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**Assessing factors causing construction delay in Addis Ababa housing
development corporation projects, the case of project 12**

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**A Research Project submitted to school of commerce of Addis Ababa
University in partial fulfilment of the requirement for MA degree in
Project Management (MAPM)**

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**ASSESSING FACTORS CAUSING CONSTRUCTION DELAY IN ADDIS ABABA
HOUSING DEVELOPMENT CORPORATION PROJECTS, THE CASE OF
PROJECT 12**

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STATEMENT OF DECLARATION

I, the undersigned, hereby declare that this research project entitled “**Assessing factors causing construction delay in Addis Ababa housing development corporation projects, the case of project 12**” is carried out by myself with the close guidance and support of my advisor Dr. Atsede Tesfaye. I have followed all ethical standards while conducting the research and have duly and properly acknowledged all references and sources. The study is original and has not been used as a requirement for partial fulfilment for any sort of educational qualification at this university or any other.

Getahune Anteneh

Signature

Date

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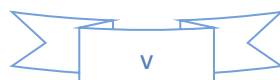
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The moral support from my family and friends will never be forgotten and this work is dedicated to them.

ABSTRACT

The paper assessed significant factors causing delay in the construction of project 12 at Bole Arabsa site. The assessment involved the professionals from the three important major stakeholders in the sector who were involved in the project 12. In conducting the assessment five important sources of delay determinant (independent variables) were identified from previous literatures as **client related, contractor related, consultant related, construction material related** and **construction environment related** to be evaluated for their significance level to cause project delay at project 12. The research adapts descriptive research design and involves mixed research approach to collect data relevant to the paper. The study also considered the project time management system as a confounding variable between the dependent variable (project time performance or project delay) and the independent variables considered in five main categories. The sample for this assessment research was taken from three different population groups which are the client, the contractors and the consultants participating in project 12. Disproportionate stratified sampling was used to select sample representative for each group and purposive non probability sampling to address the selected sample of each group. From 38 lists of factors identified under the main categories of delay causing factors the most significant factor causing delay were identified in terms of their relative importance level evaluated by 18 contractor's representative, 15 client representative and 12 consultant representative professionals. From the study top significant causes of delay within each category were identified and ranked according to the relative importance from combined responses of the stake holders and the perception of each stakeholder towards the most significant important source of delay was identified. The research also identified the significant sources of delay determinant from among the five main categories of delay sources with the degree of their relative importance and the frequencies of factor contributed in the first top ten list. The paper evaluates the project time management practice as confounding variables between the dependent and independent variables and it was found that the poor performance of time management also played a significant role for the delay of the project as it increases the influence of independent variables and also impact project time performance at the same time.

Key Words, Delay Determinant, Dependent Variables, Independent Variable, Time Management, Confounding Variable.



Contents

STATEMENT OF DECLARATION	iii
ACKNOWLEDGMENTS.....	iv
ABSTRACT.....	v
LIST OF TABLES	ix
LIST OF FIGURES.....	ix
LIST OF ABBREVIATIONS	x
CHAPTER ONE	1
1.1 Back ground of the study	1
1.2 Statement of the problem	2
1.3 Research question.....	3
1.4 Objective of the study.....	3
1.4.1 General objective	3
1.4.2 Specific objective	3
1.5 Significance of the study.....	3
1.6 Scope of the study	4
1.7 Limitation of the study.....	4
1.8 Definition of terms.....	4
1.9 Organization of the paper.....	5
CHAPTER TWO	6
2. Literature review	6
2.1 Theoretical review	6
2.1.1 Definition and concept.....	6
2.1.2 Project management and construction project delay	6
2.1.3 Types of delay in construction projects	7
2.2 Previous local studies conducted on construction project delay	9
2.3 Delay determinant factor.....	10
2.3.1 Client related factors.....	11
2.3.2 Project consultant / design team related factors	11
2.3.3 Contractor related factors	12
2.3.4 Construction material related factors.....	12
2.3.5 Construction environment related factors	13
CHAPTER THREE	18
3. Research methodology and methods.....	18

3.1	Introduction	18
3.2	Studying approach	18
3.3	Research design	18
3.4	Source of data	19
3.5	Population of the study.....	19
3.6	Sampling process and sample size.....	19
3.6.1	Determination of sample size	19
3.6.2	Sampling technique.....	20
3.7	Design of research instrument and method.....	21
3.7.1	Questionnaires.....	21
3.7.2	Design of questioners	21
3.7.3	Questionnaire administration.....	21
3.8	Data measurement	22
3.9	Data analysis	22
3.10	Scale Reliability and Validity Measurement.....	23
3.11	Summary of research process.....	23
CHAPTER FOUR		24
4.	Result and discussion	24
4.1	Introduction	24
4.2	Characteristics of respondents	24
4.3	Delay determinant factors	25
4.4	Result Presentation.....	25
4.4.1	Reliability and Validity of data	25
4.4.2	Contractor related factors	25
4.4.3	Client related factors.....	26
4.4.4	Consultant related factors	27
4.4.5	Construction material elated factors	28
4.4.6	Construction environment related factors	29
4.4.7	Most important source of delay determinant	29
4.4.8	Perception of client contractors and consultant towards the Most important source of delay determinant.....	31
4.5	Evaluation of time management practice in AAHDC	33
4.5.1	What kind of method do you use to represent the project planning and scheduling? 34	

4.5.2	How often your project team does formally meets for discussing of monitoring, updating and controlling project progress?.....	34
4.5.3	How often do you coordinate your work schedule with the master schedule of the project?	35
4.5.4	How often do you require the contractor or supplier to submit their detail activity schedule for you in advance to adjust your actual schedule?	35
4.5.5	How do you supply the incentive system to stimulate the construction time?	35
4.5.6	Which software do you apply for planning and scheduling the progress of your project?	36
4.6	Summary Of The Finding.....	37
CHAPTER FIVE		38
5.	Conclusion and Recommendation	38
5.1	Conclusion.....	38
5.2	Recommendation.....	38
References		40
APPENDIXES		43

LIST OF TABLES

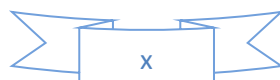
Table 2. 1 selected previous studies on delay determinant.....	13
Table 3. 1, sample size determination adapted from Carvalh.....	20
Table 3. 2, rating scale for factors of project delay determinant	22
Table 4. 1, Demographic information of the respondent in terms of job category, job position and work experience	24
Table 4. 2, Reliability and validity.....	25
Table 4. 3 Relative importance ranks for contractor related factors.....	25
Table 4. 4 Relative importance rank for client related factors.....	26
Table 4. 5 Relative importance rank for consultant related factors	27
Table 4. 6 Relative importance rank for construction material related factors.....	28
Table 4. 7 Relative importance rank for environmental related factors	29
Table 4. 8 top ten important factors causing delay in construction project and responsible source	29
Table 4. 9 Over all perspective towards the most important delay determinant factors in AAHDPO.....	31
Table 4. 10 Usage of planning method	34
Table 4. 11 Frequency of meeting type of project team	34
Table 4. 12 Coordination frequency of current schedule with master schedule.....	35
Table 4. 13 Frequency of coordination with sub-contractors and supplier schedule.....	35
Table 4. 14 Usage of each incentive system	36
Table 4. 15 project progress management software.....	36

LIST OF FIGURES

Figure 3. 1 Rate of response representation graph,.....	22
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LIST OF ABBREVIATIONS

AAHDC	Addis Ababa housing Development Corporation
AAHDPO	Addis Ababa Housing Development Project Office
AARH	Agency for Administration of Rental Houses
AU	African Union
DBB	Design Bid Build
IHDP	Integrated Housing Development Program
KPI	Key Performance Indicator
MoWUD	Ministry Of Works and Urban Development
MS	Microsoft
PM	Project Management
SPSS	Statistical Package For Social Science



CHAPTER ONE

1.1 Back ground of the study

Ethiopia, like other developing nations, is struggling to improve the life of its urban living condition of its people in the whole country and Addis Ababa. As the capital city and home for African major institution (AU) and responsible of handling international conferences, Addis is receiving special attention to bring it up to standards in the continent. Addis Ababa is among the oldest cities to be founded in the history of urbanization, at the age of over 130 years old since its foundation in 1886. The city suffers from severe housing shortage and is characterized by poor housing, infrastructural and neighbourhood conditions. Considering the housing agenda as uppermost of the urban development challenge the city administration initiated a program to build several thousand homes based on the condominium concept for different categories of income groups. The initial target of the program, though, was the low income and lower Middle income groups but it seems that the mission is not to the target. (Sixteen years have passed since the program commenced in 2004. Since mid-1960s, an area that has remained a prime concern of successive governments is the dire situation of urban housing. The conditions of housing in urban Ethiopia today is appalling and - old

Deteriorated/dilapidated buildings, overcrowding, insanitary and unhygienic neighbourhoods is a fairly accurate description of the characteristic appearance of homes in the cities and towns. Historically speaking, the genesis of the problem dates back to the Imperial period during which time settlement development was haphazard and without binding urban plans, when the poor relied on the houses built by the feudal landlords (the ruling elite class) and paid regular rent as tenants. On coming to power in 1974 the Derg regime (the Socialist government) abolished the feudal land ownership and nationalized all urban and rural land. Furthermore, all extra homes and rented houses owned by the elite class were seized through Proclamation No. 47/1975 and transferred to the Kebele2 Administration and Agency for Administration of Rental Houses (AARH) currently known as the housing corporation, with responsibilities to collect rents, renovate the existing stock and build new dwellings to meet future demands. However, the rental amount levied was low and uneconomic so the Agency was unable to repair the existing housing stock, let alone support the construction of new residences and apartments to the near time. Since 2004 the main low-cost urban housing delivery mode has remained the condominium scheme. According to the data presented UN-HABITAT, (2011) the government of Ethiopia was planning to build nearly 400,000 new units of house at the national level through integrated housing development program (IHDP), but as of mid-2010 the government had built a total of 80, 257 units of house in Addis Ababa. Despite that there are other factors for the failure to perform the goal settled in the plan to reach low and middle income groups and also to achieve the scheduled delivery of the project in the program, project performance in general and time performance of the project in particular has its own influence in the case of housing development by the project office. Project performance success is basically measured by the project performance indicators. Researchers in the area indicated that project cost performance, project time performance, project quality performance, client satisfaction, project safety and productivity are among the basic project performance indicators yassin et al,(2019) Adnan et al, (2009) (biyadgligh, (2017) Michael, (2012). Project time performance is one of the basic indicators of project conversion performance success. The failure in project time performance in other term delay in construction project is one of the major issues in the construction industry and a headache to professionals in the sector. Delay as referred in construction is prolonged construction period and disruptions of events that disturb the construction programme Indhu and Ajai, (2014). The problem of delays in construction industry is a global phenomenon and there is

no exception. Time performance is the most important indicator of project performance in construction. yassin et al, (2019) in their studies in Mogadishu construction companies remarked that time is the most important performance measuring factor followed by cost and quality in the construction projects. This study is also supported by (Adnan et al, 2009) in their study conducted at Gaza strip in their study of factors affecting the performance of construction projects. Michael, (2012) in their studies to determine the key performance indicators in DBB projects ascertain that cost and time as the frontline running factors in measuring performance. Therefore if time of a project is one of the critical performance measures in the construction industry, then it would be crucial for project performance success to study factors affecting time performance of construction projects. Therefore if time of a project is one of the critical performance measures in the construction industry, then it would be crucial for project performance success to study factors affecting time performance of construction projects.

1.2 Statement of the problem

In Ethiopia, the present state of the construction industry falls short of meeting domestic and international quality standards and the performance demand expected from the sector MoWUD, (2006). Construction projects have problems with construction techniques and management as well as limitation of funds and time. The critical problems are inability to complete the projects on schedule, low quality work and cost overrun. In general, most (if not all), construction projects experience time overrun and cost overruns during their execution phase Mehdanit. et al, (2020) Tadesse et al, (2016). Many projects in Ethiopia suffered in performance of delivery. Project time performance in particular would have a major impact on construction project as it would lead into the failure of other major success factor of the project like cost overrun and quality failure and client satisfaction. Chaingz, (2019) poor time performance would lead to cost overrun Atkinson,et al., (1997) cited by Takim and Kintoye, (2002: 551) revealed that client will not be satisfied if the product fails to meet their price, time frame and functionality.

Projects can be delayed for a large number of reasons. Ethiopian construction industry is well known for failing to meet the project performance requirement. It doesn't need any scientific proof to conclude that all most all of the construction projects in the country facing fell in performance specially in terms of time performance and project cost performance as it is open fact to anybody in the sector. The reason behind is adhered to a wide range of problems depending on the project characteristics , level of complexity, geographical location of the project, condition of the major project stakeholders and so on. Among many projects under construction housing development project is one of the major development projects that the government of Ethiopia is working on for the last two decades. Addis Ababa housing development program and housing corporations are on the mission on construction of residential housing for different level of income groups in Addis Ababa for the last 20 years amid the success rate of delivery is much below what is planned to accomplish.in regard to time The underperformance of project delivery has been assessed by researchers who are eager to investigate problems responsible for poor performance limitation conducted at different projects administered by the institution. According to the case study conducted by Mehdanit. et al, (2020) a condominium construction at bole arabsa shows a wide variation of schedule between planned and completion time. The study revealed that a g+4 typology and g+7 typology is planned to be complete within 540 and 720 days respectively but actually it

takes 995 extra days at the time of the study and the construction of a g+4 typology took 815 extra days for g+7 at the time of the study on average . As clearly indicated in the study the project status at the time of the study was 83% to 89% completed. Tadesse et al, (2016) also identified that poor time management practice is among the major problem in Ethiopian construction industry. According to Fetene, (2008) Guesh, (2017) Michael, (2017) So many projects under construction under the housing development suffers more than double time overrun with the planned schedule which intern be highly influence the project cost variation and also believed to cause quality compromise than any other factors to be considered in a given construction project. Therefore the main aim of this research was to investigate and define the most critical delay factors in Addis Ababa housing development projects according to professionals working in the major project stakeholders.

1.3 Research question

The paper aimed to address the following research questions.

- ▶ What are the significant factors causing delay in project 12 housing construction?
- ▶ What are the most significant sources of delay factors in project 12 housing construction?
- ▶ What is the perception of major stakeholder’s professionals towards the significant cause of delay in project 12 housing construction?
- ▶ What is the level of time management practice in project 12 housing construction

1.4 Objective of the study

1.4.1 General objective

The general objective of the research was to assess the determinant factors related to clients, contractors, consultants, materials and environmental affecting project time performance at Addis Ababa housing development construction projects.

1.4.2 Specific objective

- ▶ To assess significant factors causing delay in project 12 housing construction.
- ▶ To identify the most significant source of delay causing factors in project 12 housing construction.
- ▶ To assess the perception of professionals in the project towards significant cause of delay in project 12 housing construction
- ▶ To assess time management practice in project 12 housing construction.

1.5 Significance of the study

The purpose of this study was to identify the most significant delay determinant factors from the perspective of project owners (Addis Ababa housing project development agency), contractors and consultants participating in the construction of projects under the agency. The paper plays its own roles for further study in the area for researchers who are eager to conduct further investigation on the issue. On the other hand the finding and recommendation of this research is used for those concerned bodies to find out more effective solutions to respond in controlling the impact of delay causing factors on the

project time performance. It is hoped that the paper gives awareness on the significant delay causing factors and initiated the professionals working in the stakeholders currently working on the project to undertake deep analysis and researches in responding to the problem of project delay causing factors to develop sound solution in managing the influence. Specifically the study is used for AAHPC as one of the basic source for analysing and respond to delay causing factors in the future project. It also used as a reference for future researches studying the subject matter.

1.6 Scope of the study

Even though the construction of condominium is taking place intensively in the country exclusively in Addis Ababa, the paper was limited to a specific project under way at bole arabsa site which is the construction of 20/80 condominium under the investigation of Addis Ababa housing development project office, project 12. The study focuses on identifying delay determinant factors and evaluates the level of their significance from client (AAHDCP), contractor and consultant perspective in the case of project 12 condominium construction of 20/80.

1.7 Limitation of the study

The paper work was limited to this specific project to accommodate with the time frame and manageable cost to deliver the project work. Also the finding of study is not confidentially generalizable to the whole construction projects in the country for the fact that working culture and methodology in Addis Ababa housing project is different from the usual construction projects in the country. The quality of the paper is also limited to the working experience of the participant of the study and due to cost and time constraint small sample size was taken.

1.8 Definition of terms

Client related delay; delay caused due to the failure of the project owner to fulfil the responsibility by his side which inhabit the time performance of the project.

Contractor related delay; factors causing delay in which the contractor of the project is considered as the source.

Consultant related delay; when delay factors are caused because of the consultant of the project they are termed as consultant related.

Delay; draw back in time due to the failure in performance because of different factors.

Delay determinant; all of the factors which negatively affecting the project time performance in construction.

Environmental related delay; factors causing delay which occurred from the construction surrounding and external to the control of the stake holders.

Material related delay; factors causing delay because of the construction material in a given project.

Time management; controlling the project time by applying the necessary tools techniques and management system to maintain project time performance to the planned schedule or for better achievement of project time performance.

1.9 Organization of the paper

This study is organized into five chapters. the first chapter deals with introduction part reflecting on the background of study, statement of the problem, objectives of the study, research question, significance of the research, scope of the study, limitation of the study, definition of terms and organization of the paper. The second chapter deals with related review of literature relevant to this study in this chapter the theoretical empirical and conceptual frame work of the paper has been carefully assessed and presented. The third chapter discusses the research methodology and methods of conducting the study presented. The collected data from the subject of the study are carefully analysed and interpreted under the fourth chapter. The fifth chapter presents summary, conclusions and recommendations on the findings of the study. Reference and appendix which include questionnaire are also being part of this study paper.

CHAPTER TWO

2. Literature review

This section reviews the literature that is already in existence concerning the factors leading to delay in construction projects in the world and Ethiopia with specific accent on the construction projects. It presents an overview of previous work on related topics that provide the essential background for the purpose of this research. It further organizes the work into various topics and sub-topics under theoretical review and empirical review that are strongly guided by the six objectives of the research.

2.1 Theoretical review

2.1.1 Definition and concept

Delay is one of the major problems in construction industry. A construction delay is a time over run beyond the time specified and agreed to between the parties or stakeholders of a given project. To minimize the effect of delay on other important parameters of a given construction it needs to know the causes of delay and analyse it carefully. Construction delay is mostly observed in project undertaking in developing countries. The construction industry plays a major role in the economy due to its contribution in creating the job opportunity and helps to develop wealth. Construction delay is something that cannot be avoided but can be minimized with the scientific study to manage the influence it will impose in the sector. Project time is one of the basic issues in construction because time is one of the measures of project performance as performance indicator identified in the frontline. Cheung et al, (2004) remarked seven main key indicators for performance which are: - time, cost, quality, client satisfaction, client changes, business performance, and safety and health.

2.1.2 Project management and construction project delay

Project management and project performance are two faces of the same coin, implies that this two concepts are very closely related. Actually project management is one of the basic tools that will determine project performance in the construction industry. Therefore as time is one of the key indicators of project performance success, construction project management and delay (project time performance failure) are quite related issues in the sector of this industry. According to N. hamzah. et al, (2011) the improvement of delay factors are not limited to technical factors but also highly dependent on project management. N. hamzah. et al, (2011) assures in their conclusion that project management has to be work out from the perspective of both process involved and human activity in the project implementation. (A. abdukkadir 2019), remarked that the project managers should be aware of all factors that can threaten the successful implementation of the project through proper project management system to ensure that adequate performance reporting is carried out at all stages. This ensures that problems can be identified quickly and measures taken to mitigate them. C. Ahabab, (2012), in his research thesis concluded that Management plays a big role in construction projects time performance. He underlined the effect of management failure is a big problem to enhance project time performance by applying important project management tools like MS and primavera in his research investigation in selected construction project in turkey and Iran.O.Emanuel et al, (2017) on their studies conducted on factors affecting contractors performance revealed that project management related are among three frontline factors. Obodoh.D and C. obodoh (2016) remarked the Improvement of contractors' managerial skills by continuous working training programs for personnel in the industry to update their knowledge and be familiar with project management techniques and processes will have an

influential impact on project time performance. Construction management is one of the important issues in the Ethiopian construction projects nevertheless no due attention is given to assess and improve as much as it requires. W. koshe k.n. jha, (2016) remarked that lack of professionals in construction project management in most of the contractor organization is among the major lists in causing delay in the construction industry of Ethiopia. They assure that the education system is not delivering the required specialists in project and contract management. tadesse et. al, (2016) conducted an assessment on the performance and challenges of Ethiopian construction industry initiated by poor performance of project management in Africa compared to the western and northern in the research report of the previous studies. The finding revealed that the level of construction project management practice in terms of adapting general project management procedure, project management functions, tools and techniques has been unsatisfactory. The researchers also underlines that time management practice was at the lowest point of performance.

2.1.3 Types of delay in construction projects

2.1.3.1 Delay classification

Delay in construction can be categorized into different entities with the following important parameters to define and describe it in the construction industry.

2.1.3.1.1 According to source of delay

2.1.3.1.1.1 Internal

Delays that are caused due to the fault of any or all of the project stakeholders are taken as internal sources of delay. Such types of delays are in the control of the control of the stakeholders if they are actively performed their responsibility in the project execution. Any performance failure from the client, the contractor, the consultant and design team or any non-contractual stakeholders who can manage to influence the project time performance are responsible for creating internal cause of delay to the project.

2.1.3.1.1.2 External

External factors are those factors caused out of the control of all the major stakeholders of the project. External factors causing delays in construction project includes weather condition, regulatory changes by public bodies and change in building codes, problems with neighbours and unforeseen ground condition. Long et al, (2004) as cited by Bayafers, (2018) remarked that factors external to the project are among the major delay causing factor in the construction industry.

2.1.3.1.2 According to how they operate contractually to compensate;

According to Ahmed et. al, (2003) as cited by Wa'el et.al, (2007), delay can be grouped into the following from contractual point of view.

2.1.3.1.2.1 Non-excusable delays

Non-excusable delays are delays, which the contractor either causes or assumes the risk. Non excusable delay is caused due to the fault of the contractor which may result from the under performance of the main contractor itself, the subcontractor appointed by the contractor or the supplier. Wa'el et al, (2007) Zaki.M.K and James E.D, (1987) Werku. Kand K.N jha, (2016). In the case of non-excusable delay the contractor might granted compensation from

subcontractors and suppliers but not from the owner (Alaghbari, 2005) as cited by Wa'el et al (2007) contractor is responsible for non- excusable delay.

2.1.3.1.2.2 Excusable non-compensable delays

Excusable delays, also known as “force majeure” delays, are the third general category of delay. These delays are commonly called “acts of God” because they are not the responsibility or fault of any particular party. Excusable without compensable delays are delays caused by factors that are not foreseeable, beyond the contractor’s reasonable control and not attributable to the contractor’s fault or negligence

2.1.3.1.2.3 Excusable compensable delays

According to Wa'el et al, (2007) Compensable delays are those that are generally caused by the owner or its agents. The most common form of compensable delay is inadequate drawings and specifications, but compensable delays can also arise from the owner’s failure to respond in a timely fashion to requests for information or shop drawings, owner’s changes in design or materials, and owner’s disruption and/or change in the sequence of the work. According to Alaghbari, (2005) as cited by Alahghbari et al (2007: 195) The contractor is entitled to both additional money and additional time resulting from compensable delays .Generally, a delay is deemed compensable if the cause of the fault to performance failure is due to the client of the project Sweet (1977) as cited by Alahghbari et al (2007:195). These delays can occur under different situations. They can be caused by the owner's failure to furnish the site to the contractor by an agreed date, faulty design, or incomplete drawings and specifications Sweet (1977) as cited by Zaki.M.K and James.E.D, (1987:592). For this type of delays, the contractor is entitled to a time extension and Damages for extra costs associated with the delay Lee (1983). However, the contractor must demonstrate that the delay was "unreasonable" and prove the extent of the additional expense involved Clough (1975). The issue of owner-caused delay are as common in contract language as "No Damage" clauses. Such clauses attempt to place the entire risk for delay damages upon the contractor and to limit the contractor to time extension. Such clauses, which usually come under the heading of exculpatory, are enforced in some jurisdictions.

2.1.3.1.2.4 Concurrent delays

A concurrent delay happens when both owner and the contractor are accountable for the delay. Delay or allowance of time: the contractor will be accountable for damages if the actual completion date of the works occurs after the agreed completion date unless the delay is caused by a matter for which an extension of time is available and the contractor complies with the notice and other requirements under the contract. According to Alaghbari, (2005) as cited by Wa'el et al, (2007) if the cause of delay is because of one single factor and one responsible party among the stake holders then it will be easy to calculate both time and money for the liquidated damage and to manage the conflict of interest among the contracting parties. A more complicated – but also more typical – situation is one in which more than one factor delays the project at the same time or in overlapping periods of time. These are called concurrent delays.

2.1.3.1.3 According to responsible stakeholders

2.1.3.1.3.1 Client related

Delays are caused by the client’s actions emanating from his need or inactions contrary to provisions stipulated in the contract. Examples include late payment to the contractor, change

order, differing site condition, interference, late decision making, etc. In this case, the contractor will be entitled to claim for time extension and financial compensation

2.1.3.1.3.2 Contractor related

Delays are also caused by the contractor's non-performance of activities due to his own problem or problems within his control which finally result in time overrun and cost overrun. Examples include inadequate experience, poor site management, problems related to subcontractors and suppliers, shortage of material, labour and finance, improper project planning, mistakes during construction, etc. In this case, the contractor will not be entitled to time extension and financial compensation, rather pay liquidated damage or actual damage to the client.

2.1.3.1.3.3 Consultant related

In fact, delays may result from consultant problems, which include design errors, late approval of tests and drawings, poor project administration etc. In this case, the contractor will be entitled to claim for time extension or/and financial compensation whereas the client will not be entitled to claim for liquidated damage as the consultant is the representative and within control of the client.

2.1.3.1.3.4 Force majeure

Delays are caused by force majeure, which are beyond the control and without the fault of the client or the contractor. Examples include the unforeseeable act of a third party for whom the contractor is not responsible, an official prohibition preventing the performance of the contract, a natural catastrophe such as an earthquake, lightning or flood, international or civil war and the death or a serious accident or unexpected serious illness of the contractor. In this case, the contractor shall not be entitled to financial compensation, but extension of time to complete the project. In addition, the contractor shall not pay liquidated damage to the client. With a critical path network, it is possible to determine reimbursement in time, and to some degree in cost, for the delays rising from a consequence. In fact, delays can be caused by several parties, contracting parties, or others; consequently, the effects and remedies vary from case to case. Concurrent delays are two or more delays occurring at the same time and have always been difficult to resolve. According Zaki and James, (1987) Delays can be classified according to liability by three major types: (1) Compensable; (2) excusable; and (3) no excusable. Construction delays are normally caused by either the contractual parties such as client, contractor and consultant or factors beyond the control of the parties or force majeure.

2.2 Previous local studies conducted on construction project delay

Even though not much has been done in research work on the construction delay in Ethiopia there is a progressive activity in the subject matter recently. Most of the study related to the construction performance is conducted by students who are doing their research to fulfil the requirement of their academic task. But it is believed that in order to improve the construction industry of the country a significant research studies, journals and articles has to be done with professionals in the sector. biyadgign, (2017) Research and studies in this field in Ethiopia are few compared to the problem of time and cost overrun. Starting from the last 2 decades

the impact of construction sector in all circumstances of the country is increasing rapidly. Therefore continuous assessment of the sector to improve in all aspects of its influence has to be given attention. Intensive research studies has to be conducted to increase the efficiency of project management which plays a vital role to increase project quality output, to maximize project performance success in terms of the time and cost overrun, client satisfaction and all other performance measurement parameters. In the review of literatures written on the local construction sector related to the project performance has been assessed and presented in this paper to understand the level of construction problem analysis and the possible solutions recommended from the previous research studies. Fetene, (2008), werku and jha, (2016) remarked that construction delay is common problem in construction projects in Ethiopia. The researchers also ascertain that if delay causing problems are identified and corrective project management decision is not taken in time project may incur extra cost. weku and jha, (2016) identified difficulties in financing projects by contractor, escalation of material price, fetene, (2008) ineffective project planning as the main and critical factors causing project delay in Ethiopian construction industry. (Guesh,2017) in his assessment study of condominium housing project found out that contractors main problem is lack of experience and technical profession leading into project delay in time and cost escalation. guesh, (2017) also revealed that factors related to the main project stakeholders which are client, contractor and consultant were the top five delay causing factors. Adem, (2018) studied cause of delay in construction projects in private real estate and identifies the top 10 delay causing factors. According to his finding owners interference, frequent change order, long waiting time of test approval, shortage of construction material, mistake in design document, inappropriate organizational structure, discrepancy in design document, discrepancy in contract document, subcontractors defect and lack of communication in the order of significance level. (Michael, 2017) studied cause of condominium housing construction projects delay and effects at arabsa site in Addis Ababa considering 7 dimensions of measurement as client related, contractor related, consultant related, material related, equipment related, labour related and external factors and revealed that client and contractor related factors are the major cause of delay. He also identified that time and cost overrun is the major effects identified. Tadesse et al, (2016) conducted a sound research study to assess project management practice in the construction industry of Ethiopia, in which they remarked that the time management practice to enhance the project time performance was very poor. The study revealed that delay management practice is among three major shortcomings in the construction industry of Ethiopia in line with safety and risk management practices.

2.3 Delay determinant factor

Time for performance of a project is usually a primarily important consideration for the owner and the contractor. Frequently, the most worrying construction disputes involve delays and failure to complete the work in a timely manner. According to Ayman, (2000) performance period or time of project execution is the vital component prior to any other project performance measuring instrument. Time extension or delay in construction is a common problem in most projects.

Delay can be described as one of the most important issues of a project success. In spite of its proven significance, it is common to see public sector construction projects failing to attain its objectives within the definite time. To this effect, several past studies have acknowledged typical determinants of delay in the public sector construction projects. Ahmed et al (2003) and Alaghbari (2005) as cited by Wa'el et al (2007) conducting their studies in construction projects in Malaysia under the variables of contractor responsibility, consultant responsibility, owners responsibility and environmental factors. Mesfin. H (2019) in his thesis research study of factors affecting construction project performance in the case of save the children identified 7 independent variables which are project characteristics related, labour and material related, contractual relationship related, project procedure related, external environment, client related and contractor related factors. Nevertheless, the focus of this study will be on such determinants, which are very common in various construction projects and believed to be the major cause of delay in the case of Addis Ababa housing development projects. These are client related factors, project consultant related, contractor related, construction material, and environmental related factors.

2.3.1 Client related factors

Client related factors among the influential factor that affecting project time performance in the construction industry especially in the developing countries. This fact is supported literatures previously conducted in construction projects. Obodoh and Chikasi,(2016) in their study of the cause and effect of construction project delay in Nigerian construction industry identified 57 factors causing delay and the result of their analysis of the most significant factor as a cause of delay was monthly payment difficulty is 3rd and change order 4th from the client related lists of factors. Wa'el et al (2007) in their studies of the significant factors causing delay of building construction projects in Malaysia identifies top ten factors out of 31 lists of factors under four categories which are contractor related, consultant related, owners related and external related. From the result of their analysis they found that financial difficulties and economic problems rank 1st and delay in decision making ranks 8th from client related cause of delay in construction projects in Malaysia. shabab and sadique , (2016) client relate factors like slow decision making process, delay in payment to the contractor change order by owners are the most significant factors in determining project time performance.

2.3.2 Project consultant / design team related factors

Project consultants or design team are also responsible for many factors that cause construction time performance defect. Number of literatures from previous studies supports this hypothesis. shabab and sadique, (2016) in their research study of delay factors in construction projects in Saudi Arabia remarked that project consultant related factors are among the major delay causing factors in the construction projects. According to their research finding, from 20 hypothesised factors causing construction delay approval of test samples of materials, approval of drawing and change orders are on the top list in terms of significance in affecting project time performance. Mohan and Daniel, (1998) in their analysis of relative importance of delay causing factors in building construction works in hong kong to identify contributors to construction delay ascertain that delay in design

information is among in the list of top ten factors. The researchers also remarked that design team related factors in the is the 3rd important factor following project related and client related delay causing factors from 8 categories of delay causing factors hypothesised for their study. Ayman, (2000) found that 106 projects suffered time over run out of 130 samples considered in the study, which counts 81.5% of the total project. From the result of his quantitative analysis the main cause of delay were poor design and change orders.

2.3.3 Contractor related factors

Factors related to construction contractors are caused die to the failure of the contractor. Contractor related factors are very important in deciding construction project performance. The significance of these factors in terms of the impact of influence is variable from one another as revealed from literatures. Most of the studies in the subject matter considered contractor related factors as the most important dimension to cause delay in the construction industry. From the literature review among a number of factors related to contractor causing delay in construction just a few are:- contractor performance, contractor experience, contractor financial capacity, work methodology and technology adapted, management capacity, quality of personals, communication capacity are some. Ubaid (1991) as cited by shabab and sadique (2016:88) remarked that the performance of contractors is the major cause of delay in construction projects. Shabab and Sadique, (2016) also ascertain that the impact of contractors to manage construction delay extremely significant. According to their research finding number of workers available for the project, contractor relationship with suppliers, communication status with other project stakeholders in the list of top causes of construction project delay from the perspective of project managers. Kumaraswamy and chan,(1996) in their survey study of contributors to construction delay remarked that productivity improvement through enhancing adaptive construction methodology and technology, maintain organized and well managed staff are most significant factors to avoid construction delay. Salleh, (2009) identified from 7 important top factors affecting project performance in gaza strip availability of personals with high experience and qualification is the fifth most significant factor. sibiya, (2015) remarked that management skill of project manager and experience of the contractor are decisive factors in the construction industry of south Africa. Kumaraswamy and Chan, (1996) found that poor site management, unforeseen ground conditions and low speed of decision making involving all project teams are the three most significant factors causing delays and problems of time performance in local building works. Chaingz, (2019) Helen and oyewale, (2016) dele and Anthony, (2015) remarked that the prominent factor causing delay in construction are related to contractors and client of the project.

2.3.4 Construction material related factors

Factors related to construction materials are one of the decisive dimensions of project time performance in the construction industry. From review of literatures it is revealed that among the significant factors noted on the top list factors those related to construction material are also influential cause of delay. Shaba and sadique, (2016) salleh, (2009) kumaraswamy and chan, (1996) remarked material price escalation is a major factor of delay causing in construction. Helen and oyewale, (2016) stated that escalation in material price would affect client and contractor performance which leads to finishing the project with poor output. Chaingz, (2019) investigating factors causing cost and time overrun and found out that unavailability of required materials in the local market on time is in the list of top ten causes of project delay

Enshassi et al, (2009) discovered in her study that top factors that influenced on delay and cost overruns included on increment in material prices due to continuous delay in construction fluctuation in cost of construction materials unsettlement of local currency in relation to dollar value, funds and associated auxiliaries not ready, lack of finance planning and monitoring during pre-test and post contract stages culminating into inaccurate construction project take-off. According to a study done by Kombo, (2006) on delay an cost overruns in public sector construction projects in Kenya, it was found out that construction works in the public sector projects depends mainly on equipment, plants and materials whose unavailability may cause project delay and increase in cost overruns without effective and efficient procurement procedures. Michael, (2017) studied cause of condominium housing delay and ascertain that construction material related factors were significantly influencing project time performance.

2.3.5 Construction environment related factors

Environment is another source of problem in the construction sector in project implementation. Construction environment is basically defined as the surrounding palace in which the construction project is under implementation. almonani, (2000) and koushki, (2005) in Jordan and Kuwait as cited by shabab and sadique, (2016:92) respectively remarked that weather condition of construction environment is one of the list of top 5 causes of delay from the finding of their research. kumaraswamy and chan, (1996) studied 8 categories of delay determinant factors from the perspective of three main stakeholders in the construction project and remarked that according to client, contractor and consultant ranked 5th, 6th and 2nd respective to each of the stakeholders in terms of the determining impact on construction delay.

Selected previous studies dealing with delay determinant time performance influencing factors) are summarized in table below

Table 2. 1 selected previous studies on delay determinant.

Item No	Researchers'	Dimensions considered in the study	No of factors	Identified key delay determinant factor
1	Adem, (2018)	8-catagories client contractor, consultant, labour and equipment, material, contract, contractual r/n ship, and external factors.	31	The researcher identifies key delay causing factors, as owner interference, frequent change orders, long time for material test approval, shortage of construction material in the market and mistake in design document are the top five causes of delay.
2	Alaghbari, (2005) cited in wa'el et al, (2007)	4-catagories, client contractors, consultant and construction environment		Remarked that if delay causing factor is from one responsible party can be easily managed.
	(Assef et al)	9-catagories project, owner, contractor,	73	Researches ranked delay causing factors in terms of frequency of

Item No	Researchers'	Dimensions considered in the study	No of factors	Identified key delay determinant factor
		consultant, design team, material, equipment, labour and external.		occurrence, degree of severity, and importance index. The result indicates that client and contractor related factors are the top 2 source of delay in construction projects in all the three measures.
3	Biyadiglgn, (2017)	Studied project performance factors in which time was one of the dimensions in the study.	8 time relate factors	From the analysis it is revealed that the client considers change orders and resource unavailability as key for time performance, contractors consider unavailability of resource and claim approval as the key constraint and finally the consultant groups take resource unavailability and financial constraint as critical. The combined result indicates that unavailability of resource was affecting time performance of the construction at most.
4	Chaingz, (2019)	7- Categories management of work, economic factors, client, consultant, contractor, material /manpower/ equipment and external factors.	46	He identified top 10 overall factors affecting time of project that includes financial difficulties by contractor and owner, equipment and man power shortage, design changes ,inadequate contractor experience, in the top 5 lists
5	bayfers, (2018)	4-catagories client contractor, consultant and environment	61	The key delay factors identified in the research includes cash flow problems by contractor, owners delay to deliver site, inadequate early design, poor planning of project by contractor and lack of communication among the parties the top five lists of factors.
6	Dale and anthony, (2015)	Not specified	10	From the data gathered from consultant and contractors representative, they evaluate the importance of identified factors in causing delay and found that Clients financial difficulties, Monthly payment difficulties, Inadequate fund allocation, Incomplete drawings/details and Contractor's financial difficulties are the top five causes of delay.
7	Enshassi et al, (2009)			Remarked that cost of construction material was one of the most

Item No	Researchers'	Dimensions considered in the study	No of factors	Identified key delay determinant factor
				significant cause of delay in construction projects.
8	Helen and oyewale, (2016)	6-categories project related, labour related, contractual related, consultant related, client related and contractor related	35	The study indicates that from the group causing delay (source) client, labour related factors and contractual relationship were the top three sources of delay. The researchers also identified top five delay causing factors combined from all of the dimensions as delay in progress payment, client interference, client inability to brief project objective, escalation of material price and client experience in the respective order.
9	Koushki, (2005)cited in shabab and sadique, (2016)			Remarked that the influence of weather condition from external related was severe
10	Kumaraswamy and chan, (1996)	8-categories client contractor, consultant, labour, plant/equipment, material, design team, , and external factors	83	According to analysis made the researchers identified top three important factors causing delay both in building construction and civil engineering as poor site management, unforeseen condition and poor resource management and low speed of decision making respected to each of the two item of work.
11	Mesfin, (2019)	7-categories project character, labour /material, contractual, project procedure, external environment, client related, contractor related	35	The combine measures from all parties response indicate that short compilation period allocated, absence of skilful workers, insufficient supply of materials, escalation of material price, and political environment are found to be the most significant cause of construction delay in the public construction of Ethiopia. In line to that the researcher also remarked that labour, material and external environment related source of factors are responsible to contribute most of the factors o the industry in relative sense.
12	obodoh and chikasi, (2016),	8-categories,owner, contractor, consultant, , material, ,equipment,	57	The researchers remarked that for those identified groups responsible for delay causes finance, labour and

Item No	Researchers'	Dimensions considered in the study	No of factors	Identified key delay determinant factor
		finance, labour and external		contractor were the top three sources of delay causing factors. In line with that the finding revealed that insufficient No of equipment on site, inaccurate time estimate, monthly payment difficulty, change orders and inaccurate cost estimate were the top five causes of project delay.
13	Saleh, (2009)	8-catagories client, contractor, consultant material, labour/equipment, contract related, contractual relationship and external factors.	28	Revealed that from the categories identified as a source of delay factors contract related, contractual relationship related and client related factors are the most significant delay causes.
14	Shabab and sadique, (2016)	10-catagories project, owner, contractor, consultant, design team, material, equipment, finance, labour and external.	95	From the identified factors the researchers select out top 20 critical factors of delay through by analysing the relative importance factor. Slowness of owners decision, delay in payment, change orders, uncooperative owners, long waiting time for approval of material test, are the most significant factors in regard to this finding owners were the top source of delay in the construction projects.
15	Ubain, (1991) cited in shabab and sadique, (2016)			
16	Michael, 2017	7- categories client related, contractor related, consultant related, material related, equipment related, labour related and external factors	28	The finding of the research analysis indicates that delay in material delivery, shortage of construction material low skill of labour, late procurement of material, and late approval of design are the top five influential factors causing delay
17	Tadesse et al, (2016)	Studied construction performance and challenges in Ethiopia	-	Conducted a descriptive study on project management practice in Ethiopian construction industry and identifies that safety culture and time performance are the major shortcomings, challenging the industry.
18	Wa'el et al, (2007)	4- categories contractor, owner, consultant and	31	Financial problem, and coordination problem were the most important

Item No	Researchers'	Dimensions considered in the study	No of factors	Identified key delay determinant factor
		external factors		factors causing delay in construction projects.
19	Werku and jha, (2016)	8- categories consultant, contractor, design team, labour, material, client equipment and external factors	88	The researcher investigates the influence of factors in terms of their significance and remarked that the finance by contractor, escalation of material price, ineffective schedule, resource management, delay in payment and lack of skilled professional are the top 5 key factors causing delay

CHAPTER THREE

3. Research methodology and methods

3.1 Introduction

In this chapter the methodology of how to conduct the study is presented in which important elements of research process are defined. William, (2005) as cited by Biyadgign, (2018:34) defined research methodology as a plan of action developed that shows how the problem is investigated , what information is required and collected, what technique and process has to be used to collect data, methods of analysis in order to arrive right conclusion and develop recommendation . The Research process includes the following but not limited to the research design, research approach, data collection method, sampling technique, identifying source of, and data measurement etc. In conducting a scientific research study one of the major task is identifying the objective of the problem statement. Any researcher is belied to have a good understanding of the topic of his research at the beginning. Therefore the issue in focus will be emerging in one's mind from what is observed, read, heard through media or maybe from documentaries watched. From either of those listed or any other means of noticing a problem will initiate some to go in search of the answer to the problem in mind. The focus of this paper is to assess the delay causing factors in the case of Addis Ababa housing development projects called delay determinants considering a specific project at bole arabsa called project 12 under construction. The project has aimed to deliver the construction of condominium of 20/80 housing units within 2 years of construction period amid it has taken over 6 years now uncompleted. The rate of delay is already over 300% by this time which take my attention to conduct this research study.

3.2 Studying approach

There are two basic types of research approaches in the data collection process of research work. These are qualitative research approach and quantitative research approach. The combination of these two will give us the third options called mixed research approach which most of the researchers applies in their research work.in the case of this paper, The study was undertaken in AAHDC due to massive building and civil engineering construction projects of condominium residential housing construction in the city that were embarked upon by the city administration in the last seventeen years and from the fact on the ground the project planning to be achieved and what actually converted since the time of project start suffered a wide range of performance problem, from which one was believed to be related to project time that the paper is concerned about. A combination of qualitative and quantitative mixed research approaches was adopted through review of literatures and questionnaire to achieve the purpose of the study.

3.3 Research design

Creswell, (2003) as cited by Dawit, (2008:24) defined a research design as the scheme, outline, or plan that is used to generate answers to research problems. A research design adapted a given research is dependent on the type of research conducted. It depends on how detail and to what extent that a researcher can get the information in doing his research and also depends on the question intended to answer at the end of the research work. In this paper

work a descriptive research design is applied as it is found efficient to answer the research questions raised in the first chapter and address the objective of the research.

3.4 Source of data

Data for the research is collected from both the primary and secondary source. Secondary data refers to data that is collected by someone other than the primary users. A common source of secondary data for research includes census information from government departments, organizational records, and data that was originally collected for other research purpose. Therefore data from previous literatures, like journal articles, books magazine's and research studies done on the subject matter is served as the secondary data source for this paper. A primary data source is an original data source, that is, one in which the data is collected by the researcher for specific research purpose. There are many different ways of collecting primary data but one of the most common one is through questioners, direct interview of personnel's who has knowledge of the subject matter and direct observation of what is to be studied.

3.5 Population of the study

The populations used in this research were from project 12 at bole arabsa construction projects. . The population of this research work consists of registered construction experts in the built environment who are working with the client (AAHDC), contractor or the consultant who are working at bole arabsa project 12. The sample was drawn from a list of these construction contractors, clients and the consultants. These sets of population were chosen due to their huge participation in the construction process of condominium building and infrastructural projects at project 12. And participants such as, owners (professionals working in Addis Ababa housing development project working on project 12), contractors and consultants of projects.

3.6 Sampling process and sample size

Sampling is a method that allows researchers to infer information about population based on results from subset of the population without having investigated every individual. Sampling is a process of selecting units that represent a given population in a research study in a manner that is good enough to generalize the result back to the population from which they were chosen from. In this project work it is found suitable to apply probability sampling method for selecting representative sample of the population.

3.6.1 Determination of sample size

Sample size is a research term used for defining the number of individuals included in the research study to represent a population. It refers to the total number of respondents included in the study, and the number is often broken into sub groups by profession, demography such as age, gender etc. determination of sample size is one of the important factors in statistical analysis. In this paper work the sample size was taken disproportionate to increase participant of client. Therefore 50 copies of questionnaire were distributed to client, contractor and consultant professionals as 15, 20 and 15 copies of questionnaire respectively. Due to the time and cost constraint in this study, **the sample size determination method developed by Carvalh (1984) was used for sample size determination** in the case of project 12. The total

population of the site was 278 which fall between the ranges of 151-280 as shown in table, 3.1 below.

Population	Low	Medium	High
51-90	5	13	20
91-150	8	20	32
151-280	13	32	50
281-500	20	50	80
501-1200	32	80	125
1201-3200	50	125	200
3201-1000	80	200	315
1001-35000	125	315	50
35001-45000	200	500	800

Table 3. 1, sample size determination adapted from Carvalh

3.6.2 Sampling technique

The purpose of sampling is used for data collection. A sample technique enables a researcher in selecting a reliable representative and valid sample from a given population which helps to arrive at result which the finding can better generalized to the population studied. In this paper disproportionate stratified sampling technique was used in selecting representative sample size from client, contractors and consultant groups. The reason I have to adapted disproportionate stratified is to favour the participant from the client, because of the fact that client representative who are working AAHDC are well experienced and also they are more close to the working cultures of the institution. Then the researcher used non probability purposive sampling because it was found preferable in gathering information from employees who were conveniently available at the time of data collection.

3.7 Design of research instrument and method

3.7.1 Questionnaires

In this research, a set of questionnaires will be used because it is cost effective to gather information. Often questionnaires are the only feasible way to reach a number of respondents large enough to allow statistically valid and reliable analysis of the result. The choices of using this method are made based on a variety of factors including the type of information to be gathered and the available resources for the research as well as to conduct effective research under optimized and economical way. According to most of previous research Data collection through questionnaire will help to address many respondents and helps to gather enough information required to the research study.

3.7.2 Design of questioners

A questionnaire is a series of questions asked to a sample of respondents to obtain statistically useful information about a given research issue. Well-structured and prepared questionnaires are important to enhance the quality of research being conducted. Properly constructed and responsibly administered, questionnaires become a vital instrument by which statements can be made about specific groups or people or entire populations. In designing the questionnaire, the objectives of the study were first established. This will be done to help in determining what questions to ask and how to ask them. The questionnaires also have to be clear for understanding of respondents and therefore care has been taken to make the questions to be understood by using easy words. The questionnaire was designed into four main parts. The first part is about the general information of the background of the respondent. This background information was essential in order to determine the likely reliability and credibility of the data. The second part dealt with the project performance related problems in which information's on delay determinant factors were gathered, the third part is about the specific time management practice in the case of project 12 and in Addis Ababa housing project development in general. Finally the fourth part of my research questionnaire is optional and presented for those who may have their personal attitude on the issue. The general format and component of the questionnaire is found on Appendix.

3.7.3 Questionnaire administration

A Total of questionnaires were distributed for owner's representatives 15, contractors Representatives 20 and consultant representatives 15. These questionnaires were filled by project managers, site and office engineers and others in different companies. Questionnaires were returned 47 (94%) as follows: 15 (100%) from owners, 19(95%) from contractors and 13 (87%) from consultant respondents. from the collected response questionnaires filled by the clients are all found to be valid for the analysis, where as one paper from each of those filled by the contractors and consultant representative were not valid for the analysis. Figure shows details of the responsiveness of the questionnaire.

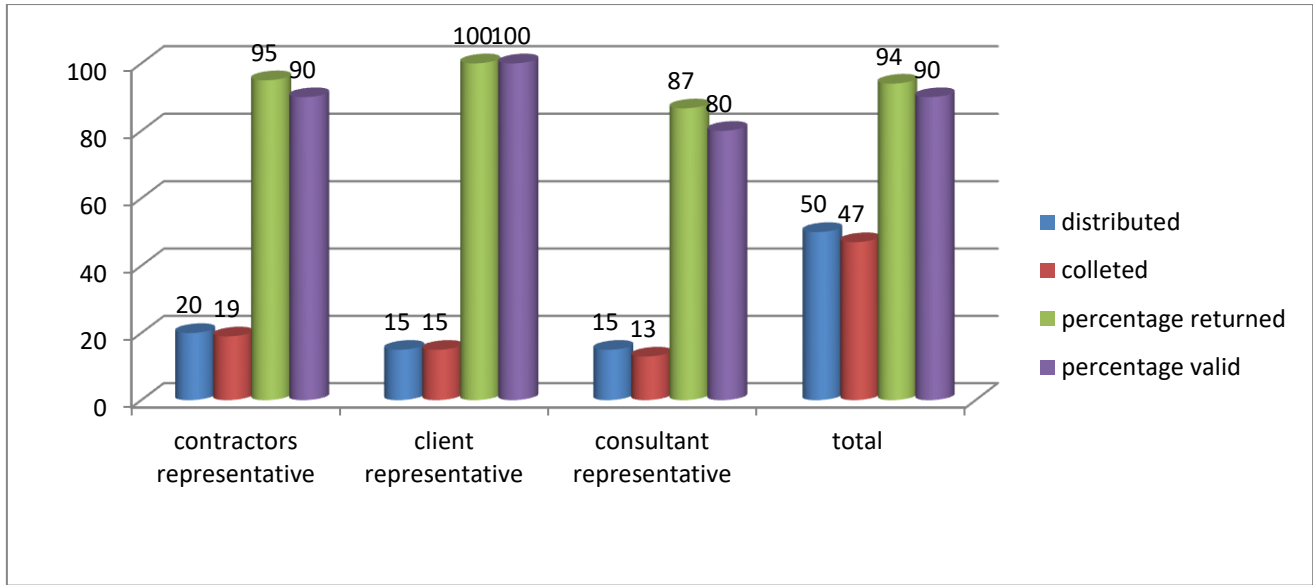


Figure 3. 1 Rate of response representation graph,

3.8 Data measurement

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each type of measurement, there is/are an appropriate method/s that can be applied and not others. In this research, ordinal scales were used on the major research questions under part 2 of my research questionnaire. Ordinal scales as shown in the tables are a ranking or a rating data that normally uses integers in ascending or descending order. The numbers assigned (1, 2, 3, 4, 5) do not indicate that the interval between scales are equal, nor do they indicate absolute quantities. They are merely numerical labels. Based on Linker scale we have the following tables.

The ordinal scales measures the level or the degree of agreement on the delay determinant factors presented from previous studies and hypothetical observations from experience by participant respondents of the study.

Extremely significant(5)	Very significant(4)	Moderately significant(3)	Significant (2)	Not significant(1)
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Table 3. 2, rating scale for factors of project delay determinant

3.9 Data analysis

Descriptive statistics was used in this study. The descriptive data analysis involved frequency, tables, percentage and relative importance index. The relative importance index method (RII) was used to determine the Consultants, Clients and Contractors perceptions of the relative importance of the identified key performance factors. The index was adopted from Cheung et al. (2004); Iyer and Jha, (2005); Haupt, (2007) and Enhassi, (2009) and calculate by the following equation

$$RII = (\sum W) / AN \dots\dots\dots 3.1$$

Where,

W is weighting specified to each factor by participants in the questionnaire. The range was between 1 and 5, where 1 is not significant and 5 is extremely significant,

A is the highest weight which is 5 in this questionnaire and

N is the total number of the participants.

3.10 Scale Reliability and Validity Measurement

To ensure validity and reliability of the research before the analysis of data the cronbach alpha value for variable would be checked which it has to satisfy at least a value of 0.7 and above to be reliable and valid for measurement. Therefore data would be tested and presented before analysis and discussion of the finding.

3.11 Summary of research process

The research problem, initiated from observation and reading literatures in the construction project. The research basic information is assessed in the literature review part of the research. The literature review has helped in the assessment and identification of variables. Once the variables are identified, research instrument preparation, and data collection has been executed in their order. Consequently, analysis of the data obtained from questionnaires and interviews have process which involves simple statistical approach, examining, tabulating and categorizing based on the chosen measurement scale. After the collected data has been analysed, the findings and results will be discussed. Finally, the researchers will give their conclusion and recommendation, based on the analysis and discussion.

CHAPTER FOUR

4. Result and discussion

4.1 Introduction

In this chapter the indication of the result and discussion of data analysis would be provided. The primary data gathered through distributed questionnaires from the participant respondents and the secondary data collected by referring to different types of literature would be discussed in detail aiming to provide answers to the questions raised and also to address the objective set in the first chapter of the paper. In conducting the discussion the analysis of the primary data would be done through statistical technique and indices. After the analysis of data the discussion of the result would be conducted by comparing the finding of the analysis with the previous literature. There were 38 factors identified under five important sources of factors as contractor related, client related, consultant and design team related, construction material related and environmental related which affect construction project time performance. These factors were identified from the literature reviews conducted in the second chapter of the paper. Analyses of data were conducted through Statistical Package for Social Sciences (SPSS) version-23 software and excel 2010.

4.2 Characteristics of respondents

The purpose of the personal information of the respondents is to indicate their general background with regard to respondent's job category, job position and work experience. Therefore the information related to the respondent characteristics has been presented in the following Table 4.1.

Table 4. 1, Demographic information of the respondent in terms of job category, job position and work experience

JOB CATEGORY					
Valid		Frequency	%	Valid %	Cumulative %
	Client	15	33.3	33.3	33.3
	contractor	18	40	40	73.3
	consultant	12	26.7	26.7	100
	Total	45	100	100	
JOB POSITION					
Valid		Frequency	%	Valid %	Cumulative %
	manager	2	4.4	4.4	4.4
	office engineer	14	31.1	31.1	35.6
	project team leader	7	15.6	15.6	51.1
	site engineer	22	48.9	48.9	100
	Total	45	100	100	
WORK EXPERIENCE					
Valid		Frequency	%	Valid %	Cumulative %
	0-5	25	55.6	55.6	55.6

	06-10	10	22.2	22.2	77.8
	11-15	10	22.2	22.2	100
	Total	45	100	100	

Source, (SPSS) version-23 software

4.3 Delay determinant factors

Delay determinant factors which are identified from literature study categorized into five major parts according to their sources. In conducting the study 38 factors are identified and grouped into contractor related, client related, consultant and design team related, and construction material related and environmental related. The analysis and discussion of the factors is presented under each of these major categories. Before the presentation of analysis and discussion, reliability and validity measurement of data used in the research has been presented in the table 4.2 below.

4.4 Result Presentation

4.4.1 Reliability and Validity of data

From the table below it is confirmed that the value of cronbach's alpha for the entire variable considered in the study were above 0.7 which shows that data is reliable and valid enough to conduct further analysis.

Table 4. 2, Reliability and validity

Item Of Variables	Cronbach's Alpha if Item Deleted
Contractor Related Factors	.703
Client Related Factors	.749
Consultant Related Factors	.749
Material Related Factors	.757
Environmental Related Factors	.768
Project Time Performance	.751

4.4.2 Contractor related factors

4.4.2.1 Analysis and finding of the result

From the analysis of response of the participant it is revealed that the most significant top five cause of delay in the construction of condominium construction project under project 12 of AAHDC in the category of contractor related factors were identified as poor resource management (0.809), poor rate of project progress (0.769), insufficient skill of labours (0.764), poor site management (0.756) and safety related factor(0.742) as listed out below in the table, 4.4in terms of the relative importance of response from research participant. Other studies which were conducted on delay causing factors and referred to in the literature review of the chapter are also in support of this finding. Among some of which the finding is with the line of this result were, Kumaraswamy and chan, (1996) who identified poor site management and poor resource management as the top causes of delay. Mesfin, (2019)' and Michael, (2017), who revealed in their finding that absence of skilful workers from

contractor side is one of the top list to determine the impact of delay, Werku and jha, (2016), also found that resource management problem and lack of skill were in the top five causes of delay.

Table 4.3 Relative importance ranks for contractor related factors

CONTRACTOR RELATED FACTORS	RELATIVE IMPORTANCE FACTOR (RII)	RANK
Poor Resource Management	0.809	1
Poor Rates Of Progress	0.769	2
Insufficient Skill Of Labours	0.764	3
Poor Site Management	0.756	4
Safety Related Factor	0.742	5
Construction Methodology	0.724	6
Unavailability Of Equipment	0.72	7
Insufficient Capacity Of Equipment	0.716	8
Failure To Compile With Specification	0.711	9
Poor Planning And Scheduling	0.698	10
Lack Of Experience	0.676	11
Shortage Of Finance	0.667	12

Source, (SPSS) version-23 software, analysis by excel 2010

4.4.3 Client related factors

4.4.3.1 Analysis and finding of the result

From table 4.6, below the most important delay determinant factors related to clients were identified by relative importance analysis. Accordingly, variation order (0.773), additional work (0.769), financial difficulty (0.756), poor communication of owners with other stakeholders (0.742) and late decision making (0.698) are the top five lists causing delay in construction projects in AAHDC, specifically in the case of project 12 under construction .the finding of this analysis was also supported by literatures I have referred in the review chapter of the research. studies from (Adem, (2018), Chaingz, (2019) and Bayfers, (2018) are in line with the result in which they recognize that change order, financial difficulties from owner and contractor and lack of communication between parties are among the top 5 lists of their findings to cause delay. Dale and Anthony, (2015), Helen and oyewale,(2016) found that client and contractor financial difficulty, interim payment, and inadequate finance are among the top causes of project delay. Kumaraswamy and Chan, (1996), identifies speed of decision making, obodoh and chikasi, (2016), remarked monthly payment problem and change orders top delay causing factors. Finding from Shabab and Sadique, (2016) indicates that slowness of decision making, delay in payment and change orders were critical delay factors. Wa’el et

al, (2007), pointed out financial problems as one of the critical delay causing factors in his research finding.

Table 4. 4 Relative importance rank for client related factors

CLIENT RELATED FACTORS	RELATIVE IMPORTANCE FACTOR (RII)	RANK
Variation Order	0.773	1
Additional Work	0.769	2
Financial Difficulty	0.756	3
Poor Communication	0.742	4
Late Decision Making	0.698	5
Delay Of Payment	0.613	6
Change In Project Scope	0.604	7

Source, (SPSS) version-23 software

4.4.4 Consultant related factors

4.4.4.1 Analysis of finding and result

From the factors under the consultant category considered in the research study of the paper as shown in the table Table,4.8 the most influential factors in terms of its relative importance according to the research participants, the top five delay determinants are identified as poor supervision (0.742), inaccurate estimates of cost (0.738), delay approval of drawing and variation order (0.733), unrealistic contract duration (0.729), inadequate experience (0.724) and frequent design change (0.724). The result of the finding is supported by literature and articles from the previous study. Adem, (2018), Changiz, (2019), remarked design change as one of the critical causes of construction project delay in support of the finding. Dale and Anthony, (2015), identified the effect of incomplete drawing and design whereas obodoh and chikasi, (2016), remarked That inaccurate time estimates and cost were critical which supports the finding of inaccurate estimates of cost and unrealistic contract duration of this finding. Michael, (2017) also identified late approval of design as a critical cause of construction project delay.

Table 4.5 Relative importance rank for consultant related factors

CONSULTANT/ DESIGN TEAM RELATED FACTORS	RELATIVE IMPORTANCE FACTOR(RII)	RANK
Poor Supervision	0.742	1
Inaccurate Estimates Of Cost	0.738	2
Delay Approval Of Drawing And Variation Order	0.733	3
Unrealistic Contract Duration	0.729	4
Inadequate Experience	0.724	5
Frequent Design Change	0.724	6
Incomplete Design	0.684	7
Unclear Or Vague Specification	0.676	8

Source, (SPSS) version-23 software

4.4.5 Construction material elated factors

4.4.5.1 Analysis of finding and result

From Table 4.10 under the category of construction material four Factors considered significant to affect the time performance of construction projects were identified and evaluated by respondents and the following results were found. Delay in material delivery (0.773), change in material type during construction (0.769), late procurement of material (0.716) and shortage of construction material in market (0.698) are in the respective order. The finding is supported by Adem, (2018), Helen and oyewale (2016), Mesfin, (2019), Michael, (2017) revealed in their studies that material related factors like price escalation, late material delivery to construction site, unavailability of material in the market and shortage were among the top lists of delay causing factors in construction project.

Table 4.6 Relative importance rank for construction material related factors

CONSTRUCTION MATERIAL RELATED	RELATIVE IMPORTANCE FACTOR	RANK
Delay In Material Delivery	0.773	1
Change In Material Type During Construction	0.769	2
Late Procurement Of Material	0.716	3
Shortage Of Construction Material In Market	0.698	4

Source, (SPSS) version-23 software

4.4.6 Construction environment related factors

4.4.6.1 Analysis of finding and result discussion

Construction environment related factors are those which are external to the control of the major stakeholders if occurred in the construction industry. Therefore the impacts of such factors are mostly beyond the control of the parties and needs the cooperation from external third party like the government body to manage the influence. According to the analysis presented in Table, 4.12 the top five delay determinant factors which sourced from the construction environment in project 12 condominium construction project were restrictions and control from government body, delay in permission from government, change in regulation by public body, effect of site condition and unavailability of utility with relative importance of (0.733), (0.711),(0.702), (0.698) and (0.684), respectively. Mesfin, (2019) indicates that the political environment has a significant cause of project delay in the Ethiopian construction industry which supports restrictions imposed by the government in such times of crises. Kumaraswamy and chan, (1996) pointed out unforeseen condition in the top three lists of delay cause in project in their study. This also supports the environment weather condition which is beyond the prediction of project participant.

Table 4. 7 Relative importance rank for environmental related factors

ENVIRONMENTAL RELATED FACTORS	RELATIVE IMPORTANCE INDEX	RANK
Any Restriction And Control From The Government	0.733	1
Delay Of Permission From Government Body	0.711	2
Change In Regulation By Government	0.702	3
Effect Of Site Condition	0.698	4
Unavailability Of Utility	0.684	5
Weather Condition	0.671	6
Social And Cultural Factors	0.56	7

Source, (SPSS) version-23 software

4.4.7 Most important source of delay determinant

To identify the most important source of delay, top ten causes of delay as shown in Table, and 4.13 has been identified according to their relative importance value. From the data presented delay causing factors from contractor, client and construction material related were identified as the most significant cause of delay in construction of project12. The analysis revealed that among top ten causes of delay identified the first 8 major delay causing factors are from the three categories of those delay sources. Poor resource management by the contractor (0.809) is the most delay causing factor in this specific project followed by variation order by the employer (0.773) and delay of material delivery (0.773). Poor rates of

progress (0.769), additional work (0.769), and change in material type during construction (0.769), Insufficient Skill of Labours (0.764), Financial Difficulty by Owner (0.756), Poor Supervision (0.742) and Inaccurate Estimates of Cost (0.738) were the top ten causes of delay from the contractor, client, construction material and consultant related delay causing factors. From the analysis it is revealed that contractor, client, construction material and the consultant related factors were found in the top ten list causes of construction delay in project 12. In support of this finding Assaf et al, (2006) studied 8 time related factors and found that client and contractor related factors were the top two sources of delay. Chaingz, (2019), revealed that most of the causes of project delay appeared in the top list were contractor's related factors. bayfers, (2018), also found that the client related and contractor related factors were the major source of delay. (Dale and Anthony, 2015), remarked that all the lists in the top five of delay causing factors were sourced from client and contractor. (Helen and oyewale,2016), studied 6 categories of factors causing delay in construction and found that client and labour were in the top three sources of delay in the sector. Mesfin, (2019), remarked that construction material related factors were the most significant cause of delay. obodoh and chikasi, (2016), found that contractor related factors were the third important source of delay factors. saleh, (2009), revealed in their study that contractor related and client related factors were the most significant delay causes. Shabab and Sadique, (2016) remarked that owners were the top source of construction delay. Michael, (2017), in his thesis research identified construction material related factors are the most significant cause of delay in the construction industry of Ethiopia. Wa'el et al, (2007) identified the coordination and the financial problems of the major stakeholders were the major source of delay. According to Werku and jha, (2016) the major causes of delay were contractor, client material and consultant related factors.

Table 4. 8 top ten important factors causing delay in construction project and responsible source

DELAY DETERMINANT	RELATIVE IMPORTANCE FACTOR	RESPONSIBLE SOURCE	RANK
Poor Resource Management	.809	contractor	1
Variation Order	.773	client	2
Delay In Material Delivery	.773	construction material	3
Poor Rates Of Progress	0.769	contractor	4
Additional Work	.769	client	5
Change In Material Type During Construction	.769	construction material	6
Insufficient Skill Of Labours	0.764	contractor	7

Financial Difficulty By Owner	.756	client	8
Poor Supervision	.742	consultant	9
Inaccurate Estimates Of Cost	.738	consultant	10

Source, (SPSS) version-23 software

4.4.8 Perception of client contractors and consultant towards the Most important source of delay determinant

In the table, 4.14 below the overall perspective of the three major stakeholders of the construction project 12 evaluated and ranked in terms of the relative importance value by professionals working under each of the parties has been presented. According to the data presented from the perspective of the client, contractors and consultants were listed in the order of their relative importance in causing construction delay in the view of each party's evaluation. From the analysis professionals from the client (AAHDC representative) claims that consultant and contractors related factors are the most significant causes of delay in the case of project 12. From the analysis it is revealed that out of 38 important causes of delay evaluated for the level of significance in the view of client side professionals, seven of the top ten influential factors were consultant and contractor related whereas the remaining three were related to construction material and client related factors as shown in table 4.14 below. Contractor's representative professionals on the other hand confirmed that the major sources of delay factors in project 12 were contractors themselves and the client in the respective order. According to the information from the analysis of relative importance out of the top ten lists four contractor related factors, three client related factors and two external factors and one consultant related factor was identified. According to the consultant professionals both the contractor and the client were found accountable for their contribution of the major significant causes of delay in project 12. out of top ten lists of factors causing delay in the perspective of consultant professionals the two parties contribute eight factors each sharing four and the last two factors were construction material related.

Table 4. 9 Over all perspective towards the most important delay determinant factors in AAHDPO

ITEM NO	CLIENT PERSPECTIVE		CONTRACTOR PERSPECTIVE		CONSULTANT PERSPECTIVE	
	DELAY DETERMINANT FACTORS	(RII)	DELAY DETERMINANT FACTORS	(RII)	DELAY DETERMINANT FACTORS	(RII)
1	Unrealistic Contract Duration	0.893	Any Restriction And Control From Government Body	0.822	Financial Difficulty By Client	0.800
2	Poor Supervision	0.893	Frequent Design Change	0.813	Poor Site Management	0.800
3	Additional Work	0.880	Failure To Compile With Specification	0.767	Additional Work	0.767

4	Inaccurate Estimate Of Cost	0.880	Delay Of Payment	0.756	Delay Of Payment	0.767
5	Insufficient Skill Of Labour	0.880	Unavailability Of Equipment	0.756	Insufficient Skill Of Labour	0.767
6	Change In Material Type And Specification	0.880	Poor Communication	0.744	Unavailability Of Equipment	0.767
7	Frequent Design Change	0.867	Change In Regulation By Government	0.744	Change In Material Type And Specification	0.767
8	Inadequate Experience	0.867	Variation Order	0.722	Variation Order	0.733
9	Variation Order	0.853	Poor Rate Of Progress	0.722	Poor Rate Of Progress	0.733
10	Incomplete Design	0.853	Construction Methodology	0.722	Delay In Material Delivery	0.733
11	Delay Approval Of Drawing And Variation Order	0.853	Delay In Material Delivery	0.722	Change In Project Scope	0.717
12	Poor Rate Of Progress	0.853	Delay Of Permission From Government Body	0.722	Insufficient Capacity Of Equipment	0.717
13	Delay In Material Delivery	0.853	Poor Supervision	0.711	Poor Resource Management	0.717
14	Poor Resource Management	0.840	Shortage In Finance	0.711	Late Procurement Of Material	0.717
15	Financial Difficulty	0.813	Weather Condition	0.711	Late Decision Making	0.700
16	Poor Site Management	0.813	Unavailability Of Utility	0.711	Poor Communication	0.700
17	Late Decision Making	0.800	Safety Related Factors	0.700	Poor Planning And Scheduling	0.700
18	Poor Planning And Scheduling	0.800	Lack Of Experience	0.700	Safety Related Factors	0.700
19	Shortage In Finance	0.800	Inadequate Experience	0.689	Shortage Of Construction Material In Market	0.700
20	Shortage Of Construction Material In Market	0.800	Unrealistic Contract Duration	0.689	Change In Regulation By Government	0.683
21	Vague Specification	0.787	Delay Approval Of Drawing And Variation Order	0.689	Shortage In Finance	0.667
22	Construction Methodology	0.787	Additional Work	0.678	Delay Of Permission From Government	0.667

					Body	
23	Change In Project Scope	0.773	Financial Difficulty	0.678	Unavailability Of Utility	0.667
24	Poor Communication	0.773	Inaccurate Estimate Of Cost	0.678	Inaccurate Estimate Of Cost	0.650
25	Insufficient Capacity Of Equipment	0.773	Insufficient Skill Of Labour	0.678	Delay Approval Of Drawing And Variation Order	0.650
26	Safety Related Factors	0.773	Poor Site Management	0.678	Failure To Compile With Specification	0.650
27	Late Procurement Of Material	0.773	Change In Material Type And Specification	0.678	Effect Of Site Condition	0.633
28	Delay Of Payment	0.747	Change In Project Scope	0.667	Any Restriction And Control From Government Body	0.633
29	Unavailability Of Equipment	0.747	Insufficient Capacity Of Equipment	0.667	Frequent Design Change	0.617
30	Delay Of Permission From Government Body	0.733	Poor Resource Management	0.667	Vague Specification	0.617
31	Lack Of Experience	0.707	Late Procurement Of Material	0.667	Inadequate Experience	0.600
32	Any Restriction And Control From Government Body	0.707	Incomplete Design	0.644	Poor Supervision	0.600
33	Failure To Compile With Specification	0.693	Social And Cultural Factor	0.633	Lack Of Experience	0.600
34	Weather Condition	0.693	Vague Specification	0.622	Unrealistic Contract Duration	0.583
35	Change In Regulation By Government	0.693	Late Decision Making	0.611	Weather Condition	0.583
36	Effect Of Site Condition	0.680	Poor Planning And Scheduling	0.611	Incomplete Design	0.533
37	Unavailability Of Utility	0.667	Shortage Of Construction Material In Market	0.611	Construction Methodology	0.533
38	Social And Cultural Factor	0.520	Effect Of Site Condition	0.556	Social And Cultural Factor	0.500

Source, (SPSS) version-23 software

4.5 Evaluation of time management practice in AAHDC

4.5.1 What kind of method do you use to represent the project planning and scheduling?

From the analysis presented in table below it is clearly indicated that the planning and scheduling of the project in the case of project 12 is represented by using a bar chart. All the professionals working under AAHDPO and the consultant professionals confirmed that the bar chart is adapted 100% whereas the contractor's response has gone almost 90% bar chart and 10% critical path. Chen, (2007) as cited by Shaban, (2008), stated that time management would be effective if the activity time is deterministic and known. This can be decided with the method adapted for the project time management. Usually CPM is the most useful method to be effective in the modern construction projects since it will enable the professionals to notice the critical activities on the project progress and respond accordingly so that the project will maintain its scheduled time.

Table 4. 10 Usage of planning method

ITEM	PERCENT IN %(FREQUENCY)		
	CLIENT(AAHDPO)	CONTRACTORS	CONSULTANTS
BAR CHART	100%(15)	88.9%(16)	100%(12)
CRITICAL PATH	11.1%(2)		
S CURVE			
OTHER			

Source, (SPSS) version-23 software

4.5.2 How often your project team does formally meets for discussing of monitoring, updating and controlling project progress?

For the presentation in the Table (4.11) below the response of the participant indicates that the meeting between the professionals in the case of project 12 is not conducted with scheduled time table. In this case contractors are better to give attention to project meetings in a relative sense which is still not enough to control project progress effectively. It is obvious that it will push all the stakeholders to be actively taking their responsibility under scheduled reporting of project progress and also give a better control of project execution. But the analysis indicates that the meeting might be held upon some situations that could be crises that may need urgent solution.

Table 4. 11 Frequency of meeting type of project team

ITEM	PERCENT IN %(FREQUENCY)		
	CLIENT(AAHDPO)	CONTRACTORS	CONSULTANTS
DAILY		16.7%(3)	
WEEKLY	50%(9)		
MONTHLY		22.2%(4)	32.3%(4)
ACCORDING TO TIME CONDITION	66.7%(8)		

AS NEEDED	100%(15)	11.1%(2)	
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Source, (SPSS) version-23 software

4.5.3 How often do you coordinate your work schedule with the master schedule of the project?

From Table (4.12) there is no coordination of master schedule with the progress of the project by all of the stake holders. Only 16.7% of the contractors check on the master schedule and evaluate their progress. The coordination of project schedule with the master one is helpful to correct improve efficiency of work so that to avoid delay or keep it to be minimum.

Table 4. 12 Coordination frequency of current schedule with master schedule

ITEM	PERCENT IN %(FREQUENCY)		
	CLIENT(AAHDPO)	CONTRCTORS	CONSULTANTS
DAILY			
WEEKLY			
MONTHLY		16.7%(3)	
NOT PRACTICED			
AS NEEDED	100%(15)	83.3%(15)	100%(12)

Source, (SPSS) version-23 software

4.5.4 How often do you require the contractor or supplier to submit their detail activity schedule for you in advance to adjust your actual schedule?

Data from Table (4.13) revealed that other sub-contractors and suppliers will expected to submit their contractual obligation to those stake holders up on the request of the need of major stakeholders whom they would have contractual relationship.

Table 4. 13 Frequency of coordination with sub-contractors and supplier schedule

ITEM	PERCENT IN %(FREQUENCY)		
	CLIENT(AAHDPO)	CONTRCTORS	CONSULTANTS
DAILY			
WEEKLY			
MONTHLY		32.3%(6)	
AS NEEDED	100%(15)	66.7%(12)	100%(12)

Source, (SPSS) version-23 software

4.5.5 How do you supply the incentive system to stimulate the construction time?

According to the information from Table (4.14), all the three parties client contractor and consultant applies training to increase the potential of their workers. Contractors somehow think that they can motivate their workers by increasing salary applying penalty when they observe poor performance.

Table 4. 14 Usage of each incentive system

ITEM	PERCENT IN %(FREQUENCY)		
	CLIENT(AAHDPO)	CONTRCTORS	CONSULTANTS
INCREASE SALARY		22.2%(4)	
PENALITY		16.7%(3)	
TRAINING	93.3%(14)	50%(9)	100%(12)
CONDITIONAL	6.7%(1)	11.1%(2)	

Source, (SPSS) version-23 software

4.5.6 Which software do you apply for planning and scheduling the progress of your project?

Table (4.15), shows that excel sheet is used for planning and scheduling of the project progress. This indicates that construction projects under the office are poor in terms of time management. Because by using excel sheet in monitoring the project progress it’s difficult to administer and informed of each and every single activities of the project. Therefore the office has to adopt software like MS and primavera which enables to look over every work packages of the project and can help to identify the critical work item that could lead the project to delay in time and control the project progress at each and every step of its implementation.

Table 4. 15 project progress management software

ITEM	PERCENT IN %(FREQUENCY)		
	CLIENT(AAHDPO)	CONTRCTORS	CONSULTANTS
PRIMAVERA			
MS PROJECT			
EXCEL SHEET	100%(15)	100%(18)	100%(12)
OTHER			

Source, (SPSS) version-23 software

4.6 Summary of the Finding

From the study as it is revealed in the analysis of the result it is found that since most of the contractors employed a manpower with insufficient skilled it is logically true that poor progress of work, poor site management, poor resource management and failure to apply safety measures would occur resulting in poor time performance. Therefore those five factors were the most significant delay determinant factors in the case of project 12. Client related delay determinant factors as revealed in the finding and result of analysis were variation order, additional work, financial difficulty, poor communication, and late decision making. From this finding it is possible to conclude that the change in ideas of the client frequently led to poor communication of parties with one another which in turn caused late decisions resulting in project delay. From the consultant side there was a frequent design change then needed time for approval leaving the ideal time of work. Inaccurate estimates of cost and duration also played its own role for delay occurrence. Regarding the construction material and environmental related factors both of them influence the time performance of the project significantly. From the analysis's conclusion, if there is a delay in delivery of material then there would be change in material type because of unavailability of the required material in the market and the process needs time to be approved which leads to project delay. On the other hand due to restrictions made from the government body and in turn waiting for the permission was found influential cause of delay at the project. To identify the most significant delay determinant sources in the case of project 12 top ten lists of factors causing delay were analysed and presented. From the finding it was concluded that contractors, client, construction material and consultant were the most significant sources of delay determinant factors in their respective order. The conclusion is made based on the relative importance value and the frequency of factors in the top lists related to the items.

In order to identify the perceptions of the three major stakeholder's evaluation of the relative importance of all the factors were conducted by professionals from each of the three parties differently and listed in the order of importance. According to the result, client representative professionals replied that consultants, contractors and somehow construction materials related factors were the most important causes of factors. The contractors confirmed that contractors themselves and clients were the significant sources of delay determinant. Evaluation from consultant professionals revealed that contractors, client and construction material related factors are significant causes of delay.

The time management practice in the case of project 12 was evaluated and the result revealed that it is poorly practiced. Six, time management related questions were presented to respondents from each party and the result indicates that all the stakeholders rarely adapted modern management tools and software for planning and controlling project progress. Rarely conduct project meetings, almost no coordination of project progress with the master schedule, and practically there are no strong obligations between parties to submit their progress which is limited on paper. To conclude the project staff was using the bar chart to represent the planning and scheduling of the project and excel sheet for controlling project progress. Therefore it is difficult to be informed of each and every activity and work packages of the project and also unable to identify the critical activity that could lead the project to delay.

CHAPTER FIVE

5. Conclusion and Recommendation

5.1 Conclusion

The important issue focused on in this study was an investigation into factors influencing the time performance of construction projects under the implementation of AAHDPO in the case of project 12 under construction at bole arabsa site. The paper assessed delay causing factors in the project to evaluate the project time performance and also evaluated the project time management practice to identify the major causes of delay. Delay in construction projects is a common problem observed in most projects especially in the developing countries. In fact there are situations beyond the control of responsible parties to avoid delay in the sector but most of the factors are due to performance failure and absence of commitment to hold on the challenges as concluded in many studies. In this paper delay determinant assessment was conducted and analysed in order to give answers to the research question raised in the first chapter of the study and Based on the result of the finding of the analysis the following conclusion has been made.

- ▶ All the identified delay sources have significant impact on the project delay of the selected site.
- ▶ Client and the contractors' were found the major sources of construction project delay in the selected site.
- ▶ Project time management was found poor and facilitates the impact of independent variables and increase the failure of time performance at the same time.
- ▶ From the perceptions of professionals of each groups it is possible to conclude that there was a blame on one another for the contribution of project delay in the selected project.

5.2 Recommendation

From the literature review and analysis made in assessing delay determinant factors in the case of projects under the administration of Addis Ababa housing development, most time performance failures were due to the major stakeholders. In the case of project 12 considered in the study even though there were situations beyond the control, delay causing factors related to the contractors, clients , consultant and construction material would take the lion's share which could be managed to be avoided with committed, professional genuine work habits of personnel in the sector. From the study conducted the following recommendation has been made to be adapted in Addis Ababa housing construction project.

- ▶ To increase project performance output research and evaluation of project has to be conducted in terms of time, cost, quality and other factors of project performance measure in Addis Ababa housing development Corporation especially in relation to the major stakeholders of construction project.
- ▶ The government should privatized housing development supporting those participants in some specific conditions which increases the cost and quality efficiency so that the product can address the capacity of intended citizens.

- ▶ Contractor selection and award system in the case of projects under AAHDC should be under computational and set of criteria to increase project time performance.
- ▶ Project feasibility study before launching large construction project has to be conducted so that most reliable schedule of time and cost will be adhered during the implementation stage
- ▶ The current working plan of AAHDC has to be evaluated critically to identify the significant problem related to time management system. The institution also has to keep records of the project history cautiously so that it enables to judge the problems of project performance in all aspects of measurement specially time related project performance to help better project handling for future projects in this regard.
- ▶ Training should be provided to professionals working in the institution to develop the necessary skill to adapt modern working technology especially in relation to time management practice
- ▶ All of the parties engaged in the projects under housing development should have to apply technologically viable time management practice to maintain efficient time management system.

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APPENDIXES

APPENDEX- A: QUESTIONNAIRE

I am Getahune Anteneh, a research student of Master of Arts in project management program of Addis Ababa University School of commerce. As part of the program, I am conducting a survey on “Assessing factors causing construction delay in Addis Ababa housing development corporation projects, the case of project 12”. The objective of this study is to assess the factors that affect time performance of the construction of housing development projects under the corporation and study their level of impact. Please be assured that all your responses will be kept strictly confidential and your identity will remain anonymous. All the data will be aggregated and strictly used for academic purposes only. I realize that your time is valuable, as you are busy with your work. However, your participation in this survey, which will require about 15 - 20 minutes of your time, is vital for the success of this study. I look forward to receiving your response in this regard and thank you in advance for your cooperation. By participating in this research survey, you will be eligible to get a copy of the research report after the completion of the study. Please indicate your interest if you wish to receive the research report which will help you and your organization to understand factors which impact project time performance. Should you have any queries related to this study, please contact me through email at getarse1@gmail.com or call me at +251-912-08-65-13

Sincerely
Getahune Anteneh
Addis Ababa University School of commerce

Part 1 General Information about Respondents

Dear respondent please fill the blank space and mark with (√) in box to clarify your demographic information and organizational profile.

1. Organization;- your branch office _____

2. Job category Client contractor consultant sub-contractor

3. Job position

Manager Office engineer

Project team leader Site engineer

Others (specify); _____

4. year of work experience

0 to 5 6 to 10 11 to15 16 to 20 above 20

Part 2 Basic Information on the Determinant of Construction Project Delays

Below are numbers of determinant factors affecting time performance (factors of project delay) in construction projects identified from previous literatures, From your experience, please express your opinion on the importance of the following factors as key time performance determinants (determinants of project delay) in construction projects **in the case of Addis Ababa housing development Corporation condominium construction projects** by ticking (√) under the appropriate box

Extremely significant(5)	Very significant(4)	Moderately significant(3)	Significant (2)	Not significant(1)
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Determinant factors	5	4	3	2	1
Here under list of factors presented that could be summarized under, five major source of delay determinants (employer related, consultant related, contractor related, material related and environmental related), so please take a moment to rate the scale of significance by ticking (√) under the appropriate box.					
<i>Example; inefficient equipment</i>		√			
Client /Employer related					
1. late decision making					
2. Additional work					
3. Variation order					
4. Change in project scope					
5. Delay of payment					
6. Poor communication					
7. Financial difficulties					
Consultant/ design engineer related					
8. Frequent design change					
9. Vague specification /unclear specification					
10. Incomplete design					
11. Inadequate experience					
12. Unrealistic contract duration					
13. Inaccurate estimates of cost					
14. Poor supervision					
15. Delay approval of drawing and variation orders					
Contractor related					
16. Poor planning and scheduling					
17. Insufficient skill of labours					
18. Poor rate of progress					
19. Insufficient capacity of equipment					
20. Unavailability of equipment					
21. Safety related factor					
22. Poor site management					
23. Failure to compile with specification					

24. Construction methodology					
25. Lack of experience					
26. Poor resource management					
27. Shortage of finance					
Material related					
28. Shortage of construction material in market					
29. Change in material type and specification during construction due to unavailability					
30. Delay in material delivery					
31. Late procurement of material					
Environmental factors					
32. Effect of site condition					
33. Delay of permission from government body					
34. Weather condition					
35. Unavailability of utility					
36. Social and cultural factor					
37. Change in regulation by government					
38. Any restriction and controls from government body					

Part 3 time management practice of the project in Addis Ababa Housing Development Corporation; please add (√) as appropriate:

1. What kind of method do you use to represent the project planning and scheduling?

Bar chart	Critical path	S curve	Other.....
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2. How often your project team does formally meets for discussion of monitoring, Updating and controlling the progress?

daily	weekly	monthly	As needed	
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3. How often do you coordinate your schedule with master schedule of the project Owner?

daily	weekly	monthly	As needed	
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4. How often do you require the contractors or supplier to submit their detail Activities schedule for you in advance to adjust your actual schedule?

daily	weekly	monthly	As needed	
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5. How do you supply the incentive system to stimulate the construction time?

Increase salary/ bonus/	penalty	training	Conditional on forcing factors	
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6. Which software do you apply for planning and scheduling the progress the Project

primavera	Microsoft project	Excel sheet	Other....
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Part 4 personal observation (optional)

1. Write any delay determinant factor (factor that causes delay) you observed in your work experience in Addis Ababa housing development project

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APPENDIX- B: SITE PLAN SHOWING PARTS OF PROJECT 12 SITES



**APPENDEX- C: TYPICAL BUILDING PROJECT UNDER CONSTRUCTION IN
PROJECT 12**

