ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

ASSESSMENT ON THE CHALLENGES OF PROJECT CLOSEOUT: THE CASE OF ADDIS ABABA LIGHT RAIL PROJECT PHASE 1

BY
FikirAsmamaw

DECEMBER, 2019
ADDIS ABABA, ETHIOPIA

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A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ART IN PROJECT MANAGEMENT

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FACULITY OF BUSINESS

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BY

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DECLARATION

I hereby declare that this research project, entitled "Assessment on the challenges of project closeout: the case of Addis Ababa light rail project phase 1" is my original work and prepared under the guidance of **Temesgen Belayeneh (PhD).** All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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Fikir Asmamaw _____

Signature

St. Mary's university, Addis Ababa **December, 2019**

ENDORSEMENT

This thesis has been submitted to St. Mary's university school of graduate studies for examination with my approval as a university advisor.

TEMESGEN BELAYENEH (PhD) _____

Advisor **Signature**

St. Mary's university, Addis Ababa **December, 2019**

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ACRONYMS

AALRT: - Addis Ababa Light Rail Transit

CREC: - China Railway Group limited company

EPC: -Engineering, Procurement and Construct

ERC: - Ethiopian Railway Corporation

PMI: Project Management Institute

RII: - Relative importance index

SPSS: - Statistical Package for Social Science

SweRoad:-Swedish National Road Consulting AB

ABSTRACT

Project closeout is a significant and mandatory process, particularly in mega projects. During the project closeout phase, megaprojects often face different challenges which depend on the nature of the project including lack of budget, project delay, lack of required resources, disputes and claims. This study was conducted on the Addis Ababa Light Rail Transit (AALRT) phase 1,one of ERC mega project in Ethiopia as a case study. The main purpose of the study was to assess the challenges of project closeout in the AALRT phase 1project. The study adopted descriptive research design. The study used both qualitative and quantitative methods of study. Source of data collection used for the study were both primary data (structured survey questionnaire and structured interview)and secondary data. The study used census technique and identified 30 respondents from contractor, consultant, and client who were professionals and directly participated in the project closeout phase of AALRT project and currently available in Ethiopia. A total of 30 questionnaires were collected and 30 responses were found valid which 100% response rate.Quantitative data were analyzed using statistical analysis of descriptive statistics frequency, mean and the Relative Importance Index (RII) to compute the data as well as qualitative data from interviews were analyzed using a qualitative description of interview responses. The study found out that external challenge; government interference and delay in utility services have scored first and second respectively as the major closeout challenge in closing the AALRT project. Also delay in decision making of the client, the financial difficulty of the owner, change of consultant responsible person at a critical time and limited consultant staff at the closeout stage scored from 3 to 6 respectively. The study concludes that the AALRT project closeout was affected by both internal and external challenges that were faced during the AALRT project closeout. The study recommended that for successful project closeout all stakeholders should plan the closeout, prepare finance before the closeout stage in advance and project should be free from unnecessary government interference. For future studies, other researchers can study the challenges with its impacts on the project management.

Keywords: project, project closeout, challenge, internal and external closeout challenges.

CHAPTER ONE
INTRODUCTION

1.1. Background of the study

Project closeout is the last phase and the most critical stage in project management processes since lack of ability to manage it well could delay the project resulting in time and cost overrun and result in total failure of the project. Carefully managing the closure phase is as important as any other phase of the project.

Project Closeout refers to the completion of all construction contract requirements following substantial completion, including punch list items, delivering documentation such as operations and maintenance manuals, as-built drawings, contractor's verification forms, resolution of change orders and claims, final inspections, final payment and owner's internal resolution of all accounts and reporting. The closeout phase is supposed to start when the contractor substantially completes the work on the project, and it can often extend long after completion of the work on site (Fisk and Rapp, 2004)'.

The subject of completion of the project is, therefore, a universal concern that affects all parties to a construction project. It is thus in the interest of project management as an emerging profession to address all the factors that affect the completion of construction projects. Indeed the idea of EPC contracts was conceived to partly transfer the risks involved in project implementation largely to the contractor charged with implementing it. The contractor usually has a limited ability to claim additional money which is limited to the circumstances where the project company has delayed the contractor or has ordered the variation of the works (McNair et al, 2011).

Kual (2014), the closeout phase is more often not under-planned. Less experienced employees typically underestimate the importance of project closeout. From the study similarly conducted,industry stakeholders indicated that punch list items are the prominent cause for delays. Solutions to this problem include addressing simple reminders to the contractors and keeping only one running punch list. In addition O'Neill (2015) concluded that improvements could be made in many areas. For example, staff should not postpone paperwork that can be

finished during slow periods. Postponing paperwork leads to it being overlooked, misplaced, or neglected entirely, especially if there are not enough employees on staff to complete it all.

This is a very important concept in today's construction industry as it has become increasingly difficult to closeout a project in its planned schedule. The closeout phase is one aspect of the industry that has been a victim of negligence, for which the required approach of the involved party representatives has always been inadequate (kual, 2014).Even projects which were taking place as per schedule would pause towards the end of the project due to different administrative and contractual project closure challenges.

Despite its prominent role, the construction industry in Ethiopia, like in other developing countries, faces several challenges in its practice. Some of these challenges are project cost and time overruns poor quality, inappropriate Procurement systems, and a failure to cope with project requirements and the inability to adopt best practices (Tadesse A, et al 2016). Similar study shows that, the finding indicated that Ethiopia is the second from the last followed by Mozambique in performing poor management practices, which indicates that the management practice in Ethiopia is even far behind from those poor performing developing countries in Africa. Lack of sound Project Management by owners or contractors on projects, on the other hand, leads to construction delays and extra costs for both parties Construction Projects (A.A.E.Othman, 2007). Challenges are common during the closeout process when important information of the project needs to be tracked down or when pending or incomplete change orders cause difficulties.

Ethiopian Railway Corporation (ERC) was established by the ministry of transport on November 28, 2007, by regulation 141/2007 with a mandate to create a modern nationwide railway network, to replace the Franco-Ethiopian railway. Addis Ababa light rail transit (AALRT) project phase 1 was one of the projects which were constructed under the ERC. Addis Ababa light rail transit (AALRT) project is the first light rail and rapid transit in eastern and sub-Saharan Africa. The construction of the AALRT phase 1 project was signed the EPC turnkey (engineering, procurement and construct) contract between Ethiopian Railway Corporation (ERC) a corporation incorporated under the laws of federal democratic republic of Ethiopia and China railway group limited (CREC), incorporated under the laws of People's Republic of China

in September 2009 and commenced into construction in January 31, 2012, G.C. and the construction was planned to completed in June 2015 G.C.The contract price of the project was USD 475,000,000.00(Four hundred and seventy-five million, United State of American Dollar only) (AALRT ET/ERC/CREC/0901Contract Document, 2009). The actual completion that the contractor has gained taking over certificate date was March 31, 2016G.C. The project started commercial operation on September 8, 2015. (AALRT Annual report, 2017).

The study refers to different project reports of AALRT and finds out that due to different challenges faced during the project closeout phase, the AALRT contract is not contractually or officially closed until this date. Therefore, this study intends to identify the challenges of project closeout in the Ethiopian Rail Way corporation (ERC) project, selecting the AALRT project as a case study and draw up possible recommendations/ methods of minimizing the closeout challenges for successful completion of the project with respect to planning and managing of closeout. For this reason, the researcher was motivated to assess the challenges of project closeout with reference to the AALRT project under consideration. The thesis: 'assessing the challenges of project closeout in the case of Addis Ababa light rail transit project' will highlights the major challenges faced in the process of project closeouts, which is essential in providing a positive approach in this phase without trying to pass the liability or blame to anyone.

1.2.Statement of the problem

Even though there is a plentiful literature on project management but in that literature the project closure is very limited (Havila& Salmi, 2009, Havila et al., 2013). There is no sufficient reason found in the literature for poor contract closeout performance. Studies put forward that inefficient closeout processes result from a combination of factors and sources (e.g. lack of closeout stage planning, punch lists, slow contractor response to requests, and owner's lack of attention). Pinto et al (1998) as cited in Tim Mrozowski (2008), describe the typical project closeout scenario as anything but smooth because team members are focusing on the next job and not the job at hand, problems exist that need to be worked out, resources are Running out, and finally, near the end of the job, the need to produce documentation becomes critical.

There arelimited studies conducted to discover the problems or challenges associated with project closure in the construction industry. Studies showed that the major problem associated

with project closure in the construction industry is inability to achieve final completiondue to its lengthy and problem plagued phase of a construction project.According to Kual (2014), 80% of a project all over the world gets delayed due to the closeout stage; this means each project phase has its own contribution to successfully complete the project objective and to celebrate its deliverables. Compared to other phases of construction, closeout phase is more difficult to successfully execute (Rogers, 2012).

This shows that Project closeout is the most important phase that should be managed properly as a project community, but most of them failed to give the same attention and commitment of this as they do during planning and execution.When a construction project is not completed on time or on the specified date as agreed by the parties, it means that it has been delayed (Diva and Ramyas, 2015, as cited in F.K.Ziddah, 2016). According to Ziddah(2016), delay is the major problem associated with project closeout followed by documentation. The other researcher showed that improper project closeout is one of the major project delay factor (Taddese, 2017).

The sources of a research problem vary depending on many factors including the researcher. According to Polit and Beck (2012:75), researchers being inquisitive about the research problem are one of the minimum requirements for a problem to be successfully studied. Researchers can develop inspiration on a specific research problem for variable reasons. A thoughtful observation based on their experience is one reason (Polit& Beck 2012:75).

This study was inspired to study the selected problem due to three main reasons. The firstone was during her stay at AALRT project staff theresearcher has observed thateven though the AALRT project started operation since September 2015, the project is not achieved final completion due to different challenges faced on closeout stage. The second reason was that the preliminary literature review made by the researcher before her final decision on the research topic shows that the project challenges that faced in project closeout are a worldwide problem that contributes to many project delay and cost overrun.

The third reason was the researcher refers the Addis Ababa Light Rail Transit project 2017 annual report thatindicates the project was completed substantial completion and started operation in September 8, 2015but till this date the project is not formally or contractually closed which indicates that the project not achieved formal acceptance. The closeout phase of AALRT faces different challenges due to contractual and administrative factors initiated by contractors,

clients and consultants and there is no study found to overcome this problem in this railway sector.

The purpose of this study was to identify the project closeout challenges that affected AALRT project to achieve successful closeout. This can be achieved when the project closeout challenges are precisely identified; it becomes easier to locate key areas and then specifically works on them to ensure the successful implementation of the closeout processes.

Therefore,the researcher sought to fill in this gap, by studying those closeout challenges, which are associated with AALRT projectcloseout to be able to understand the challenges project closeout and to recommendfor future railway projects for successful closeout. It is from this perspective that the study focused on assessing the challenges of project closeout in the case of Addis Ababa Light Rail Transit project (phase 1).

1.3. Objective of the study

1.3.1.General objective

The general objective of the study was assessing the challenges of project closeout in the case of Addis Ababa Light Rail transit project (phase 1).

1.3.2. Specific objective

- To Identify the internal challenges of AALRT project closeout
- To Identify the external challenges of AALRT project closeout
- To identify the major challenges that affect AALRT project closeout

1.4. Research questions

- What are the internal challenges possibly faced during theproject closeout in the AALRT Project?
- What are the external challenges possibly faced during the project closeout in the AALRT Project?
- What are the major challenges that affect AALRT project closeout in the case of AALRT Project?

1.5. Scope andlimitations of the study

The study scope centers on project closeout challenges, in the case of AALRT phase 1 railway construction project. Construction projects are according to general project management practices, thus there are a project initiation, project planning, project implementation and project closure. This research was strictly considering project closure challenges that cause the closeout phase difficult in a railway construction project by taking the AALRT project as a case study. The survey and the interview was only from the respondents who were directly participate in the AALRT project closeout phase and that the researcher had the contacts and currently available in Ethiopia.

The purpose of limitation of the studywas to highlight the limitations and identify items that cannot be analyzed. The contents that could not be taken into account are enlisted below:

- Liquidated Damages, mediation and arbitration was not included since this research is about the phase between substantial and final completion and these contractual provisions are required up to substantial completion.
- Economic factor such as inflation and new technology adaptation external closeout challenges was not included.
- The study does not include the challenges of other project phases like planning, implementation and others, only focused on project closure challenge.
- Staffs participated in the AALRT Project from the beginning project initiation to the end of project closeout are difficult to find currently at the project because of the project team was disband in a different location. The respondent who was participated in AALRT project closeout and not available here in Ethiopia were not included in the study.Therefore, the study includes only the staffs currently available in Ethiopia and had their contacts
- This study faces language barrier with most of the contractor staffs those who cannot speak or understand English to fill questionnaire and conduct interview.

1.6.Significance of the study

The significance of the study can be viewed from three perspectives, i.e. future research, practice and policy. The gaps identified during the research will inform the scope of future research on

project closure practices in the railway construction industry in Ethiopia and beyond. If the findings and recommendation of this research are well adhere to, it will encourage emerging contractors and client with good potentials to close project properly. It will also help address the abandoning of project and doing careless jobs. It will help increase the performance of officials who work on projects which will in turn increase productivity.Further, it is expected that findings of the study will influence policy directives and practice of construction project closure challenges in AALRT. It will also identify loop holes in the closure process of construction works so that the necessary polices and measures can be put in place to address them. Numerous problems are caused when a contractor is unable for whatever reason to close a construction project on schedule.

1.7. Definition ofwords

The project that the study was conducted implemented EPC turnkey contract type, the definition of client, consultant and contractor defined as follow:

- **EPC turnkey contract: -** means the contract under which the contractor is responsible for both design and construction of a facility.
- **Employer/client/**: The employer is the person or entity identified as such in the Agreement. The term employer means the owner or the owner's authorized agent or representative as designated to the contractor in writing, but does not include the consultant. (FIDIC,1999)
- **Contractor:** means the contractor shall design execute and complete the works in accordance the contract and shall remedy any defects in the works. (FIDIC,1999)
- **Consultant/Employer representative/:** means the representative which act on the behalf of the employer, in this event the employer shall give notice to the contractor of the name, address, duties and authority of the employer representative. (FIDIC,1999)
- **Project management**: Project management, then, is the application of knowledge, skills and techniques to execute projects effectively and efficiently. It's a strategic competency for organizations, enabling them to tie project results to business goals and thus, better compete in their markets. (PMI, 2010, chapter 1).
- **Project life cycle**: A project life cycle is the series of phases that a project passes through from its initiation to its closure. (PMI, 2010, chapter 2).

1.8.Organization of the study

Chapter one provides an introduction of the study by highlighting the background of the study,statement of the problem, objectives, research question, scope of the study, limitation of the study and significance of the study. Chapter two reviews related literature on project closure in the construction project. Chapter three explains method / methodology:-This chapter gives an overall view of research methodology for the research and includes the method of data collection and questionnaire type, while chapter four presents the data analysis:-This chapter focuses on analyzing collected data and discussing the findings. It contains the analysis of the information gathered through the questionnaire, interview and document review survey, identifies the challenges of project closeout in AALRT and analysis that support the recommendation and conclusion of the study. Chapter five concludes the study by summarizing the findings and providing recommendations thereof.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1.Introduction

This section reviews literature on project closure in the railway construction industry. It will consider project and project management concepts, the project life cycle, project closeout, the activities of the project closure and project closure practices, problems associated with project closure as well as challenges that prevent contractors, clients and consultants from achieving projects on time. This section presents a view of the literature on the project, components of project closure and challenges project

2.2. Project and project management

2.2.1. Project

The word 'project' finds a number of distinct definitions inside the literature related to project management and the following are some of them. The project management body of knowledge defines project as: A project is a temporary endeavor undertaken to create a unique product, service, or result (PMI, 2013).The temporary nature of projects means that a project has its own definite start and end.

Project Management Institute describes a project as: A project is a temporary endeavor or efforts that is undertaken to create a unique product, service, or result(PMI, 2010, p. 5).Another definition from British Standard 6079, 2000, project is a unique set of organized activities, with definite starting and finishing points, undertaken by an individual or organization to satisfy specific performance objectives within defined schedule, cost and other performance parameters (Maylor, 2010). One more from PRINCE 2(2009): the projectmanagementsituation that is created for the purpose of delivering or producing one or more business products compliance with specific business interests. And: A temporary organization that uses predetermined, expected or planned resources to produce a unique and predefined result or outputs at a given time.(Maylor, 2010).

Also Lewis, (2001) mentioned that 'A project is a one-time, multitask job with a definite starting point, definite finishing or ending point, a clearly defined scope of work, a budget and generally a temporary team.'

Gardiner (2005) provide the explanation for so many attempts of defining project; there are so many potential differences from one project to another that it is difficult to have one-for-all definition. Lewis (2001) makesan interesting point that projects never match the textual meanings of real-life projects.Maylor (2010) notes that three common themes arise from different definitions of the project, the first is unique; there is no specific project, the second is a temporary project; the project has a beginning and an end and has a dedicated budget, and the last one is project is focused; the project is expected to deliver a certain product/service/outcome.

Likewise, Gardiner (2005) notes that each project has three primary characteristics that differentiate a project; each project is a temporary venture undertaken for a limited period of time, each project is unique, and each project undergoes a phase of ' progressive growth ' in which the specifics are described and added over time. According to Cardinal and Marle (2006), a project is a result-oriented change agent. These may be to improve the performance of the project or to create an original product offering or to adjust the company's current role and the like

2.2.2. Project management

Project management is applying adequate and proper knowledge, skills, tools and techniques to project activities in order to fulfill a project specifications and requirements effectively.Project management is accomplished or achieved through the use of project processes such as initiation, planning, execution, monitoring and controlling, and closure process (PMI, 2013).

Project management usually includes, but is not limited to; identification of requirements, addressing the different needs, concerns and expectations of stakeholders in the planning and execution of the project; creation, maintenance and execution of active, efficient and collaborative communications between stakeholders; management of stakeholders to meet project requirements; and creating project deliverables and Balancing the competing project constraints, which include, but they are not limited to: Scope, Quality, Scheduling, Budget, Resources, and Risks.

2.3. Project life cycle

Project Life Cycle (PLC) explains in detail the entire project's development history, including a detailed explanation for each of the crucial project activities. Trevor L. (2007) states that project

have such specific characteristics, all time-limited; it goes through a life cycle, of course,just as a product does. The distinction here is that the life cycle is dynamic at any point and subject to reiteration during the project.All projects which have been initially accepted for a similar life cycle.

A life cycle of a project is the sequence of phases experienced by a project from initiation to termination/closeout/ (PMI, 2013).

1. **Initiating Process Group**. These processes were performed by obtaining permission to start the project or process to establish a new project or a new phase of an existing project.
2. **Planning Process Group.**These processes needed to determine the project's scope, refine the targets, and identify the course of action needed to achieve the goals the project was undertaken to achieve.
3. **Executing Process Group.** These processes were carried out in order to complete the work specified in the project management plan to meet the requirements of the project.
4. **Monitoring and Controlling Process Group**. These processes needed to monitor, review and control the project's progress and performance; identify any areas where changes to the plan are necessary; and implement the appropriate changes.
5. **Closing Process Group.**Such procedures were carried out to finalize all tasks and officially close the project or phase across all process groups.

Figure2. 1: project life cycle (PMI, 2013)

2.4. Project closeout

The final or last phase of the project life cycle, project closure phase, is a significant stage in a project's lifetime and needs due diligence (De, 2001).De (2001) and Dvir (2005) stress that the project closure should be properly planned and budgeted, as should all other phases of the project life cycle. Gardiner (2005) struck the right note with the point that project closure starts during the planning of the project and not at the project end. Gardiner (2005) adds that closing activities

should be performed throughout the project's lifecycle to ensure that the project can be properly closed.

Project Closure entails handing over the deliverables to your client, forwarding the documentation or paperwork to the company, canceling contracts with contractors, releasing staff and equipment, and telling stakeholders about the project closure.

The project closure or termination incorporates two processes, ' project deliverables commissioning and recording of all project experience ' (Gardiner, 2005). The closing of the project is predictable or inevitable but how it is handled and when it is done has a huge impact on the project's successes (Hormozi et al., 2000). Project closure for a project means that the information system has been installedor built and is ready to be handed over to the customer (Cadle&Yeates, 2004).

Additionally, Cadle and Yeates (2004) have stated that the necessary technical documentation, user manuals, testing and training should be completed at this point.Project closure guidelines or a requirement includes are lessons learned, final project audits or assessments, project evaluations, product validations, and approval requirement (PMI, 2013).The final stage can be considered as part of the delivery of the project and present the closure process.

All projects must follow a structured closing process, usually involving the compilation and review of both project-related content and financial information, and collaboration between the lead contractor and each of the various partners. Project managers will have to show during this phase that the project's outcomes and impacts have been achieved according to the goals outlined in the proposal. Therefore, attention should be paid to the benchmarks and delivery of all work sets, as well as adequate final reports on the activities they have carried out by all project partners.

For today's construction industry, this is a very important concept as it has become extremely difficult to complete a project on time. Closeout is one aspect of the industry that has been the victim of incompetence, which has always been insufficient for the appropriate response of the members of the parties involved.While planned projects,which were taking place as per schedule, due to various administrative, technological, financial and psychological factors, will pause towards the end of the project (Kual, 2014).

The closure process may take time, but the project partners can already be informed about what is expected of them during this period with good planning and organization from the start. Despite being prepared, the fact is that during this period, delays are not uncommon. Project managers may need to spend extra time empowering project workers, as all project tasks have been completed.

In financial terms, programmers need confirmation that paying out the last part of the grant is safe and no future issues or problems are expected. When projects are in the key implementation process, in terms of financial management results, programmers can afford to be somewhat versatile orflexible. Deductions from later payments can be made if there are problems, and expenditure affected by open questions can be left out until a later date. Nonetheless, closing the project means that no questions can be left open. All problems need to be finally resolved. This may be the main challenge of project closure, although the actual checks conducted in earlier stages vary little from the financial tests. If the project's financial management was nice, the closure test should be a formality that only confirms the results of other checks at the first stage.

2.4.1. Substantial completion to actual completion

Studies have been conducted on the legal significance of "substantial completion" and how it affects the ability of the owner to force the contractor to achieve final completion (Carson et al., 2009; Crowley et al., 2008). Liquidated damage clauses have faced several legal challenges in which unreasonable and unenforceable was considered the contractually specified dollar amount (Crowley et al., 2008). The first milestone associated with delay estimates is often substantial completion, always referred to as the "punch-list" work, which completes the project enabling the final completion. Punch-list work may be a source of controversy over the actual quality of the work, the pace of occupancy, the start of warranty periods, and the assessment of delay costs or liquidated damages (Rogers, 2012).This can be avoided if the closing phase is planned before work has even begun, but it is off the project management team's radar screen at the beginning of a project, as a result of which, due to lack of initial planning, it later becomes the most challenging and unmanageable part of a project to schedule and complete.

The figure given below,shows that the common schedule logic between substantial and final completion.

Figure2.2: Common Schedule Logic between Substantial and Final Completion (Kual, 2014)

It offers no insight into the tasks that need to be done to complete the project. Between the significant and actual completion there is a series of activities that take place, beginning with the development and execution of the punch list, followed by the occupancy certificate, then the beneficial occupancy, also known as the occupancy of the owner of a project, before it is 100percent complete and it complements the attainment of substantial completion (Fisk and Rapp, 2004). Lastly, it includes commissioning, final inspection by the local governing body, final customer inspection, final completion and finally completion of the project.

2.4.2. The importance of project closeout

According to Barager (2013), 'without a formal closure process, project teams can fail to recognize the end, and then the project can drag on sometimes at great expense'.

Field and Keller (2007) and Barager (2013) write that a formal project closure ensures that the assignments and events remain healthy, customers and stakeholders are satisfied with the end result, critical knowledge is captured, the end product matches the project goals. The team feels a sense of completion and resources for new projects are released.

Also De (2001) writes that poor management of project closure will result in several adverse effects such as time-over-run, over-run costs, damaging the project team's reputation and prestige, locking up valuable human and other resources that could have been gainfully used elsewhere and stressing the project workers.

Failure to carry out a comprehensive close-out of the project could potentially (a) place the organization at a considerable risk, (b) prevent the organization from recognizing the expected benefits of the project's accomplishments, (c) result in significant losses to the organization and (d) undermine the credibility of the project manager and project management team.

2.4.3. Types of project closeout

The completion may not be as straightforward as planned on some projects. Although a definite ending for a project may be specified in the scope statement, the actual ending may or may not fit. Luckily, with a well-defined conclusion, most ventures are blessed. Regular project updates can recognize projects with different endings than plans. Identify the different types of closure here.

Gray and Larson (2008) identify five circumstances for project closure:

1. **Normal closure:**it is the common condition of project closure when the project is completed as planned or expected. This is when the project goals and objectives are achieved, the client accepts the project and the normal project closure begins.
2. **Premature closure**: Most projects do not or are not given the opportunity to produce all their objectives or goals. Instead, they are prematurely closed by eliminating elements of the project that were initially defined in the scope of the project. This could be due to cost reasons, where the client is reducing the project funds or the project has already consumed the budget. Premature closure often takes place when the project is of strategic importance and has to be completed earlier than expected, such as the launch of a new product. Delaying the product to the original completion date can result in a loss of opportunity for the consumer.
3. **Perpetual projects:**Some projects, on the other hand, never seem to end. These are projects that have encountered multiple delays, failures and problems.Perpetual projects also suffer from drift, add-ons and modifications of infinite variety. The problem with these types of projects is that due to the changes and consistent scope screep, they never achieve their goals or objectives. For the project manager and the project team, this becomes very frustrating. It will also be highly frustrating for the client because, despite the consistent request for changes, they do not see the project goals being achieved. The project manager has to set the scope and prepare for completion at some stage. This can be achieved by redefining the scope of the project in order to force project termination, restricting budget or resources, or setting a time limit. As a consequence, any new requests made by the client can be treated as a second phase of the project rather being perpetual.

4. **Failed projects:** Far too often projects close because they have failed. There are a number of grounds for project failure. It is not unusual for the client to run out of funds, thus permanently killing the project.
5. **Changed Priority:**The priorities of organizations often change and the direction of strategy shifts. For example, organizations shifted their focus from money-making projects to cost-saving projects during the 2008–10 financial crises. The supervisory board regularly updates project selection goals to reflect changes in the course of the company. Projects may need to be modified or cancelled in the process. A project can therefore start with a high priority, but see its rank erode or crash as conditions change during its project life cycle.As priorities change, it may be appropriate to modify or cancel projects in progress. Different types of termination of the project present unique problems. Some adjustments may be necessary to generic closure processes to accommodate the type of termination of the project that you face.

2.5. Stages of project closure

Project closure is the last stage of a project. This requires the activities that signify a project's expiration. This begins with the client approving the project production (deliverables) in the construction industry and finishes with the commissioning of the facility for use (Federal Transition Administration, 2006).The aim of the project closure is to assess or evaluate the project, i.e. whether the results or output are achieved or not, and to draw lessons learned for future purposes (ITRM Guideline-Project Management Guideline, 2006). Therefore, the project closure process involves project deliverables turnover, project progress reports and lessons learned, resource allocation, financial account closure, project record collection, and post-implementation review preparation.

According to the ITRM Project Management Guideline, the main key concern for project closure is administrative closure and logistics. The project closure has two basic components for a construction project, namely contract closure and administrative closure (Federal Transition Administration, 2006).

Contractual closure involves the signing off the project by parties to the project. It involves parties observing the procedures and acts in the terms and conditions of each contract, the approving authority granting certificates of beneficial occupancy, and performing cost

accuracy and contract audit verification.Administrative closure means reassigning project personnel to other long-term or short-term projects, as well as project assessment (compilation of files and documentation) and financing stopped.

2.5.1. Contractual closure

Contractual closure may be defined as the process of signing off a project under the terms and conditions specified. This will involve verifying the completed project scope, contract audit, and final payment and release of retention as stated above.According to the FTA Construction Project Management Handbook (2006), the contractual closure for a construction project should ensure that the following activities are accomplished and accepted by all stakeholders.The tasks include planning a punch list, manuals and instruction, assurances and promises, advantageous occupancy, document drawings, preliminary review, final inspection, receiving project approval from the key stakeholders, final payment and commissioning.

2.5.2 Administrative closure

Administrative closures are actions performed by the contractor to ensure that project resources are allocated (ITRM Guideline-Project Management Guideline, 2006). The tasks conducted include demobilization of the project, closure of project funding and financing, collection of project documents, and assessment of the project and closure of stakeholders (Federal Transition Administration, 2006) .These activities are project demobilization, Closure of project financing and funding, disposition of project records, project evaluation and stakeholder closure.

2.6. Project closeout challenges

During the closing of the project, a number of things can go wrong. Projects are affected bya varietyof factors that can be external or internal to the entity that oversees and implements them. These include weak project management, insufficient incentives for potential recipients to engage in project selection and design, poor relations between project activities and project development, project purpose, insufficient attention to external environment during project design, among others.

Spire and Hamburger (1988), recommend that the major challenges of project closeout for the project manager at termination.Project termination' should be treated as a project itself to complete the project successfully, according to Spire and Hamburger (1988). In addition, the

function of project closure suits the classic definition of a project as a unique undertaking with limited resource constraints. In the closure phase, Spire and Hamburger identified a number of potential problems. These are divided into the intellectual and emotional elements that should be addressed by management when the termination process begins.

According to KirtGilliland (2019), the potential issues during project closeout or some common pitfalls that crop up during project closeout are;

- **Punch list Delays**:through careful supervision of the closing process of the project, you can run into trouble having things completed on your punch list. A punch list for a project is a list of things to modify or complete before a project can be deemed complete. After physical construction has been completed, the punch list is created and generated with the help of the architect who worked on the project. Any delays in completing the necessary changes can lead to costly delays in the timeline for completion of the project.
- **Incomplete Document Production:** As the project owner, at the moment the keys are handed over, you will want all the documents related to the project in your possession. There are a variety of reasons, for a comprehensive collection of project documentation. Not only is it necessary to keep accurate records, but for equipment maintenance and warranty services you may need documentation. If a portion of the construction does not meet the requirements outlined in the contract, you may also need documentation in the future. Without having all the paperwork for a project is an issue that at the time you take over a project may not be readily apparent. Too often, owners find out that they don't have a necessary piece of documentation months or even years after the completion of the project. By then, finding the individual or organization that has the records you need can be challenging. The potential complications resulting from this make it necessary to receive all the required documentation as part of the closing process of the project and before taking possession of the premises.
- **Communication Breakdown**: Communication is a key component of any successful project. This is valid during the entire project, including the completion of the project. Once each organization involved in a project starts to demobilize, communication becomes more difficult. It becomes more difficult to obtain the necessary documents from each activity as time goes on and people and businesses involved in the project are going on to

other occupations. The slowing and eventual deterioration of communication between project stakeholders will lead to significant delays in each phase of the closing of the project. Changing orders can be delayed on the punch list and documents cannot be produced.

The overall challenges of project closure arise from either internal or external to the project**.** These internal and external challenges of project closeout that possibly affect the project are explained as follow:-

2.6.1. Internal challenges

This type of challenges is under the control of the owners/clients, contractors, and consultants.Kual(2014) identified Internal related challenges of project closeout arises from the technical, financial, administration or psychological factors. The challenges related with owners/clients, contractors, and consultants are discussed as follow:

2.6.1.1. Contractor related challenges

Usually, contractors are driven to complete projects in the shortest reasonable time to save overhead costs and receive final contract payments (Rogers, 2012). Contractor-related challenges arise due to the contractor's mismanagement in handling key construction project activities.According to Archarya et al. (2006), therefore, the contractor is responsible for the successful execution of the construction design; they can be attributed to most of the delays. The contractor, in their opinion, controls the construction finances, undertakes job planning, scheduling and site management, manages supplies and coordinates among other items between the workers. Consequently, if these are not well handled, it may result in delay and or failure of the project. Contractor-related project closing challenges may be due to technical, financial, administrative or psychological factors.

Technical: According to Heerkens (2002), to ensure that the project delivers what has been promised, most of the technical issues and issues that could be addressed during the project's execution and control phases will arise during the final phase of closure. The technical challenges arise from clients are, excessive/multiple punch lists, absence of a clear handover strategy , delay in performing testing of equipment and engineering systems after substantial completion, errors and discrepancies in design documents, vague details in drawings, contractor

(subcontractor personnel transferring to new projects) lack of sufficient staff in closeout stage, thorough/detailed/ identification and agreement on all remaining deliverables, shortage / late-arrival of resources, i.e., manpower, materials and equipment in closeout stage / and inability to finish punch lists due to lack of appropriate technical manpower,

Psychological: Approaching the project's closure process, the performance of the team begins to falter. After finishing their research, some team members have disappeared; those who remain may be worried about "life after this project."Team members (or those remaining) are struggling to complete the last few tasks, which may not have been included in the original plan. This is a difficult time for the project manager to fight against the team's loss of interest or looking for the next assignment. The psychological challenges that face at the closer out stage as identified by Kual (2014) are: loss of team functionality as some members complete their tasks, loss of interest in tasks such as documentation, attention is diverted as members transition into new projects or other work,lack of urgency in approach, enthusiasm and motivation of parties involved due to achieving substantial completion and fear of no future work.

Administrative: Murali et al. (2007) identified challenges such as inadequate planning of contractor and inadequate contractor experience contributes to of causes delay. Examples of administration are contractor lack of preparedness and planning for closeout, completing punch lists in occupied space, improper / untimely contractual closeout documentation, lack of contractor commitment to meet contractual agreements /like providing spare parts/.

Financial: - Essam (2006) identified the problems of subcontracting, the contractor is not well structured, the financial problems of the contractor and the low quality of the work of the contractor relate to the causes of delays. The dispute between Contractor and other parties identified by Sadi et al. (2006) can trigger project delay.For example with client, disagreement on the cost of additional work with clients and contractor poor financial control systemcan be also the challenges of project closure.

2.6.1.2.Client related challenges

There are several studies by different researchers identified client related factors as causes of project implementation delays. Client related challenges of project closeout could be due to technical, financial, administration or psychological factors.According to Archarya, et al.,

(2006), Owner-caused delays are triggered by the initiator and financier of the construction project. As the projects financial, the owner / client have the power to influence the project's scope and order. Shewaferahu(2016), identified owner changeorder; delay to paymentandslowness in decision making by owner contributes to project implementation delay. Meaza, (2015) identified owner interference, slow decision making, unrealistic contract duration and requirements imposed contribute to causes of delays. Fong et al (2006) identified the client type, lack of timely making decision; unrealistic imposed contract and client initiated variations contribute to causes of delays. Essam, (2006) identified change or variation orders, owner-induced delay, owner-induced oral change orders lead to delay causes. Sadi et al. (2006)identified the delays to furnish and deliver the site to the contractor by the owner, change orders by owner during construction, poor communication and coordination by owner and other parties, slowness in decision making process by owner, unavailability of incentives for contractor for finishing ahead of schedule, suspension of work by owner contribute to causes of delays. Abdalla et al. (2002) noted that owner' s interference, slow decision making by owner, unrealistic impose contract duration contribute to causes of delays. Sweis et al. (2007) identified the delays in site preparation, delay in contractor's claims settlements, work suspension by the owner, too many change orders from owner, slow decision making from owner, inference by the owner in the construction operations, delay in progress payments by the owner. There are a lot of factor that were get from previous study about the factor cause the delay in construction project. Most of the researchers agree that are the factor that always happen relate to the client:

- The owner's inference in the construction work changes the owner's orders during the construction owner.
- Owner poor communication and coordination by with other parties.
- Slow decision making from owner.
- Delay in payment

2.6.1.3.Consultant related

The previous studies by different researchers identified consultant related factors as causes of project implementation delays. Consultant related challenges of project closeout could be due to technical, financial, administration or psychological factors. Shewaferahu(2016), identified consultant related factor of slow response and inspection contributed cause of delay.Divya.R and

S.Ramya (2015) identified the possible consultant related factors causing delays in construction projects in Malaysia are inadequate experience of consultant and poor communication and coordination.F. K. Ziddah(2016), identified poor communication and coordination as one of consultant related cause of delay in Ghana Cocoa Board Construction Projects of his study.

2.6.2. External challenges

This group of challenges are out of the control of owners/clients, contractors, and consultants. David (2016)study concluded that the political environment affects the construction of a project, changes in government actions are a major external risk factor militating against the success of projects. An external challenge includesfederal regulatory requirement (government interest in early completion of the project), weather effect on construction activities, and accidents during construction and delays in providing utility services. Meaza (2015) and Kual (2014) both have been identified unfavorable weather condition causes of project delay.An activity that can affect something related to government policy and its administrative practices.Most business operators will keep an eye on any political factors, such as new legislation or regulatory shifts that could have a significant impact on how their company works and its bottom line. Citizens elect politicians to decide public policy, including the implementation of public projects, while the government employs officials to enforce these policies. Within their districts, when faced with high levels of political pressure, lawmakers may be motivated to improve the quality of potentially voting-winning public projects.Consequently, they may seek to overcome barriers such as bureaucrats' offensiveness, inactivity, or dishonesty. There is evidence that the quality of public projects can be enhanced through political competition. According to David(2016), political interference plays a critical but poorly understood role in determining the success or failure of the processes of project management that dominate efforts to form international regimes or, more generally, institutional arrangements in international society. An examination of the nature of project management serves as a springboard both for pinpointing the role of leadership in regime formation and for differentiating three forms of leadership that regularly come into play in efforts to establish international institutions: structural leadership, entrepreneurial leadership, and intellectual leadership Holland et al.(, 2009).

The real work of the development of the regime takes place in the interplay of different kinds of leadership; the study of interactions between individual leaders is a high priority for those who

want to illuminate the processes involved in the creation of political movements. Not only does such a study help to explain the conditions under which regimes form or fail to form, but it also provides an opportunity to bring the individual back in to an important area of international affairs (Migai, 2008 cited by David (2016) Politics demonstrates itself in all organizations as opinions and attitudes of the different stakeholders in these organizations. In addition, the stakeholders relied upon by the project may also have their own agenda and preferences for participating in the project. The relationships to the project by these stakeholders can vary from very supportive to antagonistic, but depending on their field of influence, must be considered and managed. However, neither the sponsor nor the project manager has control over external politics such as political turmoil which may disrupt the project.

Public projects are often left uncompleted or delivered to a poor quality World Bank, (2004) as cited in David (2016). Failure to deliver these projects undermines citizen welfare and leads to an estimated loss of US$150 billion per year in public resources World Bank, (2007) as cited in David (2016).The extent of these failures varies within and across countries, driving national and global inequalities. According to Adriaanse and Voordijk, (2014), both politicians and bureaucrats are viewed as critically important agents in the delivery of government projects.

The unsettledproblem is how politicians are able to influence the bureaucratic arm of government, and raise bureaucratic productivity, to satisfy short-term electoral concerns. Typically, politicians do not under-take government projects themselves, but must delegate these tasks to bureaucrats, whom they then incentivize. Our understanding of the interactions betweenpoliticians and bureaucrats is very limited, both in terms of their causes and their consequences David (2016). More generally, given their significance as the main producers of public projects in many countries, there is a small empirical literature on bureaucrats. It is important to understand the reward environments in which bureaucrats work in order to understand the delivery of public projects: both formal incentives in the contract of a bureaucrat and informal interactions.

kual (2014) provide the following table about factors affecting project closeout that includes future of project staff, handover and maintenance, documentation, contract completion, financial accounting, project review, and handling the loss of interest in the project.

Table2.1: Factors affecting project closeout (Kual, 2014)

No	Major Factors	Types
1	**Psychological**	• Project manager or superintendent demobilized before final completion • Stress of learning new technology due to manpower shortage (Example: Software related to the client's database, in order to submit the required documentation to the client). • Lack of urgency in approach, enthusiasm and motivation of parties involved due to achieving substantial completion • Demotivation of team members losing their coworkers due to project downsizing • Leadership of the project team • Barrier in communication flow
2	**Financial:**	• Owner directed change orders • Delay by owner for payment of work before substantial completion • Contractor project team bonuses or other incentives for timely final completion
3	**Technical:**	• Technical Expertise • LEED / Other commissioning requirements (certification) • Lack in planning and resource allocation • Unclear directives for closeout, in specifications and contractual requirements • Accidents to people/equipment after substantial completion. • Procedural inexperience of owner representative or architect
4	**Administrative**	• Improper / Untimely contractual closeout documentation • Subcontract closeout requirements. • Multiple punch lists • Shortage / Late-arrival of resources, i.e., manpower, materials and equipment • State and Municipal regulatory requirement • Federal regulatory requirement

Source: Factor affecting project closeout (kual 2014)

2.7. Successful project closeout

According to A.A.E.Othman (2007), on his conference paper on delivering successful project through achieving professional project closeout and identified the key elements for achieving successful project closeout as follow:

1. **Ensure that the project will deliver what was promised:** Throughout the execution and control process, this key element should be discussed. The project manager must

continually monitor and protect from degradation the functionality and quality of the project deliverables. The project manager has to stop last-minute surprises from the close-out viewpoint of the project.

2. **Actively lead the project team through a confusing period of time:** At this time, the project manager will actively make his exposure higher than at any point since the project starts. When the project is nearing completion, the project team will begin to disintegrate as a cohesive unit. Communication for the project manager will become more complicated. It will become more and more difficult to organize people and things. All of these things require a high profile of the project manager and a strong leadership role.
3. **Ensure timely completion of the "odds-and-ends" (the punch list activities):** A point will come where the project manager will be able to give up the original project plan. When that happens, it will be helpful for the project manager to focus the attention of everyone on the specific work items needed to get the job done. This can be done by meeting the requirements of the punch list.
4. **Prepare for the transition into the next phase in the overall project life cycle**:The timeframe following completion of the project is of primary importance for the project's progress. The results obtained by the project are normally accepted by the customer and used. One of the basic rules of project management is that the primary responsibility of the project manager is to ensure that the "handover" to the client or user is smooth.
5. **Secure consensus that the project has met the completioncriteria:** As mentioned earlier, at the beginning of your project, you should set criteria for completion. Until the end of your project, if you neglect this problem, disagreements can become major in scope. It can involve significant rework to fix certain issues late in the project.
6. **Obtain customer acceptance and verify customer satisfaction:** At least not in a formalized way, this is not achieved enough. While approaching customer acceptance and customer satisfaction, the project manager will strive to create an almost "ceremonial" environment. Just as a formal kick-off meeting signals the start of the project, a structured session in which you ensure customer satisfaction and approval will signify the successful completion of the project in a positive way.
7. **Ensure that the project records reflect accurate "as-built"data:** A wide range of documentation may include this problem. This applies to the updating process of any

and all project-related documents to reflect the reality that occurs at the project's end. It means that accurate historical data exists, which in the future can be of great value to project teams. The project files (especially the project plan) should be updated to reflect the actual "final".

8. **Transfer the learned to others:** Carrying out a "learned lessons report" is crucial to successful projects. This research seeks to obtain information by systematically analyzing project interactions. Understanding the nature of positive and negative interactions makes it possible for future projects to minimize unfavorable effects and take advantage of advantageous opportunities. The project manager should include input from all of the study's key stakeholders. In planning and carrying out the report, the project manager plays a leading role. The style and layout of the lessons learned can vary, but in a team meeting sense it is often achieved using a similar approach to brainstorming.Transferring what critical information has been gathered or lessons learned to anyone who can profit from the newly acquired experience are important anduseful.
9. **Acknowledge the contribution of contributors:**Those who helped the project manager to achieve project success must be recognized by the project manager. It's not just a nice thing to do; it's a powerful future building block. People who work hard and make important contributions can de-motivate themselves if their work goes unrecognized.Itcan hurt the organization's overall effectiveness. Study after study shows that it means more to people than almost any other type of reward. Financial rewards are good, of course, but realizing that others value your work is for most people the most meaningful thing. It's a personal affirmation that shows them that all people want something to matte.
10. **Bring the project to efficient administrative closure:** This may include a vast array of administrative issues. For example, accounting problems such as closing open charge account numbers need to be handled by the project manager. It also involves ensuring that pending invoices were sent and payment of all bills. It may also includeclosing out rental or lease agreements, as well as disposing of or storingany leftover materials (Heerkens, 2001).

2.8. Conceptual framework

This is also captured in the conceptual framework which is organized relationship between the independent variables and dependent variable. The conceptual framework of the study was developed from different authors findings (kual (2014), Meaza(2015), Markus and Tanis (2010), David (2016),Divya.R and S.Ramya (2015), and others). The study was guided by conceptual framework stated below.

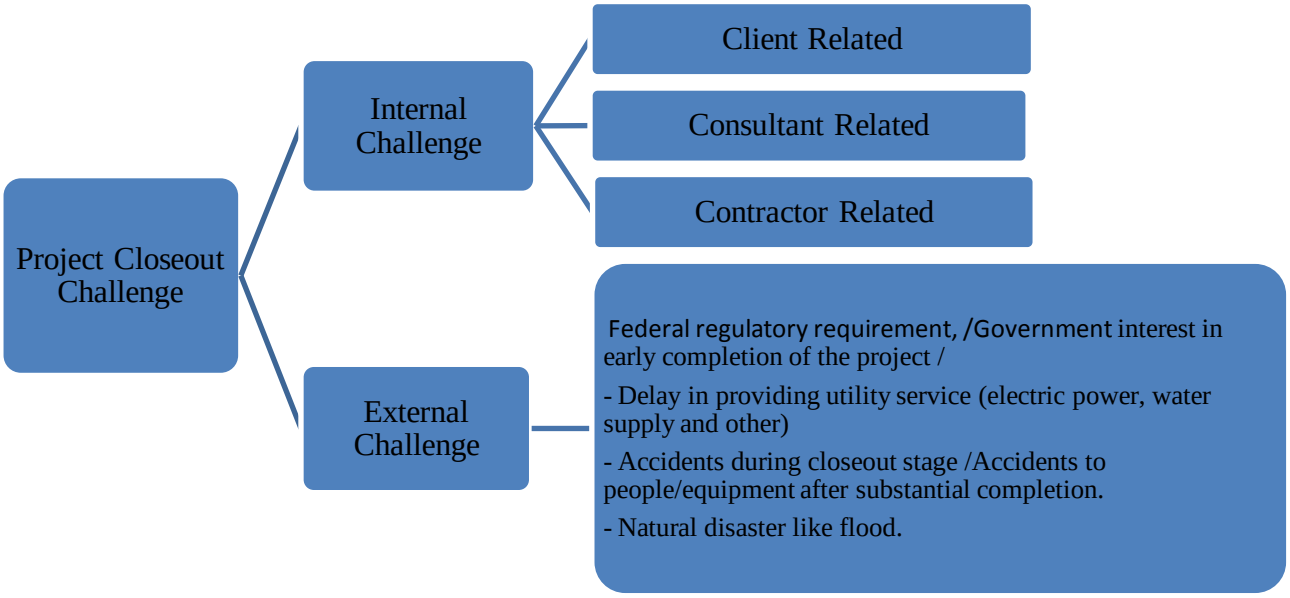


Figure 2.3: Conceptual framework of the study (source: own)

CHAPTER THREE
RESEARCH METHODOLOGY

The methodology refers to the procedural framework within which the research is conducted. This chapter presents how the current study was designed and provides a clear description of the specific steps that were taken to address the research problem. For this thesis research methodology, the research methods, approaches, designs, population and census technique, data collection tools and methods, and methods of data analysis are described each in detail below.

3.1. Research Approach and Design

3.1.1. Research approach

The study intends to assess the challenges of project closeout in AALRT project phase one. Creswell and Borrego described three research approaches: such as qualitative, quantitative and mixed methods (Creswell, 2013). Based on the character of the research questions, here, in this study, a mixed approach is used. In this regard, both qualitative approach and quantitative approach have been incorporated to provide alternative insight and to identify major challenges of the project closeout process. Depending on the type of data that are used in the research, the general research approaches are identified, qualitative or quantitative. In this study, both types of data that can and cannot be quantified are used. The quantifiable data are gathered by closed-ended questions of the questionnaire which were designed to keep the respondents in scope. There were also open-ended questions and face to face interviews providing unquantifiable data, which were designed to provide respondents with the freedom of expressing what they believe important for the study. This leads to the study to use a mixed research approach in which both qualitative and quantitative research methods are applied.

3.1.2. Research Design

Research design is the plan, structure, and strategy of examining conceived so as to obtain answers to research questions. In this study, descriptive study design was employed. This studyfocused on assessments of the major challenges of project closeout in the case of Addis Ababa light rail transit project (phase 1). Based on this reason the study used descriptive study. The descriptive study aims at identifying the various characteristics of a community or institution or problem under study which includes surveys and fact-finding inquiries of different kinds. The major purpose was the description of the state of affairs as it exists at present. It describes a particular phenomenon, focusing upon the issue of what is happening, or how much of it has happened, rather than why it is happening, this makes it appropriate for the study to implement a descriptive research design.

3.2. Population and Census Technique.

3.2.1 Study population

The target population is defined as the whole group a researcher is interested in to study. According to Zikmund (2003) the definition of population was identifiable total set of elements of interest being investigated by a researcher. Population contains those group or individuals who are in a position to answer the questions and to whom results of the survey apply.The populations of this research areprofessional employees of owners/client; consultant and contractor of the AALRT phase 1 project.

3.2.2. Census Technique

A census is a study of every unit, everyone or everything, in a population. It is known as a complete enumeration, which means a complete count. It is a study of each unit, all or all, in a population (Calleam Consulting Ltd(2012).Census has its benefit, most of it provides real population assessment rather than sampling methods, benchmark data can be collected for future studies, detailed information on small sub-groups within the population is more likely to be available, Calleam Consulting Ltd(2012). Because of this and other reasons like – a total study population is less than 100; rather than using sampling techniques, it chose to use census techniques.

The defined target population for this study particularly includesemployees of all AALRT project parties such as the client; Ethiopian Railway Corporation, Addis Ababa light rail transit project staff, the contractor, which is China Railway Engineering Company (CREC) and the consultant (SweRaod)who directly participated in the AALRT project closeout stageand who are professionals, since they are qualified to explain and responses the required inquire as per the researcher interests. Referring contractor, client and consultant payroll who participated directly in the closeout stage, they are 30 employees in all side. The study used those individuals who directly participated in the AALRT project closeout stage, those who are professional (have a first degree and above)and the individuals that are currently available in Ethiopia. Based on the census technique used from the total population of this study which is 30 employees, 14 client staffs, 10 contractor staffs and 6 consultant staff participated in the construction of the AALRT project closeout phase and those who have a first degree and aboveand the individuals that currently available in Ethiopia when the study was conducted. Hence, respondent distribution

was undertaken through census andthe approximate target population of this research that participated inthe AALRT project closeout stage was30 in number, the study usedall respondents as a study population.

3.3. Data Collection Instrument and Method

3.3.1. Data Source and Type

This study employed both primary and secondary types of data. Primary data represents data obtained first- hand by the researcher on the variable through structured questioner and interview of interest for the specific purpose of study, while secondary data was collected from sources already existing documents in the AALRT project phase 1and other documents reviewed fromrelated to the study.

3.3.2. Data Collection Instrument

The primary data for this research was collected through questionnaire and interviewfrom sample respondents of the AALRT project all parties such as consultant, client and contractors who are directly participated in the project closeout stageby using interview guideThe secondary data was used or referred from project file such as; annual reports, progress reports, contracts and other documents related to project closeout, books, journals, articles and different internet websites sources. For this research, structured questionnaire was designed, distributed and filledby the sampled respondents to collect primary data. Because, thequestionnaire survey method is usually cheap, easy to administer to manyrespondents, and normally gets more consistent and reliable results. Thestructured questionnaire was employed with five ranking scale. Interviewswere conducted with concerned management bodies and technical staffs of the client to gather the relevant primary data.

3.3.3. Procedures of Data Collection

The data collection procedure used for this study was interview,questionnaire and document review method. The interview methodused wasstructured interview; interviews were planned to conduct with 3 purposely selected interviewees (1 project manager and 2 technical experts) from client to collect in depth information about their view about the efforts in addressing the challenges of project closeout. The other method used was self-administered questionnaires that were distributed to the respondents.Invitations were sent electronically through Email to 8

respondents and the remaining 22 questioner was given to professionals who are working in the project through self-administered in hard copy to fill and return their response. The Document review methodincludesrelevant contracts, amendments,performance reports, contractor's compliant letters, minutes, manuals, etc.will be reviewed to supplement information to be gathered throughquestionnaire and interview.

3.4. Methods of Data Analysis

The data analysis procedures used for quantitative data of this study was a statistical analysis of descriptive statistics likefrequency, mean and theRelative Importance Index (RII)that helps to describe and understand the features of specific data set by giving short summaries about the sample and measures of the data. Using descriptive statistics for this study helped to identify major closeout challenges in AALRT project and describe the data that was collect from the questionnaires. The quantitative data analysis was done using descriptive statistic assisted by Statistical Package for Social Scientists (SPSS) program for Windows, Version 23.

The RII measures used for this study were to significance of the variables in challenging the closeout stage in the AALRT railway construction projects. This is intended to present the results in the AALRT project context. This was measured using the formula as follows:

$$RII = \frac{\Sigma W}{A*N}, \text{ where, } 0 \leq \text{RII} \leq 1$$

W:- is the weight given to each factor by the respondents and ranges from 1 to 5, (where "1" is "strongly disagree" and "5" is "strongly agree");

A: - is the highest weight (i.e. 5 in this case) and;

N: - is the total number of respondents.

Also for the qualitative data from interview and open ended questions was analyzed using content analysis based on the research questions. Content analysis is the process of extracting desired information from a text by systematically and objectively identifying specified characteristic of the text (Smith, 2000 in Hoyle et al., 2002, cited by Meaza(2015). More specifically, analysis of qualitative data used the procedures recommended by Cresswell (2003), as follow;

- The data were read a number of times to identify points that are significant for the study

- Thematic contents were formulated based on the major research questions
- Emerging theme titles were listed out on a separate sheet in to find connection between them.
- A master list of themes was produced and ordered coherently
- Sub-themes, which go with each master theme, were identified
- The relevant information was organized under each theme and analyzed.

3.5. Validity of Research Instruments

Validity is the degree to which a test measures what it means to measure, according to Borg and Gall (1989). The content validity of an instrument is improved by expert judgment, according to Borg and Gall (1989). Build validity deals with how the questions were designed in the questionnaires to be straightforward and not ambiguous.As such, the researcher needs the appointed supervisor's support, which as a research specialist helps improve the instrument's material validity.

Validity is the degree to which an instrument measures what it is meant to measure, according to Kothari (2004). The word therefore applies to the degree to which, in terms of accuracy, an instrument asks the right questions. The content validity of the research instrument for this study will be determined by piloting where the subjects ' responses to the research objective were checked.The material chosen and included in the questionnaire must be applicable to the variable being studied in order to be considered appropriate for a research instrument. The researcher randomly conducted the pilot test with 5 samples of the AALRT project workers not included in the final analysis.The instrument's material validity is checked using the opinion of a research professional who was the testing supervisor. The research specialist independently evaluated the relevance of the questionnaire elements with respect to research goals.

3.6. Reliability of Research Instruments

Mugenda and Mugenda (2003) describe reliability as a measure of how consistent results after repeated testing are produced by a research instrument. The questionnaires are divided into two identical halves and then a coefficient of correlation for the two halves determined using the formula Spearman-Brown Prophesy. The coefficient shows the extent to which the test's two

halves yield the same results and thus reflect the test's internal consistency. A minimum correlation coefficient of 0.65 is recommended as representing a reliable instrument, according to Kiess and Bloomquist (1985). Reliability will also be ensured through the review of procedures and reports to ensure accuracy.

An instrument's reliability is the measure of the degree to which a research instrument after repeated tests produces consistent results or data. A pilot test will be carried out and a Cronbach Alpha Moment Co-efficient will be measured to assess the reliability of the questionnaire as a research instrument. This calculated to what degree the questionnaire generates the same answers whenever it will be administered.

Cronbach's Alpha is given as $\alpha = \frac{N*C}{V+(N-1)*C}$

Where: N = the number of items,

C = Average covariance between item-pairs

v = Average variance

For the instruments to be considered reliable, the acceptable reliability coefficient value of alpha is 0.70. The total questionnaire test generated a reliability test of 0.89, which meant that the research instrument was reliable.

Table 3.1:- Cronbach's Alpha for total questionnaire

Cronbach's Alpha	N of Items
0.897	51

Source: own survey (2019) N= 30

Table 3.2:- Cronbach's Alpha for variables

Variable	Cronbach's Alpha
Technical	.760
psychological	.728
Administrative	.732
Financial	.553

Source: own survey (2019) N= 30

3.7. Ethical consideration

These study respondents were informed of the confidentiality in the study so to ensure respect for the dignity of participants in the study. Their confidential information was only accessed by the researcher and the supervisor. The respondents were not required to write their names in the questionnaires or interview schedules. Respondents were not forced to participate except those who were voluntary agreed to participate in the study. They will not be required to deliver any identifying details and as such, transcripts and the final report will not reflect the subjects identifying information such as their names, in the case they are not comfortable with it. After the study has been completed and a final report written, the tools used to collect data was destroyed.The study also tried to arrive at conclusions based on objective inferences that are purely and blindly guided by the data collected. The analysis of data and interpretation of the results of data analysis were limited to what the data actually tell.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, the data that were collected from the respondents were organized into a systematic format to enable analysis. Analysis refers to examining coded data critically and making inferences while presentation refers to ways of arranging data to make it clearly understood (Kombo and Tromp, 2006). The researcher analyzed the data in line with the objectives of the study to identify the challenges of AALRT project closeout. The study analyze the data to categorize the factors such as technical, financial, psychological and administration factor in an internal challenge such as contractor related, client and consultant related challenges and also to analyze the external challenges of the AALRT project closeout.

Response rate refers to the number of people who participated in the survey. Invitations were sent electronically through email to 8 respondents who are not currently working in the Ethiopian railway Corporation AALRT project and the remaining 22 questioner given to professionals who are working in the project through face to face in hard copy to fill and return their responses. The survey distributed for those individuals who were directly participated in AALRT project closeout stage in particular among client, consultant, and contractor. A total of 30 Questionnaires were distributed to the respondents and 30 were collected having been filled. This constituted a response rate of (100%) According to Mugenda and Mugenda (2003) a response rate of 50 percent is adequate for analysis and reporting. Table 4.1 is a summary of the response rate in this study.

The response rate for interview

This study was intended to interview three respondents but two of them were interviewed which indicates 66.7% of respondents interview was considered and the responses was used for analysis.

The response rate for the Questioners

Table 4.1: Response rate

Category	Frequency	Percentage
Response	30	100%
Not returned	0	0%
Total	30	100%

Source:Own survey (2019)

4.2.Demographic variables

In this section, the researcher identified the demographical information of the respondents such as sex, work experience in the railway sector, education background or field of study,education level and the organization they are or were working for that was used for the analysis.

Table 4.2:Demographic variables

No.	Demographic variables	Frequency	Percentage

1	Sex		
	Male	25	83.3
	Female	5	16.7
	Total	30	100
2	Work experience in railway sector		
	0-5	6	20
	6-10	21	70
	11-15	3	10
	total	30	100
3	Education background/Field of study/		
	Civil Engineer	15	50
	Mechanical Engineer	4	13.3
	Electrical Engineer	5	16.7
	Others	6	20
	Total	30	100.
4	Education level		
	Degree	9	30
	Master	21	70
	PhD.	0	0
	Total	30	100
5	Organization		
	ERC	14	46.7
	CREC	10	33.3
	SweRoad	6	20
	Total	30	100

Source: Own survey (2019)

4.2.1. Sex

In this study, the term sex is used to refer to male or female. Respondents were asked by the researcher to give their sex as part of the moderating variable of the study.The data presented in Table 4.2 reveals that there was a difference in the representation of both male and female. The survey shows that (25) 83.3% of the respondents were male and (5)16.7% were female. The result indicates that there was gender inequality; this could be due to the fact that in a construction project it is common that the majority of the workers are male. The researcher wanted to know the participation of female in mega project like AALRT project closure and found out that they have little involvement on this project.

4.2.2. Work Experiences in railway sector

In this section, the study wants to analysis the work experiences of the respondents in order to determine whether the project closure was utilizing with experienced staff in the railway sector or professional expertise through employing qualified staff or not.Regarding the work experience, the findings established that (21) respondents or seventy (70%) of the respondents had 6 to 10 years of work experience in the railway sector that indicates they have adequate experience to understand the study objectives. This was followed by (6) respondents or twenty percent (20%) who had 0 to 5 years of work experience and the remaining respondents of them (3) respondents or ten percent (10%) who had 11 up to 15 year of work experience in railway sector. The results indicate that the project staff members are fairly experienced, that means the employees can effectively recognize and understand their work in the management of project closeout.

4.2.3. Education background

Statistics relating to the background of education attained by the respondents was also analyzed. This information would allow the researcher to determine whether the project was utilizing the professional expertise through employing qualified staff that is important to manage the project effectively.

As far as the educational background of workers is concerned, the above Table 4.2 shows that from the total respondents majority, 15 (50%) of the respondents were civil engineer, five(16.7%) respondents were electrical engineer,four (13.3%) respondent were mechanical engineer and the other remaining 6 (20%) of the respondents were have others education background. The results imply that the project team members have adequate or the required education background for performing in the project closure. Different educational fields of study are important for the railway closeout stage for electromechanical, civil and other works that need different skill and knowledge of employees.

4.2.4. Educational level

In this section the researcher defines the criteriathat are included in the study was only the professionals respondents who have first degree and above,based on this the education level of respondents astable 4.2 represents the results on the level of education achieved by the respondents. The study found out that, majority of the respondents had attained master's degrees;

this represented 70% (21) of the respondents. 30% (9) of the respondents had achieved bachelor's degrees. The result showed that the project has employed staff with various qualifications at different levels with the majority having attained a master's degree that helps them to understand and manage the closeout work of the project.

4.2.5.Organization that the respondents are/were working

Information related to the respondents working organization that they are currently working or were working for helps to determine in which project team are/were working to identify whether they are the employee of the client, consultant or contractor. The reason for asking this question was it is fair to include all project parties who were working on during the period of project closeout in the study for full understandings of the challenges closeout stage. As far as the organization that the respondents are/were working for is concerned, the above Table 4.2 shows that from the total respondents majority, 14(46.7%) of the respondents were ERC (Ethiopian railway corporation) worker which is the client of AALRT project, 10 (33.3%) of the respondents were CREC (china railway group limited), which is the contractor and (6) respondent or twenty (20%) were SweRoad (Swedish National Road Consulting AB)which was the consultant worker. The result implies that the majority of the respondents were ERC workers which are not fairly distributed. This was due to the difficulty of getting CREC and SWEROAD respondents at this time when the study was conducted.

4.3. Respondents Attitudes about AALRT Project Closeout Views

The respondents were asked to give their opinions about the closeout of the AALRT project and their views on railway Construction Projects completion. The responses were measured by a five-point Likert scale; 1. Strongly disagree 2. Disagree. 3. Neutral, 4. Agree, and 5. Strongly agree.

Table 4.3:Respondents Attitudes about Closeout and AALRT Project Views

No.	Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean
1	Compared to other phases of construction, the closeout phase isdifficult to successfully execute	2	3	1	6	18	4.16

2	On typical projects where the work progresses according to schedule, the closeout phase usually is executed according to schedule, as well.	9	7	3	5	6	2.73
3	Compared to others, AALRT project does a good job of managing the closeout phase of construction projects.	10	13	3	4	0	2.03
4	AALRT project places a great deal of emphasis on the closeout phase of construction projects	8	11	4	7	0	2.33
5	AALRT spends an appropriate amount of time and effort planning for project closeout in the early stages of each project	9	9	7	4	1	2.30
6	To the extent that there are delays in project closeout, they are usually due to another party's actions/inactions, rather than my firm	4	11	7	7	1	2.66
7	AALRT project have a formal system for managing/implementing project closeout	4	9	4	11	2	2.93

Source:Own survey (2019)

The results in Table 4.7 would seem to know the attitudes of the respondents on AALRT project closure, with 24 (80%) of the 30 respondents agreed with the statement, "Compared to other phases of construction, the closeout phase is more difficult to successfully execute." Only 5(16.7%) respondents disagreed with that statement and 1(3.3%) respondent neutral with the statement. From this analysis we can understand that due to different reasons, the project closeout phase of the AALRT was difficult. This statement agrees with (Rogers, 2012), mentioned in his study that Compared to other phases of construction, closeout phase is more difficult to successfully execute. The possible reason might be lack of attention given to the closeout phase, lack of ability to manage it well, less experienced employees typically underestimate the importance of project closeout, due to different administrative and contractual project closure challenges and in general there is lack of sound Project Management experience of owners or contractors in the country.

Also, the response shows that 16 of 30 respondents (53.3%) disagreed that on typical projects where the work progresses according to schedule, the closeout phase usually is executed according to schedule, as well. It shows that closeout stage were not executed according to the schedule, 11(36.7%) of the respondent agree on closeout phase are executed according to the schedule when typical projects where the work progresses were according to the schedule and the remaining 3(10%) of respondents were neutral to the statement. This is a very important concept in today's construction industry as it has become progressively difficult to close out a project on time. The study agree with (Kual, 2014), even though projects which were taking place as per schedule would pause on the way to the end of the project because of several administrative, technical, financial and psychological factors.

Also, 26 from 30(86.7%) respondents respond that the AALRT is not successful at managing the construction closeout phase than others. On the contrary, the research of Rogers (2012), find out that (75%) respondent agreed that their firm is more successful at managing the construction closeout phase than others. This indicates that managing project closeout differs from project to project. The possible reason for not successfully managing the AALRT project closeout might be lack of experience, lack of technical expertise, lack in project management knowledge, and negligence of the closeout phase due to achieving substantial completion.

The 19 (63.3%) respondents reply that the AALRT project doesn't place a great deal of emphasis on the closeout phase of construction projects.Also eighteen respondents (60%) felt that the AALRT project do not spend an appropriate amount of time and effort planning for project closeout in the early stages of each project. The research of Molenaar and Saller (2003) might help clarify this opinion; they found that owners, designers, and contractors place a little emphasis on education connecting to closeout.

Fifteen (50%) of respondents disagree, 8 (26.7%) of respondents agree and 7 (23.3%) of respondents neutral on the extent that there are delays in project closeout, they are usually due to another party's actions/inactions, rather than my firm. It indicates that closeout delays were usually caused by the AALRT project than others.

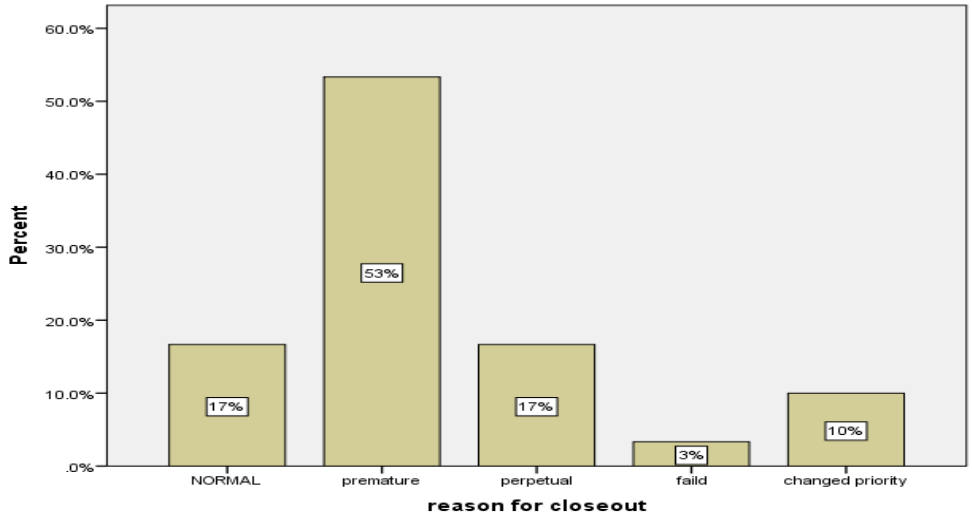
For the statement AALRT project have a formal system for managing/implementing project closeout, 13(43.3%) agree, 13(43.3%) disagree and 4(13.3%) neutral. In this case the researcher faces difficulty to decide the result due to the same level of agrees and disagrees. This response

contradict with the statement that (86.7%) of respondent agree with answer the AALRT project not doing a good job of managing the closeout phase of construction projects.

Respondent's attitudes on reason for closing AALRT project

This study was asked " reason for closing AALRT project " to answer based on the type of closure such as normal, premature, perpetual, failed and changed priority. The response of the respondents summarized in figure 4.1 as follow:

Figure 4.1: Reason for closeout



Source: Own survey (2019)

The result shows that 53% of the respondents said that the reason for the AALRT project closeout was premature closure, that means the project ended early with some open issues pending.The reason for this was the closeout was started not fully completed the substantial completion of the project due to government interference to complete early the project. 16.7 % of the respondents answer normal, the other 16.7 % said perpetual, 3.3% failed and the remaining 10% respondents respond that the reason was changed priority. In the case of AALRT due to government interference, the client initiated the closeout to start with partial substantial completion through formally written letter to a contractor.But for an EPC turnkey contract like AALRT the project closure request must be initiated by contractor. This influence the project managements to announce the substantial completion early with some open issues pending which affect the project reason of completion to be premature.From the above data, we can conclude that the reason for the Addis Ababa light rail project closeout was premature. The study implies

that the AALRT project does not achieve all their deliverables or is not given the opportunity to do so.

4.4. Internal challenge of the AALRT project closeout

4.4.1. Contractor related

Table 4.4: Contractor related project closeout challenge

Factors	No	Contractor related challenges	1	2	3	4	5	Mean	RII
Technical	**1**	Absence of a clear handover strategy.	1	6	4	10	9	3.6	0.73
	2	Delay in Performing testing of equipment and engineering systems after substantial completion.	9	7	1	9	4	2.7	0.55
	3	Excessive/Multiple punch lists,	0	6	2	11	11	3.9	0.79
	4	Errors and discrepancies in design documents, vague details in drawings.	3	8	5	7	7	3.2	0.65
	5	Contractor/subcontractor personnel transferring to new projects /lack of sufficient staff in closeout stage	2	7	1	11	9	3.6	0.72
	6	Lack of thorough/detailed/ identification and agreement on all remaining deliverables.	2	5	7	10	6	3.4	0.69
	7	Shortage / Late-arrival of resources, i.e., manpower, materials and equipment in closeout stage /	5	5	3	13	4	3.2	0.64
	8	Inability to finish punch lists due to lack of appropriate technical manpower.	1	8	2	15	4	3.4	0.69
psychological	**1**	Loss of interest in tasks such as documentation.	5	5	5	8	7	3.2	0.65
	2	Fear of no future work.	4	6	11	7	2	2.9	0.58
	3	Unavailability of key personnel i.e. the project manager	2	12	3	9	4	3.0	0.61
	4	Lack of urgency in approach, enthusiasm and motivation of parties involved due to achieving substantial completion.	0	4	2	16	8	3.9	0.79
Administration	**1**	Contractor lack of preparedness and planning for closeout	4	7	5	9	5	3.1	0.63
	2	Completing punch lists in occupied space	3	3	6	16	2	3.3	0.67
	3	Lack of Contractor commitment to meet contractual agreements /like providing spare parts/	4	7	2	8	9	3.3	0.67
	4	Improper / Untimely contractual closeout documentation	3	8	3	11	5	3.2	0.65

Financial	**1**	Disagreement on the cost of additional work	5	1	10	11	5	3.4	0.69
	2	Poor financial control system	4	13	3	8	2	2.7	0.54

Source: Own survey (2019)

The table 4.8 shows that the study found out that the contractor challenge such as Lack of urgency in approach, enthusiasm and motivation of parties involved due to achieving substantial completion had great importance for the case of AALRT project compared to other contractor related challenges with the mean score of 3.966 and Excessive/Multiple punch lists score as the second with 3.933 mean value that agreed with Kual(2014) study which indicates multiple punch lists significantly affect the closeout process. Also, the result was agreed with Rogers (2012) study that found the above challenges as a factor that delay project closeout.

The other closeout challenge the respondents asked werecontractor/subcontractor personnel transferring to new projects /lack of sufficient staff in closeout stage, thorough/detailed/ identification and agreement on all remaining deliverables, shortage / late-arrival of resources, i.e., manpower, materials and equipment in closeout stage, /inability to finish punch lists due to lack of appropriate technical manpower, loss of interest in tasks such as documentation, Contractor lack of preparedness and planning for closeout, Completing punch lists in occupied space, lack of Contractor commitment to meet contractual agreements /like providing spare parts/, improper / untimely contractual closeout documentation, disagreement on the cost of additional worksuch as lift TPLS (traction power substation) station and escalator and unavailability of key personnel i.e. the project manager score between 3.6667 to 3.033 which indicates we can consider them as contractor related challenge for project closeout. The remaining contractor related challenges like poor financial control system, fear of no future work anddelay in performing testing of equipment and engineering systems after substantial completion mean scored 2.700,2.900 and 2.733 respectively. This indicates as we can consider as have little effect on project closeout challenge. From the above analysis we can conclude that majority of contractor related challenges affected the AALRT project closeout process.

4.4.2. Consultant related

Table 4.5:Consultant related project closeout challenge

Factors	Consultant Related	1	2	3	4	5	Mean	RII
Technical	Lack of Technical Expertise	2	5	5	14	4	3.4	0.69
	Late review and approval of project closeout document by consultants /Verifies the completeness, content of documentation provided by the contractor/	0	4	3	13	10	3.9	0.79
	Delay in approving test of equipment and engineering systems	2	3	6	13	6	3.6	0.72
	Disagreements on punch list with contractor	0	2	4	16	8	4.0	0.8
Psychological	Change of responsible personnel at critical transition points	1	1	3	12	13	4.1	0.83
	consultant's lack of urgency	0	4	5	12	9	3.9	0.78
	consultant expertise lack in experience	0	7	7	10	6	3.5	0.7
	Consultant Limited staff in closeout stage	0	7	0	14	12	4.1	0.83
	Loss of interest in tasks such as documentation	1	6	1	15	7	3.7	0.74
Administration	Consultant lack of preparedness and planning for closeout	2	6	2	12	8	3.6	0.72
	Lack of team functionality	0	3	4	15	8	3.9	0.79
	Delay in decisions making	0	7	2	15	6	3.7	0.74
	Procedural inexperience of employer's representative.	1	3	4	18	4	3.6	0.74
Financial	Delay in approval of contractor payment	0	3	11	8	8	3.7	0.74

Source: Own survey (2019)

The above table 4.5 shows that three challenges such as consultant limited staff in closeout stage, disagreements on punch list with contractor and change of responsible personnel at critical transition point's scores 4.166, 4.0 and 4.166 respectively which indicates that compared to the other challenges they has high degree of importance for project closeout process.

The remaining consultant related challenges such as lack of technical expertise ,late review and approval of project closeout document by consultants /verifies the completeness, content of documentation provided by the contractor/,delay in approving test of equipment and engineering systems, consultant's lack of urgency, consultant expertise lack in experience , loss of interest in tasks such as documentation, consultant lack of preparedness and planning for closeout, lack of team functionality, delay in decisions making ,procedural inexperience of employer's

representative and delay in approval of contractor payment score above mean 3.433 this shows that most of the respondent considered them as consultant related closeout challenges.

From the above analysis we can conclude that all consultant related challenges affected project closeout process.

4.4.3. Client related

Table 4.6:Client related project closeout challenge

Factors	Client Related	1	2	3	4	5	Mean	RII
Technical	Owner directed change orders or scope change	1	3	6	16	4	3.6	0.73
	Lack of technical expertise	2	5	3	15	5	3.5	0.71
	Lack in technical knowledge, skill and experience in railway projects	2	6	2	13	7	3.57	0.71
Administration	insufficient in communication	2	3	3	19	3	3.6	0.72
	Lack of project team experience	1	4	7	12	6	3.6	0.72
	Unclear directives for closeout, in specifications and contractual requirements	0	3	3	16	8	3.9	0.79
	Poor project management and coordination among parties	1	3	5	17	4	3.6	0.73
	Delay in decision making process	0	1	1	16	12	4.3	0.86
	Delay in consultant contract extension	1	0	6	16	7	3.9	0.79
Financial	Delay payments to contractor	0	3	5	11	11	4.0	0.8
	Delay payments to consultant	0	3	3	15	9	4.0	0.8
	Financial difficulties of owner	0	2	6	7	15	4.1	0.83
psychological	Loss of project staff interest in tasks remaining such as documentation	1	3	4	13	9	3.8	0.77
	Owner's lack of urgency	1	5	4	15	5	3.6	0.72
	Diversion of effort (to other works)	3	3	1	17	6	3.6	0.73

Source: Own survey (2019)

Delay in decision making process ranked first from client related challenges with mean 4.3, followed by financial difficulties of owner with mean 4.16 and both delay payments to contractor and delay payments to consultant score third with 4.0 mean value. Owner shall make finance available for the project in advance.

Owner directed change orders or scope change, lack of technical expertise, lack in technical knowledge, skill and experience in railway projects, insufficient in communication , lack of project team experience ,unclear directives for closeout, in specifications and contractual

requirements , poor project management and coordination among parties, delay in consultant contract extension , loss of project staff interest in tasks remaining such as documentation ,owner's lack of urgency and diversion of effort (to other works)score above mean 3.533 this shows that most of the respondent considered them as client related closeout challenges.

Most of the result such as owner's lack of urgency, unclear directives for closeout, in specifications and contractual requirements, lack of technical expertise, owner directed change orders or scope change was agree with kual (2014) finding of factors affecting project closeout. From the above analysis we can conclude that all client related challenges affected project closeout process.

4.5. External challenge of AALRT project closeout

The respondents were asked to respond about external challenges of the AALRT project closeout and their views in relation to railway Construction Projects completion. The responses were measured by a five point Likert scale; 1. Strongly disagree, 2. Disagree. 3. Neutral, 4. Agree, and 5. Strongly agree.

Table4.7:Analysis of external challenges of AALRT project closeout

No.	External challenge	SD	D	N	A	SA	Mean	RII	RII level	Rank
1	Federal regulatory requirement, /Government interest in early completion of the project /	0	1	0	9	20	4.60	.92	H	1
2	Delay in providing utility service (electric power, water supply and other)	0	1	2	12	15	4.33	.87	H	2
3	Accidents during closeout stage /Accidents to people/equipment after substantial completion.	2	10	13	0	5	2.86	.57	M	3
4	Natural disaster like flood.	11	9	9	1	0	2.00	.40	M-L	4

Source: Own survey (2019)

The study found out that 29(96.7%) of the respondent agreed with the federal regulatory requirement or the government interest for early completion of the project as the external challenge of the AALRT project closeout. The Federal regulatory requirement (Government interest in early completion of the project) ranked first. This indicates that based on the respondents measure the federal regulatory requirement plays a major role compared to the other external challenges for the AALRT project closure.

This agrees with Markus and Tanis (2010), and David (2016), political interference plays a critical but poorly understood role in determining the success or failure of the processes of project management that dominate efforts to form international regimes or, more generally, institutional arrangements in international society.

Also, 27(90%) of the respondents agree with the statement 'delay in providing utility services like electric power, water supply and other'. There was a delay in power supply and differences on type of cable to be supplied for power supply. This might be due to a shortage of electric power and water supply in the country as a whole, the other reason might be the utility companies given little attention to the project, insufficientcapacity of utility services and the project consume a high amount of power, lack of working in integration witheach other's and the like. The project was constructed in the capital city of Ethiopia, the right of way or relocation issues might take longer time than expected. The project did not involve different utility companies in the project planning phase and consider their concerns that may help them to deliver the required utility service on time.

The other point in this study was 13(43.3%) of the respondent neutral, 12(40.3%) disagree and the remaining 5(16.7%) agree with the statement accidents during closeout stage /Accidents to people/equipment after substantial completion. This could be the reason that the respondents do not have information about accident records that was happened in the closeout stage or the accident records registered by the operation service due to the operation started adjacently with the closeout stage so the record might not be found in the project offices of all parties.

The final point in the external challenge of this study is there a natural disaster like floods happened in the AALRT project closeout, 20(66.67%) disagree, 9(30%) neutral and 1(3.33%) agree with this. The study found out that majority of the respondent replies that there is no natural disaster in the AALRT project closeout.

4.6. Major challenges of AALRT project closeout

The respondents were asked to respond about the both internal and external challenges of the AALRT project closeout and their views concerning railway construction project completion. The responses were measured by a five-pointLikert scale; 1. Strongly disagree 2. Disagree. 3. Neutral, 4. Agree, and 5. Strongly agree.

In this section of analysis the study considered as the major challenges of project closeout that their RII value scored above 0.81 or their RII-Level indicates high relative importance level which is explained below

Table 4.8: Relative importance index level

No	RII value	RII-Level
1	0 up to 0.20	High
2	0.21 up to 0.40	High-Medium
3	0.41 up to 0.60	Medium
4	0.61 up to 80	Medium- Low
5	0.81 up to 1	Low

Based on this the following challenges are considered as the major challenges of the AALRT project closeout.

Table4.9: Major challenges of AALRT project closeout

No	Challenges	Major Challenges	Mean	RII	RII-Level	Rank
1	External	Federal regulatory requirement, /Government interest in early completion of the project /	4.6	0.92	H	1
2	External	Delay in providing utility service (electric power, water supply and other)	4.33	0.87	H	2
3	Internal/Administration	Delay in decision making process	4.3	0.86	H	3
4	Internal/Financial	Financial difficulties of owner	4.17	0.83	H	4
5	Internal /Psychological	Change of responsible personnel at critical transition points	4.17	0.83	H	5
6	Internal/ Psychological	Consultant limited staff in closeout stage	4.17	0.83	H	6

Source: Own survey (2019)

1. **Federal regulatory requirement (Government interest in early completion of the project)**

From all project closeout challenge that the researcher were asked federal regulatory requirement (government interest in early completion of the project) was scored first. The total respondent was 30, 29(96.7%) were agreed with there were government interference that challenges the AALRT project closeout.In theAALRT project everything has been stipulated in the contract

document and condition of contract (FIDIC, silver book) due to the unnecessary involvement of the employer to take over the project giving priority to government interests. The project was handed over and the system was started operation violating the condition of the contract that means the system has started without fulfilling the project substantial completion criteria; finally, this has attributed to delay the closeout of the project.

2. Delay in providing utility service (electric power, water supply and other)

27(90%) of the respondents agree with the statement delay in providing utility services like electric power, water supply and other,this scored second from the overall challenges that were asked the respondents to react. This external challenge scored second from the overall challenges that were asked.

3. Delay in decision-making process of the Client

The study found out that 28(93.3%) of the respondent agreed with there was a delay in the decision -making process of the client. This administration challenge of the clients scores thirdwith a mean value of 4.3 compared with all internal challenges that the respondents were asked. This agreed with the delay causes that are enlisted by (El-Razek, Mobarak&Bassioni, 2008), as slowness of the owner decision making process. According to Peter Drucker point of view, ‘ the most common source of mistakes in the management decisions is the emphasis of finding the right answer rather than the right question’s’ the main task is to define the actual problem very clearly.

The study identified different reasons for the delay of decision making process of the client, the first one was there were irregular decision making procedure from the top management level up to project management office. Executive managers mixed the administration of the project contract and the operation contracts which affects the decision making process.The other reason was lack of Effective communication of decision, this agree with the question that the respondent were asked as one of administration problem of the client ‘insufficient in communication’, this was scored 3.6 mean value which indicates it has high-medium importance for project closeout.

Also, the major decision- making problems that happened in ERC was due to termination of the contract of the consultant before project closeout. Due to this there was a delay in consultant (SweRoad) contract extension for 10 months. This delay affects the project closeout in general

because of the unavailability of the consultant the project closeout was interrupted. The client should decide on the contract extension of the existing contractor or sign agreement with other consultants. This agree with the internal challenge that was asked the respondent to react 'Delay in consultant contract extension' as one of the internal challenges of administration factor of the client and respond as it had a high -medium level of importance with the mean score of 3.93.

The other important point in decision making was Poor project management and coordination among parties, this question were asked to the respondent to react and the researcher has got 3.6 point of a mean score which indicates high-medium value so this supports the idea that there was the delay in decision- making in ERC.

Also, the delay of the AALRT project decision making there was a lack in managing project changes, in the case of the AALRT project it was work-related or human resource-related. The first one related to the work of the project was disagreements on scope changes and the costs of additional works that affect the decision-making process. The other reason find out in the response from open ended questions was high turnover in ERC top management at AALRT closeout stage. A change of ERC chief executive officers (CEO) two times at the closeout stage, this requires both CEOs needs time to understand the nature of the project and make the decision-making process delayed.

4. Financial difficulties of owner

The study found out that 22(73.3%) of the respondent agreed with there was a delay in the decision -making process of the client. This financial challenge of the clients scores fourthwith a mean value of 4.17 compared with all internal challenges that the respondents were asked. Kual(2014) found out that owner directed change orders and delay by owner for payment of work before substantial completion, both affect the closeout process. It this study the results of delay payments to contractor and delay payments to consultant scored with mean 4, which indicates that there was a financial difficulties of owner.

Also, owner directed change orders or scope change were asked and the 20(66.6%) respondents agree that there was owner directed change order in AALRT project that challenge the closeout with the mean score 3.6.

5. Change of responsible personnel at critical transition point

The study found out that 26(86.6%) of the respondent agreed with Change of responsible personnel at critical transition point as a psychological factor that challenges project closeout. This study agrees with Kual (2014) finding of as one of the psychological factors that delayed project closeout process was Project manager or superintendent demobilized before final completion. The change of AALRT project consultant resident engineer who has been working at execution stage and closeout stage wasone of the reasons that the respondents agree with this selecting it as the second internal challenge with the mean score of 4.16.The reason for the Change of responsible personnel at critical transition point was disagreement between the SweRoad resident engineer and his company SweRoad(consultant). SweRoadshould implementing effective change management process when there was planned change or unplanned/unexpected/ change of responsible personnel occurred during project critical transition point. New resident engineer who was not in project execution stage need time to understand the project situation like referring contracts, reports, minutes of meetings and corresponding letters.

6. **Consultant limited staff in closeout stage**

The study found out the from the overall challenges that the respondent were asked consultant limited staff in closeout stage scored 4.17 mean value which means it has high importance for as a cause of project closeout challenges. Due to contract termination of the consultant in closeout stage there wear high turnover of the staff that are available in project implementation.

4.7. Findings form open ended questionrecommendation for Successful project closeout for similarprojects.

The respondents were asked to suggest their opinion for a Successful project closeout for similar project and their responses are summarizing as follow:-

1. The project closure should ensure that the participation of professional experts and experienced staff. Assigning the right person for the right position.This agrees with the

questionnaire finding of lack of technical expert of client score 0.71 RII values and lack of technical expert of consultant which both have high importance for project closeout.

2. The project closeout should follow contractual procedure stated in the contractual agreement. This agrees with the questionnaire finding of lack of contractor commitment to meet contractual agreements score 0.67 RII values which means it have high importance for project closeout.In the case of AALRT the contract document was no detailed or descriptive as needed for exampleit lacks detailed representative article to execute the project closure.
3. Closeout must be started after fulfilling substantial completion criteria. This finding agree with A.A.E.Othman(2007), idea of prepare for the transition in to the next phase in the overall project life cycle.
4. Avoid political interference and manage purely in technical and professional term to avoid premature operational commencement. The RII value of government involvement was 0.92 which was the first factor that affected the AALRT project closeout.
5. Implement effective decision making procedure. To close the project decision making plays a major role which helps to solve challenges raised from different parties. Dealy in decision making process of owner score 0.86 RII value it shows that it has high importance challenge in closing AALRT project.
6. Ensure that the plans are detailed and clear such as contract document, employer requirement etc.
7. Punch lists should be recorded before the starting the operation.Agree with the idea ofLack of thorough/detailed/ identification and agreement on all remaining deliverables which has scored 0.69 RII value with high medium importance for project closing.
8. Appreciation should be given for team members for their contribution. This finding agree with A.A.E.Othman (2007) idea of acknowledge the contribution of contributor.
9. Manage the project team effectively. This agrees with lack of team functionality RII value scored was 0.79 as a cause of project closeout challenge.
10. Giving a great attention for project documentation. This also agree with A.A.E.Othman (2007) idea of ensure that the project records reflect accurate ‘as-built’ data.
11. Follow up the closeout
12. Ensure that lesson learned conducted to learn from previous negative and positive experience.

13. Owner shall make finance available for the project in advance to avoid financial difficulty. This agrees with the finding of financial difficulty of owner with RII value of 0.83 as a major challenge in closing AALRT project.
14. The employer should implement the comment given by the employer representatives.

CHAPTER FIVE

SUMMERY, CONCLUSION AND RECOMMENDATION

This chapter includes the summary of major findings of the study and conclusions drawn from the analysis made. Furthermore, based on the findings of the study, possible recommendations are made.

5.1.Summary of the major findings

The main purpose of this study was to identify the AALRT project closeout challenges. Before going to the main analysis of the study, a reliability test was administered to check whether the questionnaire is reliable or not. In this regard, as Table 3.1 illustrates, all the questionnaires were reliable and acceptable with Cronbach's Alpha result 0.897.

Related to the demographic characteristics, Table 4.2 specifies that majority of the projects staff, 25 or (83.3%), were male. The majority of the respondents 21(70%) have6-10 years of working experience. Regarding educational level, majority of the project staff were master holders and also majority staff have civil engineers education background. Regarding to the organization the respondents working24or (80%) working on the client side.

Respondents attitudes about the AALRT project showed that majority of the respondents agree with 53% of the respondents said that the reason for the AALRT project closeout was premature closure, closeout phase is difficult to successfully execute,closeout phase usually not executed according to schedule,AALRT project not done a good job of managing the closeout phase,the project dose not places a great deal of emphasis on the closeout phase and not properly planned the closeout phase.Regarding the AALRT project has a formal system for managing/implementing project closeout the 43.3 % respondents agree and similarly 43.3% disagree with the idea.

The internal challenges of the AALRT projects

- **Contractor related**

  The Contractor related challenges such as lack of urgency in approach, enthusiasm and motivation of parties involved due to achieving substantial completion had great importance for the case of AALRT project compared to other contractor related challenges with the mean score of 3.966 and excessive/multiple punch lists score as the second with 3.933 mean. In the contrary contractor related challenges like Poor financial control system, fear of no future work and delay in performing testing of equipment and engineering systems after substantial completion mean scored 2.7, 2.9 and 2.7 respectively which indicates that they have little effects in the project closeout.

- **Consultant related**

Table 4.5 shows that from all consultant related challenges three challenges such as consultant limited staff in closeout stage, disagreements on punch list with contractor and change of responsible personnel at critical transition point's scores 4.166, 4.0 and 4.166 respectively which indicates that compared to the other challenges they has high degree of importance for project closeout process.

- **Client related**

  Client related challenges such as delay in decision making process andfinancial difficulties of owner with mean 4.3 and mean 4.16 respectively scored first and second challenges and also both delay payments to contractor and delay payments to consultant score third with 4.0 mean value.

The external challenges of the AALRT project

The study found out that 29(96.7%) of the respondent agreed with the federal regulatory requirement or the government interest for early completion of the project as the external challenge of the AALRT project closeout.Also, 27(90%) of the respondents agree with the statement 'delay in providing utility services like electric power, water supply and other'.

5.2. Conclusion

A developing country like Ethiopia, working on a successful mega project closure is important, hence megaproject construction closeout delay in the railway industry are sensitive and has multiple effects in the development of the country. This study focuses on assessing the challenges of project closeout, which is an extremely important phase in the AALRT railway construction project. Project closeout encompasses the period between substantial acceptance and critical final release. Closeout takes place after all obligations have been fulfilled and the required documents have been executed. It is the most difficult time for the project manager throughout the project life cycle. As the end of the project approaches, the project manager faces a completely new set of challenges to bring the project to a successful conclusion. Therefore, researching this area will have vital importance in railway projects. The main objective of this research is to identify the challenges of project closeout in Addis Ababa light Rail (AALRT) project phase 1. The questionnaire, interview and document review were used to identify the challenges of project closeout. Client, consultant, and contractors were asked to identify the variables of challenges of project closeout in AALRT railway construction projects. Mean,

Relative importance index and the analysis of the results from the open-ended part of the questionnaire were carried out using descriptive analysis with the help of SPSS version 23. The conclusion of the study was to being made through the comparison of the study objective with the result of the study.

The study concludes that the overall challenges of AALRT project closure are arisen from one of the external related challenges that is government interferences to start operation before fully completed the substantial completion requirement of the project. The study concludes that the AALRT project transition from construction to operation was not planned.

Based on the literature reviews in the study, the results of questionnaire and interview responses and case studies the following conclusions are drawn.

- Federal regulatory requirement (Government interest in early completion of the project), delay in providing utility service like electric power and water supply, delay in decision-making process of the Client, financial Difficulties of Owner, Change of consultant responsible personnel at critical transition point and Consultant limited staff in closeout stage are the major challenges that are faced in AALRT phase 1 project closeout.
- Client delay in payments to contractor and consultant, consultant delay in approval of contractor payment, disagreement on the costs of additional work and Owner directed change orders or scope change are internal financial factors that caused by both client and consultant in the project closeout challenges in AALRT project.
- Contractor lack of urgency in approach, enthusiasm, and motivation of parties involved due to achieving substantial completion, loss of project staff interest in tasks remaining such as documentation, diversion of effort to other works, consultant's lack of urgency, Loss of interest in tasks such as documentation and owner's lack of urgency are internal psychological factors that caused by all contractor, client, and consultant in the project closeout challenges in the AALRT project
- Late review and approval of project closeout document by consultants /Verifies the completeness, content of documentation provided by the contractor, Lack of team functionality, Excessive/Multiple punch lists, Procedural inexperience of employer's representative, contractor absence of a clear handover strategy, Thorough/detailed/ identification and agreement on all remaining Deliverables, consultant delay in approving

test of equipment and engineering systems, Contractor lack of sufficient staff in closeout stage, disagreements on punch list with contractor. Consultant, contractor, and client lack in technical knowledge, skill, errors and discrepancies in design documents, vague details in drawings and experience in railway projects and contractor late-arrival of resources in closeout stage are internal technical factors that caused by all contractor, client, and consultant in the project closeout challenges in AALRT project.

- Contractor, consultant and client lack of preparedness and planning for closeout, Lack of Contractor commitment to meet contractual agreements like providing spare parts, Completing punch lists in occupied space Improper / Untimely contractual closeout documentation, unclear directives for closeout, in specifications and contractual requirements, owner's Poor project management and coordination among parties, lack of project team experience, client insufficient in communication and delay in consultant contract extension are internal administration factors that caused by all contractor, client, and consultant in the project closeout challenges in AALRT project.

From this, the study concluded that technical, psychological, financial and administration related factors caused by all parties; client. The contractor and client contributed to the challenges of project closeout in the case of the AALRT phase 1 project experience.

5.3. Recommendations

The challenges related to project closeout affects Addis Ababa Light Rail Transit Phase 1 project. All internal and external stakeholders for the project such as employer, contractors, consultant federal government and utility company should work together to achieve successful projects closeout within the stipulated time and budget, and exceed the anticipated quality standard. Therefore, to effectively complete the project the Consultant, the contractor and the client should give equal attention to the project closeouts stage like other project management phases.

Aligned with the above conclusion, the researcher proposes the following corrective measures that should be considered by concerned stakeholders to reduce project closeout challenges. These include:

- As the finding of the study showed government interference plays a major role in AALRT project closeout. Therefore, Politicians should know and ensure that the project closure criteria have been fully satisfied and that no outstanding items are remaining before engaging themselves or decided for the project to be completed without considering the effect of their action for the project completion. The government should assign effective chief executive managers and trust them to execute projects in technical and professional terms.
- Change in project management is common. The consultant should implementing effective change management process when there was planned change or unplanned/unexpected/ change of responsible personnel occurred during project critical transition point. Effective change management in the project closeout stage could save time.
- According to Peter Drucker's point of view, ‘ the most common source of mistakes in the management decisions is the emphasis of finding the right answer rather than the right question’s’ the main task is to define the actual problem very clearly. The client should implement timely and useful decision making procedure to avoid the delay in decision making.
- A client should have adequate finances in advance to pay the payments timely to the contractors after completion of the work. Therefore, a client should work closely with the financing bodies and institutions to release the payment on schedule. It also arranges quick payment mechanism and minimize rigid in payment issue; that minimize unnecessary and excessive administrative procedures in the client organization. A client should have accomplished contractual responsibilities, especially as concerns to payment of contractor's works accordingly implemented.
- A client should plan the project effectively before the start of the project to avoid scope change during the project implementation stage. Also, all parties should prepare a detailed project closeout plan and agree on a clear procedure and time frame for project closeout phase at the early stage of the project.
- The client should give a great deal of attention and must involve experienced experts in the signing of a contract agreement. A contract agreement should be detailed and crystal clear to avoid possibly raise disagreements between Clint and the contractor.

- All parties should engage technical experts who have sufficient skills and knowledge in project implementation and closeout in the railway sector.
- A client should engage in operation after fully completed the substantial completion of the project. The transition from the project implementation stage to the closeout stage should be clearly planned and demarcated. Also, contractual disputed items should be resolved before taking over the project.
- A client should be preparing appropriate risk planning and mitigation measures in future projects. Identification and assessments of all risk elements for proper analysis to minimize their influence on the project are important for the success of the project closeout. This could help the project manager to think through how these risk elements can be managed for a successful result. Accordingly, adequate contingency allowance budget should be allocated to cover an unexpected increase in cost during the project implementation.
- A project team from all side should be motivated and give attention to project closeout like other phases in the project management stage.
- A client should work on effectively communicate with utility company stakeholders in planning and implementing the required service from them.

This finding could help the practitioners in Ethiopian railway construction projects to gain a better understanding of the challenges of projects closeout in the project management stage. By taking care of these potential challenges in their present and future projects, construction participants can reduce and control the extent of delays. All stakeholders such as the federal governments, utility companies, and ERC can have chances to discuss the trends of the projects to take care of next constructions.

5.4. Future study

This study gives attention to identifying project closeout challenges only in the AALRT project experience, for the future, it could be better to include other projects and study to get a general understanding of the construction industry. Also for future studies, another researcher can include external challenges like inflation factor and technology adaptation as a challenge and consider identifying their implication in the project closeout stage.

A few more points that could be studied in greater depth are

1. This study only identified the challenges of project closeout; therefore, for future study, the researcher recommended that research should focus on the impacts of project closeout challenge from the perspectives of the client, consultant, and contractor.

2. Do companies have a separate closeout guideline schedule that would help them plan independently for the closeout phase? Do they think it will be a valuable resource to help them achieve timely completion?

3. If firms are not spending sufficient time planning for closeout during the early stages of projects, are they focusing more on that phase as it comes closer? At what point do they realize that the closeout phase is something they need to tackle immediately.

REFERENCES

1. A A E Othman and K A Zaid(2007), *Delivering Successful Construction Projects through Achieving Professional Projects Closeout,* Conference paper, The British University in Egypt, 19/06/2007. Cairo, Egypt.
2. Abd El-Razek, M.E., Bassioni, H.A. and Mobarak, A.M.(2008). *Causes of delay in building construction projects in Egypt.* Journal of construction engineering and management.vol.134 issue 11,831-841.
3. AALRT Phase1 (2009*). AALRT/ERC/CREC/0901Contract document*. Addis Ababa, Ethiopia.
4. AALRT Phase1, *client annual report* (2017). Addis Ababa, Ethiopia.
5. Archarya, N. K., Lee, Y. D. and Im, H. M., 2006. *Investigating delay factors in construction industry: A Korean Perspective*. Korean Journal of Construction Engineering, 7(5), pp. 177-190.

6. Aziz, E. E. (2015). *Project closing: the small process group with big impact*. Paper presented at PMI® Global Congress 2015—EMEA, London, England. Newtown Square, PA: Project Management Institute.
7. Borg, W. R. and Gall, M. D. (1989*) Educational Research: An Introduction* 5th. Edition. NewYork: Longman.
8. Cadle, J., & Yeates, D. (2004). *Project Management for Information Systems*, 4th Edition. Essex, UK: Financial Times Prentice Hall.
9. Cardinal, J. S., & Marle, F. (2006). *Project: The just necessary structure to reach your goals.* International Journal of Project Management, 24(3), 226-233.
10. Carson, C. W., Potter, J. C., Saunders, M. C. and Stauffer, J. J., (20090. *The Great Debate: Planning and Scheduling from Substantial to Final Completion.*AACE International Transactions.
11. Creswell, J. W. (2013). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. United States of America: SAGE Publications
12. De PK (2001). *Project termination practices in Indian industry: a statistical review*. International journal of project management, 19(2):119-26.
13. Divya, R. and Ramya, S., 2015. *Causes, effects and minimization of delays in construction projects*. International journal ssrg, pp. 47-53.,
14. Erik. W. Larson and Clifford. F. Gray (2011)(2008). *Project Management: The Managerial Process,* 11th Edition, McGraw-Hill Hills Companies, Inc., New York.
15. Essam T., M.A., Amin, O., EI Tayeb, & B., Mattiasson (2006). *Biological treatment of industrial wastes in a photo bio reactor,* Water Sci Technol., 53(11):117−25.
16. Federal Transition Administration, 2006. *Construction Project Management Handbook*.
17. Fédération Internationale des Ingénieurs-Conseils (FEDIC), published in 1999. Silver book, *Conditions of Contract for EPC/Turnkey Projects*, First Edition.
18. Fisk, Edward R., & Rapp, Randy R. (June 2004). *Introduction to Engineering Construction Inspection*, Jhon Willy and Sons inc. USA pg. 408.
19. Fourie A, Brent AC (2006). *A project-based mine closure model (MCM) for sustainable asset life cycle management*. Journal of Cleaner Production.2006; 14(12):1085-95.
20. Frank Kwaku Ziddah(2016).*Project Closure Practices In Ghana: A Case Study of Ghana Cocoa BoardConstruction Projects,*Master's Thesis**,** Kwame Nkrumah University of science and technology,Kumasi Ghana.
21. Harvey Maylor (2010), *Project Management, Financial Times Prentice Hall*, UK, Fourth edition.
22. Havila, V., & Salmi, A. (2009). *Managing Project Ending*. Oxon, UK: Routledge.
23. Havila, V., Medlin, C. J., & Salmi, A. (2013). *Project ending competencies in premature project closures.* International Journal of Project Management, 31(1), 90-99.
24. Heerkens, G. R. (2002). *Project Management*. New York, USA: McGraw-Hill
25. Hormozi, A. M., McMinn, R. D., & Nzeogwu, O. (2000). *The project life cycle: The termination phase*. S.A.M. Advanced Management Journal, 65(1), 45-51.
26. ITRM Guideline (2006). *Project Management Guideline*; *Project closeout.*

27. Kirt Gilliland (2019). Gilliland construction management, *what is construction project closeout management*.https://gillilandcm.com/2019/03/26/what-is-construction-project-closeout management/. San Diego, CA
28. Kombo, D.S., and Tromp, D.L (2006). *Proposal and Thesis Writing: An Introduction*. Nairobi: Paulines Publications Africa.
29. Kothari, C.R. (2004) *Research Methodology Methods and Techniques*. 2nd Edition, New Age International Publishers, New Delhi
30. Lewis, J. P. (2001). *Project Planning Scheduling & Control A Hands-On Guide to Bringing in On Time and On Budget*, Third Edition. New York, USA: McGraw-Hill.
31. Meaza A. (2015). *Causes of Project Implementation Delay in the Ethiopian Electric UtilityEnterprise: The Case of Construction Projects in Universal Electric AccessProgram*, published on JBAS, Vol. 7 No. 2.
32. Molenaar, Keith R., & Saller, Brian J. (2003). *Educational Needs Assessment for Design/Build Project Delivery*. Journal of Professional Issues in Engineering Education and Practice, 129(2), 106-114.
33. Mugenda, Olive M and Mugenda, A.G (2003). *Research Methods: Quantitative and Qualitative Approaches*. African Center for Technology Studies (ACT) press. Nairobi, Kenya.
34. Murali, S. & Y.W., Soon (2007). *Causes and effects of delays in Malaysian construction industry*, Graduate School of Management, University Putra, Malaysia, Serdang Selangor, Malaysia.
35. Ogeno David Owour (2016).*Factors influencing completion of construction projects in Kenya: a case of government buildings construction projects in Nairobi County, Kenya*,University of Nairobi, Keneya.
36. Paul Gardiner (2005). *Project Management; a strategic planning approach*, Red Globe Press, London, UK.
37. PMI. (2010). *a Guide to the Project Management Body of Knowledge:* PMBOK Guide 4th Edition. Project Management Institute Inc, Pennsylvania, USA.
38. PMI. (2013). *a Guide to the Project Management Body of Knowledge: PMBOK Guide 5th Edition*. Project Management Institute Inc, Pennsylvania, USA:
39. Polit, DF & Beck, CT (2012). *Nursing research: generating and assessing evidence for nursing practice*. 9th edition. Philadelphia: JB Lippincott.
40. Rogers, J. (2012). *Opportunity Lost: Mismanagement of the closeout. College of technology*, Masters Thesis, Paper 76.
41. Sadi et al (2006).*Causes of delay in large construction projects*, International Journal of Project Management 24.pp,349–357
42. Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research Methods for Business Students*, 4th Edition. Essex, UK: Prentice Hall.
43. Sweis, G, R., Sweis, A.,Abu Hammad & A., Shboul (2008). *Delays in construction projects: The case of Jordan*. International Journal of Project Management, 26, 665−74.

44. Tadesse A, et al (2016).*Assessment on Performance and Challenges of Ethiopian Construction Industry*,Quest Journals, Journal of Architecture and Civil Engineering,Volume 2, Issue 11, pp: 01-11.
45. Tadesse Tulu (2017).*Determinants of Project Implementation Delay: The Case of Selected Projects Financed By development Bank of Ethiopia*, Master's Thesis,St. Mary's University, Addis Ababa, Ethiopia.
46. Tim Mrozowski (2008). Construction management of steel construction: project management, scheduling and estimating .USA
47. Vasudha Kual(2014).*Excessive Delays in Closeouts Can Be Removed With theAdaptation Of Better Practices.* Master's Thesis, Purdue University, West Lafayette, Indiana.
48. Zikmund, W.G. (2003). *Business Research Methods.* 7th Edition, Thomson South Western: Ohio

APPENDIXES

Appendix 1
Ranks of AALRT Project Closeout Challenges

No	Internal and External Challenges	Mean	RII	RII-Level
1	Federal regulatory requirement, /Government interest in early completion of the project /	4.6	0.92	H
2	Delay in providing utility service (electric power, water supply and other)	4.33	0.87	H
3	Delay in decision making process	4.3	0.86	H
4	Financial difficulties of owner	4.17	0.83	H
5	Change of responsible personnel at critical transition points	4.17	0.83	H
6	Consultant limited staff in closeout stage	4.17	0.83	H
7	Delay payments to contractor	4	0.8	HM
8	Delay payments to consultant	4	0.8	HM
9	Disagreements on punch list with contractor	4	0.8	HM
10	Unclear directives for closeout, in specifications and contractual requirements	3.97	0.79	HM
11	Lack of urgency in approach, enthusiasm and motivation of parties involved due to achieving substantial completion	3.97	0.79	HM
12	Late review and approval of project closeout document by consultants /Verifies the completeness, content of documentation provided by the contractor	3.97	0.79	HM
13	Delay in consultant contract extension	3.93	0.79	HM
14	Lack of team functionality	3.93	0.79	HM
15	Excessive/Multiple punch lists,	3.93	0.79	HM
16	consultant's lack of urgency	3.9	0.78	HM
17	Loss of project staff interest in tasks remaining such as documentation	3.87	0.77	HM
18	Delay in decisions making	3.72	0.74	HM
19	Loss of interest in tasks such as documentation	3.7	0.74	HM
20	Delay in approval of contractor payment	3.7	0.74	HM
21	Procedural inexperience of employer's representative.	3.69	0.74	HM
22	Absence of a clear handover strategy	3.67	0.73	HM
23	Diversion of effort (to other works)	3.67	0.73	HM
24	Poor project management and coordination among parties	3.67	0.73	HM
25	Owner directed change orders or scope change	3.63	0.73	HM
26	Lack of project team experience	3.6	0.72	HM
27	insufficient in communication	3.6	0.72	HM
28	Delay in approving test of equipment and engineering systems	3.6	0.72	HM
29	Owner's lack of urgency	3.6	0.72	HM
30	Consultant lack of preparedness and planning for closeout	3.6	0.72	HM
31	Contractor/subcontractor personnel transferring to new projects /lack of sufficient staff in closeout stage	3.6	0.72	HM
32	Lack in technical knowledge, skill and experience in railway projects	3.57	0.71	HM
33	Lack of technical expertise(Client)	3.53	0.71	HM
34	consultant expertise lack in experience	3.5	0.7	HM

35	Disagreement on the cost of additional work	3.47	0.69	HM
36	Lack of Technical Expertise /consultant/	3.43	0.69	HM
37	Lack of thorough/detailed/ identification and agreement on all remaining Deliverables	3.43	0.69	HM
38	Inability to finish punch lists due to lack of appropriate technical manpower	3.43	0.69	HM
39	Lack of Contractor commitment to meet contractual agreements /like providing spare parts/	3.37	0.67	HM
40	Completing punch lists in occupied space	3.37	0.67	HM
41	Loss of interest in tasks such as documentation	3.23	0.65	HM
42	Improper / Untimely contractual closeout documentation	3.23	0.65	HM
43	Errors and discrepancies in design documents, vague details in drawings	3.23	0.65	HM
44	Shortage / Late-arrival of resources, i.e., manpower, materials and equipment in closeout stage /	3.2	0.64	HM
45	Contractor lack of preparedness and planning for closeout	3.13	0.63	HM
46	Unavailability of key personnel i.e. the project manager	3.03	0.61	M
47	Fear of no future work	2.9	0.58	M
48	Accidents during closeout stage /Accidents to people/equipment after substantial completion.	2.87	0.57	M
49	Delay in Performing testing of equipment and engineering systems after substantial completion	2.73	0.55	M
50	Poor financial control system	2.7	0.54	M
51	Natural disaster like flood	2	0.4	ML

Appendix 2
INTERVIEW QUESTIONS

1. In which stages of project management life cycle do you participated? Initiation, planning, execution, monitor and control and closeout.
2. Is project closure/termination formally taken up?
3. When do you start preparing for project closure?
4. How do you determine that it is time to start the project closure task?
5. With which activities do you start with the project closure?
6. What are the challenges you face during project closure?

Appendix 3

QUESTIONNAIRE

St. Mary University

Department of Business School

Post Graduate Program in Masters of Project Management

Questionnaire

Dear Sir/Madam,

I am currently pursuing my Master's Degree in Project management with St. Mary's University, business school graduate studies. Currently, I am writing my thesis titled ***"Assessing the challenges of project closeout: in the case Addis Ababa Light Rail Transit project (phase1)".*** The purpose of the study is to identify the challenges associated with closure of construction project in the case of Addis Ababa Light Rail Transit project phase 1 (AALRT) . This questionnaire is meant to solicit information regarding the topic. Information provided will be used for academic purposes only, thus your responses are strictly confidential and anonymous.

Thank you for participating in this survey. Your feedback helps me to enrich my study report. I appreciate your time, any input and responsiveness in advance.

FikirAsmamaw

Section 1:- General Information

Please TICK [√] where appropriate

Demographical information of the respondents

1. Sex: Male ☐ Female ☐

2. Work experience in Railway sector

0-5 years from ☐ 6 – 10years from ☐ 11 – 15 Years ☐ 16 & above Years ☐

3. Education background:-

Civil Engineer ☐ Mechanical Engineer ☐ Electrical Engineer ☐ Other _____

4. Education level: -DegreeM☐rsPhD and a☐e ☐

5. Organization you are working for: -Ethiopian railway corporation (ERC) ☐

China Railway Engineering Corporation (CREC) ☐

Ethio-Djibouti Railway (EDR) ☐

SWEROAD ☐

Section 2:-For the following series of questions, the following will be the definition of "**closeout phase**": The portion of construction project between substantial completion (the point when the project is ready for the owner's use) and final completion (the point when the contractual relationship between the general contractor/construction manager, the consultant, and the owner terminates (except for warranties, latent defects, etc.)).

Please indicate whether you agree or disagree with each statement using the scale shown below as a guide:

1. Not at all true= strongly Disagree
2. Rarely true = Disagree
3. Neither Agree Nor Disagree = Neutral
4. Mostly true = Agree
5. Almost always true = strongly agree

Table 1: Respondents' Attitudes about Closeout and AALRT project Views: (Please put **X** mark under each service)

No.	Questions	1	2	3	4	5
1	Compared to other phases of construction, the closeout phase is**not**difficult to successfully execute					
2	On typical projects where the work progresses according to schedule, the closeout phase usually is executed according to schedule, as well.					
3	Compared to others, AALRT project does a good job of managing the closeout phase of construction projects.					
4	AALRT project places a great deal of emphasis on the closeout phase of construction projects					
5	AALRT spends an appropriate amount of time and effort planning for project closeout in the early stages of each project					
6	To the extent that there are delays in project closeout, they are usually due to another party's actions/inactions, rather than my firm					
7	AALRT project have a formal system for managing/implementing project closeout					

8. Reason for closing AALRT project (circle your answer)

A. Normal:- project ended as planned

B. Premature :- project ended early with some open issues pending

C. Perpetual :- project extend due to increase in scope

D. Failed :- project could not be completed

E. Changed priority:-Organizations' priorities often change and strategy shifts directions

Section 3:-For the following series of questions, the following will be the definition of "challenges of AALRT project closeout phase":

Please indicate whether you agree or disagree with each statement using the scale shown below as a guide.

1. Not at all true= strongly Disagree
2. Rarely true = Disagree
3. Neither Agree nor Disagree =Neutral
4. Mostly true = Agree
5. Almost always true = strongly agree

Table 2: Internal challenges of AALRT project Closeout: (Please put **X** mark under each service)

Factors	Internal Challenge : Contractor, Client and Consultant Related	1	2	3	4	5
Technical	**Contractor Related**					
	Absence of a clear handover strategy					
	Delay in Performing testing of equipment and engineering systems after substantial completion					
	Excessive/Multiple punch lists,					
	Errors and discrepancies in design documents, vague details in drawings					
	Contractor/subcontractor personnel transferring to new projects /lack of sufficient staff in closeout stage					
	Lack in thorough/detailed/ identification and agreement on all remaining Deliverables					
	Shortage / Late-arrival of resources, i.e., manpower, materials and equipment in closeout stage/					
	Inability to finish punch lists due to lack of appropriate technical manpower					
Psychological	Loss of interest in tasks such as documentation					
	Fear of no future work					
	Unavailability of key personnel i.e. the project manager					
	Lack of urgency in approach, enthusiasm and motivation of parties involved due to achieving substantial completion					
Administration	Contractor lack of preparedness and planning for closeout					
	Completing punch lists in occupied space					
	Lack of Contractor commitment to meet contractual agreements /like providing spare parts/					
	Improper / Untimely contractual closeout documentation					

Financial	Disagreement on the cost of additional work					
	Poor financial control system					
	Consultant Related					
Technical	Lack of Technical Expertise					
	Late review and approval of project closeout document by consultants /Verifies the completeness, content of documentation provided by the contractor/					
	Delay in approving test of equipment and engineering systems					
	Disagreements on punch list					
Psychological	Change of responsible personnel at critical transition points					
	consultant's lack of urgency					
	consultant expertise lack in experience					
	Consultant Limited staff in closeout stage					
	Loss of interest in tasks such as documentation					
Administration	Consultant lack of preparedness and planning for closeout					
	Lack of team functionality					
	Delay in decisions making					
	Procedural inexperience of employer's representative.					
Financial	Delay in approval of contractor payment					
	Client Related					
Technical	Owner directed change orders or scope change					
	Lack of technical expertise					
	Lack in technical knowledge, skill and experience in railway projects					
Administration	insufficient in communication					
	Lack of project team experience					
	Unclear directives for closeout, in specifications and contractual					

	requirements					
	Poor project management and coordination among parties					
	Delay in decision making process					
	Delay in consultant contract extension					
Financial	Delay payments to contractor					
	Delay payments to consultant					
	Financial difficulties of owner					
psychological	Loss of project staff interest in tasks remaining such as documentation					
	Owner's lack of urgency					
	Diversion of effort (to other works)					

Table 3: External challenges of AALRT project Closeout: (Please put X mark under each service)

No	**External challenge**	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
1	Federal regulatory requirement /Government interest in early completion of the project/					
2	Delay in providing utility service (electric power, water supply and other)					
3	Accidents during closeout stage/Accidents to people/equipment after substantial completion.					
4	Natural disaster like flood.					

1. Please write any additional challenges for AALRT Project closeout

2. Please write your recommendation for a successful project closeout in similar projects

Appendix 4
INTERVIEW RESPONSES OF THE INTERVIEWEE

Interview with No 1 interviewee

This interview was conducted with AALRT project manager

1. In which stages of project management do you participated? Initiation, planning, execution, monitor and control and closeout
    - *I participated from project implementation (execution) phase to project closeout phase. I did not participated in feasibility study/initiation/ and project planning phase.*
2. Is project closure/termination formally taken up?
    - *In general term I can say that the project closeout takes place formally, but it started with partial handover of the sub system and the system. It started with partial substantial completion not fully taken place the substantial completion (formally process the taking over certificate procedure). I can say that the partial substantial completion of the project had the capacity to start the commercial operation. The project closeout phase started with partially substantial completion due to different reasons. After the project started commercial operation with the partial substantial completion, full substantial completion of the contract agreement of the project take place adjacently with the AALRT operation service. The challenges that happened in project closeout phase of AALRT project the transition from project implementation to project closeout was mixed due to the operation started with partial substantial completion.*
    - *To give taking over certificate to the contractor there was management problem of the client. The client hold the taking over certificate taking operation defect and mix with project defects which was not contractually and scientifically supported. The client could treat these defects in the defect liability period. Currently the project closure was delayed due to different issues that were not contractual. These issues could be treated in operation management contract which is the separate contract from the AALRT project contract.*

3. When do you start preparing for project closure?
    - *The project started preparing after getting the ERC management decision of to start the operation with partial substantial completion of the project. After getting the official consent or permission from the ERC top management the project office started preparing for project closeout. After that the project closeout proceeds with b fulfilling the formal procedure of the contract.*
4. How do you determine that it is time to start the project closure task?
    - *In my opinion, the time to determine the project closeout tasks depends on the project nature but it will be better after fully completing the substantial completion of the project in professional way.*
5. With which activities do you start with the project closure?
    - *After getting the decision to start the project closeout with partial substantial completion from the ERC management the client take the initiation to start the project closeout and then give direction to the contractor to produce the project closeout proposal.*
6. What are the challenges you face during project closure?
    - *Lack of detailed planning of the project.*
    - *The contract was no detailed or descriptive as needed.*
    - *Improper project management practice of the client (executive managers). Guided by partnership based with the contractor not contractual based.*
    - *Mixed administration of the project and the operation*
7. When was the contract signing, commencement and actual completion date of the project?

No	*project*	*Date*
1	*Contract signing date*	*Sep, 2009 G.C*
2	*Commencement date*	*January 31,2012 G.C*
3	*Planned project completion date*	*June 2015 GC*
4	*Actual completion date(taking over certificate to the contractor)*	*March 31, 2016*
5	*Commercial operation started*	*Sep 8, 2015*

Interview with No 2 interviewee

This interview was conducted with ERC contract Administration expert

1. In which stages of project management do you participated? Initiation, planning, execution, monitor and control and closeout.
   - *I participated in the project as a contract administration expert to Monitor and control project implementation and closeout.*
2. Is project closure/termination formally taken up?
   - *No. the project closure was not formally taken out due to political reason, utility crossing and right of way issue were not resolved moreover the client and the contractor have not reached in to common agreement. The contract document as not drafted by people who have not participated in railway contract drafting or lack experience in EPC turnkey contract. This resulted on lack of spare parts.*
3. When do you start preparing for project closure?
   - *Project closure was initiated on June 2015 when the contractor initially requested for TOC (Taking over certificate) i.e. contractually. however project closure should have started preparing for project closeout planning and should started when the project was commenced on the commencement date of the project*
4. How do you determine that it is time to start the project closure task?
   - *I can determine that it is the time to start the project closeoutwhen the project has been substantially completed i.e. from 85-100%*
5. With which activities do you start with the project closure?
   - *For an EPC turnkey contract the project closure request must be initiated by contractor. But in the case of AALRT due to government interference the client initiated the closeout to start with partial substantial completion through formally written letter to a contractor.*
6. What are the challenges you face during project closure?
   - *Long punch lists*
   - *Disagreement on scope such as lift, TPLS (traction power substation) station and escalator.*
   - *Delayed power supply and differences on type of cable to be supplied for power supply.*
   - *Lack of detailed representative entity to execute the project closure.*