ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

COLLEGE OF BUSINESS AND ECONOMICS

Assessment of Causes of Distressed Project in Addis Ababa Water and Sanitation Authority: A Case of Package Wastewater Treatment Plant Electromechanical Supply and Civil Work Construction (Lot II)

A project work submitted to School of Graduate Studies of Addis Ababa University in partial fulfilment of the requirements for the Master's of Arts Degree in Project Management

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DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted at any university for a degree.

Signature: _____ Date: _____

LETTER OF CERTIFICATION

This research paper has been submitted for examination as with my approval as the University Supervisor.

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Abstract

A distressed project is whenever the performance of a project falls outside nominal values. Project distress can occur at any time during the life of a project, which could make it difficult for the project to be completed successfully within project constraints. The objective of this research is to assess the cause and prevention project of distress management on wastewater treatment project in Addis Ababa Water Sanitation and Authority. This paper used qualitative approach and case study strategy by means of narrative qualitative analysis. The findings implied that the Package Wastewater Treatment Plant Electromechanical Supply and Civil Work construction (Lot II) project were distressed in its life time of the project. The main cause of distress was selection of inappropriate technology, lack of cash flow and economical inflation; poor planning; issue related with scope change management; issue related to resource management; improper risk management and issue to stakeholder management. The prevention management strategy used to avoid distress in the project was periodic reviews. Based on the findings, recommendations are given. Before the selection of technology it is necessary to conduct a feasibility study that incorporates the local condition of the city. The project planning should also be conducted by gathering the necessary primary data and secondary data to estimate the schedule according to the current market condition of the resource. Rectifying the above causes of project distress will help in minimizing the occurrence of distress however having an effective prevention management strategy will play a significant role. The several tools and process to prevent project (i.e. dynamic risk management; scope change management and others) must be in place which are the finest way to detect early warning signs of distress. The prevention management strategies is also important that the implementation of the tools and process to prevent distress must be strictly followed deliberately.

Key Terms: *Distress project, Early warning signs, Prevention management strategy*

Table of Contents

List of Figure

List of Table

Acronyms

AAHDPO- Addis Ababa Housing Development Project Office

AAWSA- Addis Ababa Water and Sanitation Authority

AC-Actual cost

CPI- Cost Performance Index

EV-Earned Value

EVM-Earned Value Management

MBR- Membrane bioreactor

PMBOK- Project Management Body of Knowledge

PWTPESC-II - Package Wastewater Treatment Plant Electromechanical Supply and Civil Work Construction Lot-II

ROW-Right of Way

SPI- Schedule Performance Index

TPM-Traditional Project Management

WBS- Work Breakdown Structure

CHAPTER-ONE

1. INTRODCTION

1.1. Background of the Study

In Ethiopia, from ancient time of Aksumite dynasty constructions up to the contemporary construction of the Grand Ethiopian Renaissance Dam, construction's reflects the socio cultural and socio economy of the country. As Loosemore & Uher, 2004 construction projects symbolise the social, cultural and technological developments of succeeding civilizations. Construction industry had been playing significant role in all aspects of human life. Managing a giant industry as such had never been an easy task due to the interdependency with national economy. Recent studies by (Zewdu & Aregaw, 2015) indicated that the GDP contribution of the construction industry has been raised to 5.6% and approaches to the sub Saharan average (6%), meanwhile, the Gross Domestic Capital Formation (GDCF), which was about 60 percent in 1996/97, has reached nearly 75% in 2002/03.

Construction industry is heterogeneous and complex (Sears, S. Clough & Sears, G., 2008). However, managing the project does not guarantee success. As Kliem argue that if different criterion used budget, schedule, quality, or some other and the statistics by think tanks, institutes, associations, and other trade organizations all point to one inescapable conclusion: a project has a greater chance of getting into trouble than staying out of it (Kliem, 2011).

Development construction projects in Ethiopia include housings, non-residential buildings, utilities and industries. The purpose of project management is to manage a system of tasks, resources, people, and organizations to accomplish the project goal (Nicholas and Steyn, 2008). It has become so common for development construction projects to go through cost overrun, delay and/or exceed in more than one metrics beyond the acceptable tolerance limit in Ethiopia. As Ayalew, Dakhli & Lafhaj, (2016) support that there are more schedule slippage, cost overrun and deviation in other metrics in construction projects in Ethiopia which all contributes for project to become distressed or fail. When developmental construction project faces distress, stakeholders will face extra cost, delay and minimize end users quality of life directly or indirectly.

A distressed project is whenever the performance of a project falls outside nominal values (Wysocki, 2014). Moreover, projects will never come to distress or failure suddenly, it shows early warning signs. The early warning signs will help to take remedial action on time to prevent projects from becoming distress. If the project manager and the team do not incorporate more successful practices of distress management, the cost of managing troubled project is high on the basis of how much cost the organization might lose. As Kerzner (2010) failure to recognize early warning signs early can make the cost of downstream corrections a very costly endeavour. Also, the longer you wait to make the corrections, the more costly the changes become.

Among the few studies conducted for the distress of construction projects depict that there are several development construction projects that are under stressed for a very long time; the key factors that affect the performance of construction projects are cost, time, quality, and leadership style (Yada & Yadeta, 2016). Similarly, several researchers had tried to investigate the cause of project distress or trouble under different categories. PM Solutions, 2011 classified cause of stress in projects into: requirement related cause, resource related cause, cause related to schedule, poor planning based on insufficient data and unidentified and unmanaged risks in the project. Correspondingly, Alaskar (2013) sorted it into two categories: out of the project boundaries and in the project boundaries. Another author, Kerzner, classified it as management mistake, planning mistake and external influence (Kerzner, 2010). Meanwhile, others put a list of causes that brought project in to distress (Kliem, 2011; & Wysocki, 2014).

The Addis Ababa Water and Sanitation Authority (AAWSA) was re-established in 1971. The authority has mandates of supplying safe and adequate potable water, and providing wastewater and sludge disposal services for Addis Ababa city. AAWSA is sole provider of the service. Therefore this study will try to assess the cause of managing distressed project in Package Wastewater Treatment Plant Electromechanical Supply and Civil Work Construction Lot-II (PWTPESC-II) project on AAWSA.

1.2. Problem Statement

Project management scholar Kerzner state that the chances of failure on any given project may be greater than the chances of success (Kerzner, 2010). Unlike project success which

happens at the end of a project, distress or failure can occur in any life cycle of project. Project become in distress and if it continues in the same trend the project will fail (Wysocki, 2014). Based on preliminary interview conducted on the construction project for waste water treatment plant particularly in the case of Package Wastewater Treatment Plant Electromechanical Supply and Civil Work Construction Lot-II (PWTPESC-II) projects show that the project had faced deviation in more than one project performance metrics (i.e. schedule and cost) and there were also a significant change such as turnover of key personnel and project face high risk through the life of the project. Different indicators reveal when projects are distressed or troubled, these symptoms manifest in one or more metrics of project such as cost, schedule, and quality and/ or other metrics. The key is to look for these symptoms and recognize them as the causes of distress and effectively address them early. When developmental projects face distress stakeholders encounter extra cost and delay and the end users quality of life might be minimized.

According to several research there are a number of identified common cause of project such as issues related to requirement, planning, scope management, communication, resource management, quality, risk and others (Alaskar, 2013; Kliem, 2011; PM Solutions, 2011; & Wysocki, 2014). Nonetheless projects are executed under different environment therefore it necessary to understand what causes the distress in the context of the project. Understanding the cause of distress will enhance the opportunity for successful prevention and intervention of trouble that help in taking the timely and appropriate action to recover project in to the new normal state. As Addis Ababa city a primate city with high rate of urbanization the city have a huge demand for waste water treatment plants; the conventional waste water treatment plants and the current that is under construction are just spoon of water in an ocean. Based on the significance of the project, the stakeholders do not desire to pay the consequence of distress on such projects.

Meanwhile, there are always signs and symptoms of an unhealthy project and through proper checkups and corrective actions, most issues can be caught early and resolved (Sompura & Roessling, 2019). Early warning signs are often overlooked or misunderstood. Managing a construction project is not an easy task to do and recognizing

early warning signs to prevent projects from distress needs an effort however using prevention management strategy does not guarantee that the project will not fail in distress(Wysocki, 2014). So the research will assess the cause and prevention strategy management used in the PWTPESC-II project to grab the opportunities ahead.

1.3. Objective of the Study

1.3.1. General objective

The general objective of this study is to assess the cause and prevention management strategies on PWTPESC-II project in AAWSA.

1.3.2. Specific objective

The specific objectives of the research are:

1. To identify the characteristics or indicators of distress on PWTPESC-II project in AAWSA
2. To identify the causes of distress on PWTPESC-II project in AAWSA
3. To assess the prevention strategies used for on PWTPESC-II project in AAWSA

1.4. Research Question

The research questions of the research are:

1. What were the characteristics or indicators of distress on PWTPESC-II project in AAWSA?
2. What were the causes of distress on PWTPESC-II project in AAWSA ?
3. What were the prevention strategies used for wastewater treatment project in AAWSA?

1.5. Significance of the Study

This assessment paper is relevant to the client (AAWSA), contractors, consultants and others stakeholder to provide insight about characteristics of distress project, cause of distress project as well as prevention management strategies in order to recognize early warning signs , to take the necessary actions on time to enhance project success. After assessing and examining the actual causes of distress to rectify cause of distress in addition to implement prevention mechanism and provide possible recommendations that are essential for wastewater treatment project successes.

1.6. Scope of the Study

The construction industry in Ethiopia especially developmental projects had high rate of running over budget and delay. However the research is conducted concerning waste water treatment project in AAWSA that is located in Addis Ababa. Prevention management strategy for distress project may not be enough to increase project distress management, it is also necessary to put on intervention management strategy including when to terminate the project. Nevertheless, here only prevention management strategy and the cause of distress in wastewater treatment are discussed due time and financial limitations. The research is executed within the timeframe of 4 months.

1.7. Limitation of the Study

The cause for project distress or failure had different pattern in different context. The research cannot be generalized for the methodology used helps in getting deeper insights and have limited ability for generalization.

The researcher has limited scope based on time and data constraints therefore the cause of distress in project management rather than root cause of distress. Hence, main focus is given to indicate the weakness and potential improvements.

1.8. Definition of Terms in the Study

Distressed project is a situation that can arise at any time during the life of a project, which could make it difficult for the project to be, completed successfully (Tebongo, 2011). The term distressed, troubled and stressed are used as synonyms for this study.

Domestic wastewater is made up of human waste (faces and urine) and sullage, is wastewater arising from personal washings, laundry, food preparation, and cleaning of the kitchen utensil (Oladoja, 2017). In this study wastewater is used as synonym for domestic wastewater.

Early warning signals is are signals, which can be seen variously as an expression, indication, a proof, or a sign of existence of some future negative issues (Othman et al. 2018).

Effluent is the liquid stream which is discharged from a wastewater treatment plant or discharge from a unit process or operation (Bani, 2011).

Failed Project is a project with also overrun in schedule, budget, unsatisfactory quality and scope exceeds the acceptable tolerance limit and it cannot be rescued (Alaskar, 2013).

Membrane bioreactor (MBR) systems are unique processes, which combine anoxic- and aerobic-biological treatment with an integrated membrane system that can be used with most suspended-growth, biological wastewater-treatment systems (Bani, 2011).

Prevention management strategy is a proactive method to significantly reduce the chance of projects from becoming stressed (Wysocki, 2014).

1.9. Organization of the Study

The research paper has five main chapters. It starts by introducing the research which incorporates the background of the study; the research objective; the research question; significance of the study; definition of terms and scope of the study. Immediately, the paper continues with literature reviews that bring out the project management concepts and provide understanding about existing ideas on the study topic. The second chapter consist the theoretical and conceptual literature; empirical literature and conceptual framework. Achieving research needs, clear and appropriate research methodology. The methodology used is presented as research design; sample design; type and sources of data; data analysis and presentation, ethical consideration; research validity and reliability and limitation of the study. The next section presents the analysis of the data and discussion and interpretation are presented in detail. Finally, conclusion and recommendation is incorporated.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Introduction

This chapter is dedicated to explain the literatures about the project management, process groups in project management, what distressed or troubled projects is and it characteristics; causes of distress in project and managing distressed project in a manner to give an insight. It consist the theoretical and conceptual literature, empirical literature, conceptual framework and finally conclusion.

2.2. Projects and Project Management

2.2.1. Project

The term 'project' implies a particular and unique activity that has a definite start and finish time (Loosemore & Uher, 2004). According to PMBOK (2017) project is defined as a temporary endeavour undertaken to create a unique product, service, or result. Projects are undertaken to fulfil objectives by producing deliverables that can be either unique product, service, or result. The temporary nature of projects show that defined beginning and end not necessarily mean a project has a short duration. And projects enable business value creation that is the net quantifiable benefit (tangible, intangible, or both) derived from a business endeavour.

As Nicholas & Steyn (2008) noted project have peculiar characteristics such as: it is temporary, unique process to achieve a goal; it involve a single, definable purpose and well-defined end-items or deliverables; it is somewhat or largely unfamiliar that needs application of multiple professions skills and organizations: and project has something at stake that calls for scrutiny or effort because failure would jeopardize its goals. Given the unique characteristics of project, project has to manage in order to achieve the specified goals. Subsequently, project management enables organizations to execute projects effectively and efficiently (Nicholas & Steyn, 2008).

2.2.2. Project Management

There are different definitions of project management; among them the common ones are presented below.

According to Loosemore & Uher, 2004 definition project management is concerned with management of people who form a short-term project team for the purpose of achieving project objectives in terms of cost, time, quality, function and utility.

As Nicholas & Steyn (2008) project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

Lastly, project management is also defined as the art of directing and coordinating human and material resources throughout the life of a project by using modern management techniques to achieve predetermined objectives of scope, cost, time, quality and participation satisfaction (Hendrickson as reported in Munier, 2013). There are different activities executed in managing a project. These activities are sorted in process groups which are discussed next.

2.2.2.1. Project Management Process Group

According to (PMBOK, 2017) there are five process groups that are the initiating (scoping), planning, launching (executing), monitoring and controlling, finally the closing process group.

Initiating Process group: here the initial scope will be defined as well as the financial resource will be committed for the preliminary activities and setting success criteria (PMBOK, 2017). As Wysocki (2014) this process group includes the following: identifying stakeholder; recruiting the project manager; eliciting the true needs and high level requirements of the client; documenting the client's needs; deliver project scope statement (POS); and gaining senior management approval to plan the project.

Planning Process Group: As Wysocki, 2014 the planning process group is about answering the two questions: "What will you do?" and "How will you do it?" and this process group consists the following: defining all of the work of the project; estimating how long it will take to complete the work; estimating the resources required to complete the work; estimating the total cost of the work; sequencing the work; building the initial project schedule; analyzing and adjusting the project schedule; writing a risk management plan and documenting the project plan.

Executing Process Group: this process group is about integrating people and other resources to carry out the project management plan (Team, F.M.E., 2013). The launching

or executing process group consist all processes related to recruiting and organizing the team and establishing the team operating rules. It also includes activities as establishing the scope change management process, finalizing the project schedule and listing work packages (Wysocki, 2014).

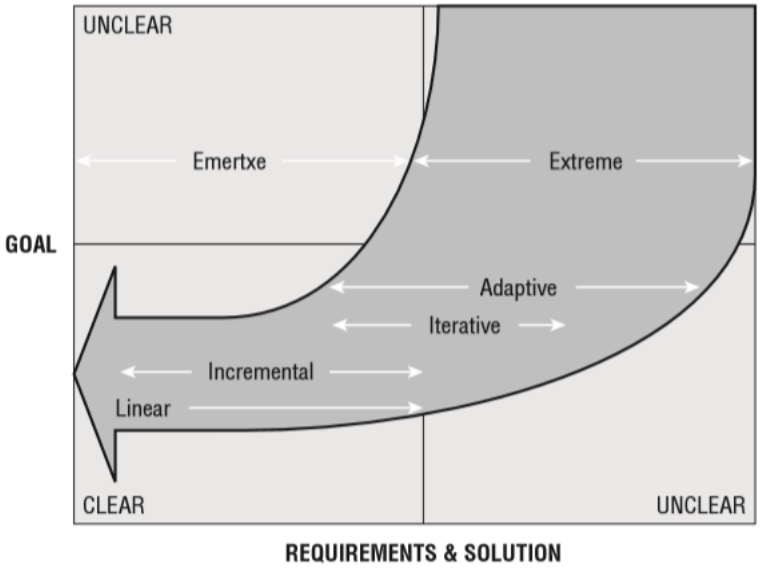
Monitoring and Controlling Process Group: in this process group is about measuring and monitoring **t**he progress to detect any variance from the base plan and to rectify when necessary to achieve the objective (Team, F.M.E., 2013).

According to Wysocki (2014) the monitoring and controlling processes groups includes the following activities as: establishing the project performance and reporting system; monitoring project performance; monitoring risk; reporting project status; processing scope change requests; and discovering and solving problems.

Closing Process Group: the final process group includes activities related to the completion of the project, besides the processes consists: gaining client approval of having met project requirements; planning and installing deliverables; writing the final project report; and conducting the post-implementation audit (Wysocki, 2014).

A project management life cycle (PMLC) is a sequence of processes in project (Wysocki, 2014). The Project Management Life Cycle (PMLC) models are illustrated on the basis of clarity of requirement and solution, and goal hence it is expressed in four quadrants. The first quadrant has project with clear goal and clear solution called the Traditional Project Management Life Cycle (TPM), the next quadrant, Agile Project Management Life Cycle (APM) comes with a clear a goal while unclear solution hereafter comes the where there are unclear goal as well as unclear solution the Extreme Project Management Life Cycle (xPM). The last one is where there is unclear goal however somehow clarity of solution is Emertxe Project Management Life Cycle (MPx). All the types of PMLC models do all the process groups in a project. Commonly small construction project is treated as TPM as the solution and goal is clearly known however large scale projects are better treated as APM (Burmistrov, Siniavina & Iliashenko, 2018). Therefore, it is necessary to take the facts under consideration when selecting PMLC models.

Figure 2.1 PMLC Approach



Source: Wysocki, 2014

2.3. Construction Project Management

Construction industry is one of the biggest industries that are highly heterogeneous and complex. As Sears, S. Clough & Sears, G. (2008) there are several major classifications of construction that differ markedly from one another: housing, non-residential building, heavy civil, utility, and industrial.

The unfamiliarity, amount of effort, dynamic environment, dependencies among activities and the need to increase project success: construction industry needs project management (Nicholas & Steyn, 2008). It is also obvious that while the construction process, even a project of modest proportions involves many skills, materials, and literally hundreds of different operations that calls for project management (Sears S, Clough, & Sears G, 2008).

Most of the time there are three main parties that involve in construction project: the client, consultant and the contractor. All parties have their own role in delivering the project successfully within the project constrains (time, cost and scope). The client or project owners are the ones that commence the project, finance the project and contracts out the project to potential operators (Business dictionary, 2018). The

project owners in the construction industry also has the responsibility that the project follows the specific regulations that might be required (Byggherrarna, as reported by Andreas & Ida 2018).

The second party, the consultant is responsible to administer the contract in the time of construction to give professional service in project (Ceerigaabo, n.d.). Most definitions describe consultants by their roles and responsibility and services provided using tools and skills in delivering a task assigned by the client or the owner of the project (Dzulkarnaen, as stated by Nikumbh, & Pimplikar, 2014).Typically, the responsibilities of the consultant on a construction project are set out in a standard form agreement between the consultant and the owner.

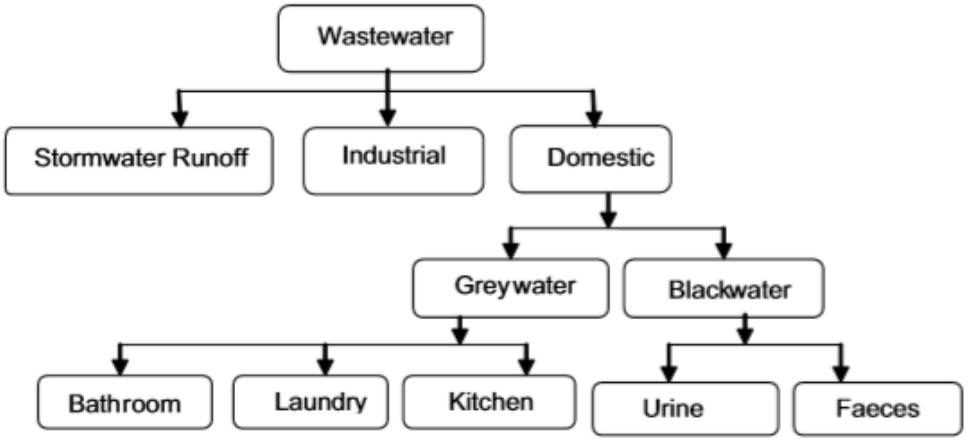
The third party, the contractors are the operators that provide the project with the right resources and carry out the project. In addition, all the main parties have limited resources in terms of time for planning and execution of pp. (Kozlovska, Mackova, & Spisakova, 2016), Construction project management starts at the point at which the contractor is brought into the project (Sears S., Clough, & Sears G., 2008).

There are many factors that affect construction project outcome such as management practices of the contractor, involvement and response of the owner, design change and design errors, and procurement delay (Hanna & Gunduz, 2005). Therefore delivering a successful construction project had never been only about a trouble free execution process: it includes the period of time to define the scope, arrange financing, developing design and administrating the contracts prior to the execution (Loosemore, & Uher, 2004). The next topic discuss specific topic from construction industry as it is the area of the study.

2.3.1. Domestic Wastewater Plant Project

Domestic wastewater is the water that has been used by a community and which contains all the materials added to the water during its use that is composed of human body waste (black water) and grey wastewater resulting from personal washing, laundry, food preparation and the cleaning of kitchen utensils (Mara, 2013). From this point on wastewater is used as synonym domestic wastewater.

Figure 2.2 Types of wastewater



Source: Bani, 2011

Wastewater is water whose physical, chemical or biological properties have been changed as a result of the introduction of certain substances which render it unsafe for some purposes such as drinking(Bani, 2011).On the other side, untreated wastewater causes major damage to the environment and to human health (Mara, 2013).

Developing countries has only a small proportion of the wastewater produced by sewer communities because of lack of finance but it is also due to ignorance of low-cost wastewater treatment processes and of the economic benefits of treated wastewater reuse (Mara, 2013).

2.4. Distressed project management

2.4.1. Definition of distressed project

There is no single definition of distressed or troubled project in PMBOK however different author gave their definition.

According to Mochal, (2007) simply define a distressed project as a project verified to exceed the defined tolerances limit. Vargas elaborate it more by saying distressed project as a project where the difference between what is expected and what has been accomplished exceeds the acceptable tolerance limits, pushing into a course that will inevitably lead to failure (Vargas, 2007). Moreover, according to Teongo's definition, project distress is a situation that can arise at any time during the life of a project, which could make it difficult for the project to be, completed successfully (Tebongo, 2011).

From the above definitions, the question of what acceptable tolerance will arise. Therefore, acceptable tolerance is the upper limit on metrics such as the budget, schedule, and deliverable and within tolerable quality (Mochal, 2007). Understanding the acceptable tolerance limit is important because the project may be over-budget or overdue but still in an acceptable range, although those might be early warning signs. As Alaskar (2013) implies more concern must be taken for project since it can be troubled or failed at any phase of the project life cycle however project success can be determined at the end of the project.

2.4.2. Understanding Distressed Projects

Based on the definition of success; project failure can be better understood. The PMBOK definition of success is more inclined to accomplish the project under the triple constraints criteria however stakeholders are more interested in the desired value. As Kerzner (2010) project success is achieved when the planned business value is achieved within the imposed constraints (scope, cost and budget) and assumptions, and the customer receives the business value. Therefore, failed project is a project with also overrun in schedule, budget, unsatisfactory quality and scope exceeds the acceptable tolerance limit and it cannot be rescued (Alaskar, 2013). Project might progress from conventional project management zone where the metrics are under the acceptable tolerance limit to a possible recovery zone where intervention is made to restore and precede the project to success. Nonetheless, despite the intervention, project might need to be terminated and accepted as a failed if they exceed the possible recovery zone. The

2.4.3. Indicators of Distressed Project

There are numerous features identified for distressed project. Among the frequently illustrated characteristics are articulated below.

According to Alaskar (2013) one or combination of metrics exceeds the acceptable tolerance limit that could lead the project to fail. Ignoring these metrics will lead to multiple interrelated problems rather than arise of single problem which may complicate the project or might lead the project to fail. This metrics can be expressed as delays in meeting milestones or completing deliverables; high risk to the project chance of delivering anticipated benefits; project is over-budget with no end in sight; significantly

growing technical issues with the project and as such. This situations stress the project team in working extra time, demand repeated intervention and makes the project team will be frustrated concerning delivering the project need.

As noted by Wysocki (2014) project that recently faced significant change that may result in failure is another sign of distressed project. Even though the project performance metrics do not indicate any problem, the environmental change may be sufficient to throw the project off course. The same author gives two examples of major changes that can take place in executing projects these are such as change in sponsor and a loss of critical resources (Wysocki, 2014).

The indicators of troubled project are depicted with issues that arise from documentation and formalization; cost and schedule; scope; risk; resources and stakeholders (Vargas, 2007).

2.4.4. Reasons for Projects Distress or Fail

Among the numerous reasons found by several scholars for project distress eventually failure some of the common reasons are discussed below:

2.4.4.1. Issue Related to Requirement Documentations

Requirements are capabilities that a product must meet to satisfy a user's need to solve a problem; the user's needs can come from a number of sources including compliance to a standard or to legal regulations, a business need, a business problem, market need, competition, etc. (Kumar, 2006).

According to Coventry (2015) that requirements management is an iterative set of activities that help ensure that elicitation, documentation, refinement, and changes of requirements is adequately dealt with during a lifecycle, with a view toward satisfying the overall mission or need in a quality manner and to the customers' satisfaction. Requirements come from end users, from customers, and sometimes from developers. Problems that arise with related to poor, inadequate or no requirement document, not recognizing the complexity of requirement are the prominently mentioned.

According to Wysocki (2014) it is impossible to generate complete requirements documentation at the beginning of a project however, a reasonable certainty is necessary

for the identified set of requirements and only the identified requirements detailed decomposition is suspect. The lack of detail and realism in the project plan has a potential to cause distress in a project. Since project complexity is high at the beginning of projects a sizable percentage of milestones might be marked as To Be Determined (TBD) and other milestones set with a lack of detail or realistic analysis of how the milestone was determined just as to fulfil the management need for document (Kliem, 2011). Correspondingly, requirement complex, inadequate and unclear the chance of the project to fall under stress will be very high.

As noted by Sompura & Roessling (2019) unclear specifications can become very costly, especially when the owner's and contractor's interpretations differ significantly. Correspondingly, research affirms that projects with poor requirement practice have more chance to face cost overrun as IAG Consulting as reported in Coventry, 2015. Therefore, in order to know if the requirement definition is poor, it could be known by asking what the project goal and objective plus if the specific requirements of the project are addressed as Kliem, 2011.

2.4.4.2. Poor Scope Management

As PMBOK, 2017 define project scope as, it is the boundary of what a project will produce and the work needed to produce it. Defining scope is the vital part of project; the purpose of defining scope is to lucidly describe and gain agreement on the logical extent of project by stating what is within the boundary of the project and outside the boundary (Mochal, 2007).

Among the top listed reasons for project distress or failure is the area of scope management; in relation to scope management issues are inadequate definition of scope, scope creep and frequent scope change.

According to Larson, R. & Larson, E. 2009 scope creep is adding additional features or functions of a new product, requirements, or work that is not authorized (i.e., beyond the agreed-upon scope. Moreover, scope creep is dreaded in projects that may occur for a multitude of reasons such as to the fact that projects bring change, an unpredictable occurrence (Millhollan, 2008). As Sompura and Roessling, 2019 there are three fundamental driver of scope creep include: the first is client requests that are out of the

scope of work originally settled upon; the second is the unforeseen or general conditions that are unknown to the contractor at the time the contract is signed and the third one is client not doing thorough preliminary work (e.g., site surveys, proper planning, Geotechnical report etc.). As scope is among the triple constraints of project, scope creep increase the chance for a project cost overrun and delay.

On the other hand, scope changes are changes to the current project scope that are known and accepted by the main parties of the project (Nelson, 2015). These can be changes that are reimbursable, or changes that the contractor agrees to do it without compensation. Nevertheless, there is an agreement in scope change, it might lead to trouble if there is no tracking system for the frequency and cumulative number of scope change is in place as Wysocki, 2014.

2.4.4.3. Poor Project Planning

Project plan is a guide line that shows what and when to do tasks that enable the objective to be achieved (Mochal, 2007). Failure to plan is planning to fail; a plan plays vital role for project success. According to PM Solution, 2011 issues related to planning can arise from planning using insufficient data, missing items, insufficient details and poor estimates.

As Mochal, 2007 spending time on a good planning ends up taking much less time and effort than having to correct problems while the project is underway. However, if planning is done with insufficient data, it will be reflected mostly in cost and time. Besides when project has baseline plan and if the project manager and the team does not have lucid understanding of the progress made and the remaining work; it can be a reason for project distress (Mochal, 2007). Similarly if several revisions and significant change had taken place to the base plan by the client request there might be serious doubt that the plan can be achieved as Wysocki, 2014.

Furthermore as Kliem, 2011 emphasise that the need to clarify the reason behind assumption and expectation, while developing the plan, need to be visible to all project team in case where key person leave the project should not be an issue how to precede the project (Kliem, 2011). As Wysocki, 2014 suggest the acceptable strategy is to get estimates from staff members who have done the tasks before. Others suggest that it is

critical to include continuous monitor in the project plan to closely examine progress so that delay and cause cost overruns can be minimized (Sompura and Roessling, 2019).

2.4.4.4. Issues related to resource management

Any project demands different types of resources that are material, equipment and man power. These resources need to be managed wisely to increase the chance of success in a project. Lack of resources, resource conflicts, turnover of key resources, poor planning are top listed cause of distress with respect to resource management in a project (PM solution, 2011). If the staffs do not have the required competency to execute the project, having plenty number of staff means cost that bring nothing in return. According to Kliem (2011) when selecting a project team both hard and soft skills are necessary nonetheless hard skill is overrated in most cases therefore many projects are in trouble not because of a dearth of hard skills but soft skills.

Resource conflict happens when project are approved without assessing resource availability. Even though organization have the competent personnel it does not necessary mean that they can deliver the task of under the given schedule for the project due to the fact that engagement in other activity (Wysocki, 2014). According to Kliem (2011) projects in trouble frequently overlook the dependencies for resource and deliverable of prior activity, assuming instead that they can operate independently. Moreover there are also dependencies among organization that are involved in the projects directly or indirectly. As Kliem, 2011 no project is an island, failure to recognize external dependencies can lead to a feeling of invulnerability, in turn, leading to trouble if and when something does happen.

2.4.4.5. Improper Risk Management

Uncertainties increase with the size of the project (physical size, financial value, manpower requirements.etc.), the complexity of project (which is affected by the number of disciplines involved.), the level of involvement of external agencies (i.e. the impact of government regulations), the degree of impact of environmental issues (e.g. weather, local lobbies), the level of impact of international trading condition and currency fluctuation, unknown levels of inflation for long term projects and complexity of financing (Khamooshi, 2004). In order to reduce the impact of risks, a well thought out

risk management plan must be in place where possible risks are identified, analyzed and managed. In reality few project are execute a planned risk management therefore possible risks should be identified and mitigated early deliberately. If risks are not addressed timely, they are addressed in high level. As PM Solution, 2011 unidentified or assumed or not managed risks are the cause for distress. Correspondingly, failure to implement risk management plan might be a sign of distress (Varga, 2007).

2.4.4.6. Issues related to Stakeholder Management

Stakeholders are those who have a stake or an interest in a project or strategy, they will be affected in some way be the project and so have an interest in influencing project. Consequently stakeholder management is highly complex management task because it is about managing stakeholder expectations to ensure that the completed product/ service meets the needs of stakeholders as well as possible and is favourably accepted (Vogwell, 2003).

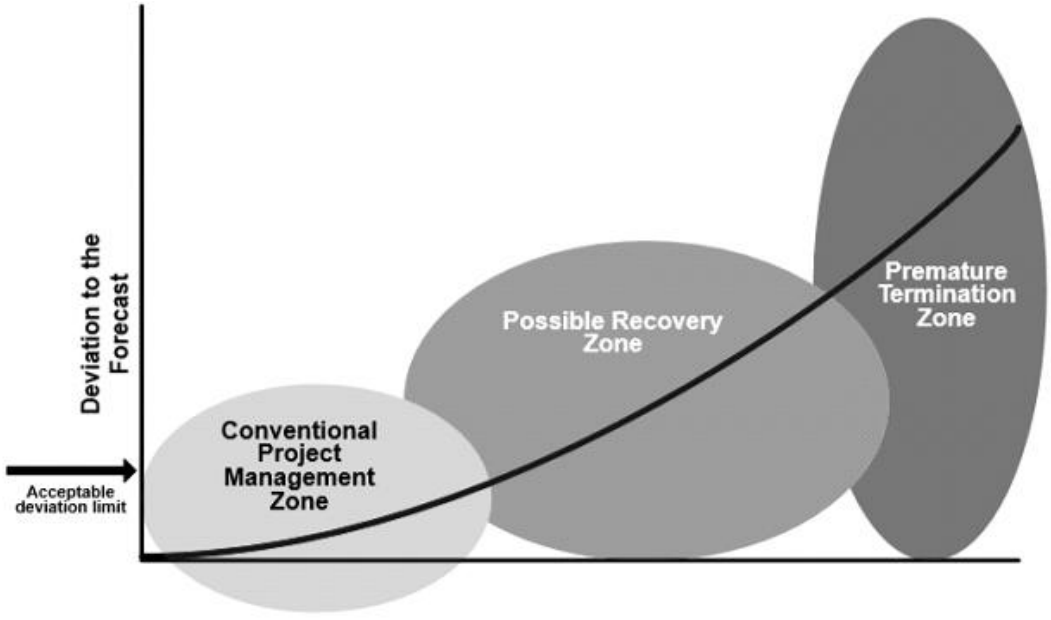
According to Vargas (2009) sponsors, executive managers and/ or client express discontent with the project in evident or disgusted manner; insufficient involvement from client and client who is not ready to take responsibility in the project is concerns that arise in relation to stakeholder management. Correspondingly inappropriate or insufficient sponsorship, unwillingness to make tough decisions and inconsistent client sign-off are issues emphasized by Wysocki, 2014.

In order to acceptably satisfy stakeholders and gain client sign off, it is necessary to asses as well as to meaningfully involve stakeholder's helps in satisfying expectation. End users of the project must be identified to have the idea of whose demand the project need to satisfy so as to be able to define them as Kliem, 2011. Effective communication among stakeholder is incredibly critical to the success of any project: if stakeholders are not getting the right information at right time, solving problems become costly that leads to trouble (Sompura and Roessling, 2019). Failure in communicating with stakeholders will result in difference in expectation, uninformed decisions and main parties will be frustrated whenever unexpected incident occur as Mochal, 2007. Furthermore Wysocki (2014) state if stakeholders take unacceptable time to make tough decisions, there is a good chance that the project may face delay and cost overrun.

2.4.5. Strategies for Managing Distressed Project

Projects pass through different life cycles in order to end up successful. Projects becoming in trouble is a reality therefore it needs different strategies to achieve its objectives despite of the stress. According to Wysocki (2014) there are two strategies for managing distressed projects: prevention management strategy and intervention strategy. Prevention management strategy is a proactive method to significantly reduce the chance of projects from becoming stressed. Even though several prevention strategies are implemented, the project might still fail in to distress afterward come to the intervention management strategies due to several prevailing condition beyond your power to control. The intervention strategy is applied when project is in distressed situations; it is implemented to bring the distressed project in to the new normal condition. As noted by Kerzner (2010) the cost of recovery is huge and the plan is not to finish on schedule but to finish with reasonable benefits and value for the customer and the stakeholders. As the saying "prevention is better than cure" not all projects will be recovered regardless of the intervention. Hence for the purpose of this research focuses on prevention strategy.

Figure 2.3 Continuous sequence of distressed project



Source: ESI International, 2007

2.4.5.1. Early Warning Signs

According to Tebongo (2011) in spite of the fact project trouble is a real concern and can be exorbitant: it is conceivable to take note early signs and subsequently take early actions to address before it creates serious issues. Early warning is defined by signals, which can be seen variously as an expression, indication, a proof, or a sign of existence of some future negative issues (Othman et al. 2018). There are always early warning signs and indications for troubled projects since no project become distressed overnight. Through the right checkups and remedial activities, most issues can be caught early and settled (Sompura and Roessling, 2019).

Early warning sign are important for several reasons. Failure to recognize early warning signs at early possible time can make the cost of recovery or correction expensive endeavour (Kerzner, 2010). On the other hand the successful identification and evaluation of the early warning signs can indicate the fate of the distressed project; few change to the original requirement or demand major change or worse the project should be terminated.

As PMBOK (2017) project has five process group of project management: initiation, planning, execution, control and closure. As it is mentioned above project distress or failure could occur at any stage during the project life cycle, consecutively the early warning signs could be identified at any stages.

As Othman et al. (2018) remarks the ideal stage of detecting early warning sign is during initiation & planning or front-end stage of the project. The planning stage is where the most essential decisions are made. Generally, at the beginning of a project, uncertainty is high: only estimate the control factors (i.e. time, money, team, quality goals and necessary information) of the project as it progress more knowledge emerges so clarity increases (Baars et al. 2006). Due to the fact uncertainty is high in the beginning of project, nevertheless high potential of corrective actions to be made that consequential leads in minimizing the occurrence of negative impacts. As the author suggests that project team should scrutiny for area of vulnerabilities to avoid unpleasing surprises.

2.4.5.2. Using Tools and Process to Prevent Distressed Project

According to Wysocki (2014) there are six tools and technique used to give early warning signs in the prevention management strategy these are: requirement gathering; Work breakdown structure (WBS) construction; scope change management process; dynamic risk management process; milestone trend charts; and earned value management (EVM).

2.4.5.2.1. Requirement Gathering

Requirements management improves all major aspects of organizational strategy (portfolio, programs, and projects) or operations management (day-to-day business) by reducing cost, decreasing time taken and risk, improving quality and enabling and effective scope management (Coventry, 2015).

A solid requirements document also serves as a guide to development and testing throughout the project (Smith, n.d.). If you have a list of everything your product should do, it's easier to create a product that does everything you wanted (and to test it to see if it really does it all). However, as Wysocki (2014) complete requirements documentation is difficult if not impossible at the beginning of the project, hence extra care in identifying the list of requirements should be taken.

2.4.5.2.2. Work breakdown structure (WBS) construction

As PMBOK, 2017 define WBS is defined as a deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables and it is essential element of initiating, planning, executing, and monitoring and controlling processes.

As Brotherton, Fried & Norman, 2008 WBS includes 100% of the work defined by the project scope and, by doing so, captures all of the deliverable, internal, external, and interim, in terms of work to be completed, including project management. WBS helps to define the scope of the project will help ensure delivery of the project's objectives and outcomes. As Rev, 2003 noted that all the work contained within the WBS is to be identified, estimated, scheduled, and budgeted. Another author support the idea as having a complete and correct WBS is critical to the success in TPM and whatever difference there is between your WBS and a complete WBS will probably be reflected in the number of scope change requests there will be (Wysocki, 2014).

2.4.5.2.3. Dynamic Risk Management Process

According to Lavanya & Malarvizhi, 2008 risk management framework should be defined in initiation stage of project consisting the list of possible risk sources and categories; impact and probability matrix; risk reduction and action plan; contingency plan; and risk threshold and metric. Dynamic risk management plan is believed to be the finest mechanism to prevent project from becoming distressed that is metrics-driven risk monitoring and control process (Wysocki, 2014). To increase the success of project, risk management plan must be continuous and dynamic (Khamooshi, 2004). Necessitate for dynamic risk management crop up from the dynamic environment project is executed and knowledge that emerge as the project progress. Correspondingly, risk management plan needs risk owner, may not mandatory be project managers who is person selected in executing the plan to eliminate or lower the probability of risk occurrence or to minimize the impact of risks on project objective and project constraints (Lavanya & Malarvizhi, 2008).

2.4.5.2.4. Scope Change Management Process

As Millhollan (2008) among the advantages of defining scope is to enhance the certainty that everyone is on the same page nevertheless scope change is inevitable and natural and it is important to understand what is necessary is not to stop scope change, but to successfully manage the change. Furthermore, scope change is an area that often gives rise to most project problems especially when there is no management control exercised over the frequency of scope change requests consequently the scope change process must put some controls or certain level and frequency of change requests in place to track that cumulative history (Wysocki, 2014).

2.4.5.2.5. Milestone trend charts

Milestone Trend Chart is another most effective and clear tool for the supervision of the project progress by enabling the project team and the project manager to visualise if the work corresponding to certain project milestones is ahead, behind or on schedule (Angermier, 2017).In a similar point, the milestone trend chart is best early warning system by providing information obtained timely to analyze and rectify abnormalities as well as it should be part of every monitoring and control process as Wysocki, 2014.

There are several advantages besides early detection of deadline bottlenecks such as concise visualisation of the history and prognosis of milestones; improvement of deadline awareness among project participants and good instrument to document project progress (Angermier, 2017). Generally, Wysocki (2014) suggest by a protection against potentially distressed projects that might need to consider establishing very conservative trigger values, trends, and control limits that hint of potential distressed projects.

2.4.5.2.6. Earned value Management (EVM)

Earned Value Management (EVM) is a project management methodology for objectively measuring project performance using an integrated schedule and budget based on the project WBS (Lukas, 2012). It is a periodic evaluation of the project status, usually on a monthly basis or when a significant change happens to the project (Reichel, 2006).

The analysis is done using planned value (PV), actual cost (AC) and earned value (EV).Planned Value (PV) describes how far along project work is supposed to be at any given point in the project schedule and cost estimate in addition PV is the budgeted cost for the work scheduled to be done to be spent at any given point in time while Actual Cost (AC), is the cost incurred for executing work on a project (Reichel, 2006). The other component is Earned Value (EV), that is the quantification of what the project has accomplished to date and EV is the percent of the total budget actually completed at a point in time (Lukas. 2012).

PV is determined by the cost and schedule baseline while AC is determined by the actual cost incurred on the project and EV is a physical terms that depict what the project accomplished (Reichel, 2006).

Schedule Variance is expressed as the difference between EV and PV. Though SV does indicate the money value difference between work that is ahead or behind the plan and reflects a given measurement method whereas the cost variance (CV) is defined as the difference among EV and AC (PMBOK,2017) .

SV = EV – PV

CV = EV – AC

Variance either SV or CV is equal to 0, the project is on budget; when a negative variance is determined, the project is over budget; and if the variance is positive the project is under budget.

Similarly, schedule performance index (SPI) is the ratio of earned value (EV) to planned value (PV) that describe efficiency on a project at the same time cost performance index CPI is the ratio of EV to AC and it measure of cost efficiency on a project(PMBOK,2017).

SPI = EV/PV

CPI = EV – AC.

If the SPI is greater than 1, the project is ahead of schedule which obviously is desirable; below 1 indicate that the work performed was less than the work scheduled hence, the project is behind schedule. As in CPI is greater than 1, spending less than was budgeted for the work performed as well as CPI will be less than 1 illustrate overspending for the work performed.

2.5. Empirical Literature

2.5.1. Causes of Distress

Different authors see causes of project distress or failure from different perspective. According to (Mochal, 2007; PM solution, 2011; Kliem, 2011; Wysocki, 2014; and Sompura &Roessling, 2019) provide a general summary for the causes of distress in project while other give illustration by categorize the reason for stress into group (Kerzner, 2010; and Alaskar, 2013).

According to Kerzner (2010) the causes of project stress ultimately failure are sorted into three broad categories as management mistakes; planning mistakes; and external influences. The management mistakes are concerned in failure of stakeholder management which comprise allowing lots of unnecessary scope changes, failing to provide proper management for schedule and budget, taking longer time to necessary decisions, not performing proper timely performance monitoring and controlling and ignoring the project manager's quest for help. The next one is the planning mistakes which about not planning for project monitoring and audit, not selecting the proper

tracking metrics and not having a timely “kill switch” or acceptable tolerance limit in the plan when the project overrun in one or more metrics. The final one is the external influences that incorporate failures to assess the social, political, legal, economic and environmental influences over the project.

On the other hand, Alaskar categorize cause for troubled project as: out of project boundaries and in project boundaries (Alaskar, 2013). The categories that fall in the outside project boundaries are generally about sponsor, stakeholders, enterprise, environment or top management mistakes in the project that consists refusing to approve required changes in a well timed manner, imposing new stakeholders in late stage of the project, changes in organizational assets, changes in the business case, change the expected business value of the project. While the second type of mistake is inside project boundaries which result from poor project management and failure to follow the principles as stated in the PMBOK Guide.

According to Mochal, 2007 presents the summary of causes of distress as inadequate project definition and planning; poor scope management; inappropriate work plan management; poor communication; and poor quality management (Mochal, 2007).

As PM Solutions, 2011 the top 5 causes of troubled Projects are the first is with respect to requirements such as unclear requirement, lack of agreement in requirement, lack of priority in requirement and contradictory, ambiguous and imprecise requirement. The second is concerning resource such as lack of resources, conflicts of resource, turnover of key resources and poor planning of resource. The third one is about too tight, unrealistic or overly optimistic schedule. The next one is about problems related to planning as insufficient or missing that can be input data for estimate and poor estimates. Finally, the top cause for troubled project is with regarding to proper risk identification, impact, priority and management. Furthermore, as Kliem (2011) affirms that the cause for stressed project is summarized as poor definition and management of scope as well as requirement; lack of involvement and buy-in of key stakeholders; lack of detail and realism in the project plan; negative conflicts among team members and poor morale; ill-defined assumptions and expectations; lack of people with the necessary attributes (lack

the necessary hard and soft skills); failure to identify or deal with risks; and finally too many dependencies between activities.

Moreover, the reasons for projects to become distressed or fail has been noted by Wysocki as: poor, inadequate, or no requirements documentation and not acknowledging the complexity of requirements, over commitment of staff resources relating to the requirement; inappropriate or insufficient sponsorship, unwillingness to make tough decisions and inconsistent client sign-off, lag time between project approval and kickoff are in relation to stakeholder management ; estimates done with little planning or thought, no plan revision after significant cuts in resources or time and no credibility in the baseline plan with regarding to planning and finally unmanageable project scope (Wysocki, 2014).

In the meantime, as Sompura & Roessling (2019) affirms that the cause of stress or failure in project are under estimating the project; scope creep & change orders; delays; unexpected change or surprise conditions; unclear specification; financing issues; unreliable workers or subs; communication gaps; and lastly improper planning.

Amongst the review literatures , the researcher were able to assess distressed project management, reason behind for project distress and the prevention strategies to notice the early warning signs. Study conducted by Shibeshi, 2019, is one of project work from the studies conducted with respect to distressed project management that tries to assess the prevention management strategy for project distress in Addis Ababa City Road Authority (AACRA) in road construction project. Besides peculiarity of projects by itself, the wastewater treatment plant construction project has major electromechanical (EM) works than a road construction project which creates different context. The objective of this study is to assess the causes of distress and prevention management strategies for wastewater treatment plant construction project in AAWSA. Thus the study is worth doing to call for attention for effective management of distressed project.

To wrap up, understanding distressed management have vital role in enhancing project success. From the above literature, there is various cause of distress in projects and the common causes are issues related to requirement management, scope management, project planning, resource management, risk management and stakeholder management,

they are discussed above. Similarly prevention management strategy including the tools and process are also discussed.

CHAPTER THREE

3. METHODOLOGY

3.1. Introduction

Having a lucid and suitable research methodology plays a significant role in achieving the research objective. This section incorporate the research approach, research design, sample design, method of data collection and data analysis, ethical consideration the research validity and reliability and finally the limitation of the study of the study are illustrated in this section.

3.2. Research Approach

Qualitative approach is used to achieve the objective of the research. Qualitative research ensures obtaining profound understanding of the case from the perspective of the key informants being studied (Creswell, 2014). This approach enable to ask open questions, to discover what is taking place and get enlightened about a topic of interest which is about managing distressed project (Saunders et al, 2012).

3.3. Research Design

To accomplish the objective of the research, to assess the cause and prevention of distressed project management, is carried out using descriptive type of research. Descriptive type of research is useful in the mapping out of a circumstance, situation, or set of event (Creswell, 2014). As another author John et al. 2007 state the purpose of descriptive research is simply describing phenomena. The research uses a case study type of strategy that is going to be under taken for PWTPESC-II in AAWSA.

3.4. Target population and Sampling

Two wastewater treatment plant constructions had been implemented by AAWSA executed using the same however due to availability of information and willingness of the project teams PWTPESC-II was selected. The target population for this research is mainly the managers, representatives and/or team leaders from the client (AAWSA project rehabilitation office); contractor (JV. Mesogeos S.A-Devise S.A-Technova Ltd.); and consultants (HYWAS Engineering Consultants) that are involved directly in delivering in AAWSA. The necessary data are collected using purposive non probability sampling technique with six interviewees, each two interviewees from all the main parties

that are the client, consultant and contractor. The purposive sampling technique is used because the research needs someone who has rich information on what happened during the project life time. The interviews were conducted from May 16, 2020 up to May 26, 2020 with aid of sound recorder to facilitate the interview. The interview was transcribed from audio voice recorder in to written format using computer. Since the researcher does not work in any of the institution it helps in minimizing bias.

3.5. Data Collection

To achieve the objective of the research both primary and secondary data were used. The primary data are collected through semi structured interview with key informants of the client, contractor and consultant. The secondary data was gathered from numerous unpublished documents such as reports and other necessary materials that are collected from the client the contractor. The secondary sources are integrated with the primary sources so that the research became comprehensive enough to incorporate all elements of the phenomenon under study.

3.6. Data Analysis

The narrative analysis is used for the analysis of the primary and secondary data that are gathered using interview and document review. According to Parcell & Baker, 2017 narrative analysis is a genre of analytic frames whereby researchers interpret stories that are told within the context of research and/or are shared in everyday life. Furthermore, the document review was used to underpin the analysis by referring different documents that are collected from the client and contractor official reports.

3.7. Research Validity and Reliability

Ensuring the quality and credibility of the research is significant for the research to be useful in the scientific community; the study is given due care for both reliability and validity in the research process and generating the research output.

The research is conducted using different data collection instruments such as interviews and document reviews from stakeholders that helped in eliminating bias and enhances reliability. Afterwards the result and findings of the study are displayed by triangulating the collected data as one way of conforming the validity and reliability.

3.8. Ethical Consideration

The data was gathered following moral and ethical principles. All the primary and secondary data is going to be collected with the full consent of the respondents. The data collected will be strictly confidential and only used ethically for the purpose of the research.

CHAPTER FOUR

4. DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1. Introduction

This section deals with the analysis and interpretation of data collected from the interviews and document review and finally the discussion. Responses for the set of objectives are presented narrations that are easy to understand.

4.2. Response Rate

To achieve the purpose of assessing the cause and prevntion of distress project management in AAWSA, six interviews were expected however only the five interviews were successful. One interviewee was not conducted due to Covid-19 pandemic the key informant were not available at the office. However the researcher had collected sufficient data from the five interviewees so the researcher proceeds with the analysis.

4.3. Background information of Respondent

The background information of the participants incorporates the sex, age, educational status, position and work experience in the project. As it is shown in the Table 4.1, there are four male and only one female participants who are 80% male and 20% female interviewee. For the age group category, 40% (n=2) of the respondents are under the age of 30, while the other three categories from the range of 31-40 years, 41-50 years and more than 50 years age group each consist one participant (20%). Educational status is one of the most vital characteristics that determine the response of interviewees the Table 4.1 depict that 60% (n=3) of the participants has masters degree while the remaining 40% of the interviewees has bachelor's degree. The current positions of the interviewees are resident engineer, project manager, construction manager, supervisor and project team leader each consisting 20% (n=1). The final characteristic in the background information of the participants is the work experience of interviewees in the project which plays imperative role to get reliable data for the research. Most of the interviewees (n=4, 80%) have more than 5 years experience and the remaining one (20%) is under the range of 2-4 years work experience. From the Table 4.1 implies that all the key informants are matured educated and have excellent experience to provide accurate information in reference to the project.

Table 4.1 Background information of Interviewees

Description	Frequency	Percentage %
Sex		
Female	1	20
Male	4	80
Total	5	100
Age		
<30 Years	2	40
31-40 Years	1	20
41- 50 Years	1	20
>50 Years	1	20
Total	5	100
Educational Status		
BA/BSc	2	40
MA /Msc	3	60
PHD	-	-
Total	5	100
Job Position in the parties		
Resident Engineer F	1	20
Supervisor	1	20
Project manager	1	20
Construction Manager	1	20
Contract Administrator	1	20
Total	5	100
Work Experience in the project		
< 1 Year		
2-4 Years	1	20
5-6 Years	4	80
Total	5	100

Source: Own Survey, 2020

4.4. General Information of the Project

According to the collected document and conducted interview the general information of the project is presented below. The name of the project is Package Wastewater Treatment Plants Electromechanical Supply and Civil work construction Lot-II, (PWTPESC-II) and its objective is to treat domestic waste water that is collected from condominium housings through conventional sewerage systems. The main purpose of wastewater treatment

plants construction is to contribute for the improvement in the sanitation condition, to recycle and use the wastewater treatment for urban agricultural and construction around Addis Ababa by operating and maintaining, seven membrane bioreactor (MBR) wastewater treatment plant by upgrading the skill and capacity of AAWSA to carry out. The 7 MBR wastewater treatment plants are located 3 in different places the sites are in at Tullu Dimtu 3 sites , another 3 sites at Bole Arabsa, and 1 site at Oromia condominium. The wastewater treatment plants had capacities ranging from 1000 up to 4300 meter cube per day (m3/d) and a total of 16,660 m3/d.

The project used the design build project delivery method. This type of contract is suitable for lump sum contract which the price given by the contractor is fixed when the design is finished and the scope of the project is clearly known. The main parties involved in the project are: the owner of the project is AAWSA project rehabilitation office; while the contractor JV. Mesogeos S.A-Devise S.A-Technova Ltd. and the consultant who is HYWAS Engineering Consultants. The main contract considered is between the contractor and client by international competitive bidding.

The scope of the project was to design, EM supply and installation, civil work construction, testing, commissioning including the six months of operation and maintenance.

The project agreement was signed on August 21, 2014 and the original schedule of the project was 350 calendar days. The contractual work had been completed on 15th of September, 2018 including the six months of operation and maintenance.

The total original cost of the project was 497,954,213.53 Ethiopian Birr (ETB) without VAT which is equivalent to18,527,632.66 Euro.

4.5. Characteristics of Distress in PWTPESC-II Project

The characteristics of distress project are expressed as: when one or more project performance metrics exceed more than the acceptable tolerance limit; when the project has exhibited a performance trend that, if continued result in failure; and significant change faced in during the life time of the project execution.

As the key informants from consultant affirm that the project had exceeded in one or more performance metric such as in schedule and budget. All the other key informants from client and contractors also confirm that some project performance metrics had gone beyond the baseline plan. The interviewee's from the client side exact words were "there was more than 10 times a request for time extension." Similarly, the cost overrun was for the client and the contractor. Both interviewees from the consultant affirm that they had renewed their contracts several times. All the key informants agreed, since the main contract was lump sum therefore there was no additional cost that the client incurred with the main contractor however the client had paid the consultant additional money after the first contract. From the interview with the contractor and con sultant respondents, it was also remarked that the contractor had suffered from cost overrun. The contractor had paid additional cost for the subcontractor, personnel and other costs from unforeseen conditions that arise during the implementation of the project. The same was true for the client that, there were variation works that was executed by another contractors. The document reviewed depicts the same idea that the original schedule of the project was 350 calendar days excluding the defective liability period. The contractual work was signed on August 21, 2014 and it had been completed on 15th of September, 2018 including the six months of operation and maintenance.

According to the conducted interview, the key informants from the contractor affirm that there was significant change that occurred in the life of the project. The first significant change was turnover of project country director was changed twice from the contractor while execution of the project. In addition the project has faced high risk exposure. His words were "because unanticipated subsoil condition was found that had brought one of the major scope changes." He also emphasised that "due to this unforeseen condition the project was delay for a year and incurred additional cost."

From the conducted interviews with the key informants, there is no fixed tolerance limit set by the main parties to call for project distress however the duration of the extended time was more than fourfold from the original schedule. In reference to the additional cost incurred, the project had reserved 10% contingency costs although with the good will of the contractor, the contractor did not demand the client for extra incurred costs

due to unforeseen conditions such as unsuitable subsoil condition and others. However when there are scope changes the client brought additional new contractors to execute the work particularly to the civil work that made the client to face cost overrun under one project.

The conducted interviews indicate that the project has been in distress for some period of time. After confirming the project was in distress condition for some period of time, the next discussion topics is what cause the distress in the project.

4.6. Main Cause of distress in PWTPESC-II

According to the conducted interviews and document reviewed several causes of distress were identified theses are: selection of inappropriate technology; lack of cash flow and economical inflation; poor planning; issue related with scope change management; issue related to resource management; and improper risk management. However, it should be noted that the causes of distress are not exclusive rather there is exist interdependence among them.

4.6.1. Selection of inappropriate technology

The most crucial decision in construction of wastewater treatment plant is selecting suitable technology with respect to the context of the project. Both the consultant and the contractor agree that the MBR technology is inappropriate in reference to the local condition. The consultant interviewee exact words were, “MBR technology is not suitable with regarding to high operation cost; lack of skilled manpower to operate and maintain the plant, high demand of power supply and shortage of spare part availability for maintenance rather waste water stabilization technology that fits for tropical countries as Ethiopia however it demands intensive land with minimum operation cost.”

From the conducted interview with both the contractor and consultant indicate that the MBR technology, that was the latest technology of the time, consist intensive electromechanical equipment that demands high amount of power supply. But the frequent power supply fluctuation and shortage had brought other breakage of EM equipments simultaneously when the plant stop the process, it the domestic wastewater is discharged into the environment also produces pungent smell. Similarly, the contractor also affirm that the EM equipment have maintenance break time and when the project

took more time than anticipated, another additional costs was incurred because of the maintenance. The interviewees' exact words were that "EM equipment maintenance break time pass due to the time extension for the project and the additional cost incurred estimated to be one million birr for equipment and 500,000 for personnel."

As per the contractors view, technological dependency is another issue that comes with selection of technology, maintenance of EM equipments are not available in the local market therefore spare parts are all imported material and cannot be easily maintained.

The client states that the main reason at the time of technology selection was that MBR technology consume less land than other technology with a good capacity and high quality of effluent. The interviewee emphasise that Addis Ababa has high rate of urbanization and a compacted population density therefore the MBR technology was appropriate for less land consumption with higher plant capacity. However the interviewee affirms that the authority does not have experience in operation and maintenance of conventional wastewater treatment plants.

The AAWSA report illustrate that the client does not have the required skilled manpower, tools and resources to carry out the operation and maintenance activities which include among others operation of the plants in most efficient and safe way while meeting the performance standards. Moreover, the technologies and processes (MBR) that are introduced at the various plants are also new to the Authority. Currently the client is conducting a study to outsource the operation and maintenance of the plant.

As 70% of the project consists EM equipments, for all EM equipments to work properly it require auto machine programs. Therefore, guest professional was brought to develop the auto machine programs. After the program was developed there are times when the program fail or be corrupted due to several reasons. Furthermore, the project also suffered from lack of skilled professional to operate and maintain the project. As all main parties interviewees agreed that to fulfill the knowledge gap of the new technology the contract had to provide training and skill upgrading for the staff on how to make the wastewater treatment plant operational. Despite the fact that the consultant had identified the

prerequisite for that should get the training, the training was not given to the right personnel this had created a gap on how to operate the treatment plant.

4.6.2. Lack of Cash flow and economic inflation

As the interviews with the contractor indicate economic inflation was the other cause of distress for this specific project. The contractor state that the project cost was paid 30% in ETB and 70% in Euro. Unfortunately, the Euro currency rate became very high relatively to the initiation time of the project execution. The Euro the contractors brought a huge amount of Euro to aid the project and the Euro was not able to take it back due to the scarcity of the foreign exchange. Therefore, the contractor was forced to wait for payment of ETB from the client. The client interviewee affirmed that since the contractor was an international contractor, they faced shortage of ETB in order to solve this problem the client and consultant had agreed to pay the contractor by dividing the work in percentage and gain ETB particularly for the civil work in spite of the fact the payment will be done at the end of the project.

The other issue raised by the contractor there was disagreement between contractor and subcontractor that lead to litigation process where the contractors' bank account was frozen for not less than six months. The client was not paying the contractor and either the contractor was not able to withdraw ETB from their account therefore the project had suffered from lack of cash flow.

Critical material such as cement and reinforce bar price rises more than twofold in the market at construction stage of the treatment plants. As the interviewee said the treatment plant needs enormous amount of reinforced bars and cement that affected the budget of the project.

4.6.3. Issue related with Scope change management

According to the contractor key informant, there were few scope changes in the project PWTPESC-II however all the scope changes did not affect the project performance metrics. The very few scope changes that affected the project performance metrics and expressed in the schedule and the budget were given emphasis. The interviewee expressed one of the scope changes as "while working on the excavation work in one of

the site, unexpected hard rock was found that was not even operated by jack hammer so there was design change for the route of the pipe line." This scope changes had led to suspension of the specific site work and to incur additional cost that do not brought any value.

The other significant scope change was with regarding to the pipe network, the collected wastewater are expected to enter the plant with gravitational system (water falls from higher ground level to the lower ground level) but the inlet level of the treatment plant were found to be higher than the pipe level by 2 meters therefore the plant can no longer use gravitational system therefore it needed additional pumps. Hence additional pump means addition of extra activity that affected the budget as well as the schedule.

As it is stated in the scope of the project, the project was handover to the client after 6 months of operation and maintenance period. In reference to this, a major scope change was the necessary chemicals that are used in treating the wastewater were not included in the contract. For this reason the chemicals were included in variation contract for the contractor to supply and the chemicals were imported materials. According to the contractor side interviewee "this major scope changes had made the project to delay for about six months and around three million ETB." From this it could be understood that the scope changes had been a cause of distress in PWTPESC-II project.

4.6.4. Poor Project Planning

As the interview conducted with the consultant explain the original project plan had poor estimation of cost, resource and schedule. It is said by the consultant interviewee that "the project plan was done by in experienced personnel without considering the local factors." It is also said that the client had developed an ambitious plan with adoption of new technology that makes the plan very poor.

Similarly, the interviewee from the contractor side supported the consultant by saying the client has set the estimations of cost, time and major resource that are required with no prior experience. Since the project has adopted a new technology and the client had developed an ambitious plan that was unattainable.

The estimation of time including the entire project tasks in the scope within 350 days were including the design, electro mechanical materials were all imported that include the logistic process, installation, testing, operation and maintenance and finally commissioning.

The client had also admitted that the project plan was ambitious and project risks were not given enough emphasis. She also stated that due to the poor estimation of the schedule several time extensions were in place and guaranteed according to acceptable reasons. As the interviewee from the consultant also indicated that there were two sorts of reasons in requesting time extension that are the external reasons and contractors problem. Among the external reasons requested for time extension were delay in solving right of way (ROW) problem by client and completion of incoming sewer line; rectification work on the incoming sewer line that is handled by Addis Ababa Housing Development Project Office (AAHDPO); delay in carrying out electric power source for treatment plants; delay in leakage test at 3 sites due to absence of wastewater supply; shortage of some fittings; construction of effluent outlet at ROW problem; and delay in construction inlet by AAHDPO are some of them that are gathered from secondary documents. Furthermore, the few of contractors problem were delay in concrete casting for some part of treatment, performing water leakage test on civil structure, site work with concrete plat forms and installation of EM items at different sites; delay in installing electrical transformers; to not be able to receive wastewater due to lack of readiness and to re-install EM items in the new inlet in good way.

The client interviewee had said that "Despite the external reasons, with contractors problem the contractor would have go through liquidated damage and might end up paying up to 10% of the project budget." After that the next thing will be to terminate the contractor under the given situation it is very hard to find another contractor that will finish the project and entering another international contractor will bring enormous challenge to finish the project. Her exact words in expressing the condition were "finishing the project would have been day dreaming." She had also emphasized that the contractor were generous enough not to ask reimbursement for extra cost they incurred which might be as equal as the liquidated damage.

Correspondingly, the contractor of the project had also highlighted that the plan does not incorporate risk management plan. As the conducted interviews and gathered documents depicted that poor project planning had been one of the causes of distress.

4.6.5. Issue Related to Resource Management

From the conducted interview with the contractor, the project has numerous EM items which were imported goods. Some damage to equipment occurred while transporting and theft from the ware house of the project had led to loss of equipments. The interviewee exact word was “replacing the damaged and lost equipment was very tough since the contract does not include spare part items.”

As all the interviewees explained that lack of awareness had led to breakage of equipment by saying “the public awareness with regarding to how to dispose waste is very low and an open manhole seems like an open garbage can.” They also stated that “ head of sheep was found at the inlet of the treatment plant that came through wastewater treatment sewer ends” at the time of operation. Particularly, the consultants’ key informants also showed concern about misuse of open manholes in the vicinity dwellers dump a big size solid waste that came through the sewer line in to the treatment plan: blockage of the line to the treatment plant in addition overflowing of wastewater through the nearby manholes and directly to the environment; furthermore EM items were damaged and operation were made difficult.

The power required to run the treatment plants were massive that each the phases require 230KW for each with 3 phase power supply were required. Until the power supply line was provided the treatment plants was suspended for four months. The contactor interviewee states that the provision of power was the clients’ responsibility which was not delivered on time.

Lack of skilled personnel that design the auto machine program and personnel that can operate and maintain the wastewater treatment plant had caused a project to delay for a while.

4.6.6. Issue related to Stakeholder management

As the contractor and consultant interviewees' agreed that it takes longer time for the client to take tough decisions. They have said that the client has AAWSA head quarter and project rehabilitation office. The AAWSA project rehabilitation office has responsibility to manage all aspects of the projects under the AAWSA headquarter. According to the interviewees with the contractor and consultant show that when AAWSA project rehabilitation office request for decisions concerning issues that arise in the project the AAWSA head quarter takes longer time that resulted the project to be in distress.

As the client interviewee stated that there was no formal stakeholder management however the stakeholders of the project are commonly known and a habitual practice is in place. On the other hand the contractor interviewees implied that the contractor had assigned personnel that manage the routine activities as well as issues related to stakeholder however the contractor had also followed the customary practice of the client.

As the contractor interviewee testified there were time where some complaints among farmers who face ROW issues and been victims of the wastewater overflow on the surface and damage a farm. Correspondingly, communities around the site had complaints about the smell however this happens only when the treatment plant is not working mostly due to power supply shortage. All issues were not reimbursed and handled informally. Luckily, these issues had influence the project for not more than week. Similarly, issues related to stakeholder management had influenced the project to become in to distress.

4.6.7. Improper Risk Management

According to key informant from the consultant, there was no risk identification and analyzing the probability of occurrence and the impact of the risk on project. In the life of the project was exposed to several risks that were mitigated in a reactive manner that had led to schedule slippage.

Similarly as the interview conducted with the contractor, there was no risk management plan in the beginning of the project. Since the project involve wastewater there are issues

related to safety and health risk that the effect is seen in a long term such risk were overlooked and no measure was taken until the project handover.

4.7. Prevention management strategy of distress project in PWTPESC-II

Prevention management strategy is proactive method to prevent project stress using different tools and process such as: requirement gathering, construction of WBS, scope change management, dynamic risk management, milestone trend, EVM were identified by the literatures. Here the prevention management strategies tools and processes are presented.

4.7.1. Requirement Gathering

According to consultants' key informant said that the requirement prepared by the client was lucid, detailed and completed at the initiation stage of the project.

The contractor interviewees indicated that the project had adequate requirements that are essential to the design project. The client had already selected all the site locations and the technology to be used. As the interviewee from the client office affirmed that the client had a good requirement document that was used as guideline.

Correspondingly, as the interview with the client illustrated that, the client had the requirement documented with sufficient details that was used as guideline.

4.7.2. Construction of WBS

As the interview conducted with the contractor illustrate that before execution of any project work breakdown, resource breakdown and cost break down is carried out. As the document gathered from the contractor showed that the WBS structure contains the starting and ending time of the activities, required resource and estimated cost. Based on the WBS, activities are carried out. After execution of the work any variance is recorded and reported to the management with justifications. According to the interview conducted with the consultant showed that, the starting and ending time for activities are updated always as time extension is approved.

Thus, it could be said that there was a complete WBS which is done that include all the activities and tasks with their deliverables.

4.7.3. Scope Change Management Process

As the client interviewee indicated that the contractor had excellent experience with regarding to designing and constructing wastewater treatment plants which had made significant contribution in reducing the number of scope change although there were no established scope bank that show the frequency and cumulative of scope change. The consultant and the contractor interviewee had also agreed that there was only some

4.7.4. Dynamic Risk Management plan

All parties' interviewees had agreed that there was no comprehensive risk management plan. They testified that there was no prior identification of risk, analysis of risk (qualitative and/or quantitatively) and mitigation response however risks were managed in reactive manner except safety condition. The consultant interviewee point out that due to the reactive way of risk management practice, it had taken longer time to provide the right risk response.

4.7.5. Periodic reporting and review

As the interviewee expressed that the contractor had used one sheet daily report, weekly and monthly that is used to assess the progress of the project. The document reviewed from the contractor show that the report has contents such as description of the work, units of the work, total previous executed work, current executed work, total up to date executed work, the percentage of work executed and any remarks. The contractor also affirm that the contractor also submit weekly report for the consultant too.

As per the interview conducted with the consultant, the consultant had formal daily inspection of the sites and based on the received weekly report they prepare monthly report for the client. The client also affirms that the reporting system collected from the consultant was on timely basis.

Besides the periodic reporting system, periodic reviews were conduct in four month and whenever it was necessary that involve all main parties. According to the contractor key informant, main parties were brought to together for site inspection, observe the status of the project and to conduct meetings concerning issues at hand meetings whenever there were scope changes, amendments and other unforeseen situations happen. However, there

were no reviews done with the involvement of other stakeholders (besides the main parties).

Moreover, as the interviewee from contractor stated that, in order to prevent distress that arise from lack of skilled personnel; prior to the operation trainings were provided by the contractor for both contractors and client personnel in the in the country and abroad even though it was not effective in filling the knowledge gap.

Therefore from the conducted interviews done with key informants and document reviewed the project used different prevention management strategy. These prevention management strategies were requirement gathering, construction of WBS, used periodic reporting and reviews, and provision of trainings. However there were no established scope change management and dynamic risk management process. At the same time there was no use of milestone trend chart as well as EVM usage.

4.8. Discussion and interpretation

4.8.1. Characteristics of distress in PWTPESC-II project

The project has exhibit the following characteristics in its life time. The PWTPESC-II project performance metrics were beyond the baseline plan. As the result display the project schedule had exceeded four times more than the original schedule and there was more than 10 times request for time extension. In addition the project had depicted that there was budget overrun. According to the collected data, most of the extra incurred cost was due to extension of time and other unforeseen conditions. At last the project has gone through major changes in its life time such as change in key personnel and it was exposed for high risk. Even though there is no fixed acceptable tolerance limit, based on the conducted interview and documents reviewed it could be said that the project was in distress condition because the project has exhibited the characteristics of distressed project. As Alaskar (2013) agrees that distress projects has feature as one or combination of metrics exceeds the acceptable tolerance limit that could lead the project to fail. The other indication of distressed project is significant change faced that may result in distress or failure (Wysocki, 2014).

4.8.2. Cause of distress in PWTPESC-II Project

There was several cause of project distress that is identified under PWTPESC-II Project in AAWSA. Each of identified causes of distress in PWTPESC-II project is discussed as the following.

As result of the collected data show that MBR technology, the latest technology at the time of the contract, is not suitable technology with regarding to high operation cost; lack of skilled manpower to operate and maintain the plant, high demand of power supply and scarce spare part availability for maintenance. From the data it could be said that selection of unsuitable technology had brought the project a cascading effect that resulted the PWTPESC-II to be in stressed condition. Selection of appropriate technology is generally recognized as encompassing technological choice and application that is small-scale, decentralized, labour-intensive, energy-efficient, environmentally sound, and locally controlled (Hazeltine et al. as reported in Oladoja, 2017). Similarly, as Sianipar et al. (2013) remarks that appropriate technologies have features such as low cost, low usage of fossil fuels, and use of locally available resources can give some advantages in terms of sustainability. According to Wysocki, 2014 if a project will use the latest and greatest technology, main parties might not be equipped from a staffing perspective, and the project will be exposed to staff shortages or become too dependent on outside vendors that lead to stressed condition.

In addition, lack of cash flow and economic inflation had been identified as a cause of distress in PWTPESC-II project according to the gathered data. The data illustrate that the contractor faced lack of cash flow in ETB due economic inflation as well as financial sanction from the court that create total dependency on the client. As Wa'el Alaghbari support that factor of poor economic conditions such as currency and inflation rate would significantly give impact to project's cash flow, and hence affect the timely performance of the project (Wa'el Alaghbari as stated in Abdul-Rahman, et al. 2009).

Scope management is a common area for project distress or failure. As the result illustrate, there were few scope change that affected the project performance metrics these are unforeseen sub soil condition that led to design change, variance in design and actual condition that end up in design modification to get the deliverables and the

requirement for chemical supplies that resulted in variation contract. As Millhollan, (2008) noted that scope change has the ability to influence a project outcome in either good or bad ways. According to Vargas, 2007 scope change in a project that has significant impact on project and could be probable cause of distress.

Poor project planning is one of the causes of project distress. Project planning includes estimation of resource and budget and building schedule and poor project planning is reflected on the schedule and budget of the project. As the result illustrates that the PWTPESC-II had poor planning due to preparation plan by inexperience personnel and not considering the context of the project. Poor estimates or improper planning that are expressed in tight or inflexible schedules are normal in construction projects as result a project can take longer time and cause cost overruns (Mochal, 2007). Correspondingly, it had been by authors is that lack of qualified team, that is unreliable team, is a recipe for disaster when it comes to construction projects (Sompura and Roessling, 2019).

Thus from the collected data show that replacing damaged and lost equipment was difficult, power supply shortage and lack of skilled personnel had influenced the project to be in distress. Lack of resources is among one of resource management issues that is listed as a cause of distress (PM Solution, 2011). Likewise, inadequate resource; inability to procure required resources, materials and supplies; and delays in delivery and are reason for inadequate project execution and operation that contribute for ultimately failure developmental projects (Rondinelli,1976). Similarly, lack of expertise, experience, resources for maintenance, lack of training, etc are mentioned as prominent cause of distress ultimately failure in developmental projects (Okereke,2007).

Taking longer time to take tough decision and none existence of formal stakeholder management were identified from collected data to be cause of stress in PWTPESC-II projects. Correspondingly, it had been agreed by Wysocki that unwillingness to make tough decisions is one of the issues emphasized with regarding to stakeholder management that leads to distress (Wysocki, 2014).

4.8.3. Prevention management strategy from distress in PWTPESC-II project

The PWTPESC-II project had used different prevention management strategies such as requirement gathering, construction of WBS, scope change management process and periodic reporting and review.

The data collected show that there are well detailed and completed requirement document that was prepared in the initiation stage of the project. An author support that solid requirements document also serves as a guide to development and testing throughout the project that show (Smith, n.d.).

Thus the conducted interview and document showed that the WBS used in the project was clear and complete. The WBS used contained the duration and schedule of activities, required resource and estimated cost. As Rev, 2003 noted that all the work contained within the WBS is to be identified, estimated, scheduled, and budgeted. From the WBS used in the PWTPESC-II project was detail with the necessary information that enable to track the schedule.

There were very few major and minor significant scope changes. The data showed that there were no established scope bank that depict the frequency and cumulative of scope change which scope changes will be tracked. However, as Wysocki, 2014 there should be management control exercised over the rate of scope change requests subsequently the in place to track that cumulative history.

The result depicted that there was no comprehensive risk management plan that include identification of risk, analysis of risk (qualitative and/or quantitative analysis), and response plan. Even though the PWTPESC-II project does not used dynamic risk management plan, it is believed to be the finest mechanism to prevent project from becoming distressed that is metrics-driven risk monitoring and control process (Wysocki, 2014).

Periodic review and report was used to track progress of the project based on the conducted interview with all key informants. As the result illustrate, in the PWTPESC-II project there were daily, weekly and monthly reports within the contractor, likewise the contractor also submit the executed work report monthly besides the frequent inspection

of the work. Furthermore, the consultant also reports to the client on the basis of the contractors report. In addition to the above tools and technique the PWTPESC-II project had been using period review and reporting to monitor the project progress. As Sompura and Roessling, 2019, stated that it is critical to include continuous monitor in the project plan to closely examine progress so that delay and cause cost overruns can be minimized. Moreover, trainings were provided to resolve lack of skilled personnel to operate maintain the project before the starting of operation.

CHAPTER FIVE

5. Conclusion and Recommendation

5.1. Introduction

This section is the last part of the research paper that provides the conclusion and recommendation. The conclusion for the study is anchored in the results, discussion and interpretation. The researcher had concluded that the cause and prevention of project distress in Addis Ababa city should be improved. More over based on the conclusion, recommendation are suggested.

5.2. Conclusion

The paper had analyzed the cause and prevention of distress project in AAWSA on PWTPESC-II project. The paper is vital for the main parties involved as well as to the others stakeholder to provide insight about how to identify stress in a project and its cause subsequently to enhance project success by preventing it and recognizing early warning signs.

Characteristics or indicator of distress in project had been identified that helped in understanding the status of project. Among the indicators of distress, the PWTPESC-II project had shown more than one project performance metrics went beyond the baseline plan that are the schedule and budget. Likewise the project had also gone through significant change in its life time.

Accordingly, the result of data in PWTPESC-II project, there had been various cause of distress in project which threw the project off course. These are selection of inappropriate of technology; lack of cash flow and economical inflation; poor planning; issue related with scope change management, issue related to resource management, improper risk management and issue related to stakeholders management were identified. However some of common reasons for distress where not cause of distress in PWTPESC-II project these are issues related to communication, quality and others that indicate that peculiarity of project distress with respect to the project context.

There are different prevention management strategies that had been used to prevent project from getting in to troubles hence the PWTPESC-II project had used few of the

tools and process amongst are requirement gathering, construction of WBS and periodic review and reporting nevertheless the project had not used the finest ways of prevention tools and process such as the dynamic risk management process, the EVM and milestone trends consequently the project had failed to recognize the early warning signs and take the necessary actions timely.

5.3. Recommendation

The assessment on the cause and prevention of distressed project management was very limited in terms of scope and time. In light of the above conclusion, the researcher makes the following recommendation to address the key constraints identified by findings:-

There was several identified cause of distress in the PWTPESC-II project AAWSA that are selection of inappropriate of technology plays a significant role. Before implementing latest technology there must be well detailed feasibility study in reference to the local condition. In order to minimize the cascading effect of the technology the necessary preparation before execution of the project must be in place such as issue related to resource. The necessary material, equipment and personnel must be estimated in detail with the possible way of acquiring them. Whenever there is a gap or confusion in how to acquire the resources; practical strategies, with regarding to the time, cost and other consideration, should be developed on how to acquire the resources in temporary and permanent way. The provision of training should be in a continuous manner as well as starting from the execution of the project for the right competent personnel who will be responsible in operating the treatment plant even after the closing of the project.

Likewise, the poor planning are another cause of distress. In order to minimize the impact, proper planning, planning must be done with experienced personnel with sufficient data and the project plan should be incorporated with monitoring. The project planning should also be conducted by gathering the necessary primary data and secondary data to estimate the schedule according to the current market condition of the resource.

Furthermore for the cause of distress that arises from improper risk management. A comprehensive risk management plan, which is metric driven and be monitored, that

incorporate the identification of risks with prioritization as well as analysis of the impact and probability of occurrence and possible mitigation should be in place. Similarly, formal stakeholder management plan should be prepared that incorporated that includes identification of stakeholder, communication, monitoring relationship and reviewing the project status. The stakeholder management process should also encourage proper amount of stakeholder involvement to promote swift decision making and accountability.

Besides using the requirement gathering, construction of WBS and periodic review and reporting other effective prevention management strategy tools and process should also be used such as the scope change management, dynamic risk management process, EVM and milestone trend chart. Mainly the dynamic risk management process should be in place since it is the best way to recognize early warning system prior to the starting of the execution process. Quantitative tools and process such as EVM and milestone trend charts are also play vital task in recognizing the performance progress of the project therefore the client must enforce using several effective prevention management strategy tools and processes.

Due to the limited time and scope of the study, it is better for further studies to conduct identification of the root cause of the study. Furthermore, the study is conducted using qualitative approach that gives deeper insight and minimizes its ability to be generalized. Subsequently it is imperative to use the mixed approach in order to determine the root cause of distress and effectiveness of the prevention management strategies of distressed project.

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Appendix 1: Interview guideline

Date_____

Institution _____

Position_____

1. Describe the general information of the project, what is the objective of project? And why it is necessary?
2. What is the original budget and schedule? What is the current status of the project?
3. Is there a fixed acceptable tolerance limit with regard to different metrics (i.e. cost, time, scope (frequent and major), quality) and what does the project performance metrics look?
4. Was there any significant change during project execution (turnover of important personnel, withdraw of sponsor, increase in risk exposure)?
5. What were the causes for project distress?
6. How was the requirement documentation with regarding to completeness and detail?
7. How was the scope management in the project?
    a. Was there a scope creep and scope change? Was there significant impact that due to scope management on performance metrics?
8. How was the project planning of the project?
    a. How was the estimate for cost, schedule and resource?
9. How does the resource management look like in the project? Was there scarcity of resource or contention of resource and other issues influence the project performance metric?
10. How was the communication among client, contractor, and consultant and within project team? Was there conflict of among teams?
11. Was there a proper stakeholder management analysis (identification, communication, monitoring relationship, review project status)?
12. How was risk managed in the project? Was risks identified, analyze and mitigation response in place?

13. How the procurement process was in the project and did it has an effect on the project?
14. How was quality assessed in the project? Was there a time quality had been influence cause of time or cost?
    a. What external environment factor affected the project (market, technology, economy, political and legal) how did it impact the project?
15. What was your organization‘s strategies to prevent projects from becoming distressed?
16. Was there a clearly defined requirement management?
17. What was the process used to prepare a complete and clear work breakdown structure in place starting from the beginning? Detail deliverable? Considered in estimating the schedule and budget?
18. Was there comprehensive risk management plan in place containing identified risk, analyzed and with response plan?
    a. Was the implemented risk response plans, track identified risks, monitor residual risks, identify new risks, and evaluate risk process effectiveness?
    b. Was there a continuous updating of the risk response plan and strategy as well as assignment of risk response owner (from management or selected from project team)?
19. Was there well- defined (detailed) and well managed scope change management process in place?
    a. How many scope changes were there during implementation and did it affect any of the performance metrics?
20. Did you use quantitative method to track project performance with planned budget and schedule?
21. Any additional points