ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

THE EFFECT OF PROJECT CONSTRAINT ON PROJECT PERFORMANCE IN THE CASE OF AYAT 40/60 BUILDING PROJECT

BY

BETHLEHEM WONDIM TADESSE

ADDIS ABABA, ETHIOPIA

JULY, 2023 G.C

THE EFFECT OF PROJECT CONSTRAINT ON PROJECT PERFORMANCE IN THE CASE OF AYAT 40/60 BUILDING PROJECT

BY

BETHLEHEM WONDIM

THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF BUSINESS AND ECONOMICS GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER'S OF SCIENSE IN MANAGEMENT

JILY 2023

ADDIS ABABA, ETHIOPIA

DECLARATION

I BethelhemWondimTadesse, registration number I.D. number GSE/3906/13, prepared this research titled “The effect of project constraint on project performance in the case of Ayat 40/60 building project” is my own work with the advice and help of my research advisor for the partial fulfillment of the requirements for the degree of Master of Science in Management Specialization in Total Quality Management and Organizational Excellence from Addis Ababa University. I hereby declare that this thesis is my original work and that it has not been submitted partially; or in full, by any other person for an award of degree in any other university/institution.

Submitted by:

Full Name: Bethlehem Wondim Signature:  Date: 08/06/2023

Approved by: Dejene Tulu (PhD)

This Thesis has been submitted for examination with my approval as adviser,

Advisor Name: Dejene Tulu (PhD) Signature:  Date: 08/06/2023

APPROVAL

The undersigned certify that they have read and hereby recommend to ADDIS ABABA UNIVERSITY, COLLEGE OF BUSINESS AND ECONOMICS GRADUATE STUDIES to accept the Thesis submitted by BETHELHEM WONDIM and entitled "THE EFFECT OF PROJECT CONSTRAINT ON PROJECT PERFORMANCE IN THE CASE OF AYAT 40/60 BUILDING PROJECT" in partial fulfillment of the requirements for the award of a MASTER'S OF SCIENSE IN MANAGEMENT**.**

Submitted by: Full Name: Bethelhem Wondim

Signature  Date 11/07/2023

Approved by:

Advisor: Dejene Tulu (PhD) Signature  Date 08/06/2023

Internal Examiner: Habtamu E. (PhD) Signature  Date 11/07/2023

External Examiner: Merga M. (PhD) Signature  Date 01/07/2023

ACKNOWLEDGMENT

At the very onset, I need to praise the Almighty God then I would like to express special gratitude to my advisor Dr.Dejene Tulu, for his constructive, critical and valuable comments through the research work and professional support and guidance that made this work possible.

My Especial thanks are goes to my beloved Family for all the all support, love and their prayer throughout my study that you gave me on this journey. I also forward my thanks to my friends for support me.

My thanks also extend to all offices that have cooperated in providing me relevant material for doing this research. I am also indebted to all respondents for their willingness to be participants of the study in sharing of their thoughts and experiences with me that made this study possible.

Finally, my deepest appreciation and thanks goes to my families and all my friends for their supporting materials and sharing ideas for this research.

DEDICATION

This research work is dedicated to My Father WondimTadesse, My Mother YeneneshWorkiye, My Sister FebenWondim and My Brother DagimWondim for their endless support, patience, encouragement and prayers towards my Successful completion of this course during the entire period of my study.

ABBREVATION AND ACRONYMS

ANOVA ……. Analysis of Variance

SPSS……. Statistical Package for Social Science

WBS…… Work Break down Structure

TOC…… Theory of constraints

PMBOK…… Project management body of knowledge

PMI……. Project management institute

TABLE OF CONTENT

Contents

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The main objective is to analyze the effect of project constraint in construction project performance at Ayat 40/60. Primary and Secondary data sources were used to achieve the specified objectives of the study. Collected information or data were organized and presented in the form of tables and graphs. To analyze quantitative data explanatory statistics and an equation such as multiple regressions were also used, as well Using 87 discovered factors divided into 5 groups, a questionnaire survey was run. 150 of the 154 questionnaires that were distributed were returned. 150respondents were used in the primary data collection and a standardized questionnaire was used. To come up with the results the researchers employed explanatory analysis. The researcher revealed that the project constraints highly contribution in project performance. According to the study parameters including cost, scope, and quality had a big impact on how well the Ayat 40/60 project performed as a result of project constraints during project execution. The other factors time and resource have insignificant impact on project performance. The results also demonstrate that while time, resource, and quality-related factors have a negative association with building construction performance, cost and scope-related factors have a positive greater favorable effect on project performance. The project cost and scope have also contribution on the performance of the project. The study concluded that cost related factors and scope related factors are positively and significantly influence project performance but quality related factors were found positive but not significant factor influencing the project performance. On the other hand time and resource related factors were found negative and but not significant. It is therefore recommended that project constraints can never be eliminated and each project will have a different set of constraints the only way to properly manage constraints. Policies and procedures should be strengthening by the construction bureau. The stakeholders have to develop a plan and a strategy for each project phase, have good quality control, balance resource use, and have a thorough understanding of each restriction and transparent communication between project team members.

Key words: Multiple Regression Analysis, Project Constraint, Ayat 40/60 project, Construction performance

CHAPTER ONE

INTRODUCTION

1.1 Back ground of the study

Sector of multibillion dollar building constantly grows by size and technological complexity on a global scale. It is a large economic sector that has a big impact on the efficacy and output of other industrial sectors. Construction activity is growing at a faster rate than both the population and the GDP in several developing nations, according to Chitkara (2004). Because there are so many different parties involved in construction projects, including clients, contractors, consultants, stakeholders, stockholders, and regulators, there is inherent complexity in the way that these parties can affect how well the project performs. The main goal of all of these parties' involvements, methods, phases, and stages of work as well as the significant input from both the public and commercial sectors is to successfully complete the project.

Construction project delays are now increasingly typical due to many project limitation criteria. Companies engaged in the planning, production, modification, refurbishment, upkeep, facility management, demolition and recycling of building and civil engineering projects as well as the provision of resources, can be seen as belonging to the construction industry. It encompasses all internal and external stakeholders who support the policies, processes, practices, and culture of the industry in some way. Hills, Martyn J., Fox, Paul W., Skitmore, Martin, Hon, Carol K. H., and Fong, Patrick Sik-Wah (2008) claim that the development of the construction industry is a planned and managed process with the goal of enhancing the sector’s capacity and effectiveness in order to meet the demand for building and civil engineering products in the national economy and to support long term objectives for social and economic development. M. Nov, J. Nováková, and M. Waldhans (2012) state that in the practice of old building industry complete documentation according to the technical and economic level of the design its realization plan and actual implementation took place.

According to Kimiti (2018), project management is the act of using information, skills, and tools as well as arranging and managing resources in a systematic manner.The current project would be finished within the parameters of scope, quality, time, and money. According to Kibaara's (2016) findings, in general a project is considered successful if it is completed on time, within budget, andin full compliance with all the objectives that were originally specified for it. It is also successful if the clients for whom it is meant accept and use it.

Three constraints have been urged by project managers to use a framework for project planning, monitoring, and management. Time, Cost and Scope are the three triple constraints quality is occasionally added as a fourth constraint a replacement for scope or both, are described as "a frame work for assessing completing demands" (PMI, 2004, p. 378). Those three constraints were primary factors in which all of them could defined the framework of a project and directed project managers. If one or more of them are changed adjustments should have to be made.

Studies were conducted to examine the factors influencing project performance in developing countries. Inadequate supervision, bad site management, inappropriate leadership, a lack of skilled labor, a breakdown in equipment, and other factors all play a role in the United Arab Emirates' development delays. (2006) El-Sayed and Faridi. The selection of the contractors is a critical component for the project manager and typically has a substantial impact on the success or failure of a project, according to Ajayi et al. (2010).There will undoubtedly be a correlation between a contractor's performance and the success of the contract. Along with Ajayi, he added that the construction business has struggled with performance evaluation for many years. Researchers have put forth a number of models and techniques for evaluating the success of projects. Ajayi et al. (2010) note that the majority of these approaches, however, restricts their research to a few key variables, like price, timeframe, or labor productivity. Construction performance includes time performance, cost performance, construction quality, scope, and resource management.

As Ethiopian development becomes more complex, there is an increase in demand for housing and project management services. All stakeholders engaged in the building process may find it difficult when project management is used to track progress against deadlines, costs against bids or budgets, and quality against specifications. Additionally, they experience project constraint

management. One of the most crucial elements in completing assignments in the time allotted, budget, and scope is managing project limitations. In Ethiopia's construction business, there are numerous issues that can prevent projects from being completed. Ethiopian building projects are influenced by poor building project management, failed projects, a lack of funding, and schedule delays. Tesfhunegn (2013).

Construction projects in Ethiopia face difficulties due to a number of limitations, which eventually causes delays. Therefore, managing the restrictions is a prerequisite for the construction project to perform well at any stage of the construction process. This study's primary goal is to examine how project constraints affected the Ayat 40/60 construction project.

1.2 Statement of the problem

Construction initiatives today have challenges with project management, construction methods, and resource constraints. Project restrictions are the main cause of project performance degradation, which results in resource underutilization and considerable economic loss. One of the biggest problems with building projects is poor project constraint management, according to Rugenyi (2016). It is necessary to consider project restrictions in order to assess whether total project success has been achieved.

Due to the presence of constraints construction projects were unable to perform at high level. Identifying constraints helps an organization on in the process of making organizational decisions. If restrictions are well recognized on time better performance can be assumed. Mishra, (2019).

Despite its significant importance, construction initiatives have problems that need for quick attention (ECIDP, 2014; Nega, 2008). Infrastructure and construction project delays are a significant issue that can impede or delay anticipated economic development (ECIDP, 2014; LiYin et al., 2006).

The primary reasons for project failure include problems and performance failureaccording to studies conducted Karim and Marosszeky, (1999); DETR, 2000; Lehtonen, (2001); Samson and Lema, (2002); Kuprenas, (2003); Cheung, (2004); Iyer and Jha, (2005); Navon, (2005); Ugwa and Haupt, (2007). In addition, there are other causes and contributing elements for this issue. In

contrast to their total performance, the majority mainly of these studies concentrate on a single performance aspect difficulty, primarily Cost and Time. The context of Ethiopia has only been the subject of a very small number of studies Merid, (2016), Shambel, (2018), Fetene and Tadesse, (2008), and none of them have focused on a particular construction initiative carried out by non-governmental organizations.

According to MoWUD (2006), Ethiopia's performance of the construction sector is now insufficient to meet both domestic and international quality standards. The main problems include late project completion, subpar work and expense overruns. Most construction projects execution phase is where time and cost overruns typically happen. According to Morris et al. (1998), who looked at the records of more than 4,000 construction projects, projects were rarely completed on schedule or within the allotted money, quality, time, resource, and scope.

Werkukoshe, K.N. Jha's (2016) investigations on the reasons of construction delays in Ethiopia revealed that only 8.55% of projects there had been completed by the original scheduled completion date.

Project constraint application is not currently receiving significant attention in Ethiopia. Even if a controlling and follow-up system exists, it appears that it was ineffective and unable to promptly resolve the issues. In accordance to better the Success of upcoming construction projects, the researcher sought to conduct a study on the Analysis of the effect of project constraints on the Ayat 40/60 building project's performance, which was managed by SIGOR Consult in Addis Ababa.

1.3 Basic research questions

The following are the main research inquiries this study aims to answer in order to frame its design:

1. What are the effects of Project constraint on the performance of construction projects?
2. How are the perceptions of Clients, Consultant and Contractors towards the relative importance of these factors in construction projects of Ayat 40/60?

3. What is the relationship between project constraint (Time, Quality, Scope, Cost& resource) on the one hand and performance of construction projects in Ayat40/60 on the other?

1.4 Objective of the study

1.4.1 General objective

This study's main goal is to examine how project constraints affect project performance in the context of the Addis Ababa based Ayat 40/60 building construction project.

1.4.2 Specific objective

The specific objective of this research is:

- To identify the project constraints that affect the performance of construction projects and identify the most ranked significant factors.
- To examine the perception of Clients, Consultants and Contractors towards the project constraints in Construction projects of Ayat 40/60.
- To examine the effect of time related factors, scope related factors,cost related factors, quality related factors and resource related factors on construction project performance.

1.5 Significance of the study

In Ayat 40/60 building projects, project constraint management is crucial. Project management in the construction industry is complicated by needs and limits. Because the clientele may be of all types and origins, there are a variety of needs. However, unless appropriate corrective and constraint management is used to manage and fix the constraints / problems on time, constraints in construction projects limit their ability to achieve high performance.

It is important to understand that every working environment has limitations. However, there may be times when we are ignorant of the limitations or when we prioritize the project goals over the limits. Although there is a lot of management literature that discusses constraints, there

is little in-depth research on how to manage and provide solutions for limits or difficulties that are encountered in construction working settings. It is typical for there to be a variety of requirements and restrictions in the workplace. However, the management practices that are employed to promptly address the limits are what really count.

It's also critical to recognize any obstacles that can arise during the construction project. Doing so will help to reduce wasteful spending and time and money losses brought on by poor planning. Therefore, managing the restrictions is a prerequisite for the construction project to perform well at any level or stage of the construction process.

As a result, the primary goal and focus of this research article are to examine how project constraints affected the Ayat 40/60 building project.

1.6 Scope of the study

The Ayat 40/60 was included in the study's purview.Building construction sites in SIGOR'Sconsult architects and engineers consulting in the city of Addis Ababa.

Methodological Scope: Multiple linear regression analysis, the quantitative research method, and an explanatory study design were all used by the researcher. For the study, a questionnaire and document review will be used.

Geographic Scope: Ayat 40/60 building project, Ethiopia Addis Ababa is regarded as part of the study.

Timeline Scope: The research emphasized projects. Complete and not completed started in 2007 E.C in order to gather pertinent information.

1.7 Limitation of the study

The main drawback of this study is that the researcher is unable to generalize the case for how project constraints affect the building construction sector because of the scope of the study. The respondents' failure to provide accurate information, the presence of misleading information, their hesitation as a result of their fear, and their unwillingness to complete the questionnaire are the study's second limitation. As a result, the researcher had to persuade and reassure the

respondents that the data they were providing was only intended for academic purposes and nothing else, which required the researcher to produce the required report.

1.8 Organization of the research

Chapter one provides general background of the study, statements of the problem, objectives of the research, research questions, significance of the investigation, scope of the study, and limitation of the study Chapter two reviews previous literatures done by different scholars on the assessment of project constraints management practice in construction industry. Chapter three presents include research design and sampling techniques, instrument of data collection and method of data analysis. Chapter four Data Analysis and Discussionused the collected data an analysis was conducted to determine the effect and meet the objective of the research and which was include the result and discussion of the research finding in qualitative terms. Finally chapter five gives conclusion and recommendation reflections and final concluding remarks of the study based on the results and discussions presented throughout the paper.

CHAPTHER TWO

REVIEWOF RELATED LITERATURE

This chapter discusses the literature on project constraints and performance in the construction sector. It puts into perspective several papers' results and conclusions. The main notion of this work has been deemed to be reflected in recent articles and publications. Accordingly, such literatures will be reviewed for the development of the research that analyzes project constraints' impact on project outcomes in the construction industry. This includes theoretical review, empirical review of literature conceptual frame work and pertinent to the research's conclusions.

2.1 Theoretical review

2.1.1 Project constraint

Over the years, a variety of authors have provided broad descriptions of project constraints. The general constraints of a project, however, can be summed up as those that must be taken into account throughout the project life cycle. In project management, anything that restricts the scope of a project is referred to as a project constraint. It raises the possibility of cost overruns and jeopardizes the effectiveness and quality of a project. A project is frequently considered to be successful if its goals are met by the deadline and the budget. Other limitations, other from those related to time, scope, and money, prevent the project's goals from being adequately achieved.

When the project's deliverables are finished on time, within budget, of a high standard, and with minimal danger to workers, the project is successful. McCaffer, R., and F. T. Edum-Fotwe (2000). Due to its impact on project deliverables, research on resource constraints, risk, and management strategies is essential in the construction industry. (2005),Blismas, N.G.; Pendlebury, M.; Gibb; and Pasquire. Contrary to the conventional idea of the paradigm shift in construction project management emphasizes the significance of recognizing the primary constraint variables due to the triple constraints of time, cost, and quality. Newtown Square (2013).

According to Whelton, M.; Pennanen, A.; Ballard, G. (2005), Javed, A.A.; Pan, W.; Chen, L.; and Zhan, W. (2018), construction constraints are situations or forces that prevent construction

operations from progressing the cost, time, and quality objectives or goals of the triple project, which are regarded as the yardstick for project success. A project management restriction, according to Bhavsar, U.M., and Solanki, J.V (2020), is when things don't proceed according to plan.

According to Fashina, A.A., Omar, M.A., Sheikh, A.A., Fakunle, F.F (2021), Amusan, L., Aigbavboa, C., Olubiyi, T., and Babatunde, O. (2021), the execution of construction projects is dangerous and susceptible to a variety of obstacles and situations that could jeopardize its successful completion. According to Solanki, J.V., in line with Bhavsar, U.M., regulating these constraints is a requirement for the construction project's astounding performance. According to Tanko, B.L., Abdullah, F., and Ramly (2017), construction restrictions have the potential to hinder project success and cause conflicts or lawsuits among stakeholders;It can affect how well the project is performing. Constraints may have an impact on each party to a contract,in their research, Irfan, M., Thaheem, M.J., Gabriel, H.F., Malik, M.S.A., and Nasir (2019) made observations. If managed improperly, it will affect the shareholder parties' contractual commitments.

Therefore, limits on the operation of building projects have negative repercussions such as schedule and cost overruns, a decline in profit and productivity, and injury to contractual relationships. (2016) Memon, N.A., Ali, T.H., and Memon, Z.A. Khahro, S.H. Ahlemann, El Arbi, Kaiser, M.G., Heck, A.A. (2013), Narh, O.C., Owusu, E.E., Oduro-Apeatu, K., and Tettey-Wayo, N. (2015) contend that constraints must be acknowledged and managed at the beginning of the project because failing to do so could lead to disputes, conflicts, and the sabotage of stakeholder relationships. Therefore, if limits are not recognized and handled,they could cause conflicts between the parties involved, direct or indirect financial costs for customers and contractors, and damage the scope and quality of a project during its design and execution. J.M. Siegelaub (2016).

In line with this, a study by Bhavsar, U.M., and Solanki, J.V. (2020) found that a number of constraint factors, including improper funding distribution to parties, land acquisition, building and safety regulations, a dispute over the terms of the contract, government labor laws, a delay in resolving design issues, an inaccurate project cost estimate, and flawed drawings and details,

have a significant impact on how well a construction project performs. Land acquisition disputes, weather patterns, the state of the economy, and governmental regulations are four examples of external environmental factors that impede project performance in Nigeria, according to Ajayi, O.M., Ogunsanmi, O.E., Ajayi, K.A., and Ofili (2010).By Akanni, P.O., Oke, A.E., and Akpomiemie (2015), the aspects were further broken down into six categories: political, legal, building techniques and resources, economic and financial, socio-cultural, and physical. Ogunde, A.O., Dafe, O.E., Akinola, G.A., Ogundipe, K.E., Oloke, O.C., Ademola, S.A., and Olaniran, H.F. (2017) noted the absence of cash flow, the clients' financial challenges, and insufficient procurement. Project constraints that have an impact on productivity, according to Ugulu, R.A., Arewa, and Allen (2010), include a lack of incentives, poor worker health, material delays, a lack of site amenities, and an ageing workforce.

According to Kuprenas (2003), cost, schedule, and quality improvements during the design and construction phases are included in project performance measurement. According to Navon (2005), performance measuring is the practice of contrasting desired and actual performances. The success of the building business is influenced by national economies (Navon, 2005). The building sector is essential to the growth and achievement of social goals despite its complexity. Physical infrastructure, such as roads, bridges, and buildings, can be used to estimate a nation's economic growth rate Takin & Akintoye, (2004). On-time completion of building construction projects is a sign of success, is cost-effective and in accordance with specifications, and is to the satisfaction of all stakeholders, claim Chua et al. (1999); Puspassari, (2005); Ogunsemi, (2006); Yaman, (2007).

2.1.2 Theory of constraint (TOC)

The Theory of Constraints is a concept that offers a methodology for identifying the biggest obstruction to achieving a goal and systematically eliminating that obstruction from the situation. Lau and Kong, (2006), Dr. Eliyahu Goldratt developed the Theory of Constraint (TOC), which became well-known because to his best-selling book "The Goal" from 1984. Since then, TOC has developed and matured, becoming a significant element of the management best practices community. One of the alluring qualities of the Theory of Constraints is its inherent capacity to rank improvement attempts. Always pay close attention to the current constraints. In situations

where there is an immediate need for change, TOC is a highly concentrated practice for improvement. According to the Theory of Constraints, every process has a single restriction, and overall process throughput can only grow William & Jacob, (2003).

This has the important conclusion that optimizing non-constraints won't produce meaningful results; only changing the restriction will help achieve the goal of making more profit. TOC works to deliver precise and sustained concentration in order to make the current limitation better until it no longer limits throughput. The next constraint comes into sight at that point. The underlying power of TOC stems from its ability to produce intense focus on a single goal (profit) and to remove the primary impediment (The Constraint) to achieving more of that goal. According to Dr. Eliyahu Goldratt, (1984), the essence of TOC is actually attentiveness. A sensible method of system improvement is TOC. Usually, every system has a flaw, like the weakest link in the chain. Only when the weakest component's strength can be increased can the system as a whole become stronger.

It has been proposed that TOC can be applied to project management. The activities involved in construction projects are difficult and time-consuming. Construction projects need competent management in order to produce the desired outcomes in terms of functional satisfaction, aesthetic satisfaction, on-time and within-budget completion, value for the money invested, and health and safety. Construction management is defined by Walker (1989) as "the planning, control, and coordination of a project on behalf of a client from conception to completion (including commissioning)." It emphasizes determining the clients' objectives in terms of utility, function, quality, cost, and time, as well as the development of connections between resources.

The integrating, observing, and managing of project participants and their output, as well as the evaluation and selection of alternatives being sought for the satisfaction of the customer, are the fundamental components of construction project management. If clients and teams are given the ability to specify restrictions throughout the project definition phase, those constraints must be taken into account while creating the project plan. (2003) Chua and co. Due to the fact that project development in this context resembles a production process where productivity is impacted by various constraints, the Theory of Constraints will be used to quantify the assessment of the actual constraining effect on project objectives and the procurement process.

2.1.3 Theory of triple constraint

Every project must be finished within the triple constraint, which is a triangle made up of time, money, and performance, in accordance with the triple constraint principle. Dobson, M. S. (2004). The crucial traits, in accordance with Van Wayngaad, Pretorius, and Pretorius (2012), are:

1) As a consequence of the project's higher aim, the triple constraint balances the three interdependent project components of scope, time, and cost.

2) Throughout all stages of a project, the cause and impact of new or altering triple constraint needs are continuously negotiated.

3) According to the three fundamental triple constraint relationships, at least one of the variables must be constrained (otherwise, there would be no baseline from which to plan) and at least one of the variables must be exploitable (otherwise, quality might be impacted).

According to the Project Management Institute (PMI) and countless other text books on the subject, the application of a body of knowledge and methods to manage projects controls the trade-off or "triple constraints" between the time, cost, and quality requirements David (2014). For the project to be successful, the deliverables must follow the guidelines. To do this, the project manager must continually make choices that keep the triple constraint of being on schedule, on budget, and within requirements in (2015), Richardson. It is not necessary for a constraint's cause and its mode of expression to be connected. Budgets may put timelines under strain, and deadlines may change performance. Dobson and Fleischert, (2007).

2.1.4 Iron triangle

All initiatives must go by certain guidelines, which frequently relate to budget, schedule, and scope with quality as the top priority. The "Iron Triangle" is what is referred to as this in project management. To be successful, a project needs these three components to work together.

These three essential restrictions are referred to as "The Iron Triangle". Every manager must deal with the three interconnected project restrictions known as the iron triangle. The triple limitations and project management triangle are other names for it.

2.1.5 The theory of performance

In order to build a framework that can be used to explain performance as well as performance advances, the Theory of Performance proposes and connects six fundamental concepts (Don, 2010). Performing means producing results that are worthwhile, a performer can be a single person or a team of people who collaborate to put on a performance. Your performance level represents where you are in your performance development, the six components. The current level of performance is influenced by context, knowledge, skill, identity, fixed variables, and personal characteristics. Three axioms are offered as effective performance improvements. They comprise developing a performer's mindset, spending time in an engaging environment, and practising reflectively. The labels "Level 1," "Level 2," etc. show a performance's efficacy as it progresses through stages. In other words, a Level 3 individual or group outperforms a Level 2 individual or group. The benefits of working harder include (i) quality improvement, better results or goods that meet or exceed stakeholder expectations, and waste reduction. Improvements in (i) capability—the ability to take on more difficult tasks or performances; (ii) capacity—the ability to produce greater output; (iii) knowledge—the depth and breadth of knowledge—and (iv) are also possible.

2.1.6 Construction projects and performance

Essentially, the goal of every initiative is to be successful. The fundamental factor in determining if building goals are accomplished is performance success. The outcomes of various past investigations of the effectiveness of construction projects were looked at. Dissanayaka and Kumaraswamy, (1999) claim that one of the main causes of the construction industry's underwhelming performance is the unsuitability of the selected procurement procedure. According to Thomas (2002), the following factors are important: Health and safety, resources, connections with clients and consultants, managerial skills, claim and contractual disputes, relationships with subcontractors, reputation, and the amount of subcontracting are the main performance criteria for construction projects. According to Chan and Kumaraswamy (2002), construction time is becoming more essential because it typically serves as a crucial benchmark for assessing a project's performance and the efficiency of the project organization.

2.2 Empirical Review

In a study by MarylinMumbi and Michael Mundia (2020), it was determined that project management restrictions had an impact on how quickly building construction projects in Kenya's Nakuru County were completed. The author's explicit goal was to ascertain how scope and resource management affected the success of building construction projects in Nakuru County. A descriptive survey research design was used for the investigation. The intended audience was Nakuru's registered building construction workers. A favorable and statistically significant link between scope management and building construction project completion in Nakuru County. It also revealed a positive and statistically significant correlation between resource management and building construction project completion in Nakuru County.

Fred Rugenyi wanted to assess the triple limits on projects in Nairobi from the perspectives of the project managers in a study he carried out in 2015. According to the author, 20% of respondents said that when working on projects in Nairobi, the two challenges they encountered most frequently were project scope and project expense. Project scope and project expense are the two triple limitations that project managers in Nairobi meet most frequently, the author concludes.

The other piece of study that needs to be examined is that written by Pratima V. Patil and Abhay M. Joshi (2021). The purpose of the research was to pinpoint the major obstacles to onsite labor productivity and suggest solutions. The findings indicated that, in order of decreasing impact, legislative compliance, unforeseen circumstances, and broader external dynamics comprise the main external limitations to on-site worker productivity. It was discovered that internal limitations had a significantly greater impact on onsite production than external factors. The internal constraints include reworks, workforce skill and experience levels, adequate construction methods, build ability concerns, and insufficient supervision and coordination, listed in decreasing order of impact.

The authors of the report, Ernest Kissi, Divine KwakuAhadzie, and Edward Badu (2014), emphasize five significant underlying restrictions. The paper makes several recommendations that should be carefully considered in order to advance professional project management practices in the Ghanaian construction industry: a lack of a strong project management

knowledge base, a lack of a clearly defined project manager role, a poor understanding of procurement practices, a weak institutional framework, and poor communication practices.

According to WerkuKoshe and K. N. Jha (2016), every stage of a project in Ethiopia is plagued with construction delays, which are a common problem. Furthermore, it is well known that one of the primary causes of project failure is the delay of construction projects. Unless the delay is identified and the Corrective project management decisions are taken in a timely manner, a project may incur higher expenses and take longer than expected, which causes dissatisfaction from all parties involved. The most prevalent and important delays in building due to were assessed using data gathered from After the author first identified the primary issues causing delay in Ethiopian construction sectors, she conducted construction managers, resident engineers, contractors, and clients were surveyed, and senior industry professionals were also interviewed. According to the study, the following are the main important factors that cause construction delays in Ethiopia: Contractor financial challenges, Material price increases, Poor project planning, Resource scheduling, etc. the failure to pay progress fees for finished projects, The business lacks qualified specialists with experience in construction management, and seasonal labor availability varies from season to season. According to the study, In Ethiopia, only 8.25% of projects have finished by the dates they were supposed to. A.K. Hassan, A.Q. Adeleke, and Taoefeeq (2019) made reference to the implications of project triple constraints (time, cost, and quality) on building projects in Kuantan, Malaysia. The researchers demonstrated a beneficial association between the construction businesses' building projects and the project triple limitation (time, cost, and quality).

Research Gap

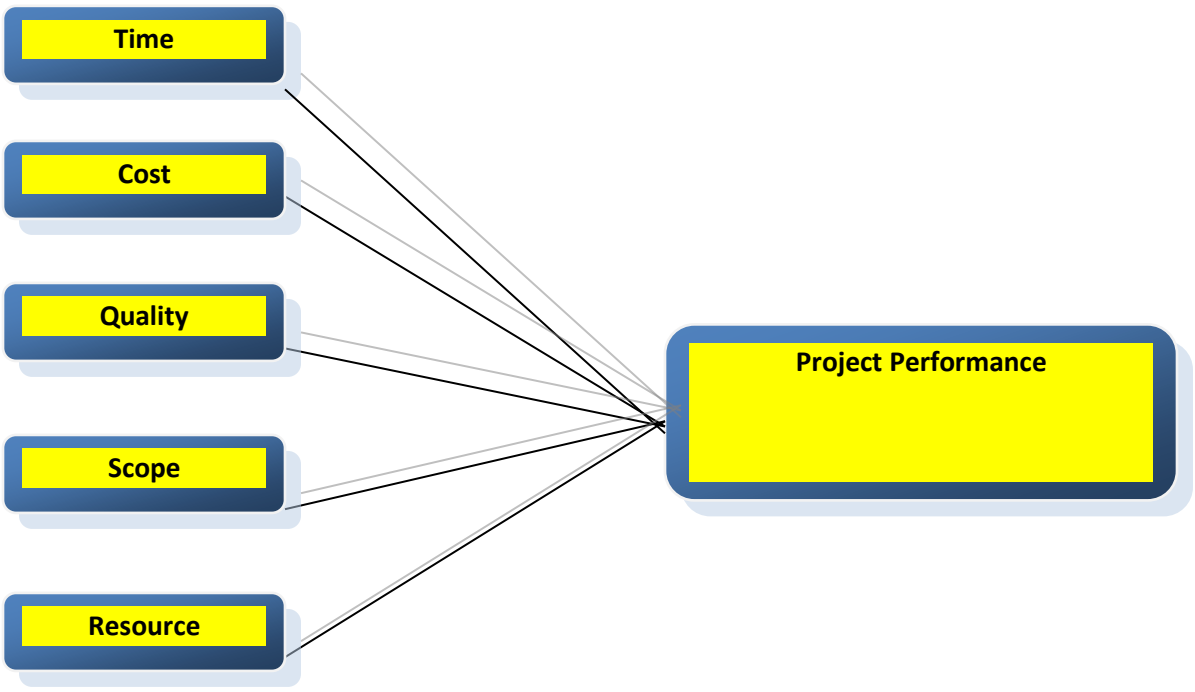
From the standpoint of the project managers, Rugenyi (2015) investigated the implications of triple restrictions on project management in Nairobi. Despite the current study will focus on building projects, the previous study included general project management. Ethiopia will host the current trial. According to WerkuKoshe and K. N. Jha's (2016) study, the Ethiopian construction industry's construction delays have various causes. The latest study will be undertaken in a

specific section of the Ayat 40/60 building development project in Addis Ababa, whereas the previous study was conducted throughout Ethiopia.

Constraints are the only elements that are thought to be essential for a project's success, although it is yet unknown what influences their growth or fall. These studies evaluated the effect of project constraints on the effectiveness of construction projects in order to meet the requirement to take into account the effects that are important for project performance limits.

2.3 Conceptual framework

The relationships between the variables are explained by the conceptual framework. The different elements in this are the independent and dependent variables. An independent variable influences and decides how another variable will affect the relationship. In this study, the project performance of the Ayat 40/60 building project is the dependent variable, and the project constraints (time, cost, quality, scope, and resource) are the independent factors. Some academics think that a project's outcome is directly influenced by its duration, cost, and an accurate evaluation of its quality.



Independent Variables Dependent Variable

Source: adapted from Josiah,(2019)

Figure 1 Conceptual frame work

2.4 Research Hypothesis

Ha1: Cost related factor has a significant effect on construction project performance.

Ho1: Cost related factor has no a significant effect on construction project performance.

Ha2: Scope related factor has a significant effect on construction project performance.

Ho2: Scope related factor has no a significant effect on construction project performance.

Ha3: Time related factor has a significant effect on construction project performance.

Ho3: Time related factor has no a significant effect on construction project performance

Ha4: Resource related factor has a significant effect on construction project performance.

Ho4: Resource related factor has no a significant effect on construction project performance

Ha5: Quality related factor has a significant effect on construction project performance.

Ha5: Quality related factor has no a significant effect on construction project performance.

2.5 Definition of terms

Project: A project is described as a set of tasks that must be finished in order to achieve a specific result. A project is any temporary effort having a distinct beginning and end, according to the project management institute.

Performance: the success of a specific building project in relation to the agreed-upon budget, schedule, and quality requirements.

Time overruns: is characterized as the passage of time past the targets for completion.

Cost overruns: The difference between a project's initial construction cost estimate and the actual construction cost is known as a cost overrun.

Owner: organization on whose behalfthe building project is started.

Contractor: a human being or an entity having a construction project building contract with an owner.

Consultant: Constructionconsultants assist clients in making informed plans for prospective projects and make sure that contractors do the work on budget.

Constraint: Any restriction that outlines a project's constraints is referred to as a constraint in project management.

1. **Budget/ Cost Constraint**

Projects require a variety of expensive resources, including labor, materials, and equipment. As the project manager, it is your responsibility to make sure that you accurately estimate your project expenses throughout the planning phase and before execution. At that time, you will create a project budget that takes all of your expenses into consideration. If you don't create a sufficient project budget, your project can fail.

The total amount authorized to be spent on a certain project is specified in the project budget. It does make reference to the costs of the particular things or processes that are required. The budget or cost includes everything from vendor payments to labor costs to contingency funds that are only required when you are in damage control mode if things don't go as planned.

Similar to how project time costs or budgets are major concerns for the stakeholders. As a result, managing costs will be a continuous project management responsibility. The management must adhere strictly to the stated budget while maintaining.

2. **Time Constraint**

If you want to properly manage the time available to carry out your project, you must create a calendar that details a timeline for completing the project's activities. The project schedule also lists the resources needed for each particular project activity. The ability to manage time effectively is essential since ineffective time management could affect other project constraints like scope and quality. Failure to keep track of time could result in missed deadlines and a lower project scope.

A project may contain a number of tasks, each of which must be completed within a specific amount of time. It is necessary while making sure that all relevant tasks are completed prior to the deadline, to account for that time.

Stakeholders are taken into account while estimating project duration. That is how long it will require finishing the project. The Endeavour manager's job should therefore include making the most accurate time estimates for the project. As a result, the manager must use both research and experience to address issue.

3. **Scope Constraint**

The project scope is the total amount of work that has to be completed on a project. Outlining the activities, deliverables, and milestones is essential for establishing clear expectations with stakeholders. You should also include a list of what won't be done.

Project parameters are quite specific and contain all the relevant details regarding the project's final output. Any project must accomplish the features and tasks specified in the scope to be deemed successful.

4. **Quality Constraint**

While this constraint is quite similar to scope it is slightly different as scope defines the specific desired outcome.

5. **Resources Constraint**

The resources a project uses have a direct impact on its cost. The use and purchase of resources may be constrained depending on the amount of funding required to achieve the intended outcome, resulting in another constraint.

CHAPTHER THREE

This chapter outlines the methodology used in the research study. It describes the type of research design that was used, target population, sample size and sampling procedure, Research instruments, a description of tools used in collecting the data, the measurement of variables and the techniques used in analyzing the collected data reliability of data collection instruments, data analysis techniques and ethical considerations.

3.1 Research methodology

The study's approach and methods for doing research were the main topics of this chapter. The study technique was discussed in this chapter, along with the research population and sample. The measurement tools employed in this study, as well as their validity and reliability, are examined. The research methodology is covered in this section; along with the data were examined using the data sources, sample size and sampling methods, data gathering instruments and procedures, and different data analysis approaches. The study's ethical ramifications are then examined.

3.2 Research Design

An analytical study, also known as an explanatory design, was employed by the researcher. Finding any causal relationships between variables or factors that are pertinent to the research problem is the main objective of explanatory research. Explanatory research focuses on why-related issues. Explanatory studies are helpful for figuring out the causes of various processes as well as looking at how changes affect present norms, practices, and other things. Project limits' impact on how well construction projects perform Ayat 40/60 is then described and critically analyzed in these studies.

3.3 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”, where as 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, a quantitative technique is applied. In order to give the data, the researcher employed statistical methodologies to statistically collect and assess numerical data.

3.4 Population, sample and sample size

3.4.1 Target Population

The "target population" refers to the entire population from whom a sample is taken. The 250 employees who work on the Ayat 40/60 building construction sites in Addis Ababa are the research's target population. They include clients, consultants/supervisors, contractors, designers, daily laborers, material and equipment suppliers, and externals.

The Client is the Sponsor of the Project; Consultant who may be the project manager provides the consultancy advice for the project on designing evaluating the cost technical issues. Contractors perform the construction works and engage in actual construction according to the design specification, contract document communicated by the relevant parties.

3.4.2 Sampling Method

Purposive sampling method is going to be applied in selecting samples therefore from the Ayat 40/60 construction sites in Addis Ababa consulted by SIGOR Resident Engineer and Site supervisor, the project manager from contractor and the client from each construction site was included besides this some individuals involved in the construction work who are expected to have awareness on this issue will be considered as a sample.

3.4.3 Sample Size

Mugenda (2003) asserts that because it is impossible to investigate the entire targeted population, the researcher must choose a sampled community. Using the formula, 154 out of 250 people were comprised in the research's sample.

The researcher determined the required sample size for the investigation using the Solving sampling formula (Yemane, 1967). The formula for determining the required sample size at an accuracy level of 5% and a confidence interval of 95%.

$$\frac{N}{1 + N(e)^2}$$

Where n= sample size

N= population size

e= level of precision (0.05)

n= 250/ $(1+250(0.05)^2)$

n=153.846

n=154

3.4.4 Source of data, data collection instrument and procedures

3.4.4.1 Source of Data and data collection

Data were gathered or collected from different sources such as primary and secondary sources which were designed to meet the specified objectives and or for understanding and suggesting recommendation for solving the research problems. The questionnaire was created so that it could assist the investigation in gathering comprehensive data on the bases of contractor, client, consultant or supervisor, designer, laborer, supplier of materials and relevant externals.

The secondary data was acquired from books, journals, websites, academic papers on the subject under examination, and other media. Documents collected from the institutions that were required in order to produce further data on the construction characteristics in the study region.

3.4.4.2 Data measurement

To select the optimal method of analysis, it is vital to comprehend the level of measurement. Ordinal scales will be used in this study. A ranking or rating on an ordinal scale often uses either

ascending or descending order of numbers. (1), (2), (3), (4), and (5) used to represent the degree of agreement or influences do not represent absolute values or the distance between scales.

Significance Level	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Scale	5	4	3	2	1

Table 1 Rating scale for significance level of factors on project performance

3.4.4. 3 Research Instrument

A typical questionnaire used to gather information for the research (Josiah 2019). Data gathering was conducted using a standard questionnaire survey. The information or data gathered was arranged using quantitative techniques. Data processing and analysis were done using tables and graphs.

Standard questionnaires from empirical study carried out by several academics were used by the researcher.

The questionnaire was modified from a standardized source from literature evaluations carried out by different academics on the numerous aspects influencing the most crucial variables influencing construction projects should be determined both from the performance of current projects as well as secondary data sources.

A set of standardized questionnaires served as the study's main data collection tool. A strong questionnaire design is crucial for producing accurate a high rate of return and survey results (Zikmund, 2000).

The broad literature analysis, the fact that the construction business is international, and the importance of the Ayat 40/60 construction building project setting are all taken into consideration in the questionnaire that was created for this study. There were three sections to the questionnaire: The first part of the questionnaire, the purpose of Part A is to build a general profile of the respondent. The project cost-related factors, scope-related elements, time-related

factors, resource-related factors, and quality-related factors are all included in Part B and are divided into five categories (Josiah 2019).

3.4.4.4 Piloting the research Instrument

The initial questionnaire was piloted with 10 respondents before being sent out to ensure three things: that there were no grammatical or spelling issues, that everyone understood all of the questions, and that the instrument ranking order had been changed and improved as a result of feedback. Following the pilot test, the researcher gave the questionnaire to all the study samples and administered it to them.

3.4.4.5 Reliability

Reliability relates to the consistency of a measuring instrument (questionnaire), which is concerned with the research findings. A measure of consistency among distinct components of the same construct is called internal consistencyand is known as reliability. Lee Cronbach (1951) created the reliability metric known as Cronbach's alpha. A reliability coefficient is Alpha of Cronbach. It is widely used to assess the internal consistency or reliability of a psychometric exam for a sample of test-takers.

Cronbach's alpha is a trustworthy indicator of a psychometric test's internal consistency or reliability for a sample of test-takers. In light of this, Lombard (2010) states that coefficients of 0.90 or more are almost always acceptable, 0.80 or higher is acceptable in the majority of cases, and 0.70 may be appropriate in some exploratory studies for some guides.

The researcher was able to evaluate the items' internal coherence were created for respondents by tracing this body of literature. Since Lombard indicated that coefficients of 0.80 or above are generally acceptable time based on this the study test result shows that, the reliability of the whole items is 0.909, 0.867, 0.931, 0.719&0.933 for cost, scope, time, resource & quality respectively indicating that the full items were reliable and acceptable.

Variables	No of items	Cornobach's alpha Coefficients
Cost	25	0.909

Scope	13	0.867
Time	26	0.931
Resource	8	0.719
Quality	8	0.933

Table 2 The reliability Statistics/ Cronbach's Alpha Coefficients of the Variables

Source: own survey (2023)

3.4.4.6 Validity

Validity is the degree to which a tool (questioner) measures what it is intended to measure. The extent to which study results correctly reflect what the measuring instrument promises to measure is referred to as a measure's validity. How accurately a measure represents the underlying construct it is intended to measure is considered the measure's construct validity. Piloting is used to provide more accurate and insightful results by evaluating the validity of the construct test, criteria, and questionnaire content.

3.4.4.7 Ethical Consideration

To ensure that no one is harmed or negatively affected as a result the aim of this study's ethical standards is the research. The cause and goal of the research were explained to a responder, and managers from the sample organization will need to give their informed consent before this research project may move forward. By making sure that no one was mentioned during the data collection process, that respondents were picked without compulsion, and that a respondent was told of the cause and the study was conducted with the intention of respecting the respondents' rights. To ensure that the research was conducted in a way that was morally appropriate and that no one suffered damage as a result of their involvement in the study's findings.

3.4.5 Method of Data Analysis

The explanatory research approach was employed to examine the data collected in order to show how the variables related to one another. These variables were used, respectively, as independent (cause) variables and dependent (effect) variables. Project performance is the dependent variable, whereas time, scope, budget, quality, and resources are the independent variables. Methods for

quantitative data analysis used to examine the unprocessed data obtained from surveys. In order to identify any unanswered questions, the raw data was Observed and categorized. The tabular unsorted, uncounted data that followed the received data had been sorted and counted.

The data for the quantitative study were presented using explanatory statistical methods. For showing the explanatory type, a percentile, a Pearson correlation value, and an inferential value were the best options. The quantitative data gathered through surveys was coded, tabulated, organized, and treated with statistical processes for analysis and inference. All of this was done in an effort to provide an answer to the central issue and fulfill the objectives of the study.

3.5 Model Specification

The study of the variables was performed using multiple linear regressions. Linear regression is a technique for simulating the relationship between one or more explanatory factors (X) and a dependent/explained variable (Y). When there is just one independent or explanatory variable, simple linear regression is utilized, whereas multiple linear regressions, which will be used in this study, are used when there are numerous independent or explanatory variables. Exploring the types of these relationships and identifying which independent/explanatory factors are connected to the dependent variable are helpful. This is what the model will specify:

$Y=\beta X + \varepsilon$ (2) ……. Where,

Y = Performance of construction projects

X = the independent/explanatory variable matrix,

β = the coefficients of regression,

ε = the error term.

Construction project performance is represented by the variable Y, which depends on the explanatory variables X1, X2, X3, and so on. The error term measures how much of a building project's performance unexplained and how much is explained by each explanatory variable. The regression model will infer the following

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \varepsilon$

The variables specification will be more detailed and include the following information:

Y = the degree to which building projects perform.

$\beta 0$ = the constant

X1….Xn = the project restrictions that have an impact on how well construction projects execute.

X1= Cost related factor, X2= Scope related factors, X3= Time related factors, X4= Resource related factors, X5= Quality related factors,

$\beta 1 \ldots \beta n$ = the independent variable estimates, often known as the independent variable coefficients.

ε = the error term.

CHAPTHER FOUR

4. DATA ANALYSIS, PRESENTATION AND INSTRUMENTATION

This chapter provides an analysis of data collected from the survey and secondary data source. The results were presented in tables to highlight the major findings. They were also presented sequentially according to the research questions of the study. R square values ANOVA tables were used to analyze the data collected. The raw data was coded, evaluated and tabulated to depict clearly the results of effect of project constraint in Ayat 40/60 building construction project.

4.1 Introduction

This section contains the data gathered using various methods of data collection are carefully examined and discussed to illustrate how project limitations affect project performance. The information gained from the collected data was evaluated, presented, and interpreted by the research after the data collection process. Only 150 of the 152 questionnaires that were issued were completed and collected for analysis, which equates to 97.40% of the participants in the study. A total of 2.6% the researcher did not collect any of the sent questionnaires because the respondent did not fill out the questionnaire and did not answer.

The background data of the responder was presented before discussing the statistics. The factors are covered in the second section. A brief overview of the findings concludes this section of the investigation the data analysis. The results are given as follows in light of this.

4.2 Demographic Characteristics of Respondents

4.2.1 Types of the Organization

Types of the organization were the variable that was used to assess the demographic traits of the respondents in this study. According to the 150 respondents who were questioned for this study,

74 (49.3 percent) were contractors, 60 (40 percent) were consultants, and 16 (10.7 percent) were clients, as indicated in the table. Because the majority of the consultant respondents weren't available there were at the time of data collection more contractors who responded to the survey than consultants or clients. In this study, it was discovered that the contractor responders were more active.

4.2.2 Job Status

The job status distribution of respondents included in the survey is from the data out of 150, 32(21.3 percent) were project manager, 21(14 percent) were Middle Manager, 67(44.7 percent) were Office Engineer, 25(16.7) Site Engineer and 5(3.3 percent) were Expert.

4.2.3 Years of experience

From all of the respondents, 44.7 % were found to be 0-5 year, 44.7 % were 6-10 year, and 10.7% were 11-15 year. The majority of respondents in this survey were between the ages of 0 and 5 and 6 and 10.

4.2.4 Educational status

Respondents were questioned about their educational status during the data gathering process. According to the results, 38 (25.3%) A master's degree was held by of the respondents. 109 (72.7%) had a degree, and 3 (2.2%) had a diploma.

4.2.5 Number of executed projects

Another aspect of the data analysis in this case is the quantity of completed projects. According to the results34 (22.7%) of the projects were completed between 0 and 2, 86 (57.3%) were completed between 3 and 5, and the remaining 30 (20%) were completed between 5 and 20. (20%) were executing more than 5 projects, as shown in table.

Description	Frequency	Percent
1. Types of Organization		
Contractor	74	49.3%
Consultant	60	40%
Client	16	10.7%
Others(Project sponsor or share)	0	0
Total	**150**	**100%**
2. Job Status		
Project Manager	32	21.3%
Middle Manager	21	14%
Office Engineer	67	44.7%
Site Engineer	25	16.7%
Expert	5	3.3%
Total	**150**	**100%**
3. Years of Experience		
0-5 Year	67	44.7%
6-10 Year	67	44.7%
11-15 Year	16	10.7%
15 and above	0	0
Total	**150**	**100%**
4. Educational Status		
PHD	0	0
Masters	38	25.3%
Degree	109	72.7%
Diploma	3	2%
Total	**150**	**100%**
5. Number of Executed Project		

0-3 Projects	34	22.7%
3-5 Projects	86	57.3%
More than 5	30	20%
Total	**150**	**100%**

Table 3The frequency of profile of respondents

Source: own survey (2023)

Effects of Constraints on Project Performance

Descriptive Statistics

	N	Mean	Std. Deviation
Before the project execution all project stakeholders agree on project constraints (time, cost, scope, quality& resource)	150	3.99	.959
All completed projects are delivered within the approved project cost	150	2.09	1.258
The completed projects delivered within the agreed project time	150	1.62	.692
The completed projects are delivered within the agreed project scope	150	3.21	1.272
The completed projects are delivered within the agreed project resource	150	2.63	1.324
The implemented projects meet/satisfy customers interms of quality	150	1.83	1.019
Valid N (listwise)	150		

Source: own survey (2023)

Table 4 Effects of constraint on project performance

Table shows that most respondents (mean=3.99 SD=0.959) agree that Project restrictions are agreed upon by all project stakeholders prior to project implementation (Time, cost, scope, quality and resource). Likewise most of the respondents (mean=3.21, SD=1.272) agree that the provided projects fit the agreed-upon project scope. There is also an agreement among respondents that all projects completed within the agreed project resource (mean=2.63, SD=1.324). And also, all within the approved project schedule, finished projects are delivered cost (mean=2.09 SD=1.258), the completed projects please the clients.interms of quality (mean=1.83, SD=1.019) finally completed projects delivered in accordance with project deadlines (mean=1.62 SD=0.692). Overall, most respondents agreed that the effects of constraints interims of time, cost, quality, resource and scope are high.

4.3 Correlation Analysis

It is possible to find the association between two quantitative variables using the statistical approach of correlation without being able to establish causal relationships between the variables. The correlation coefficients range from -1 to 1, with +1 being a perfect correlation, 0.75 to 1 being a high degree correlation, 0.5 to 0.75 being a moderate correlation, 0.25 to 0.5 being a low degree correlation, and 0 to 0.25 being a non-correlation.

4.4 Inferential analysis and hypothesis test

4.4.1 Regression analysis of Project Constraints on Project Performance

Analysis of variance **(ANOVA)** and regression used to examine the impact of project constraints on project performance for construction projects using **IBM SPSS 26**. This aids the researcher in comprehending how any independent variable that is changed whiles other when independent variables are held constant, the dependent variable's usual value is changed. The outcomes are listed below.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.977[a]	.955	.954	.10500

a. Predictors: (Constant), PQRF, PRRF, PCRF, PTRF, PSRF

Source: own survey (2023)

Table 5 The model summary for respondents

According to the regression model summary in Table 9, the factors of project constraint in project performance are explained by the project constraint, and the dependent variable (project performance) is clearly explained by the independent variables (cost, scope, time, resource, and quality) by 95.5% (R Square value). This demonstrates that factors other than the project restriction can account for the remaining 4.5% of the factors affecting project performance. The Adjusted R Square (>50%) reflects the regression equation's goodness of fit.

The adjusted correlation given the degrees of freedom ratio reveals that the regression line accounts for 0.954 of the total variation. With a value of 0.977, the multiple correlation coefficients(r) indicate the correlation ratio indicating a connection between performance and of a construction project and its primary components.

This is a good result since it shows how the impact of the independent variable on the dependent variable. The residuals are presumed to be independent of one another in multiple linear regression models.

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.

1	Regression	33.923	5	6.785	615.426	.000[b]
	Residual	1.587	144	.011		
	Total	35.510	149			

a. Dependent Variable: PQR

b. Predictors: (Constant), PQRF, PRRF, PCRF, PTRF, PSRF

Source: own survey (2023)

Table 6The ANOVA results of respondents

How much the independent variables influence each other forecast the impact of project constraint factors on construction project performance is explained by the regression analysis. Test F demonstrates the part played by the independent variable in explaining how the dependent variable changed over time. The fact that the mode of the ANOVA table's test F (615.426) Approaching statistical significance (sig. =.000, p 0.5) shows the reliability of the regression mode and makes it possible to use it to analyze relationships between the dependent variables. In light of this, it is believed that the independent factors will considerably contribute to the variance in the dependent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.870	.283		6.600	.000
	PCRF	.186	.062	.228	3.021	.003
	PSRF	.274	.062	.398	4.451	.000
	PTRF	-.023	.061	-.031	-.377	.706
	PRRF	-.004	.016	-.005	-.261	.794
	PQRF	-.218	.035	-.401	-6.286	.000

a. Dependent Variable: PQR

Source: own survey (2023)

Table 7 The regression coefficient of the effects of construction project performance

The independent variables cost, scope, and quality have connections to the dependent variable that are statistically significant as shown by the above considering that their p-values are lower than the alpha threshold, of which 0.05. The project scope-related factors have a standardized beta coefficient of 0.274, making them the best predictor of the dependent variable (building projects' performance). However, whose p-values are less than the 0.05 alpha levels, factors linked to project time and resources have a statistically insignificant connection with the dependent variables. Regression analysis findings demonstrate that all categories, with the exception of those linked to project time, project resource, and project quality, were positively correlated with the success of construction projects. That is, each variable's contribution to the dependent variables was quantified by the common beta coefficients (β). A high value denotes that the A unit change in the independent variable has a large impact on the dependent variable.

According to the regression coefficient for coefficient is significantly different from zero statistically significant t-test result for Constraints, which is equal to 6.600. Project resource related factor is -0.004, project quality related factor is -0.218, and the coefficient for project time related factor is -0.023.i.e., the project cost contributed to project performance by 18.6% and the project scope contributed to project performance by 27.4% when project time crashed at 2.3%, project resource crashed at 0.4%, and project quality crashed at 21.8%. The anticipated value for project performance According to the regression coefficient for coefficient is significantly different from zero 0.283 is equal to the constant, which is 1.870.The project's scope had the most bearing on the analysis. (β = 0.398), followed by the project cost (β = 0.228), and the project resource had the lowest influence (β = -0.05), according to the assessment of independent variables. Haughey (2011) noted that if you shortenyou'll need to either boost the budget or shorten the project's schedule scale back the project's scope.

Equation 2: Project Performance Multiple Regression Equation

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4\ X4 + \beta 5\ X5 + \varepsilon$ (3)

$Y=1.870+0.186X1+ 0.274X2) + (-0.023X3) + (-0.004X4) + (-0.218X5) +0.283$

The above regression equation shows that when a project's cost and scope are met, time is cut by 2.3%, resources are increased by 0.4%, and quality is increased by 21.8%, respectively, while the project's performance (the intercept) is archived by 187% with a residual error of 28.3%. The research's findings also indicate that if all of the variables (cost, scope, time, resource, and quality) had values for and that were close to zero, and if all of the variables could be zero, the project performance would be predicted to be 187%. This suggests that it is challenging to execute a project in a balanced model (that is within budget, scope, time, and resource constraints, as well as within quality).

The research's findings, however, indicate that the project constraint cannot be justified as a crucial success factor for project performance. This is demonstrated by the numerous regression analyses, which show that while cost and scope are positive, project time, resource, and quality are declining (negative values). According to these findings, the success of a project does not always depend on its limitations; it can still be successful even if the project managers or other team members choose two constraints from the available options. The results corroborated Rose's (2005) assertion that project managers must compromise in order to achieve the project's goals.

Additionally, a project's performance may be within its budget and scope but outside of its time, resource, and quality constraints. This is demonstrated by the research's findings, which show that cost performance is 18.6% and scope performance is 27.4%, but that project time performance is 2.3% (-0.023), project resource performance is 0.4% (-0.004), and project quality performance is 21.8% (-0.218). Similar to this, project managers finish projects within budget and scope but not with the necessary amount of time, resources, or high-quality work. According to Haughey (2011), project managers can encounter any two of the three constraints; nonetheless, it is uncommon for them to have the funding necessary to complete tasks with the highest quality and on schedule.

Discussion

The model's overall fitness, which has been confirmed by a variety of statistical data, need to be the first thing taken into account in this situation. The ANOVA test, which was performed first, brought about a P-value of 0.000, which is lower than the alpha level, or 0.05. This demonstrates

that while there is no statistically significant correlation between the independent variables of time and resources and the dependent variable of project performance, there is a statistically significant correlation between the independent variables of cost, scope, and quality and the dependent variable of project performance.

A value of 0.977 for the degree of (linear) correlation is measured by the coefficient of correlation, or R. When the link between the dependent variable and the independent variables is viewed as a whole, there is a highly significant correlation between the independent variables. The adjusted R square, also known as the coefficient of determination or coef, measures how much of the entire variation or dispersion in the performance of building projects (the dependent variable) can be accounted for by the variance in the independent variables in the regression. In Gujarati, 2004 as a consequence, the linear relationship between all the independent variables and construction performance accounts for 95.5% of the variation, with an adjusted R Square value of 0.955. The implication of this is that the relationship only accounts for 4.5% of the variation in building performance. Therefore, a high adjusted R square indicates that the study's independent factors have a significant impact on the dependent variable. In general, the study's regression model can be seen as a good match for or predictor of how well the Ayat 40/60 Building Project will perform throughout construction.

The matching beta coefficients of the independent variables can be used to calculate the individual impacts. A significant positive link between project scope-related characteristics and construction performance is shown using regression analysis. Construction project performance can increase by around 27.4% for every unit improvement in characteristics linked to scope. According to the regression analysis, the second variable under consideration, parameters connected to project costs, has a favorable association with the efficiency of building.

The performance of the construction project will increase by around 18.6% for every unit increase in this variable. The third variable was the Project Time Related Factor, which had a poor relationship between construction performances. For each unit that the Project Time Related Factor increases, there is an approximate 2.3% decrease in the construction performance. Project resource related elements were the fourth factor under examination, and they had a poor

correlation with construction performance, with each unit increase in these parameters resulting in a 0.4% decline in performance.

Project quality-related factors were the fifth component under investigation, and they had a detrimental effect on the efficiency of the construction process, with each unit increase having a 21.8% reduction in efficiency.

The results also indicate that when the project duration, resources, and quality are decreased by 3.10%, 0.5%, and 40.10%, respectively, the project cost and scope increased by 22.8% and 39.8%.

The researcher demonstrated that According to A.K. Hassan, A.Q. Adeleke, and Taoefeeq D.M (2019), the project triple constraint (time, money, and quality) had a positive correlation with the building projects carried out by construction enterprises. According to Chiguru (2019), project management success can be attained by adhering to the budget and scope, but not the project timetable. Comparable to this, project managers finish projects on time and on budget, but not within the needed scope, or on time and on budget, but not within the required scope.

Judging by Josiah (2019). The outcome also demonstrated a negative association between construction performance and time-related, resource-related, and quality-related aspects. This implies that every inferior performance decrease the overall effectiveness of construction efforts in these areas.

Hypothesis Testing

H01: Cost constraints have no statistically significant impact on project success, according to the study's main hypothesis Ayat 40/60 Building Project. From the findings the p-value was 0.03 which was less the 0.05 significant levels. Therefore, based on the rule of significance, the study rejects the null hypothesis (H01) and concluded that Cost constraint has a significant effect on Project Performance in Ayat 40/60 Building Project.

The study sought to test the hypothesis that: H02: Scope constraint has no statistically significant effect on Project performance in Ayat 40/60 Building Project. From the findings the p-value was 0.000 which was less the 0.05 significant levels. Therefore, based on the rule of significance, the

study rejects the null hypothesis (H02) and concluded that a Scope constraint has a significant effect on Project Performance in Ayat 40/60 Building Project.

H03: Time limitation had no statistically significant impact on Project performance in the study, which was designed to examine Ayat 40/60 Building Project. From the findings the p-value was 0.706which was greater the 0.05 significant levels. Therefore, based on the rule of significance, the study accept the null hypothesis (H03) and concluded that a time constraint has no a significant effect on Project Performance in Ayat 40/60 Building Project.

H04: Resource constraints have no statistically significant impact on project performance, was the premise that the study was designed to evaluateAyat 40/60 Building Project. From the findings the p-value was 0.794which was greater the 0.05 significant levels. Therefore, based on the rule of significance, the study accept the null hypothesis (H04) and concluded that a resource constraint has no a significant effect on Project Performance in Ayat 40/60 Building Project.

The study sought to test the hypothesis that: H05: Quality constraint has no statistically significant effect on Project performance in Ayat 40/60 Building Project. From the findings the p-value was 0.000 which was less than the 0.05 significant levels. Therefore, based on the rule of significance, the study rejects the null hypothesis (H05) and concluded that a quality constraint has a significant effect on Project Performance in Ayat 40/60 Building Project.

CHAPTHER FIVE

SUMMARY OF FINDINGS CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

From the study findings the 95.5% of the variation in Ayat 40/60 Building construction projects performance is explained by the linear relationship with all the independent variables. As per the regression result, the project cost related factors (β=0.186) and project scope related factors (β=0.274) have a strong positive significant relation. While project time related, project resource related factors and project quality related factors result in negative relationship. From the regression equation above it demonstrates that, when cost was met at 18.6% and scope of a project by 27.4% the project time was reduced by 2.3% and the project resource & quality by 0.4% & 21.8% respectively while when all other factors remains unchanged the project performance (the intercept) was archived by 187% at a residual error of 28.3%.

5.2 Conclusion

- In general, the regression model built utilizing the research's findings can be viewed as a respectable match or predictor of how well the Ayat 40/60 building project will perform during construction. The following conclusions on the research findings were drawn in light of the research's stated aims.
- Factors that are connected to project scope and project costs have a strong positive Significant relation on project performance of Ayat 40/60 building projects the findings show that all factors that are grouped in scope and cost related factors are influence the performance of projects. This suggests that all subpar behavior in these areas will lower the overall effectiveness of construction undertakings.
- On the other hand Project-related variables include project time, project resource, and project quality-related variables. Have a negative relation on project performance of Ayat 40/60 building projects.

5.3 Recommendation

The following suggestions are made in light of the research findings should be put into practice for the construction industry who aims at performing better in construction projects.

Strategy and strategize every stage of the project: A good strategy will help you stay clear of common obstacles. A work breakdown structure that divides each phase into tasks will help to clarify the project's scope. The roles, timetables, and allocated team members can all be organized and listed in detail.

Creating a detailed work breakdown structure measuring performance throughout the project life cycle keeping the team members engaged and having an effective control strategy are some of the ways that can improve the performance. And create organizations for the construction industry with a clear mission and vision so they can plan, carry out, and assess their success.

Clarify each limitation for yourself: The better you know how each constraint affects the project, the better you can plan around it. To manage limitations, it is vital to be aware of each one and to determine which parts of the project will be affected.

Maintain proper quality control: Meeting the project's deadlines, budget, and scope is not enough; the deliverables must be of acceptable quality. Instead of trying to fit everything at the time of delivery, the quality management system must concentrate on checking important process steps frequently. Regular checks will ensure that methods are working on a periodic basis as part of the internal audit program.

5.4 Limitations of the Study

During the process of data collection, the following limitations were encountered by the researcher; the main drawback of this study is that the researcher is unable to generalize the case for how project constraints affect the building construction sector because of the scope of the study.The second limitation is the respondents were indisposed in filling the questionnaire as a result the researcher had to convince and assure them that the data they were providing were only meant for academic purposes and not otherwise, a task that made the researcher to come up with the required report.As a result, the researcher had to persuade and reassure the respondents that the data they were providing was only intended for academic purposes and nothing else, which required the researcher to produce the required report.

5.5 Future Research Direction

The researcher recommends that, further studies should be undertaken project constraints in the areas of highways and railways. Effective communication within and outside the project team members in order to eliminate project constraints during project execution.

REFERENCES

Ahlemann, F.; El Arbi, F.; Kaiser, M.G.; Heck, A.A ;Ahlemann, F., El Arbi, F., Kaiser, M. G., & Heck, A. (2013). A process framework for theoretically grounded prescriptive research in the project management field.*International Journal of Project Management*, 31(1), 43–56.doi:10.1016/j.ijproman.2012.03.008

Ahmed, K.Hassan ,A.Q.Adeleke , Taoefeeq. D.M. (2019).The Effects of Project Triple Constraint on Malaysia Building Projects.

Ajayi, O.M.; Ogunsanmi, O.E.; Ajayi, K.A.; Ofili, C.M, (2010). Risk Classification Model for Design and Build Projects.

Akanni, P.O.; Oke, A.E.; Akpomiemie, O.A. (2015). Implications of rising cost of building materials in Lagos state Nigeria.

Chan and Kumaraswamy, (2002). Significant Factors Causing Time and Cost Overruns in Construction Projects in the Gaza Strip: Contractors' Perspective.

Churchill, G. A., &Iacobucci, D. (2005).Marketing Research: Methodological Foundations.*Journal of Marketing*, 1–7.

Creswell, J. W. (2009). Qualitative, Quantitative, and Mixed Methods Approaches The Selection of a Research Design. *Research Design*.

DISSANAYAKA, S.M. and KUMARASWAMY, M.M. (1999), "Evaluation of factors affecting time and cost performance in Hong Kong building projects", *Engineering, Construction andArchitecturalManagement*,Vol.6No. 3, pp. 287-298. https://doi.org/10.1108/eb021119

Dobson M. S, (2004) .The Triple Constraints in Project Management.

Dobson &Feickert, (2007). The six dimensions of project management: Turing constraints into resources.

Edum-Fotwe, F.T.; McCaffer, R. (2000). Developing project management competency: perspectives from the construction industry.International Journal of Project Management.

Ernest Kissi, Divine KwakuAhadzie and Edward Badu, (2014). Constraints to the development of professional project management practices in the Ghanaian construction industry.

Faridi, A. S., & El-Sayegh, S. M, (2006). Significant factors causing delay in the UAE construction industry.

Fashina, A.A.; Omar, M.A.; Sheikh, A.A.; Fakunle, F.F, (2021) .Exploring the significant factors that influence delays in construction projects in Hargeisa.

Hareru, W., NeerajJha, K., Koshe, W., &Jha, K. N. (2016).Investigating Causes of Construction Delay in Ethiopian Construction Industries. *Journal of Civil, Construction and Environmental Engineering*, *1*(1), 18–29. https://doi.org/10.11648/j.jccee.20160101.13

Hills, M. J., Fox, P. W., Skitmore, M., Hon, C. K. H., & Fong, P. S. W. (2008).The role of project managers in construction industry development.In *AACE International Transactions*.Association for the Advancement of Cost Engineering.

Irfan, M.; Thaheem, M.J.; Gabriel, H.F.; Malik, M.S.A.; Nasir, A.R. (2019). Effect of stakeholder's conflicts on project constraints: a tale of the construction industry.

Isaac MwangiKibaara (2016) Factors Influencing the Performance of building contractors in infrastructural development Nakru , Kenya.

Iyer, K.C. and Jha, K.N. (2005).Factors affecting cost performance: evidence from Indian construction projects.

Javed, A.A.; Pan, W.; Chen, L.; Zhan, W.(2018), A systemic exploration of drivers for and constraints on construction productivity enhancement.

Karim and Marosszeky, (1999). Benchmarking construction consultants.

Khahro, S.H.; Memon, N.A.; Ali, T.H.; Memon, Z.A. (2016). Modeling the Factors Enhancing the Implementation of Green Procurement in the Pakistani Construction Industry.

Kimiti. (2018). Influence of Project Management Practices on Implementation Kenya, Nakuru.

Kissi, E., Ahadzie, D. K., & Badu, E. (2014).CONSTRAINTS TO THE DEVELOPMENT OF PROFESSIONAL PROJECT MANAGEMENT PRACTICES IN THE GHANAIAN CONSTRUCTION INDUSTRY. *Journal of Construction Project Management and Innovation*, *4*(1), 791–808.

KOTHARI, C. R. (2004). Research Methodology:Methods& Techniques. *New age international (p) limited, publishers* (p. 401).

Kumar Mishra, A., & Kumar Moktan, K. (2019).IDENTIFICATION OF CONSTRAINTS IN PROJECT SCHEDULE MANAGEMENT. *International Journal of Research - GRANTHAALAYAH*, *7*(2), 18–35. https://doi.org/10.29121/granthaalayah.v7.i2.2019.990

Lee Cronbach. (1951). Coefficient alpha and the internal structure of tests.Coefficient alpha and the internal structure of tests.

Liyin, S., Hong, Y. and Griffith, A. (2006), Improving environmental performance by means of empowerment of contractors, *Management of Environmental Quality*, Vol. 17 No. 3, pp. 242-257. https://doi.org/10.1108/14777830610658674

Lombard, M. (2005). Practical Resources for Assessing and Reporting Intercoder Reliability in Content Analysis Research Projects. *Analysis, 4*(2002), 1–18. Retrieved from http://www.slis.indiana.edu/faculty/hrosenba/www/Research/methods/lombard_reliability.pdf

Makori, S., &Mundia, M. (2019).Influence of Scheduling Techniques on Project Performance of Registered Building Works Contractors in Nakuru County, Kenya. *The International JournalofHumanities&SocialStudies, 7*(10).https://doi.org/10.24940/theijhss/2019/v7/i10/hs1910-014

Mugenda.(2003). Research Methods: Quantitative & Qualitative Approaches.

Nagata, M. F., Manginelli, W. A., Lowe, J. S., &Trauner, T. J. (2018). Inefficiency Caused by Delay. In *Construction Delays* (pp. 313–320).Elsevier.https://doi.org/10.1016/b978-0-12-811244-1.00014-8

Narh, O.C.; Owusu, E.E.; Oduro-Apeatu, K.; Tettey-Wayo, N.(2015). An Investigation into Professional Conflicts and Disputes in the Construction Sector.

Navon, R. (2005) Automated Project Performance Control of Construction Projects. Automation in Construction, 14, 467-476. http://dx.doi.org/10.1016/j.autcon.2004.09.006

Nový, M., Nováková, J., &Waldhans, M. (2012).Project management in building industry management. *ActaUniversitatisAgriculturaeetSilviculturaeMendelianaeBrunensis*, *60*(7), 189–198. https://doi.org/10.11118/actaun201260070189

Ogunde, Ayodeji and Dafe, O. E. and Akinola, G. A. and Ogundipe, K. E. and Oloke, O. C. and Ademola, S. A. and Akuete, E. and Olaniran, H. F. (2017) . Factors Militating Against

Prompt Delivery of Construction Projects in Lagos Megacity, Nigeria: Contractors' Perspective.

Patil, P. V. (2021). Assessment of Productivity Constraints in Building Construction Industry. *International Journal for Research in Applied Science and Engineering Technology*, *9*(10), 621–625. https://doi.org/10.22214/ijraset.2021.38453

Pendlebury, M.; Gibb, A.; Pasquire, C.(2005). Constraints to the Use of Off-site Production on Construction Projects

Pennanen, A., Whelton, M. and Ballard, G. (2005).Managing stakeholder expectations in facility management using workplace planning and commitment making techniques, *Facilities*, Vol. 23 No. 13/14, pp. 542-557. https://doi.org/10.1108/02632770510627534

PMBOK.(2013). Project Management Body of Knowledge (PMBOK® Guide)-Sixth edition. *Project Management Institute*.

Rugenyi.(2016).Assessment of the Influence of Project Management Competence on the Triple Constraint in Projects in Nairobi.

Tanko, B.L.; Abdullah, F.; Ramly, Z.M.(2017). Stakeholders Assessment of Constraints to Project Delivery in the Nigerian Construction Industry.

TesfahunegnAberaGebreslassie. (2013). Engineering Geology: Application of Engineering Geology to different Engineering Structures

Ugulu, R.A.; Arewa, A.; Allen, S.(2010). Measuring Infrastructure Skills Productivity: Management of Critical Infrastructure.

Ugwu, O. and Haupt, T. (2007).Key Performance Indicators and Assessment Methods for infrastructure Sustainability.

Van Wayngaad, Pretorius, &Pretorius,(2012). Theory of the triple constraint A conceptual review.

WerkuKoshe, and K. N. Jha, (2016).Investigating Causes of Construction Delay in Ethiopian Construction Industries.

Yamane, Taro. (1967) .Statistics an Introductory Analysis.

Zikmund, W.G. (2000). Business Research Methods.

ZinabuTebejeZewdu. (2008). Construction Projects Delay and Their Antidotes: The Case of Ethiopian Construction Sector.

APPENDICES

APPENDIX 1

RESEARCH QUESTIONNAIRE

THE EFFECT OF PROJECT CONSTRAINT ON PROJECT PERFORMANCE IN THE CASE OF AYAT 40/60 BUILDING PROJECT

(Questionnaire)

Dear Respondents,

I am currently working on a research study on the effect of project constraint on project performance, in fulfillment for my MSC in Management study in Addis Ababa University. This research is aimed to investigate the main Factors affecting project constraints that contribute to performance issues of construction projects in the Ayat 40/60 building project. Identifying the factors/variables that contribute to performance in construction projects of Ayat 40/60 and rank them in their order of severity have paramount importance to conduct analysis and subsequent recommendation of the possible solutions towards minimizing the problem. To successfully undertake this research, it is mandatory to look into the issues from different perspectives by involving professionals who have experience in the construction sector within the Ayat 40/60. In this respect, you are the one who can give the correct/true and necessary information. Hence, I kindly request you to complete the accompanying questionnaire. I would like to confirm you that your response will be kept strictly confidential and it will be used exclusively for the purpose of this research. Besides, your quick response is vitally important in order to finalize the research timely and I would appreciate if you return the completed questionnaire within a week of your receipt of same. Thank you very much for your time and cooperation and looking forward to receiving your response.

Yours Sincerely, Bethlehem Wondim

Post Graduate Candidate,

MSC in Management

Addis Ababa University

Part One: General Information: Please add (√) as appropriate

1. Types of Organization
   - Contractor ☐
   - Consultant ☐
   - Client ☐
   - Others (project sponsor or share) ☐
2. Job Status
   - Project Manager ☐
   - Middle Manager ☐
   - Office Engineer ☐
   - Site Engineer ☐
   - Expert ☐
3. Years of Experience
   - 0-5 year ☐
   - 6-10 year ☐
   - 11-15 Year ☐
   - 15 and above ☐
4. Educational Status
   - PHD ☐
   - Masters ☐
   - Degree ☐
   - Diploma ☐
5. Number of executed projects
   - 0-2 ☐

- 3-5 ☐
- More than 5 ☐

Part Two:

Below are a number of factors affecting project constraint on the performance of construction projects. From your experience, please express your opinion on the importance of the following factors as key performance indicators of construction projects within the Ayat 40/60 building project. Please tick (√) in the appropriate box.

Note: - SD = strongly disagree, D = Disagree, N = Neutral, A = Agree, SA = strongly agree

1. Is project constraint is a problem on project performance in construction industry as well as have greater effect on Ayat 40/60 building

- Strongly agree ☐
- Agree ☐
- Neutral Disagree ☐
- Strongly Disagree ☐

The following tables consist of lists of factors of project constraint on the performance of project on Ayat 40/60 building project. Based on your experience what is the likely contribution of these factors to project performance?

1. Factors affecting Cost constraint in project performance

	Project cost related Factors	**SD 1**	**D 2**	**N 3**	**A 4**	**SA 5**
1	Mistaken / Poor Planning					
2	Risks					
3	Project Change					
4	Weak administrative / leadership					
5	Project Delays					

6	Lack of human resource					
7	Communication barriers among stakeholders					
8	Stakeholders interference					
9	Poor monitoring					
10	Bureaucracy					
11	Price fluctuation					
12	Interest on delayed payments					
13	Project new designs					
14	Additional insurance costs					
15	Liquidity of organization					
16	Overhead percentage of project					
17	Project design cost					
18	Material and equipment cost					
19	Project labor cost					
20	Project overtime cost					
21	Cost of variation orders					
22	Differentiation of currency prices					
23	Escalation of material prices					
24	Regular project budget update					
25	Cost of rework					

2. Factors affecting scope constraint in project performance

	Project Scope related Factors	**SD 1**	**D 2**	**N 3**	**A 4**	**SA 5**
1	Mistaken/ poor planning					
2	Risks					
3	Project change					
4	Weak supervision / leadership					
5	Project financing					

6	Project delays					
7	Lack of human resources					
8	Specification					
9	Stakeholders interference					
10	Poor monitoring					
11	Project new designs					
12	Political interference					
13	Communication barriers among stakeholders					

3. Factors affecting Time constraint in project performance

	Project Time related Factors	**SD 1**	**D 2**	**N 3**	**A 4**	**SA 5**
1	Mistaken/ poor planning					
2	Risks					
3	Scope change					
4	Weak supervision / leadership					
5	Project financing					
6	Project delays					
7	Lack of human resources					
8	Specification					
9	Stakeholders interference					
10	Weakness in designs					
11	Late payment					
12	Poor contract management					
13	Too many meetings					
14	Force majeure (e.g. rains)					
15	Delay in materials supply					
16	Ownership financial problems					

17	Work laws (of the current government)					
18	Site preparation time					
19	Planned time for construction					
20	Percentage of orders delivered late					
21	Time needed to implement variation orders					
22	Time needed to rectify defects					
23	Average delay in claim approval					
24	Average delay in regular payments					
25	Unavailability of resource					
26	Average delay because of closures leading to materials shortage					

4. Factors affecting Resource constraint in project performance

	Project Resource related Factors	**SD 1**	**D 2**	**N 3**	**A 4**	**SA 5**
1	Constraint in human resources results to delay in the completion of construction projects					
2	Constraints in financial resources affect the overall quality of construction project.					
3	Alternative source of funds helps project managers counter financial constraints					
4	Financial constraints cause project managers shift the project start times to maximize use of critical					

	resources					
5	Project managers tend to change priorities of project activities in case of resource constraints					
6	Project manager outsources human skills in case of human resource constraints.					
7	Material constraints results to project managers reducing the scope of the project					
8	Project managers reduce the number of workers in times of materials constraints					

5. Factors affecting Quality constraint in project performance

	Project Quality related Factors	**SD 1**	**D 2**	**N 3**	**A 4**	**A 4**
1	Conformance to specification					
2	Availability of personals with high experience and qualification					
3	Quality of equipments and raw materials in project					
4	Participation of managerial levels with decision making					
5	Quality assessment system in Organization and Quality training/meeting					
6	Unavailability of competent staff					
7	Quality assessment system in organization					
8	Quality training/meeting					

6. Effects of Constraint on Project Performance

		SD 1	**D 2**	**N 3**	**A 4**	**A 4**
1	Before the project execution, all project stakeholders agree on project constraints (budget, schedule and scope)					
2	All completed projects are delivered within the approved project budget					
3	The completed projects are delivered within the agreed project scope					
4	The completed projects are delivered within the agreed project schedule					
5	The required project deliverables are obtained on time					
6	The implemented projects meet/satisfy customers in terms of quality					

Thank You