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**ADDIS ABABA UNIVERRSITY**  
**FACULTY OF BUSINESS AND ECOCOMICS**  
**SCHOOL OF COMMERCE**  
**DEPARTMENT OF PROJECT MANAGEMENT**

**DETERMINANTS OF TIMELY COMPLETION OF ROAD CONSTRUCTION  
PROJECT (THE CASE OF ROAD CONSTRUCTION PROJECTS UNDER  
DEFENSE CONSTRUCTION ENTERPRISE)**

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**A Research Project Submitted to the School of Graduate Studies of Addis Ababa  
University for the Requirement of Partial Fulfillment of the Award of Master of  
Arts in Project Management**

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**ADDISABABA UNIVERRSITY  
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**Title:** “Determinants of Timely Completion of Road Construction Project (The case of Road Construction Projects under Defense Construction Enterprise)”

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## **Statement of Declaration**

I, ***Teshome Regassa Tolossa***, declare that this work entitled “Determinants of Timely Completion of Road Construction Project (The case of Road Construction Projects under Defense Construction Enterprise) is outcome of my own effort and study and that all sources of materials used for the study have been duly acknowledged.

I have produced it independently except for the guidance and suggestion of the research Advisor. This study has not been submitted for any degree in this University or any other University. It is offered for the partial fulfillment of the degree of Masters in Project Management [PM].

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Date \_\_\_\_\_

**Advisor: Dr. Abraraw Chane**

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Date \_\_\_\_\_

### **Statement of Certification**

Here with, I state that Ato Teshome Regassa has carried out this research work on the topic entitled “Determinants of Timely Completion of Road Construction Projects (The case of Road Construction Projects under Defense Construction Enterprise)”under my supervision. This research work is original in nature and has not presented for a degree in any university, which all sources of materials used for the study have been duly acknowledged and it is sufficient for the partial fulfillment of the degree of Masters in Project Management [PM].

---

Advisor: Dr. Abraraw Chane

Date: \_\_\_\_\_

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## ***ACRONYMS***

UNDP	United Nations Development Program
GDP	Gross Domestic Product
DCE	Defense Construction Enterprise
ISIC	International Standard Industrial Classification
UN	United Nations
EEA	European Economic Area
MoFED Development	Ministry of Finance and Economic
BC	Before Christ
EC	Ethiopian Calendar
ADLI	Agricultural Development Led Industrialization
MoWUD	Ministry of Work and Urban Development
UNEP	United Nations Environment Program
PMI	Project Management Institute
CPM	Certified Property Manager
TMTT	Target Mark Time Tag
RDT	Resource Dependence Theory
TOC	Theory of Constraints
AWP	Annual Work Plan
EVM	Earned Value Management
PMB	Performance Measurement Baseline
RII	Relative Importance Index
PhD	Doctor of Philosophy

## **ABSTRACT**

*Completion of projects within schedule is a major contribution towards the competitive edge in organizations. This is based on the realization that the achievement of the targeted objectives is determined by the ability to deliver the targeted output within the stipulated time. Project completion delay can be defined as the late completion of work compared to the planned schedule. Project completion delay can be minimized only when its determinants are identified. The objective of this study is to identify the major determinants of project completion delay and methods of minimizing project implementation delays. The research targeted road construction projects undertaken by DCE. The independent variables causing project completion delay of improper project planning practices, poor project monitoring practices, poor leadership skills, ineffective procurement process, poor top management support and financial problems as internal factors, and political situations, local community obstructions, frequent changes in scope and economic factors, and the dependent variable is project delay. The study considered 9 projects through purposive sampling method from road construction projects undertaken by DCE. Data were collected from purposively selected project managers and engineers using structured questionnaire and secondary data were also used. Data were analyzed using RII. Among the delay factors (improper project planning practices, poor project monitoring practices, poor leadership skills, ineffective procurement process, poor top management support and financial problems as internal factors, and political situations, local community obstructions, frequent changes in scope and economic factors), improper project planning practices was identified and concluded as the determinants with the highest influence on project completion delay. So, the enterprise should clearly indicate the project critical paths, sufficient time to accomplish the tasks and details of activity, and contingency plan should be developed to manage unforeseen social, political and economic factors.*

**Key words:** Determinants, Timely, Project completion

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# Chapter One

## Introduction

### *1.1. Background of the study*

Construction industry makes a significant contribution to all economic and non-economic fields as mean of organizing the activity to achieve desired objectives. Construction activity is an integral part of a country's infrastructure and industrial development, and must be taken care of for a healthy growth of the economy. Construction industry has both direct and indirect link with the development and growth of national economy. It contributes to the national output, and stimulates the growth of other sectors through a complex system of linkages by facilitating basic infrastructures, reducing the unemployment by hiring large number of both skilled and unskilled labors, creating source of income for the population, and offering an employment opportunity for women. Moreover, construction industry contributes to economic activity through generation of revenue for government from corporate income taxes of companies, the rental income, sales tax, capital gain tax and employees income tax which in turn goes to the financing of public services such as provision of agricultural finance, water and electric supplies, schools, residential house expansion and health institutions among others.

The construction industry also impacts the rate of GDP and employment of many countries, and for this reason, the construction industry is considered to be vital for the economic growth of a country (Olawale, 2010), and he suggested that the construction activities have become a significant market indicator since the industry produces more products and consumes more materials than other industries.

Due to the population growth, industrialisation and urbanisation, more roads and highways are required for the easy access to market, economy and other vital purposes such as transportation and delivering goods and services (Mahamid, 2012). Therefore, it is considered that the construction has a great connection and play significant roles in the economic growth or reactivation in all countries.

Ethiopia is the non-oil driven economy among African countries. The construction industry plays a lion share in the growth of Ethiopian economy as compared with other sectors. Over this



period, Ethiopia has increased an investment on the development and expansion of various infrastructure projects like; building, irrigation, dam, roads, airports, hotels and residential and non-residential housing units.

Despite the contribution of construction industry, the management of construction projects requires knowledge of modern management as well as understanding of the design and the construction process. Construction project teams are facing unprecedented challenges where the study of factors affecting timely completion of construction projects is indispensable to improve the effectiveness of construction industry. Because, in spite of its importance, construction industry has complexity in its nature as it contains a large number of parties such as clients, contractors, consultants, shareholders, regulators and other stakeholders who influence the sector either positively or negatively. Albert et al., (2004) posited that construction industry is dynamic in nature due to the increasing uncertainties in technology, budgets, and development processes.

Construction delays are more likely to happen in almost all projects due to inaccurate estimate of time and project cost that was initially presented to the clients or project owners, and miscommunication between contractors, subcontractors, property owners or any other reasons. Delays are the most common problems causing delay in the construction industry in both developed and developing countries (Enshassi, 2009). In practice, delays occur in every construction project and the magnitude of these delays varies significantly from project to project and country to country (Wael et al, 2007). Construction projects delay is one of the common problems that upset the construction companies in terms of competitiveness and long term sustainable in the global market. According to Al-saggat cited in Yang et al (2013) identifying the causes that affect the critical path and consequently the completion of a project is the most important aspect of delay analysis. Hence, this paper aimed to provide in depth light about the existing causes of project delay in developing countries, and outline the possible recommendations for controlling project delay in future projects by analysing the case studies of different projects under implementation by Defense Construction Enterprise.

Therefore, this study would examine factors determining timely completion of road construction projects being implemented by defense construction enterprise by ranking responsible factors on the basis of their relative importance index.

## *1.2. Statement of the Problem*

Globally, construction delay is generally acknowledged as the most common, costly, complex and risky problem.

Because of the overriding importance of time for both owners and contractors, it is the source of frequent disputes and claims leading to lawsuits Ahmad et al (2003).

According to Yisa and Edwards (2002) despite the development of new alternative and less adversarial contractual arrangements, construction industry continues to be affected by problems of project time and cost overruns and consequently, client dissatisfaction (drawing from Latham, 1994; Egan, 1998).

Remon (2013) found out that delays are common in various construction projects and cause considerable losses to project parties. According to Menches and Hanna (2006) timely completion is an important aspect in determining project success. However, public construction projects are frequently behind schedule due to various uncertainties. To overcome consequent impacts of construction projects delay, various attempts were made by different researchers to determine those factors influencing timely completion of construction projects, and consequently numbers of variables influencing construction project success have been proposed. But there is no general agreement on the variables

For instance, Bernard Ogweno, et al., (2016) identified that top management support and effective procurement process determine timely completion of construction projects. However, they did not consider other factors causing construction projects completed beyond schedule. Shabbab Al Hammadi and M. Sadique Nawab(2016) argued that the main delay factors that lead to Project time overruns are related to project owner's role, contractor related, financing related, materials related and design documents. But they did not try to explore how external factors affect timely completion of construction projects. Siraw (2014) studied the analysis of factors contributing to time overruns on road construction projects under Addis Ababa city Administration, but, in his study, he did not included other external factors like political factors, local community obstructions and frequent request for design change.

Tekalign (2014) studied the role of project planning on project performance in Ethiopia. In the same way of previous researchers, Tekalign also disregarded other variables. Fekadu (2016) conducted study under “Factors Affecting the Performance of Construction Project under Oromia Industry and Urban Development Bureau, Ethiopia” under which he attempted to raise cost, time, quality and leadership factors affecting construction projects’ performance. However, he did not include other factors influencing timely completion of road construction projects.

Therefore, this research fills the knowledge gaps by capturing the factors contributing to delay in road construction projects that previous researchers did not discovered in their study.

In spite of Ethiopian construction sector high importance, several defects like infrastructure and construction projects delay, which can hold back or impair planned economic development if immediate actions are not taken, are frequently being noted in the sector Nega (2008). Moreover, Defense Construction Enterprise has experienced road construction projects delay since its establishment. Eight road construction projects of the enterprise are beyond their schedule that requires further investigation of factors contributing to delay in road construction projects.

Therefore, the rationale for conducting this study comes from the motive to investigate factors determining timely completion of road construction projects being implemented by Defense Construction Enterprise.

### ***1.3. Objective of the Study***

#### ***1.3.1. General Objective***

The objective of this research is to investigate determinants of timely completion of road construction projects under Defense Construction Enterprise.

#### ***1.3.2. Specific Objectives***

To achieve the general objective of the study, the following specific objectives were pursued:

- ✓ To find out factors influencing timely completion of construction projects.
- ✓ To determine the relative importance of factors contributing to delay in road construction projects.
- ✓ To formulate results based recommendations

#### ***1.4. Research Questions***

To successfully achieve the specific objectives of the research stated above, the researcher answered the following research questions:

- 1) What are the factors influencing timely completion of construction projects?
- 2) Which factors that affect timely completion of construction projects are relatively significant?

#### ***1.5. Significance of Study***

This work will be very important to Defense Construction Enterprise in identifying and evaluating the factors determining the timely completion of road construction projects. This paper will also benefit future researchers of any related research topics. Project Managers in general and construction project managers in particular will also be beneficiaries of this of paper. Additionally, the findings and the outcome will be relevant to practitioners in other industries. Moreover, the result of the study will be important to construction project contractors and state owned project oriented enterprises in general to create awareness on the issue, and its importance to achieve projects objective.

#### ***1.6. Scope of Study***

This research was limited only to the factors affecting the timely completion of construction projects in Ethiopia particularly Defense construction Enterprise. The study would examine the internal and external factors as the main factors influencing timely construction of construction projects. Generally, the study focused only on time disregarding other constraints.

#### ***1.7. Limitations of the study***

The study was limited by unavailability of documented information about road construction projects in DCE road construction department since the available data was not well organized. Moreover, shortage of time and were other factors that constrained the researcher not to conduct the study as much expected within schedule.

## Chapter Two

### Literature Review

#### *2.1. Introduction*

This chapter presents a literature review of the research work that was done by various scholars in the field of timely completion of construction projects. This includes theoretical review, empirical review and conceptual frame work.

#### *2.2. Theoretical Framework*

##### *2.2.1. An overview of construction projects*

A project is a temporary endeavor undertaken to create a unique product, service or result (Project Management institute, 2008). According to Hillson D., (2009), all projects are risky and there are three separate reasons for that. The first reason is that all projects share common characteristics which inevitably introduce uncertainty. Some of this common characteristics are projects are unique, complex, involve assumptions and constraints, performed by people and involve change from a known present to an unknown future. The second reason is that all projects are undertaken to achieve some specific objectives. The final reason is that all projects are affected by the external environment they exist in.

A construction in simple words is a process of constructing something by human for one purpose or another. It may be a road, bridge, a dam, a private residence, an airport, a commercial building, office and etc. According to Wikipedia, construction is a process that consists of the building or assembling of infrastructure. Construction is the recruitment and utilization of capital, specialized personnel, materials, and equipment on a specific site in accordance with drawings, specifications, and contract documents prepared to serve the purposes of a client.

According to UN (1996) International Standards Industrial Classification (ISIC), Rev. 3, construction is defined generally as an economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other such engineering constructions as roads, bridges, dams and so on. The industry consists of a group of establishments engaged in one or more of the following activities: site preparation; building of complete constructions or parts thereof, civil engineering; building

installation, building completion and renting of construction or demolition equipment with operators.

Australian Bureau of Statistics, the construction industry is described as; "all units mainly engaged in constructing buildings (including the on-site assembly and erection of prefabricated buildings), roads, railroads, aerodromes, irrigation projects, harbor or river works, gas, sewerage or storm water drains or mains, electricity or other transmission lines or towers, pipelines, oil refineries or other specified civil engineering projects. In the case of Ethiopia, although the definition adopted by the National Accounts department of MoFED is the same as that of ISIC, the activities actually covered under the industry are the construction and maintenance activities of: Residential buildings in urban and rural areas, Non-residential buildings, i.e. factory buildings, ware houses, office buildings, garages, hotels, schools, hospitals, clinics, etc., Other construction works, like roads, dams, dikes, athletic fields, electricity transmission lines, telephone and telegraph lines, etc. In principle, activities undertaken by the construction industry which do not fall under the industry such as the quarrying of stone, gravel crushing, and manufacturing of bricks, are not part of the industry's production and hence should, if possible, be allocated to separate group of economic activities. This, however, would not be possible in most cases and hence such output is also included in the construction sector (EEA 2008).

Wikipedia, the free encyclopedia, defines building construction as the process of adding structure with walls to real property or construction of buildings. It further discusses that if this buildings are not designed and constructed by professionals they might lead to undesirable results such as structural collapse, cost overrun and disputes.

A building construction project, like any other project, also faces different risks throughout the life of the project. According to Nafishah B., (2006), this is due to the uniqueness of every project, the uncertainties introduced by the project stakeholders, statutory or regulatory protocols and other intrinsic and extrinsic constraints. He further discusses that risk can constrain the achievement of key project objectives, time, cost and quality. Inability to achieve the project objectives has great consequence on all project stakeholders involved in the construction. For the client it could mean extra cost and less return on investment, for the consultants it could result in loss of confidence placed in them by the clients, for the contractor it could mean loss of profit and bad reputation etc.

### *2.2.2. Historical Background of the Construction Industry*

Construction has been an aspect of life since the beginning of human existence. The first buildings were huts and shelters constructed by hand or with simple tools. As cities grew during the Bronze Age, a class of professional craftsmen like bricklayers and carpenters appeared. Occasionally, slaves were used for construction work. In the 19th century, steam-powered machinery appeared, and later on diesel and electric powered vehicles such as cranes, excavators and bulldozers. Traditional construction, might be considered as having properly, commenced between 4000 and 2000 BC in Ancient Egypt and Mesopotamia when humans started to abandon a nomadic existence, that caused a the construction of shelter. The construction of Pyramids in Egypt (2700-2500 BC) might be considered the first instance of large structure construction. Other ancient historic constructions include the Parthenon by Iktinos in Ancient Greece (447-438 BC), the Apian Way by Roman engineers (312 BC), and the Great Wall of China by General Ming T'ien under orders from Ch'in Emperor Shih Huang Ti (c. 220 BC). Similarly, the Romans developed civil structures throughout their empire including aqueducts, insulate, harbors, bridges, dams and roads.

Population growth and urbanization led to an increasing need for shelter developments, and focused attention on the importance of local building materials and techniques. Accordingly, the construction industry in many parts of the world started to grow with an increasing demand. In line with this, construction companies are growing at a fast pace all over the world. With this growth of the construction industry and subsequent growth of construction companies, contractual relationships related to construction are increasing. Thus, there is a dire need for a coherent and efficient law to deal with such contractual relationships.

Coming to our country, *Ethiopia*, the growth and increasing demand for the construction industry has followed a similar pattern as observed in the trend of the world. Currently, construction is one of the sectors leading the way towards modernization and industrialization in Ethiopia. The construction sector in Ethiopia, generally in the world, contributes to the realization of about fifty percent of the total capital. Being the second largest employer in the country, it's also an engine for technology, innovation and overall development.

In the past history of Ethiopia, the construction industry was not considered as an independent sector of the national economy. It was rather considered as incapable of generating national wealth. As a result, no comprehensive strategy for its development was considered. This, in turn, has led to the undesirable features of the current construction sector. These features include lack of clear developmental objectives for the industry; inadequate co-ordination of planning between the industry and infrastructure programs in the various sectors of the economy heavy dependence on foreign resources such as materials, equipment and expertise representation of the role players in the construction sector by inadequate and ineffective organizations inadequate numbers of suitably qualified and experienced personnel at all levels that include engineers, technicians, mechanics, operators and foremen, etc. inadequate relevant local construction regulations and standards, and inadequate consideration given to the use of local resources (including community participation in labor-based works).

Ethiopia witnessed a decline in the performance of almost all sectors of the economy during the various periods of government prior to 1991. The post-world war period in Ethiopia registered significant changes from the time of Emperor Haile Selassie (1941-1974) to that of the Derg (1974-1991) culminating in the events of 1991 which resulted in the formation of the Transitional Government of Ethiopia (hereinafter TGE). Even though various market based economic reforms have been introduced to the various industries of the country, including the construction industry, since the downfall of the Derg regime in 1992, the domestic construction industry has still faced several hindering factors in its development.

In the New Economic Policy statement issued in 1992, the TGE made clear its intention to transform the stagnant command economy inherited from its predecessors into a functioning market-based economy. This transformation is sought to be achieved through an Agricultural Development Led-Industrialization (hereinafter ADLI) strategy for the country which is supported by similar strategies in education, health and transport sectors. However, even if the country is well endowed with natural resources with 60% of its total land area estimated to be potentially arable, its road density is amongst the lowest in Africa nations and other developing countries. Furthermore, the existing road network has deteriorated to the extent that only eleven percent of paved roads and nineteen percent of gravel roads are in good condition, making it the worst in comparison with other developing countries. It is evident from the above that the

success of the ADLI strategy and the consequent economic recovery and development of the country is highly dependent on the restoration of the country's road infrastructure.

With the above considerations in mind, the construction industry is being given special focus in the policies of the country. The construction industry is one of the three sectors of the economy identified by the Ethiopia Government for special consideration to foster the country's economic development. However, the general state of the domestic construction industry in Ethiopia is still characterized by inadequate capital base, old and limited numbers of equipment, low levels of equipment availability and utilization, deficiencies in technical, managerial, financial and entrepreneurial skills, limited experience and participation of the private sectors in construction and consultation works, and insufficient and ineffective use of labor-based road construction and maintenance technology.

The construction industry in Ethiopia is a sector that opens the door for the growth of many additional industries. Building works require high input. For instance, they require different metal products, clay works, and cement and cement products, etc. As such, the growth of these industries will surely follow the growth of the construction industry. Similarly, when the construction and renovation of housing increase, the demand for household furniture increased; thereby, indirectly, opening the door for the growth of the furniture industry. All in all, the construction industry is a sector that can entertain big micro companies, that is widely labor based. All these being taken into consideration, the industry policy of the Federal Democratic Republic of Ethiopia has sought to pay special attention to the construction industry of the country.

Defense Construction Enterprise was established in 2010 by Ethiopian ministry of council regulation NO 185/2010 as public enterprise and national defense as supervising authority of the enterprise. The authorized capital of the Enterprise is Birr 800,000,000.00 /Eight hundred million Birr /of which birr 276,438,724.00/ Two hundred seventy six million four hundred thirty eight thousand seven hundred twenty four Birr is paid up in cash and in kind.

Prior to its establishment as an Enterprise, it was structured as an Engineering Department under the Ministry of National Defense responsible for the construction of Army Hospitals, Depot,

Camps, access roads and other infrastructure activities owned by the Ministry of National Defense. Henceforth its establishment, the enterprise has mainly been undertaking various infrastructural projects to satisfy national defense infrastructural needs. In parallel, it has also been engaged in the construction of mega roads, dams, irrigation infrastructures and buildings projects that have been undertaken in different parts of the country. Defense Construction Enterprise (DCE) is one of the leading construction companies in Ethiopia. It is different from other companies as it works in the most remote and difficult areas of the country. It is dedicated and devoted to build the country. The Enterprise has been in the business of construction for more than a decade now and still counting. DCE has already built many modern and top of the art buildings in the whole of Ethiopia. The enterprise's services include Building, road, and irrigation and dam construction projects. Its goal is to modernize the construction industry, thus it uses modern technologies.

### *2.2.3. The role of the construction industry in economy*

The Construction industry has a great influence on the economy of all countries. It is one of the parts that provide vital factors for the development of any economy. According to World Bank, the share of construction industry in developing countries is approximately between 6-9% of the GDP. (Unit, South Asia Sustainable Development, 2007). In Ethiopia its percentage of GDP amounts to 3%, considerably lower than the sub Saharan average of 6%, MoWUD (2006).

According to Moavenzdadeh F. (1976), construction contributes to the economic development of any country by satisfying some of the basic objectives of development including output generation, employment creation and income generation and re distribution; it also plays a major role in satisfying basic physical and social needs, including the production of shelter, infrastructure and consumer goods. He also argued that the construction industry plays a major role in developing countries since it constitutes a significant portion of gross national product and employment; at least three-quarters of the world's construction workers are in the less developed countries. The construction industry is an important part of the economy and has a considerable impact on the efficiency and output of other industries. It is not possible having extensive investment in manufacturing, agriculture or service sectors without construction of infrastructure facilities in place. One of the main objectives and policies of any public or private sectors dealing with the execution of projects is to upgrade project performance through

minimization of costs, completion of projects within their assigned budget and time limits and improve quality.

The construction industry is a very important part of any country. It highly contributes to the growth and development of the economy in developing countries like Ethiopia (Jill Wells. 2001;

Construction industry makes significant contributions to the socio-economic development process of the country. Its importance emanates largely from the direct and indirect impact it has on all economic activities. It contributes to the national output and stimulates the growth of other sectors through a complex system of linkages. It is noted that about one-tenth of the global economy is dedicated to constructing and operating homes and offices. UNEP further observes that the industry consumes one-sixth to one half of the world's wood, minerals, water and energy. It contributes to employment and creates income for the population and has multiplier effects on the economy (EEA 2008).The construction industry employs large unskilled labor. Throughout the developing world, the majority of employees in the industry are unskilled. Women are also found to be beneficiaries of the employment in the industry. However, the employment in the industry is mainly temporary in nature and once the job is over, the workers are obliged to find other jobs or return to their place of origin. Similar to all other socio-economic activities, another key contribution of the construction industry is revenue generation to government. The construction industry contributes to economic activity through generation of revenue for government from corporate income taxes of companies, the rental income, sales tax, capital gain tax and employees income tax from those employed in the construction industry, which in turn goes to the financing of public services such as schools and health institutions among others. In order to identify and estimate the total economic contribution of the construction industry to an economy, one has to look beyond the direct expenditures made by the industry itself, since there is a ripple effect of the expenditures made for goods and services supplied to the industry. Likewise, business revenues generated from supplying of goods and services to the construction industry are paid out in wages, and material costs, which in turn are spent on living costs. This multiplier effect enlarges the economic impact of the initial construction industry expenditures. In other words, the initial wave of spending generates a second and third wave of spending as wages paid and profits made on the direct construction spending spins through the economy in several cycles. Thus, the original direct expenditure yields a greater economic impact than just initially spent (EEA 2008).

#### *2.2.4. Timely Completion of project*

Timely project completion is the projected completion time as in the contract for the construction of the project (Munano, 2012). Construction time has always been used as a benchmark for assessing the performance of a project and the efficiency of the implementing organization. It is very important to the stakeholders especially the users because they are waiting to use the product as soon as possible. Timely completion, therefore, is a success factor. Project success is a term that has elicited enormous research with differing views on various aspects of it. Its definition has changed over the years. For instance in the 1960s, project success was measured in technical terms. However, later, project success was stated in terms of meeting the following objectives: completed within planned time, planned budget and the required quality level (Kerzner 1998 cited in Gwaya et al, 2014). According to Gwaya (2014) all the three objectives are internal to the project and do not necessarily indicate the preference of the client. After the TQM, a project was considered to be a success by not only meeting the above three objectives but also making sure that the project is accepted by the client. For a project to be said to be a success therefore, it needs to be completed on a schedule that is satisfactory to the client.

According to Conchuir (2011) there are six key time management processes, five of which are in the planning process group and one in the monitoring and controlling. The first process is to identify each activity that has to be carried out, then base the time estimates on these components of work. This helps to communicate with the stakeholders objectively, to ensure that all activities are included and to bring understanding of what has to be done. Once the activities have been defined, the next step is to define their order. This uses the complete list of activities together with enough detail about each to work out relationships between them. Sequencing process sorts the various activities into the order in which they will be implemented (PMI, 2010; Conchuir, 2011). Failure to follow the sequence may be too costly. The major tools and techniques used at this level are the schedule network diagrams like the CPM diagrams.

The next step is to estimate the work periods which will be needed to complete individual tasks or activities (PMI, 2010). The Project Management Institute states several inputs for this process with expert judgment as one of the key tools and techniques. The fourth step is to determine which resources in terms of labour, equipment; facilities etc. are needed for each activity (PMI, 2010; Conchuir 2011). These estimates have to be as accurate as possible. This process uses various tools and techniques according to the Project Management Institute that includes bottom-

up estimating and use of the project management software. Once all the activity durations and their sequence have been determined they are used to create the project schedule (order) (PMI, 2010, Conchuir, 2011). This tells us when every activity will take place. The Project Management Institute list schedule network analysis as one of the tools and techniques to develop schedule. The project manager must regularly control that the planned work is proceeding according to schedule. The purpose here is to ensure that the project is being implemented as planned and acting to resolve problems.

### ***2.2.5. Delay in Construction Projects***

Projects or construction works that are not delivered on time to the client are referred to as projects that have undergone schedule overruns. Assaf and Al-Hejji [9], defined schedule overruns as the time overrun either beyond completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project. Alkhathami [10] states that schedule overruns can be defined as extra time required finishing a given construction project beyond its original planned duration, whether compensated for or not. Hence, Mohamad [8] defined schedule overruns as an act or event that extends the time to complete or perform an act under the contract. It is basically a project slipping over its planned schedule and is considered as a common problem in construction projects worldwide. Projects are delayed because the critical activities of the projects are delayed. A delayed critical activity implies that the completion of the activity has been delayed because the activity was started later than expected and/or because the activity required an unexpectedly extensive duration to complete.

#### ***2.2.5.1. Implications of Time Overrun***

Time overrun has an implication and affection to the construction project performance and to the client or project owner. Time certainty and cost is known to be the top priorities of construction clients (Davenport, 1997). Although affected by many internal and external factors, construction time is considered a good and measurable indicator of project performance. However, low cost and speedy projects are not always the main concern of clients today; instead time and cost certainty are becoming increasingly important (Flanagan et al., 1998) and it is one of the most important contractor performance criteria for clients' satisfaction Soetantoet al.,( 2001)

Client satisfaction is an important determinant of contractor performance evaluation and comparison (Sidwel, 1988) and it is the driving force for continuous improvement of contractor

performance (Ahmed and Kangari, 1995). Companies differentiate themselves from competitors and maintain a competitive edge by providing and keeping clients satisfied (Torbica and Stroh, 2001). Client long term interest to the performance of contractor is in the work performed. It must conform to the specifications established for the project. Low cost and speedy construction should be achieved because it has significant implication to the client's interest about the way of contractor work in the project performance (Xiao and Proverbs, 2001). Besides that, delays (time overrun) and cost overrun are costly and often result in disputes and claims, impair the feasibility for project owners, and retard the development of the construction industry (Odeh, A. M and Battaineh, H.

Effects of schedule overruns are the consequences that will occur when the causes of these schedule overruns are not identified and worked on effectively. A delay in the construction may cause losses, or negatively affect some or all of the project parties. Time and cost overruns on infrastructure development projects during implementation continue to pose great challenges to developing countries (Kigari&wainaina, 2010).

Assaf and Al-Hejji [9] further illustrates that, to the owner, schedule overruns means loss of revenue through lack of production facilities and rent-able space or a dependence on present facilities. In some cases, to the contractor, schedule overruns means higher overhead costs because of longer working periods, higher material costs through inflation, and due to labour cost increases. The study of Pourrostam and Ismail [21] identifies and ranks the effects of construction delays as follows, time overrun, cost overrun, dispute, arbitration, litigation, and total abandonment of projects. These findings are in general agreement with other studies as carried out by Aibinu and Jagboro [23] and Motaleb and Kishk [24]. However, the study of Baki [25] brings in the aspect of claims as one of the effects of delays in construction projects.

### ***2.2.6. Theory of Constraints (TOC) in Project Management***

The primary challenge of project management is to achieve all of the project goals and objectives while honoring the preconceived project constraints, Lamb, Robert, Boyden (2002) typical constraints are scope, time, and budget. The secondary and more ambitious challenge is to optimize the allocation and integration of inputs necessary to meet pre-defined objectives.

Goldratt (1984) in his theory of constraints asserts that any manageable system is limited in achieving more of its goal by a very small number of constraints, and that there is always at least

one constraint. Theory of Constraints is based on the premise that the rate of goal achievement is limited by at least one constraining process. Only by increasing flow through the constraint can overall throughput be increased (Cox, Jeff; Goldratt, Eliyahu (1986). Constraints can be internal or external to the system. An internal constraint is evidence when the market demands more from the system than it can deliver. If this is the case, then the focus of the organization should be on discovering that constraint and following the five focusing steps to open it up (and potentially remove it).

An external constraint exists when the system can produce more than the market will bear. If this is the case, then the organization should focus on mechanisms to create more demand for its products or services. Internal constraints are often caused by equipment, people and policies, McKinsey (2001).

### ***2.2.7. Critical Chain Project Management Theory***

Critical Chain Project Management is the Theory of Constraints logistical application for project operations. It is named after the essential element; the longest chain of dependent resourced tasks in the project. The aim of the solution is to protect the duration of the project, and therefore completion date, against the effects of individual task structural and resource dependency, variation, and uncertainty. The outcome is a robust and dependable approach that will allow us to complete projects on-time, every time, and most importantly within at most 75% of the current duration for single projects and considerably less for individual projects within multi-project environments. The shorter duration provides a sterling opportunity in the marketplace to differentiate ourselves from our competitors who deliver poorer outcomes, and late at that, via other project management methods. It also offers the opportunity to deliver more projects over all, in the same amount of time, and at no increase in operating expense, thus significantly improving the bottom line (Youngman, 2009).

### ***2.2.8. Top management team theory***

According to Nyandika & Ngugi, (2014), top management team theory (TMTT) has raised widespread concern in the academic community. Different from traditional strategic management theory, which emphasizes on purely economic and technological processes or information process, TMTT studies the strategic choice and organizational performance determinants from the process of cognitive psychology of top management team (TMT), which

overturns the economic man hypothesis in traditional theory and proposes the hypothesis of International Journal of Economics, Commerce and Management, United Kingdom Licensed under Creative Common Page 365 limited rationality proposed by the Carnegie school (Müller & Jugdev, 2012). As the cognitive psychological process of TMT is too complicated, TMTT invokes prior marketing research on demography to suggest that managerial characteristics and its heterogeneity (such as age, work experience, educational background, etc.) are reasonable proxies for underlying differences in cognitions, values, and perceptions process, which could be good predictor to predict organizational outcome (such as strategic choice, organizational performance, etc.), (Nyandika & Ngugi, (2014)). Nyandika and Ngugi, 2014 finally concluded that in relation to this study, the skills and the support of the top management is paramount in the success of development projects. It reduces the timeline of projects as it helps to smoothen the communication process.

### ***2.2.9. Resource Dependence Theory (RDT)***

According to Nyandika & Ngugi (2014), resource dependence theory (RDT) is concerned with how organizational behaviour is affected by external resources the organization utilizes, such as raw materials. The theory is important because an organization's ability to gather, alter and exploit raw materials faster than competitors can be fundamental to success. Some commentators encourage organizations to view customers as a resource predisposed to scarcity. Resource dependence theory is underpinned by the idea that resources are key to organizational success and that access and control over resources is a basis of power. Resources are often controlled by organizations not in the control of the organization needing them, meaning that strategies must be carefully considered in order to maintain open access to resources. Organizations typically build redundancy into resource acquisition in order to reduce their reliance on single sources e.g. by liaising with multiple suppliers, (Davis, and Cobb, 2010)

The procurement of external resources is an important tenet of both the strategic and tactical management of any company. Resource dependence theory has implications regarding the optimal divisional structure of organizations, recruitment of board members and employees, production strategies, contract structure, external organizational links, and many other aspects of organizational strategy. Organizations depend on multidimensional resources: labor, capital, raw material, etc. Organizations may not be able to come out with countervailing initiatives for all

these multiple resources. Hence organization should move through the principle of criticality and principle of scarcity. Critical resources are those the organization must have to function. For example, a burger outlet can't function without bread. An organization may adopt various countervailing strategies it may associate with more suppliers, or integrate vertically or horizontally, (Hillman, Withers and Collins, 2009). Ogweno, Muturi & Rambo Licensed under Creative Common Page 366 Resource dependence concerns more than the external organizations that provide, distribute, finance, and compete with a firm. Although executive decisions have more individual weight than non-executive decisions, in aggregate the latter have greater organizational impact.

Managers throughout the organization understand their success is tied to customer demand. Managers' careers thrive when customer demand expands. Thus customers are the ultimate resource on which companies depend. Although this seems obvious in terms of revenue, it is actually organizational incentives that make management see customers as a resource (Boyd, B., 1990). The basic argument of resource dependence theory can therefore be summarized as follows: organizations depend on resources; these resources ultimately originate from an organization's environment; the environment, to a considerable extent, contains other organizations; the resources one organization needs are thus often in the hand of other organizations; resources are a basis of power; legally independent organizations can therefore depend on each other; power and resource dependence are directly linked; organization A's power over organization B is equal to organization B's dependence on organization A's resources; power is thus relational, situational and potentially mutual.

## ***2.3. Empirical Review***

### ***2.3.1. Factors Affecting Time Performance of projects***

Many studies have attempted to identify the causes that put construction projects behind planned schedule. For example, Odeh and Battaineh (2002) investigated delay causes in large construction projects in Jordan. The causes identified included design changes, poor labour, productivity, and inadequate planning. Furthermore, previous studies showed that delays can be caused by owners, planners/designers, contractors, or acts of God.

McManus et al., 1996, who evaluated delay causes in architectural construction projects, concluded that many delays manifest during all project phases and primarily occur during the construction phase; however delays that start in the design phase include inadequate schedule control by architects, inability of owners to review design in a timely manner, late incorporation of emerging technologies into a design, and ineffective coordination and/or inclusion of project user groups.

Toor and Ogunlana (2008) studied construction delays in Thailand. They found that the problems faced by the construction industry in developing economies like Thailand could be: (a) shortages or inadequacies in industry infrastructure (mainly supply of resources); (b) caused by clients and consultants and (c) caused by contractor's incompetence/inadequacies. They recommended that there should be concerted effort by economy managers and construction industry associations to provide the necessary infrastructure for efficient project management.

Chan and Kumaraswamy (2008) conducted a survey to determine and evaluate the relative importance of the significant factors causing delays in Hong Kong construction projects. They analyzed and ranked main reasons for delays and classified them into two groups: (a) the role of the parties in the local construction industry (i.e. whether client, consultants or contractors) and (b) the type of projects. Results indicated that the five major causes of delays were: poor site management and supervision, unforeseen ground conditions, low speed of decision making involving all project teams, client initiated variations and necessary variations of works. Al-Momani (2000), examined 130 public projects in Jordan and concluded that the main causes of delays include changes initiated by designers, client requirement, weather, site conditions, late deliveries, economic conditions and etc. Odeyinka and Yusif (1997) have addressed the causes of delays in building projects in Nigeria. They classified the causes of delay as project participants and extraneous factors. Client-related delays included variation in orders, slow decision-making and cash flow problems. Contractor-related delays identified were: financial difficulties, material management problems, planning and scheduling problems, inadequate site inspection, equipment management problems and shortage of manpower. Extraneous causes of delay identified were: inclement weather, acts of nature, labour disputes and strikes. Al-Momani(2000), carried out a quantitative analysis on construction delays in Jordan. The result of his study indicated that the main causes of delay in construction of public projects were related to

designers, user changes, weather, site conditions, late deliveries, economic conditions and increase in quantity. Similarly, Odeh and Battaineh also conducted a survey aimed at identifying the most important causes of delays in construction projects with traditional type of contracts from the viewpoint of construction contractors and consultants. Results of the survey indicated that contractors and consultants agreed that owner interference, inadequate contractor experience, financing and payments, labour productivity, slow decision making, improper planning, and subcontractors were among the top ten most important factors. Frimponget. al., conducted a survey International Journal of Education and Research Vol. 2 No. 4 April 2014 201 to identify and evaluate the relative importance of significant factors contributing to delay and cost overruns in Ground water construction project.

Chan and Kumaraswamy (1996) stated that a number of unexpected problems and changes from original design arise during the construction phase, leading to problems in cost and time performance. It is found that poor site management, unforeseen ground conditions and low speed of decision making involving all project teams are the three most significant factors causing delays and problems of time performance in local building works. Dissanayaka and Kumaraswamy (1999) remarked that project complexity, client type, experience of team and communication are highly correlated with the time performance; whilst project complexity, client characteristics and contractor characteristics are highly correlated with the cost performance. Reichelt and Lyneis (1999) obtained that project schedule and budget performance are controlled by the dynamic feedback process.

Those processes include the rework cycle, feedback loops creating changes in productivity and quality, and effects between work phases. Chan (2001) identified that the best predictor of average construction time performance of public sector projects. This relationship can serve as a convenient tool for both project managers and clients to predict the average time required for delivery of a construction project. Kuprenas (2003) stated that process of a design team meeting frequency and the process of written reporting of design phase progress were found to be statistically significant in reducing design phase costs. Otherwise, the use of project manager training and a project management based organizational structure were found to be processes that do not create a statistically significant in reducing design phase costs.

Iyer and Jha (2005) remarked that the factors affecting cost performance are: project manager's competence; top management support; project manager's coordinating and leadership skill; monitoring and feedback by the participants; decision making; coordination among project participants; owners' competence; social condition, economical condition and climatic condition. Coordination among project participants was as the most significant of all the factors having maximum influence on cost performance of projects. Love et al (2005) examined project time-cost performance relationships by using project scope factors for 161 construction projects that were completed in various Australian States. It is noticed that gross floor area and the number of floors in a building are key determinants of time performance in projects.

Furthermore, the results indicate that cost is a poor predictor of time performance. Chan and Kumaraswamy (2002) proposed specific technological and managerial strategies to increase speed of construction and so to upgrade the construction time performance. It is remarked that effective communication, fast information transfer between project participants, the better selection and training of managers, and detailed construction programs with advanced available software can help to accelerate the performance. Jouini et al (2004) stated that managing speed in engineering, procurement and construction projects is a key factor in the competition between innovative firms. It is found that customers can consider time as a resource and, in that case, they will encourage the contractor to improve the time performance.

#### ***2.3.1.1. Leadership Factors***

There was significant relationship between the project leader's professional qualification, his leadership style, team composition and overall project performance (Odusami, Iyagba & Omirin, 2003). Leadership must be raised from among the Hispanic workers to aid in effectively coordinating work activities by providing the communication link between management and work crews. This provides the opportunity for upward mobility and gives motivated individuals the chance to advance professionally (Bob & Muir, 2005). Lack of appropriate project organization structures, poor management systems and leadership are the major causes of poor project performance (Nyangilo, 2012). Nyangilo argued that the project leaders are endowed with technical skill but lack the other basic project management skills of dealing with the human, culture and environmental sides of the project. Various statistical configurations have also been identified, indicating possible weaknesses within the team dynamic that may be addressed in an

effort to achieve improved project performance (Langford & Tennant, 2005). Kamalesh, Rizwan and Syed (2002) collected data through selected project managers and construction professionals working in managerial capacity in South Florida, it was found that the leadership style exhibited is both high task and high employee relationship; which is the selling type. They found that there is no significant difference in the leadership orientation of well experienced managers and less experienced managers. Gbadura and Oke (2010) recommended democratic and transformational leadership styles for Nigerian quantity surveyors in discharging their duties as construction projects managers.

According to Müller and Turner (2010) leadership competency profiles and stakeholder management (Turner and Müller, 2004) are important success factor in project management. Kalsen et al (2014) suggested how project managers can influence and encourage team members in order to achieve successful results. They based their argument on positive psychology theory that is an optimistic human vision. They listed use of signature strength, positive meaning, positive emotions and positive relations to create positive results. The project manager leads and influences his/her employees by influencing their thought, meaning and self-talk. A culture is required where everyone uses their competence and resources to maximize project performance rather than trying to advocate for own interest in the project. This can be done by promoting appealing project visions, goals and milestones.

Ballard et al (2014) using three case studies found that use of an adaptive management approach may lead to successful results. They observed that aligned governance and the adopted contract strategy serves as a foundation for project execution. A good interaction created both inside the project, among partners and with the external stakeholders is a success factor. External stakeholders include the local community and the national government. Meetings by stakeholders and discussions in the local community creates trust and secure commitment and acceptance from local decision makers. In addition well developed governance and procedures as well as proven tools that includes project tools and risk management are important for successful accomplishment of project tasks. Muller (2012) observe that project governance is the most important environmental factor impacting the effectiveness of the applied project management approach while stakeholder management and change management are impacted most by environmental factors.

Lundy and Morin (2013) citing Pinto et al (1998) contend that numerous authors have considered leadership skills to be essential to project success and adds that successful transformation is 70% to 90% leadership and only 10% to 30% management. The International Project Management Association (IPMA) specifically addresses leadership as one of 46 competencies seen as instrumental to project managers' success (ICB-IPMA, 2006; PMI, 2007; Lundy and Morin 2013).

According to Nixon et al (2012), in considering the effect of leadership performance on the success or failure of a project observes that it is important to understand the differences between project management and project leadership. Citing Anantatmula (2010) he suggests that project management refers to the planning and organizing of project activities, through decision-making processes that improve the efficiency and effectiveness of a project. Leadership, conversely, is about guiding others towards the attainment of project objectives, motivating and guiding people to realize their potential and achieve tougher and challenging organizational goals. Successful leadership convinces people of the need to change, stimulates new ways of thinking and problem solving, and then encourages them to work together in order to accomplish project objectives in difficult work environments (Keller,1992; Anantatmula, 2010; Nixon et al 2012).

Traditionally, it was believed that leaders were born based on the great man theory however in modern times this theory has been discarded. There are different schools of leadership theory in which transformational leadership can be found amongst the most contemporary perspectives (Keegan and Den Hartog, 2004; Turner and Müller, 2005). Transformational leadership has been defined by the ability of the leader to create a shared vision and a strong identification with team members that is based on more than just rewarding completion of project activities (Bass, 1985; Keegan and Den Hartog, 2004). Through this shared vision, the transformational leader is then able to mobilize commitment and improve the performance of both the individual and the project as a whole. Such leaders are said to show charisma, as a means of motivating others to integrate into the collective vision, and a strong consideration of and support for individual team member needs (Keegan and Den Hartog, 2004). Developing connections between the leader and individual team members is also thought to help individuals achieve their full potential.

### *2.3.1.2. Project Resource Allocation*

Resources refer to materials that the project requires for smooth implementation such as labour, equipment and facilities. Activity resource estimation helps determine which resources in terms of labour, materials and others are needed for each activity (PMI, International Journal of Scientific and Research Publications, Volume 7, Issue 4, April 2017 2250-3153 2010; Conchuir 2011). It involves estimating the type and quantities of material, human resources and equipment required to perform each activity. Wrong resource estimation is hypothesized to affect negatively project schedule because the duration estimation depends in a big way on availability and correct estimation of resources. This in effect affects timely project completion. These estimates have to be as accurate as possible.

A sufficiently well allocated resource is one of the success factors of a project (Fortune & White, 2006 cited in Ballard, 2014). There is a problem of scarce resources and therefore, a combination of resource utilization for competitive advantage and minimization of costs of resource requirements in projects subject to fixed completion time is necessary. According to Feng et al (2000), traditional time-cost trade-off analysis assumes that the time and cost of an option within an activity are deterministic. However, in reality the time and cost are uncertain. Therefore, in analyzing the time-cost trade-off problem, uncertainties should be considered when minimizing project duration or cost.

According to Piet Joubert (2010 cited in Yatich, 2016), resources are the means we use to achieve project objectives. The primary resource is people with applicable skills and competencies. The other main grouping of resources includes capital, facilities, equipment, material and information. In order to ensure a cost effective application of required resources, a proper needs analysis in order to define the project goals and objectives needs to be done. The project's baseline that must be resourced will be known after a requirement specification has been completed. The WBS is the base document for determining resource requirements. The requirement specification will spell out the real requirements to achieve through the project.

PMI (2013) explain the resource requirements using the following processes; plan cost management which is the process that establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs to provide guidance and direction on how the project costs will be managed throughout the project, resource estimation

which is a structured prediction of the cost and other resources required to execute a task to establish a control basis, budgeting which is the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline against which project performance can be monitored and controlled and costs control which is the process of monitoring the status of the project to update the project costs and managing changes to the cost baseline to provides the means to recognize variance from the plan in order to take corrective action and minimize risk. Therefore the more accurate the estimation, the more reliable the control system becomes.

Yatich (2016) citing Talbot (1982) identifies resource acquisition as another process which refers to the process of physically securing the necessary inputs. All resources required have to be paid for. The resources which may be required in a project include those which are limited on a period-to-period basis such as skilled labour, as well as money, which are consumed and constrained over the life of the project. At the planning stage the user of resource-constrained project scheduling with time-resource trade-offs approach is permitted to identify several alternative ways of accomplishing each job in the project. The financing of a project therefore plays an essential role in the acquisition process. The acquisition process must be managed properly to take care of possible seasonal shortages, labour disputes, equipment breakdowns, competing demands, delayed deliveries and other things that may go wrong. The project plan may have to be modified to accommodate or work around supply problems. The same analysis appears to point to resource leveling as another important aspect which ensures resource demand does not exceed resource availability and vice versa. If you are forced to reschedule a task on the critical path it would influence the completion dates of successive tasks.

### ***2.3.1.3. Construction project planning and completion of construction projects***

Construction project generally takes various stages. The first stage is usually project initiation where the project is identified and a feasibility study carried out to establish the viability and build a business case. The second stage is the project planning stage and in here the project design is carried out, resources and finances allocated. Project execution which is the third phase involves implementing the designs within the allocated resources in the set duration and to the set specification and quality.

Project closure involves handing over the final product to the customer, handing over the as-is-built drawings, giving the operation and maintenance plan, terminating the contracts and informing all stakeholders that the project is closed. If project completion date has been frozen without arranging inputs and proper planning, this can lead to hasty and unsystematic work towards the end of the project (K.N. JHA et al., 2006). Failure to clearly comprehend the project, all its aspects can lead to works being executed erroneously and the attendant correctional steps to remedy the errors will cause project delay. The consequences are actually grave, ranging from litigation to claims and disputes, to outright abandonment of the project (Olatunji, 2010). When a project delay can no longer be absorbed by the client, the project is abandoned. It helps then to predict and identify problems in the early stages of construction (Hussin and Omran, 2011). Planning stage is therefore very key to success of construction project. "Delivery of materials on site will quite affect the project progress. If that supply does not ensure that quality materials are delivered on site then it will cause delay of project completion" (Wambugu D.M., 2013). This is because material not meeting the quality of design will most likely be rejected and the process of getting the right material will be taking more project implementation time. When materials are lacking on site it means that the employees will not have work to do. This is quite demoralizing and will affect the project delivery negatively. This is largely a product of poor planning in the construction project. Indeed material availability is the most frequent problem that leads to delay in majority of the countries as identified by Olatunji (2010). Second to this is inadequate planning methods and ineffective coordination of resources. Failure at the conceptual planning and design stages may lead to significant problems in the successive stages of the project. Koushki et al., (2005) in a study carried in Kuwaiti illustrates that owners who carried out pre-planning phase prior to the commencement of the planning phase experienced shorter time delays that their counterparts who did not. The amount of time delay also increased with an increase in pre-planning time period. Sambasivan and Soon (2007) identify contractors improper planning as one of the causes of project delay. If a contractor fails to come up a workable work program at the initial stages, this will affect project timely completion. A similar observation is made by Jagboro and Aibinu, (2002) in Nigeria. Equally emphasizing on the need for proper planning of construction project is Pakiret. al, (2012) in a study carried out in Sudan. McMinimeet. al., in (2009) stated that it was clear that investments in advance planning and project development paid off. Mojahed (2005) states that proper planning in all phases and

components of construction project are necessary to avoid re work which in turn leads to delay in project completion.

Wideman (2001) concludes that the success of the execution phase of the project is highly depended upon the quality of planning in the prior planning phase. Wambugu, (2013) observes that planning affected the timely completion of rural electrification projects in Kenya and that the equality and importance of project planning had been considered a major cornerstone of every successful project. Tabishl and Jha, (2011) in a study carried out in Singapore conclude that comprehensive site investigation helps in sound planning which in turn helps in clarifying the scope and developing a thorough understanding. This also helps minimize change of scope during construction. Chan (1996) as quoted by Pakir et al., (2012) state that accurate construction planning is a key determinant in ensuring the delivery of the project on schedule and within budget.

#### ***2.3.1.4. Availability of Funds and Timely Project Completion***

Although project delivery process does not have a stage called funding, budgetary constraints affect each stage of the process (Sullivan & Mayer, 2010). The Right of Way to a project is not identified by a project that only fulfills the environmental process, only for the policy makers to disagree with the chosen source of funding. Mansfield et al (1994) reviewed the correlation between cost overruns and project delays and realized that a good agreement exists between the two factors. Budget limitation is consistently one of the greatest constraints to timely implementation of TBC construction projects. While projects can often compensate for a lack of technical capacity through training and/or outsourcing, they cannot compensate for the lack of money. Carrying out a TBC construction project costs money and, depending on how ambitious project implementers are about their project, it can cost a lot of money.

Successful and timely completion of TBC construction projects requires that an organization invest valuable resources, including money and peoples' time. At the earliest stage of designing a construction project, key stakeholders must make a decision on whether the activity is worth pursuing given the expected use and costs. At least a rough budget for the activity is therefore needed as part of up-front planning. Gwadoya (2001) observed that financial resources for construction projects should be estimated realistically at the time of planning for the project. While it is critical to plan for project execution together, resources for each function should be

separate. In practice, each project should have two separate budget lines for example the project and for its monitoring and evaluation agreed in advance with partners. Monitoring and evaluation costs associated with projects can be identified relatively easily and be charged directly to the respective project budgets with prior agreement among partners through inclusion in the project budget or Annual Work Plan (AWP) signed by partners. Sourcing and securing financial resources for construction project or programs can pose additional challenges. Pace (1990) stated that it is important to allocate required funds for each construction project. It is important that partners consider the resources needed for timely completion of projects and agree on a practical arrangement to finance the associated activities. Such arrangements should be documented at the beginning of the program to enable partners to transfer necessary funds in accordance with their procedures, which could take considerable time and effort. Human resources are critical for effective implementation and timely completion of construction projects, even after securing adequate financial resources. For high-quality execution of a construction project, there should be an excellent learning tool as well as a means to improve program. Private investment by large entrepreneurs in local projects has also become significant as noted. It also shows in a clear and meaningful way that African capital should be part of the solution to African challenges.

Most donors attach various restrictions to their funding including, among others, sound financial management systems in place, good leadership with integrity, educated staff with experience and the strategic plans of the organization. Organizations lacking these ingredients have difficulties attracting donor funding. Some donors will first assess the capacity of the organization's systems and structures to handle funds before funding can be approved.

Many donors give their support for the satisfaction of making a difference and so implementers should describe the return on their investment in quantifiable terms, clearly specifying who will benefit from their generosity and how (Rotary International). Cultivating a close relationship with donors can lead to increased project funding for prolonged duration of time. Donors need to be provided with regular reports on the use of donated funds. They appreciate knowing how donations are being used, and it's in the project's best interest to be as transparent and accountable as possible with project funds. Also, donors should be kept informed of the project's progress, and be invited to participate in project events and celebrations (Rotary International). Donated goods and funds can make a tremendous impact on a community project. But it should be remembered that projects should be needs-driven and not supply-driven. "When your

organization identifies the need for specific donated goods, reach out to the local community first. Purchasing goods locally may be less expensive than having them shipped but it helps support the local economy. If you decide to accept goods from an international partner, be sure that all parties understand, and are prepared to meet, the relevant customs regulations, procedural requirements, and shipping costs” (Rotary26International). Thus most donors impose stringent rules and regulations for procurement of goods, works and services. Neale and Neale (1989) illustrated the relationship between project cost and planning input in the timely completion of construction projects. Essentially, the availability of funds targeted at a particular project activity is a measure of project success, especially for activities in the critical chain. In a study to determine how District hospitals in Ghana cope with the untimely release of funds, Asante et al., (2006) noted that this created serious cash flow problems for the district health managers that disrupted the implementation of health activities and demoralized the district health staff. However, based on their prior knowledge of when funds were likely to be released, district health managers adopt a range of informal mechanisms to cope with the situation. These mechanisms include obtaining supplies on credit, borrowing cash internally, pre-purchasing materials, and conserving part of the fourth quarter donor-pooled funds for the first quarter of the next year. Although these informal mechanisms have kept the district health system in Ghana running in the face of persistent delays in funding, some of them are open to abuse and could be a potential source of corruption in the health system. The untimely release of funds, particularly during the first phase of the project, is a significant barrier to effective project delivery especially where new project staff must be recruited and pre-requisite field supplies purchased to kick-off project activities. The need for timely releases of funds has also been stressed (Foster, 2000). Odhiambo, (2007) while referring to Feuerstein, (1986) explained that locally managed and controlled funds have great potential to bring about positive development outcome at the local level especially if community participation is sufficiently enhanced and political interference reduced. It is true that there is no proper system put in place to monitor and evaluate the effectiveness of the use of these funds this is so because the appointing authority is not restricted to nominating people with such knowledge. Grossman, (2005) on his part argued that a program’s effectiveness can be measured accurately only if one knows what would have happened without it. The most important factor influencing timely completion of construction projects is financing by the contractor, during the project, changes in designs by the owner or his agent during the

construction, delays in contractor's payment and non-utilization of professional construction management. In addition, preparation and approvals of shop drawings also contribute to the delays to a significant extent. This is because of the increasing rates of interests, commercial pressure, inflation and the potential of construction project to result in disputed and claims leading to litigation or arbitration. Others are cash flow problems during the construction process. Owners on their part cause delays when they face labor shortages or engage inadequate labor skills. In countries whose construction workers are relatively unskilled and lack of adequate planning at the early stages of the project results in time and cost overruns.

#### ***2.3.1.5. Economic factors that influence Completion of Construction Projects***

Economic environmental considerations refer to the level of general economic activity and resources available to carry out construction work. Koushki and Kartam (2004) identify twenty-five such factors that could impact on construction time. These applications include the availability of materials; the availability of equipment; the availability of trades / operatives, the availability of supervision / management staff, as well as the indirect impact of interest rates / inflation and insolvency, and bankruptcy. Economic influence has two levels: first, the internal economics principle relating to the viability of a project holds that unless there is a net gain there is no point in even considering embarking on a project. The external or macro-economic relate to high interest rates and prices, tariff barriers, embargoes and shipping restrictions, among other influences, of which the project manager have no control over.

Even though conceptualizing and or measuring these capabilities is not straight-forward, an in-depth analysis of employees' competences and their development is inevitable because they form a key source for competitive advantage in construction projects. Globally from a resource- based point of view, superior performance of construction projects is linked to the resources and capabilities possessed by a particular project staff. This holds particularly true for construction projects branches facing so- called hyper competition which denotes a competitive situation where the key success factor is the ability to constantly develop new products, completed in stated timelines providing the customer with increased functionality and performance. From an economic modeling point of view, allocating available resources amongst a set of project opportunities poses a decision making problem of intriguing complexity. The question to be

answered involves addressing how the goals of generating (innovation) value and strengthening innovation capacity can best be accomplished for timely completion of construction projects.

Memo, Rahman and Azis (2012) investigated the variation and claims in construction projects in Dubai and Abu Dhabi in the United Arab Emirates using 124 claims related to can be little more specific the range of the projects or typical project. He concluded that 1) a reasonable time should be allowed for the design team in order to reduce clear and complete contract documents with no or minimum errors and discrepancies; 2) efficient quality control techniques and mechanisms need to be established to minimize errors, mismatches, and discrepancies in the contact documents; 3) special contracting provisions and practices need to add in contract contact documents; 3) special contracting provisions and practices need to add in contract document and a strategy needs to introduce to deal with tighter scheduling requirements. Alaghbari (2014) found several causes of delay in Saudi construction projects and they redrawing preparation, approval of design, payment delay, changes in design, slow cash flow, design errors, labour shortage. The filed survey in his research on the delay in construction projects in Saudi Arabia included examined 23 contractors, 19 consultants, and 15 owners. Al-Moumani (2000) conducted a qualitative analysis of construction delays by examining the records of 130 public building projects constructed in Jordan during the period 1990-1997 where the frequencies analysis method was used to identify the main causes of delay from the survey records. The result of the analysis exposed that the main causes of delay in construction projects were relate to designers user, changes weather, site conditions, late deliveries, economic conditions and increase in quantities.

#### ***2.3.1.6. Political factors influencing Completion of Construction Projects***

Chism and Armstrong (2010) confirm the fact that the political environment affects the construction of a project. Fortune and White (2014) in their review of sets of critical success factors in sixty three publications listed political stability as one of the twenty-seven critical success factors. Wide man (1986) asserts that changes in government actions are a major external risk factor militating against the success of projects. Politicians are elected by citizens to decide public policy, including the delivery of public projects, whereas bureaucrats are employed by the government to implement these policies. When faced by high levels of political competition in their constituencies, politicians may be incentivized to improve the quality of

potentially vote-winning public projects. Consequently, they may seek to overcome barriers such as bureaucrats' indecency, inertia, or corruption.

Existing evidence suggests political competition can improve the delivery of public projects. According to Markus and Tanis (2010), political interference plays a critical but poorly understood role in determining the success or failure of the processes of project management that dominate efforts to form international regimes or, more generally, institutional arrangements in international society. An examination of the nature of project management serves as a springboard both for pinpointing the role of leadership in regime formation and for differentiating three forms of leadership that regularly come into play in efforts to establish international institutions: structural leadership, entrepreneurial leadership, and intellectual leadership Holland et al.(, 2009).

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

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

The outstanding puzzle is how politicians are able to influence the bureaucratic arm of government, and raise bureaucratic productivity, to satisfy short-term electoral concerns.

Typically, politicians do not under-take public projects themselves, but must delegate these tasks to bureaucrats, whom they then incentivize. Our understanding of the interactions between politicians and bureaucrats is very limited, both in terms of their causes and their consequences Jha and Iyer, (2006). More broadly, there is a limited empirical literature on bureaucrats, despite their importance as the main producers of public projects in many countries. To understand the delivery of public projects, it is important to understand the incentive environments in which bureaucrats operate: both formal incentives in a bureaucrat's contract, and informal interactions she has with powerful actors such as politicians.

### ***2.3.1.7. Project Monitoring***

The project manager must regularly ensure that the planned work is proceeding according to schedule. The purpose here is to ensure that the project is being implemented as planned and acting to resolve problems. The Gantt chart and the schedule network are updated continually (PMI 2010, Conchuir 2011). Performance measurement is a basic requirement for tracking cost, time and quality of a project (Yang et al 2010). Narbaev (2013) citing Pewdum et al. (2009) observes that the primary purpose of managing a facility construction project is to complete it on time and within the budget while conforming to the established requirements and specifications (Pewdum et al., 2009). To achieve that objective he argues, substantial effort on managing the construction process must be provided and could not be done without an effective performance monitoring system. No matter how perfect the construction project plan is, if no regular and timely reviews are performed during the project execution, neither the project progress nor the effectiveness of the plan can be evaluated (Cleland and Ireland, 2007; Narbaev 2013). Project monitoring allows to determine what has happened and to foresee what may happen in the future if previous performance is expected to continue or if there are no changes in the management of a project. There are three metrics that any project team tries to keep on track: cost, time, and scope of work. Monitoring compares actual to planned performance and take preventive and corrective actions based on the finding. Late corrections are ineffective and can cause cost and time overrun (Narbaev 2013).

Earned value management is a powerful quantitative technique for objectively monitoring the physical project progress. It enables the actual work performance to be compared with the agreed plan (PMI 2005). It can, therefore, be argued that any project with a significant time overrun misses the steps early in the project implementation but the project manager does not realize it

until it is too late. When the problem is realized too late in the day the ability to recover the project to achieve its planned objectives is already diminished (Alvarado et al, 2004).

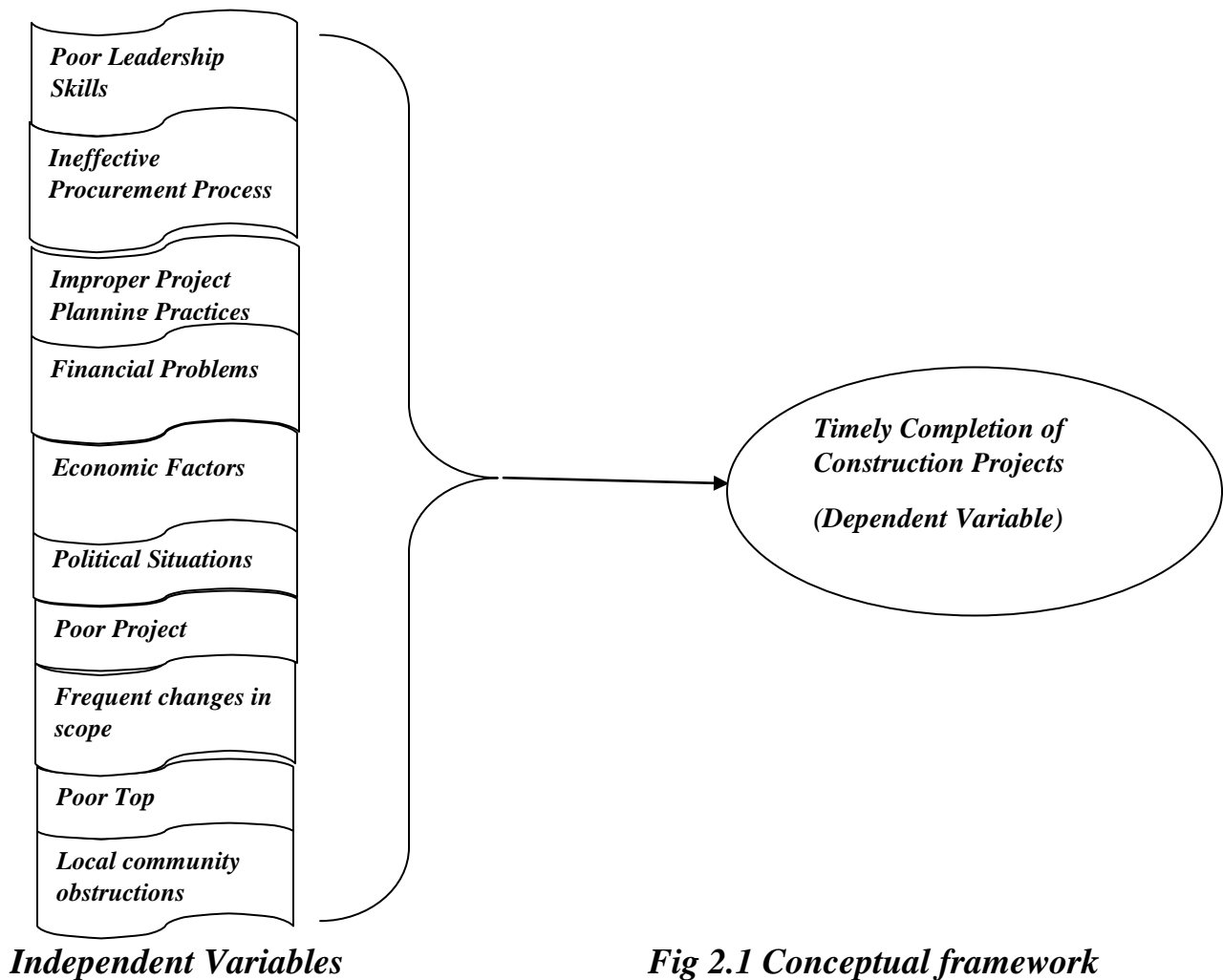
The key practice of EVM includes two steps: first, establishing a performance measurement baseline (PMB) and, second, measuring and analyzing a projects performance against the PMB. Steps to effectively build a PMB includes decomposition of work scope to a manageable level, assigning responsibilities, developing a time-phased budget for each work task, and maintaining PMB integrity throughout the project. Performance measurement and analysis comprises recording resource usage during the project execution, objectively measuring the actual physical work progress, analyzing and forecasting cost/schedule performance, reporting performance problems, and taking corrective actions (PMI, 2011).

### ***2.1. Research Gaps***

According to Menches and Hanna (2006) schedule performance is an important aspect in determining project success. However, there has been little research done on schedule performance of construction project in Ethiopia. In addition, most of the traditional publications on project management present approaches to project management that in some cases are stretched to the limit or are deemed ineffective (Al-Carlos 2014). It is important therefore to look for the most common factors hindering timely completion of road construction projects.

## 2.2. Conceptual Framework

A conceptual framework is defined as a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation (Ramey & Reichel, 1987). This conceptual framework was captured and tabulated to show a relationship between the independent variables and dependent variable. The conceptual framework of the study was developed from different authors findings (Cleland and Ireland, 2007; Narbaev 2013, Chism and Armstrong, 2010; Koushki and Kartam, 2004;Gwadoya, 2001; Koushki et al., 2005 and Odusami, Iyagba & Omirin, 2003. Therefore, the study was guided by conceptual framework.



## Chapter Three

### Research Methodology

#### ***3.1. Introduction***

In this chapter the details of all information regarding the methods that were to carry out the research are discussed. The chapter contains research design, sampling design, target population, sampling method, unit of analysis and research instruments. It also presents how data has been analyzed and presented.

#### ***3.2. Research Approach and Design***

This research is a practical problem developed from the observation of road construction projects, and the research questions are oriented to investigate the cause of time overrun in road construction projects of Defense Construction Enterprise. This research is categorized as both applied and descriptive research. It is an applied research because the research is initiated from practical problems, and aimed at finding whether there exists time overrun or not, and thereby recommends the best solutions to overcome the problems. The research is also categorized as a descriptive study because it would try to describe the factors contributing to time overrun of road construction projects completed by DCE 2003-2011 E.C. In terms of research approach, the study was categorized under quantitative research since the quantifiable data were gathered by closed ended questions of the questionnaire which were designed to keep the respondents in scope. The questionnaire was distributed to project managers and engineers who are working under the respective department of the enterprise mentioned above.

#### ***3.3. Study Population and Sample size***

According to Kitchenham (2002) population represents the group or the individuals to whom the survey applies. In other words, population contains those group or individuals who are in a position to answer the questions and to whom results of the survey apply. The sample unit is a public enterprise which is called DCE. Therefore, the study is conducted on road construction projects being implemented by Defense Construction Enterprise at various construction sites for nine consecutive years. The total projects being implemented by DCE for consecutive nine years are 12. From these projects, 10 projects are beyond contract schedule and the rest 2 projects are newly commenced projects. However, even if the implementation delay occurred in projects conducted by DCE, the time of delay is different from project to project. However, the

conclusions were made on the basis of relative importance of factors for all projects on the basis of respondents view. Currently the enterprise is running twelve road construction projects. Therefore, it has 12 project sites in addition to permanent head office. It was very expensive in terms of money and time to collect data from these entire projects or contacts since the project sites are located at different woredas and zones of the country so that the researcher was obliged to determine sample which is representative for the total population. Therefore, the sample of the study was taken only from project managers, site engineers and office engineers who know well about the subject matter on the basis road construction head. Purposive sampling technique has been used to select the respondents under the given population. Accordingly, 4 Heads of the enterprise, 12 Project Managers, 10 site engineers and 4 office engineers totally 30 respondents were available were purposively selected.

#### ***3.4. Data Collection Procedure***

Because of the pre-determined sample population and the nature of the study, the sampling methodology used was non-probability. A purposive or judgmental sampling methodology was therefore applied in this study. The sampling procedure was also guided by availability of concerned officers which means project managers, site engineers and office engineers. Questionnaires were distributed to the identified project managers, site engineers and office engineers, and successfully collected the whole distributed questionnaires.

#### ***3.5. Sampling Design***

It is very expensive in terms of money and time to collect data from these entire projects or contacts since the project sites are located at different woredas and zones so that the researcher was obliged to determine sample which is representative for the total population. Purposive sampling technique has been used to select the respondents under the given population. According to Walliman (2005), purposive sampling is a useful sampling method which allows a researcher to get information from a sample of the population that one thinks knows most about the subject matter.

#### ***3.6. Unit of analysis***

The unit of analysis is the major entity that is being analyzed in a study. In terms of unit of analysis, this research focuses on road construction projects under DCE that were completed within the last nine years (from 2003-2011 E.C).

### **3.7. Source of Data**

Both primary (Questionnaire) and secondary data (Archival Review) were used in relation to the topic under discussion.

### **3.8. Research Instrument**

To gather concrete data, all relevant and available data/documents have been assessed and analyzed. Structured Questionnaire and archival records review have been adopted as major tools to collect both primary and secondary data.

### **3.9. Data Processing and Analysis Methods**

The analysis part combined the data collected from all of respondents in order to obtain significant results. After collecting data from primary sources it was appropriately checked. In addition to that in house editing was made by the researcher to detect errors committed by respondents during completing the questionnaires. The data was analyzed by calculating the relative important index model to rank the hypothesized factors based on their importance which is derived from the views of the respondents. Sambas van and Soon (2007) used the RII method to determine the relative importance of the various factors of affecting construction projects. The same method was adopted in this study.

RIIs for each factor will be calculated as shown below:

$$RII = \sum W/A * N$$

Where:

RII = relative importance index

W = weighting given to each factor by respondents (ranging from 1 to 5)

A = highest weight (i.e. 5 in this case); and

N = total number of respondents.

The RII values have a range of 0 to 1 (0 not inclusive); the higher the RII is the more important factors indicators affecting the performance of road construction projects. The RIIs was ranked, and the results are shown by using tables.

### ***3.10. Validity and Reliability of the Instrument***

Validity refers to the ability of the instrument to measure what it is designed to measure. Kumar, (2005) as cited by Ndegwa, (2013) defines validity as the degree to which the researcher has measured what he set out to measure. It is the accuracy and meaningfulness of inferences which are based on research results. Validity therefore is whether an instrument is on target in measuring what is expected to measure. To check the validity of the instrument the researcher worked with the adviser as the expert and agreed whether the instrument was valid or not. The tool was also subjected to peer review to ensure its validity. The instrument was subjected to face validity, content validity test and construct validity test through testing it using the research done in the past.

In any research results, the issues of reliability are important confidence measures. It measures the internal consistency of the items in a scale. It indicates that the extent to which the items in a questionnaire are related to each other. Therefore, the items included in the questionnaire accurately measure what they intended to measure.

### ***3.11. Ethical Considerations***

The respondents in the study were assured of confidentiality of the information they provided. The respondents were not required to write their names in the questionnaires or interview schedules. No respondent was forced to participate except those that voluntarily agreed to participate in the study. The researcher maintained humility and conducted the research with utmost honesty avoiding distortions and misleading data manipulation. The researcher also endeavored to arrive at conclusions based on objective inferences that are purely and blindly guided by the data collected. The analysis of data and interpretation of the results of data analysis were restricted to what the data actually tell

## Chapter Four

### Data Presentation, Analysis and Interpretations

#### 4.1. Introduction

This chapter dealt with the presentation of the data collected through questionnaire and document review. An attempt was made to collect relevant data from project management department of DCE that were completed within the last five years (from 2003-2011 E.C). Documents of the company essentially the completion reports of the road construction and building projects which were considered for this study were reviewed and presented here in this chapter. This chapter describes the results and discussion of questionnaire survey and road construction projects' progress and completion report 2019 for further analysis of factors causing construction projects completion beyond schedule. Finally, the effects of improper project planning practices, poor project monitoring practices, poor leadership skills, ineffective procurement process, poor top management support and financial problems as internal factors, and political situations, local community obstructions, frequent changes in scope and economic factors were dealt.

#### 4.2. Yearly Accomplishment of Road Construction Projects

This section presents the eight years' yearly accomplishment of Road Construction Projects of the enterprise in terms of planned and accomplished budget.

**Table 4.1:** Yearly Accomplishment of Road Construction Projects

<i>Year</i>	<i>Contract Amt.</i>	<i>Plan</i>	<i>Accomplishment</i>	<i>%age</i>
2003	2,104,382,396.90	344,088,001.00	308,989,513.06	90%
2004	2,495,091,681.17	928,355,874.00	457,682,351.29	49%
2005	2,780,849,643.00	1,267,386,174.99	765,386,174.99	60%
2006	3,362,146,063.90	1,722,481,347.38	896,797,679.62	52%
2007	3,225,126,367.19	991,081,441.42	915,204,052.53	92%
2008	5,443,095,609.14	586,664,344.32	505,393,758.31	86%
2009	8,987,950,481.29	1,618,960,796.95	1,161,590,016.09	72%
2010	9,122,625,173.55	2,966,983,863.94	1,888,147,026.33	63.64%
2011	8,725,212,803.58	4,019,072,456.71	Only 9 months' accomplishment	

Source: Nine years performance report of DCE May 2011

**Table 4.2:** Contract time and actual completed time of road construction projects under Defense Construction Enterprise

S. No	Project	Commencement Date	Completion Time	Contract Time	EOT		Time Elapsed Days	Remaining Time	execute part in %
					Requested	Approved			
<b>A</b>	<b>Existing Projects</b>								
1	Dicheto-Ekidar	22/10/2015	4/01/2019	1170	675	179	1286	63	74%
2	Musli-Bada	28/01/2016	27/01/2019	1095	254	30	1188	-63	81%
3	Awash-Mille IV	22/06/2016	22/06/2018	730	497	85	1042	-227	78%
4	Adigudom-Wukro	28/07/2016	22/07/2023	2550					
		28/07/2016	28/07/2019	1095			1006	89	41%
5	Mekele-Samre	01/11/2016	01/11/2019	1095	591		910	185	43%
6	Beles-Mekanebirhane	01/11/2016	01/11/2019	1095	360		910	185	32%
7	Nekemte Airport	18/03/2017	18/03/2019	730	385	30	742	18	40%
8	Ertale-Ahmedila	02/05/2017	01/05/2020	1095	266		728	367	32%
9	DebreZeitAirforce(Phase I)	06/06/2017	06/06/2018	365	444	263	693	-65	
	DebreZeitAirforce(Airplane Parking( Agreement 01	30/10/2018	26/08/2018	300	477	293	547	46	
	DebreZeitAirforce(Airplane Parking( Agreement 02	05/08/2018	01/02/2019	180	145	134	268	46	88%
10	AfderaBidu	01/06/2018	01/05/2021	1095			333	762	88%
<b>B</b>	<b>New Projects</b>								
1	Tarmaber	23/12/2018	08/12/2021	1095			128	967	0.49%
2	Adishuhu	09/05/2019	27/04/2022	1095					0%

**Source:** Defense Construction Enterprise (Road Construction Projects' Progress and completion report 2019)

The above table clearly shows that the rate of time overrun is significantly high in Defense Construction Enterprise road construction projects. From the projects' completion report it was found that the main reasons for time overrun are improper project planning practices, poor project monitoring practices, poor leadership skills, ineffective procurement process, poor top management support and financial problems, political situations, local community obstructions, frequent changes in scope and economic As we can understand from the above table, eight projects were completed beyond their planned completion period. As it is clearly presented on the table, there is a significant difference between the plan and the actual performance of projects in terms of time requirements. As the researcher reviewed above, project efficiency is measured by its actual performance compared with what was planned in terms of time. Therefore, all projects completed beyond time schedule are assumed to be inefficient as they are failed to meet

its planned requirement in terms of time. It is possible to assume different causes/factors for the inefficiency of the above projects in terms of their time requirements. The researcher assumed/hypothesized different factors which can contribute essentially for time overrun on road construction projects as it is presented in the below analysis. The respondents were project managers and engineers who are directly involving in road construction projects under study.

#### **4.1. Part One: General Information of Respondents**

##### **4.1.1. Gender of respondents**

Questionnaire was distributed to thirty respondents that the researcher thought they know most about the unit of analysis under study. Accordingly, 4 (13.33%) of the respondents were Head of the organization. The stated four respondents were male, and they returned the whole four questionnaires distributed to them. The largest category of the respondents, project managers, cover 12 (40%) among which the 10 (33.33%) were male and the remaining 2 (6.66%) were female. The received 12 questionnaires, and successfully responded the questionnaires. Among the respondents, 10 (33.33%) were site engineers who know well about factors hindering timely completion of construction projects. Among the 10 (33.33%) site engineers, the 7 (23.33%) were males while the 3 (9.99%) were female. 10 questionnaires were distributed, and collected from site engineers. There were 4 (13.33%) male office engineers to whom four research questionnaires were distributed, and received.

**Table 4.3 Gender of respondents**

<i>Sex</i>	<i>Quantity</i>	<i>Percentage</i>	<i>Questionnaire Distributed</i>	<i>Questionnaire Collected</i>	<i>Response Rate</i>
<i>Male</i>	25	83.33	25	25	100
<i>Female</i>	5	16.67	5	5	100
<i>Total</i>	<b>30</b>	<b>100</b>	<b>30</b>	<b>30</b>	<b>100</b>

##### **4.1.2. Level of education and working experience of respondents**

Table 4.4 shows that 6.66% (2) of the respondents have experience between 1 to 4 years at construction works and 16.66 % (5) of the respondents experience between 5 to 8 years, 23.33 % (7) of respondents have experience from 9 to 12 years, and 53.33 % (16) who have experience more than 12 years. 93.32% of respondents have more than 5-12 years relevant working

experience. This shows that most of the respondents are capable to provide relevant data on factors affecting timely completion of construction projects Moreover, the team of construction projects under study was highly dominated by first degree holders calculated at 63.33% (19) respondents, and followed by 2<sup>nd</sup> degree holders of 26.66% (8). PhD holders were 10% (3) of the total respondents.

**Table 4.4:** Experience of respondents (years) and educational Background

<i>Experience</i>	<i>N<sup>o</sup> of respondents</i>	<i>%age</i>	<i>Level of education</i>	<i>N<sup>o</sup> of respondents</i>	<i>%age</i>
<1Yr	0	0%	Certificate	0	0%
1-4Yrs	2	6.66%	Diploma	0	0%
5-8Yrs	5	16.66%	1 <sup>st</sup> Degree	19	63.33%
9-12Yrs	7	23.33%	2 <sup>nd</sup> Degree	8	26.66%
≥13Yrs	16	53.33%	≥PhD	3	10%
<b>Total</b>	<b>30</b>	<b>100</b>			<b>100</b>

#### 4.2. Factors Contributing to delay in Road Construction Projects under DCE.

This part of the paper consists of results and discussion of factors that contribute for time overrun (delay) in road construction projects.

Table 4.5: Factors contributing to delay in Road Construction Projects under DCE.

<i>Hypothesized Factors</i>	<i>Significance</i>					<i>Total Value</i>	<i>RII</i>	<i>Rank</i>
	1	2	3	4	5			
<i>Improper Project Planning Practices</i>	3 (10%)	2 (6.67%)	1 (3.33%)	4 (13.33%)	20 (66.67%)	126	0.84	1
<i>Ineffective Procurement Process</i>	3 (10%)	1 (3.33%)	2(6.67%)	6 (20%)	18 (60%)	125	0.833	2
<i>Financial Problems</i>	2 (6.67%)	5 (16.67%)	0 (0)	5 (16.67%)	18 (60%)	122	0.813	3
<i>Poor Top Management Support</i>	5 (16.67%)	3 (10%)	1 (3.33%)	1 (3.33%)	20 (66.67%)	118	0.786	4
<i>Poor Leadership Skills</i>	4 (13.33%)	3 (10%)	1 (3.33%)	2 (6.67%)	19 (63.33%)	116	0.773	5
<i>Poor Project Monitoring Practices</i>	4 (13.33%)	4 (13.33%)	1 (3.34%)	6 (20%)	15 (50%)	114	0.76	6
<i>Economic Factors</i>	1 (3.33%)	6 (20%)	8 (26.67%)	5 (16.67%)	10 (33.34%)	107	0.71	7
<i>Frequent Change request</i>	2 (3.33%)	4 (13.33%)	11 (36.67%)	6 (20%)	8 (26.67%)	106	0.706	8
<i>Political Situations</i>	2 (3.33%)	4 (13.33%)	14 (46.67%)	4 (13.33%)	6 (20%)	98	0.65	9
<i>Local community obstructions</i>	1 (3.33%)	6 (20%)	16 (53.34%)	3 (10%)	4 (13.33%)	93	0.62	10

Sources: Questionnaire Survey: 2019.

The above table presents and ranks the most common factors influencing timely completion of road construction projects on the basis of their relative importance index. And, accordingly, the researcher computed for relative importance index for all factors.

From *factors* affecting timely completion of construction projects, the most significant factor was improper project planning with an aggregated RII of 0.84(84%), and was ranked as the top most cause of delays. When the respondents were asked to state how they rate the level of the impacts of improper project planning on timely completion of road construction projects they were involved in; strongly agree(66.67%), agree (13.33%), neutral (3.33%), disagree (6.67%) and strongly disagree (10%). This indicates that large number of respondents agrees with the influence of poor project planning impacts timely completion of construction projects. It had a high impact on construction projects undertaken by defense construction enterprise as planning plays crucial role for success of projects. From the summary of results in the above table, it can be observed that an *ineffective procurement processes* the second key factor that contributed most to delays in road construction projects of DCE with RII 0.833(83.3%). Respondents' levels of agreement on ineffective procurement process impacts on timely completion of projects were strongly agree (60%), agree (20%), neutral (6.67 %), disagree (3.33 %) and strongly disagree (10%). *Financial problems* has been ranked by the respondents in the third position with RII equal 0.813(81.3%). When asked whether they can rate that financial problems highly contribute delay in completion of construction projects undertaken by DCE, the respondents' level of agreement would be 60% strongly agreed,16.67% agreed, 0% neutral, 16.67% disagreed while 6.67% strongly disagreed. The fourth critical factor contributing to construction projects completion is *poor top management support* with the RII equal to 0.78 (78%). On poor top management support, 66.67% strongly agreed, 3.33% agreed, 3.33% neutral, 10% disagreed and 16.67% strongly disagreed. Poor project leadership skills is also another internal factors letting construction projects completed beyond the schedule as computed at RII 0.773. 63.33% of the respondents strongly agreed when I asked whether poor leadership skills increase the chances of delay in project completion, 6.67% agreed, 3.33% neutral, 10% disagreed while 10% strongly disagreed. This indicates that project leadership was essential for timely project completion. When further asked to give their suggestion on poor *project monitoring practices*, 50% rated it strongly agree, 20% agree, 3.34% neutral, 13.33% disagree while 13.33% as strongly disagree. Poor project monitoring practices was ranked as the 6<sup>th</sup> factor whose RII is 0.76 (76%) that contributes to construction projects completion beyond the schedule.

*Economic factors* also influence the timely completion of projects as with RII 0.71 (71%). 33.34% of respondents was strongly agreed with the impacts of economic factors as the leading

external factor, 16.67% agree, 26.67% had no idea regarding the economic factors influence on construction projects timely completion, 20% disagree while 3.33% of respondents strongly disagree that economic factors influence over time performance of construction projects. According to respondents' response, the economic fluctuation, and increase in exchange rate have adversely affected the projects undertaken by the enterprise. Respondents ranked *frequent changes in scope* with RII 0.706 (70.6%) as the factor influencing construction projects timely completion. Regarding the respondents' level of agreement in percentage; 26.67% of respondents was strongly agreed on the impacts of frequent changes in scope, 20% agreed, 36.67% neutral, 13.33% disagreed while 3.33% of respondents strongly disagreed. The ninth external factor ranked by respondents was political situation that occupies RII 0.65 (65%). Due to frequent social strikes, peaceful demonstration, social unrest and displacement of citizens from different borders of the country, the local community used to defend government militaries. This in turn resulted in the extension of construction projects completion period. Respondents ranked its level of significance as follows; 20% strongly agree, 13.33% agree, 46.67% neutral, 13.33% disagree and 3.33% strongly disagree. Local community obstruction is also another key external factor that put the construction projects completion beyond the schedules. The respondents ranked it with RII 0.62 (62%). The respective respondents ranked its level of significance as strongly agree 13.33%, agree 10%, neutral 53.34%, disagree 20% while strongly disagree is 3.33%. Road Construction projects undertaken by DCE particularly have been suffered from local community obstruction that has been undertaken by farmers and other land owners not to lose the ownership title of their land. Moreover, the local community has been asking for high amount of compensations in order not to leave their lands.

## Chapter Five

### Conclusions and Recommendations

#### ***5.1. Conclusions***

From the results of the analysis of secondary data and respondents' responses the following conclusions are drawn. Firstly, more than 80% of the projects completed 2003-2011 E.C were completed beyond their planned completion period. And this reveals that delay in completion construction projects in Ethiopia particularly construction projects undertaken by Defense Construction Enterprise is common. Secondly, the common causes of delay are broadly categorized under two common categories; namely internal factors those factors that the enterprise can control and the external factors those factors beyond the control of the enterprise. The most common factors that lead to completion of construction projects beyond the schedule are; improper project planning practices, poor project monitoring practices, poor leadership skills, ineffective procurement process, poor top management support, financial problems, and economic, political, social and frequent request for design changes are the major responsible factors influencing timely completion of construction projects. Thirdly, it should be recognized that the economic performance of the country, the enterprise itself and infrastructural service quality of the public are all affected by the problem of untimely delivery of these projects.

#### ***5.2. Recommendations***

Based on the findings of the research and the significance level of the factors ranked by respondents, the following recommendations are forwarded to the concerned stakeholders;

1. The enterprise should allow sufficient time to prepare project briefs and other feasibility studies as it will reduce the contribution of inaccurate cost estimation, unforeseen site conditions and slow site clearances for the untimely delivery (time overrun) of road construction projects.
2. Contractor, DCE, should ensure efficient time management through proper resource planning, duration estimation, and schedule development and control; to avoid delay.
3. The enterprise should clearly describe project scope and details of activities to be accomplished avoid frequent scope change request and unexpected challenges from internal and external factors.

4. All the specifications, criteria's and requirements must be clear and easily communicable for concerned participants.
5. The enterprise also should clearly indicate the project critical paths, and contingency plan should be developed to manage unforeseen social, political and economic factors.
6. The enterprise should ensure that adequate funds are available before projects are started so that it can be paid in accordance with the contract agreement which will enhance the timely delivery of road projects.
7. Effective monitoring and controlling mechanism should be developed to commence projects on time according to the agreement.
8. A flexible design should be prepared which is possible to respond more proactively to necessary changes in owner needs and requirements.
9. The researcher also would like to mention that the government should give top priority to finance construction projects, and FCY to supply the necessary materials and equipment timely.
10. DCE has to be aware about best construction materials procurement competition, so it is advised to purchase the construction materials at the beginning of work. It is also better to have time schedule for material delivery process to the site in order to avoid shortage or lack of materials

## References

- ✓ Adriaanse and Voordijk, 2014. Managing Project Supply Chains J. Construction Management and Economics. V. 31 No.11.
- ✓ Ahmad et al., 2003. Factors Affecting Time Overruns In Public Construction Projects: The Case Of Jordan. Int. J. of Business and Management; Vol. 8 No. 23.
- ✓ Ahmed and Kangari, 1995. Analysis of Client-Satisfaction Factors in Construction Industry Journal of Management in Engineering. Vol. 11, Issue 2.
- ✓ Al-Carlos, 2014. Factors Affecting Timely Completion of Public Construction Projects in Trans-Nzoia County. Int. J. of Scientific and Research Publications, Volume 7, Issue 4.
- ✓ Alkhatami, 1999. Criteria of Project Success. Int. J. of Project Management Vol. 17, No. 4, PP. 243-248.
- ✓ Al- Moumani, 2000. Significant Factors Causing Time Overrun in Construction Projects of Peninsular Malaysi. Published By Canadian Center of Science and Education Modern Applied Science; Vol. 8, No. 4; 2014.
- ✓ Al-Momani, 2000. Quantitative Analysis of Construction Delay. Int. J. Of Project Management. 18(1):51-59.
- ✓ Assaf and Al-Hejji, 2006. Causes of Delay in Large Construction Projects. Int. J. of Project Management V. 24: PP 349–357.
- ✓ Bernard Ogwen, et al., 2016. Determinants of timely completion of road construction projects financed by kenya roads board in Kisumu County. International J. of economics, commerce and management.
- ✓ Chan, 2001. Cost and time overruns of projects in Malaysia.
- ✓ Chan and kumaraswamy, 2008. Comparative study of causes of time overrun in Hong Kong construction projects. Int. J. of project management volume 15(1) pages 55-63.
- ✓ Chism and Armstrong, 2010. Factors influencing successful completion of road construction projects in Kenya: the case of Kisumu County. Int. j. of economics, commerce and management. V, issue 6.
- ✓ Conchuir, 2011. Factors affecting timely completion of public construction projects in trans-Nzoia County. Int. journal of scientific and research publications, volume 7, issue 4.

- ✓ Davenport, 1997. Assessing success factors of knowledge management initiatives of academic institutions – a case of an Indian business school electronic journal of knowledge management volume 5 issue 3: 273 – 282.
- ✓ Enshassi, 2009. Delays and cost overruns in the construction projects in the Gaza Strip.
- ✓ Fekadutakele, 2016. Factors affecting the performance of construction project under Oromia Industry and Urban Development Bureau, Ethiopia ABC research alert. Vol. 4, no 2.
- ✓ Feuerstein, 1986. The influence of project monitoring and evaluation on effective utilization of CDF funds in baring of central, Baringo county international journal of science and research (IJSR)
- ✓ Flanagan et al., 1998. A new approach to comparing the performance of contractors internationally built environment research unit, school of engineering and the built environment, university of wolver Hampton, wolver Hampton.
- ✓ Frimponget. Al., 2014. relative importance of significant factors contributing to delay and cost overruns in ground water construction project. Int. J. of education and research vol. 2 no. 4.
- ✓ Gbadura and Oke, 2010. An examination of project management leadership styles of Nigerian quantity surveyors J. of building performance vol.v1 issue 1.
- ✓ Gwaya, 2014. Factors influencing project scope performance: a case of Kenya national youth service projects in Kenya strategic journal of business and change management vol. 4, issue 4 (12), PP.207 – 220.
- ✓ Hillson. D., 2009. Managing overall project risk. Paper presented at PMI global congress, Dubai, United Arab Emirates. Newtown square, PA: project management institute.
- ✓ Jagboro and Aibinu, 2002. The effects of construction delays on project delivery in Nigerian construction industry. Int. journal of project management. V. 20: 593-599.
- ✓ Jha and Iyer, 2006. Determining critical success factors of project management practice: a conceptual framework procedia - social and behavioral sciences volume 153: 61-69.
- ✓ Jill Wells, 2001. Contemporary Issues in Construction in Developing Countries.
- ✓ Kigari&wainaina, 2010. an empirical investigation into the drivers of construction project failure in the technical department of the Cameroon Baptist convention health services. Int. J. of economics, commerce and management vol. VI, issue 1.

- ✓ Kamalesh, Rizwan and Syed, 2002. An investigation of the leadership style of construction managers in south Florida.
- ✓ Keegan and Den Hartog, 2004. Transformational leadership in a project –based environment: comparative study of the leadership styles of project managers and line managers. *Int. J. of project management* 22(8): 609-617.
- ✓ Koushki and Kartam, 2004. Effects of construction delays on construction project objectives.
- ✓ Kuprenas, 2003. Project management actions to improve design phase cost performance *journal of management in engineering* 19(1).
- ✓ K.N. JHA Et Al., 2006. Identification and evaluation of success factors for public construction projects *journal of construction management and economics* volume 29, 2011- issue 8.
- ✓ Lamb, Robert and Boyden, 2002. Factors influencing completion of construction projects in Kenya: a case of government buildings construction projects in Nairobi County, Kenya.
- ✓ Latham, 1994; Egan, 1998. Construction industry problems: the views of UK construction directors.
- ✓ Langford & Tennant, 2005. Construction management teams and project performance –a diagnostic toolkit.
- ✓ Mahamid, 2012. Causes of Delay in Road Construction Projects. *Journal of Management in Engineering* / Volume 28 Issue 3 - July 2012
- ✓ Mcminimee et al., 2009. Efficient and effective implementation of alternative project delivery methods.
- ✓ Motaleb and Kishk [24]. An investigation into causes and effects of construction delays in UAE.
- ✓ Müller and Turner, 2010. Leadership competency profiles of successful project managers. *Int. J. of project management* V. 28, 437-488.
- ✓ Munano, 2012. Determinants of timely completion of construction projects at Kenya airports authority strategic *journal of business and change management* vol. 5, issues 2, pp. 376 – 403.
- ✓ Menches and Hanna, 2006. Effect of pre-construction planning on electrical project performance. *The University of Wisconsin – Madison* pp. 267.

- ✓ Mojahed, 2005. Factors influencing completion of government road infrastructure projects in Kenya: a case of Meru County strategic journal of business and change management vol. 4, issue 4 (42), pp. 787 – 802.
- ✓ Project Management Institute, Inc., 2008. A Guide to the Project Management Body of Knowledge (PMBOK Guide) (4th Ed.). Newtown Square, PA: Author.
- ✓ Nafishah B., 2000). Developing a framework to minimize the occurrence of construction conflict and disputes in different procurement strategies.
- ✓ Narbaev, 2013. Proposal of new models in the management and monitoring of construction projects.
- ✓ Nixon. P., Harrington, M. and Parker. D, 2012. Leadership performance is significant to project success or failure: a critical analysis int. J. of productivity and performance management 61(2): 204-206.
- ✓ Nyangilo, 2012. An investigation of factors influencing the performance of contractors in Kenya international journal of soft computing and engineering vol.6 issue -2.
- ✓ Odeh and Battaineh, 2002. Causes of construction delay: traditional contracts int. J. of project management vol. 20, issues 1: pages 67-73
- ✓ Odeyinka and Yusif, 1997. The causes and effects of construction delays on completion cost of housing projects in Nigeria journal of financial management of property and construction vol. 2(3).
- ✓ Odeh, A. M and Battaineh, H., 2002. Causes of construction delay: traditional contracts international journal of project management. V. 20: 67-73
- ✓ Odusami, Iyagba&Omirin, 2003. Influence of leadership leader traits on team performance as correlates of success in construction projects' delivery. An int. J. of civil engineering and urban planning vol. 2, no. 2.
- ✓ Olatunji, 2010. Constructing dispute scenarios in building information modeling journal of legal affairs and dispute resolution in engineering and construction. V. 7(1).
- ✓ Olawale, 2010. Cost and time control of construction projects: inhibiting factors and mitigating measures in practice.J. of Construction Management and Economics. V. 28, no. 5
- ✓ Pakir, Olateju and Olawale.I, 2012. Project management and its effects on project success: cross-industry comparisons international journal of project management.

- ✓ PMI, 2010. International journal of scientific and research publications, volume 7, issue 4:2250-3153.
- ✓ PMI, 2011. Project management institute practice standard for scheduling second edition.
- ✓ Pewdum, Dominic. D,Ahiaga-Dagbuiand Simon D. Smith, 2009. Neural networks for modelling the final target cost of water projects.
- ✓ Pourrostan and Ismail, 2012. Causes and effects of delay in Iranian construction projects international journal of engineering and technology, vol. 4, no. 5.
- ✓ Reichelt and Lyneis, 1999. Factor affecting performance of construction projects in the Gaza strip.
- ✓ Rondinelli, 1993. Development Projects as Policy Experiments. An Adaptive Approach to Development Administration 2<sup>nd</sup> Edition.
- ✓ Sambasivan and Soon, 2007. Causes and effects of delays in Malaysia construction industry international journal of project management 25(5): 517-526.
- ✓ Shabbab, Al Hammadi and M. SadiqueNawab, 2016. International Advanced Research Journal In Science, Engineering and Technology Vol. 3, Issue 4.
- ✓ Sidwel, 1988. Construction management as a procurement method a new direction for Asian contractors.
- ✓ Soetanto,Bernard. K, Bernard. T,2001. Factors affecting client – contractor relationship in the Ghanaian construction industry ICIDA 2017 - 6th international conference on infrastructure development in Africa - 12-14, knust, Kumasi, Ghana.
- ✓ South Asia Sustainable Development, 2007. Achieving the sustainable development goals in south asia:key policy priorities and implementation challenges.
- ✓ Toor and Ogunlana, 2008. Problems causing delays in major construction projects in Thailand. Journal of construction management and economics vol. 26, issue 4.
- ✓ Torbica and stroh, 2001. Customer satisfaction in home building journal of construction engineering and management / volume 127 issue 1.
- ✓ UN, 1996. International Standards Industrial Classification (ISIC), Rev. 3.
- ✓ Xiao, H, Proverbs, D G, Shaw, T And Holt, G D, 2000. A new approach to comparing the performance of contractors internationally. In Akintoye, a (ed.), 16th annual Arcom conference, 6-8 September 2000, Glasgow Caledonian university. Association of researchers in construction management, vol. 1, 117-25.

- ✓ Wambugu D.M., 2013. Delays and increases in the construction of private residential projects in Kuwait journal of construction management and economics 23(3): 285-294.
- ✓ Xiao and Proverbs, 2001. The soft power of construction contracting organizations.
- ✓ Wambugu, D.M., 2013. Project success factors in the water sector in Kenya: a case of rift valley water services board international journal of economics, commerce and management vol. IV, issue 5, May 2013.
- ✓ Yatich, 2016. Factors affecting timely completion of public construction projects in trans-Nzoia county international journal of scientific and research publications, volume 7, issue 4.
- ✓ Yisa and Edwards, 2002. Organization design for international construction business.



**ADDIS ABABA UNIVERRSITY**  
**FACULTY OF BUSINESS AND ECOCOMICS**  
**SCHOOL OF COMMERCE**

**Appendix A:**

**Research Questionnaire**

*Dear Sir/Madam;*

My name is *Teshome Regassa Tolossa*. I am currently studying Masters of Arts in Project Management at Addis Ababa University school of Commerce. I am conducting an academic research entitled “*Determinants of timely completion of construction projects*” for the partial fulfillment of MA in Project Management. The main objective of this research is to identify the significant factors contributing to construction projects completion beyond schedule, and to make recommendations based on the findings.

Therefore, this questionnaire is prepared to obtain information from concerned informants with structured questionnaire only for the academic purpose. The questionnaire consists of four major sections. Questions under section one are aimed to obtain background information. Questions under section two deal with the information of delayed construction projects. Section three enquiries for information related with factors which put construction projects completion beyond schedule. Section four is all about relative significance of factors determining timely completion of road construction projects. Your response, in this regard, is highly valuable and contributes to the outcome of the research. All feedback will be kept strictly, treated confidentially, and utilized for this academic research only.

Thank you,

**Instructions:** This research is conducted for academic purposes, so please try to fill it carefully and truthfully. For each of the questions, please tick [✓] in the provided box. Please also answer all the questions to enhance the objectivity of the research. You are not expected to provide personal information that are not asked in the questionnaire. I would be grateful if you could complete the attached questionnaire as soon as possible to encourage timely completion of the paper work.

**Section I: Background Information**

1. Sex: Male  Female
2. Respondents designation: Head of the Organization
- Project Manager  Site Engineer  Office Engineer  Other
3. Working experience(In years): <1Yr  1-4Yrs  5-8Yrs  >8Yrs
4. Level of education: Certificate  Diploma  1<sup>st</sup> Degree
- 2<sup>nd</sup> Degree  ≥PhD

**Section II: Delayed Projects Information**

1. Have you ever experienced project delay? Yes  No
2. Name of the particular construction project/s completed beyond the schedule:  
 \_\_\_\_\_  
 \_\_\_\_\_
3. Name of the organization: \_\_\_\_\_
4. Initiation Year:  
 1<sup>st</sup> project \_\_\_\_\_ 2<sup>nd</sup> project \_\_\_\_\_ 3<sup>rd</sup> Project \_\_\_\_\_ 4<sup>th</sup> Project \_\_\_\_\_ 5<sup>th</sup>  
 project \_\_\_\_\_ 6<sup>th</sup> project \_\_\_\_\_ 6<sup>th</sup> project \_\_\_\_\_ 6<sup>th</sup> project \_\_\_\_\_
5. Expected Year of completion in months:

- 1<sup>st</sup> project\_\_\_\_\_2<sup>nd</sup> project\_\_\_\_\_3<sup>rd</sup> Project\_\_\_\_\_4<sup>th</sup> Project\_\_\_\_\_5<sup>th</sup> project\_\_\_\_\_
6. Actual Year of completion: 1<sup>st</sup> project\_\_\_\_\_2<sup>nd</sup> project\_\_\_\_\_3<sup>rd</sup> Project\_\_\_\_\_4<sup>th</sup> Project\_\_\_\_\_5<sup>th</sup> project\_\_\_\_\_6<sup>th</sup> project\_\_\_\_\_6<sup>th</sup> project\_\_\_\_\_6<sup>th</sup> project\_\_\_\_\_
7. For how long the project/s delayed? 1<sup>st</sup> project\_\_\_\_\_2<sup>nd</sup> project\_\_\_\_\_3<sup>rd</sup> Project\_\_\_\_\_4<sup>th</sup> Project\_\_\_\_\_5<sup>th</sup> project\_\_\_\_\_6<sup>th</sup> project\_\_\_\_\_6<sup>th</sup> project\_\_\_\_\_6<sup>th</sup> project\_\_\_\_\_

### Section: III-Factors contributing to delay in construction projects

To successfully determine factors influencing timely completion of the delayed construction projects, please indicate your opinion of the following internal and external factors by ticking [✓] in the appropriate boxes.

Where; S.A = Strongly Agree (5); A = Agree (4); N = Neutral (3); D.A. = Disagree (2); S.D. =Strongly Disagree (1);

Sr. No	<b>Hypothesized Factors</b>	Level of significance					Remarks
		S.A(5)	A(4)	N(3)	D.A(2)	S.D(1)	
<b>1</b>	<b>Improper Project Planning Practices</b>						
	<i>The project scope was not clearly described</i>						
	<i>The plan lacks details</i>						
	<i>Risks to be managed were not properly planned</i>						
	<i>Poor contingency plan</i>						
	<i>Critical path was not clearly indicated in the plan</i>						
	<i>Absence of seasonal weather condition consideration</i>						
	<i>Unrealistic activity duration estimation</i>						
	<i>Absence of key project team member participation</i>						
	<i>Unclear acceptance criteria</i>						
	<i>Unrealistic deadline</i>						
<b>2</b>	<b>Poor Project Monitoring Practices</b>						
	<i>Complex acceptance criteria by different stakeholders</i>						
	<i>Poor indicators of effective monitoring process</i>						
	<i>Lack of trained officers</i>						
	<i>Lack of experienced officers</i>						
	<i>Poor performers' skill</i>						

	<i>Insufficient budget</i>						
	<i>Insufficient time to monitor effectively</i>						
<b>3</b>	<b><i>Poor Leadership Skills</i></b>						
	<i>The project manager did not empower project team</i>						
	<i>The project manager did not deal with conflicts</i>						
	<i>The project manager was not flexible</i>						
	<i>The project manager did not engage the project team</i>						
	<i>The project manager did not inspire the project team</i>						
	<i>The project manager was not creative</i>						
	<i>The project manager was not innovative</i>						
	<i>The project manager had no confidence</i>						
	<i>Lack of good communication skills</i>						
<b>4</b>	<b><i>Ineffective Procurement Process</i></b>						
	<i>Delay in preparing technical specifications</i>						
	<i>Failure to start the procurement process on time</i>						
	<i>Extension of Bid submission date</i>						
	<i>Delay in opening Bid</i>						
	<i>Delay in starting Bid evaluation</i>						
	<i>Delay in finishing Bid evaluation</i>						
	<i>Delay in Bid approval</i>						
	<i>Delay in contract negotiation</i>						
	<i>Late delivery of ordered item</i>						
<b>5</b>	<b><i>Poor Top Management Support</i></b>						
	<i>Late decision making</i>						
	<i>Lack of a formal and an ongoing support</i>						
	<i>Late response to staff disputes</i>						
	<i>Poor communication practices with project team</i>						
	<i>Absence of scheduled discussions with project team</i>						
<b>6</b>	<b><i>Financial Problems</i></b>						
	<i>Insufficient budget allocation</i>						
	<i>Late budget approval</i>						

	<i>Poor cash flow management</i>						
	<i>Late payment</i>						
<b>7</b>	<b><i>Political Situations</i></b>						
	<i>Social unrest</i>						
	<i>Lack of security at site due to political instability</i>						
	<i>Government interference for political ends</i>						
<b>8</b>	<b><i>Changes in scope</i></b>						
	<i>Frequent design change request</i>						
	<i>Poor change management practices</i>						
<b>9</b>	<b><i>Local community obstructions</i></b>						
	<i>Unbalanced compensation</i>						
	<i>Complains not to miss ownership title of the site</i>						
	<i>Political implications</i>						
<b>10</b>	<b><i>Economic Factors</i></b>						
	<i>High bank interest rate on project loans</i>						
	<i>Sustainable increment of material prices</i>						
	<i>Financial market instability</i>						
	<i>Poor government economic policies</i>						
	<i>Shortage of foreign Currencies</i>						
	<i>Unfair exchange rate</i>						
	<i>Unfair import tariffs</i>						

#### **Section: IV-Factors contributing to delay in construction projects**

To successfully determine significance level of the factors influencing timely completion of the construction project outlined above, please indicate the significance of the following internal and external factors by ticking [✓] in the appropriate boxes.

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

<b>Sr. No</b>	<b><i>Hypothesized Factors</i></b>	<b><i>Level of significance</i></b>					<b><i>Remarks</i></b>
		<b><i>E.S(5)</i></b>	<b><i>V.S(4)</i></b>	<b><i>M.S(3)</i></b>	<b><i>S.S(2)</i></b>	<b><i>N.S(1)</i></b>	
<b>1</b>	<i>Improper Project Planning Practices</i>						
<b>2</b>	<i>Poor Project Monitoring Practices</i>						
<b>3</b>	<i>Poor Leadership Skills</i>						

<b>4</b>	<i>Ineffective Procurement Process</i>						
<b>5</b>	<i>Poor Top Management Support</i>						
<b>6</b>	<i>Financial Problems</i>						
<b>7</b>	<i>Political Situations</i>						
<b>8</b>	<i>Local community obstructions</i>						
<b>9</b>	<i>Economic Factors</i>						
<b>10</b>	<i>Changes in scope</i>						

8. What other factors that influence timely completion of construction projects do you suggest?

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