

**FACTORS INFLUENCING COMPLETION OF PROJECTS IN
GOVERNMENT TERTIARY INSTITUTIONS: A CASE OF NAIROBI
COUNTY IN KENYA**

BY

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**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE AWARD OF THE MASTER OF ARTS DEGREE IN
PROJECT PLANNING AND MANAGEMENT OF THE UNIVERSITY OF NAIROBI**

2014

DECLARATION

This Research Project report is my original work and has not been submitted for an award of a degree in this or any other University

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DEDICATION

I dedicate this Research project report to my dear wife, Catherine, for her undying patience and moral support offered to me. To my children Jane and Joy, they have been an inspiration. I adore, love and appreciate them all.

ACKNOWLEDGEMENT

I wish to acknowledge my supervisor, Ms. Veronicah Matheka for support, patience and interest in my Research Project. Her creative insight and mentorship has kept me focused. I acknowledge the Department of Extra-Mural Studies for according me a chance to study this course. I appreciate the University of Nairobi's management for creating conducive environment for me to undertake this master's program.

I appreciate colleagues and management at Alfatech Contractors and Kenline Consultants who have enabled me to work and study uninterruptedly and assisted me at various stages of this master's program. I acknowledge the support of Mr. Mwangi and Mr. Kithinji of Costwise Associates and fellow workmates for support. I acknowledge the co-operation and kind understanding of my close friends for support. I acknowledge Ms. Jacqueline who has assisted me in preparing the document in readiness for presentation. Lastly, I acknowledge support of college mates, Mr. David, Ms. Catherine, Ms. Agatha and Ms. Leah for constructive criticism and guidance.

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ABBREVIATIONS AND ACRONYMS

AAK Architectural Association of Kenya

CCK	Communications Commission of Kenya
CETA	Construction Education and Training Authority
CIDB	Construction Industry Development Board
CMA	Construction Management Authority
GDP	Gross Domestic Product
GOK	Government of Kenya
IQSK	Institute of Quantity Surveyors of Kenya
JBC	Joint Building Council
KAA	Kenya Airports Authority
KABCEC	Kenya Association of Building and Civil Engineering Contractors
KCAA	Kenya Civil Aviation Authority
KENGEN	Kenya Electricity Generating Company
KFMB	Kenya Federation of Master Builders
KNBS	Kenya National Bureau of Statistics
MBO	Management by objective
MOHEST	Ministry of Higher Education, Science and Technology
MOPW	Ministry of Public Works
NEMA	National Environmental Management Authority
PPDA	Public Procurement and Disposal Act
PPOA	Public Procurement and Oversight Authority
QS	Quantity Surveyor

ABSTRACT

The construction industry is a key driver of Kenyan economy due to its ability to create job opportunities and massive consumer of resources. The industry is characterized by varied parties who have to work together to realize a workable project. Projects are based on three pillars, time, cost and scope, and also quality and specification. The construction industry is known to be a time-consuming and material depleting industry, due to its complexity and volatility occasioned by varied needs, wants and preferences. There is thus a direct co-relation between time and cost of project as projects have definite start and finish time, consume resources and meet certain criterion in satisfaction to the beneficiaries. In a construction project, contracts are based on price or cost and time period needed to finish a project. This research report intended to look at the factors influencing completion of projects in Government funded Tertiary Institutions in Nairobi County. Of particular interest are cost and time overruns, management and environment. The research includes statement of problem, objectives and justification of the study. The objectives of the study were to examine why Government funded projects experience cost overruns; to explore reasons why projects exceed contract time; to examine managerial skills, (project and contract) in relation to success of projects; to examine impact of environment on Government funded Tertiary Institutions in relation to cost and time overruns. The researcher intended to answer research questions such as what are the causes of time and cost overruns in government funded Tertiary Institutions, effect of management to Government funded Tertiary Institutions in relation to time and cost overruns as well as environmental impact Government funded Tertiary Institutions in relation to time and cost overruns of projects. The researcher reviewed related literature from various scholars on time and cost overruns on projects, management and environmental impact on Tertiary Institutions funded by the Government. This covers variables such as management, time overruns, cost overruns, procurement systems, project and contract management and environment. The study uses quantitative research design. Data instrument tool used was survey where questionnaires were administered. The population for research was 44 Government Tertiary Institutions in Kenya of which 14 Tertiary Institutions are found within Nairobi County as per Ministry of Higher Education, Science and Technology, 2013 statistics, which forms the target population for this study. Within the 14 identified Institutions, there are 26 recently completed projects executed by 26 different contractors whose top management then became the target respondents for this study. The methodology used was field survey conducted from a purposive sample of the target population of the 25 respondent as per Krejcie & Morgan's table for determining sample size from a given population. This was followed by data collection using a questionnaire and analysis, data presentation, interpretation and presentation. The findings were then summarized as cost and time overruns in projects are as a result of instructions, delays and unrealistic project acquisition, delayed or disrupted communication or late approvals. Projects whereby professional consultants are engaged are better managed. Contractors who engage in-house professionals such as quantity surveyors and engineers manage projects better. Environment does not have a major effect on projects delivery. Religion and cultural beliefs do not impact on project delivery. Discussed were given in details, conclusions of study drawn and recommendations made. Where proper documentation of projects has been keenly followed, there are minimal disputes in project delivery of Government Tertiary Institutions. The researcher also suggested areas of further studies as the researcher has not fully exhausted the field.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

This research study was geared towards looking into factors influencing completion of projects in Government Tertiary Institutions in Nairobi County in Kenya. Construction Industry is a key contributor to the national gross fixed capital formation, which provides over 50% of the National long term assets (Construction Education and Training Authority (CETA), 2005). This industry has been frequented with occasional delays and disruptions causing time and cost overruns. These delays and disruptions are sources of potential risks that current studies are looking into ways to manage such as technical, social, economic, legal, financial, resource, construction and commercial (Kikwasi, 2012). Clients finance projects with sole aim of reaping benefits from the investments. Construction industry is known to be a time-consuming and material depleting industry, due to its complexity and volatility occasioned by varied needs, wants and preferences. No investor would invest in a project that seem to last forever, with indefinite cost or budget. There is thus a direct co-relation between time and cost of project. Projects are deemed thus because they have definite start and finish time, consume resources and meet certain criterion in satisfaction to the beneficiaries. In a construction project, contracts are based on price or cost and time period needed to finish a project (Waihenya, 2011).

Globally, studies conducted by researchers indicate that most projects fail to achieve their mission within cost and time constraints. United Kingdom (UK) in 2010 statistics showed that 52% of projects had cost overruns in excess of 10% while 45% of projects had time overruns of over 25% (Mbatha, 1986 citing Atkinson, 1991). Same research indicated that similar studies carried out in India showed that 56% of projects had cost overruns in excess of 20% while 49% had time overruns in excess of between 1 and 160 months. Projects were initiated by kings and other leaders to undertake monumental projects to build a name for themselves and their generations to come (Mbatha 1986 citing Atkinson, 1991). Ancient structures did not have time limitation or cost limitation (Bennett, 1985). However, causes of delays have been identified in various parts of the world recently such as Malaysia, Saudi Arabia, Jordan, Kuwait, Hong Kong and Thailand (Njuguna, 2008 citing Sambasivan and Soon, 2007; Al-Kharashi and Skitmore,

2008; Al-Momani, 2000; Kumaraswamy and Chan, 1998; Noulmanee, Wachirathamrojn, Tantichattanont and Sittivijan, 1999). The results reveal that there are differences and similarities as to the causes of delays. Today, those professionals in the construction field no longer cost a design, they design to cost. This means a client states categorically that s/he has (X) amount of money and intends to undertake project (Y). Thus the consultants work out a project to fit within the said amount, and not beyond. This limits creativity and innovation, unlike in the past as stated (The Quantity Surveyor, 2011).

Love *et al* (2005) states that cost and time overruns in Australia in traditional and new procurement systems accounts for 13-19% of cost overruns and 10 to 69% of time overruns. New procurement systems give 11% and 13 to 25% respectively. Baloi & Price (2001) citing Bedelian (1996), many contractors are unfamiliar with these risk factors and do not have experience and knowledge to manage them effectively and efficiently. There need to be foresight of improving knowledge of the links between risk perception, attitude towards risk objects and actual behavior (Njuguna, 2008). Consultants use skills, knowledge and experience with care to ensure clients' interests are protected (Franagan & Norman, 2002). Smith (1999) sites improved effective management of change and clarify project issues from start. Decisions supported through analysis, define and structure of projects continually monitored, clearer understanding of specific risks associated with projects. Build up historical data assist future risk management procedures.

Studies carried out in Tanzania, Uganda, Nigeria, South Africa and Mozambique on causes and effects of risks, procedures, delays and disruptions in construction projects and managerial and environmental impacts resulting to project time and cost overruns to project completion by various researchers such as Kikwasi (2012), Ayodele (2008), Baloi (2001), Radujkovic (1999), Baradyana (1996), Dlakwa (1990) and Vincent (1965) found out the major causes of delays and disruptions as; design changes, delays in payment to contractors, information delays, funding problems, poor project management, compensation issues and disagreement on the valuation of work done. Conversely, time overrun, cost overrun, negative social impact, idling of resources and disputes are the main effects of delays and disruptions. The studies suggested that there still exist a number of causes of delays and disruptions and their effects put construction projects at great risk that have an effect on their performance. The studies recommended that adequate

construction budget, timely issuing of information, finalization of design and project management skills should be the main focus of the parties in project procurement process.

Public Procurement Oversight Authority's (PPOA, 2005) Conditions of Government funded projects has provisions for variations, extension of time within reasonable limits and loss and expense clauses. The document also limits extent to which the architect/project manager can vary the contract, but with express authorization of the tender/project committee and approval. Waihenya (2011), Seboru (2006), Kivaa (2000), Talukhaba (1999), Mbatha (1986) and Baradyana (1996) have conducted research works on both cost and time implications on construction projects. This research was therefore geared towards identifying the factors influencing completion of projects in Government Tertiary Institutions in Nairobi County in Kenya, but from a contractor's point of view. Joint Building Council's (JBC) Agreement and Conditions of Contract for Building works, 1999 edition has several clauses that relates to time and cost overruns, such as Clauses 22 on Architects instructions, Clause 30 on Variations, Clause 34 on Payment where contractors are allowed to charge for interest on delayed payment, Clause 36 on Extension of Time and Clause 37 on Loss and Expense caused by disturbances of regular progress of the works. The project manager/Architects are allowed to vary extent of works, but with limitation of about 15%. At the same time, variations that have cost implication may also have time impact, thus contractors are allowed to apply for extension of contract period, but based on facts.

Kagiri (2005) looked into time and cost overruns in power projects in Kenya; a case study of Kenya Electricity Generating Company Ltd. The research pointed on the many factors that influence or causes cost and time overruns; factors that impede on successful completion of projects on time, budget and quality. Factor analysis of various significant variables from the said survey, revealed eight underlying factors namely; contractor inabilities, improper project preparation, resource planning, interpretation of requirements, works definition, timeliness, Government bureaucracy, and risk allocation as having been significant contributors to overruns. On ranking, Government bureaucracy topped the list while risk allocation was shown to have been least significant. The projects had time overruns ranging from (-4.6% to 53.4 %), while the cost overruns varied between (9.4% and 29%).

Morris (1990) stated that delays and cost overruns in public sector investments can raise the capital-output ratio in the sector and elsewhere bringing down the efficacy of investments. Government of Kenya invests in building facilities such as schools and Institutions, hospitals, residential developments for her workers, offices, infrastructures like roads, water, electricity and telecommunication. These facilities consume resources and time. Thus, successful management of processes employed in acquisition of these assets are to a large extent, determined by the amount of resources expended, time taken and quality when compared to similar projects. Infrastructure includes the capital required to produce economic services from utilities (like electricity, telecommunication, and water) and transport (roads, bridges, seaport, and airports) and are central to promoting economic activities (Kimani, 2004).

Most of the studies carried out show the contractor as the sole cause of cost and time overruns in project, managerial mishaps as well as tainting the environment. This has been done with the hope that the contractors reap massive proceeds from the project. This could be true to some extent, but cannot be substantiated as parties privy to contract have specified and clearly spelt out roles to play for successful implementation of projects. It is the responsibility of the client to pay for all costs of the project. Consultants are tasked with duty to plan, design and ensure proper implementation and supervision of the project. The contractors are tasked with actualizing the client's desire to tangible product that meets set criterion and within certain set out parameters (The Quantity Surveyor, 2011).

1.2 Statement of the Problem

Projects are based on three pertinent pillars, that is, cost, time, specifications/scope and also satisfaction. This has to do with management and the environment within which projects' delivery teams operate including building projects. In order for one to maximize returns, the project has to be delivered within the parameters of time, cost and specifications. Resources and finances are limited. Projects have to be delivered within specified timelines. They have to meet some set standards or specification and give some satisfaction to the users, be it the financiers, client, community or the environment it is placed on. It has been observed and decried by the public and other users of Government funded projects that they always lag behind in time, which conversely have a bearing on cost, due to various factors. Among such, as observed by Waihenya (2011), Seboru (2006), Kivaa (2000), Talukhaba (1999), Mbatha (1986) and Baradyana (1996)

are variation in cost of building materials, changes in design of building, changes in finishes by client, contractor running out of money to run projects for some time, hiring extra tools during construction not anticipated, under-estimation of cost of construction by the project Quantity Surveyor, application of wrong time estimation model and increment weather patterns, among many others. It has been said that risks in projects be allocated appropriately. Such risks are allocated as follows in order of responsibility; contractors, Quantity Surveyor, Architect, Structural Engineer and Clerk of Work. Mbatha (1986) while looking at cost and time overruns in Government projects found out same problem as the other researchers and made proposals on how to mitigate or cushion such occurrences as stated above. The study attributes the causes to inadequate designs, lack of understanding of project scope and size, poor project management and inadequate cost estimates. Love *et al* (2005) also attributes causes of overruns to inadequate project formulation, poor planning implementation, lack of proper contract planning and implementation, lack of project management during execution, manipulation by project champions and natural calamities and environment within which the project lies.

The study sought to investigate why the problem still persists even when the Kenyan Government has made positive strides in development such as, improvement in technology where Government adopted e-management, e-filing and e-learning and effort by Government to educate or facilitate staff's personal development in terms of career, availability of equipment and Softwares among others have also contributed to advancement in technology. Enactment of laws and Acts that govern Government procurement systems such as Public Procurement Oversight Authority (PPOA, 2005), Public Procurement and Disposal Act (PPDA, 2005) and Public Procurement and Disposal Regulations (PPDR, 2006) have gone a long way in helping curb ills associated with cost and time overruns. Despite all the efforts put in place for the last 10 years or so, Government projects still suffer heavily in cost and time overruns compared with privately funded projects in management and project delivery.

Most of the studies carried out by other researchers show the contractor as the main person who causes cost and time overruns in project, with the guise that the contractor intends to reap skyrocket profits and massive returns from the project (The Quantity Surveyor, 2011). Whereas this could be true to some extent, it cannot be substantiated as parties privy to contract have specified and clearly spelt out roles to play for successful implementation of projects. It is the

duty of the client to meet all financial obligations of the project. Consultant's duties are such as responsibility to plan, design and ensure proper implementation, monitoring and evaluation of costs and supervision of the project. The contractors are tasked with actualizing or realization, crystallization of the client's desire or dream to tangible product that meets set criterion and within certain set out parameters. This research was thus geared to factors influencing completion of projects in Government Tertiary Institutions in Nairobi County in Kenya. The researcher intended to limit the scope of the study to projects undertaken by the Government in Tertiary Institutions within the last ten or so years that are within Nairobi County, in Kenya, that falls under the Ministry of Science and Technology, formerly the Ministry of Higher Education, Science and Technology (MOHEST).

The researcher intended to look at the plight of the main contractor, as various studies have been undertaken on contribution of consultants, who point at the contractor as the sole contributor to delays and project failure such as Waihenya (2011), Seboru (2006), Kimani (2004), Kivaa (2000), Talukhaba (1999), Mbatha (1986) and Baradyana (1996). The research intended to unearth the client and consultant's management's contribution to time and cost overruns, management and environmental impact of projects from the contractor's perspective. This research is therefore relevant and important to the construction industry and general public at large.

1.3 Purpose of the Study

The purpose of this study was to investigate factors influencing completion of projects in Government Tertiary Institutions in Nairobi County in Kenya.

1.4 Objectives of the Study

The study used the following objectives;

1. To establish how time overruns influence completion of projects in Government Tertiary Institutions in Nairobi County
2. To investigate how cost overruns influence completion of projects in Government Tertiary Institutions in Nairobi County

3. To examine how management influence completion of projects in Government Tertiary Institutions in Nairobi County
4. To explore how environment influence completion of projects in Government Tertiary Institutions in Nairobi County

1.5 Research Questions

The research questions in this research study are;

1. What are the causes of time overruns in projects in Government Tertiary Institutions in Nairobi County?
2. What are the factors contributing to cost overruns in projects in Government Tertiary Institutions in Nairobi County?
3. What are the effects of management on projects in Government Tertiary Institutions in Nairobi County?
4. What is the impact of environment on projects in Government Tertiary Institutions in Nairobi County?

1.6. Justification of the Study

Consultants in the construction industry have been issuing instructions and causing variations to design, with no consciousness to the overall picture of how such instructions would affect the delivery of the project and the resultant effect on cost, time, and scope and to some extent quality of the project (Kimani, 2004). Research has been conducted by various scholars, giving insightful information over the subject of time and cost overruns and impact. (Mbatha 1986, Talukhaba 1999, Kivaa 2000, Seboru 2006 and Waihenya 2011). This has not been appropriately used as we still find Government projects suffering from overruns, despite there being all the information and legislations. Could it be that the root cause of the problems are not addressed properly, or maybe we just address the symptoms? It is the contractors who interpret consultant's designs and specifications as given from client's brief and implementing them, translate into a feasible physical project that meets clients needs or satisfaction (JBC 1999, PPOA, 2005).

In carrying out this research, the researcher intended to gather information from the contractor's perspective of cost and time overruns and how they suffer or are affected by such overruns, both in terms of management and perception by the general public and consultants as well as the

impact of the environment to overall project delivery of Government Tertiary Institutions. The researcher intended to identify if there was a difference when Government projects are managed by in-house teams and when they are out-sourced and if there was any co-relation between project delivery in terms of time, cost and quality.

1.7 Significance of the Study

The study is significant as it seeks to shed more light on why cost and time overruns are still prevalent in Government funded Tertiary Institutions. The general members of the public are the main tax-payers, and accountability of the collected funds is essential. The research is intended for applicability by various users or stakeholders such as Government agencies, Architects, Quantity Surveyor, project managers, contractors, general public, construction management authority, financial institutions, students, professional bodies such as Institute of Quantity Surveyors of Kenya (IQSK), Architectural Association of Kenya (AAK), Kenya Association of Building and Civil Engineering Contractors (KABCEC), Kenya Federation of Master Builders (KFMB) among others. The information gathered here would enable the stakeholders make informed decisions when investing in projects, shed light on ills affecting public coffers and how funds are rightly used or misused. Financiers and client investors would invest where they expect maximum returns. It also assists in highlighting pit-falls that contractors can avoid not to be black-listed as defaulters by NCA. Consultants use it to avoid making similar mistakes that they could have been making unknowingly that affects project delivery and successful implementation of projects.

The study provides insight to practical actions required to control cost and time overruns, facts necessary to change for effective site productivity and possible pit-falls and how to address them amicably.

1.8 Basic Assumptions of the Study

The researcher intended to conduct the study on factors influencing completion of Government funded projects, and more specifically the learning Institutions such as Tertiary colleges, upgrading of district schools into national schools funded thus within Kenya. The researcher concentrated on a representative sample of Counties, formerly Districts. The researcher banks on the co-operation of interviewees, trusted that they would be willing to part with pertinent

information crucial for this study and that the information given would be accurate, concise and truthfully a representation of the construction industry under study. The researcher assumed that stakeholders would make use of the findings of the study.

1.9 Limitations of the Study

Resources basically are not sufficient. It is due to this fact that the researcher pointed out possible limitations for the research under study as; finances to fund the study which affects the scope of cover, possible incremental weather conditions as weather patterns have greatly changed due to global warming effects, geographical limitations and mobility, sample size and population as published by Ministry of Public Works (MOPW) as the list of contractors registered with The National Construction Authority (NCA) had not yet been published by the time of the study. The researcher also hoped that political and/or constitutional change (anticipated due to devolved Governments) would not adversely veer off the study. The researcher was not ignorant of the fact that the respondents would not be willing or able to give the said information as no one wishes to be attributed to failed or delayed projects. Every participant in the construction industry is success-conscious and wishes to be attributed to successful completed projects.

1.10 Delimitations of the Study

The researcher works as a Quantity Surveyor in the construction industry. During the process of work, the researcher has experienced cost and time overruns, management and how environmental issues impacts on various projects handled. This has thus become a going concern as to investigate the main causes of these overruns. Ministry of Higher Education, Science and Technology (MOHEST) in their quest to meet concern of upgrading of Tertiary Institutions to meet growing demand has encountered time and cost overruns in their proposed projects. Despite Government's commitment to facilitate and finance the said projects, they still suffer heavily in matter of time and cost overruns despite measures having been put in place to curb such ills. This has thus triggered the researcher to seek to understand what the major cause for this could be, thus the reason for the study. Building and Civil Engineering contractors in Kenya are grouped by the Ministry of Public Works according to experience, financial capabilities and technical skills from lowest to highest in grade that is from H to A. This meant the data on population and

sample is readily available. The researcher also wished to look into the influence of management and environmental issues on Government Tertiary Institutions project implementation and delivery. The scope of study was also limited to projects undertaken within the last ten or so years' period.

1.11 Definition of Significant Terms used in the Study

For the purposes of this study, the following terms used have been given definitions as;

Building Construction Industry is a key contributor to the national gross fixed capital formation, which provides over 50% of the national long term assets. This is the industry defined according to ability, whose main goals is producing best construction product by making best possible use of available resources to house the populace, provide employment, create office spaces and institutional framework for the country.

Cost Overrun is defined as an element of agreed upon contract sum or tender sum forming contract that exceeds beyond acceptable allowable limits. This affects the project cost, construction cost and cost of funding the project. It also affects the loan or funds repayment in case of borrowed financing.

Environment is a term used in this study to mean cultural disparity, differences and their effects on work ethics, performance and perception of work that affects delivery of projects within parameters of time, cost, scope and specifications.

Government Tertiary Institutions is taken to mean undertaking by Government that aims at housing her workers, provide offices, infrastructural development and such facilities for service delivery. Projects are supposed to be delivered within parameters of cost, time and should meet required needs. This study limits its extent for institutional development to Tertiary colleges.

Initial Contract Period is used here to mean a period which the contractor should take in completing the said project. This forms a tenet in contractual obligations on the part of the contractor and at times a basis for competition and award.

Management is used here to mean contract management which entails the main contractor, superintendents and site gang or technical team as well as management team that supports the

projects execution. It is also used in this context to mean project management team such as Architect, Quantity Surveyor, consultant team and client's representative.

Projects are defined as an undertaking that consume resources such as materials that have cost implications, is time consuming and is placed upon a location on the earth's surface, thus affecting the environment and community at large. It also entails managerial skills to achieve intended end product.

Tertiary Institutions are Institutions of higher learning, also referred to as colleges. This is where artworks, artisans and craftsmen are trained to render quality services to the larger community. They are found all over the country and especially in almost all counties. They serve to bridge the gap between secondary education and university.

Time Overrun is defined as an element of contract period allocated for certain project exceeding beyond initially agreed period of completion.

1.12 Organization of the Study

This research project report is organized into five chapters. Chapter One contains introduction, background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, justification of the study, significance of the study, basic assumptions of the study, limitations of the study, delimitations of the study and definition of significant terms used in the study. Chapter Two comprises of reviewed literature of related studies done by other researchers who covered on time overruns, cost overruns, management of projects and environmental issues affecting projects. It also captures conceptual framework. Chapter Three covers introduction to research methodology, research design, target population, sample size and sampling techniques, data collection instrument, validity, reliability of instrument, data collection procedure, data analysis technique and ethical considerations of the study with operational definition of variables. Chapter Four covers analysis of data, presentation and interpretation. Chapter Five covers summary of findings, discussions, conclusions, and recommendations of the study as well as suggested areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter looks at the review of related literature as documented by other researchers or scholars on matter of time and cost overruns. It also looks at Government projects, how they are procured, funded and implemented, including management in relation to how they cause time and cost overruns in especially Tertiary Institutions. The research also looks at contractor's management system, procurement system, supervision, superintendence and general site productivity in relation to their contribution to time and cost overruns in projects. Emphasis is laid on time and cost overruns on how they affects and how they negatively adversely impact on project delivery within stated parameters of time, cost, scope and satisfaction (Waihenya, 2011). Such issues are risks and risk factors, finances, relationship between parties to a contract and how their obligations or responsibilities contribute to project time and cost overruns (Nyanguthi 2005). Environment in this study is used to define factors that impact on time and cost overruns such as culture of some communities, beliefs and faith that impacts on time and cost of projects. Places like Mombasa County, North Eastern regions and Mandela County where a contractor has to import labour, both skilled and semi-skilled, materials are also not locally available, especially building stones, restrictions on religion and time of worship that limits productivity, high humidity causing inefficiency and such (The Quantity Surveyor, 2011). The study also seeks to identify gaps in the literature to be filled, and the researcher intends to cover in the research and highlights scope or extent of cover and relevance to the field of construction industry.

2.2. Concept of Completion of Projects in Government Tertiary Institutions

A concept is an abstraction or generalization from experience or the result of a transformation of existing concepts or generalization from particular instances. Concepts are entities that exists in the brain, abilities that are peculiar to cognitive agents or abstract objects whose constituents of propositions that mediate between thoughts, language and referents (Maxwell J, 2009). Government has a duty to provide affordable and reliable education. This means that institutional development is paramount. Provision of learning facilities such as lecture halls, classrooms, theatres, workshops, offices and other common facilities as well as infrastructure development such as roads, bridges, footpaths and fields are important. Government has endeavored to

provide these, as well as giving proper training facilities for the lecturers and administration officials. Construction of buildings and structures that house offices, residential units as well as recreational facilities which are part of development projects that the Government undertakes to provide are essential. Resources are scarce and therefore there is need for prioritization of agenda. Meeting these needs thus becomes the main issue for Tertiary Institutions. Sensitization has played a key role in ensuring that pupils from primary schools attend these institutions that are available within their locality or near. Provision of building facilities involves various stakeholders such as professionals in the construction industry like architects, quantity surveyors and engineers. Project management to ensure projects are delivered within time, cost and scope is thus a combined effort for project delivery. Contractors employed to undertake the execution of the Government funded Tertiary Institutions projects are therefore selected and awarded the works having portrayed competence and excellence (Waihenya, 2011). For projects to be completed within time, costs and meet specifications, all those involved in project delivery have to give their quality services, workmanship has to be to the highest standards and within specifications. Tertiary Institutions act as bridging gap between those from primary schools aspiring to join Institutions of higher learning, either on full course or part-time.

2.3. Time Overruns on Construction of Projects

Delays as referred in construction are prolonged construction periods while disruptions are events that disturb the construction program. Delays and disruptions are among the challenges faced in the course of executing construction projects (Kikwasi, 2012). Delays as well as disruptions are sources of potential risks that current studies are looking into ways to manage. Various studies (Kikwasi, 2012 citing Cohen and Palmer, 2004; Baloi and Price, 2003; Finnerty, 1996; Miller and Lessard, 2001) have identified sources of and types of construction risks that need to be managed as part of project management process. There are also risks and factors (Kikwasi, 2012 citing Zou, Zhang and Wang, 2006; Aiyetan, Smallwood & Shakantu; 2008) that affect construction project delivery time which are also causes of delays. Causes of delays have been identified in various parts of the world such as Malaysia, Saudi Arabia, Jordan, Kuwait, Hong Kong and Thailand (Njuguna, 2008 citing Sambasivan and Soon, 2007; Al-Kharashi and Skitmore, 2008; Al-Momani, 2000; Kumaraswamy & Chan, 1998; Noulmanee, Wachirathamroj, Tantichattanont & Sittivijjan, 1999). The results reveal that there are

differences and similarities as to the causes of delays. Delays and disruptions have had effects to construction projects. Some of these effects as researched on by Aibinu and Jagboro, (2002) and Njuguna, (2008) citing Sambasivan & Soon, (2007) are time overrun, cost overrun, dispute, arbitration, total abandonment and litigation. All these adversely affect time and cost overruns on projects.

2.3.1. Contract Period

This is defined as the period that the contractor commits to execute the project as it forms part of contract and stated in the appendix to conditions of contracts document. It is usually competitive and given in calendar weeks (JBC, 1999) The study aims at identifying causes and impact of cost and time overruns in Government Tertiary Institutions projects. Time and cost overruns also called variations. Overruns are spread over or occupy a place in great number or continue beyond or exceed time allocated or expected cost. Clause 30 in Joint Building Council, (JBC 1999 edition) defines variations as alterations or modification of design, quality or quantity of works. Cost overruns can and has been looked at as construction risks, unwanted negative consequences of an event that also causes time overruns (Talukhaba, 1999).

Kivaa (2000) when looking at developing a model for estimating construction project time concurred with Mbatha (1986), Wachira (1996), Baradyana (1996), Bromilow (1969), Hughes (1989) and Seboru, (2006) who gave causes of project delays as material shortage, unexpected soil condition, variations in design, financial problems-project budgets, delayed payments, poor contractor's cash flows, poor organization/management form, plant and equipment shortage, unrealistic estimate of construction period, increment weather, industrial disputes, contractual claims, and shortage of skilled/unskilled labour. Some measures proposed include training construction industrial participants on managerial skills such as planning, scheduling, controlling, employing better skilled or experienced construction project managers; improve realism of construction period estimation; drawing realistic project budgets that considers inflation, funds availability and schedule-based incentives (Kikwasi (2012) citing Abu-Hijleh & Ibbs (1989) & Stukhart (1984) such as bonus/penalty schemes. Baradyana (1988) gave cost and time overruns coefficient in Tanzania as 0.5256 between 1988 and 1995, project delays as 184.7% while cost overruns as 152.3%. Mbatha (1986) found out that government performance between 1966 and 1984 as 73% time and 38% cost overruns. Wachira (1996) said that the reason contractors give too optimistic contract period is due to lack of sufficient data on productivity of

labour for accurate analytical estimate of activity times in project schedule. Talukhaba (1999) gave attitude of project participants towards project schedule. Mbatha (1986) citing Atkinson (1991) said that Britain puts pressure to reduce design and construction period. Construction finances are getting more expensive. Consultants cannot thus hide design mistakes in the construction period. Main contractors are more claim-conscious

2.3.2. Project Period

This is the period, other than period for actual implementation of project on site that spans from the time the consultants are engaged, when they commence designs all the way to completion of all processes of project execution to determination of defects liability period (JBC, 1999) and post-contract period. Pre-contract period usually facilitates proper cash-flow forecasting (Chan & Kumaraswamy, 1995). There are sound basis for detailed project scheduling methods like program evaluation and review technique (PERT) and critical path method (CPM). It also help client/consultants structure effective incentive schemes (Stukhart, 1984), have sound basis for evaluating success of project and effectiveness of project organization (Chan & Kumaraswamy, 1995). Estimation method still rudimentary, based on estimators past experience (Chan & Kumaraswamy, 1995, Mbatha, 1986). This has some consequences such as difficulties in estimating time-related project costs such as financial cost, insurance, water, electricity; difficulties in assessing and justifying extension of time; difficulties in managing estimated contract period efficiently (Mbatha 1986, Baradyana, 1988 and Wachira, 1996). Efficient coordination of project team to meet target time satisfactorily may be very elusive; efficient time management system-start with accurate estimate of contract period, then detailed schedule of construction activities, a network program like critical path method (CPM) or program evaluation and review technique (PERT). Also design and construction teams are given incentives to finish early.

The research intended to look at both pre-contract estimate of contract period with actual completion period, establish correlation between contract period and surrogates of project scope, complexity and environment, and develop mathematical model for estimating contract period. It is argued that actual contract period is significantly greater than construction period estimate at tendering stage (Kivaa, 2000). The larger the scope of a project, the longer the construction period in terms of physical size, cost value, floor area, height of building and number of storeys.

When projects are complex, they tend to take longer in construction period. Some projects are difficult to handle due to irregularity of building plans shape, total area of walls, windows and doors per unit floor area, quality of finish and services (cost of internal finishes and mechanical and electrical installation per unit floor area), potential for conflict among teams in project (number of interactions among teams). The more a project environment interferes with planned progress, the longer the contract period leading to circumstances such as risks, ambiguity of works at tendering time and managerial efficiency to handle disturbances. This affects project delivery.

2.3.3. Construction Period

Also referred to as project implementation period can be defined as the time from when the contractors are handed over site or takes physical possession of site, mobilize resources and commences project execution, all the way to when the projects are handed over back to the client as complete or at either sectional or practical completion stage (JBC, 1999). Lock (1973) argued that at initial stage, no sufficient time, data and money for detailed schedules. A report on construction project works in Nairobi accounted for about 62% of cost value of building between 1991 and 1995, (Republic of Kenya). The trend still continues to date, thus the reason for this study. The contractor needs to prepare a detailed works program using computer aid. Software such as Microsoft project, excel and expert system are used to produce works programs. Expert systems are defined as a computer programs in which the knowledge and experience of one or more experts are captured and stored in a computer and are incorporated in solving problems that typically require human judgment. Expert system relies on rule of thumb and other heuristic methods. It is not widely used in industry though serious research is going on in the field (Frenzel, 1987, Ortolano & Perman, 1987). The application of expert system in scheduling has mainly been researched on in developed countries but has a lot of application in developing countries (Chin, 1991).

There are two kinds of method used in this system, namely non-mathematical method and mathematical method that has formulas with hard and fast rules (Bromilow, 1969, De Leeuw, 1988 and Walker, 1995). Mathematical construction program is a function of both scope and non-scope factors (Chan & Kumaraswamy, 1995, Kaka & Price, 1991)

Factors considered are such as project related like scope, complexity, physical and managerial, environment related like weather, money market, material shortage, workers skills, and managerial effectiveness. The researcher considered such parameters as construction period, scope (actual cost, floor area, height,) complexity, and environment. Factors to aid in estimation of time include nature of client, whether private, public, individual or cooperation; clarity of client's brief at initial stages; project organizational form to be adopted; degree of complexity of design at tendering time; and availability of material required. The researcher gave some findings and recommendations that actual construction is 1.595 times the contract period estimated at tendering stage. Frequency of project delays is more than 80%. The researcher developed the following Mathematical model

$$T=18.064+0.858C-0.001C^2+1.871H$$

Where T=construction period in weeks

C=cost

H=height of building

$$R^2=0.73959$$

This model, if adhered to and followed at initial stages, is assumed to solve time related estimates that are usually unrealistic and unattainable.

2.4. Cost Overruns on Construction of Projects

Costs overruns are defined in this study as an element of agreed upon contract sum or tender sum forming contract that exceeds beyond acceptable allowable limits that affects the project cost, construction cost and cost of funding the project. Cost overruns are extra cost incurred to complete project over and above established budget or contract sum without increase in scope and quality of constructed structure. It also affects the loan or funds repayment in case of borrowed financing. Abwunza (2006) looked at the causes of cost overruns but focused on the Quantity Surveyors' and other consultants' perspective. The researcher described cost overruns in terms of such parameters as extra work, design and specifications change, extended and reduced contract period, delay in preparing detailed drawings, delayed payment, late instructions,

financial failure of contracting party, defective materials or works, delayed dispute resolution, differing underground conditions, delays arising from client's supplied items and inaccurate quantities. Others that are not significant but important are price fluctuations, nominated subcontractors and suppliers, shortage of main contractor materials, third party delays, permits and approvals, incremental/ unpredictable weather conditions, labour and equipment availability and productivity of labour and equipment. This failed to capture the contractor's perspective on cost overruns and their causes and how they impacts on them.

2.4.1. Contract Sum and Cost Overruns

This is defined as the tender sum or amount offered by the contractor to undertake or execute a project. This is usually based on bills of quantities (BQ), bills of approximate quantities or based on schedule of prices. These are usually prepared by a quantity surveyor (QS). Using the tenet of offer and acceptance, it forms pertinent basis for entering into contractual obligations between two parties, which are contractor and client (Thomas *et al*, 2003).

Seboru (2006) said that Ministry of Public Works provides parent ministries with suitable accommodation, implementation of Government annual programs of building and construction works. It creates standards, designs, invites tenders, supervises construction and advises the client ministry on cost of works and disbursements to be made. Sidwell (1983) statistics on accountability of ministry, Ministry of Public Works and Treasury (statistical abstract) The researcher cites reasons as complexity of buildings, increasing size of organizations, material and building type choices. Minister for Planning and National Development was quoted as saying, "The Government is taking a serious view of delays in projects through which a lot of money is lost due to cost overruns." Daily Nation, January 20th 1990. Wachira (2008) stated that change in Government in 2002, millennium development goals and foreign investment inflow has increased demand in construction industry. Economy grew from 0.6% to 5.8% between 2002 and 2005 (CBK, 2006). Skills needed are academic/cognitive; generic; technical; and soft skills.

Abwunza (2006) proposed measures such as, making sufficient allowances for factors before signing contract, rigorously vetting main contractor before awarding contract, contingency sums, say between 2 and 14% for large projects and 10 and 20% for small projects as proposed by Franagan & Norman (2002). Construction projects are full of uncertainty as operations are done

under open environment. Time and cost estimate prepared before construction, nature of final product remains uncertain until completion of the facility as there is no adequate information available. The researchers recommends that managers, when preparing cost estimates for projects should draw budget by use of zero-base budgeting method to yield lower negative variances, forecasting be correlative method, review and monitor performance and take corrective measures (Welch, 1964 and Abwunza, 2006).

2.4.2. Variations in Costs and Cost Overruns

These can be defined as alterations or modification of design quality or quantity of the works as a result of instructions given by the consultants or client' representatives that cause changes in cost of project or deviation from the contract sum (JBC, 1999). Such changes deviate from what was shown in the drawings, contract bills of quantities or specifications. A risk factor is a negative or positive impact on contract sum (Kartam & Kartam, 2001) due to time and cost overruns. Franagan & Norman (2002) attests that once risk is identified, it becomes a management problem. Rahman & Kumaraswamy (2004) argues that construction risks are project specific and should thus be allocated to different parties. Santoso *et al* (2003), Waihenya (2011) citing Wright & Taylor (1994) gave the perception as active process of obtaining and interpreting information from environment to provide order and meaning, subjective process influenced by past experience, influenced by level of experience, stake or profit expected from project, geographical region and values and level of risk communication transmitted through news and other sources of information to way they interpret cost factors (Mwangi, 2006). Contractual misallocation of risks is leading cause of construction disputes, thus increase project volatility (Mwangi, 2006 citing Megens, 1997) which impacts on cost overruns on projects.

Inflation is a rise in general level of prices of goods and services in an economy over a period of time. This leads to a reduced purchasing power, thus affecting cost of projects. Mwangi (2006) citing Aje & Jagboro (2003) says it's rare for building works not to have variations. This leads to time and cost overruns. This may lead to better product, or add no value or wasted money. Cost overruns according to JBC Clause 22 are stated as introductions, omission or addition. Mbatha (1986) states that quantity surveyors do not design, but are the cost and price specialists. They don't cost control, but cost monitor and report, whose data may be used for cost control. JBC clause 30 states that no variance of over 15% causing 0.01% of contract price without client's

approval. Variations are changes of opinion, facts, errors or omissions, alteration in scope of work.

Fluctuations are defined as an increase or decrease in cost due to legislative or market forces over and above quoted price. This is only applicable on labour and material whose contract exceeds 12 months (JBC, 1999). This means that projects that do not exceed stated period do not qualify to claim for fluctuation or invoke this clause. This is a big risk to the contractor as the effect is borne by the contractor only. Talukhaba (1999) states that variations are introduction of changes on physical characteristics of project design and specifications as well as change of obligations or restrictions imposed by client. The researcher found out the causes of variations as: inadequate brief, unsuitable design, design inconclusiveness, inadequate pre-contract planning, professional indiscipline of consultants, non-availability of materials and labour specified for works, unforeseen conditions, discrepancies between two or more contract documents and client's intentions. Variations are efficiency of project by implementing on site productivity and profitability to main contractor.

Smith (1986) states methods of managing variations by devising appropriate, alternative procedure, negotiation and record. Smith (1986) proposed use of critical path method for resource scheduling technique. Waihenya (2011) citing Clough (1986) gives a proposal for change order-individual responsibility for variations and reasons for variations. Have proposed and approved changes clearly defined. Talukhaba (1999) time overruns blame on owners and contractor. Extra work means more time. Omission variations means you pay for labour and materials. Functions of procurement are purchasing, expenditure, and receiving, inspection, shipping and subcontracting. Main contractors are prequalified on basis of experience, work capacity and past performance of contractor.

2.4.3. Final Account and Cost Overruns

This is an account settlement after sectional or practical completion of a project. This means that when the client takes partial or full possession of the project, the QS values works done, less provisional and prime cost sums. These are lump-sum amounts in contract documents which are either expended or omitted fully (JBC, 1999). Thomas *et al* (2003) argues that cost performance is the extent of final account deviates from contract sum. Coburn *et al* (1994) observes that

decisions are made and actions are taken according to the way risks are perceived. Experts use statistics, lay people, use values, philosophies, concepts, and calculations Hartman *et al* (1997) states that clients are guided by consultants in decision making as experts in responsible professions. Smith (1999) said construction industry has for years had a very poor reputation for coping with adverse effects of change, with many projects failing to meet deadlines and cost and quality targets. Mbatha (1986) and Talukhaba (1988) agree that 53.7% of projects initiated have cost overruns with magnitudes of 20.7%, while studies done by Gichunge (2000) gave rise to 16% overruns.

On cost estimate related cost overruns, Mwangi (2006) looks at cost estimation methods at pre-tender stage as unit method, floor area method, cube method, approximate quantities method, elemental analysis, priced bills of quantities, management and administrative related cost overruns; fragmented, significant negative impact, perceived low productivity, cost and time overruns conflict and disputes, resulting claims and time consuming litigation. Thomson (1981) Periodic cost reimbursements extent of time increase both fixed and variable costs. Construction cost estimates have three functions, that is, design, bid, and control. Maira (2008) states that in UK, in 1984, percentage usage of bills of quantities was 58.73%, in 1985 was 59.07%, in 1989 was 48.26% while in 1993 was 40.63%. This shows a downward trend on use of bills of quantities.

According to Masterman (1996) procurement system can be classification as integrated procurement system such as design and build, package deal, turnkey, build own operate transfer, design and manage, Private Financing Initiative/Public Private Partnership (PFI/PPP); management oriented procurement system such as management contracting, prime cost contracting; separated and cooperative procurement system such as design bid build, lump sum/stipulated sum, unit price, cost plus, guaranteed maximum price according to Sidwell (1984). The system adopted usually affects time and cost overruns of a project in terms of delivery and time taken to make decisions on projects. Syagga & Aligula (1999) argues that budget document reflects past performance though its reliability depends on intelligence and precision with which managers can predict the future. There is thus need for constant process of analysis and adjustment. Initial budgets agreed upon by the contract parties should be clear and concise and final account should not deviate far from initial budgets. This constant adjustment

can be viewed as a key contributor to cost overruns in projects, which in turn may have time implications.

2.5. Management of Construction of Projects

The researcher looks at management in this study and separates into project management, contract management, risk management, procurement system, scope and complexity, planning as well as quality and workmanship, which affects time and costs of projects.

2.5.1. Project Management

Project management is the overall planning, controlling, coordinating from inception to completion of projects to meet client's requirements (Talukhaba, 1999). Nyaguthii (2005) noted that there are problem encountered whereby managers find themselves presenting one document (budget) at start of project but end with different cost at the end of the project. This is usually the case that quantity surveyor go through in trying to justify why cost of project has exceeded the initial contract sum. Nyaguthii (2005) citing Mercy & Baker (1973) says that good management is application of skills in caring for property, its surrounding and amenities, and in developing sound relationship between parties involved, thus endeavoring to fulfill satisfaction factor to all parties. Thorncroft (1965) views management as direction and supervision of landed property with aim of securing optimum returns such as social benefits, status, prestige and political power. Projects are not just for purposes of making money. They go beyond monetary factors to meet and address social and perception issues. They give a sense of achievement to the contractor, social benefits to the public and experience to consultants as well.

Project managers, architect or client's representative must ensure that all approvals are sought. In Kenya, such approvals that are necessary for site progression are National environmental management authority, Kenya civil aviation authority, communications commission of Kenya, Kenya airports authority and city council or municipal council approvals. Welch (1964) states basic planning fundamentals as plan be based on careful evaluation of external and internal factors affecting future, alternative course of action be developed and evaluated to full extent possible, alternative selected be carefully drawn to express define plans and objectives, plans be formalized to fullest extent practicable, plans drawn in terms of responsibility and time and specify who, how, and when, plans be clearly understood and acceptable, be developed to

facilitate control. Control is an action necessary to assure objectives, plans, policies and standards are being achieved. Manager evaluates performance, compare actual performance with objectives, plans, policies and standards, analyze deviations from objectives, plans, policies and standards, take corrective action and give feedback information

Frosdick (1997) cites Thompson & Wildarsky (1986) that different cultural biases in organization results in different information being rejected in different ways. Basic types are hierarchists or entrepreneurs, egalitarians, fatalists or bureaucrats and individualists. This the researcher refers to as social complexity. Monitoring and evaluation tools that can be used are such as proper planning, organizing, pre-contract management and post-contract management. On perception, Gilmer (1970) gives set, influence and learning as the major contributors. The researcher concludes by stating that project managers should draw budget by use of zero-base budgeting method to yield lower negative variances, forecasting be correlative method, review and monitor performance and take corrective measures (Welch, 1964).

2.5.2. Contract Management, Requirements and Conditions

The contractual requirements, obligations and responsibilities are vested in contract documentation and depending on the type of contract used. The Quantity Surveyor (2000) attests that developers have become more demanding as they have a right to expect timely project completion and with budget despite increasing complexity of projects. (Jaafar & Abdul-Aziz, 2005) advices managers or organizations to get locked in situations of cascade of sub-optimal decisions made over time to force an earlier sub-optimal decision to work, personal ego and pre-occupation with maintenance of individual power position that blinds managers to make questionable choices. Diallo & Thuillier (2004) says that group members and leaders, especially in a systematic project management context behave on the basis of own perceptions more than on the basis of facts. Decision making is based on perceptions. The success of a project is very much dependent on extent to which risks involved can be measured, understood, reported, communicated and allocated to the appropriate parties (Thomas *et al*, 2003). When risks critically and capability of risk management are perceived differently, risk allocation becomes a difficult task. Rahman & Kumaraswamy (2001) gives the causes as unfair risk allocation, poor communication, unrealistic time and quality targets by client and uncontrollable external events. This however fails to capture the contractor's perspective on such risks.

Contractual misallocation of risks is leading cause of construction disputes, thus increase project volatility (Mwangi, 2006). Inefficiency have led to promulgation of new procurement systems, such as Design and Build, turnkey, package deals, private financing initiative, management contracting and build own operate and transfer. Love *et al* (2005) states that cost and time overruns in Australia in traditional and new procurement systems accounts for 13-19% of cost overruns and 10 to 69% of time overruns. New procurement systems give 11% and 13 to 25% respectively. Baloi & Price (2001) citing Bedelian (1996), many contractors are unfamiliar with these risk factors and do not have experience and knowledge to manage them effectively and efficiently. There need to be foresight of improving knowledge of the links between risk perception, attitude towards risk objects and actual behavior (Njuguna 2008, citing Rean, 1998). Consultants use skills, knowledge and experience with care to ensure clients' interests are protected (Franagan & Norman, 2002).

Management styles adopted by the construction and project management teams also vary and have effects on time and costs of projects. Some such methods are *Laissez faire*, management by objective (MBO), structured management system, management contracting and crisis management. Smith (1999) sites improved effective management of change and clarify project issues from start. Decisions supported through analysis, define and structure of projects continually monitored, clearer understanding of specific risks associated with projects are important. Built-up historical data assist future risk management procedures. It is also important to state at contract signing stage what method of dispute resolution mechanism to be employed in case of disputes. Such methods are arbitration, litigation, adjudication, expert determination, court process and out of court settlement.

2.5.3. Risk management

Risk factor is a negative or positive impact on contract sum, Kartam & Kartam (2001) due to time and cost overruns. Franagan & Norman (2002) attests that once risk is identified, it becomes a management problem. Rahman & Kumaraswamy (2004) argues that construction risks are project specific and should thus be allocated to different parties. Santoso *et al* (2003), citing Wright & Taylor (1994) perception as active process of obtaining and interpreting information from environment to provide order and meaning, subjective process influenced by past experience, influenced by level of experience, stake or profit expected from project, geographical

region and values and level of risk communication transmitted through news and other sources of information to way they interpret cost factors.

Some of the parameters of cost risks are; extra work; late instructions; defective material or works; design or reduced contract period; price fluctuations; third party delays; extended or reduced contract period; financial failure of contracting party; delayed payment; nominated subcontractors and suppliers; delayed dispute resolution; storage of main contractor's materials; differing underground conditions; permits and approvals; inclement/unpredictable weather conditions; delay arising from client supplied items; labour and equipment availability; productivity of labour and equipment; inaccurate quantities; defective designs; discrepancies in contract documentation; complexities relating to project type; delays in interpreting contract documentation; complexities arising from design buildability; site access or possession problem; complexities from construction methods; complexities arising from site location or site conditions; acts of God; changes in laws and regulations; peril such as earthquakes, fire, etc. 5.9% associates cost risk to client, while the rest associates it with the contractor. Researchers have given theoretical aspects such as introduction, nature of risk, influencing factors, attitude, perception (Kartam (2001), Rahman & Kumaraswamy (2004), Talukhaba (1999), Dlakwa & Culpin (1990), Baloi & Price (2001) and Gichunge (2000).

2.5.4. Scope and Complexity

Scope is extent of the project, while complexity is the difficulty in which the project is handled under (Waihenya, 2011). The researcher gives reasons for cost overruns as variation in cost of building materials, changes in design of building, changes in finishes by client, contractor running out of money to run projects for some time, hiring extra tools during construction not anticipated, and under-estimation of cost of construction by QS. He gives the order of merit of risk allocation/responsibility as contractor, QS, Architect, Structural Engineer and Clerk of works. Cost overruns frustrates process of development as it ties finances of unfinished project, diminishes returns to developers and causes problem of mortgage servicing.

Project is based on three major pillars, cost, quality and time. Mwangi (2006) citing Aje & Jagboro (2003) says it's rare for building works not to have variations. This leads to time and cost overruns. May lead to better product, or add no value or wasted money. Mbatha (1986)

states some of the causes of time and cost overruns as ineffective technology and economic appraisal, no thorough site investigation and market surveys, poor estimates by client and project quantity surveyor due to project brief being inadequate or using un-updated cost data, badly written condition of contract, amendments/addendums, inadequate tender evaluation, excessive variations, disruption or lack of competent contractor/suppliers. Waihenya (2011) citing Kwakye (1994) states that there are methods used in cost estimation, standard of work required, project requirements, contractor past experience with clients and advisors influence, estimators pricing method, difference in quotation prices, purchasing arrangements during procurement and frequency of purchases, settlement of credit accounts on demand, reliability of suppliers, method statement and construction program are all hinged on scope and complexity of project, which invariably affect time and costs. Availability of plants, tools and equipment pertinent for the works also contributes to project time and costs.

Talukhaba (1999) states that client and architect actions or omissions to sound project planning and control have adverse effects on project's costs and time. Kivaa (2000) faulted time estimation method used as unscientific and resulting to difficulties in estimating time-related project costs, i.e., cost of finances, insurances, water, electricity, telephone, assessing and justifying extension of time and difficulty in managing estimated contract period effectively. He thus proposes use of a mathematical model for estimating construction period. Gichunge (2008) says that joint building council (JBC, 1999) allows variations as risk and adequacy of risk management and proposes predictive models of risk. Also that extra works leads in relative frequency. Kimani (2004) attests that cost and time overruns can be minimized by design plans that minimize changes during construction stage and adequate finance planning that limits delay caused by lack of finance and associated problems

Abwunza (2006) states that building cost performance is influenced by QS perception of risk importance of cost factors such as extra works, design and specifications changes, extended or reduced contract period and delay in preparing detailed drawings. Delayed payment, late instructions, financing failure of contracting party, defective material and works, differential underground conditions, delays arising from client supplied items, inadequate quantities and price fluctuations. He suggests that one can apply cost management to mitigate cost overruns. Seboru (2006) researching on roads says that road construction delays are caused by exogenous

and endogenous factors. Exogenous factors such as political interference, inflation and interest rate. Endogenous factors such as design change by engineers and inadequate planning and scheduling. All these have effect on time and cost overruns and project complexity.

Talukhaba (1999) states that reflection of poor project time management practices, frustrates process of development, scarce funds tied to unfinished project, mortgage servicing, viable project rendered unviable due to changes in market conditions, society cost and loss of reputation of parties is immeasurable. Pre-construction time overruns reasons are statutory body estimates for permissions, increase competitive tender procedures, financial and economic cost overruns due to short term and long term funding. Short term are land purchase, loan, land development, construction payroll, 'gap' financing, construction loan, depending on size and nature. Gichunge (2008) citing Grebler (1973) noted that use of unsecured notes/debentures, unsecured commercial bank credit, commercial paper, stock warrants, subordinated convertible debentures and issuance of preferred stocks.

2.5.5. Procurement Systems on Management

Procurement system is the way in which a contractor is engaged or system used to acquire necessary service. For public projects, this is guided by PPOA (2005) and PPDA (2005) documents. Kimani (2004) when researching on time and cost overruns agrees with researchers such as Mbatha (1986), Wachira (1996), Baradyana (1996), Bromilow (1969), Radujkovic (1999), Kivaa (2000), and Seboru (2006). Traditional construction industry organization is basically organized as client, contractor, consultants with key roles and plans. Consultants prepare plans for design and tender phases, contractor prepares construction phase plans. Therefore, look at three perspectives, that is, client, consultants and contractor. This is according to agreement and schedule of conditions for building contract (JBC, 1999).

Approvals from authorities and relevant Government bodies have a lot of bureaucratic processes involved before a project is approved. Client finance project and sufficiently plans to avoid problems of partial financing. Contractor cash-flows are to be fairly accurate to assist client arrange required finances on time. Radujkovic (1999) says its lack of finance planning that often leads to delayed payment to contractor hence frustrating work progress. Productivity of resources determines time required. Computer programs make realistic and more accurate estimates. It's

important to have productivity data on labour, plant and materials by planner so as to realize accurate plans. Waihenya (2011) and Smith (1986) gave procurement methods as orthodox bills of quantities, bills of approximate quantities, cost reimbursement, target cost, continuity, serial, term, two stage tendering, design and build, management contracting.

When time is of no consequence, it is advisable to go full board in terms of all processes of procurement. Here, traditional procurement system is preferred, where Architect/Consultants designs through initial designs, scheme design, detailed design and working drawings/designs, including related approvals before QS prepares bills of quantities. This then goes on to tendering stage, analysis and recommendation of the contractor to undertake the works and finally the works commences on site. Conversely, in the case of non-traditional procurement system, the contractor is brought on board at initial stages of design. This means that the works on site can commence before designs are completed. It leads to time saving, but has disadvantage of cost. The contractor's price is not known at the beginning, which may lead to cost inflation and uneconomical, as there is no competition on cost or price. This system works well where projects of similar nature are being undertaken and no need for revision of details. However, in cases of valuing variations, such can be unbearably inflated. Both systems have advantages and disadvantages, depending on whichever system is preferred or adopted and contribute to time and cost overruns of the projects.

2.5.6. Planning, Organizing and Controlling on Management

Planning is basis for organizing, leading, controlling and steering mechanism – goals and plans. Goals are future end results, plans are road map to get there. Choice of technology, define work tasks, establish resources required, duration for individual tasks, identification of interactions among different work tasks (Maira, 2008 citing Kathlyn & David, 1991). Organizing work professionally and resource planned. Shortages reflect poor and inadequate plans. Design change is caused by decision to start project before total technical documentation is finished and accepted; additional demand for functional change; inaccuracy, incompleteness or late update documentation; weather be considered at time of program preparation and plans; cost of necessary plans preparation, but failure to plan costs much greater; plan to ensure no surprises at project execution phase; experience and theoretical knowledge, sufficient planning can be achieved in construction project; planning left to chance and done informally; remedial action

and contract conditions; role of project manager on time and cost for project completion and integrate individual plans for others. Such variables like time, changes, buildability, tendering, skills and tools, tender control, financing impact heavily on construction time and overruns in projects. An organization without planning is like a sail boat minus its ruder (Maira, 2008).

Kimani, (2004) argues that planning as management tool can minimize delays and poor planning among clients, contractors and consultants to meet project criteria of cost, time and quality. Delay hinders smooth progress of works, thus planning has direct effect on time performance. The researcher found major causes of project delays as unresolved financing of project; design changes during execution; unrealistic plan and short time for execution; material, plant or labour shortage; climate/weather changes. Poor management causes budget and time overruns and strained relationship among project participants. Generate required activities, analysis of implication and choice of alternative means of performance activities. Construction process is the conversion of architectural concepts, structural designs, engineering drawings and specifications to real structures involve complex inter-relationship between good business management and modern construction technology. Main contractor, subcontractors, owner, designer, technical staff, peripheral group of consultants and Government inspectors are the main parties. Coordination of different phases of people involved, ability to integrate construction process and solutions. With goals established, plans are developed and monitoring process carried out through use of Gantt charts, Bills of quantities, cash-flows as well as single plan project and programs.

Developing a programs has six basic steps namely, determine relationship among parts and developing a sequence; decide who takes responsibility for each part; determine how each part would be completed and what resources necessary; estimate time and required for completion of each part; developing schedule for implementing each step within budget (Maira, 2008,citing Kathlyn & David, 1991). Standing plans are policies, procedures and rules. Policies are general guide that specifies broad parameters with which the right members are expected to operate in pursuit of an organizational goal. They don't specify actions to be taken but spells out important constraints.

Procedures are prescribed series of steps to be taken under certain recurring circumstances. Provide detailed step by step instructions as to what should be done, but don't allow much

flexibility or deviations (Maira, 2008 citing Kathlyn & David, 1991). This promotes efficiency in time, cost and enhance safety in work places. Rules are statements that spell out specific actions to be taken or not in a given situation. They control quality, time and cost and spelt out in specifications, designs and conditions of contract. Communication is paramount. Modes suggested are such as internet, telephone, email, hard-copies delivery or facsimile. Whichever mode is adopted, has advantages and disadvantages as case may be.

Choice of technology and construction method depends on working or access space and available resources, define tasks, necessary framework to permit scheduling of construction activities, establish resources required by individual task, procedures, required sequence among tasks, task of defining activities, determine relationship and estimate activity duration required skill, judgment and experience of construction planner, Radujkovic (1999). Overall planning process of mission, goals, and plans can play a vital role in making construction activities more efficient and promote innovation. Mission in a statement highlight target dates and budgets for a project, address general areas which encourage innovation and motivates construction players in observing time schedules. Goals are realized by establishing plans. Steve Bostic is quoted as saying, “I want people to buy into the plan, so it isn’t just my plan anymore. It becomes theirs as well. That way, I know everybody is following the same road map when we go out into the real world.” Kivaa (2000) states that one can adopt either non-mathematical or mathematical methods. Mbatha (1986) states that contractor relates project scope to expected expenditure per week to get weeks. There needs to be inter-relation of experience and quantitative analysis of data (Kivaa, 2000).

2.5.7. Quality and Workmanship on Management

JBC (1999) and PPOA (2005) give some conditions on delay and compensation, variations, quality of workmanship required and specifications. This may affect quality of workmanship, especially if time is fixed on which to complete the project. Such has been encountered in emergency relief projects which should be completed by certain period. Some donors who funds projects also have strict timelines for delivery, failure to which may lead to withdrawal of funding or discontinuation of projects, rendering them ‘white elephants’. Strain in construction process- poor plans, design, lack of communication, mistrust, self interest and disputes, result to delays, disruption and extra cost. Pressure from clients, budgets to be spent before end of

financial year, lack of money, slow process of consultation and approvals especially public sector projects and traditional methods of designs followed by short tendering period and award of contract to contractor (Crooke & Wilham, 1998). Basic process for preparing program are such as getting a feel and sizing the project; assessing key project dates; establishing construction sequence and deciding which programming technique to use

2.6. Environmental Issues on Construction of Projects

Construction time performance is determined by scope, complexity and environmental factors. Environmental variables include cultural, economic, physical, social, political, aesthetic, financial, legal, institutional and technological factors (Ahuja & Naidakumar, 1985, Bennett 1985 and Walker, 1995). Computer programs such as ms project and sure track, accurate time schedules can be produced. Productivity is work output over a given time duration. According to Talukhaba (1988), time taken and cost incurred to complete a project are the most widely used measures of project success 73% time overruns and 39% cost overruns. Sidwell (1984) and Seboru (2006) client involved in project had far-reaching effects on satisfactory completion of project. Established construction required by approaching profits. Successful rationalization in building industry requires exam of design and construction process together and their development as an organic whole. Link design and production with contractual procedures and whole process treated as one (Sidwell, 1984 and Seboru, 2006).

Some causes of uneconomic work include; non-productive time caused by excessive travel from job, waiting for instructions and materials, failure to gain access to site, inclement weather. Improper work methods resulting in more time spent on job than necessary and waste of material, inappropriate tendering procedures and contract arrangement in relation to type of work and prevailing market conditions; changes to nature and scope of work after commencement; and lack of efficient system of recording and controlling. Frosdick (1997) cites Thompson & Wildarsky (1986) different cultural biases in organization results in different information being rejected in different ways. Basic types are hierarchists or entrepreneurs, egalitarians, fatalists or bureaucrats and individualists. This he refers to as social complexity. On perception, Gilmer (1970) gives set, influence and learning as the major contributors.

2.7. Conceptual Framework

The relationship between independent variables time overruns, cost overruns, management and environmental issues that impact on Government Tertiary Institutions as the dependent variable are illustrated in Figure 1 conceptual framework.

Independent Variables

Moderating Variables

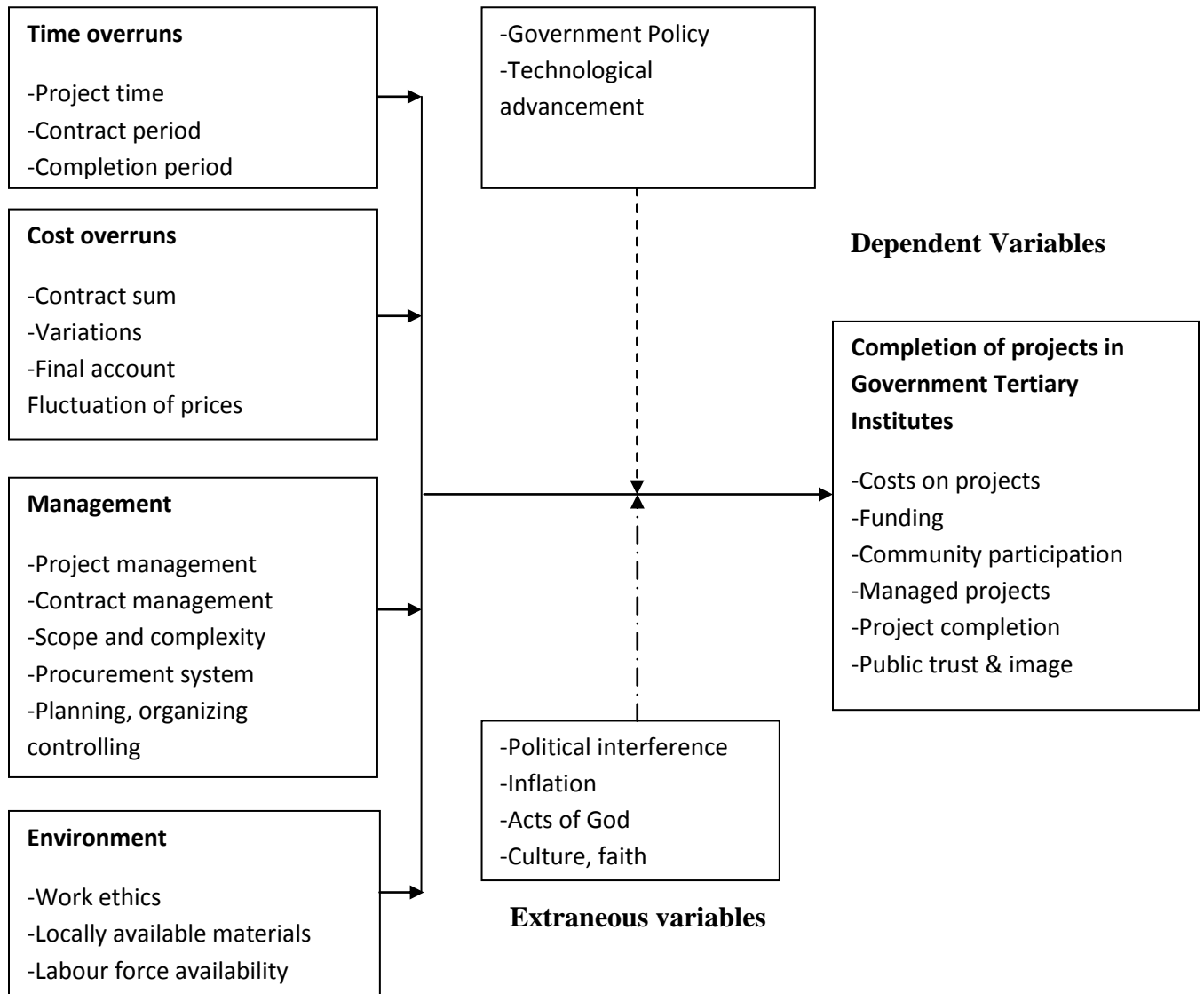


Figure 1 Conceptual Framework

2.7.1 Relationship between Variables

Time Overruns affects the overall project cost in terms of financial claims on preliminaries items which are either fixed or time-based, such as insurances, security, water and electricity, performance bond, transportation of materials and human, office staff and the like. Cost Overruns give a general feel that consultants are incompetent, contractor is inexperienced or financial support would be continued or withdrawn in case of donor funded projects or joint-venture. On Management of projects, Project managers or Architects are experts or lead consultants who issues and approves instructions and variations; Quantity Surveyors, who are experts in cost matters and who advises on cost implications; engineers both services and civil/structural affects quality and cost, which is directly related to project period/time. Client's representatives cause changes, irrespective of the financial constraints. Contract management with parameters such as the main contractor, subcontractors, and contractor's superintendent on site, management style and experience in handling projects affects completion of projects in time and cost, which impact on project delivery. Environmental issues such as cultural disparity, differences and their effects on work ethics, performance and perception of work affect delivery of projects within parameters of time, cost, scope and specifications. Material availability locality and weather also play a key role in Government Tertiary Institutions.

All the above variables affect the final outcome or completion of Government Tertiary Institution project. Government budgets are done once every year, probably in the months of June or July. Cash-flow of the projects is usually tied up as parent ministries have to file returns and account for unused funds. This in turn affects project delivery. When interventions are put in place, there should be reduced cost of projects, projects delivered or completed in time, which should meet client and public satisfaction and gain public participation and co-operation in development agenda of the Government. It should also improve management skills as well as harness learned skills from projects that meet required parameters.

2.8. Literature Gap

In majority of the studies done and reviewed so far, few researchers have comprehensively looked at the contractor's side of cost and time overruns management and environmental issues in projects. There has been a tendency to sideline the roles of contractors and blame them solely as the contributors to time and cost overruns in the guise that they are business-minded and have no recourse for others or consequences that may result in default (Mbatha, 1986). JBC and PPOA conditions of contract allow some lee-ways for extension of time, but on condition that the issues are raised as early warning to the consultants, at whose discretion the award is pegged. The consultants at no time can incriminate themselves, either verbally or in writing if they default on their end of issuing instructions or late instructions. The contribution of the contract manager and project manager has also not been given much attention. Project management is a recent discipline and not as well advanced in development as other disciplines. The contractors' superintendents have big role to play in interpreting and actualizing instructions given, clear understanding of projects and reading of drawings, specifications and details.

Government has been in the past funding its projects from public coffers. New system of partnership has emerged where donors channel funds or aid but directed towards projects. The Government meets about 10% of project cost and the donor finances the rest. Such has been the case of funding of Institutional developments such as colleges and upgrading of colleges to university status, requiring upgrading of structures therewith (MOPW, 2012). Not much has been documented on this system. The role of consultants in projects has been emphasized by many scholars. This however has left out client's representatives who issue instructions to the contractors directly, with no much consideration on cost impact that the instructions would have on the overall project. This affects project delivery time and creates issues to the project management. Striking a balance between quality, time, scope and cost thus becomes a concern to all parties in projects. They are inter-related and inter-dependent. Cost and time overruns are directly related in projects where one affects the other. Managerial skills and competencies reflect on overall project delivery. The environments under which Government Tertiary Institution projects are delivered affect their actual delivery. These projects are implemented to meet specific needs, thus the reason for the study on how to enhance delivery.

2.9 Summary of Chapter Two

The chapter is organized into introduction of reviewed literature; concept of completion of Government Tertiary Institutions, time overruns in projects where initial contract period, project period and construction period were discussed; cost overruns in projects where contract sum, variations and final account are considered; management of projects where project management, contract management, requirements and conditions, risk management, scope and complexity, procurement system, planning, organizing and controlling aspects as well as quality and workmanship were discussed in length; impact of environment on projects as well as literature gap that the research intends to fill have been discussed. The researcher has also looked at conceptual framework and the relationship between the variables.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides a discussion of the research methodology used in this study. It gives a discussion on the research design used especially with respect to choice of design. It discusses target population of study, sample size and sampling technique adopted, data collection methods used, data collection instrument, validity, reliability of the instrument, data collection procedure, data analysis methods employed in the study as well as ethical considerations.

3.2 Research Design

This study adopted a quantitative approach and in particular a descriptive survey research design. The design was appropriate because the study aimed at collecting information from respondents on their attitudes and opinion on factors influencing completion of projects in Government Tertiary Institutions in Nairobi County in Kenya. Descriptive survey is a method of collecting information by interviewing or administering questionnaires to a sample of individuals (Orodho, 2003). It can be used to collect information about people's attitudes, opinions, habits or any of variety of education or social issues (Orodho & Kombo, 2002).

The researcher aimed at studying factors influencing completion of projects in Government Tertiary Institutions in Nairobi County in Kenya. The research intended to look at the contractor's perspective on roles of consultants and their contribution in occasioning delays and cost overruns for these projects. It aimed at establishing relationship between contractors' managerial experience and time and cost overruns. It also sought to establish the impact of project management system used in realization of a project and the impact it has on time and cost overruns of a project as well as environmental issues that are at play.

3.3 Target Population

Target population refers to a collection of all-possible individuals, objects or measurements of interest (Orodho & Kombo, 2002). Target population determined here were all Tertiary Institutions construction projects funded by the Government in the past ten years. There are 44

Government Tertiary Institutions in Kenya as per Ministry of Higher Education, Science and Technology, 2013 statistics, which forms the target population for this study. Among those, 14 of them are found within Nairobi County. Within the 14 identified Institutions, there are 26 recently completed projects executed by 26 different contractors whose top management were the respondents for this study. This data was obtained from the Ministry of Higher Education, Science and Technology database. One contractor firm was randomly selected to be used to pilot survey the reliability of the research instrument and was therefore excluded from the main research. Therefore, 25 firms were targeted for the main study.

3.4. Sample Size and Sampling Techniques

Sample is a portion or part of a population of interest. It is a subject of measurement selected from a population. Sample frame is a complete listing of all sampling units or elements that can adequately represent that population (Nachmias & Nachmias, 1996). There is no such a complete formal list that can adequately satisfy a researcher as a sample frame (Njuguna, 2008). Since no standardized sampling frame exists for all these organization on Government Tertiary Institution projects, the firms that would provide this data were selected using purposive sampling method, according to Njuguna (2008), citing McDaniel Jr. & Gates (1996), in such instance, it is suggested that the researcher develops a sample frame that produce a representative sample of the population elements with the desired characteristics or attributes. Information on sample size targeting 25 contractors who undertook projects in Tertiary Institutions funded by the Government and contractors list was obtained from the Ministry of Public Works and also from National Construction Authority (NCA) on their current list of registered contractors, Government database on contractors who have undertaken work with them for the period of time.

The researcher targeted 25 cases. Alteck & Settle (1985) stated that when sample size is less than 30 cases, the researcher then takes the total population as sample size. The target respondents were the top management of the 25 sampled construction contractors' firms. Based on responses of previous similar studies, a response rate of 40-50% was envisaged and would give required information (Njuguna, 2008).

Since statistical information shows that most of construction firms have their offices in Nairobi, but may be undertaking works across the Nation, the researcher concentrated on firms established in Nairobi County and its environs. The category of contracting firms studied depended on their undertaking of Government projects irrespective of their class as they must be pre-qualified to undertake such projects. The researcher assumed that they were therefore more organized and thus would give viable information or data. The researcher endeavored to scrutinize, verify and screen the data collected from the field by ascertaining facts of the project from Government database, so as to rid of erroneous and misleading information. The tool used herewith was correlation in nature of time and cost overruns as well as management and environmental issues in Government funded projects in Tertiary Institutions in Kenya, with consideration of Nairobi County projects.

3.5 Data Collection Instrument

Primary data was collected from senior managers of sampled organizations using questionnaires with both structured and unstructured questions. Questionnaire design contained both open and closed questions. Open questions gave respondent room to decide extent, aspects, details and length of the answer with flexibility to convey certain case. The closed questions were designed to keep questionnaire to a reasonable length due to constraints (Alreck & Settle, 1985). The researcher, due to time constraints of the study employed services of two research assistants, who have understanding of construction industry to aid in data collection. The researcher gave them guidelines on the data collection procedures on how to administer questionnaires, ensured follow-up and that the information given was relevant to the study.

3.5.1. Validity of Data Instrument

Validity is the degree to which data collected by an instrument can be said to be valid for purpose of analysis and making inferences from the data (Mugenda & Mugenda, 2003). In order to ensure content validity, the questionnaires composed of carefully constructed questions to avoid ambiguity and in order to facilitate answers to all the research questions. The supervisor was involved in evaluating items in the research questionnaire instrument. The instrument was also administered to about two senior managers in construction companies whose response

would help to ascertain the instrument's face validity, relevance and clarity of questions before administering to the target sample.

3.5.2. Reliability of Data Instrument

Reliability of a research instrument is the extent to which the results obtained from the instrument are consistent and are an accurate representation of the population under study (Kabue, 2011). The research used pilot survey method to establish the validity and reliability of the data instrument (Njuguna, 2008). This is a process where one respondent is issued with a research tool, whose response is noted. The same respondent is given the same research tool after a certain period of time. In this case, the data collection tool used for pilot survey was administered within a span period of one and a half weeks and information compared. The researcher computed the results of the tests and noted that the information differed slightly, with an error factor of less than 5% reflecting consistency and thus confirming that the instrument was reliable. The respondent was excluded from the main survey.

3.5.3. Data Collection Procedure

The researcher prepared the questionnaires and administered them to principals or top management of selected firms. Where necessary, the questionnaires were sent in advance to the firms before visiting them to allow them ample time to provide necessary information. Interviews would also be encouraged for further clarification of information or data provided. A letter of introduction was availed with each questionnaire for ease of identification and authentication of data and undertaking that information collected would only be used for the said research only. This, the researcher hoped would dispel any fear in disseminating pertinent information. The study obtained telephone contacts and physical contacts for self administration of questionnaires to the respondents. The respondents were required to respond within two weeks' time and the researcher collected the filled questionnaires for analysis.

3.6 Data Analysis Techniques

Questionnaires were coded, given a distinct number and data entered manually in a computer. This was then analyzed and tabulated accordingly. Data was analyzed using descriptive statistics. This was subjected to ordinal, nominal, ratio and interval scales of measurement. This data was

coded to allow for analysis using computer Softwares. This would then be tabulated and presented in percentages and tables. Software for primary quantitative data –Statistical Package for Social Science (SPSS) software was used, cleaned and verified, then transferred to Microsoft Excel and Microsoft Word. Quantitative analysis involved derivation of statistical descriptions and interpretation of data that relied purely on numerical values (Nachmias & Nachmias, 1996). Open ended questions were analyzed using qualitative method of data analysis. This involved derivation of explanations and making use of interpretation of findings based on descriptions of open ended questions. Data was represented by use of frequencies, percentages and tabulated in frequency tables and descriptive statistics.

3.7 Ethical Considerations

Due to the sensitivity of the information on costs involved in construction and the fact that most companies treat such monetary information with confidentiality, the researcher ensured that the respondents were treated with unanimous kind of resilience. The researcher produced, on request by respondent a letter from relevant authority attesting to the fact that the information gathered was to be used for this study and not for any other intent. This letter accompanied every questionnaire that was administered. The researcher also endeavored to maintain ethical issues of impartiality, inclusivity, honesty and avoid corruption or bribery in order to get information. Voluntary consent of participation was sought. The researcher also intended to uphold and maintain cultural practices, where required to and where questions infringe into such, amicable resolute would be arrived at. The right to information and clarification was also upheld. Any respondent who sought clarification of any question in the questionnaire was accorded thus. Data analysis, collection, interpretation and presentation were done as objectively as practical.

3.8. Operational Definition of Variables

Table 3.1 shows the relationship between the operational relationship of variables

Table 3.1 Operational Definition of Variables

Objective	Independent Variable	Indicators	Measurement scale	Types of analysis
Time overruns in Government Tertiary Institutions projects	-Time overruns	-Late instructions -Material order delays -Complexity -Procurement system -Timely project delivery -Project completion on budget -Project specifications change -Projects not delivered to clients satisfaction -Client' involvement	Nominal and Ordinal scale	Descriptive statistics
Cost overruns in Government Tertiary Institutions projects	-Cost overruns	-Delays in approval of budgets -Variations -Fluctuations/inflation -Authorization of variations -Higher final account	Nominal and Ordinal scale	Descriptive statistics

Project and contract management in Government Tertiary Institution projects	-Management	<ul style="list-style-type: none"> -Expertise -Handling similar projects -Ethics -Managerial system/ experience -Education -Interpret drawing -Correctly order material -Note variations -Ask for clarifications in case of discrepancies -Experience in people management 	Nominal and Ordinal scale	Descriptive statistics
Impact of Environment on completion of Government funded Tertiary Institutions projects	-Environment	<ul style="list-style-type: none"> -Culture/customs -Laziness & Laxity -Work ethics -Quality conscience -Material not available -Motivation 	Nominal and Ordinal scale	Descriptive statistics
	Dependent	<ul style="list-style-type: none"> -Scope -Quality -Output -Community perception 	Nominal and Ordinal scale	Descriptive statistics

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.0 Introduction

This chapter presents the analysis of data collected from the fielded items in the study questionnaire. The findings were analyzed and presented in the form of frequency tables, numerical values and percentages generated through Statistical Package for Social Science (SPSS) Version 17 computer software. The responses are presented followed by a brief interpretation guided by the research objectives and a discussion on research findings from the analysis of the data.

4.1 Response Rate of the Study

The questionnaires were distributed to 25 purposively selected respondents of which 20 were completed and returned.

Table 4.1 Response rate of the study

	Frequency	Percentage
Responded	20	80
Non-Response	5	20
Total	25	100

Table 4.1 gives a response rate of 80%. The collection procedures involved personal administration, reminder and personal collection whenever possible. As for the 5 unreturned questionnaires, this can be attributed to the inability by the respondents to complete and return them by the end of time given for responding to the items.

4.2: Background of the Respondents

4.2.1 Gender Profile of the Respondents

The respondents were asked to indicate the gender profile in terms of being male or female. This expresses the nature of gender relations in the construction industry. Table 4.2 illustrates gender profile of the sample.

Table 4.2 Gender of Respondents

Gender	Frequency	Percentage
Females	4	20
Males	16	80
Total	20	100

Table 4.2 shows that majority of respondents were males and few were females. The observation shows this is a reflection of the distribution of the available gender sampling aspects in an environment that has been historically dominated by men. This then calls for women to be more involved in construction and management of projects.

4.2.2 Age of Respondents

The respondents were asked to indicate their age. Five categories were given and the following table indicates the age brackets

Table 4.3 Age of Respondents

Age	Frequency	Percentage
20-29	5	25
30-39	5	25
40-49	6	30
50-59	3	15
60-above	1	5
Total	20	100

Table 4.3 shows that majority of respondents fall in the bracket of 40-49 years while only a small percentage (5%) falls in the category of age bracket from 60 years and above. This could explain the dynamics of the construction industry that due to stress associated with the industry, only the middle class can cope. This shows generational change from aged to younger managers.

4.2.3 Highest Education Qualification

The respondents were asked to indicate the highest level of academic qualification achieved. Table 4.4 illustrates the level of qualification across the sample

Table 4.4 Highest Education level

Education level	Frequency	Percentage
Degree	3	15
Masters	11	55
PHD	6	30
Total	20	100

Table 4.4 shows that the highest numbers of respondents were masters' degree holders while only a few had PHD and had undergraduate degrees. This means that level of education in top management of construction industry is dynamically changing.

4.2.4 Category of Registration

The respondents were asked to indicate the current registration class. The analysis is presented in Table 4.5.

Table 4.5 Category of Registration

Category	Frequency	Percentage
A	10	50
B	4	20
C	2	10
D	3	15
F	1	5
Total	20	100

Table 4.5 shows that majority of respondents were in class A, followed by class B, D and C respectively. Only a small percentage of the respondents were in class F, a small scale contractor. Due to magnitude and complexity of qualification for Government funded projects, small scale firms rarely qualify for such projects. Class F is the lowest category and the highest class is “A”. The registration category of the firm indicates the growth path and the level of experience of the firm over time. More competent contractors are engaged in Government Tertiary Institutions than those in lower levels.

4.2.5 Firms’ Experience

The researcher sought to establish how long the firm has been in existence in construction work in Kenya. Table 4.6 shows the results from the respondents.

Table 4.6 Experience of Firm

Period	Frequency	Percentage
3-6 years	1	5
7-9 years	2	10
10-12 years	8	40
13 years & Over	9	45
Total	20	100

Table 4.6 shows that majority of respondents have experience of over 13 years while only 5% that falls between 3-6 years bracket. This can be correlated with the classification as per MOPW listing or NCA categorization. The more experienced, the better the output of projects in terms of time, quality and workmanship, resulting to the contractor getting more work from the Government.

4.2.6 Projects' Experience

The respondents were asked to indicate period they have been handling projects with the Ministry of Public Works, which deals with projects on behalf of parent ministries. The data results are given in Table 4.7.

Table 4.7 Project Experience

Period	Frequency	Percentage
3-6 years	1	5
1-2.5 years	1	5
7-9 years	4	20
10-12 years	6	30
Over 12 years	8	40
Total	20	100

Table 4.7 shows that a high number of respondents have tackled projects with the Ministry of Public Works for over 12 years while small numbers have least experience. Ministry of Public Works is the highest employer in the construction industry.

4.2.7 Experience of Key Personnel Employed in the Firm

The study sought to establish the experience in years that the key personnel or team leaders that they have been practicing management in their respective deployments. The results are shown in Table 4.8.

Table 4.8 Experience of Key Personnel

Level	Frequency (years)	Percentage
Top level management	8	40
Middle level management	6	30
Lower level management	2	10
Technical management	4	20
Total	20	100

Table 4.8 shows that on average, majority of respondents have held top level posts followed by middle level while others have had lower level management positions. Very few respondents have had technical management expertise in the firms. Through gaining experience within same firm, one is likely to rise in ranks with time.

4.3 General Project Information

4.3.1 Project Consultants

The study sought to know deployment of professionals in the projects they handled and results from respondents were presented as shown in Table 4.9.

Table 4.9 Professional Consultants

Consultant	Frequency	Percentage
Architect	5	25
Civil/Structural engineer	5	25
Mechanical/electrical engineers	4	20
Quantity Surveyor	6	30
Total	20	100

Table 4.9, shows that majority of the respondents indicated that the projects they handled had a team comprising quantity surveyors, architects, followed by civil/structural engineer and mechanical/electrical engineers involved in the projects they handled. Projects with full team of consultants were better managed and implemented.

4.3.2 Consultant Firms' Nature of Engagement

The research wanted to establish the nature of engagement of the consultants' team. The respondents were given the option to indicate if the teams were in-house or outsourced from the private sector by indicating which specific consultants fell into which group. The data is presented by Table 4.10.

Table 4.10 Nature of Consultant firms

Consultant	Frequency	Percentage
Architect	4	20
Civil/Structural engineer	6	30
Mechanical/electrical engineers	2	10
Project manager	2	10
Quantity Surveyor	6	30
Total	20	100

Table 4.10 shows that the highest respondents have handled projects where quantity surveyors and civil/structural engineers were engaged, while architects, mechanical/electrical engineers as well as project managers were least engaged. Among these respondents, they also indicated that some team members were outsourced from the private sector in the execution of the projects they handled. This means projects are delivered with professionalism where all consultants are engaged.

4.3.3 Cross Tabulation of Professional Firms engaged from both Public and Private Sectors

Cross tabulations are used to summarize data in such a way that reveals the relationship between two variables, in this case professional engagement and sectors. Government seems to be

outsourcing professionals from the private sector to help manage projects on their own behalf on professional engagement. Projects handled by private professional teams seem to do better than government supervised projects. This could be attributed to capacity and expertise.

Table 4.11 Cross tabulation of professional firms engaged from both public and private sector

Professionals	Sector			
	Public	Percentage	Private	Percentage
Architect	8	40	4	20
Civil/Structural engineer	5	25	8	40
Project Manager	1	5	3	15
Quantity Surveyor	6	30	5	25
Totals	20	100	20	100

Table 4.11 shows that most respondents indicated that architects from public sector were mostly engaged followed by quantity surveyors, civil/structural engineers and project managers respectively. Conversely, civil/structural engineers, quantity surveyors, architects and project managers from the private sector were also engaged in that order. This agrees with MOPW (2004) requirement that private sector professionals be engaged, based on qualifications and magnitude of projects, to offer competent professional project management on behalf of the private sector. When project professionals are outsourced, there is better output of projects than where in-house teams employed by the Government ministries are used.

4.4 Construction Time Period

4.4.1 Period of Site Possession

Respondents were asked to give in weeks the project period within which the project was supposed to be completed as was documented in the contract agreement. Table 4.12 shows the results from the respondents.

Table 4.12 Construction Project Time

Period (weeks)	Frequency	Percentage
0-60	12	60
60-100	2	10
100-over	5	25
Non-response	1	5
Total	20	100

Table 4.12 shows that majority of the projects were handled within 0-60 weeks, while those completed in over 100 weeks were least. Small number declined to respondent to this question. This confirms the fact that most projects are proposed to be done and completed within the contract period depending on the magnitude, complexity and prevailing constraints, though some

exceed by far. Most projects under study were not delivered in time due. Proper co-ordination of projects hand-over is then important for project delivery.

4.4.2 Project Commencement Date

The study sought to confirm the time period of the projects that respondents handled by requesting them to indicate the first date of site possession for the project. The results are indicated in Table 4.13.

Table 4.13 Start of Construction Project

Year	Frequency	Percentage
2005	1	5
2006	1	5
2007	3	15
2008	1	5
2009	2	10
2010	3	15
2011	4	20
2012	4	20
Non-response	1	5
Total	20	100

Table 4.13 shows that majority of projects were started in 2011 and 2012 respectively while least projects were done in the years 2005, 2006 and 2008 respectively. Some respondents did not indicate the time of site possession. This shows that there has been a marked improvement in development and most projects in Tertiary Institutions were handled in the period spanning from 2011 and 2012. This shows upward trend in projects development and external factors that come to play such as demand for Tertiary Institutions due to free primary education and economic stability of the country in the last one decade.

4.4.3 Completion Date

The study sought to establish the completion date for the projects that the respondents were handling, and results are as shown in Table 4.14.

Table 4.14 Completion Date

Year	Frequency	Percentage
2008	2	10
2009	3	15
2010	5	25
2012	6	30
2013	2	10
Non-response	2	10
Total	20	100

Table 4.14 shows that most projects were completed in 2012 and 2010 while few projects were completed in 2008 and 2013 respectively. Some respondents did not indicate completion date for the projects they were handling. This research study shows that most of Government projects are not usually completed within time thus has time overruns.

4.4.4 Respondents' Opinion on Time Allocated for Projects

The study sought to get the opinion of the respondents on whether the projects they were handling could have been completed within a shorter period of time than it actually took. The results are as tabulated in Table 4.15.

Table 4.15 Opinion of Respondents

Response	Frequency	Percentage
No	13	65
Yes	7	35
Total	20	100

Table 4.15 shows that majority of respondents indicated that the projects could not have been handled in a shorter period than was allocated while others indicated that time allocated was enough to finish the projects. This could be attributed to other factors as stated by the respondents as delays occasioned by the non-payments, slow response to get instructions and information from consultants, delays in materials delivery among others. Others felt that the project could have been completed within contract period. Government projects experience massive delays due to factors attributed to delays in response on Government officials in information dissemination, delayed payments among other factors. Projects payments should be effected in time, information disbursed and instructions given and documented appropriately.

4.4.5 Contributors of Project Delays

The study sought to establish the contribution of different professionals and personnel engaged in project production in terms of involvement and degree of contribution given as highly, moderately or lowest. The results were as shown in Table 4.16.

Table 4.16 Contribution of Project Personnel

Personnel	Frequency	Percentage
Architect	4	20
Civil/structural engineer	2	10
Clerk of works	2	10
Electrical engineer	2	10
Mechanical engineer	1	5
Project manager	4	20
Quantity surveyor	5	25
Total	20	100

Table 4.16 shows that majority of respondents felt that the quantity surveyor contributes the highest in delays, then the architect, project managers civil/structural engineers, clerk of works and electrical engineers, mechanical engineers respectively. Thus, during issuance of instructions, processing payments as well as valuing of works done and variations, decision which affects project delivery in time should be made with speed.

4.4.6 Effects of Project Delays

The study sought to establish the overall effect of time overruns to the firm in relations to various parameters and results were as tabulated in Table 4.17.

Table 4.17 Effects of Time Overruns to Projects

Indicator	Frequency	Percentage
Creditor's confidence	4	20
Debtor's confidence	4	20
Firm's profitability	3	15
General public perception	1	5
Supplier's confidence	3	15
Staff motivation	5	25
Total	20	100

Table 4.17 shows that majority of respondents indicated that staff motivation is mostly affected when projects are delayed while general public perception of the firm is least considered. None of the respondents felt that time overruns affects their relationship with any registration bodies. This means that the professional bodies are able to cushion their members against harassment.

4.5 Contract Cost Information

4.5.1 Initial Contract Sum

Respondents were requested to indicate here the tender award sum or contract sum for the projects they handled for Tertiary Institutions of Government indicating also the currency of the tender. Their responses are as tabulated in Table 4.18.

Table 4.18 Contract sum

Amounts (Range in Millions)	Frequency	Percentage
50-100	8	40
101-150	6	30
151-200	4	20
201-250	2	10
Total	20	100

Table 4.18 shows that respondents indicated that they handled majority of projects whose initial contract sums ranges between 50-100 Million shillings while the smallest number of respondents handled projects ranging between 201-250 Million. Government Tertiary Institutions do not undertake projects of high magnitude.

4.5.2 Final Contract Amount

Respondents were requested to indicate here the final contract amounts for the completed projects they handled for Tertiary Institutions of Government indicating also the currency of the amount. Their response is as tabulated in Table 4.19.

Table 4.19 Final Contract Amount

Amounts (Range)	Frequency	Percentage
50-100	7	35
101-150	4	20
151-200	5	25
201-250	4	20
Total	20	100

Table 4.19 shows that the highest respondents indicated the final contract sums that ranged between 50-100 Million shillings while 101-150 and 201-250 were lowest respectively. This is an indication that most of the projects had cost overruns from initial contract sums that were tendered for, with ranging disparities. Proper financial management is important.

4.5.3 Personnel Contribution to Cost Overruns in Projects

The respondents were requested, in a scale of 1-5 to indicate the contribution, from lowest to highest how project professionals contributes in causing cost overruns in projects and results were as shown in Table 4.20.

Table 4.20 Professionals' Contribution to Cost Overruns

Professionals	Frequency	Percentage
Architect	4	20
Civil/structural engineer	3	15
Clerk of works	1	5
Electrical engineer	1	5
Mechanical engineer	3	15
Project manager	4	20
Quantity surveyor	4	20
Total	20	100

Table 4.20 shows that majority of respondents attributed overall total cost overruns to the architect, quantity surveyors and project managers while least number attributed to clerk of works and electrical engineers each respectively. Projects that involve all professionals should not basically experience delays in delivery.

4.6 Management of Projects

This is the overall management of the project from inception to completion and factors that play therewith for the realization of the project in terms of deliverables

4.6.1 Procurement System

The study sought to establish the procurement system that was used to select the contractor for the particular Government Tertiary Institution projects. The results were as shown in Table 4.21.

Table 4.21 Procurement System

Procurement Type	Frequency	Percentage
Open tendering	10	50
Selective tendering	4	20
Two-stage tendering	6	30
Total	20	100

Table 4.21 shows that majority of respondents preferred open tendering while small number preferred selective tendering method. This gives all contractors equal chances and should thus be

encouraged. This is entrenched in the PPOA conditions of contract where lowest tenderer is awarded the project.

4.6.2 Contract Documentation

The study sought to establish the type of conditions of contract documentation that was engaged into at the inception stage of the contract and results were as follows;

Table 4.22 Conditions of Contract

Type	Frequency	Percentage
Engineering type (FIDIC)	6	30
Joint Building Council (JBC)	4	20
Public Procurement Oversight Authority	10	50
Total	20	100

Table 4.22 shows that majority of respondents indicated that PPOA conditions of contract was engaged in project execution of Government projects handled while JBC conditions of contract was least used. This is mostly to ensure that contractors' and clients' interests are taken care of in a legal and binding manner in case of default on one party. Government projects are better managed with PPOA conditions of contract than any other type.

4.6.3 Initial Documentation

Respondents were asked to indicate which documents were issued at inception of the project among a list of them. Table 4.23 shows the results as follows;

Table 4.23 Initial Documents

Document	Frequency	Percentage
Bills of quantities	8	40
Drawings-Architectural	4	20
Drawings-Engineering	7	35
Specifications	1	5
Total	20	100

Table 4.23 shows that most respondents indicated that bills of quantities were issued while specifications were least issued with lowest respondents. Contract documents that are well detailed are preferred so the contractor can know extent of commitment.

4.6.4 Post-Contract Documentation

Respondents were asked to indicate which documents were issued at inception of the project among a list of them. Table 4.24 shows the results as follows;

Table 4.24 Post-Contract Documents

Document	Frequency	Percentage
Bills of quantities	10	50
Drawings-Architectural	4	20
Drawings-Engineering	3	15
Specifications	3	15
Total	20	100

Table 4.24 shows that most respondents indicated that bills of quantities were issued mostly while engineering drawings and specifications were lowest each respectively. These documents should augment each other for avoidance of conflicts and contractual claims.

4.6.5 Management Technique

The study sought to establish the management style/technique that various firms employed in the realization of productivity in their projects and profitability and results were as follows;

Table 4.25 Managerial Technique

Type	Frequency	Percentage
Management by Objective	14	70
Management contracting	3	15
Structured management	3	15
Total	20	100

Table 4.25 shows that the most used management technique among the respondents was management by objective while structured management and management contracting respectively were least used. This should then be emulated for all firms, especially those in the lowest classification.

4.6.6 Monitoring and Evaluation tools

The study sought to identify monitoring and evaluation tools that the management of the firms used frequently to ensure project delivery within parameters of time, cost and scope and gave the following information as tabulated in Table 4.26.

Table 4.26 Monitoring and Evaluation tools

Monitoring & Evaluation Tool	Frequency	Percentage
Controlling	2	10
Directing	7	35
Organizing	4	20
Planning	7	35
Total	20	100

Table 4.26 shows directing and planning each respectively as the most preferred monitoring and evaluation technique used by majority of respondents while controlling was least. Projects that are well planned from on-set are delivered in a better way.

4.6.7 Cash-flow Management

Respondents were asked to give an indication of how they manage cash-flow for projects they have been undertaking and gave reasons as shown in Table 4.27.

Table 4.27 Cash-flow Management

Management	Frequency	Percentage
Advance payments	4	20
Debits	5	25
Getting materials on credit	8	40
Interim valuations	3	15
Total	20	100

Table 4.27 shows that majority of respondents managed projects cash-flow by getting materials on credit while interim valuations were least favored. This shows that they have good credit-worthy records with suppliers and have cultivated healthy working relations with them. Debt financing was and advance payments for the projects were equally considered. Interim valuations are usually done after contractor has shown some performance of actual works implementation. Government should discourage advance payments for projects.

4.6.8 Work-force in Projects

The study sought to establish the average number of workers engaged for performance of projects that the firm handled. Results for the above are as tabulated in Table 4.28.

Table 4.28 Work-force in projects

Type	Average	Frequency	Percentage
Semi-skilled	16	4	20
Skilled labourer	18	5	25
Unskilled	56	11	55
Total	90	20	100

Table 4.28 indicate that majority of the respondents agreed that the labourers who are majority effectively deliver the project are unskilled. Semi skilled and skilled labourers are least favored by respondents respectively. Casual labourers are essential for project delivery.

4.6.9 Communications in relations to issuance of instructions

The study sought to identify the flow of communication and who issues instructions that causes much of cost overruns or variations in project. The results are as shown in Table 4.29.

Table 4.29 Issuance of Instructions

Professional	Frequency	Percentage
Architect	14	70
Civil/structural engineer	3	15
Mechanical/electrical engineer	1	5
Quantity surveyor	2	10
Total	20	100

Table 4.29 shows that respondents arguably agreed that architects are the major cause of variations and issue most of the instructions in projects execution that have cost implications and that result in cost overruns while mechanical/electrical engineers are the least. Instructions causing variations are issued by architects.

4.6.10 Approval Requirements

The study sought to establish the kind of approval from Government bodies that are in place to monitor construction projects that could have been required for the particular project undertaken by respondents. The results are as shown in Table 4.30.

Table 4.30 Approval requirements

Approving authority	Frequency	Percentage
CCK	1	5
City/Municipal Council	2	10
KAA	1	5
KCAA	4	20
NEMA	12	60
Total	20	100

Table 4.30 shows that respondent required NEMA approval before any meaningful work can commence from site while KAA approval is least important. In order to avoid project delays, it is crucial to have all approvals ready before commencement of projects to avoid disruption of project progress once the project commence actual implementation on site.

4.6.11 Parent Ministry

Respondents were requested to indicate which ministry that the works they undertook mostly fell to or the financier ministry. The results were indicated in Table 4.31.

Table 4.31 Parent Ministry

Parent Ministry	Frequency	Percentage
Education	17	85
Roads	1	5
Special program	1	5
Sports	1	5
Total	20	100

Table 4.31 shows that respondents did much works for the Ministry of Education unlike all other ministries. Though the works were done for Tertiary colleges such as roads within the colleges and special programs like economic stimulus projects, sports, that is doing sporting facilities for the colleges gave least consideration. Tertiary Institutions falls under the Ministry of Education.

4.6.12 Communication with Consultants

The study sought to establish which mode of communication was mostly used between firms and respective project professionals and also requested to indicate how long it took to get feedback. The results were as tabulated in Table 4.32.

Table 4.32 Communication Modes with Consultants

Type	Frequency	Percentage
Email	8	40
Hard copies	8	40
Telephone	4	20
Total	20	100

Table 4.32 shows that the most preferred modes of communication with the consultants were emails and hard-copies with the highest response rate each. Telephone conversation was least preferred due to inability to record or store for future reference. Contractors should discourage use of telephone for instructions as no records can be referred to later on.

4.6.13 Communication with Project Execution Teams

The study sought to establish which mode of communication was mostly used between firms and their project execution team on the ground and also indicate how long it took to get feedback. The results were as shown in Table 4.33.

Table 4.33 Communication Modes with Execution Teams

Type	Frequency	Percentage
Email	3	15
Hard copies	9	45
Telephone	8	40
Total	20	100

Table 4.33 shows that the most preferred modes of communication with the production or execution team were hard-copies and telephone while email correspondence was least preferred due to inability to access network that would delay execution process. Hard copies offer back-up information and can be used for reference in case of discrepancies or disputes.

4.6.14 Communication with Project Manager and Office Management

The study sought to establish which mode of communication was mostly used between firms' office management and their project manager and also indicate how long it took to get feedback. The results were as tabulated in Table 4.34.

Table 4.34 Communication Modes with Teams' Project Manager

Type	Frequency	Percentage
Email	8	40
Hard copies	2	10
Internet	6	30
Telephone	4	20
Total	20	100

Table 4.34 shows that the most preferred modes of communication between the project manager and office management were email and internet that were highly rated while hardcopies were the least preferred among the respondents. Emails have become acceptable means of responding and communicating project issues.

4.6.15 Alternative Dispute Resolution (ADR) Mechanisms

Respondents were requested to indicate the alternative dispute resolution mechanism that was most preferred in the contract or during the lifetime of the project handled with Government or Tertiary Institutions. The results were as indicated in Table 4.35.

Table 4.35 Alternative Dispute Resolution Mechanisms

Type	Frequency	Percentage
Adjudication	3	15
Arbitration	7	35
Court process	8	40
Expert determination	2	10
Total	20	100

Table 4.35 shows that most of the respondents prefer to use court process to settle contractual issues while the least used method of alternative dispute resolution mechanism was expert determination. Construction teams have not yet embraced amicable settlement of disputes away from court processes, which are lengthy and leads to projects delay.

4.7 Environmental Issues on Projects

4.7.1 Community Response

The study sought to get the feel of the community towards work and approach which they took during the lifetime of the project. The results were as tabulated in Table 4.36.

Table 4.36 Community Response

Response	Frequency	Percentage
Hardworking	12	60
Laxity	5	25
Partially active	3	15
Total	20	100

Table 4.36 shows that the respondents identified the communities that the projects were sited as hardworking and supported the projects in matters of providing available labour force by about. Laxity or negative attitude towards projects by community was accounted while partial activism was least. Nairobi County is viewed as very active.

4.7.2 Community's Religion and Faith

The respondents were requested to indicate the effect of local community's faith and religion towards the project and how the two parameters affected project delivery. This was as shown in Table 4.37.

Table 4.37 Faith and Religion

Response	Frequency	Percentage
No	16	80
Yes	4	20
Total	20	100

Table 4.37 shows that religion and faith of the community did not have any effect on the project delivery while few respondents felt that religion affected their project delivery. Nairobi County is metropolitan and cross-cultural, thus no effect on religion and faith.

4.7.3 Material Delivery

The study sought to determine if the state of infrastructure like road network to and from site of project affected material delivery and project delivery in terms of cost and time. The results are as shown in Table 4.38.

Table 4.38 Material Delivery

Response	Frequency	Percentage
No	13	65
Yes	7	35
Total	20	100

Table 4.38 shows that condition of the infrastructural development did not adversely affect material delivery. Condition of roads did not deter material delivery while other respondents felt

that they could have performed better in project delivery if road networks were improved than they were.

4.7.4 Material Requirements

The study sought to establish whether material availability in the locality had any effect on project delivery and achievement of completion period. The results were as shown in Table 4.39

Table 4.39 Material Requirement

Response	Frequency	Percentage
No	12	60
Yes	8	40
Total	20	100

Table 4.39 shows that non-availability of major material in the locality did not adversely affect project delivery as shown by high response rate while least respondents felt that they could have performed better in project delivery if major materials were locally available and did not have to import them from other locations. Tertiary Institutions use basic materials with no complication or items that may require lead time for importation and the like.

4.8 Qualitative Analysis

From the responses to the open ended questions on materials requirements, financial challenges, causes of time overruns, managerial techniques and general environmental issues that affect project productivity, respondents gave varied reasons to why the above affected project delivery of Government Tertiary Institutions. The following are some of the responses raised by various respondents to open-ended questions.

4.8.1 Major Materials for the Works

The study sought to establish main materials that were required for the execution of the project. The respondents indicated such materials as cement, sand, ballast, quarry stones, quarry dust, murrum, quarry chippings, machine-cut stones, hollow-blocks and hollow-pots, lime, hoop iron, binding wires, structural timber, reinforcement bars, doors, windows, cabro blocks and paving slabs among others.

4.8.2 Major Plants and Equipments

The respondents were requested to state the major plants, machinery, plants and tools that were required for realization of the projects they handled. They were also requested to state if owned or leased. Majority of respondents stated that they owned basic plants such as concrete mixers, excavators, cranes, mechanical hoists, compressors, compactors, graders, poker vibrators among

others. For transportation of materials, respondents indicated that they used large trucks, lorries and pick-ups, which were either owned, hired or leased.

4.9 Summary of Data Analysis

From the foregoing analysis done, the highest number of respondents acknowledged that Government projects suffer from time overrun. The same group acknowledges that such projects cannot be fast-tracked to finish before given period. This was attributed to such issues as communication bureaucracy, bottleneck, and delays in issuing relevant instructions and payments. Cost overrun was experienced in 100% of all projects. This was attributed to such matters as time overrun, preliminaries information, communication breakdown, modes of payment system and procurement system adopted. Similarly, a high number of respondents seem to agree that Government projects are better managed by private professional firms as private firms are more focused and have specificity unlike government professionals who are laid back and seem not to care for failure or success of the projects. There is little or no much effect on environment in project delivery as envisaged by the respondents' responses to questions.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

5.1 Introduction

This chapter summarizes the study findings and draws conclusions from the data collected. Recommendations to the Government and stakeholders in the construction industry are made on how to improve on project delivery and maximizing output from the contractor's perspective. The study also draw recommendations on how to better manage projects given constraints such as costs, finances, time, managerial systems as well as operating environment.

5.2 Summary of Findings

The study was conducted to investigate the factors influencing completion of Government funded Tertiary Institutions in Nairobi County. The researcher uses responses from the contractors, construction project managers and stakeholders in the construction industry firms. The following are summaries drawn;

The response rate of the study was 80% which was considered adequate for the study. Compared to other results in the building industry by Chiocha (2009) at 47.14%, Buys (2004) at 32% and Crafford (2002) at 19.3%, the overall response rate of 80% was found to be adequate for analysis and for discussions of the study findings. Analyzing the data on the issue of gender, The results agrees with the findings of Chilipunde (2007), who viewed this as a true reflection of the construction industry set up which is predominantly male. Moss (2007) reaffirms the observation and states that this is a reflection of the distribution of the available gender sampling aspects in an environment that has been historically dominated by men.

Those in the top managerial positions and middle management levels formed majority of the respondents. This gave credibility to the information given as the respondents had authority to give and verify, ascertain that the data given is accurate and responsible. However, some had risen over the ranks to top management and thus better skilled managers as well. The study investigated the influence of technical skills, managerial skills, ease of access to financial facilities, procurement systems, construction period and costs of projects that impact on project's outcome and performance. The researcher found out that the influence of managerial and technical skills determined the performance of projects. Hall (1995) suggested that, the level of education is an important aspect in terms of competence and performance in the industry. According to Mbogo (2011), owner manager who has worked at both middle management and operational level management acquire information about the business through personal experience rather than relying on feedback from other sources and are better top level managers due to their wide understanding of the field operations.

Where complete teams of professional consultants were engaged from onset, projects were better managed, and especially with out-sourced teams of consultants. Majority of the respondents have handled projects with initial construction periods of below 60 weeks. This means strict targets for project completions. The same experience completion lapses and thus projects are not delivered within set periods. The study shows that most projects were started in the years 2010 and 2012. This could be attributed to the economic stimulus programs and donor injection into the economy. Most of the studied projects were completed between 2011 and 2013. On the opinion of respondents on time allocation, 65% agree that projects could not have been fast-tracked to finish with less than the initial contract period given due to prevailing factors beyond their control. The highest contributors to project delays are quantity surveyors, architects and project managers. This is due to late payments, site instructions, variations of project scope, complexity and time related preliminaries that overshoot the budgets. The effect of time overruns on projects results in low staff motivation, waning creditor's and debtor's confidence. Majority of projects' financial scope were below 100 million shillings with a combined response rate of 70%. Those above 100 million were about 30% of respondents. Conversely, the final contract sums of those projects spanned beyond 200 million shillings. This reflects cost overruns in the tunes of over 45%. Ease of access to capital or financial services also determined the performance of contracts.

The procurement system adopted influenced the project output in terms of time overruns, cost overruns, project management system adopted and how well the project jelled with the environment. 50% of respondents preferred open tendering. This gives equal opportunities to all contractors to compete on level ground and win the projects. The study showed that 50% of respondents were comfortable handling projects whose contracts have PPOA and FIDIC conditions. Projects that had proper documentation well detailed and conclusive contracts initiation were better managed than those whose initial commitment was not envisaged during project commencement. Those that had bills of quantities were well receptive than those based on drawings and specifications in terms of assessing risk factors of engagement. This was also the response even for post-contract documentation stages.

Managerial techniques used by majority of respondents were management by objective with 70%. Others were not favored with the firms. Monitoring and evaluation tools frequently used were planning and directing while organizing and controlling were not well adopted in this study. Getting materials on credit was given a 40% preference as a tool for managing cash-flow. Most firms have well established customer base and thus can enjoy material supplies on credit awaiting payments from the parent ministries.

Workforce for most firms comprised of unskilled labour, with 55% response. Skilled and semi-skilled labour force scored a bare 20% each. On the consultants' contribution to delays envisaged in projects was also sought and analysis showed that Architects cause much communication delays in issuing instructions that have cost implications and time overrun implications with 70% response. Others contribute marginally. NEMA approval was seen as the most sought for with

60% and this could cause delays in project commencement. Some even decried works stoppages from the said approving authorities. This could be as a result of understaffing or incompetency. Most of the project fell under the Ministry of Education docket with 85% responses. This is because the study had focused on Government Tertiary Institutions of learning.

Communication channels, modes and means preferred both for in-house management and with consultants are emails, hard-copies, internet and telephone conversations. Few were in favor of fax or any other modes. The most preferred method of dispute resolution for majority of the respondents were court process and arbitration. Other methods are not as advanced as the two above. Material availability, access to labour and infrastructure systems impacted on the performance of projects. Firms viewed the local community response to projects as committed and hardworking. Projects are welcome to the communities. They participated in terms of giving conducive working environment, labour contribution and participation.

Religion does not affect project delivery as far as the respondents are concerned. The study showed that 35% of respondents preferred environment where labour and materials were locally available as opposed to where they had to import the same for the projects while 65% felt that the availability or non-availability does not impact negatively on projects delivery and completion.

5.3 Discussions of Findings

The following discussions were drawn from the study;

The study with a view to establish the influence of completion of Government Tertiary project performance showed that proper documentation of project at various stages is paramount. This ensured that initial project periods and commencement periods are adhered to and that the contractor can move to site with confidence and with ease. This is supported by Waihenya (2011), Kivaa (2000), Talukhaba (1999) and Mbatha (1986) findings that project commencement is key in mitigating future project delays, which helps in curbing time overruns.

The study showed that procurement system adopted had an influence on project performance. Lack of effective documentation and bid management during the early stages is a major cause of poor time and cost performance of projects. Jaafal and Abdul-Aziz, (2005) claims that most contractors have the weakness of tracking project financial performance throughout the project. They rarely account for their expenses and thus cannot accurately predict if they are making profits or having loss making ventures. Consultants contribute to cost overruns with issuing instructions that have cost implications. Delays in decision making by Government bodies, bureaucracy and stereotype in hierarchy affects decision on projects on site, thus affecting completion of projects in time and within costs. This invariably raise the capital-output ratio in the public sector and elsewhere bringing down the efficacy of investments (Morris, 1990).

The managerial technique adopted by the firm also affects performance. This agrees with Kagiri (2005) while investigating on time and cost overruns in power projects in Kenya, a case study of KENGEN. This is also supported by Kimani (2004), Ileri (2008) and Kikwasi (2012) who found that inadequacy in technical and managerial skills required in project implementation by contractors have impeded their performance and growth. This in turn impacts on time which invariably causes cost overruns. Success of projects depends on competent skills, adequate resources, proper timing of activity planning and performance, teamwork, effectiveness in communication both internally and externally, fair dealing with people, ethical practices, honesty and integrity and proper working environment are all essential. The experience of top management with the firms, competence and level of education determined success of the projects and outcome.

The environment within which the project is operating also impacts on the project delivery. The study showed that availability of local materials does not affect project delivery. The contractors have mechanisms of importing materials in time and thus do not affect performance of projects. Religion and faith also does not have any impact on project delivery. One is able to plan in advance in case of disruptions that may cause project delays. This thus mitigates any time overruns that may occur as a result.

5.4: Conclusions of the Study

The researcher made the following conclusions;

The main pillars of a project are time, cost and specifications. These pillars are inter-related in that when one is varied, it adversely affects the others. When projects exceed in terms of time, there are some items that are time related such as security, lighting, water, supervision of works, transportation and management. These parameters affect project cost.

Projects that were to start and end in say, one year, the contractor has done ample calculations and made mechanism to ensure all systems are in place to finalize within such period. Any deviation from this has a relative cost implication.

Change of specifications and workmanship also affect time and cost. When client's needs or project manager varies some specifications, this means outsourcing for the said item that could not have been envisaged in the critical path analysis method of project delivery. Such deviations invariably affect project output, not forgetting the financial instruments such as interest on borrowed capital for the contractor, repayment plans for the contractor and return on investments for the client in case of borrowed funds.

Managerial system from inception should be taken into consideration. Contractor engagement, proper documentation at project inception and post-contract period is of essence. Modes of communication, ease and channels should be decided from onset, dispute resolution mechanisms

be properly outlined as well as payment methods, frequencies and recourse for not honoring each party's part of the bargain.

The researcher had also sought to investigate the impact of the environment where the projects are undertaken. This was researched in terms of local matters, local community's perception of the project, local influence and impact that the project would have on them in terms of contribution to labour, material availability, relationship between the project and the religion and general environment impact. The study showed that the environment does not adversely affect the project outcome save for increment weather. Contractors always take care of such eventualities especially where the communities are deemed to be hostile towards a project. They import labour and materials to ensure project delivery is not affected, which in turn affects their profit realization.

5.5: Recommendations of the Study

The researcher made the following recommendations;

When sourcing for a contractor to undertake a project, it is of paramount importance to vet them to ensure that they have capacity and are well capable to undertake the project in question. Proof of competence of undertaking similar projects and similar magnitude is an added advantage. Proof of competent staff, well educated and balanced is also important. Appropriate equipment both for office and for site production and proof of either ownership or ability to lease or rent should also be used in the assessment of viability and proof of adequacy and sufficiency.

Proper documentation prior to project commencement, during and after project completion is important. Starting from a wrong footing of haphazard or scanty documentation process would invariably lead to misinterpretation, mismanagement, contractual issues, conflicts and project delays. This means that proper contract signing, ensure documents required for site production are availed in advance, proper approval processes and documentation should be sought prior to commencement of project. The procurement method applied also affects project delivery and implementation. During project implementation, proper documentation, instructions and recording of minutes or undertakings on regular basis and project closure impacts heavily on project output. Team-work and spirit of co-operation between the project professionals such as Architects, Engineers, Quantity Surveyors and on the other hand the production team such as main contractor, project managers, electrical and mechanical subcontractors, various specialists and suppliers is important for project realization. This means leaner levels of disagreements, less disputes and more productivity of site activities. Rivalry and competition in projects results in time and cost overruns, which affect overall workmanship and output, management and environment of the projects.

Financiers and client's contribution from onset is also of essence. Management meetings are mandatory and their representation is also of importance so that they are also in sync with the happenings of the project. In case of variations or deviations from the initial proposals, they are

advised accordingly and thus buy the ideas. Lowering lending rates and charging low interest rates, availing finances in time as and when required, honoring valuations and certification process be made simple and non strenuous for the production team. Consultants and client teams should always be properly represented and available on short notices in case of emergencies or crisis management of the project to off-set disasters that may result in hampering project implementation process. Communication channels should be properly outlined both for the external and internal framework. Dispute mechanism when they arise should be well spelt out to stem out contradiction or confusion.

Monitoring and evaluation tools and techniques employed goes a long way in ensuring or guaranteeing project production is on course or has veered off from set plans. Gantt charts, ms project software and such tools should be used to give indications of whether resources are being utilized properly, monitored against set standards and level of workmanship at all times. This should not be a one-off but a continuous process.

The communities where the projects are undertaken should also be involved and consulted from the onset. This could be done by undertaking workshops to sensitize the communities on involvement and showing them the benefits of having such projects within their locality. This ensures participation directly or indirectly by ownership of the project.

The contractors should endeavor to properly utilize the locally available materials and work-force before deciding to import the same from elsewhere. This promotes trade and improves local economy. This in turn enables the contractor to realize more profits. Pilferage in projects is a direct result of lack of involvement of the locals. Proper public relation with the local authorities also mean that the projects are not delayed unnecessarily due to the lengthy processes and procedures for approval and certification.

5.6: Suggestions for Further Studies

This study endeavored to research on the plight of the contractors who play a key role in project delivery and implementation on time overruns, cost overruns, management and environment and how they impact on the project delivery, especially government funded Tertiary Institutions. These are not the only factors that influences government funded project. The research recommends the following areas for further research;

1. Influence of contractor's production methods or techniques for project delivery and implementation process that could improve the construction industry's image.
2. Impact of engaging project managers and construction managers in terms of project delivery and competence.
3. Factors influencing completion of other Government Institutions such as Universities, hospitals and secondary schools.

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APPENDICES

APPENDIX 1

Letter of Transmittal of Data Collection Instrument

Ndungu Lukas Mugo
P.O Box 965,
KARURI (00219)
Date: 10th September 2013.

Dear Sir/Madam,

RE: FACTORS INFLUENCING COMPLETION OF PROJECTS IN GOVERNMENT TERTIARY INSTITUTIONS; A CASE OF NAIROBI COUNTY IN KENYA

I am a Master of Arts Degree in Project Planning and Management student at the University of Nairobi, Extra-Mural Studies, Nairobi Centre. My Registration number is L50/69983/2011. I am conducting a survey titled “Factors Influencing Completion of Projects in Government Tertiary Institutions; a Case of Nairobi County in Kenya.”

To facilitate this study, you have been randomly selected as a participant in answering the questionnaire. You are requested to respond to all questions as your response will be very useful to this study.

Please be assured that any personal information will be treated with utmost confidentiality.

Thank you in advance for your co-operation and participation.

Yours faithfully,

Ndungu Lukas Mugo
Reg. No: L50/69983/2011

APPENDIX II
Questionnaire for Contractors

This questionnaire is to be completed by owner of the company or senior management. It seeks to investigate the Factors Influencing Completion of Projects in Government Tertiary Institutions: a Case of Nairobi County in Kenya. Kindly answer all questions as honestly and as fully as you can.

Part One: Background Information

Demographic: Please choose the suitable answer and tick (√) the option that is most appropriate to you

Q1. Gender

- i) Male
- ii) Female

Q2. Age

- i) 20-29 yrs
- ii) 30-39 yrs
- iii) 40-49 yrs
- iv) 50-59 yrs
- v) 60 yrs &above

Q3. Highest Education Qualification

- i) Diploma
- ii) Degree
- iii) Masters
- iv) PHD
- v) Others

Q4. Registration Category: Kindly indicate (tick) the category for which the firm is registered

- A
- B
- C
- D
- E
- F

G

H

Q5. Firms Experience: For how long has the firm been in existence dealing with construction works? Please choose suitable answer here below and tick (√) where applicable.

i) 1-2 1/2 yrs

ii) 3-6 yrs

iii) 7-9 yrs

iv) 10-12 yrs

v) 13-15 yrs

vi) Over 16 yrs

Q6. Project Experience: For how long has the firm been handling projects with the Ministry of Public Works? Please tick (√) the suitable answer here below

i) 1-2 1/2 yrs

ii) 3-6 yrs

iii) 7-9 yrs

iv) 10-12 yrs

v) 13-15 yrs

vi) Over 16 yrs

Experience of Key Personnel Employed in the Firm

Q7) Kindly indicate here the experience of the team leader in the following categories in terms of years they have been practicing in their respective deployments.

(i) Top Management (*other than the owners*)(years)

(ii) Middle Level Management (e.g. *Operations Team*)(years)

(iii) Technical Management (e.g. *Projects Managers, Procurement Team*)(years)

(iv) Lower Level Management (e.g. *Site Managers/ foremen*).....(years)

(v) Others (*please specify*).....(years)

.....
.....
.....

Part Two: General Project Information

Consultants

Q8) Kindly indicate whether the following consultants were used in the project handled by marking with a (√) below;

- (i) Architect
- (ii) Quantity Surveyor
- (iii) Civil/Structural Engineer
- (iv) Mechanical/Electrical Engineers
- (v) Others. Please specify

Consultants Firms Nature of Engagement

Q9) Kindly indicate here with a (√) mark if the consultant team was in-house (from ministry) or private consultants

- | | <u>Ministry</u> | <u>Private firm</u> |
|---|--------------------------|--------------------------|
| (i) Architect | <input type="checkbox"/> | <input type="checkbox"/> |
| (ii) Quantity Surveyor | <input type="checkbox"/> | <input type="checkbox"/> |
| (iii) Civil/Structural Engineer | <input type="checkbox"/> | <input type="checkbox"/> |
| (iv) Mechanical/Electrical Engineers | <input type="checkbox"/> | <input type="checkbox"/> |
| (v) Project manager | <input type="checkbox"/> | <input type="checkbox"/> |
| (vi) Others. (<i>please specify</i>)..... | | |

Part Three: Construction Time Period

Q10) Kindly insert here the period (*in weeks*) that the project was supposed to be completed within as documented in contract agreement.(*Weeks*)

Q11) Kindly indicate the first date of site possession for the said project.....

Q12) Kindly indicate here the final completion date when the project was practically handed over to the client (*Weeks*)

Q13) In your own opinion, could the project have been completed in a shorter period than when it was practically completed? Yes No

Kindly and briefly support your answer for the above choice.....
.....
.....
.....

Q14) Kindly indicate in the table below, in your own assessment, who among the following could have contributed to time overruns in the project, in a relation to the given parameters. (Use a (√) or an (X) where applicable)

Name	Highly	Moderately	Lowest
i) Architect			
ii) Quantity Surveyor			
iii) Civil/Structural Engineer			
iv) Mechanical Engineer			
v) Electrical Engineer			
vi) Project Manager			
vii) Clerk of Works			
viii) Any other (specify)			

Q15) How does time overruns affect your firm in relation to the following parameters? Please use a (√) where appropriate and comment on the same where possible

Indicator	Effect	Remark/Comment
a) Firms profitability		
b) Staff motivation		
c) Supplier confidence		
d) Creditor's confidence		
e) Debtor's confidence		
f) General public perception		
g) Registration bodies		
h) Any other (please specify).....		

Part Four: Contract Cost Information

Q16) Please state herewith the Initial Contract Sum or Tender award for the project

..... (Specify currency)

Q17) Please state herewith the Final Contract Amount at Final Account stage

..... (Specify currency)

Q18) In a scale of 1-5, (where 1 is the lowest and 5 the highest), kindly indicate the contribution of the following personnel in causing cost overruns of the project

Name	Contribution
i) Architect	
ii) Quantity Surveyor	
iii) Civil/Structural Engineer	
iv) Mechanical Engineer	
v) Electrical Engineer	
vi) Project Manager	
vii) Clerk of Works	
viii) Any other (specify).....	

Part Five: Management

Q19) Kindly state here with a (√) the type of procurement system used at engagement of contractor or at tendering stage before commencement of the project

(i) Open tendering

(ii) Two-stage tendering`

(iii) Selective tendering

(iv) Continued tendering

(v) Serial tendering

(vi) Any other (please specify)

.....

.....

Q20) Indicate with a tick (✓) the type of Conditions of Contract documentation entered into at inception stage of project.

- i) Public Procurement Oversight Authority (PPOA)
- ii) Joint Building Council (JBC)
- iii) Engineering type of contract (FIDIC)
- iv) Conditions for subcontractors (KABCEC)
- v) Any other (please specify).....

Q21) Please mark with a tick (✓) the kind of documentation available at project initiation stage when signing contract;

- i) Bills of Quantities
- ii) Drawings (Engineering)
- iii) Drawings (Architectural)
- iv) Specifications
- v) Form of contract
- vi) Any other (please specify)

Q22) After contract has been signed (Post-contract), which documentation was issued for purposes of project implementation? Tick appropriately below

- i) Bills of Quantities
- ii) Drawings (Engineering)
- iii) Drawings (Architectural)
- iv) Specifications
- v) Form of contract
- vi) Any other (please specify)

Q23) Kindly tick herewith the management technique that the firm uses in realizing its productivity

- i) *Laissez faire* (free style)
- ii) Management by Objective (MBO)
- iii) Structured management
- iv) Management contracting
- v) Crisis management

Q24) What Monitoring and Evaluation tool does the firm employs to ensure project delivery within parameters of time, cost and scope? Kindly tick appropriately in the space provided below

- i) Planning
- ii) Organizing
- iii) Directing
- iv) Controlling
- v) Pre-contract management
- vi) Post contract management
- vii) On-spot technique
- viii) Reporting
- ix) Crisis management
- x) Others. (*please specify*).....

Q25) How has the firm been managing cash-flows for sustaining the project?

- i) Advance payment
- ii) Interim Valuations
- iii) Debits
- iv) Getting materials on credit
- v) Turn-key/Once the project is completed
- vi) Others. (*please specify*).....

Q26) Kindly give a list of major equipment owned or leased by the firm for project execution

	Equipment Name	Number	Owned	Leased
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Q27) Kindly indicate the average workforce engaged in the said project for execution of various trades.

<u>Type</u>	<u>Number</u>
i) Skilled workers
ii) Semi-skilled
iii) Unskilled
iv) Others. (Please specify).....	
.....	
.....	

Communication/Instructions

Q28) Who in the list below gives instructions that cause changes/variations in the projects?

Please indicate with the use of a (√)

- i) Architect
- ii) Quantity Surveyor
- iii) Civil/Structural Engineer
- iv) Mechanical/Electrical Engineers
- v) Others. Please specify.....
-
-

Q29) Tick appropriately the approvals required by the following Government bodies and indicate on average how long did it take to get the said approval if any

	<i>Period (Weeks/Days)</i>
i) NEMA <input type="checkbox"/>
ii) KAA <input type="checkbox"/>
iii) KCAA <input type="checkbox"/>
iv) CCK <input type="checkbox"/>
v) City/Municipal Council <input type="checkbox"/>
vi) Other (<i>please specify</i>).....	
.....	

Q30) Which is the Client/Parent ministry for the project undertaken (*please specify*)

.....

Q31) Which Mode of communication had been preferred in the project execution team between contractor and consultants and how long does it take to get feedback?

Period (Weeks/Days)

- i) Internet
- ii) Telephone
- iii) Email
- iv) Hard copies
- v) Fax
- vi) Any other (please specify).....

Q32) Which Mode of communication had been preferred in the project execution team between the Main Contractor and the Sub-Contractors and how long did it take to get feedback?

Period (Weeks/Days)

- i) Internet
- ii) Telephone
- iii) Email
- iv) Hard copies
- v) Fax
- vi) Any other (please specify).....

Q33) Which Mode of communication had been preferred in the project execution team between the Contractor's Project Manager and office management and how long does it take to get feedback?

Period (Weeks/Days)

- i) Internet
- ii) Telephone
- iii) Email
- iv) Hard copies
- v) Fax
- vi) Any other (please specify).....

.....

Q34) What Alternate Dispute Resolution mechanism had been employed during the project lifetime or as per contract agreement

- i) Arbitration
- ii) Adjudication
- iii) Court process
- iv) Expert determination
- v) Litigation
- vi) Any other (*please specify*).....
.....
.....

Part Six: Environment

Q35) Kindly state herewith the response of the community towards work on the said project

- a) Hard working community
- b) Laxity
- c) Partially active
- d) Any other (*please specify*).....
.....

Q36) Did religion and faith of the local community affect project delivery?

Yes No

Briefly explain your choice for the above.....
.....
.....

Q37) Where the project was situated, did you experience delays in material supply due to infrastructural incapacitation? Yes No

Briefly explain your choice for the above.....
.....
.....

Q38) Were major material required for use in the said project locally available? Yes No

Briefly explain your choice for the above.....
.....
.....

Q39) State briefly the key materials that were needed in the project realization and how you managed to procure in time

	Materials	Timely	Delayed	Remark/Reason
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Q40) Kindly give any other information that could be of importance to this study

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Thank you for your participation and assistance

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