orders, suspension of work, lack of communication, late decision making, conflicts among partners); Consultant (Inadequate experience, delay in approving drawings and samples, inadequate detailing and clarity in drawings, quality assurance control, mistakes & discrepancies in design documents); Contractor (delay in payment, delays in sub-contractor work, poor site management and supervision, rework due to errors, inexperience, poor qualification of staff, in effective planning, frequent change of subcontractor); Labour & Equipment (shortage of labour, low productivity level of labours, in-experienced work force, delay in material delivery, shortage of materials, shortage of equipment, equipment break down, low productivity & efficiency, poor operator skill, lack of communication); and External factors (change in government, poor soil conditions regulations, delay in obtaining permits, climatic factors, accidents during construction, delay in commissioning).

2.4 Conceptual framework

Conceptual frameworks, according to Kothari (2008), are structured from a set of broad ideas and theories that help a researcher to properly identify the problem they are looking at, frame their questions and find suitable literature. The general idea from the past literature shows that there is a relationship between delay causing factors and delay effects. Most academic research uses a conceptual framework at the outset because it helps the researcher to clarify the research questions and aims.

Based on literature review and my office structure I came up with the following conceptual framework as below.


FACTOR LEADING TO CONSTRUCTION DELAY IN AKSCGCO
CONTRACTOR RELATED
CONSULTANT RELATED
CLIENT RELATED
EXTERNAL FACTOR RELATED
Improper site management
Late delivery of materials
Not applying time schedule
Inexperienced
Long Time for Approval of Test & payments
Poor Supervision
Week Decision Maker
Small number of designers
Design change
Conflicts of design &specification
Bureaucracy & Corruption
Late Payment provide for contractor
Inflation
Natural disaster
Bad site condition

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0. INTRODUCTION

This chapter was discussed the research methodology that have been applied in this research. It explains the research design that was adopted in this research. It also describes the methods through which the objectives of the study can be answered. Various methodological issues were also discussed including: research design and approach, population and sampling techniques, source of data and collection techniques and data analysis method that have been used to conduct the study.

3.1 Research Approach

The basic aim of any research study is to find out true, authentic, reliable and unbiased answer to the research question. The researcher uses several tools to accomplish this task, for this purpose the researcher collects and analyse the collected data and at the end of the day find out solution to the research problem.

There are three research approaches: qualitative, quantitative, and mixed methods. The approaches are not totally opposite or are distinct categories but they are different ends of a continuum. (Saunders, 2009).

According to Croswell (2014) when selecting a research approach it is very important to consider the research problem because "Certain types of research problems call for specific approaches. Quantitative research approach is best for such studies like the "identification of factors that influence an outcome'' (Croswell ,2014) So considering the above mentioned fact the research approach that was used in this research is a quantitative approach and collect the relevant data the survey was used standardized questionnaire.

3.2 Research Design

Research design refers to the arrangement of collecting and analysing data in manner that aims to combine relevance to the research purpose with the economy in the procedure (Babbie, 2007). The objective of the study was to identify the factors that lead to construction project delay in Addis Ketema Sub City. For this objective descriptive research design was adopted with a view to provide descriptions with regard to the factors of project delay. A descriptive research design

is a scientific method which involves observing and describing the behaviour of a subject without influencing it in any way. In addition, a descriptive study attempts to describe a subject, often by creating a profile of a group of problem, people or events, through collections of data and the tabulation of frequencies on research valuables and the research reveals who, what, when, where or how much (Serakan, 2010).

3.3 Population and sampling techniques

3.3.1 Population

Population is a set of elements, services, people, household, groups, or things that are well defined and being investigated in the study. There should be observable characteristics in the population which the researchers will generalize his result on (Mbachu, 2004). According to Mark (2009) the full set of cases from which a sample is taken is called the population.

3.3.2 Study Population

According to Mark (2009) the full set of cases from which a sample is taken is called the population. Clients, contractors, and consultants were important data sources for this study. Since the main objective of the research is to identify the Factors Leading to Construction Project Delays, the professional construction employee's like, site engineers, quantity surveyors of these two construction companies, clients and the professional-finance office representatives like supervisors resident engineers were hence in a better position to provide the information required by this study.

3.3.3 Sample size determination

The sample for this study was

- All contract Administration team employee, all design team employees, all audit team employees, all finance team employees, (client)
- All contractors and having project at the time
- All consultants having project at the time

Based on the obtained list the total number of contractor having projects at the time are 15, consultants 13, all contract Administration team employee are 14, all design team employees are 14, all audit team employees are 11, all finance team employees are 7, so the total population was 74. From this, it's decided to use census method because my population size was less than

100. So the targeted respondents of the questionnaire were construction professionals who were working in Addis Ketema Sub City construction office, consultant and contractor. The inclusion criteria were the respondents should be construction professionals. This includes project managers, site engineers, office engineers, Architects, supervisors, quantity surveyors who were directly related to design change in construction sites. The exclusion criteria were an employee of the Addis Ketema Sub City construction office whose job is not directly related to construction and nonprofessional employee like Human resource team, planning and preparation of budget team, property general service team were not included.

3.4 Data Collection Tools

The instrument of data collection that was used in the study is Questionnaires. Which is convenient while conducting survey research? Questionnaires a written forms comprising of a set of questions that will be used to gather the data required from a sample population. Each item in the questionnaire was developed to address the research objectives.

3.5 Questionnaire

A questionnaire survey was designed based on the objectives of the study, which are factors of delay in construction projects at Addis Ketema Sub City construction office.

The questionnaires are all classified into 3 parts:

- PART 1: Respondent Background
- PART 2: factors that lead to construction project delays
- PART 4: open-ended Question

Part 1: Respondent Background in this section, the researcher was trying to obtain the respondents‟ information. The questionnaire includes:

- Gender of respondent
- Age of respondent
- Educational background
- Year of experience in Addis Ketema Sub City construction office
- Work division of the respondent

Part 2: factors that lead to construction project delays. This section is designed to evaluate the factor that contributes to construction projects delays at Addis Ketema Sub City construction office from the previous literature review. There are in total of seven groups of factors that leads

to construction project delays in Addis Ketema Sub City. The questionnaire is mainly based on Likert scale of 5 ordinal measures from 1 to 5 according to level of contributing.

- (5) = strongly Agree
- (4) = Agree
- (3) = neutral
- (2) Agree
- (1) strongly Agree

PART 4: open-ended Question

For this section, respondents were asked How do they can they handle a delay in construction projects in Addis Ketema sub city construction office.

3.5 Method of data analysis

The data collected through pre-tested structured questionnaire were categorized and analysed. The data were analysed and interpreted using SPSS version 20. The five points scale was converted to a Relative Importance Index (RII) for each individual factor using the following formula:

$$RII = \frac{1\,n1 + 2n2 + 3n3 + 4n4 + 5n5}{A*N} \quad \text{.....Equation 3.1.}$$

Where,

RII = Relative Importance Index,

n1, n2, n3, n4, n5 = Number of respondents answer each factor

1, 2, 3, 4, 5 = weight given for each factor (ranging from 1 to 5),

A = highest weight (i.e. 5 in our case),

N = total number of respondents.

The importance indices were calculated for all delay causes and the delay causes were ranked accordingly. In order to identify how project delay can be mitigated, it is important to identify the responsible party. Therefore, the responsibility of the delay causes is illustrated in the factor or category column. The RII value had a range from 0 to 1, where the higher the value of RII, the more important was the cause or delays (Sambasivan & Soon 2007). The RII is then being classified based on the RII classification table as shows in Table 3.1 The discussion will be made when the RII was classified as most preferred causes and effects of delay only.

Table 3.1-1Classification of RII

Scale	Level of preference	RII
1	Not preferred at all	$0.0 \leq RII \leq 0.2$
2	Slightly preferred	$0.2 < RII \leq 0.4$
3	Moderately preferred	$0.4 < RII \leq 0.6$
4	Preferred	$0.6 < RII \leq 0.8$
5	Most Preferred	$0.8 < RII \leq 1.0$

Source: Kometa et al. 2008,

Pearson Correlation analysis was conducted to test the existence of a significant relationship between the factors leading to construction projects delay in Addis Ketema Sub City and effects of delay.

3.6 Ethical consideration

Ethical considerations were taken into account throughout the process of conducting this study. Due to sensitivity of some collected information, the researcher holds moral obligation to treat the information utmost propriety and respondents were assured about the confidentiality of the information they provided. The researcher also informed all prospective participants about nature and the objective of the study. It was clarified that their response to the offered questions was only for the purpose of academic research and would never be disclosed to anyone at all times.

3.7 Validity

Validity explains how well the collected data covers the actual area of investigation (Ghauri and Gronhaug, 2005).

Therefore, the population is homogenous and helps to have a robust and valid data. All possible efforts exert to make the data collection instruments easily understandable by the respondents so that the intended information collected thereby increasing trustworthiness of the ultimate findings. Different procedures are taken to guarantee the validity of this research. First, literature review was used to assure content validity. Second, questionnaire was adjusted and the validity was verified based on the context of the company. In addition, it will assess and examine by the

research advisor and senior project managers prior to the data collection to examine the instrument for the content validity.

3.8 Reliability

Reliability concerns the extent to which a measurement of a phenomenon provides stable and consist result (Carmines and Zeller, 1979). Reliability is also concerned with repeatability. For example, a scale or test is said to be reliable if repeat measurement made by it under constant conditions will give the same result (Moser and Kalton, 1989).

Testing for reliability is important as it refers to the consistency across the parts of a measuring instrument (Huck, 2007). A scale is said to have high internal consistency reliability if the items of a scale "hang together" and measure the same construct (Huck, 2007, Robinson, 2009). The most commonly used internal consistency measure is the Cronbach Alpha coefficient. It is viewed as the most appropriate measure of reliability when making use of Likert scales (Whitley, 2002, Robinson, 2009). No absolute rules exist for internal consistencies, however most agree on a minimum internal consistency coefficient of .70 (Whitley, 2002, Robinson, 2009).

It assesses the consistency or reproducibility of quantitative measurements made by different observers measuring the same quantity. The respondents were selected according to the position in the respective construction projects and their experience in the construction industry. In this regard, the response from the respondents is highly expected to be consistent. Moreover, the researcher has delivered most of the survey in person and has explained the respondents about the importance of genuine information and respondents were required to verify their response with an explanation of supporting practices and experiences.

Given the above outcomes, the research instrument (survey questionnaire) was found to be consistent and reliable.

CHAPTER FOUR

DATA ANANLYSIS AND DISCUSSION

4.0 INTRODUCTION

The research is mainly based on respondent view using a structured type of questioner which has their parts. On Part one of the questionnaires the researcher tried to obtain general information about the respondent. On part two tried to evaluate the factor that contribute to the delay of construction project delay by using a five point Likert scale (strongly agree, agree, neutral, disagree and strongly disagree). And on part three the study include open ended questionnaire for more explanation about how to handle a delay in construction projects

Table 4.0 data distribution and collection

Description	Number of questionnaires distributed	Number of questionnaires complete and return	Percentage of number of respondent
Contractor	15	15	100%
Consultant	13	13	100%
Contract administrator team (client)	14	14	100%
Audit team (client)	11	11	100%
Design team (client)	14	14	100%
Finance team (client)	7	7	100%
Total sum	74	74	100%

A total of 74 questionnaires were distributed to respondent and all of the 74 respondent return the questionnaires. The researcher collects those wisely and used them for the analysis. As shown on the table I collect the questionnaires Contractors, Consultants, Contract Administrator team,

Audit team, Design team and Finance team were all 100% or fully collected. So the analysis is based on these data collected from my respondents

4.1 Demographic characteristics of respondent

Demographic characteristics of respondent of my research include Gender, Age, Educational Background and work division.

Table of Demographic characteristics of respondent

Table 4.1 Gender of Respondents

Gender	Frequency
Male	54
Female	20
Total	74

As table 4.1 I have 73% male and 27% respondent are participated. Concluded from this most of my respondents are male

Table 4.2 Age Of Respondents

Age	Frequency
18-30	29
31-40	36
41-50	7
above 50	2
Total	74

As per result of table 4.2, 49.2% of my respondent age is 18-30, 48.6% of the respondent is between 31-40, is 9.5% is 41 up to 50 and the rest of them are above 50 which is about 2.7%.

Table 4.3 Educational Background of Respondents

Educational Background	Frequency
TEVT	3
Diploma holder	6
bachelor's degree holder	61
Master's degree and above	4
Total	74

Agreed to by table 4.3 most of the respondent 82.4% of Bachelor's Degree holder and 5.4% of them are Master's Degree Holder and above so most of my respondent are able to understand my questionnaires easily.

Table 4.4 Work Division of Respondents

Work Division	Frequency
Contractor	15
Consultant	13
contract administrator team	14
Auditor team	11
Design team	14
Finance team	7
Total	74

According the analysis on Table 4.0, I have 20.3%, 17.6%, 18.9, 14.9%, 18.9%, and 9.5% of Contractors, Consultants, Contract Administrator team, Audit team, Design team and Finance team respondent respectively. I have Majority respondent are from contractor and design team in which each cover 21.05% of respondent.

Table 4.5 Work Experience of Respondents

Work Experience	Frequency
0 up to 2	14
2 up to 4	12
4 up to 6	31
6 up to 8	7
above 8 years	10
Total	74

.as it is shown in the table 41.89% of respondents have an experience of 4-6 years in the construction industry, 18.92% of them are mature , 16.22% stay 2-4 years in the experience,13.51% respondents are well experienced which have above 8 years understanding and also 9.48% of defendants good practice experience in the area. This is good and simple to realize and answer the questionnaires for the respondents.

4.2 Descriptive Analysis Result

The objective of conducting the analysis for this section is to establish the factors under the groups of factors identified from the literature review and the ranking according to their significant influence towards cause of Addis Ketema Sub City construction project delays. A ranking method was used to achieve this objective and the significant of using these methods is revealing the most influential factors within each category of factors.

4.3 Factors that lead to construction delay in AKSCGCO

The first objective of study related to causes of delays from twenty-seven set of questionnaire have been identified and grouped into six major groups (design team related factor, budget related factor, finance related factors, consultant related factors, contractors related factors, external factors and Audit team related factor). These factors were ranked in each group based on Relative Importance Index (RII) from the viewpoint of clients, consultants and contractors. The following is a brief description of these factors in each group. In Addis Ketema Sub City construction office these groups are highly inter dependent in meeting the goal of the office. To finishing construction project on the given time, all these teams should work together. Because of their connection of work make them to know about each other deeply the view of the teams is considered and analysed.

4.3.1 Client Related Factor

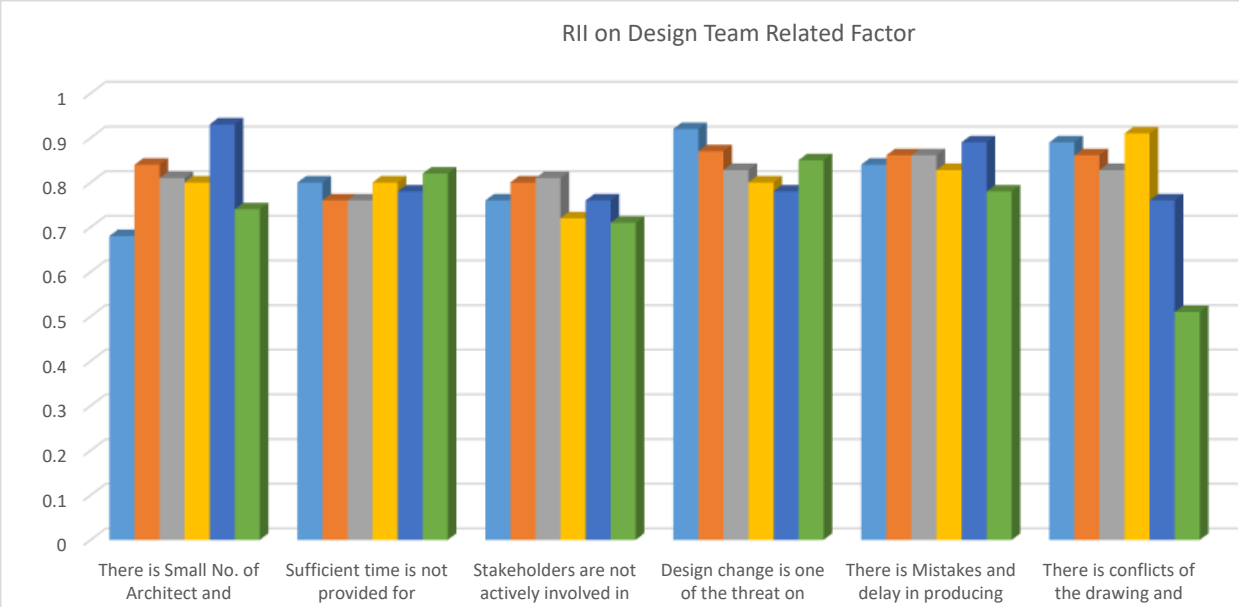
- Design team related factor of construction project delay in Addis Ketema Sub City

Under this topic, design team related factors were ranked according to the design contractors, consultants, contract administration team, Audit team, Design team and finance team view respectively and overall scores. The questionnaire included six Design team related construction projects delay factors. The most preferred causes of delay are those with high RII which means greater than or equal to 0.8. The table below shows the Importance indices for all the factors within this group.

Table 4.3.1 Importance and ranking of Design Team related factors

NO	ITEM	N	MEAN	STD	RII	RANK	AVERALL RANK
1	There is Small No. of Architect and structural designer	74	4.04	0.803	.808	3	6
2	Sufficient time is not provided for Designing	74	3.94	0.784	0.789	2	7
3	Stakeholders are not actively involved in designing stage	74	3.84	0.719	0.768	5	11
4	Design change is one of the threat on finishing the project on time	74	4.25	0.84	0.849	1	3
5	There is Mistakes and delay in producing design document	74	4.17	0.82	0.832	2	5
6	Conflicts of the drawing and specification	74	4.19	0.84	0.846	4	4

Source own survey questionnaire, Jan 2022



According to my relative important index analysis I compare relative important index the factors as discovered by contractors, consultants contract administration team, audit team, design team and finance team views and tried to interpret it. Out of the six factors four are most preferred causes discovered by contractors are Design change is one of the threat on finishing the project on time (RII = 0.92), There is conflicts of the drawing and specification (RII = 0.89) There is Mistakes and delay in producing design document (RII = 0.84), Sufficient time is not provided for Designing (RII = 0.8). While most preferred factors discovered by consultants are Design change is one of the threat on finishing the project on time (RII = 0.87), There is Mistakes and delay in producing design document (RII = 0.861), There is conflicts of the drawing and specification (RII = 0.861), There is Small No. of Architect and structural designer (RII = 0.84) and Stakeholders are not actively involved in designing stage (RII = 0.8). At the same time contract administer team most preferred factors are Design change is one of the threat on finishing the project on time, there is Mistakes and delay in producing design document, there is conflicts of the drawing and specification all with the same (RII = 0.828), There is Small No. of Architect and structural designer and Stakeholders are not actively involved in designing stage also having the same (RII= 0.81). hence the Audit team most selected factor is There is conflicts of the drawing and specification (RII =0.91), There is Mistakes and delay in producing design document (RII= 0.89), and There is Small No. of Architect and structural designer, Sufficient time is not provided for Designing, Design change is one of the threat on finishing the project on

time with the same (RII=0.8). and again the design team view on their own team related factor of construction delay seems a little bit under estimated but they preferred that the most delay factor that cause delay in their team is The Small No. of Architect and structural designer (RII= 0.93). at the last Finance team view on design team factor of delay indicates that Design change is one of the threat on finishing the project on time (RII=0.85), Sufficient time is not provided for Designing and There is Mistakes and delay in producing design document with same (RII= 0.82) respectively are best preferred factors in design team related factors.

Generally, when I interpret the data according to the overall relative importance index (RII), Design change is one of the threat on finishing the project on time (RII= 0.84), Mistakes and delay in producing design document (RII=0.83), and Small No. of Architect and structural designer (RII=0.8) are most preferred design team related factors of construction projects delay in Addis Ketema Sub City Construction office. These three factors are also interdependent within each other having a small number of Architect and structural designer leads to happen a very high work load and stress on the officer so these stress and work load cause mistakes in providing design documents which after all forced to change the design what one needs bureaucracy and take a time to correct that and follows delay in construction projects.

In agreement of the overall RII result, these factors are also preferred and consistent next to the above factors. Conflicts of the drawing and specification (RII = 0.79), Sufficient time is not provided for Designing (RII = 0.78) and Stakeholders are not actively involved in designing stage RII = (0.78) are also design team related factors that leads to construction project delay.

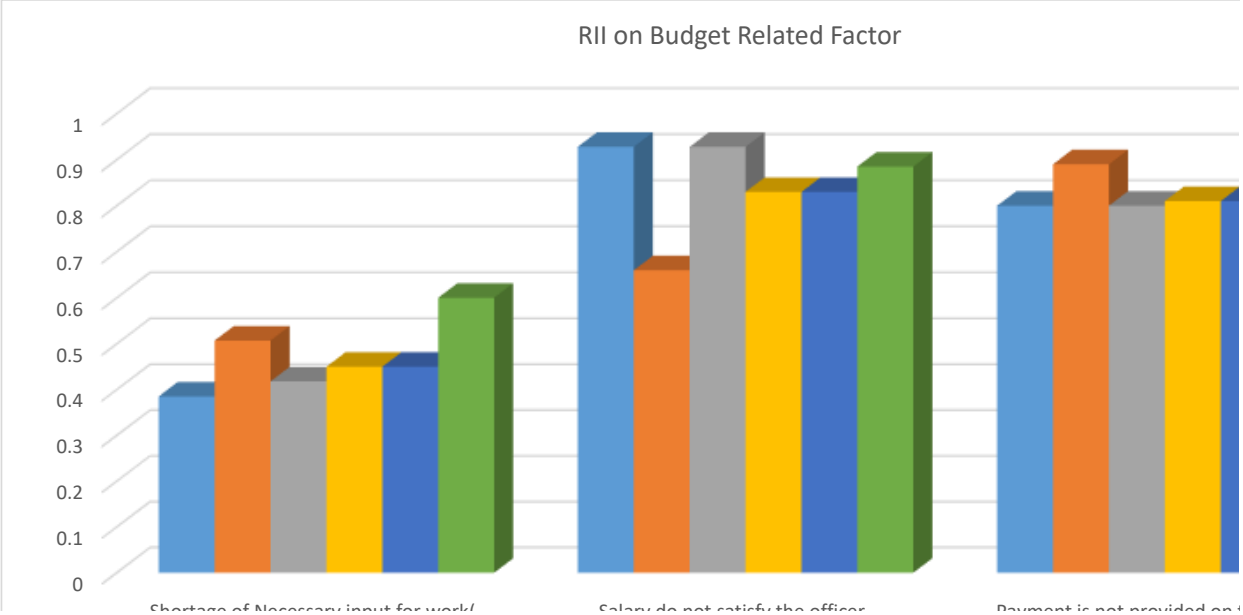
- Budget related factor of construction project delay in Addis Ketema Sub City

Being talked about, budget related factors were also ranked according to the contractors, consultants, contract administration team, Audit team, Design team and finance team view respectively and overall scores. The questionnaire included three budget related construction projects delay factors. The most preferred causes of delay are those with high RII which means greater than or equal to 0.8. The table below shows the Importance indices for all the factors within this group.

Table 4.3.2 Importance and ranking of Budget related team factors

NO	ITEM	N	MEAN	STD	RII	RANK	AVERALL RANK
1	Shortage of Necessary input for work(computer, printer, paper)	74	2.31	0.46	0.462	3	25
2	Salary do not satisfy the officer	74	3.89	0.77	0.778	2	8
3	Payment is not provided on time for contractors	74	4.255	0.84	0.851	1	2

Source own survey questionnaire, Jan 2022



As shown on the above table agreed by contractors Salary do not satisfy the officer (RII= 0.92) and Payment is not provided on time for contractors and consultant (RII= 0.8) are best preferred budget related factors. Consultants say “the main cause that lead to construction project delay in Addis Ketema Sub City is not providing payment on time for contractors and consultants (RII=0.89) in budget related factor”. Contract administration team mostly blame the salary they earn (RII=0.92) is a factor in delaying construction projects and late payment provided for contractor and consultant (RII= 0.8). as Audit team data shows unsatisfied salary the officer get (RII=0.83) and payment which is not provided on tome for contractors and consultant (RII=0.81)

respectively are most preferred factors on budget related delay. Design team also have the same RII values and rank with Audit team so they both have same interpretation too. Finance team view aware me that Salary do not satisfy the officer and Payment which is not provided on time for contractors and consultant with (RII= 0.855) equally affect the time performance of construction projects in the office under Budget related factor delay.

Broadly speaking, depending on overall relative importance index (RII), Salary that does not satisfy the officer (RII= 0.84) is the cause for delay in budget related factors of delay in the AKSCCO which opens the door for corruption and bribe and additional money from contractors and consultants to approve payments, time justification, materials and other many things which is a cause our work act later planned and brings the office in to delay construction projects. Payment that not provided on time for contractors and consultant (RII= 0.82) the second most preferred factor that cause to slow down construction project and make happen delay in AKSCCO. Shortage of Necessary input for work (computer, printer, paper) with low (RII=0.46) is not significant to affect construction project time performance in AKSCCO.

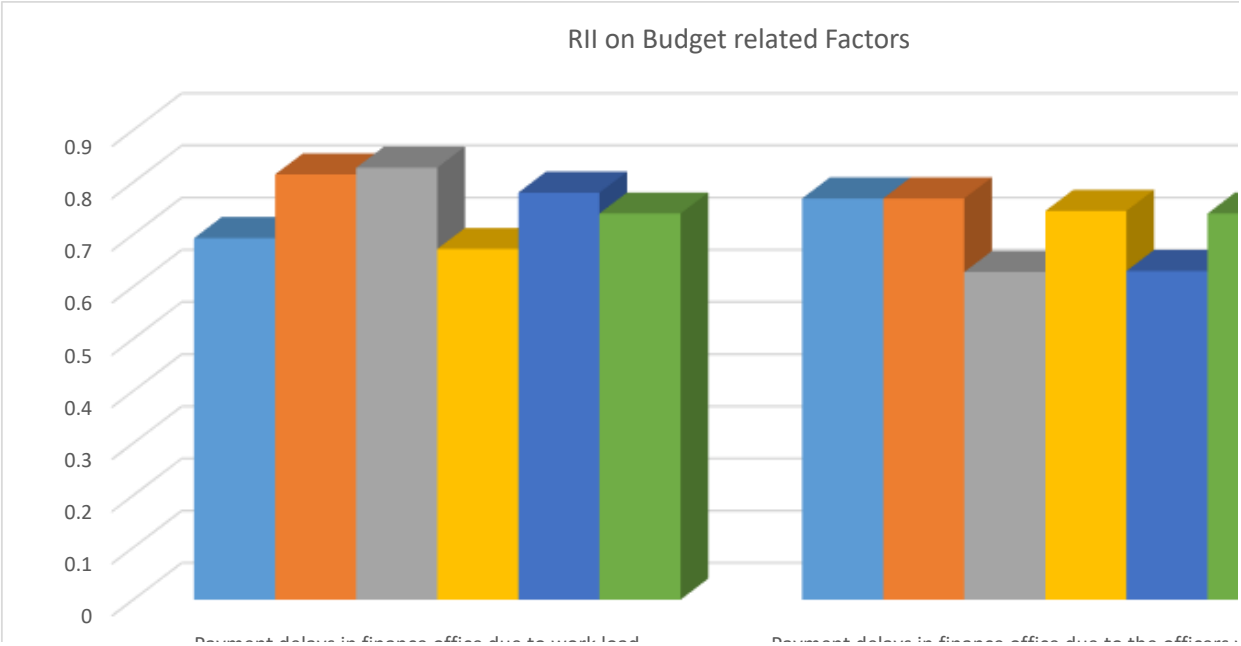
- Finance team related factor of construction project delay in Addis Ketema Sub City

In context from my data, finance team related factors were also ranked according to the contractors, consultants, contract administration team, Audit team, Design team and finance team view respectively and overall scores. The questionnaire included two finance team related construction projects delay factors. The most preferred causes of delay are those with high RII which means greater than or equal to 0.8, RII between 0.6 and 0.8 means preferred (consistent) cause of delay the below Table shows the Importance indices for all the factors within this group.

Table 4.3.3 Importance and ranking of Finance team related team factors

NO	ITEM	N	MEAN	STD	RII	RANK	AVERALL RANK
1	Payment is not provided on time for contractors	74	4.255	0.84	0.851	1	2
2	Payment delays in finance office due to work load	74	3.55	0.701	0.711	2	18

Source own survey questionnaire, Jan 2022



In most case, contingent on overall RII payment that delay in finance department due to work (RII= 0.75) load is preferred as one of the factor that leads to construction project delay in finance team related factor of construction delay in AKSCCO. Payment delays in finance office due to the officers want bribe (RII= 0.71) is also preferred. So these two factors are consistent to bring delay in Addis Ketema Sub City Construction Office. And you can see contractors, consultants, contract administration team, Audit team, Design team and finance team view respectively on the table above in detail.

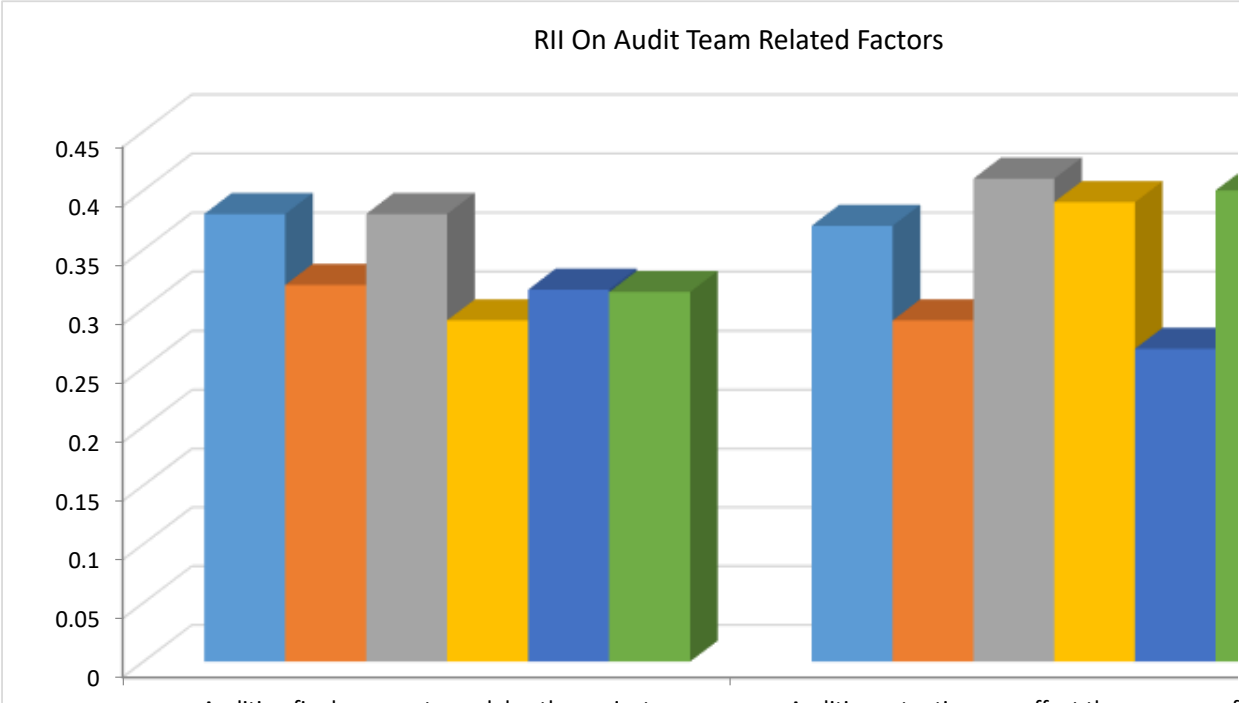
- Audit team related factor of construction project delay in Addis Ketema Sub City

Under the topic, Audit team related factor of construction project delay were ranked according to the contractors, consultants, contract administration team, Audit team, Design team and finance team view respectively and overall scores. The questionnaire included two Audit team related factor of construction project delay factors. The most preferred causes of delay are those with high RII which means greater than or equal to 0.8, RII between 0.2 and 0.4 means slightly preferred almost not preferred cause of delay the below Table shows the Importance indices for all the factors within this group.

Table 4.3.7 Importance and ranking of Audit Team related team factors

NO	ITEM	N	MEAN	STD	RII	RANK	AVERALL RANK
1	Auditing final payment can delay the project	74	1.54	0.305	0.31	1	26
2	Auditing retention can affect the progress of the project	74	1.98	0.39	0.4	2	27

Source own survey questionnaire, Jan 2022



Then I can conclude there is almost no relation between Audit team and construction project delay in Addis Ketema Sub City construction office. Because as I see the result of RII values, both auditing retention can affect the progress of the project and Auditing final payment can delay the project (RII= 0.346) have low RII values with the meaning of almost not preferred.

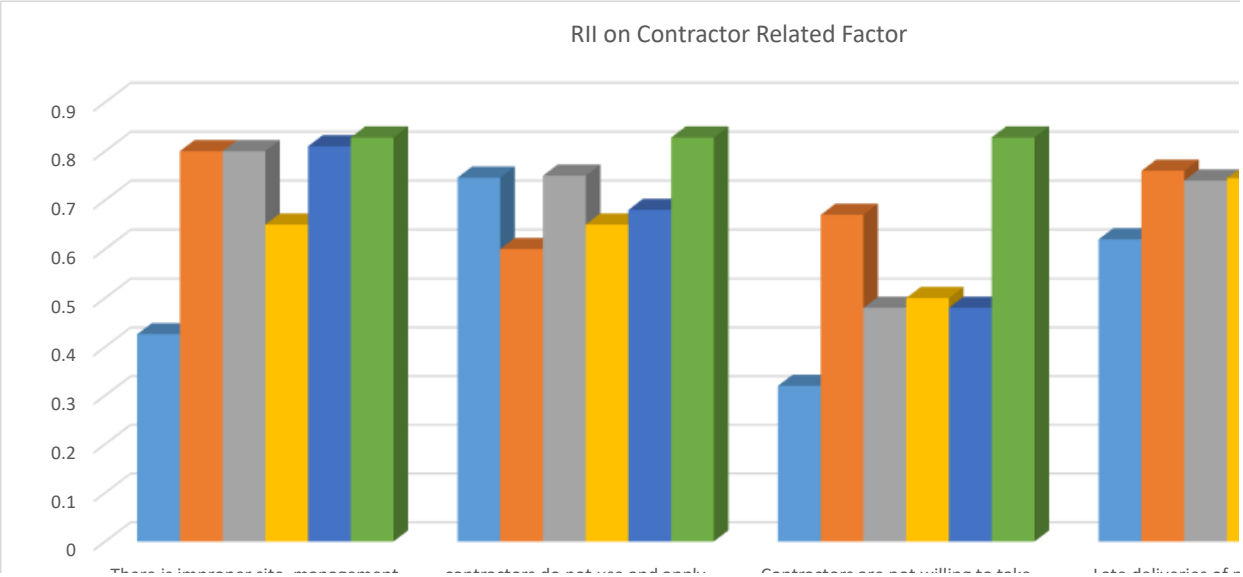
4.3.2 Contractor related factor

As stated on my table, contractor related factors were too ranked according to contractors, consultants, contract administration team, Audit team, Design team and finance team view respectively and overall scores. The questionnaire included four contractor related construction projects delay factors. The most preferred causes of delay are those with high RII which means greater than or equal to 0.8, RII between 0.6 and 0.8 means preferred (consistent) cause of delay the below Table shows the Importance indices for all the factors within this group

Table 4.3.4 Importance and ranking of Contractor related team factors

NO	ITEM	N	MEAN	STD	RII	RANK	AVERALL RANK
1	There is improper site management by contractor	74	3.5	0.69	0.708	2	19
2	contractors do not use and apply time schedule for their work	74	3.475	0.685	0.703	3	20
3	Contractors are not willing to take order	74	2.44	0.482	0.495	4	24
4	Late deliveries of materials and equipment	74	3.6	0.712	0.732	1	15

Source own survey questionnaire, Jan 2022



Depending on contractor perspective contractors do not use and apply time schedule for their work (RII=0.746) and Late deliveries of materials and equipment (RII= .062) look more preferred factor for delay happening on contractor related factor delay but the other factors like improper site management by contractor (RII= 0.426) and Contractors are not willing to take order (RII=0.32) with low RII are just blaming according to them. On the other hand, consultant accuse contractors by their improper site management (RII= 0.8) which is most preferred factor. Late deliveries of materials and equipment (RII= 0.76), Contractors are not willing to take order (RII=0.67) contractors do not use and apply time schedule for their work (RII= 0.6) are also preferred factors. improper site management by contractor (RII=0.8) is also the most preferred factor according to contract administrator view and contractors do not use and apply time schedule for their work (RII=0.75) and Late deliveries of materials and equipment RII=0.74) are also preferred cases. The last with low RII= 0.48 Contractors are not willing to take order is not important to be worthy of attention for contract administration team. As maintained by Audit team view Late deliveries of materials and equipment (RII=0.745) is preferred as a cause of delay in construction projects in AKSCCO, there is improper site management by contractor and contractors do not use and apply time schedule for their work with same (RII= 0.65) also preferred. Design team labelled the is improper site management by contractor (RII= 0.81) is most preferred cause for delay in AKSCCO. Late deliveries of materials and equipment of contractor (RII= 0.78) and contractors do not use and apply time schedule for their work (RII= 0.68) are preferred factor. Finance team says “There is improper site management by contractor, contractors do not use and apply time schedule for their work, Contractors are not willing to take order all with identical (RII= 0.828) are most preferred factors of construction project delay AKSCCO.

When the researcher read overall RII values I ranked the factors as There is improper site management by contractor (RII=0.708), contractors do not use and apply time schedule for their work (RII=0.703), Late deliveries of materials and equipment (RII= 0.732) are preferred factors of construction project delay in AKSCCO. The factor listed as Contractors are not willing to take order (RII= 0.495) is not notable factor to affect time performance of projects in the office.

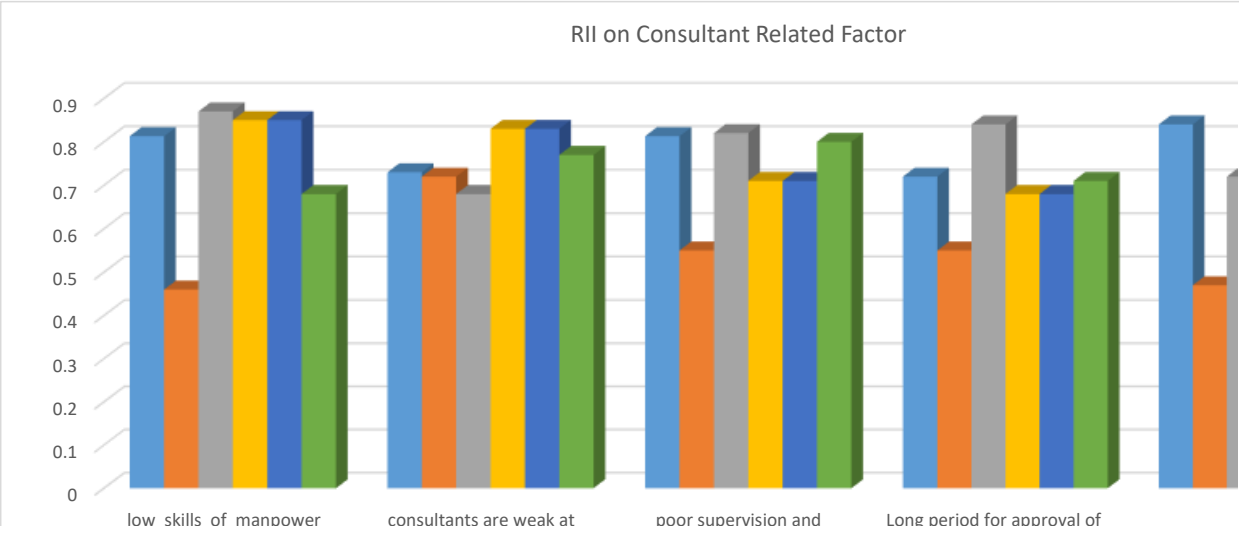
4.3.5 Consultant related factor

As claimed on my table, consultant related factors were also ranked according to the contractors, consultants, contract administration team, Audit team, Design team and finance team view respectively and overall scores. The questionnaire included five consultant related construction projects delay factors. The most preferred causes of delay are those with high RII which means greater than or equal to 0.8, RII between 0.6 and 0.8 means preferred (consistent) cause of delay the below Table shows the Importance indices for all the factors within this group.

Table 4.3.5 Importance and ranking of Consultant related factors

NO	ITEM	N	MEAN	STD	RII	RANK	AVERALL RANK
1	Consultants are not well experienced in analyzing and doing the project	74	3.78	0.748	0.770	2	10
2	low skills of manpower of consultant	74	3.701	0.732	0.754	4	14
3	consultants are weak at making decisions	74	3.794	0.75	0.773	1	9
4	poor supervision and controlling the site	74	3.749	0.741	0.765	3	12
5	Long period for approval of tests and inspections	74	3.503	0.691	0.714	5	17

Source own survey questionnaire, Jan 2022



Long period for approval of tests and inspections of consultants (RII= 0.84), and Consultant is not well experienced in analysing and doing the project and consultants are weak at making

decisions with the same weight (RII=0.813) are most preferred factors that affect construction project time performance according to contractor view. According to consultant low skills of manpower (RII=0.72) is the only preferred problem in construction project delay. The other factors are not significant as their perception. Contract administration team conclude that Consultant is not well experienced in analysing and doing the project (RII=0.87), poor supervision and controlling the site of consultant (RII= 0.84) and consultants are weak at making decisions (RII=0.82) are most preferred cause of delay respectively. Shown on Audit team view list low skills of manpower (RII= 0.85), Consultant is not well experienced in analysing and doing the project and consultants are weak at making decisions with the same RII value of 0.83 are most preferred consultant related factor of delay. Design team agreed that low skills of manpower in consultant PLC (RII=0.85) and Consultant is not well experienced in analysing and doing the project & consultants are weak at making decisions having RII of 0.83 are the most preferred factors. Poor supervision and controlling the site (RII=0.8) is the major cause according to finance team.

Collectively bringing the overall RII and ranking them the consultants are weak at making decisions (RII=0.773), Consultant is not well experienced in analysing and doing the project (RII= 0.770), low skills of manpower & poor supervision and controlling the site with the same (RII= 0.765) are preferred as consultant related factor of construction delay.

4.3.6 External factor related

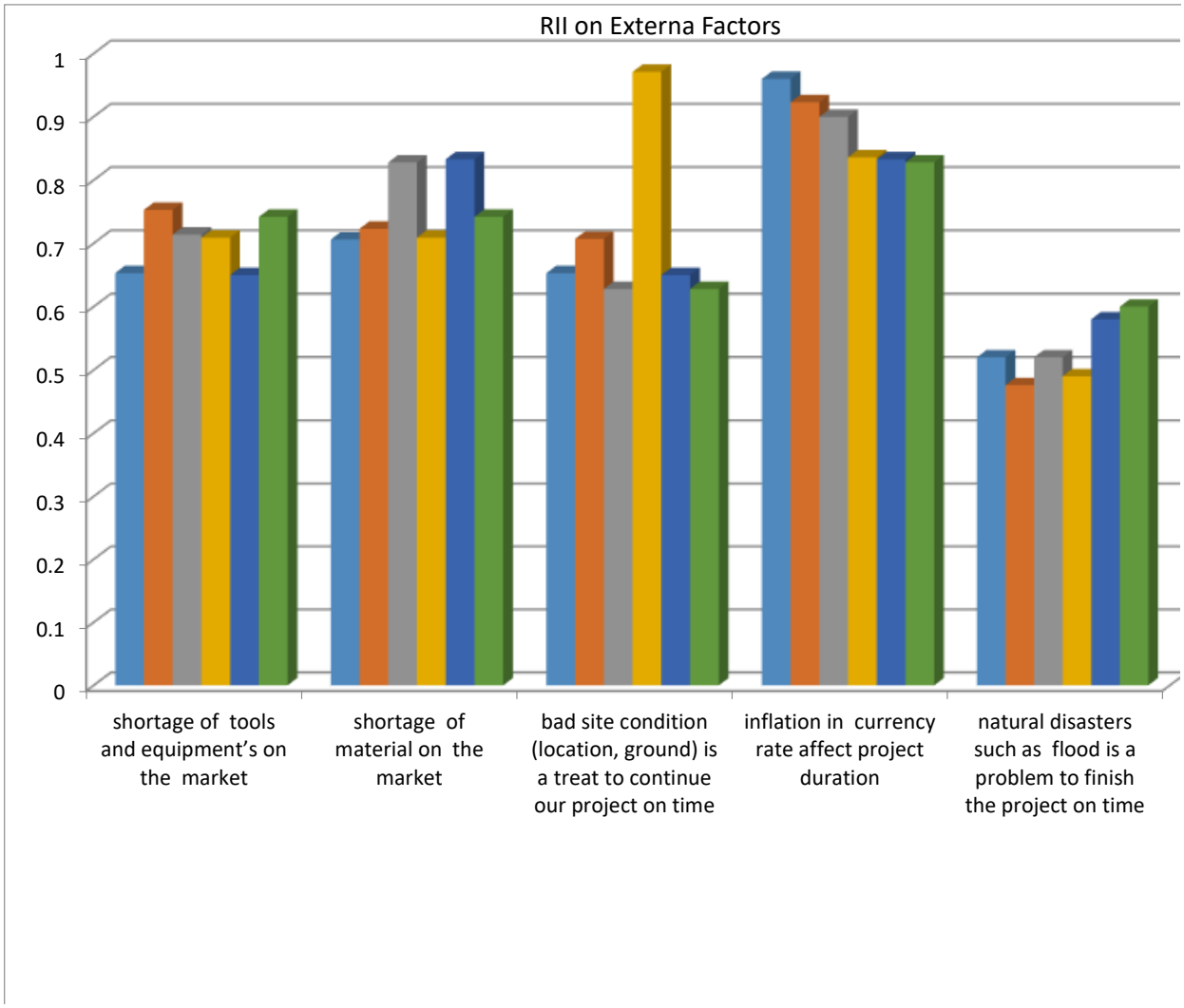
Under the topic, external factor related of construction project delay were ranked according to the contractors, consultants, contract administration team, Audit team, Design team and finance team view respectively and overall scores. The questionnaire included five external factor related of construction project delay factors. The most preferred causes of delay are those with high RII which means greater than or equal to 0.8, RII between 0.6 and 0.8 means preferred (consistent) cause of delay the below Table shows the Importance indices for all the factors within this group.

Table 4.3.6 Importance and ranking of External Factor related

NO	ITEM	N	MEAN	STD	RII	RANK	AVERALL RANK
1	shortage of tools and equipment's on the market	74	3.47	0.685	0.703	3	21

2	shortage of material on the market	74	3.74	0.74	0.759	2	13
3	bad site condition (location, ground) is a treat to continue our project on time	74	3.28	0.65	0.665	4	22
4	inflation in currency rate affect project duration	74	4.404	0.87	0.893	1	1
5	natural disasters such as flood is a problem to finish the project on time	74	2.584	0.543	0.524	5	23

Source own survey questionnaire, Jan 2022



Determined by the overall relative importance index value inflation in currency rate affect project duration with high RII value of 0.893 is most preferred external factor related of

construction project delay and shortage of material on the market (RII=0.759) bad site condition (location, ground) is a treat to continue our project on time (RII=0.7061) and shortage of tools and equipment's on the market (RII= 0.703) are sequentially preferred as a factors that affect construction project delay in AKSCCO.

Top Three Factor Leading to Construction Project Delay

Factor Leading to Construction Project Delay	Factor Categories	Mean	STD	RII	Rank
inflation in currency rate affect project duration	External factor	4.404	0.87	0.893	1st
Payment is not provided on time for contractors	Client	4.255	0.84	0.851	2nd
Design change is one of the threat on finishing the project on time	Client	4.25	0.84	0.849	3rd

Source own survey questionnaire, Jan 2022

4.4 Discussion of Top Factor Leading to Construction Project Delay

Brief discussion on the critical factors that leads to construction project delays in Addis Ketema Sub city in the descending ranking order.

Factors that leads to construction project delays that can be classified as most common factors are inflation in currency rate (RII=0.892), payment is not provided on time for contractors and consultants (RII=0.851), design change (RII=0.849), conflict of the drawing and specification (RII=0.846) mistakes and delay in producing design documents (RII=0.832) and small number of architect and structural designer (RII= 0.808).

Inflation in currency rate (RII=0.892),

Construction and engineering services play an important role in the economic upswing of the world, generating job opportunities for millions of workers. The construction industry employed 7,505,000 workers in July 2019 and projected a rise of 864,700 new jobs by 2026, with an

approximate growth rate of 12%. Doyle A. Construction careers: options, job titles, and description Retrieved From, 2019

Inflation in currency rate affects not only construction sector but also the health sector, financial sector and other sectors. In this research it is indicated that inflation in currency rate is the most preferable factor that lead to construction delay in Addis Ketema Sub City Construction Office. Most contractors and consultants says that "material cost increase daily because of inflation in currency, as material increases labor and equipment, machinery and many things also increase, for this reason it is difficult to do their work without rate improvement so this make them not to perform their work at the given time."

Payment is not provided on time for contractors and consultants (RII=0.851)

The issue of delayed payment in the construction industry is a global phenomenon (Hasmori,Ismail & Said, 2012). The construction industry especially construction contractors suffers from delayed payment that affect time, cost and cause termination and claim and disputes between each other. This variable is preferred as the second most factor that leads to construction delay in Addis Ketema Sub City Construction Office. All department team and contractor & consultant agreed on payment is not provided on time and this cause the project to be delayed because of shortage of budget.

Design change (RII=0.849)

A design change is defined as any change in the design or construction of a project after the contract is awarded and signed. Such changes are related not only to matters in accordance with the provision of the contract but also changes to the work conditions (Burati et al., 1992). Similarly, Akinsola et al. (1997) noted that these changes are any additions, omissions or adjustments made to the original scope of work after a contract is awarded. It may cause an adjustment to the contract price or contract time, and it occurs regularly on construction projects (Ibbs, 2012).

Han, sangwon, et al., (2013) concluded that design error has led to some reworks in construction projects and resulted in to 5% to 20% increase in the project. Addis Ketema Sub City Construction Office Projects are suffering from the dilemma of cost overrun, schedule delays and loss of productivity due to changes in design at later stage. This design change may happen

because of client unstable desire, unexpected site condition and mistakes while designing so these design related rework generate delay to the project.

Conflict of the drawing and specification (RII=0.846)

In Addis Ketema Sub City Construction Office drawing and Specification is prepared By Different Person. Most of the time insufficient communication between them makes to happen conflict of the drawing and specification. After the project is started this conflict brings dilemma and disagreement between contractor and client and takes time to resolve it. So this also leads to construction project delay in the office.

Mistakes and delay in producing design documents (RII=0.832)

Errors in the preparation of designs, in both the construction design and the detailed design, are inseparable part of preparing a construction investment and, unfortunately, they tend to occur frequently. A simple definition of design error is "a deviation from the plans and specifications". (Suther, 1998). In Addis Ketema Sub City the main cause for mistake and delay in producing design document is, lack of time to prepare a high quality document, this will have discussed later and small number of Architect and structural designer is also the reason as discussed above.

Small number of architect and structural designer (RII= 0.808)

Small number of Architects and structure lead to design error because work is overloaded on them.

Factors that leads to construction project delays that can be classified as preferred factors are Sufficient time is not provided for Designing (RII= 0.789), Salary do not satisfy the officer (RII= 0.778), consultants are weak at making decisions (RII= 0.773), Consultant is not well experienced in analyzing and doing the (RII= 0.770),Stakeholders are not actively involved in designing stage (RII= 0.768), poor supervision and controlling the site (RII= 0.765), shortage of material on the market (RII= 0.759), low skills of manpower (RII= 0.754), Late deliveries of materials and equipment (RII= 0.732), Payment delays in finance office due to the officers want bribe (RII= 0.716 Long period for approval of tests and inspections (RII= 0.714), Payment delays in finance office due to work load (RII= 0.711),There is improper site management by contractor (RII= 0.708), contractors do not use and apply time schedule for their work (RII=

0.703 shortage of tools and equipment's on the market (RII= 0.703), bad site condition (location, ground) is a treat to continue our (RII= 0.665).

Sufficient time is not provided for Designing (RII= 0.789)

In Addis Ketema Sub City Construction office however, the number of these officers is small and is work is overloaded on them sufficient Time is not provided of Architect and Structural Designer. In addition to this work overload, insufficient time given to complete the design is the reason for mistaken design production which leads to latter Design modification and takes time to correct.

Salary do not satisfy the officer (RII= 0.778)

Argument found in the literature is that there is a greater public tolerance for corrupt practices when civil servants' incomes are insufficient for living and their relative level are low or perceived as unfair in comparison to private sector salaries. Informal payments are perceived as a subsistence strategy that compensate for inequitable working conditions and economic hardships make it less reprehensible to demand or accept bribes for poorly paid staff as a survival coping strategy. This leads to corruption and bad bureaucracy in the office which is the cause for project delay.

Consultants are weak at making decisions (RII= 0.773)

Need to look for an appropriate solution arises whenever the guidelines are not coherent, the criteria for an evaluation of alternatives escape easy comparisons, or when too many goals have been defined and it is difficult to decide which are priority ones. (Hayes, 1993.)

According to definitions quoted by many (Faber, & Rackwitz 2004, Książek, & Nowak 2011) a decision is a choice of one option among available alternatives. If there is no alternative, there is no choice either.

In Addis Ketema Sub City Consultants are weak and afraid of making decision by themselves because of small experience, Government Bureaucracy, fearing the responsibility and accountability. the lack of decision making on time leads to happen the project to lag.

Consultant is not well experienced in analysing and doing the project (RII= 0.770)

Consultants manage the Project by application of their Knowledge, Skills, and Experience at various stages. However, consultants have to face various challenges Constructability Issues, Long lead material Issues, Inter Contractor Coordination Issues, Engineering Issues, Safety Issues, etc. These issues could be tackled by a well organised approach of the Consultant. In addition to above Consultancy is effective and efficient only when it is involved in Total Project Life Cycle from Conception to Closeout. Awareness of various Processes involved in Project Management and detail study of multiple constraints of project like Time-Cost-Risk-Scope-Quality-Resource are an integral part of any project management consultancy. In Addis Ketema Sub City Construction Office Consultants are not Experienced and skilled to manage the projects properly because Government focused only on job opportunity for jobless in the country.

Stakeholders are not actively involved in designing stage (RII= 0.768),

According to PMI (2013), stakeholder management in projects includes all the processes required in identifying the people, groups or organizations that may have an impact on or be impacted by the project, analysing their expectations and their impact on the design, and developing appropriate management strategies for their engagement.

From a practical point of view, stakeholder management allows the project leaders to create factors that lead to the effective participation of stakeholders in the project and consequently allow the leaders to reap the benefits of the engagement of the stakeholders with regard to obtaining resources and using their influence Purvis et al., (2014).

In Addis Ketema Sub City Construction Office stakeholders of the Project take part in in designing stage in some Extent but it is not satisfactory, that is why Design change, missed item in specification and other problems that leads to construction project delay happens.

Factors that leads to construction project delays that can be classified as moderately preferred factors are natural disasters such as flood is a problem to finish the project (RII= 0.524), Contractors are not willing to take order (RII=0.495), Shortage of Necessary input for work (computer, printer, paper) (RII=0.462).

Factors that leads to construction project delays that can be classified as almost not preferred factors are Auditing retention can affect the progress of the project (RII=0.346), Auditing final payment can delay the project (RII=0.346).

CHAPTER FIVE

SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATION

In previous chapter, data analysis and interpretation has been presented. In this chapter, major findings are going to be summarized and the subsequent conclusions will be made. Based on the conclusion, recommendations are forwarded in relation to literatures reviewed to better enhance the organizations project success. Therefore, this chapter includes summary of the finding, conclusions and recommendations that would help in solving the occurrence of delay and its effects in the building construction of projects in Addis Ketema Sub City Construction Office.

5.0 Summary of finding

Through this study, the construction industry is still facing the delay in project and this study come out with the causes and effects of the delays. A questionnaire is designed and distributed among the Design team, contractors and consultants, Contract Administration team, Audit team and Finance team at Addis Ketema Sub City Construction Office, This study identified the most common causes of delay in Addis Ketema Sub City Construction Office are inflation in currency rate (1), payment is not provided on time for contractors and consultants (2), design change (3), conflict of the drawing and specification (4) mistakes and delay in producing design documents (5) and small number of architect and structural designer (6).

This study also comes out with the most common effects of construction delay which is (1) time Overrun and (2) cost overrun.

5.1 Conclusion

Project delay is still happening and will continue to happen in the construction for various reasons. Delays are inevitable; however, they can be avoided or minimized when their causes are effectively identified and analysed. The objective of this research was to identify the factors that lead to construction delay in Addis Ketema Sub City Construction Office. A literature review and stakeholder interviews were conducted to identify the factors of delay.

5.2 Recommendations

Building construction project will be successful when the construction project activities are done by proper planning and scheduling, within the allocated budget and specified quality, under specified timeframe and by the satisfaction of the stakeholders. Delays are a part of the construction projects, however, they can be avoided or minimized when their causes are effectively identified and analysed. Based on the above mentioned results and findings of this study, the following points can be recommended as ways to minimized and control delay in construction projects at Addis Ketema Sub City Construction Office.

For Design Team

This team should give high attention for Designing work because as previously mentioned design change is the most preferred factor of construction project delay in the office in category of design team related factor so avoiding mistakes, giving sufficient time for architecture and structural designers and in order to minimize work load increasing number of architect and structural designer is the solution.

For Addis Ketema Sub City Construction Office

Budget related factors are highly related with the government official appointed by government to inform and pressure to sufficient budget is provided and Payment is provided on time for contractors and consultant and to increase Salary of the officer to avoid corruption in the office. The office should not give attention only to job Opportunity but also take to consideration to consultant's experience and skill

For contractors

Contractor should avoid to be careless and improper site management because these carelessness lead to project delay and termination. Time and work schedule must be applied by contractors for their work to evaluate themselves.

For consultants

Consultants have to improve their confidence at making decisions, skills and supervise and control their site frequently.

Finance Team

Finance team should have also increase number of officers to decrease workload in the team and to release payments early as soon as possible.

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APPENDIX 1

DEPARTMENT OF PROJECT MANAGMENT

The purpose of this questionnaire is to collect data for the research on the Factors Leading to Construction Project Delays in Addis Ketema sub City Government Construction Office. The research out comes are important for Addis Ketema sub City construction Office and also for Addis Ababa Construction Office which is the head of all sub city Construction Office with the same structure. Your Genuine and honest response is very important for the success of the research and the researcher would like to thank you for your cooperation in advance.

Note: for any clarification or question please don't hesitate to contact the researcher through the following Address

- Name: Hawi Mekonnen
- Mobile Number 0986589797
- Email Address : hawimekonnen9797jm@gmail.com

Thank you in advance, for your time.

General Instruction

- No need to write your name
- Your response confidentiality is maintained
- Instruction for each part of the questionnaire is given at the beginning of the questions
- Please mark by "√" "

PART ONE: GENERAL QUESTION

1. **Gender**

   1/ Male □ 2/Female □

2. **Age**

   1/18-30 □ 3/41-50 □

   2/31-40 □ 4/Above 50 □

   3. Educational Background

   1/ high school Graduate □ 2/ Diploma Holder □

3/ TEVT □ 4/ Bachelor's Degree Holder □

5/Master's Degree and above

4. Work division

1/ Contractor □ 2/ Consultant □

3/ Contract Administrator Team □ 4/ Auditor Team □

5/Design Team □ 6/ Finance Team □

5. Work Experience

1/ 0 up to 2 years □ 2/2 up to 4 years □

3/ 4 up to 6 years □ 4/ 6 up to 8 years □

5/ above 8 years □

PART TWO: Factors Leading to Construction Project Delays

Questions specific to Factors Leading to Construction Project Delays in Addis Ketema sub City Government Construction Office

Listed below are a series of statements that represent the Factors Leading to Construction Project Delays in Addis Ketema sub City Government Construction Office with respect to your own feeling about construction project delay in Addis Ketema sub city construction office please indicate the degree of agreement or disagreement with each statement by putting a tick mark (√) on one of the five alternatives. Response are measured on 5- point scales with the following verbal anchors (5), Strongly Agree (4), Agree (3), neutral (2), Disagree (1), Strongly Disagree.

	5	4	3	2	1
CLINET RELATED FACTOR					
• **Design team Related factor**					
There is Small No. of Architect and structural designer					
Sufficient time is not provided for Designing					
Stakeholders are not actively involved in designing stage					
Design change is one of the threat on finishing the project on time					
There is Mistakes and delay in producing design document					
Conflicts of the drawing and specification					
• **Budget Related factor**					

Shortage of Necessary input for work(computer, printer, paper)					
Salary do not satisfy the officer					
Payment is not provided on time for contractors					
• **Finance team Related factor**					
Payment delays in finance office due to work load					
Payment delays in finance office due to the officers want bribe					
• **Audit team related factors**					
Auditing final payment can delay the project					
Auditing retention can affect the progress of the project					
CONTRACTOR RELATED FACTOR					
There is improper site management by contractor					
contractors do not use and apply time schedule for their work					
Contractors are not willing to take order					
Late deliveries of materials and equipment					
CONSULTANT RELATED FACTOR					
Consultant is not well experienced in analysing and doing the project					
low skills of manpower of consultant					
consultants are weak at making decisions					
poor supervision and controlling the site					
Long period for approval of tests and inspections					
External Factors related					
shortage of tools and equipment's on the market					
shortage of material on the market					
bad site condition (location, ground) is a treat to continue our project on time					
inflation in currency rate affect project duration					

natural disasters such as flood is a problem to finish the project on time					

PART FOUR: OPEN ENDED QUESTION

1. How do we can handle a delay in construction projects in Addis Ketema sub city construction office?_____

_____

_____

_____

_____

APPENDIX 2

Ranking delay factors by RII value	
RII	**FACTORS**
0.893	inflation in currency rate affect project duration
0.851	Payment is not provided on time for contractors
0.849	Design change is one of the threat on finishing the project on time
0.846	Conflicts of the drawing and specification
0.832	There is Mistakes and delay in producing design document
0.808	There is Small No. of Architect and structural designer
0.789	Sufficient time is not provided for Designing
0.778	Salary do not satisfy the officer
0.773	consultants are weak at making decisions
0.77	Consultant is not well experienced in analysing and doing the
0.768	Stakeholders are not actively involved in designing stage
0.765	poor supervision and controlling the site
0.759	shortage of material on the market
0.754	low skills of manpower of consultant
0.732	Late deliveries of materials and equipment
0.716	Payment delays in finance office due to the officers want bribe
0.714	Long period for approval of tests and inspections
0.711	Payment delays in finance office due to work load
0.708	There is improper site management by contractor
0.703	contractors do not use and apply time schedule for their work
0.703	shortage of tools and equipment's on the market
0.665	bad site condition (location, ground) is a treat to continue our
0.524	natural disasters such as flood is a problem to finish the project
0.495	Contractors are not willing to take order

0.462	Shortage of Necessary input for work(computer, printer, paper)
0.4	Auditing retention can affect the progress of the project
0.31	Auditing final payment can delay the project