ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

FACTORS CONTRIBUTING THE DEALY OF CONSTRUCTION PROJECTS: THE CASE OF PLAN INTERNATIONAL

BY

Samrawit Habtemariam

ID.NO: SGS/0115/2012B

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ADDIS ABABA, ETHIOPIA

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THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER'S OF ARTS IN PROJECT MANAGEMENT

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DECLARATION

I declare that this thesis entitled "**FACTORS CONTRIBUTING THE DEALY OF CONSTRUCTION PROJECTS: THE CASE OF PLAN INTERNATIONAL**" is my original work. This thesis has not been presented for any other university and is not concurrently submitted in candidature of any other degree, and that all sources of material used for the thesis have been duly acknowledged.

Samrawit Habtemariam _____

Candidate Signature & date

ENDORSEMENT

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

Temesgen Belayneh (PhD) _____

Advisor Signature & date

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LIST OF ACRONYMS/ABBREVIATIONS

PI/PIE …… Plan International Ethiopia

SPSS …… Statistical Package for Social Science

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ABSTRACT

Construction industry has complexity in its nature because it involves large number of parties as clients, contractors, consultants and others. Construction projects suffer from many problems and complex issues in performance such as cost, time, scope and quality. The same is true for Plan International construction projects and it is important to minimize the existing time over run issue in by knowing who are responsible for main identified factors and provides possible recommendations. Therefore, this thesis tries to identify and evaluate the main factors affecting that contribute to the delay of construction projects in the organization. A questionnaire survey was conducted using forty one identified factors which are categorized into four groups. 66 Questionnaires were distributed, and 55 questionnaires were returned: 9 (90%) from owners and 46 (82%) from contractors. The results were analyzed using relative importance index method (RII) to determine owners and contractors' perceptions toward the identified delay factors in construction projects. From the results it was found that more than 90% of the construction projects suffered delays. Accordingly, the top most important factors agreed by both parties were: Political instability (eg. Security issues), Inadequate Contract duration, Price fluctuations (inflation/escalation), Shortage in material/equipment/tool on site, Poor skill and experience of labor/technical staff, Inadequate planning and scheduling of work, Delay in finance and payments of completed work, unexpected surface and subsurface conditions, delay in delivery of material on site and leaders commitment to provide the required resources to implement performance management system were ranked the top ten most important performance factor by contractors and owners.

Keywords: *Delay, Time overrun, Plan International, Construction projects, Contractors, Owners*

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

The construction sector is a multibillion-dollar industry worldwide that grows almost always in size and complexity of technology. It is one of the most labor demanding sectors and gives job opportunities to several citizens. This industry is one of the most important sectors to the local economy, but it also contains a significant portion of the work force. It has long been known that the role of this industry goes beyond its share in national output in socio-economic developments. Many studies have focused on the issue of employment creation and others have emphasized its multiplier effect on other sectors of the economy (Turin, 1973; Ruddock *et al.*, 2010; Amaratunga and Haigh, 2010). The uneven nature of the construction service sector is especially relevant in everyday lives of people because it brings to them the physical infrastructure for personal shelter, water and electricity delivery, sanitation, transportation, schooling, health services, and private sector doings. In most economies, it is one of the main service areas in terms of value adding and employment. Therefore, the industry can be considered as one of the engines of national economic development, where resources, capital, labour, equipment, materials, and market interchange are provided from within the national economy. Development in this sector is imperative for growth in national revenue (Ogunlana et al., 1996).

The construction industry is large, complex, unpredictable, risky, and requires enormous capital expenses and tight money. It provides a bigger challenge to maintain its scheduled time, budgetary cost, and appropriate quality (Shaikh *et al.*, 2010). A major critique facing the construction industry is the rising rate of delays in project delivery. Enshassi *et al*. (2003, 2008) explains that the growing complexity of construction projects and the environment within which they are constructed place greater demands on construction managers to deliver projects on time, within budget and with high quality. On-time completion is one of the most significant factors in the success of project plans. However, completing construction projects on time and within budget has been a main problem (Flyvbjerg *et al.*, 2003; Sanders and Eagles, 2001). Delay in construction occurs in almost all over the world and many studies have been carried out to assess the causes of time overruns in construction projects. For example, Assaf and Al-Hejji (2006) reported that 70% of the construction projects in Saudi

Arabia are experiencing delay. Odeyinka and Yusif (2002) noted that seven out of ten projects in Nigeria suffered time overruns in their execution. In South-East Asia, the fast-developing country Malaysia, the construction sector has not escaped the problem of delays. Among 417 public projects, 17% projects experienced around three months of delay in 2005 (Sambasivan and Soon, 2007). Through seven years of sampling, that covered 258 projects across 20 nations and 5 continents, Flyvbjerg (2009) concluded that 90% of construction projects suffer cost and time overruns.

As per the Plan International construction tracker report, most projects suffer different levels of delay. Due to such time overruns in implementation of construction project, the communities and users as well as the nation need to wait longer than is necessary for the provisions of services and public goods. Thus, delays restrict the growth potential of the economy and its competitiveness (Singh, 2009). The major factors that contribute to the cause of construction project delays are poorly understood. Thus, this research undertakes to investigate and to identify the factors that contribute the time overrun in construction projects of Plan International, Ethiopia program.

1.2. Definition of Terms

Delay: It is an act event which extends required time to perform or complete works of the contract manifests itself as additional days of work (Assaf and Al-Hejji, 2006).

1.3. Statement of the Problem

Construction projects have problems with construction techniques and management as well as limitation of funds and time. The serious problems are lack of ability 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 implementation phase. An examination of the records of more than four thousand construction projects by Morris et al, (1998), showed that projects were rarely finished on time or within the allocated budget. Hence, Accomplishment of a project on time is considered as the most important factors of successful projects, which help to decrease problems for all parties and give new chances to construct other related projects. It also helps to increase the profits and development of construction industry. The initiation for this research is largely due to experience and observation of construction projects delay in the Plan International endeavors. The projects were not completed on time causing delay in providing the intended beneficiaries on time, increasing

cost and leading to technical and managerial problems between project's parties.

This problem is a result of security, lack of managerial skills, low labor productivity, lack of planning, price increment of materials, environment, type of project and others. For that, it is of key importance to exert the utmost effort to conduct such study to detect the previously mentioned factors and to treat all the weakness points and from all sides and so giving specific priorities in order to avoid time overruns at construction projects.

Therefore, this study will focus on identifying the main contributing delay factors for Plan International constructions to help improve performance of the future construction projects.

1.4. Research Questions

This section encompasses questions that the researcher wants to ask to shape the study. These are:

- How is the achievement of Plan International in terms of timely completion?
- How do the construction project participants rate the different delay factors?
- What are the most frequently happening delay factors in construction projects of Plan International?
- What are the possible corrective measures to be taken to enhance/foster construction project success in terms of time requirement in Plan International?

1.5. Research objective

1.5.1 General Objective

The aim of this research is to analyze the contributing factors affecting the timely completion of construction projects in the Plan International Ethiopia programs.

1.5.2 Specific Objectives

The specific objectives are:

- To identify factors that cause delays in construction projects of Plan International.
- To analyze and rank in their order of significance.
- To recommend mitigation measures that minimize delay in future construction projects.

1.6. Scope and Limitations of the research

Methodological scope: The researcher used descriptive research design and quantitative

research method. Questionnaire and document review were used for the study.

Geographic Scope: Plan International, Ethiopia country office was considered for the study.

Timeline Scope: The study focused on projects completed between 2020 – 2021 for the sake of getting relevant information.

1.7. Organization of the Research

A thorough literature review follows the identification and approval of the research problem. Various documents and relevant information are collected. The collected information along with data retrieved from questionnaire respondents are discussed and analyzed. The results are interpreted and based on which conclusions and recommendations are made. In general the research thesis is structured into the following five major chapters:

Chapter 1: Introduction

The introductory chapter provides background information about the problem and the rationale to undertake a research.

Chapter 2: Literature Review

The purpose of this chapter is to identify the factors, as exhaustively as possible, that influence construction projects by looking into previous studies made on the subject.

Chapter 3: Research Methodology

The third chapter discusses the design or the approach adopted in this research for obtaining the information needed to structure the research questionnaire, to collect data, and methods of analysis to achieve reliable results on the study area.

Chapter 4: Result and Discussion

The fourth chapter discusses on the results of data analyses and the interpretation of results obtained from the survey under the respective major categories.

Chapter 5: Conclusions and Recommendations

The fifth chapter summarizes the main findings in the conclusion part and gives recommendations to assist the future projects.

CHAPTER 2

LITERATURE REVIEW

2.1. General

A successful construction project is an combined effort by people of different qualifications ensuring its completion within the scheduled time, without exceeding the allocated budget, and within the specified quality and standards. However, for various reasons, project successes are not common in the construction industry, particularly in developing countries, caused by delays and cost overrun. Many factors are contributing causes of delays in construction projects. Several studies have pointed out various factors based on the underlying condition that the specific study is concerned with, such as project type, specific location and project size.

The main purpose of this chapter is to identify the factors that contribute to the cause of construction project delays as exhaustively as possible through an intensive and comprehensive review of past research carried out by various researchers in different construction environments. This literature investigation is particularly important as it provides a substantial part of the inputs for the lists of factors to be considered for the research and to develop a conceptual framework for the research method design.

In the following sections, a brief discussion of the types of construction project delays are described and presented.

2.2. Construction Delays

Most construction projects need to go through several stages: from planning and developing of the project, to its approval, to tendering of the contract, and to the actual construction. In the early stage of project development phase, the estimates of time and cost will be needed to achieve the projects on time are prepared by the project management consultants (Singh, 2009).

Based on these estimates and other preliminary information, tender documents are prepared. During the tendering process, the contractors provide their respective prices along with their work program (schedule). After the tenders assessment and evaluation process, the contract is awarded based on lowest or best evaluated offer. The contract document which is the

binding agreement between the client and the contractor requires the project timelines for completing the scope of work within the approved cost. The actual date of completion is nearly always different from the expected date.

According to Singh (2009), time overrun is defined as the difference of time between the actual and the initially planned dates of completion. The time difference is often measured in months. A related term such as the implementation phase or implementation period is the duration in which a project is planned to be executed. Delay could occur in all phases of construction. However, several other studies have reported that project delays occur mainly during the construction phase. This is because most of the project budget is consumed during the construction process and many unforeseen factors are always involved in the construction phase such as the performance and the involvement of other parties, resources availability, environmental conditions, and contractual relations. Assaf and Al-Hejji (2006) define construction delay as the time overrun either ahead of the completing date that is signed in the agreement or the date which has been agreed by the owner and contractor. It is a phenomenon where the project is postponed for more time than planned. On the other hand, Aibinu and Jagboro (2002) define construction delay as a circumstance where a contractor and the project owner or the client equally or separately contribute to the non-completion of the construction project within the stipulated (original) or agreed contract period. Additionally, Stumpf (2000) presents delay as the extension of time required for completing the task under the contract. Delay is lack of performance or a postponement of time from the stipulated estimated finishing time that can be caused by contractor, consultant or owner as well as by some other external aspects. Construction delay is one of the most costly, complicated and common events in construction projects because it comprises large numbers of parties as clients (owners), consultants, contractors, regulators and stakeholders. Besides, the industry plays a major role in the development and achievement of society's goals. According to Alaghbari *et al.* (2007), time delay is crucially important to both the owner (in terms of performance) and the contractor (in terms of money) and which becomes the origin of regular disputes and claims leading to lawsuits. This is because those delays affect all the various construction project participants. For the client, delay can be seen as the loss of revenue due to lack of production facilities, rentable space or a dependence on present facilities.

To the professionals, time overrun implies inability to deliver value for time and money as well as tarnish their reputations and names, and results in loss of confidence rested in them by clients (Assaf and Al-Hejji, 2006). Whereas to the contractor, delay is simply an additional

liability as: (i) the construction period becomes longer, (ii) higher cost of material through inflation and due to labour cost increases, (iii) longer construction period results in higher overhead costs and expenses and (iv) the entire contractor's working capital may become trapped in one project.

2.3. Types of Delays

Any delaying event in construction could happen from the fault of the employer, or the contractor or for a condition that is beyond the control of both parties. In this respect, Kaming *et al*. (1997) classified delays into excusable, inexcusable and concurrent delays and are presented diagrammatically in Figure 1.

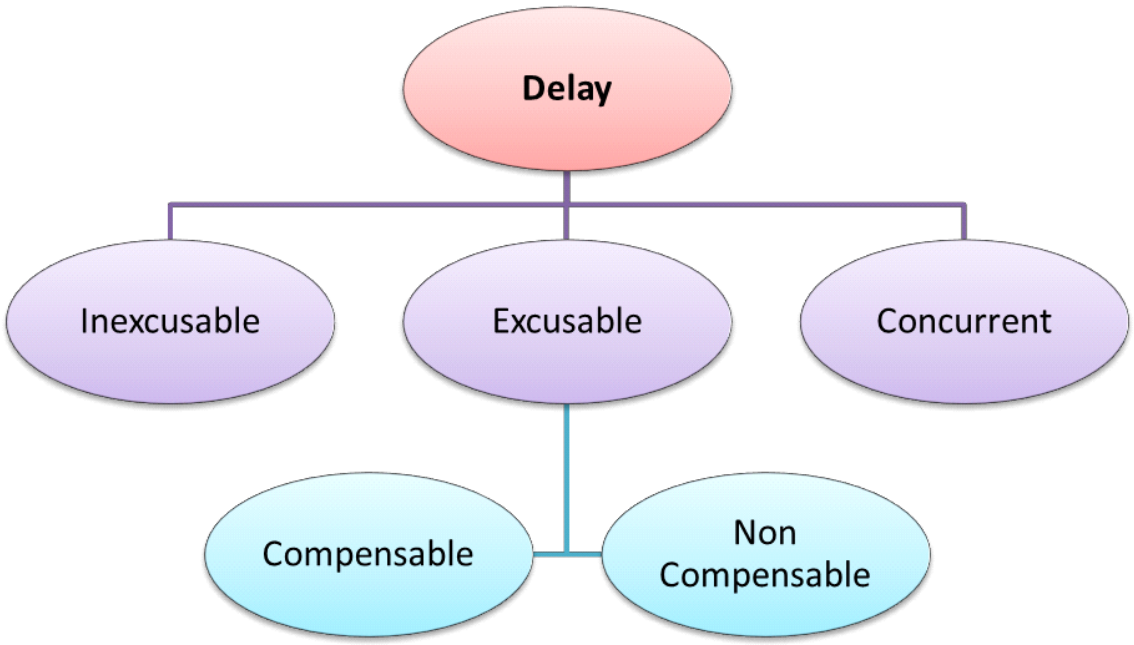

Figure 1: Diagrammatical representation of the different type of delays (Kaming *et al*., 1997).

Excusable Delays

Excusable delays are not attributable to the actions or inactions of contractor, and basically include unforeseen events. These events are out of the contractor's control and are without negligence or fault on contractor's part. According to general provisions in public agency specifications, delays resulting from the subsequent events would be considered excusable. These are general labour strikes, fires, floods, acts of God, owner- directed changes, omissions and errors in the plans and specifications, differing site conditions or concealed conditions, unusually severe weather, intervention by outside agencies and lack of action by government bodies, such as building inspection. Excusable delays can be further classified into compensable delays and non- compensable delays. Whether a delay is compensable or not

it depends primarily on the agreement of the contract. In most cases, a contract specifies the kinds of delays that are non-compensable, in which the contractor does not attain any additional money but can be allowed a time extension (Kaming *et al*. 1997).

Compensable Delays

Compensable delay is a type of delay over which the client (or client's representative) has control. Basically, in compensable delay the contractor will be eligible to additional reimbursement for the cost of delay and additional time for contract performance as well. If the owner causes delay like change in scope of work, impeded site access, late supply of client's materials or information, failure to provide timely and review shop drawings and differing site conditions; the contractor will be granted for additional time and money, this type of delay for which the innocent party is eligible for extension of time and additional reimbursement for the resulting costs.

The contractor is entitled due to time of the owner to offer all necessary details and instruction. For instance, where the employer or owner causes a delay, if the agreement does not include a provision acquitting the employer from liability for delays, the contractor is eligible to both time extension and compensatory damages. Construction contract agreements do not usually need the contractor to apply all the performance time given by the agreement. Distinguishing this, courts held owners liable for delaying contractors even though the project was done within the contractually agreed time because the contractor is barred from attaining an early finish. Thus, finishing on time does not necessarily prevent the recovery damages of delay where a reasonable as-planned schedule would then have yielded early completion (Alkass *et al*., 1996).

Non-compensable delays

Non-compensable delays are caused by an unforeseen event or incident beyond the control of the contractor and the client. As a result, both parties can incur losses in term of cost. The contractor admits his time overrun costs for taking more time in the project while the client absorbs its additional cost in the form of liquidated damages by giving additional time to the contractor and extending the contract. Causes for this type of delay cannot be controlled by any party to take the responsibility of extra cost resulting from it. These causes of delays include events such as force major; act of public enemy; war, acts of another contractor; strike, acts of God; unusual weather, fires, actions of government in its supreme capacity. In

this situation, the contractor is usually eligible to extension of time but not eligible to any additional financial compensation for delay damages from the owner. Liquidated damages are set as an amount of money stated in the contract agreement by an agency to compensate the party for unexcused interruption in the performance of the contract. The aim of the liquidated damages clause is to establish, in advance, a practical reasonable evaluation of the damages that would be incurred by the party if there is a breach of contract or an unexcused delay (Kaming *et al*. 1997).

Inexcusable delays

Inexcusable delays are delays over which the contractor (or any subcontractor) has control or delays that are not accepted by the client. In contrast to excusable delay, a non-excusable delay offers no bases for recovery of either the monetary or the time impact of the delay. Accordingly, this type of delay grants no entitlement extension of time or delay damage to the contractors even if the delay affects the whole project. The owner however could be entitled to liquidate damages. For instance, a non-excusable delay could be when a contractor is not able to provide sufficient manpower to complete the work on time. In addition, non-excusable delay is in which the party accepts the risk of delayed performances and its consequences. Commonly for contractor non- excusable delays include failure to complete work within the allotted time frame (Alkass *et al*., 1996).

Concurrent Delays

Concurrent delays are delays that occur, at least to some degree, during the same period of time. In construction, the term concurrent delay refers to the situation when non- excusable delay and an excusable compensable delay occur during overlapping time periods or at the same time. According to Alkass *et al*. (1996), concurrent delays refer to situation of delays while two or more than two delays (regardless of the type) exist at equal time or overlap to a certain degree. Concurrent delay is also used to denote a project overrun period that is caused by two or more effective delay causes which are nearly equal causative potency. In a nutshell, this type of delay can be described as a where there are more than one delay causes operating at a specific point of time.

However, in concurrent delay there are two events in which one is more important than the other. The contractor is eligible to additional time for the period of time overrun caused by the relevant event nevertheless the concurrent effect of another event. Concurrent delay

generates complex legal issues about assessing responsibility for overall delayed project. The analysis of concurrent delays could be further complicated if: (i) the delay periods are different lengths, (ii) the delay periods are not totally concurrent, and (iii) the delay periods are periods that have different influence on the type and number of work activities that are affected and the severity of the impacts upon the affected work activities are different for each of the delays (Yogeswaran *et al*. 1998).

Basically, such classifications are used for the purpose of defining the responsibility and subsequent entitlement for compensation of the impact of any delay event in the context of the conditions of contract provisions. Alkass et al. (1996) and Yogeswaran et al. (1998) have described the aforementioned classifications as excusable – non compensable, excusable - compensable and non-excusable delays respectively. They further explain concurrent delays where there is a situation where two or more delays exist at the same time or overlap to a certain degree. In such circumstances the combinations of the aforementioned scenarios should be considered in order to determine the possible entitlement to the contractor, either only for extension of time or extension of time with financial compensation.

It is however not a simple task to determine the amount of extension of time and/or monetary compensations as each of the concurrent delay events should be reviewed in line with the contractor's work program to see whether the delaying events are on the critical path or not. Critical path is the sequence of tasks which sum up to the longest overall duration. It is the minimum possible time required to finish the project. Any dalliance on the critical path hinders the finishing date of the project. A project could have many parallel, nearly critical paths. Yogeswaran *et al*. (1998) present a further detailed analysis of different scenarios of concurrent delay events with critical and non-critical activities. Hence, when there are such overlaps of causes usually the following approaches are applied:

- When the non-excusable delay is on the critical pathway and the excusable delay is non-critical, no extension of time is due.
- When the non-excusable delay is non-critical and the excusable delay is on the critical path, extension of time is due even if the non-excusable delay commenced early in the non-critical chain of activities in so far as the non- excusable delay does not impact the critical activity.
- When both excusable and non-excusable delays are critical and commenced together and cease at the same time, both the employer and contractor should bear

responsibility for them. The contractor is entitled for extension and is not entitled for associated costs even if the excusable delay is a compensable delay.

- When an excusable delay occurs first on a critical path followed by a non- excusable delay on a parallel critical path, there are grounds to argue that no compensation should be permitted but still the case will be open for debate. However, the dominant cause for the delay should be the deciding factor (Yogeswaran *et al*, 1998).

To reach to a conclusion that the contractor is entitled to a certain amount of time and/or monetary compensation or the client for liquidated damages, the agreement between the parties should have express terms in the contract for which type of delay events that the contractor is responsible and for which he is entitled to time and/or additional payment; otherwise, the situation will be even more complicated. Besides, if there is any ambiguity in the extension of time clause, it will be taken against the party who was responsible for drafting the contract (Murdoch and Hughes, 2000), because of the fact that being in such a condition usually prevents the employer (client) from its right to deduct liquidated damages from the contractor.

2.4. Factors that affect construction duration

It is widely accepted that construction time has been regarded as one of the three critical success factors together with cost and quality for construction project. Many researchers reported that construction duration of a project is affected by a vast number of factors reviewed (Chan and Kumaraswamy, 1997; Kaming *et al.,* 1997 and Sambasivan and Soon, 2007). Chan and Kumaraswamy (2002) classified factors that influence duration of construction projects in Hong Kong into four broad categories. These are project scope, complexity, environment, and management related attributes. These four categories are explored in association with their causal factors which are described as:

- Project Scope: comprises construction cost, gross floor area, number of stories, building type, contract procurement system and variations.
- Project Complexity: includes client's attributes, site condition/ site access problem, build ability of project design, quality of design co-ordination and quality management.
- Project Environment: includes physical, economic, socio-political and industrial relations.
- Management Attributes: includes client/design team management attributes, construction team management attributes, communication management for decision making, organization structures and human resources management, and productivity.

What has been explained so far is about definition, impacts and processes of determining liabilities for losses that already happened due to different factors in a project? It is however possible to reduce the impacts by learning from the problems experienced in previously executed construction projects elsewhere. In doing so, it is important to identify first the root causes to the problems, make assessment to the major factors and then analyze the major variables towards recommending a workable solution. As part of this process, the assessment for the identification of factors that cause delays has been conducted from review of previous research done on the subject. In this research, delay refers to the time overrun beyond the completion date agreed between the parties during contract signature and specified on the contract.

A comprehensive literature review finds a set of factors that cause time overrun of construction projects to develop a questionnaire. A questionnaire survey is also deployed to assess the perception of experienced respondents (contractors, consultant and client) based on the frequency of occurrence, severity and important index to achieve the research objectives and to investigate other causal factors. Many studies conducted on how to manage causes of delay in construction projects both in African countries and elsewhere in the world had been reviewed (Al-Ghafly, 1995; Al-Momani, 2000; Apolot *et al*., 2012, Assaf and Al-Hejji, 2006).

Surveys conducted by Le-Hoai *et al*. (2008) studied delay and cost overruns in Vietnam's large construction projects by comparison with some selected countries. In this survey, twenty-one causes of cost and time overruns suitable with building and industrial construction projects are identified and ranked. Evaluation of causes of cost and time overruns are done with different model construction industries in Africa and Asia. The factor analysis method was applied to categorize the causes, as a result seven factors are determined, namely: lack of constraint and slowness, design, estimate and market, financial capability, incompetence worker and Government. These results might encourage practitioners to focus on time overrun problems that might have been in their future or present projects.

A survey is also done by Sambasivan and Soon (2007) to establish the most important causes and effects of delay in the Malaysian construction industry. A questionnaire survey and relative importance index methods are used to identify the causes and effects of delay from clients, consultants, and contractors. The top ten most important causes identified from the survey include, among others, improper planning of contractors, poor site management of

contractors, insufficient contractor experience, insufficient client's finance and payments for accomplished works, problems with subcontractors, shortage in labour and material supply, lack of equipment and failure, mistakes during the construction stage and poor communication between parties.

Research was carried out by Chan and Kumaraswamy (1997) in Hong Kong construction projects to assess the relative importance of eighty-three possible delay factors. The main reasons for delay are analyzed, ranked and classified on the basis of a) responsibility of the parties in the construction industry, and b) the type of projects. Data are collected from 167 local construction organizations and analysed by using the relative impact index method in order to rank the determinant delay factors for different types of construction projects. As a result, five principal factors are identified. These are poor supervision and risk management, unpredicted site conditions, slow decision making, owner-initiated variations, and variation works.

A survey to find out the causes of delay and their prominence according to each of the three key project participants (owner, consultant and contractor) in construction projects of Saudi Arabia has also been done by Assaf and Al-Hejji (2006). The field survey carried out includes fifteen owners, twenty-three contractors, nineteen consultants. Seventy-three causes of delay are identified through literature review and discussion with other parties involved in the construction industry. These factors are classified into nine groups based on the following sources of delay: factors related to client, consultant, contractor, project, manpower, materials, design-team, equipment, and external factors. Owners explained that causes of delay are associated to contractor and labour. Their study points out the severe causes of delay for the contractor are related to owner while client and consultants recognize highest frequent factor of delay is that awarding to the lowest bidder. The common cause of delay that all parties agreed is the change of orders by client during construction. Several common causes between two parties, such as improper planning and scheduling by contractors, delay in progress payments, poor site management and supervision by contractors, difficulties in financing by contractor and shortage of labour. All key parties agree that the subsequent causes are the least important: accidents during construction, restrictions at site and traffic control, effect of social and cultural factors and changes in government regulations. However, the study revealed that the contractors identified that the main sources of delay were owners and consultant while both consultants and owners specify contractor and labour related causes are the severe and significant sources of delay.

Greenwood *et al*. (2001) did a comparative analysis of administrative delays in hospital building in order to examine whether the construction of large hospitals are susceptible to common delays or not. Two completed hospital building projects were chosen as case studies: the Tripoli Medical Centre in Libya and Guy's Hospital in London. One of the most influential causes of delay on large public projects such as these hospitals has been found to be administrative reasons. Despite the obvious differences between them, the problems encountered by the two projects exhibit some interesting similarities:

- Administrative failings associated with large public sector projects are similar regardless of factors such as geographical location and relative economic development.
- The preliminary findings show that, in most cases, hospital projects in any part of the world face similar difficulties, including slow decision-making, late approvals and changes to the make-up of administrative teams.

The problem of delay and cost overrun in African countries' construction projects are no different. Causes of delay in building construction projects in Egypt are discussed by Abdl-Razek *et al*. (2008). The main causes of delay in these construction projects are constraints in financing by the contractor during construction, design changes by client or his agent during construction, delays in contractor's payment by owner, partial payments during construction, and no utilization of qualified construction/contractual management. The results show that the consultant is found as having more intermediate views, whereas clients and contractors are seen having opposing views, usually blaming each other for delays.

A study on the Nigerian construction industry projects which was carried out by Aibinu and Jagboro (2002), reported construction delay to have reached an endemic level in Nigeria. They examined the effects of delays on the delivery of construction projects in the country. Utilizing a questionnaire survey of 61 construction projects, the authors identify and assess the impact of delays on the delivery of construction projects and finds out client-related delay is significant in Nigeria. The study recommend that acceleration of site activities coupled with improved clients' project management procedures and inclusion of appropriate contingency allowance in pre-contract estimate should assuage the adverse effect of construction delays.

Tumi *et al*. (2009) conducted research to identify causes of delays in construction projects in Benghazi city, Libya and five principal factors are identified. The first ranking is improper planning followed by lack of effective communication, shortage of supply such as steel, concrete and design errors seem to be the third-ranked reasons that cause delays.

Consequently, factors such as slow decision making, and financial issues are ranked fourth.

In Uganda, Apolot *et al.* (2012) investigated the causes of delays and cost overruns in public sector construction projects. The study is targeted to identify the causes and rank them according to their severity, frequency and importance. They point out that delayed payments, poor monitoring and control, change of work scope, political instability/insecurity and high cost of capital, are the five most significant causes of delays in public construction projects.

All the preceding discussions show that there is a great concern for construction project delays. Moreover, the funding for construction industrial activities worldwide are used to regulate the economy and as the construction industry continues to grow in size, so do planning and budgeting problems. Aibinu and Jagboro (2002) state that the contribution of the construction industry to national economic growth necessitates efforts geared towards improving construction efficiency by means of precision and cost-effectiveness. They believe that such efforts will be beneficial and contribute to cost saving for the whole country. Time, cost, quality and participant satisfactions are identified as the main criteria in measuring the overall success of construction projects.

Among construction projects undertaken by Plan International, it is reported that most of them are delayed well beyond the expected time for completion. This problem in turn is causing difficulties in timely utilization of the facility by the public, and the relationship of the stakeholders (Employer, Contractor, and Financier) involved in the construction process.

2.5. Conceptual framework

This research is aimed at investigating the problems as to why most construction projects are delayed beyond their completion date. Furthermore, the research will looks into how these problems could be substantially minimized and the responsible parties for the causes of delay in construction projects are identified from the stake holders. In order to attain these objectives and identify the factors that cause delay in construction projects of PIE, a literature review undertakes to generate a set of factors that are believed to be the most common and frequently occurring causes. From the literature review, forty one variables are identified that are known to cause delay of construction projects worldwide. Based on these identified variables, a questionnaire developed which are distributed to the construction stakeholders (client and contractors) so as to identify the most important factors that cause delay in construction projects in the area and come up with possible solutions/recommendations to the problem.

CHAPTER 3

RESEARCH METHODOLOGY

3.1. Introduction

Research methodology is the step-by-step procedure used to determine a solution to a particular problem. The methodology adopted in this research provides the procedures that are necessary for obtaining the information needed to structure the research questionnaire, collect data, analyze the collected data, and interpret and present the results. The methodologies followed in this survey are outlined in the following sections.

3.2. Research Approaches

There are two basic approaches to research: quantitative and qualitative (Leedy and Ormrod, 2005). The former involves the generation of data in quantitative form which could be subjected to accurate quantitative analysis in a proper and rigorous manner and in the form of a data base from which to realize characteristics or relationships. In quantitative research, samples of a population are studied (observed or questioned) to establish its characteristics, in short, a quantitative approach attempts to produce “real answers” from “hard data”, whereas a qualitative approach is concerned with subjective evaluation of opinions, behavior and attitudes. Qualitative methods are not good at giving direct answers, but are good at developing more questions, because of consistent use of “soft data” (Higgins, 2009). Therefore, in this research, quantitative approach is used.

3.3. Research Design

This research is a practical problem developed from the observation of construction projects and the research questions are oriented to investigate the cause of delay in construction projects implemented by PI Ethiopia country office. This research can be categorized as applied and descriptive type. It is applied because the research is initiated from existing practical problems. It is also descriptive because it tried to describe the factors that contribute to time overrun in construction projects of PI Ethiopia country office.

3.4. Research Methods

3.4.1 Sampling techniques and sample size

Target population

The population of the study comprises of the stakeholders involved in construction projects; as owner (Plan International, Ethiopia country office) and contractors who were involved in construction projects taken (considered). For this study, projects completed from 2020-2021 GC are taken to get possible reasons for delay and data availability in the organization construction tracker sheet. There was a total of 12 peoples administering construction projects on the owner side and 62 from the contractor side. No consultant is selected as PI didn't hire during studied periods; all projects were managed by owner/client staffs.

Sampling method

A two-step process is used in which the population is partitioned into strata as owner and Contractors. The strata are mutually exclusive and collectively exhaustive in that every population element should be assigned to only one stratum and no population elements should be omitted.

Sample size

In the case of the research population, it does not mean that all members (employees) of stakeholders are possible respondents for the questionnaire. Rather the questionnaire was distributed to engineers & other professionals who know the concerned construction projects during the specified time. Hence, the study sampling design conducted through Purposive sampling, which is one of non-probability sampling techniques. The minimum sample size to get any kind of meaningful result is 100. If the population is less than 100 then recommended to survey all of them. Hence for this study, all the population is taken.

3.4.2 Data sources, data collection instruments and procedures

Data Source and data collection

There are two types of research data collection, primary and secondary data collection. The primary data used in this study are collected through a questionnaire survey. The secondary data used in this research are obtained from the organization project and construction report papers. A questionnaire is designed from literature review of various factors affecting performance of construction projects and from secondary data sources to identify the most

important factors that contribute construction delay of projects implemented by Plan International.

Data Measurement

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. In this research, ordinal scales were used. Ordinal scale is a ranking or a rating data that normally uses integers in ascending or descending order. The numbers assigned to the agreement or degree of influence (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 this scale, the researcher has the following table:

Table 3.1: Rating scale for significance level of factors on project performance

Significance Level	Extremely significant	Very significant	Moderately significant	Slightly significant	Not significant
Scale	5	4	3	2	1

3.5. Research instruments

Good quality questionnaire design is a key to finding good survey results and guaranteeing a high rate of return (Zikmund, 2000). The questionnaire designed for this study utilizes the information sourced from the extensive literature review, the global nature of the construction industry and relevance to Plan International Ethiopia construction project context.

The questionnaires were divided into three sections: Part A which seeks to establish general details of the respondent, Part B which contained factors contributing the delay of construction projects grouped into four and Part C which contained open ended question The open-ended questions help key respondents discuss easily and freely on the delay in construction of Plan International and will be used in this research for triangulation purposes. Only selected staffs are interviewed as key informant through telephone. Four respondents were selected and interviewed from two directorates (one from Emergency and one from development projects) from the owner organization and Two (General Managers) from the contractor side who have done relatively many projects during the study periods.

3.6. Piloting the research instruments

Taking into consideration the significance and need to identify and establish weaknesses in the instrument that was used in the research study, the self-administered questionnaire was pre-

tested before distributing it to the respondents. The questionnaires were reviewed and then tested on a small pilot sample of respondents with similar characteristics as the study respondents. The pilot sample consisted of 2 from owner side and 6 from contractors' side who were randomly selected and are excluded from final sample. Mugenda and Mugenda (2003) suggest that the piloting sample ought to represent 10% of study sample based on the study sample size. Proposed suggestions for improvement of the questionnaire were gathered and adjustments were made to obtain a refined instrument. Piloting helps in revealing questions that could be vague which facilitates their examination until they communicate the same sense to all the subjects (Mugenda & Mugenda, 2003).

Reliability of research instruments

Reliability estimates the consistency of the measurements or more simply, the degree of uniformity of the results obtained from repeated measurements. "*Reliability is essentially about consistency*" (Adams, et al, 2007). For this purpose, the quality of data was measured, evaluated and guaranteed using appropriate techniques.

The data quality has been assured and measured through internal validity instrument in to correct research instruments application for accurately measuring the variables during the data collection procedures. Besides, data consistency was checked using reliability test (Cronbach's Alpha methods). According to Sekaran (2010), reliability less than 0.6 are considered to be poor, those in the 0.7 range, acceptable, and those above 0.8 are good. The closer the reliability coefficient gets to 1.0, the better.

Table 3.2 : Shows the Reliability Statistics/Cronbach's Alpha coefficients of the variables:

Variable	No. of Items	Cronbach's Alpha coefficients
Project related factors	6	.817
Owner related factors	10	.798
Contractor related factors	15	.803
External related factors	10	.779

Cronbach`s Alpha is a statistical test used to examine the internal consistency of the attributes determined for each dimension. As shown in above table, the value of the Cronbach's Alpha for variables was found to be above 0.7 which is an indication of acceptability of the scale for further analysis.

Validity of research instruments

Validity is the degree to which the sample of the test item represent the content that is designed to measure. Creswell (2003) notes that validity is considering if one can draw consequential and valuable inference from scores on the instrument. The research adopted content validity which refers to the extent to which a measuring instrument provides adequate coverage of the topic under study. To ensure content validity, the instruments were reviewed to enabling the content to address the purpose and avoided ambiguity. This ensured that all respondents understood the content on the questionnaire.

3.7. Method of Data Analysis

The relative importance index method (RII) is used to determine owner and contractors' perceptions of the relative importance of the key performance indicators in PIE construction projects. The relative importance index is computed as (Cheung et al, 2004; Iyer and Jha, 2005; Ugwu and Haupt, 2007): The relative importance index is computed using SPSS and MS excel by the following formula;

$$RII = \frac{\sum (W)}{A \times N} \quad \text{.....Equation 2}$$

Where;

- W is the weight given to each factor by the respondents and ranges from 1 to 5
- A = the highest weight = 5
- N = the total number of respondents

3.8. Ethical Considerations

At the beginning the researcher has explained the purpose of the study to respondents. After that one questionnaire was given to each respondent. Respondents were guaranteed that no one will have access for an individual respondent's information except the researcher. Then, respondents have given their informed consent by completing and returning the questionnaire. Results of the study are reported in a complete and honest way without misinterpreting or intentionally misleading others with regard to the research findings. The study is the researcher's own work, and where researcher's ideas or words were used, it was acknowledged in the research report. Every person involved in the study was entitled to the right of privacy and dignity of treatment, and no personal harm was caused to subjects in the research. Information obtained was held in strict confidentiality by the researcher.

CHAPTER 4

RESULTS AND DISCUSSION

In this chapter, results have been presented and discussed to address the research questions and objectives.

4.1. Demographic characteristics

4.1.1 Respondent representation

Table 4. 1 : The frequency of organization the respondent represent:

Type of Organization	Frequency	Percent%	Frequency	Percent%
	Distributed		Responded	
Owner	10	15.15%	9	90%
Contractor	56	84.85%	46	82.14%
Total	**66**	**100.00%**	**55**	**83.33%**

The overall response rate is 83% which is sufficient to find out the perceptive of the relative importance of project performance indicators.

4.1.2 Respondent general Information

Table 4. 2 : The frequency of profile of respondents

Description	Owner		Contractor		Cumulative	
	Frequency	Percent%	Frequency	Percent%	Frequency	Percent%
Gender (Male, Female)						
Male	7	77.78%	46	100.00%	53	96.36%
Female	2	22.22%	0	0.00%	2	3.64%
Total	**9**	**100%**	**46**	**100%**	**55**	**100%**
Respondents' designation						
Owner of organization	0	0.00%	6	13.04%	6	10.91%
Project/Program manager	2	22.22%	1	2.17%	3	5.45%
Site Engineer	0	0.00%	21	45.65%	21	38.18%
Office Engineer	1	11.11%	18	39.13%	19	34.55%
Site Supervisor	5	55.56%	0	0.00%	5	9.09%
Other	1	11.11%	0	0.00%	1	1.82%
Total	**9**	**100%**	**46**	**100%**	**55**	**100%**
Level of education						

Certificate	0	0.00%	0	0.00%	0	0.00%
Diploma	0	0.00%	10	21.74%	10	18.18%
Degree	5	55.56%	36	78.26%	41	74.55%
MA/Msc	4	44.44%	0	0.00%	4	7.27%
PhD or above	0	0.00%	0	0.00%	0	0.00%
Total	**9**	**100%**	**46**	**100%**	**55**	**100%**
Years of Experience in the organization						
0 to 4	0	0.00%	3	6.52%	3	5.45%
4 to 8	7	77.78%	30	65.22%	37	67.27%
8 to 12	1	11.11%	8	17.39%	9	16.36%
More than 12	1	11.11%	5	10.87%	6	10.91%
Total	**9**	**100%**	**46**	**100%**	**55**	**100%**
Types of response the constructions belong						
Emergency Response	6	66.67%	21	45.65%	27	49.09%
Development Programs	1	11.11%	10	21.74%	11	20.00%
Both	2	22.22%	15	32.61%	17	30.91%
Total	**9**	**100%**	**46**	**100%**	**55**	**100%**

From these table, the response was dominated by male respondents who accounted 96.3% (n=53) while 3.6% (n=2) were female. All the women are the owner staffs and none from the contractors. As shown in table, respondents in this study have different positions. positions such as Owner of Organization/Managing Director 10.9%, Project/Program Manager 5.5%, Site Engineer 38.2%, Office Engineers 34.6%, Site Supervisor 9.1% and Others 1.8%. The study sought to establish the level of education of the respondents and the results indicated in the table above. Respondents with a degree education dominated at 74.6%. They were followed by those with Diploma holders accounted 18.2% and Master's Degree at 7.3%. the study also showed that 88% of owner staffs and 78% of contractors participate in constructions related to Emergency responses. Finally, the work experience of respondents revealed that more than 90% have more than four-year construction experience. This gave a dependable data on the study because the respondents were familiar with PIE construction projects activity and therefore has the way in to all relevant data to answer the questionnaires effectively. This is an advantage to the company in order to implement projects if it is efficiently utilized.

4.2. Analysis of factors factors contributing to the delay of Construction Projects

The results of this part of study provide an indication of the relative importance index and rank

of factors affecting the delay of construction projects in PIE. The following shows summary of factors ranking according to each type of target group.

Table 4. 3 : The relative importance index (RII) and rank of factors of factors contributing the delay of construction projects

Groups/Factors	Owner		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank
(1) Project related factors						
Discrepancies between contract documents	0.82	22	0.70	40	0.72	40
Suspension of work by owner or contractor	0.84	19	0.71	39	0.73	39
Change order (frequency, type, etc.)	0.91	5	0.81	24	0.83	18
Type of project bidding and award (lowest bidder)	0.80	28	0.74	38	0.75	37
Inadequate Contract duration	0.91	5	0.92	2	0.92	2
Complexity of the project	0.78	33	0.75	37	0.75	36
(2) Owner related factors						
Delay in finance and payments of completed work	0.82	22	0.87	6	0.86	7
Owner interference	0.78	33	0.80	28	0.80	33
Slow decision-making by owners	0.76	37	0.78	35	0.78	35
Unrealistic contract duration imposed	0.89	8	0.83	17	0.84	14
Bureaucracy in client organization	0.84	19	0.80	31	0.81	29
Lack of sufficient cash for project implementation	0.80	28	0.83	15	0.83	20
Poor contract management	0.89	8	0.81	24	0.82	22
Lack of coordination with the contractor and utility providers	0.80	28	0.85	10	0.84	12
Inadequate design specifications	0.76	37	0.82	20	0.81	30
Selection of incompetent contractor’s	0.91	5	0.81	24	0.83	18
(3) Contractor related factors						
Financial problems	0.82	22	0.81	22	0.81	25
Subcontractors issue (like frequent change, poor performance, etc)	0.82	22	0.80	31	0.80	31
Poor site management & supervision	0.87	14	0.80	28	0.81	25
Construction methods	0.78	33	0.81	24	0.80	31
Inadequate planning and scheduling of work	0.93	3	0.86	7	0.87	6

The leaders are committed to providing all the required resources to implement performance management system.	0.80	28	0.86	7	0.85	9
Construction mistakes and defective works (by different means)	0.87	14	0.83	17	0.83	16
Inadequate contractor experience	0.87	14	0.84	12	0.84	11
Poor skill and experience of labor/technical staff	0.87	14	0.88	4	0.88	5
Labor supply	0.84	19	0.80	28	0.81	28
Labor productivity	0.89	8	0.80	31	0.81	24
Quality of material	0.80	28	0.83	17	0.82	22
Shortage in material/equipment/tool on site	0.96	1	0.87	5	0.89	4
Delay in delivery of material on site	0.89	8	0.84	12	0.85	10
Insufficient delegation of power to the site	0.82	22	0.79	34	0.79	34
(4) External related factors						
Natural Disaster	0.73	39	0.85	9	0.83	16
Major disputes and negotiations	0.78	33	0.83	14	0.83	20
Local Government/Community issues	0.82	22	0.81	22	0.81	25
Inclement weather conditions	0.89	8	0.83	15	0.84	13
Political instability (eg. Security issues)	0.96	1	0.94	1	0.95	1
Unexpected surface and subsurface conditions	0.89	8	0.85	10	0.85	8
Lack of material, equipment, and tools on the market	0.93	3	0.82	20	0.84	14
Change in laws and regulations	0.71	40	0.76	36	0.75	38
Price fluctuations (inflation/escalation)	0.87	14	0.91	3	0.90	3
Delay in providing services from utilities (such as telephone, water, electricity)	0.67	41	0.64	41	0.64	41

As per the above relative importance index (RII), the table below shows the top ten factors contributing the delay of construction projects.

Table 4. 4 : The top ten factors contributing the delay of construction projects in Plan International

Groups/Factors	Owner		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank
Political instability (eg. Security issues)	0.96	1	0.94	1	0.95	1
Inadequate Contract duration	0.91	5	0.92	2	0.92	2
Price fluctuations (inflation/escalation)	0.87	14	0.91	3	0.90	3
Shortage in material/equipment/tool on site	0.96	1	0.87	5	0.89	4
Poor skill and experience of labor/technical staff	0.87	14	0.88	4	0.88	5
Inadequate planning and scheduling of work	0.93	3	0.86	7	0.87	6
Delay in finance and payments of completed work	0.82	22	0.87	6	0.86	7
Unexpected surface and subsurface conditions	0.89	8	0.85	10	0.85	8
The leaders are committed to providing all the required resources to implement performance management system.	0.80	28	0.86	7	0.85	9
Delay in delivery of material on site	0.89	8	0.84	12	0.85	10

Political instability (eg. Security issues) is ranked first. The main reason associated with this is that for the last two to four years the country political problems was not stable that affect free flow of people and material as needed. Many projects suffer time overrun. This result agrees with Cho Y. J., Lee J. W. (2012) as this factor affects strongly on project schedule & cost performance of projects. Shorter completion period given for the contract is ranked second with an average RII of 0.92. The main reason is that many construction projects done under emergency program have smaller time to complete to mate donors given time without considering the volume of work and local condition. This is a strong indication of the importance of proper estimation of project duration. One of the important obligations of owner is to determine the duration of project according to the volume of activates and local condition. This result is in agreement with Odeh and Battaineh (1999) as this factor affects strongly on project schedule performance.

Escalation of material prices is ranked third. The main problem is due to devaluation of birr and shortage of hard currency that have direct and indirect impact in construction projects especially

material and labor prices. Increase in materials prices affect both the owner and the contractor which in turns leads to projects been finished with poor output, overall performance of the project. The result is in line with Enshassi et al (2009), escalation of material prices affects the liquidity of owners and the profit rate of contractors. Shortage in material/equipment/tool on site is ranked fourth. The main reason is that for any insufficient supplying of materials on time or quantity will delay the schedule and result in increased overall cost. This result is in agreement with Koushki, P. A. & Kartam, N., (2004) as this factor affects strongly on overall project performance. Poor skill and experience of labor/technical staff is ranked fifth. The main reason is especially in emergency projects, skill full people don't what to travel to sites with only basic facilities, inconvenient environment and usually higher expenses of living. Working with the available not qualified workers compromise quality, cost and time. This result agrees with Adnan Enshassi et al., (2010) as this factor affects strongly on project performance because it affects strongly time & cost overruns.

Planning effort by contractors is ranked sixth. The main reason is unavailability of qualified technical staffs both at office and field to do proper planning along with the quick decision-making capacity by the owners or manager on contractor side. Delay in delivery of materials which is ranked in Tenth go along with this factor. This result agrees with Arditi, J.D. (1985) as this factor affects strongly on project performance and may even result in total project failure. Chan Albert and Chan Daniel (2004) also obtained that the accurate construction planning is a key determinant in ensuring the delivery of a project on schedule and within budget.

Delay of progress payment to contractors ranked seventh. The main reason for delay of progress payment to contractors is that almost all construction payments tendered in Addis Ababa or regional area offices needs to be reviewed at the point of tendering which usually take more time for processing. This is usually aggravated when there is comments that needs revision at lower level and since only four peoples are available to check the payments at head office along with the three weeks minimum contractual time given for processing will have impact on contractors who needed their money the soonest. This result agrees with Lim (2005) as this factor affects strongly on project schedule & cost performance of projects. Ofori (1984) also revealed the effect of chronic delay in the payments of contractors on their performance.

Unexpected surface and subsurface conditions are ranked eighth. The main reason for this are inadequate knowledge by contractors before submitting bids and unexpected site specific

situations. This also agrees with Musa et al., (2015). The leader's commitment to provide the required resources to implement performance management system is ranked ninth. The main reason is that every time there is consistent project leaders' involvement, will always result in improving the performance by solving any problem faced in during implementation and create some pressure on staffs at field in following the agreed schedule. This result is in agreement with UNRWA. (2006) as this factor affects strongly on project completion time.

Table 4. 5 : The relative importance index (RII) and rank of major groups affecting the time factor of construction projects performance

Factors	Owner		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank
(1) Project related factors	0.84	2	0.77	4	0.81	4
(2) Owner related factors	0.82	3	0.82	3	0.82	3
(3) Contractor related factors	0.85	1	0.83	1	0.84	1
(4) External related factors	0.82	3	0.82	2	0.82	2

As shown in the table above, contractor related factors are the top ranked factor groups that contribute delay of construction projects in Plan International. All the above major factors are as stated by respondents during interview as they are selected based on their key knowledges on the study construction projects.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This study was conducted in Plan International Ethiopia projects, which work all over the country, Ethiopia with the major intent of identifying major factors contributing the delay of its construction projects and rank factors to give some recommendations based on their significance to avoid or minimize delays. Based on the purposes and results of the study, the following conclusions are drawn.

Desk study was used to identify the existence and extent of delays. More than 90% of the investigated 112 projects in the research suffered delay. Questionnaire survey was used to identify the factors affecting delay in PIE construction projects. The data collected from the survey are studied using the mean score (MS). Forty-one factors were identified and listed under four groups. These groups are project related factors, Owner (PIE) related factors, contractor related factors and external environment factors. Political instability (eg. Security issues), Inadequate Contract duration, Price fluctuations (inflation/escalation), Shortage in material/equipment/tool on site, Poor skill and experience of labor/technical staff, Inadequate planning and scheduling of work, Delay in finance and payments of completed work, unexpected surface and subsurface conditions, delay in delivery of material on site and leaders commitment to provide the required resources to implement performance management system were ranked the top ten most important performance factor by contractors and owners. These results are in line with many of literatures, it's found that there is a real similarity of the important factors that influencing delays.

5.2. Recommendation

Considerations on the ongoing external environment especially political instability, through different assistances (flexible schedule, technical assistance) to contractors will improve the performance of works. Effective and continuous assistance to contractors will help them in their planning and project management effort. Availability of meeting before bid submission date may help contractors to get valuable information on their price setting and understand scope of works. Contractors need to conduct site visits to reduce risk associated with physical environment especially on material & labor availability and their quality. It is also necessary

for construction implementing organization (owner) to evaluate the volume of works and local condition to estimate proper time before tendering and entering into contract. When the available time is small, especially like the case emergency projects, larger works needs to break into possible separate unique projects and be tendered. Bigger contractors may be invited for critical construction projects that won't be separated into smaller projects. This will help in balancing quality & available time. Having skilled workers available in all sides at both office and site will solve associated problems on proper construction management, quality of work, cost control and time management. This along with sufficient supply of materials on time and in quantity will improve project performance specially meeting agreed contract time. To attract skilled workers, the contractors need to have some form of incentives to workers to avoid using available unskilled labors.

Solution to have reduced payment waiting time from the owner side needs an immediate action. Working on online/softcopy approval system may be one solution. Adequate planning before and during implementation time, on-time request of interim payments and taking consideration for possible change of material price during tendering time will help contractors from the risk of escalated material prices, improve financial liquidity and the profit of contractors. Proper construction planning and management to ensure the delivery of a project on schedule and within budget is only possible by having technically capable skilled staffs. Contractors needs to work on that. Project leaders needs to have early & continuous involvement in the project to get on time information about their sites, to work on problems, adjusting plan and implement contract management systems to mate actual site conditions and others faced during actual implementation.

REFERENCES

Abdl-Razek, M.E., Bassioni, H.A. and Mobarak,A.M,(2008).Causes of delays in building construction projects in Egypt, *Journal of Construction Engineering and Management*, 134 (11):831-841.

Aibinu,A.A., and Jagboro,G.O.(2002).The effects of construction delays on project delivery in Nigerian construction industry, International Journal of Project Management. 20: 593–599.

Alaghbari, W.,Kadir, M.R.A., Salim, A., and Ernawati B.(2007).The significant factors causing delay of building construction projects in Malaysia, *Engineering, Construction and* Architectural Management, 14 (2): 192-206.

Al-Ghafly M.A. (1995).Delays in the construction of public utility projects in Saudi Arabia, Master's Thesis, CEM Dept.

AlkassS., Mazerolle M. and Harris F. (1996). Construction Delay Analysis Technique, *Construction Management and Economics Routladge*, 14(5):375–394.

Al-KhalilM.I.andAl-GhaflyM.A. (1999).Important Causes of Delay in Public Utility Projects. *Construction Management and Economics*. 17(2): 101-106

Al-Momani, A.H.(2000).Construction delay a quantitative analysis, *International Journal of Project Management*, 18 (1): 51-59.

Amaratunga,D. and Haigh, R.(2010).Disaster and the Built Environment: Towards Mature Discipline, *International Journal of Disaster Resilience in the Built Environment*(Editorial),1:11-24.

Apolot, R., Alinaitwe, H. and Tindiwensi, D.(2012). An Investigation into the Causes of Delay and Cost Overrun in Uganda's Public Sector Construction Projects, *Second International Conference on Advances in Engineering and Technology.* Makerere University

Assaf, S.A. and Al-Hejji,S.(2006).Causes of delay in large construction projects, *International Journal of Project Management*, 24:349–357.

Assaf,S.A., Al-Khalil, M. and A-Hazmi,M.(1995).Causes of Delay in Large Building construction Projects, *Journal of Management in Engineering*, ASCE. March/April 45-50.

Chan,D.W.M, and Kumaraswamy, M.M,(2002).Compressing construction duration: Lesson learned from Hong Kong building projects, *International journal of project management*.20 (1): 23-35.

Chan,D.M.W. and Kumaraswamy, M.M.(1997).A Comparative Study of Causes of Time Overruns in Hong kong Construction Projects, *International Journal of Project Management*, Elsevier. 15(1): 55-63.

Enshassi,A., Lisk,R., Sawalhi,I., Radwan,I.(2003).Contributors to construction delays in Palestine, *The Journal of American Institute of Constructors*, 27 (2):45-53.

Enshassi,A., Mohammed,S., AbuMosa, J.(2008).Risk management in building projects: contractors' perspective, Emirates *Journal for Engineering Research*,13 (1): 29-44.

Flyvbjerg B., Holm M. S. and Buhl S. (2002). *Understanding costs in public works projects: Error of lie?* Journal of the American Planning Association, 68(3) pp.279-295.

Flyvbjerg,B., Holm,M.K.S. and Buhl,S.L (2003).How common and how large are cost overruns in Transport infrastructure projects? *Transport Reviews*, 23:71-88.

Flyvbjerg,B(2009).*Optimism and misrepresentation in early project development.* Palgrave Macmillan, Basingstoke, pp. 147

Greenwood, D.J.,Osborne, A.N. and Aggiag, M.A.(2001).A comparative analysis of administrative Delays in hospital buildings, In Akintoye,A (Ed.),17th Annual ARCOM Conference, University of Salford. Vol. 1, 795-802

Higgins,G.E.(2009).QuantitativeversusQualitativeMethods:Understanding Why Quantitative Methods are Predominant in Criminology and Criminal Justice**.** *Journal of Theoretical and Philosophical Criminology*, Vol 1 (1): 23-37

Kaming,P., Olomolaiye, P.,Holt,G, and Harris,F.,(1997).Factors influencing construction time and cost overruns on high-rise projects in Indonesia, *Construct Manage Economics*, 15: 83–94.

K.K Chitkara, (2003), Construction Project Management. Planning, Scheduling and Monitoring

Leedy,P.D. and Ormrod,J.E.(2005), Practical Research: planning and design.8thEd.New Jersey: Pearson Prentice Hall.

Le-Hoai,L.,Lee, Y.D. and Lee,J.Y.(2008),Delay and Cost Overruns in Vietnam Large

Construction Projects: A comparison with other selected countries, KSCE *Journal of Civil Engineering*, 367-377

Murdoch, J. and Hughes, W.P. (2000). Construction Contracts Law and Management, Third Edition, London; Spon Press.

Odeyinka,H.A and Yusif,A. (2002).the causes and effects of construction delays on completion cost of housing projects in Nigeria. *Journal of Financial Management of Property and Construction* 2(3):31–44.

Ogunlana,S.O., Promkuntong,K. and Jearkjirm.V.(1996).Construction delays in a fast growing economy, comparing Thailand with other economies. *International journal of project Management*14 (1):37-45

Ruddock,L., Amaratunga,D., Wanigaratne,N. and Palliyaguru,R.(2010), Post-Tsunami Reconstruction in SriLanka: Assessing the Economic Impact, *International Journal of Strategic Property Management*, 14: 217-230.

Sambasivan, M.and Soon, Y.W. (2007).Causes and effects of delays in Malaysian construction industry, *International Journal of Project Management*, 25(5):517-526.

Sanders,D and Eagles,W.D.(2001). Delay, Disruption and Acceleration Claims. Borden Ladner Gervais LLP, May 2001scant information", Basingstoke, UK: Palgrave MacMillan

Shaikh,A.W.,Muree,M.R. and Soomro,A.S.(2010). Identification of Critical Delay Factors in Construction, Jamshoro. Pakistan, Sindh Univ. *Res.Jour.* (Sci.Ser.)42 (2): 11-14

Singh,R. (2009).Delays and Cost Overruns in Infrastructure Projects: An Enquiry into Extents, Causes and Remedies, Department of Economics Delhi School of Economics University of

Sidney M.Levy (2002), Project management in construction, fourth edition

Stumpf, G.R. (2000). Schedule Delay Analysis, *Cost Engineering*, 42(7): pp. 32-43.

Susan,J.(2004). Likert Scales: How to (Ab) Use Them. Medical Education38: 1217-1218

Tumi,S.H., Omran,A. and Pakir, A.H.K.(2009),Causes of Delay in Construction Industry in Libya, The International Conference on Economics and Administration, Faculty of Administration and Business, University of Bucharest, Romania ICEA–FAABucharest,14-15th November.

Turin,D.A.(1973).The Construction Industry: Its Economic Significance and its Role in

Development. London: University College Environmental Research group.

UNRWA. (2006). Projects completion reports, UNRWA, Gaza.

YogeswaranK., Kumaraswamy M.M., and Miller Douglas R.A.(1998),Claims for Extensions of Time in Civil Engineering Projects, *Construction Management and Economics*, 16(3): 283.

Zikmund,W.G.(2000).Business research methods.6thed.Orlando, US: Dryden Press.

APPENDIX

School of Graduate Studies
Department of Project Management

The purpose of this questionnaire is to gather information on factors contributing to the delay of construction projects, in plan international. The researcher guarantees the organization that this study is intended fully for academic purpose and all information that you provide will be used only for research purpose and kept confidential. You are kindly, therefore, requested to provide thoughtful and honest responses that will give the most valuable information for the research. The study report will later be shared to the organization for utilization of results, findings and recommendations of the researcher.

For any clarification on this questionnaire, please contact the researcher on 0925 939529 (Samrawit Habtemariam)

SECTION A: GENERAL RESPONDENT INFORMATION

1. State respondent organization/company type.

   Client/PI ☐, Contractor ☐

2. Respondents Gender: ☐ Male, ☐ Female

3. Respondents' designation:

   Owner of organization/General Mangers ☐ Project/Program manager ☐ Site Engineer ☐

   Office Engineer ☐ Site Supervisor ☐ Other _____

4. What is your level of education?

   ☐ Certificate, ☐ Diploma, ☐ Degree, ☐ MA/Msc, ☐ PhD or above

5. Relevant working experience (Years):

   1-4Yrs ☐ 4-8Yrs ☐ 8-12Yrs ☐ >12Yrs ☐

6. What types of response do the constructions belong? (Which the contractor or employer involved)

   Emergency Response ☐ Development Programs ☐ Both ☐

SECTION B: FACTORS CONTRIBUTING TO DELAYS OF CONSTRUCTION PROJECTS IN PLAN INTERNATIONAL

Please indicate the significance of each factor by ticking the appropriate boxes. Add any remarks relating to each factor on the last column e.g. as to the reasons, the critical factors or the solutions.

E.S. = extremely significant (5); V.S. = very significant (4);
M.S. = moderately significant (3); S.S. = slightly significant (2);
N.S. = not significant (1)

No	Factor	E. (5)	V. (4)	M.S. (3)	S.S. (2)	N.S. (1)	Additional comment (If any)
1	**Project – related**						
a	Discrepancies between contract documents						
b	Suspension of work by owner or contractor						
c	Change order (frequency,						
d	Type of project bidding and award (lowest bidder)						
e	Inadequate Contract duration						
f	Complexity of the project						
2	**Owner/PI**						
a	Delay to furnish and deliver the site						
b	Poor communication and coordination						
c	Delay in finance and payments of completed work						
d	Owner interference						
e	Slow decision-making by owners						
f	Unrealistic contract duration imposed						
g	Bureaucracy in client organization						
h	Lack of sufficient cash for project implementation						
i	Poor contract management						
j	Lack of coordination with the contractor and utility						
k	Inadequate design						

l	Selection of incompetent contractor's						
3	**Contractor**						
a	Financial problems						
b	Subcontractors issue (like frequent change, poor performance, etc)						
c	Poor site management & supervision						
d	Construction methods						
e	Inadequate planning and scheduling of work						
f	Construction mistakes and defective works (by different means)						
g	Inadequate contractor						
h	Poor skill and experience of labor/technical staff						
i	Labor supply						
j	Labor productivity						
k	Quality of material						
l	Shortage in material/equipment/tool on site						
m	Delay in delivery of material on site						
n	Insufficient delegation of power to the site						
4	**External factors**						
a	Natural Disaster						
b	Major disputes and						
c	Local						
d	Inclement weather conditions						
e	Political instability (eg. Security issues)						
f	Unexpected surface and subsurface conditions						
g	Lack of material, equipment, and tools on the market						
h	Change in laws and regulations						

i	Price fluctuations (inflation/escalation)						
j	Delay in providing services from utilities (such as telephone, water, electricity)						

SECTION C: INTERVIEW QUESTION

The following are interview questions for selected key respondents on the mitigation methods of project delay.

1. What is your general opinion about the construction project regarding construction delay in Ethiopia and projects in Plan International?
2. What is your company's strategy towards time management and zero delay performance?
3. Which construction stakeholders contribute to cause of delays in Plan International? Can you elaborate?
4. What are the different causes of delay in construction projects?
5. What are the project delay mitigation methods for owner causing delay factors from your experience?
6. What are the project delay mitigation methods for contractor causing delay factors from your experience?
7. What are the project delay mitigation methods for external causing delay factors from your experience?

If you have comments regarding delay, kindly request to write here

_____

_____

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