UNIVERSITY OF NAIROBI

SCHOOL OF THE BUILT ENVIRONMENT

DEPARTMENT OF REAL ESTATE AND CONSTRUCTION MANAGEMENT

IMPACT OF INCREASING BUILDING CONSTRUCTION COSTS ON EFFECTIVE IMPLEMENTATION OF PUBLIC PROJECTS.

A CASE STUDY OF THE PROJECTS INITIATED BY THE MINISTRY OF PUBLIC WORKS WITHIN NAIROBI COUNTY - KENYA

BY

MWERESA JORAM OMBISA

B66/29924/2009

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT FOR THE AWARD OF DEGREE IN BACHELOR OF QUANTITY SURVEYING

MAY 2013
DECLARATION

I declare that this is my original work and has not been presented for a degree in any other university or for any other award.

Signature……………………………………… Date……………………………………

MWERESA JORAM OMBISA

B66/29924/2009

DECLARATION BY THE SUPERVISOR

I confirm that the work reported in this project was carried out under my supervision.

Signature……………………………………… Date……………………………………

MR. NG’OLUA NTARANGUI

B.A (Bldg Econ.) Hons, M.A. (Bldg Mngt.) RQS, MAAK (QS, MIQSK)

Supervisor
DEDICATION

I dedicate this work to my dear mum Elizabeth, dear wife Rose, Daughter Cindy, Son Kerry. Indeed it has been a long journey, is a great honour to have you. May the almighty Bless you.
ACKNOWLEDGEMENT

In producing this Research Project, I am conscious of my indebtedness to my friends and colleagues. I would particularly like to thank Qs. Ng’olua Ntarangui of the University of Nairobi for his continuous help. He provided constant advice and guidance on the choice of the topic and structuring of the project since the work was first conceived to the task of writing the project.

Thanks also to the members of staff of the Department of Real Estate and Construction Management for their material support and guidance.

Appreciation to the Chair, Dr. Mary Kimani, Dr. I. Njeri and Dr. Mbatha for their support throughout my research.

To all of you I say MAY THE LORD BLESS YOU.
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<tr>
<td>SPSS</td>
<td>Statistical Programme for Social Scientists</td>
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<tr>
<td>NC</td>
<td>Nairbi county</td>
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<td>G.D.P</td>
<td>Gross Domestic Product</td>
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<td>C.P.I</td>
<td>Consumer Price index</td>
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<td>I.Q.S.K</td>
<td>Institute of Quantity Surveyors of Kenya</td>
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<td>M.O.P.W</td>
<td>Ministry of Public Works.</td>
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<td>Q.S</td>
<td>Quantity Surveyor</td>
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<td>J.B.C</td>
<td>Joint Building Council</td>
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<td>P.E.V</td>
<td>Post Elections Violence</td>
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<tr>
<td>C.B.S</td>
<td>Central Beureau of Statistics.</td>
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<td>P.P.I</td>
<td>Project Planning and Implementation.</td>
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<td>C.W.P</td>
<td>Construction Works Programme.</td>
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Abstract

The rapid increases experienced in utility construction costs have raised the price of recently completed infrastructure projects. This study, therefore attempts to investigate the impact of increasing building construction costs on effective implementation of public projects. The objectives of the study are to identify the major causes of rising building construction costs in public buildings, Identify measures that can be put in place to safeguard the financiers against rising costs as a result of extended preliminaries/time related costs and to identify problems and put in place measures to reduce the increasing building construction costs The study will rely on previous related studies by other scholars and researchers to determine what has been done in this area and also to identify gaps in those studies. The population of the study consisted of contractors, consultants and clients. Purposive sampling were done 40 respondents will be selected thereafter; stratified random sampling will be used to sample the population. From each stratum, 20% of the respondents will form the sample size of 80 respondents. Data collection instruments to be used include questionnaires and document analysis. Data will be analyzed qualitatively using descriptive methods and quantitatively using pie charts, tables, graphs, frequencies and percentages. Data will be analyzed based on the research questions of the studies. This study will help identify the causes of construction costs and subsequent impact of the same during implementation and timely completion of public projects within Nairobi County. Factor analysis of 33 significant variables from the 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. There was also a perception that these factors would recur on public projects in future projects under similar implementation environment. By closely relating the factors to the various variables, it was observed that they resulted to overruns on the projects by varying magnitudes. The Projects had time overruns ranging from –4.6% to 53.4 %, while the cost overruns varied between 9.4% and 29%. These revelations should enable planners to take stock of past performance and incorporate lessons learned on future projects planning and implementation. The variables and underlying factors have potential of recurring in future projects, there is need to anticipate their occurrence, and to continually design appropriate strategies and mechanisms to overcome or minimize their potential impacts.
CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The inability to complete projects on time and within budget continues to be a chronic problem worldwide and is worsening (Ahmed et al., 2002). Azhar and Farouqui (2008) observe that the trend of cost overrun is common worldwide and that it is more severe in developing countries. The debate in the construction industry on how to minimise or eliminate delays and cost overruns has been on for some time among professionals, clients and/or end users, and the policy makers. The funding for construction industry activities is, in many countries, used to regulate the economy. As the construction industry continues to grow in size, so do planning and budgeting problems. This is because it is common for projects not to be completed on time and within the initial project budget. Because of construction delays and cost overruns, less and less work is performed despite the increase in construction budgets. The aim of the research was to investigate the causes of delays and cost overruns and their subsequent impact on the success of construction projects in Kenya’s public sector.

Cost has its proven importance as the prime factor for project success. Most of the significant factors affecting project costs are qualitative such as client priority on construction time, contractor’s planning capability, procurement methods and market conditions including the level of construction activity (Elchaig et al, 2005). A project otherwise completed may not be regarded as a successful endeavor until and unless it satisfies the cost limitations applied to it.
In spite of its proven importance it is not uncommon to see a construction project failing to achieve its goal within the specified cost. Cost overrun is a very frequent phenomenon and is almost associated with all projects of construction industry. Cost overrun can be simply defined as when the final cost of the project exceeds the original estimates (Avots, 1983). According to one very comprehensive research made on cost overruns in global construction (Flyvbjerg, 2002), it was found that 9 out of 10 projects had overrun; overruns of 50 to 100 percent were common; overrun was found in each of the 20 nations and five continents covered by the study; and overrun had been constant for the 70 years for which data were available. It is believed that construction projects experience an increase in cost of about 33% on average (Hartley and Okamoto 1997).

Angelo and Reina (2002) state that the problem of cost overruns is critical and needs to be studied more to alleviate this issue in the future. They also point out that cost overruns are a major problem in both developing and developed countries (Angelo & Reina, 2002). The trend is more severe in developing countries where these overruns sometimes exceeds 100% of the anticipated cost of the project. Low quality materials cause higher construction cost than expected because of the loss of materials during construction. This results from a lack of standards for materials and management systems (Thungphanich, 1997). Lack of ability to prevent cost overruns or to control construction costs causes many Thai construction companies to fail (Sriprasert, 2000).

In Kenya, construction sector is an important sector. Although not working to its fullest potential, it still is of prime interest to the country. Growth in this sector is critical for growth in national income as it is among the largest sectors that generates employment within the country as well as a key indicator of the economy of Kenya. As many other developing country, Pakistan
is facing also cost related issues among which cost overrun is quite prominent. There are several factors that are responsible for these cost overruns. This paper attempts to identify the major factors of cost overrun in construction sector of Kenya and can serve as the way forward for future work in coping with these overruns.

Public sector projects are identified, planned, and implemented by the government ministries or their implementing agencies in state corporations. The aims of these projects are to improve the country’s infrastructure like health, communication networks, housing, energy, and water. Hence, expeditious implementation to realize the desired benefits to their end users is important. However, in Kenya, it is a well-known fact that time and cost overruns are widely prevalent in the public sector projects (Mwandali 1996, Talukhaba 1988, Karimi 1998, and Musa 1999). Their findings showed that, poor communication, lack of experience by project manager, procurement delays, lack of planning, poor infrastructure, inadequate resources, lack of motivation, tendering methods, variations, project environment, poor project definition as being some of the major contributors to time and cost overruns. The time and cost overruns on the projects, in this study were limited to those that occurred during the construction or implementation phase.

Oluoch (2010) noted that the Kenyan construction industry has in the past five years experienced a tremendous growth in terms of production so much that it defied a global economic recession to post a 6% growth in the year 2009 according to Kenya National Bureau of Statistics and 5% in 2010 according to World Bank Global Economic Prospects. The cost of any building design is determined primarily by the costs of labor and materials involved in erection. The rising cost of construction will impact both supply and demand, with the rise in cost, the cost of the building will rise.
1.2 Problem Statement.

Many construction project proposals have been crafted but only to be left to gather dust on shelves merely because the cost is enormous and cannot be sustained. Overtime, the costs of putting up a viable investment in Kenya has been of great concern. Many investment proposals fail to materialize or some stagnate as a result of lack of finances. This is mainly attributed to the rapid increase in the cost of construction. The difference between ex-ante and ex-post contract prices is significant. According to Kariuki (2010), contractors worldwide as well as Kenya have experienced cost overruns in projects leading to low profits, zero profits or even losses in some instances and some of the causes of cost overrun include sudden increase in materials prices and poor timing of resource procurement. The resulting effects are many which may include lack of sufficient and sustainable development, compromise on the quality of construction products and timely delivery of projects which indeed has a cost factor attached due to extended preliminaries.

A comparison of the information published by the Institute of Quantity Surveyor of Kenya (IQSK) Journals with respect to construction rates of work in Nairobi, construction costs have increased tremendously in the last one year. For example, the costs of constructing one square meter of 1200mm thick masonry stone walling (measured as built) has increased from Kenya shillings 1100 to Kenya shillings 1350 from the year 2011 to 2012. This represents a 20% increase of construction costs from the base year. Similarly, the cost of a kilogram of steel bar reinforcement square twisted high tensile bars 8mm diameter, has increased from Kshs.120 to Kshs. 140 in the same period. This represents 10% increase in cost. (East African Standard Newspaper, 14th November, 2011).
Quantity surveyors and Engineers have had a hard task in justifying some building costs. A good proposal is tabled, accepted by the client/employer but the main question after all these has always been” How much will that cost”. The burden of high costs has always been transmitted to the client (owner). According to Baradyan, Bromilow (1969) Cost as a major component if addressed properly can help to resolve many things for example project completion period, cash flows of both the contractors’ suppliers and financiers. Building Cost therefore acts as a pivot/king pin in timely realization of any building construction project.

Wachira (1996) points out that the construction industry in Kenya has experienced unforeseen and external factors influencing building costs. Wachira reveals factors such as national and local shortages of labour and building materials, a credit squeeze and sudden increase in the price of building materials or components or fuel influence building construction. The problem of Increase in fuel and building materials prices impacts severely both developers and contractors. Ireri (2008) reveals that contractors re-negotiate the contract prices incases where an increase in building material costs is experienced. (Shunnet,2008) argues that this results to breach of contract since it becomes a bit complicated with sudden variations necessitated with these. A building contract being documents which distribute the risks to both the contracting parties. The contract document tries to apportion risks however in such unpredictable circumstances it becomes unbearable thus leading to a breach He continues to say that many property developers are likely to delay new projects due to the rising costs of construction materials.

The government has made various efforts to improve the management of the construction industry under the Ministry of public works. These efforts have been carried out in the various
ministries, departments and agencies that have a stake in the Ministry of Public Works office. However, despite of all these building construction materials have gone up. Therefore, this study attempts to investigate the causes of rapid increase in construction costs and the measures to mitigate the problem in order to relieve the stakeholders the burden that occurs as a result.

1.3 Objectives of the Study.

The main objectives of the study are:

1. Identify the major causes of rising building construction costs in public buildings.
2. Identify measures that can be put in place to safeguard the financiers against rising costs as a result of extended preliminaries/time related costs.
3. To identify problems and put in place measures to reduce the increasing building construction cost.

1.4 Research Questions.

This study will be guided the following research questions.

a) What are the factors that cause building construction cost increase in public projects?

b) What are the challenges brought about by the increase in building construction costs to project realization?

3 What are the impacts of increasing building costs on project implementation?

1.5 Research hypothesis.

This study will be hinged upon the following hypothesis

*Null Hypothesis* – Rising construction cost does not have an impact on public project implementation in Kenya.
**Alternative Hypothesis** – Rising construction costs have an impact on the Public project implementation in Kenya.

**1.6 Significance of the study.**

Rising construction costs is an important subject that participants within the construction industry need to be aware of and understand as clearly as possible. This study is presumed to bear the significance of compiling the causes of rising construction materials costs and challenges faced by contractors in the process of project delivery. The ability of the contractors to identify the causes and understand the effects brought about by rising construction materials costs and subsequently contain the effects brought about by rising construction materials cost is paramount. This demonstrates the contractors’ ability to produce building work on a cost effective way to meet the customer’s requirement thus building the client’s confidence.

This study aims at finding out how contractors are affected by the rising costs of construction materials in project delivery process and sensitizing contractors on the necessary steps to take so as to avoid problems that arise out of the rising construction costs. This study will assist contractors to understand the behavior of the materials market so as to bid accurately for tenders. This is paramount for contractors since they will cushion themselves appropriately and thus avoid the effects that may affect them.

**1.8 Scope and limitation of the Study**

The study will focus on factors affecting construction costs in relation to effective implementation of public projects within the county. Focus will also be on the key stakeholders in the construction of public projects namely contractors, clients, consultants who includes; Architects, quantity surveyors, Engineers and technicians. Issues of finances in relation to commodities being a highly sensitive issue will pose a challenge with many players in the
construction industry being skeptical and unwilling to provide information for this study. This challenge will be dealt with amicably by allowing only those willing to participate in the study. The questionnaires might not be submitted back to the researcher on time. Furthermore, the respondents might not be highly enlightened on issues relating to the study.

1.9 Organization of the study.

Chapter 1: Introduction to the study. This provides a background to the study, statement of the problem, research questions, objectives, and significance of the study, limitations and the definition of terms.

Chapter 2: Literature Review. The chapter discusses theories relevant to the study and provides literature previously done by other authors on the impact of increasing building construction costs of public projects. It also gives an overview of the current status building construction costs in Kenya.

Chapter 3: Research Methodology. This chapter discusses the research design, sampling procedures, data collection methods and analyses that would have been used in the research.

Chapter 4: This chapter will presented and discuss the results in relation to the research questions.

Chapter 5: Conclusions Recommendations and. The findings will be summarized and recommendations and conclusions given based on the results.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter looks at a review of relevant literatures that give a background of the Kenyan construction industry, the challenge of high construction cost, the factors affecting construction cost, effects of high construction costs and the solutions on how to minimize construction cost. According to Abbas (2006), late completion of works as compared to the planned schedule or contract schedule is what is known as delay. Delay occurs when the progress of a contract falls behind its scheduled program. It may be caused by any party to the contract and may be a direct result of one or more circumstances. A contract delay has adverse effects on both the owner and contractor (either in the form of lost revenues or extra expenses) and it often raises the contentious issue of delay responsibility, which may result in conflicts that frequently reach the courts. A cost overrun occurs when the final cost of the project exceeds the original estimates (Azhar & Farouqi, 2008).

There is a relationship between schedule, the scope of work and project conditions. Changes to any one or more of the these three can affect the compensation level and time of completion. It has been argued that it is necessary to create awareness of causes of project schedule delays, their frequency, and the extent to which they adversely affect project delivery (Al-Khalil & Al-Gafly, 1999). Kaliba et al. (2009) concluded from their study that the major causes of delay in road construction projects in Zambia were delayed payments, financial deficiencies on the part of the client or contractor, contract modification, economic problems, material procurement, changes in design drawings, staffing problems, equipment unavailability, poor supervision,
construction mistakes, poor coordination on site, changes in specifications, labour disputes, and strikes.

Agaba (2009) attributes delays in construction projects to poor designs and specifications, and problems associated with management and supervision. In their study, El-Razek et al., (2008) found that delayed payments, coordination difficulty, and poor communication were important causes of delay in Egypt. Sambasivan and Soon (2007) established poor planning, poor site management, inadequate supervisory skills of the contractor, delayed payments, material shortage, labor supply, equipment availability and failure, poor communication and rework, were the most important causes of delays in the Malaysian Construction Industry. Kouskili and Kartan (2004) identified the main factors affecting cost and time overrun as inadequate/inefficient equipment, tools and plant, unreliable sources of materials on the local market, and site accidents.

Le-Hoai et al., (2008) ranked the three top causes of cost overruns in Vietnam as material cost increase due to inflation, inaccurate quantity take-off, and labour cost increase due to environment restriction. Kaliba, et al (2009) conclude that cost escalation of construction projects in Zambia are caused by factors such as inclement weather, scope changes, environment protection and mitigation costs, schedule delay, strikes, technical challenges and inflation. Bubshait and Al-Juwait (2002) list the following as factors that cause cost overrun on construction projects in Saudi Arabia: effects of weather, number of projects going on at the same time, social and cultural impacts, project location, lack of productivity standards in Saudi Arabia, level of competitors, supplier manipulation, economic stability, inadequate production of
raw materials by the country, absence of construction cost data. It can therefore be deduced that the most important factors vary from one region to another.

2.1 Construction Industry in Kenya

The construction industry in Kenya is very important for the Kenyan economy; contributing 5 per cent of the country’s gross domestic product (GDP) and employing more than one million people (Njoroge 2012). The creation of the Ministry of Transport and infrastructure (The Daily Nation Thursday newspaper 18th April, 2013) is an indication of the importance and contribution of the construction industry to our country’s Economy. The Department of infrastructure in this case will be charged with full responsibility of supervising of all roads and public works project. Construction industry therefore remains the Engine towards realization of vision 2030.

According to report by Kenya National Bureau of Statistics (KNBS 2011), the economy of Kenya grew by 4.9 per cent in the first quarter of 2011 due to the improved productivity in the construction industry. KNBS reported that the construction industry added Sh12.6 billion to the country’s GDP in Q1 2011 supported by the massive road infrastructure projects currently under way across the county. The construction boom was also reflected in cement consumption which rose to 779.3 million tonnes up from 667.1 million tonnes consumed in Q1 2010. According the (KNBS 2011), report the construction industry in Kenya is expected to expand further as investors rush to meet increasing demand for decent housing.

Njoroge (2012) further notes that opportunities are immense particularly in the manufacture and supply of construction materials and components, construction of middle and lower income housing as well as in the area of upgrading informal settlements. According to (The peoples Friday newspaper 15th June, 2012) the contribution of construction to the National economy is
immense as represented by the value added and by the economically active population employed in construction including materials and service industries. (Khwathenje 1996), established that the public sector i.e. the Government is the major contributor (over 50%) to the construction industry. He further established that the industry is influenced by the government socio-economic policies and political development in general.

2.2 Types of costs
According to Seeley (1996) cost can be classified as Quantity related cost, Occurrence related cost and time related costs.

a) Quantity related costs.
These are the costs which have a direct relationship to the permanent work to be done. Such cost includes construction material costs and labor costs. Increase quantity related costs will increase the total cost of the project. (Seeley 1996)

b) Occurrence related costs.
These are the cost related to the specific even or occurrence such as bringing plant to site, hiring excavation plant, assembling and transporting the plant around the site as necessary and dismantling and removing it when it is no longer required. (Seeley 1996)

c) Time related cost,
These are the cost related to the length of time on site. This cost may include the cost of hiring a plant for use on the site and its total cost is determined by considering the hourly operating costs and the length of time it remains on site for use (Seeley 1996).

2.3 The Roles of Construction Key stakeholders in Construction cost
There are different interests in the construction industry. The major key players in the construction industry are:

2.2.1 The Client
The Client is, by far, the single most important member of the construction team. He is the initiator and financier of all the projects. Smith (1971) noted that the major contribution the
client can make to the successful operations of the construction industry lies in his skill in specifying his needs prior to the preparation of the design. It is also important for the client to set cost limits of the project at the briefing. He should also ensure that adequate financial provisions are made prior to the commencement of any project.

2.2.2 The Consultant

Cost considerations are among the most important and basic considerations that Consultants must deal with. It is essential to see that projects are contained within the client’s budget and cost forecasts. Cost has the final control over virtually every project. Accurate cost analysis and control is one of the necessary services the client requires from the consultants (Smith (1971).

2.2.3 The Contractor

Smith (1971) further reveals that the major task of Contractors is to assemble and allocate the resources of labour, equipment and materials to the project in order to achieve completion at maximum efficiency in terms of time, quality and cost.

2.4 Cost Overrun

Cost overrun is a very common phenomenon and majority projects in construction industry facing this problem. Cost overrun occurs when the final cost or expenditure of the project exceeds the original estimation cost, Avots (1983). Angelo and Reina (2002) pointed out that cost overrun is one of the main problems in construction industry. The problem may found in both developing and developed countries. This problem is quite serious and further study on this issue is needed to reduce the problems that result into ineffective and timely implementation.

2.4.1. Definition of Cost Overrun

Costs overrun: An instance in which the provision of contracted goods or services are claimed to require more financial resources than was originally agreed between a project sponsor and a contractor (Mansfield 1994). The amount by which actual costs exceed the baseline or approved costs (Wideman, 2002).
2.4.2 Causes of Cost Overrun

Several studies of major projects show that cost overruns are common (Avots, 1983) stated that cost overrun is a major problem in both developed and developing countries. The causes of cost overrun in construction projects are varied, some are not only hard to predict but also difficult to manage observes (Morris and Hough, 1991). According to a study made in Turkey by Arditi, et al, (1985), the important sources for cost overruns were found to be inflationary pressures, increases in material prices and workmen's wages, difficulties in obtaining construction materials, construction delays, deficiencies in cost estimates prepared by public agencies and unexpected sub soil conditions were the most important sources for cost overruns. Kaming, etal, (1997), studied the factors influencing construction time and cost overruns for high-rise projects in Indonesia, and pointed out that the major factors influencing cost overrun were material cost increase due to inflation, inaccurate material estimating and the degree of project complexity.

Mansfield, Ugwu, and Doran, (1994), found that cost overrun is attributed to problems in finance and payment arrangements, poor contract management, material shortages, changes in site conditions, design changes, mistakes and discrepancies in contract documents, mistakes during constructions, price fluctuations, inaccurate estimating, delays, additional work, shortening of contract periods, and fraudulent practices and kickbacks. Stewart, (1982), attributes cost overruns to several factors that are either not controllable or that to a varying degree are unmanageable. They include the accuracy of original cost estimate, degree of government regulation and control, construction completion delays, number of design changes, and labor related matters such as their availability, skills, and increases in fringe benefit.
According to Robert F Cox, (2007), project owners identified five reasons for project cost overruns: these reasons were, incomplete drawings, poor pre-planning process, escalating cost of material, lack of timely decisions and excessive change orders. According to User’s Guide, (2005), the following are the factors that change the cost of the construction projects through time: poor project management, design changes, unexpected ground conditions, inflation, shortages of materials, change in exchange rates, inappropriate contractors, funding problems and force majeure. In developing countries the lack of proper phasing of construction projects can contribute to the economy to become ‘overheated’. This leads to shortage of construction materials as the demand will exceed the supply, this in turn leads to a climb in the cost of construction materials; this inevitably gives rise to project cost overruns, with consequential effects on inflation difficulty in implementation and a decline on efficient activity in the construction industry (Mansfield, Ugwu and Doran, 1994)

According to Jahren, et al, (1990), on their research on predictors of cost overrun rates they found the following factors to influence the cost overrun rates; the size of the project, the difference between lowest bid and engineer’s cost estimate, the type of delivery method, the level of competition, quality of contract documents, and the nature of interpersonal relations on the project. Studies have shown that the size of a construction project influences the rate of cost overrun. Large projects are generally more complex, and in complex projects some items are fraught to be missed out or may be forgotten during planning and design stages hence the complexity may increase the rate of cost overrun. However, since the stakes are higher on larger projects, more care may be exercised from conception of the project until completion. Review of some literatures indicates support for both of these conflicting views. Randolph, et al, (1987),
found that cost overrun rates decreased as the contract amount increased, while Rowland, (1981), found that cost overrun rates increased with increase in the contract amount of construction projects.

2.4.3 Factors that could influence construction costs are numerous.
Cost can be described as one of the most important issues of a project success. Despite its proven significance it is common to see construction project failing to achieve its objectives within the specified cost. To this effect, several past studies have identified typical factors affecting cost overruns in the construction industry projects. For instance, Roachanakanan (2005) examined project cost controls in the United States and Thailand, as well as the causes and solutions for cost overruns in the two countries also are examined. Flyvbjerg et al. (2004) presented results from the statistically significant study of the causes of cost escalation in infrastructure projects of different nations. According to Frimpong et al. (2003) major delay and cost overruns occur during the project implementation phase; therefore, in their studies factors such as, monthly payment difficulties, poor contractor management, material procurement, poor technical performances and escalation of material prices were examined in construction of groundwater projects in developing countries. Other studies (Datta 2002; Mansfield et al. 1994; NAP 2003; Schexnayder et al. 2003) identified cost escalation to be a result of problems such as delay in land acquisition, unexpected problems in supply of raw materials, illegal encroachment on land even during project implementation, or due to internal problems in government organisations.

2.4.4 Factors which affect the cost of a construction project.
Factors which affect cost of a construction are numerous. For this study the following factors will be discussed.
Inaccurate or Poor Estimation of Original Cost

Peeters and Madauss (2008) stated that the biggest factor that contributes to overruns of budget is inaccurate estimation of original or initial cost of a project. It is because of technical problem on how to estimate project costs and also not enough project information in the early stage of project.

Inflation of Project Costs

Harrison (1981) stated that inflation of project costs cause increasing of costs. Inflation of materials, equipments, and labours costs may vary geographically within a country, from country to country, and contracts of subcontractors with suppliers may involve different inflation protection terms that agreed with a client. As inflation goes up, interest rates will go up and the costs will increase too.

Improper Planning

According to Frimpong (2003), improper planning and management experience limitation caused failures of using technical. The processes to produce a product become slower and take longer period to complete the project.

Fluctuation in Price of Raw Materials

Price fluctuation causes cost overruns in most cases where it is hard to estimate the cost accurately because it is objective. This happen caused by high inflation of price in developing countries or the speculation of suppliers (Long et al., 2008).

Poor Project Management

Poor of site supervison and management and poor project management assistance contribute to problem of cost overrun in construction projects. Poor of site management reflected the
weakness and incompetency of contractors. Skilful and experience human resource is insufficient in site management (Long et al., 2008).

**Lack of Experience**

Chan and Park (2005) found that most of the contractors are lack of experience especially in financial management. The distribution of the costs do not plan well in the projects. It might cause over of costs budgeted.

**Obsolete or Unsuitable Construction Equipments and Methods**

Obsolete and unsuitable equipments and methods cause the progress of construction works become slower. Some countries try to import or transfer the modern technology into their countries. However, the method is unsuccessful because lack of skilful human to operate the technology (Long et al., 2004a).

**Unforeseen Site Conditions**

Nega (2008) found that actual site conditions of a project are not usually determined until excavation is completed. It is sometimes possible that site conditions are overlooked by the initial review or conditions have changed due to change of weather conditions or subsoil conditions. The unexpected conditions on sub surface sometimes require fundamental redesign of projects with high expense. Changes of site conditions become a problem for machinery and supplies to move in and out of the site. This also increase costs required.

**Mistake in Design**

According to Long et al. (2008), mistakes in design or poor design are caused by the low competence designer. The approval design or drawing process becomes low quality and ineffective especially for those with government-funded projects. The unrealistic design which found after the start the construction projects has to change and it could lead to cost overrun.
Insufficient Fund
Long et al. (2008) noted that delay of the projects followed by cost increasing to cover all the expenses during construction. Owners are not preparing sufficient fund for project and pay on time as shown in contract agreement to contractor.

Poor Contract Management
Ogunlana and Olomolaiye (1989) mentioned that many contractors in developing countries have organizes their own commercial undertaking. They are good in managing expense because they are familiar with the business of making money. They pay low wages, submit low bids and low ability to plan and coordinate contracts. They do not follow the agreement that stated in contract.

High Cost of Machineries
Chan and Park (2005) found that high cost of machineries is one of the market related problems. Construction industry is mainly market driven where it is influenced by current market style. For example, when the oil needed to run machineries increasing, the rental cost of machineries also increasing.

Construction Cost Underestimation
In order to get project approval for the project, some parties have deliberated underestimating of costs for their project. It is quite serious situation that occurred on some project (Nega, 2008).

Measures to Control Construction Cost
There are some measures which are found from the researchers’ study to control the construction costs or to overcome the problems of cost overruns. The researchers have their own opinion on how to solve the problems. The measures are as below:
**Proper Project Costing and Financing**

Kaliba et al. (2009) stated that delays of schedule may occur caused of delayed in payments due to complex financial processes in client organisations. Delay in payment would cause financial difficulties to contractors and subsequently delay the schedule to complete the activities on site. Interest could be charged on delayed payments hence inducing cost overruns in the project.

**Competent Personnel**

Kaliba et al. (2009) mentioned that contractors, consultants, and clients should ensure that they have the right personnel with appropriate qualifications to manage their projects efficiently. It is better if construction manager have experience and qualifications in project or construction management.

**Appropriate Scope Definition**

Nega (2008) agreed that only concern on the works required to complete the project successfully. Guard against incomplete identification of scope is important to avoid frequent changes. Also, do not incorporate the works out of scope to avoid unnecessary works.

**Proper Cost Control**

Ashworth (1994) mentioned that one of the client’s requirements in respect of construction project is assessment of its expected cost. Proper cost control is important as it is the general trend towards greater cost-effectiveness and ensures construction costs not solely in the context of initial costs, but in terms of life-cycyle costs or total cost appraisal.

**Risk Management during Project Execution**

Peeters and Madauss (2008) found out some approach to avoid cost overruns. In any development project, there must be contain certain amount of risks. Therefore, a risk management function needed to be performed by project manger to determine and reduce the
risks of the particular project. The aim of risk management is to minimise any risk that might result failure to meet the project requirements.

**Appropriate Contractual Framework**

Peeters and Madauss (2008) has supported that once the objective of cost has been estimated, it is followed by choosing an appropriate contract model where there are techniques to make a relationship between the initial estimate and final price.

**Increase Supply of Materials**

Frimpong et al. (2003) found that there should prepare adequate allowance for any emergency case in order to cover increasing in material cost due to inflation.

**Realistic Cost Estimation**

The initial cost estimates should be as accurate as possible. Accuracy of cost estimation allows clients to check and determine the required funds for executing the project are made available when required (Kaliba et al., 2009).

**Efficient Management**

Gould (2002) stated that efficient management is important to produce a productive and cost efficient site. Scope may changes due to inadequate planning and feasibility studies. In order to control the project effectively, the project manager must follow up the schedule to avoid additional costs and ensure the building can be occupied on time as planned.

Based on the literature review and the findings, it is clear that the above factors have significantly impacted on the implementation of the public projects in Kenya. In order to identify measures this needs to be put in place to reduce the increasing building construction cost.
Managing the above factors will help the clients, consultants and contractors reduce possible factors causing cost overrun and negative impact on the implementation of the public projects.

2.5 Effects of Cost Overrun

The global construction industry is plagued with cost overruns in project delivery. This development has brought about loss of clients’ confidence in consultants, added investment risks, inability to deliver value to clients, and disinvestment in the construction industry (Mbachu and Nkado, 2004). Cost overruns in public and in private construction projects are often the stuff of scandal in the news media. Typically owners and contractors are treated as eager participants in bribes, illegal financing and other forms of corruption and waste (Oberndorfer, 1994) Cost overruns have obvious effects for the key stakeholders in particular, and on the construction industry in general. To the client, cost overrun implies added costs over and above those initially agreed upon at the onset, resulting in less returns on investment. To the end user, the added costs are passed on as higher rental lease costs or prices. To the professionals, cost overrun implies inability to deliver value for money and could well tarnish their reputations and result in loss of confidence reposed in them by clients. To the contractor, it implies loss of profit for non completion, and defamation that could Jeopardize his her chances of winning further jobs, if at fault. To the industry as a whole, cost overruns could bring about project abandonment and a drop in building activities, bad reputation, and inability to secure project finance or securing it at higher costs due to added risks (Tindiwensi, Construction Review 1995 Oct).

All these consequences undermine the viability and sustainability of the construction industry. According to Arditi, et al, (1985), the effects of cost overrun are not confined to the construction industry but are reflected in the state of the overall economy of a country. They state that delays
and cost overruns in construction projects prevent the planned increase in property and service production from taking place, and this phenomenon in turn affects, in a negative way, the rate of national growth. Angelo and Reina, (2002, state that the problem of cost overrun is critical and needs to be studied further to alleviate the problem in the future. Project cost overruns can cause a slower payout and reduce an early return on the client’s or project owner’s investment (Ritz, 1994).

2.5 Ways of minimizing high construction costs.

There are several ways in which cost of construction can be minimized. Fisk (1997) reveals two cost reduction measures. The first is the application of a value engineering concept, which aims at a careful analysis of each function and the elimination or modification of anything that adds to the project cost without adding to its functional capabilities. He argues that by carefully investigating costs, availability of materials, construction methods, procurement costs, planning and organizing, cost benefit values and similar cost influencing items, an improvement in the overall cost of project can be realized. Fisk (1997) further notes that managing construction costs includes estimating, scheduling accumulating and analyzing cost data, and finally implementing measures to correct construction cost problems. Throughout a project design, and construction phases, cost management is employed as a means of balancing a projects scope, expectations of quality and budget.

(Oberndorfer, 1994) observes that cost control during the construction process is vital to ensure the success of a project. As a project progresses more information becomes available to allow costs to be calculated to a greater degree of accuracy, and these information helps for controlling costs. The second is to provide comprehensive and error free designs and specifications to avoid misinterpretations by the contractor or delay due to missing details. According to (Bill et al,
Project cost control provides management with cost related information for making decisions with a view to complete the project with specified quality, on time and within budgeted costs.

According to Cooke and Williams (2003) recommended as cost reduction measures the elimination or minimization of design specification, delivery and site wastes through the formulation and implementation of effective material policy and material management. In addition, Ashworth (2000) observed that profitable firms may be generating their revenues from the elimination of waste at both professional and trade practice levels. Cost reduction measures also include: establishing firmly the requirements and features of the project at the onset before getting started, preparing the project team to do its best by getting members to sign off on capabilities and responsibilities, staying diligent about keeping the project on the right path through contract clauses that disallow significant changes once the project is underway, effective human resource management through effective motivation and project tracking involving discerning early what area or paths are leading dead ends and applying and early corrective actions. (Bill et al, 2006). According to Seeley a good measure of control can be achieved by the employer employing a quantity surveyor to undertake the following the following duties so as to minimize costs

- Supervision of the delivery of materials on to the site, their retention and use and checking of labor force and activities performed.
- Checking of all records relating to the contractor’s payments and transactions and certifying of amounts due to subcontractors and suppliers.
- Constant monitoring to ensure that no money is wasted by the use of unnecessary or unsuitable plant or in the lack of coordination of services or discontinuity of the work’
According to Ramus(2009) in addition to open tendering process, a contracting firm or company selected should meet the following requirements so as to ensure cost effectiveness

i. Financially stable and with good business record

ii. One of which the size of the project is neither too small not too large.

iii. One that has a reputation for good quality workmanship and efficient organization.

iv. One that has a good record of industrial relations

2.6 Summary

In summary, high construction costs have obvious negative implications for the major players in particular, and the industry in general. Project abandonment, drop in building activities, bad reputation and inability to secure project finance are all implications of high construction cost. However, an application of the proffered solutions would restore clients’ confidence in consultants, reduce investment risks and generally boost the viability and sustainability of the industry.
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Description of study area and population

3.1.1 Description of study area

The study area for this research was Nairobi County which is centrally located in Kenya. The choice of Nairobi County as the study area is because since the creation of the state in 1964 it has never ceased to be the center of the country’s economy, commerce and ‘power’; coupled with its highest population it naturally enjoys the benefits of being the fulcrum of the nation. Nairobi is a relatively ‘built – up ‘ environment with many infrastructures like roads, bridges, skyscrapers, estates, government establishments, all kinds of private developments, schools, hospitals, theaters, cinemas, shopping malls to mention a few. All these infrastructures are the handiwork of construction. As such there cannot be a better place to obtain data for this study.

3.1.2 Study population.

The population of the study consisted of clients, consultants and contractors in Nairobi.

3.2 Sampling technique and sample size.

The researcher identified clients, consultants and contractors as the target groups for the effective conduct of this research, seventy respondents comprising of seven clients, twenty five consultants and eight contractors were be randomly selected using stratified random sampling technique as a type of probability sampling in order to give everyone that falls into any of these identified target groups equal and independent chance of being included in the sample.
3.3 Data Collection instruments

Two sets of data were relevant to the effective conduct of this research namely primary and secondary. The primary data which refers to field data was obtained through the use of well structured questionnaire developed from the initial identification of likely factors affecting construction cost in Nairobi Kenya and solutions to minimizing same. The questionnaire was designed to elicit information on the following:

a) The respondent’s role in construction
b) How long the respondent has been in construction
c) Impact of cost overrun on project implementation
d) An assessment of the severity of likely factors of overrun on effective project implementation.
e) Project implementation cost overrun outcomes
f) An evaluation of the effectiveness of proffered solutions to minimizing construction cost and enhances effective implementation.

Secondary data through the review of various relevant literatures was used in the course of carrying out the research. Generally, the scales of the variables will be nominal and ordinal scales. The questionnaire will be validated by my supervisor before its administration.

3.4 Data Collection procedures

The questionnaires were delivered by hand to the various target groups.
3.5 Data analysis.

The descriptive survey method was used, where forty well structured questionnaires were distributed among the principal actors in the construction industry namely: the client, the consultant and the contractor. Frequency and percentages was used for the descriptive data. Coded broad sheets will thereafter be used for extracting data from the returned questionnaires. The researcher analyzes the data by SPSS (Statistical Package for Social Science) having carefully completed the variable view and imputed the extracted data appropriately on the data view. Mean score, standard deviation was used to achieve the stated objectives.
CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1. Introduction
This part of the study deals with the analysis and discussion of the data gathered from the questionnaire survey and project literature review. It includes the identification of the factors affecting cost overrun in public projects, existence and extent of cost overrun, severity on effective implementation of Public Projects, the most affected party in cost overrun, resultant of cost overrun and factors that minimize cost overrun. The procedure used in analyzing the results was aimed at establishing the relative importance of the various factors responsible for cost overrun and their effects. The questionnaire gave each respondent an opportunity to identify the factor that was likely to cause cost overrun by giving the response “I strongly disagree”, “I disagree”, “I agree”, etc…; frequency occurrence of the variables of cost overrun ; and the impacts of each cost overrun variables on the final cost of the project. For each variables of cost overrun, the percentages of respondents’ response were ranked for analysis purpose. On the basis of the ranking of the variables by the various groups, it was possible to identify the most important factors that influenced cost overrun in public building construction projects in public project.

From the desk study a variety of completed public building construction projects throughout Kenya were surveyed. During the desk study all the documents of each project such as correspondence letters, project report, payment certificate, the contract amount, contract time during signing of the contract actual cost and actual completion time at completion of the project were thoroughly investigated. These help to understand the reasons behind each project for cost overrun, and to investigate how the actual cost at completion deviates from the contract amount.
Collecting these data helped to analyze and draw the relationship between rate of cost overrun and contract amount.

### 4.2. Questionnaire Response Rate

Detailed questionnaires were designed and distributed for the assessment of cost overrun on public building construction projects in the Ministry of Public Works, for this purpose the questionnaires were distributed to major stakeholders in the construction industry; these are Contractors, Consultants and Clients (project owners). To make the analysis more comprehensive a total of 40 questionnaires were distributed to consultants, contractors and clients (project owners) out of which all 40 questionnaires were filled and returned.

Table 4.1 below shows the number of questionnaires distributed to clients, consultants and contractors and the number of questionnaires returned from these stakeholders including their percentage response rate.

**Table 4.1:** Summary of number and percentage of questionnaires distributed and returned; and response rate

<table>
<thead>
<tr>
<th>No</th>
<th>Respondents</th>
<th>Questionnaire Distributed</th>
<th>Questionnaire returned</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>1</td>
<td>Client</td>
<td>7</td>
<td>17.5</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Consultant</td>
<td>25</td>
<td>62.5</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>Contractors</td>
<td>8</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
</tr>
</tbody>
</table>

Source: Own research, (2013)
The above table shows that the response rate was satisfactory. All the questionnaires were filled and returned on time. This represents 100% of the questionnaire distributed. This means that the reliability of the data collected will be justifiable to make a general conclusion on the existence and extent of cost overrun in public projects in Kenya.

4.3: Demographic data
The research was interested in the demographic data of the respondents. This will assist in making judgment on the age, gender, function and experience of the respondents.

4.3.1: Age distribution frequencies
Age is a critical factor in analyzing cost overrun. This is because different parties of different age has a different approach in construction project and more so the ability to carry out different task with minimal pressure. The researcher sorts to know the age distribution of the respondents. The following table shows age group distribution.

Table 4.2: age distribution

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-29 yrs</td>
<td>3</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>30-35 yrs</td>
<td>6</td>
<td>15.0</td>
<td>15.0</td>
<td>22.5</td>
</tr>
<tr>
<td>36-41 yrs</td>
<td>13</td>
<td>32.5</td>
<td>32.5</td>
<td>55.0</td>
</tr>
<tr>
<td>42 and above</td>
<td>18</td>
<td>45.0</td>
<td>45.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own research, (2013)
From the above table, majority of the respondents were 42 years and above. This represents 45% of the total respondents. 33% were between 36-41 years, 15% were between 30-35 years and 8% were between 24-29 years. This means that most of the public projects are being undertaken by older professional clients, consultants and contractors. This may affect in one way or another implementation of public projects.

4.3.2: Sex distribution

Gender was also an important factor to be considered by the researcher. Gender constitutes other responsibilities apart from professionalism which affect the quality and commitments to public project implementation. The following table shows gender distribution of the respondents.

### Table 4.3: Sex distribution frequency

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>37</td>
<td>92.5</td>
<td>92.5</td>
<td>92.5</td>
</tr>
<tr>
<td>female</td>
<td>3</td>
<td>7.5</td>
<td>7.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Own research, (2013)

From the above table, majority of the respondents were male representing 92% of the total respondents and 8% female. This means that majority of parties working in public building construction industry in the ministry of public works are male. Gender representation in the industry is biased towards male professionals.
4.3.3: Respondent role in construction
The role of the respondent in the construction was also an important factor to be considered by
the researcher. The role played by the respondent in the building construction industry is a major
responsibility in the building industry. Table below summarize the findings.

Table 4.4: Respondents role distribution

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>7</td>
<td>17.5</td>
<td>17.5</td>
<td>17.5</td>
</tr>
<tr>
<td>Consultant</td>
<td>25</td>
<td>62.5</td>
<td>62.5</td>
<td>80.0</td>
</tr>
<tr>
<td>Contractor</td>
<td>8</td>
<td>20.0</td>
<td>20.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own research, (2013)

From the above table, majority of the respondents were consultants which represents 62% of the
respondents, followed by contractors with 20% while clients represent 18%. It can be concluded
that, consultants has a bigger role in building construction industry. Most consultants are
engaged in many projects as compared to contractors and clients. This constitutes their massive
presence in the ministry.

4.3.4: work experience

The experience of the respondents in relation to public project construction was also a major
factor to be considered by the researcher. The researcher sort to know the experience of the
respondents distributed in the age group presented in the questionnaire. The following table
summarizes the findings.
Table 4.5: Work experience distribution

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid 4-6 yrs</td>
<td>6</td>
<td>15.0</td>
<td>15.0</td>
<td>15.0</td>
</tr>
<tr>
<td>7-9 yrs</td>
<td>6</td>
<td>15.0</td>
<td>15.0</td>
<td>30.0</td>
</tr>
<tr>
<td>10 and above</td>
<td>28</td>
<td>70.0</td>
<td>70.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own research, (2013)

From the above table, it can be concluded that majority of the respondents have been working in the public projects construction industry for 10 years and above representing 70% of the respondents. 15% has 7-9 years experience and 15% also has 4-6 years experience. This means that most the respondents have massive experience in the construction industry.

4.4. Existence and Extent of Cost Overrun
The research was interested to know the existence and extent of cost overrun in public projects. This is to check whether cost overrun affects the smooth implementation of public projects (frequency distribution).

4.4.1: Establishment whether cost overrun affects the smooth implementation of public projects (frequency distribution)
The researcher sorts to know if cost overrun exists in public projects. The following table shows the results.
Table 4.6: cost overrun impact on smooth Project implementation- frequencies

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid yes</td>
<td>31</td>
<td>77.5</td>
<td>77.5</td>
<td>77.5</td>
</tr>
<tr>
<td>no</td>
<td>9</td>
<td>22.5</td>
<td>22.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own research, (2013)

From the above table, it is concluded that cost overrun exist in public building and therefore affects smooth implementation. 77% of the respondents noted that cost overrun affects smooth implementation of public projects. 23% of the respondents differ with the others by saying ‘no’ to the survey question. It can be generally concluded that cost overrun affects smooth implementation of public projects.

4.4.2: Extent to which cost overrun affect project implementation

Cost overrun affects project implementation in different degree depending on the prevailing problem. The researcher was interested to know the general degree to which cost overrun affect the implementation of the public construction projects. The table below illustrates the results of the findings.

Table 4.7: Extent of cost overrun on the implementation of the project

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid 0-25%</td>
<td>16</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
</tr>
<tr>
<td>26-50%</td>
<td>17</td>
<td>42.5</td>
<td>42.5</td>
<td>82.5</td>
</tr>
<tr>
<td>51-75%</td>
<td>7</td>
<td>17.5</td>
<td>17.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own research, (2013)
From the above table, it is apparent that cost overrun exists in public construction projects. 43% of the respondents noted that cost overrun has an extent of 26-50% on the project implementation. 18% of the respondents noted that cost overrun has an extent of between 51-75% on the project implementation. 40% noted that cost overrun has an extent below 25%.

On the basis of data gathered from the desk study, out of 13 public building construction projects investigated 7, (54%), public building projects suffered cost overrun. From this result, the number of construction projects that suffered cost overrun in Kenya are more than the number of projects that suffered cost overrun in other countries, as indicated in the literature review (MOW, 2013), found that 7 out of 13 projects experienced cost overrun.

Table below shows the types of public building projects, contract time, extended time, contract amount, final contract cost and cost overrun at completion.

**Table 4.8: Summary of projects undertaken by the ministry of public works that suffers cost overrun and those which met the budget allocation.**

<table>
<thead>
<tr>
<th>NO.</th>
<th>Project</th>
<th>Contract period in weeks</th>
<th>Extended period in weeks</th>
<th>Contract sum-Kshs</th>
<th>Final account sum Kshs</th>
<th>Additional amount-Kshs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed partitioning works at Ira phase 1</td>
<td>4</td>
<td>8</td>
<td>1,802,547.20</td>
<td>1,980,000.00</td>
<td>177,452.80</td>
</tr>
<tr>
<td>2</td>
<td>Proposed partitioning works at public complaint standing committee</td>
<td>20</td>
<td>64</td>
<td>16,500,000.00</td>
<td>19,000,000.00</td>
<td>2,500,000.00</td>
</tr>
<tr>
<td>3</td>
<td>Proposed erection and completion of Ngong police lines</td>
<td>32</td>
<td>NIL</td>
<td>108,000,000.00</td>
<td>108,000,000.00</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>Project Description</td>
<td>Estimated Cost</td>
<td>Actual Cost</td>
<td>Variance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------------</td>
<td>----------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Proposed erection and completion of a school dormitory block at Alliance girls high school- kikuyu</td>
<td>18,000,000.00</td>
<td>19,600,000.00</td>
<td>1,600,000.00</td>
<td>1,600,000.00</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Proposed completion works at Dandora police lines</td>
<td>66,086,619.00</td>
<td>66,086,619.00</td>
<td>0</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Proposed roofworks at Muthangari police lines</td>
<td>5,900,000.00</td>
<td>5,500,000.00</td>
<td>(400,000.00)</td>
<td>(400,000.00)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Proposed social hall complex at national security intelligence service</td>
<td>31,000,000.00</td>
<td>45,000,000.00</td>
<td>14,000,000.00</td>
<td>14,000,000.00</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Proposed partitioning works for Ira at shelter Afrique-phase 1</td>
<td>4,858,996.00</td>
<td>5,315,247.42</td>
<td>456,251.42</td>
<td>456,251.42</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Proposed perimeter wall at M.O.W sports club-south c</td>
<td>21,368,863.00</td>
<td>20,615,000.00</td>
<td>(753,863.00)</td>
<td>(753,863.00)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Proposed laundry at Kenya institute of administration- Kabete</td>
<td>10,260,000.00</td>
<td>11,126,000.00</td>
<td>866,000.00</td>
<td>866,000.00</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Proposed centre for excellency in Kariobang</td>
<td>49,600,000.00</td>
<td>49,600,000.00</td>
<td>0</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Proposed chapel at Kenya institute of administration- Kabete</td>
<td>9,800,000.00</td>
<td>9,650,000.00</td>
<td>(150,000.00)</td>
<td>(150,000.00)</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Ministry of Public Works, (2013).
4.5: Severity on effective implementation of Public Projects

The respondents were asked to rate using 0-4 the severity of factors affecting effective implementation of the public projects. The numbers 0-4 represent, 0-I strongly disagree 1-Disagree, 2-Neutral, 3-I agree and 4-I strongly agree. The following descriptive table illustrates the findings.

Table 4.9: severity of variable factors on effective implementation of public projects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay in payments</td>
<td>5</td>
<td>3</td>
<td>7</td>
<td>20</td>
<td>65</td>
</tr>
<tr>
<td>Additional cost</td>
<td>0</td>
<td>3</td>
<td>10</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>Inflation</td>
<td>0</td>
<td>8</td>
<td>5</td>
<td>55</td>
<td>33</td>
</tr>
<tr>
<td>Drastic change</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>55</td>
<td>25</td>
</tr>
<tr>
<td>Changes in foreign exchange</td>
<td>3</td>
<td>18</td>
<td>15</td>
<td>43</td>
<td>23</td>
</tr>
<tr>
<td>Complexity in construction projects</td>
<td>8</td>
<td>23</td>
<td>18</td>
<td>13</td>
<td>40</td>
</tr>
<tr>
<td>Special risk</td>
<td>13</td>
<td>18</td>
<td>15</td>
<td>20</td>
<td>35</td>
</tr>
<tr>
<td>Delay in issuing site instructions</td>
<td>20</td>
<td>8</td>
<td>10</td>
<td>38</td>
<td>25</td>
</tr>
<tr>
<td>Cash flow problem</td>
<td>25</td>
<td>3</td>
<td>15</td>
<td>25</td>
<td>33</td>
</tr>
<tr>
<td>Lack of proper planning</td>
<td>23</td>
<td>13</td>
<td>15</td>
<td>8</td>
<td>43</td>
</tr>
<tr>
<td>Additional requirement</td>
<td>23</td>
<td>5</td>
<td>13</td>
<td>38</td>
<td>23</td>
</tr>
<tr>
<td>Improper documentation</td>
<td>25</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>38</td>
</tr>
<tr>
<td>Failure to identify problem</td>
<td>30</td>
<td>8</td>
<td>3</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>Inexperience contractors</td>
<td>28</td>
<td>0</td>
<td>25</td>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>Changes in specification</td>
<td>25</td>
<td>5</td>
<td>28</td>
<td>35</td>
<td>8</td>
</tr>
<tr>
<td>Difficulties in obtaining construction materials</td>
<td>28</td>
<td>25</td>
<td>10</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Ambiguities in tender documents</td>
<td>25</td>
<td>28</td>
<td>15</td>
<td>25</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Own research, (2013)

From the above table, it is well evident that delay in payment forms the biggest cause of cost overrun in public projects. This is shown by 65% of the respondents strongly agreeing with the
variable. However, inexperience contractors, change in specification and ambiguities in tender documents are rated the least as cause of cost overrun. In a general view most of the variables affect the effectiveness of the implementation of the public projects.

Additions or enhancement required by the client, late site handover to the contractor by clients, etc… are found to be causes of cost overrun for which project owners or clients are found to be responsible. Contractors inexperienced or inappropriate contractor, etc are found to be caused by the contractor problems, inflation or increase in the cost of construction materials, change in foreign exchange rate (for imported materials) are found to be caused by government related actions or others such as international or national market conditions, foreign government influences or general global conditions.

4.6: Most affected party

The respondents were asked to name the most affected party among the clients, contractors and consultant in the event of delay in project completion.. The following table shows the findings.

**Table 4.10: Frequency table for the most affected party**

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Contractor</td>
<td>11</td>
<td>27.5</td>
<td>27.5</td>
</tr>
<tr>
<td></td>
<td>Client</td>
<td>29</td>
<td>72.5</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own research, (2013)

From the above table, clients are the most affected party in the construction cycle. This represents 73% of the respondents. The least affected are contractors represented by 27% of the respondents.
4.7: Other affected players.

The researcher sorts to know if there are other players affected by delay in completion besides the three key players. The response is presented in the following table.

Table 4.11: Other players affected by cost overrun

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>36</td>
<td>90.0</td>
<td>90.0</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>4</td>
<td>10.0</td>
<td>90.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>40</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Own research, (2013)

From the above table, it is evident that other players apart from the three key players are affected as well. This represents 90% of the respondents while 10% think that it doesn’t affect other parties. The respondents were further asked to provide explanation if they agree. Most of the respondent cited the government and the general public as the other key players which are affected directly by the cost overrun.

4.8: Effect of cost overrun

The respondents were asked to rate using 1-5 the severity of factors affecting effective implementation of the public projects. The numbers 1-5 represent, 1- I strongly disagree, 2- Disagree, 3- Neutral, 4- I agree and 5- I strongly agree. The most frequent effect of cost overrun were assessed from respondents and results are given in Table 4.13 below. From the 5 effects of cost overrun which have a mean score of greater than or equal to 2 (MS = 2) rate of occurrence are considered as important because there is at least a probability of 50% chance for the occurrence.
Table 4.12: The critical impact of cost overrun on implementation.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
<th>Skewness</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased number of stalled projects</td>
<td>40</td>
<td>3.5500</td>
<td>.26055</td>
<td>1.64784</td>
<td>-.708</td>
<td>.374</td>
</tr>
<tr>
<td>Phasing of projects</td>
<td>40</td>
<td>3.5000</td>
<td>.23479</td>
<td>1.48497</td>
<td>-.742</td>
<td>.374</td>
</tr>
<tr>
<td>Poor relationships</td>
<td>40</td>
<td>3.3500</td>
<td>.24166</td>
<td>1.52836</td>
<td>-.494</td>
<td>.374</td>
</tr>
<tr>
<td>Compromised quality of work</td>
<td>40</td>
<td>2.6500</td>
<td>.22518</td>
<td>1.42415</td>
<td>-.124</td>
<td>.374</td>
</tr>
<tr>
<td>Retrenchments of staff</td>
<td>40</td>
<td>2.2500</td>
<td>.22857</td>
<td>1.44559</td>
<td>.663</td>
<td>.374</td>
</tr>
</tbody>
</table>

Source: Own research, (2013)

From the above table, it is noted that increased number of stalled projects forms the highest mean score of 3.55, followed by phasing of projects with 3.5, poor relationship with 3.35, compromised quality of work with 2.65 and retrenchment as the least with 2.25. Generally all the variables forms the greatest effects of cost overrun in public project as all the variables are greater than 2.

4.9: Preferred solution to effective implementation

Respondents were asked to rate the solutions by using a scale of 1-5. 1-I strongly disagree 2-Disagree, 3- Neutral, 4- I agree and 5- I strongly agree. The most frequent effect of cost overrun were assessed from respondents and results are given in Table 4.14 below. From the 6 solutions to to smooth implementation which have a mean score of greater than or equal to 2 (MS = 2) rate of occurrence are considered as important because there is at least a probability of 50% chance for the occurrence.
Table 4.13: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper documentation</td>
<td>40</td>
<td>4.6000</td>
<td>.13775</td>
<td>.87119</td>
<td>-2.038</td>
</tr>
<tr>
<td>Honoring payments</td>
<td>40</td>
<td>4.5750</td>
<td>.15561</td>
<td>.98417</td>
<td>-2.428</td>
</tr>
<tr>
<td>Reduce government</td>
<td>40</td>
<td>4.4500</td>
<td>.14300</td>
<td>.90441</td>
<td>-1.485</td>
</tr>
<tr>
<td>bureaucracy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prompt decision making</td>
<td>40</td>
<td>4.4250</td>
<td>.13815</td>
<td>.87376</td>
<td>-2.186</td>
</tr>
<tr>
<td>Proper selection of</td>
<td>40</td>
<td>4.4000</td>
<td>.17097</td>
<td>1.08131</td>
<td>-2.034</td>
</tr>
<tr>
<td>contractors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proper risk allocation</td>
<td>40</td>
<td>4.0000</td>
<td>.19936</td>
<td>1.26085</td>
<td>-1.293</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>40</td>
<td>4.0000</td>
<td>.19936</td>
<td>1.26085</td>
<td>-1.293</td>
</tr>
</tbody>
</table>

Source: Own research, (2013)

From the above table, it is clear that the best solution to smooth implementation of public projects according to the findings is proper documentations with a mean score of 4.6, followed by honoring payments with 4.57, reducing government bureaucracy with 4.45, prompt decision making with 4.42, proper selection of contractors with 4.4 and proper allocation of risk with 4.0.
CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents conclusion and recommendation made based on the analysis and findings of the study. Identification of causes of cost overrun is a prerequisite to minimize or to avoid cost overrun in the construction industry. The main objective of this research is, therefore, to identify and investigate the critical causes and effects of cost overrun on public building construction projects in the ministry of Public Works. Desk study was used to identify the existence and extent of cost overrun on public building construction projects in past projects undertaken in Kenya based on the data available at the ministry. Questionnaire survey was also used to identify the causes and effects of cost overrun. Clients, consultants and contractors were asked to identify the variables of cost overrun and effects in the public project. Frequency of occurrence of the variables of cost overrun, and their impacts on the final cost of the project were also asked. The data gathered from the survey are analyzed using the mean score and frequency tables. The analysis of the results from the open-ended part of the questionnaire was carried out using descriptive analysis.

From the survey results almost all respondents agreed on the severity of the effects of cost overrun on the project owner (client) or end user. Although the degree of effects of cost overrun varies on the stakeholders in the construction industry, all the parties involved are affected by cost overrun. The first victim of cost overrun would be the project owner since he has envisaged his construction project to be realized within an allocated cost and time frame. Anything outside these stated frames are cost overrun and time overrun to the client.
Cost overrun does not affect only those parties that are involved directly in the construction of a project, but its effects pass to the construction industry as a whole and consequently to the national economy of the country. Cost overrun for public clients, whose financial resources are scarce, has many effects and it will be a source of friction between the public client and the consultant. When the cost overrun is due to financial constraints of clients, the construction projects suffer lots of problems which further aggravate the problems of cost overrun. For public projects cost overrun will lead to delay as the public clients do not have enough financial resources which are ready to be pumped to the construction project, they require new approval for these additional costs from higher public officials or Ministry of Finance and National Development, in doing so time will go on and consequent delay on the project realization will crop up. Which lead to further cost overrun as a construction project is delayed for a long period of time it will be subjected to inflationary pressure and interests will be accumulated.

Generally, one can conclude that the rate of cost overrun decreases with increase in the contract amount; that is rate of cost overrun is higher for small projects, and it is smaller for bigger projects. Thus, the size of estimated cost has a significant negative impact on percentage cost overrun rates indicating that percentage overrun tend to be lower the higher estimated costs are. Since cost overrun rate decreases with estimated cost of projects, this may indicate that larger projects generally are under better management as compared to smaller ones. For small projects the emphasis given is little, as the consultant and supervisor assigned for these small projects is not a well qualified one and the time allocated for planning and design of these small projects is
short. Hence, there might be some mistakes in their design and contract document preparation that ultimately lead to changes or variations and consequentially these projects will face higher rate of cost overrun. For bigger projects the emphasis given is big, and the consultant hired and supervisor assigned for these projects is a qualified one and the time allocated for planning, design and contract document preparation of these projects is enough to complete the whole design and contract document preparation accurately.

5.2 Recommendations

Based on the findings of the research, the following recommendations are expected from key role players in construction projects.

5.2.1 Expected from Consultants

The consultant is one of the key role players in construction projects that translates the clients’ needs and ideas into plans and drawings and supervises the translation of these plans and drawings into visible physical structures. The following recommendations are expected from consultants.

1. Continuous coordination and direct communication, which will eliminate design discrepancies and errors as well as omissions in design and also provide an opportunity for professionals to review the contract documents thoroughly. This would help in minimizing variations orders resulting from the discrepancy in contract documents.

2. Provide comprehensive information required for easier interpretation of the drawings and setting out of the works. Specifications should also be standardized as much as possible for ease of understanding by project participants; ensure adequate and realistic specifications of materials and methods are stated in the contract documents.
3. Detailed and comprehensive Preliminary site investigation should be done at the design phase to avoid variations and late changes during the construction phase.

4. As much as possible avoid complex designs, while trying to achieve aesthetic appeal, consider seriously the issue of build ability in the design.

5. Provide adequate contingency to respond more proactively to imminent changes in client needs and requirements; after completion of designs and plans, cross-check designs and details to eliminate errors.

6. Adopt efficient information retrieval and distribution systems to guard against communication gaps; respond as quickly as possible to contractor and client questions and requests for clarification to avoid associated delays and confusions which consequentially will lead to cost overrun hence affect implementation process.

7. Ensure that the scope includes all the work required, and only the work required to complete the project successfully. Guard against incomplete identification of scope to avoid frequent changes; do not incorporate unnecessary works to avoid distractions and a drain on scarce resources.

8. Implement the necessary measures to reduce construction cost, since construction cost has a direct bearing on the smooth project implementation based on the findings earlier stated.

5.2.2 Expected From Clients/Project Owners

Clients are one of the most important parties who invest their money for realization of construction project, and they are the key role players starting from conception through
construction up to operation of the project. The following recommendations are expected from clients.

Clients should allow sufficient time to prepare project briefs and other feasibility studies. Allow sufficient time for proper feasibility studies, planning, design, information documentation and tender submission. This helps to avoid errors and omissions that consequentially help in avoiding or minimizing cost overrun. By offering enough time for project preparation, the consultants and contractors will have adequate time to carry out project requirements and make any relevant changes to the project feasibility before implementation hence reducing unnecessary delays.

Ensure comprehensive articulation and communication of owner and end-user needs and requirements during briefing sessions; client goals should be sufficiently accurate and realistic. It has been realized that project delay and cost overrun arises due to clients’ own fault. Changes to the specification and requirements has to be done before the onset of the project as well as making realistic estimates taking into consideration risk factors and allocating budget for them.

Fulfill contractual obligations, especially as regards to payment of contractor's works duly executed, or settlement of fees accounts of consultants and possession of construction site. Clients should ensure that adequate funds are available before projects are started, so that contractors can be paid in accordance with the contract agreement. This will reduce stalled projects and preventable cost overrun.
Employ professionals to work as counter part with consultants and contractors. Having qualified professionals to work along side contractors and consultants will lead to early identification of problems which might delay the project and possible measures taken to minimize them.

Select suitable contractors not only on the basis of price and time offerings, but also on experience, financial standing, capacity and expertise. Experience contractors tend to have learnt from the past projects and having such contractors will help to reduce cost overrun and negative impact on the project implementation.

Minimize red-tape; that is, minimize unnecessary and excessive bureaucratic procedures in the clients’ organization. Unnecessary bureaucracy procedures can be avoided when all the departments work as a team and clear roles assign to each department on the project implementation. This will reduce the time needed to approve documents and payments for the project implementation.

Implement cost reduction incentive proposals which are cost friendly to all the actors. By implementing such cost reduction proposals, the client will ensure that whatever they will be initiating is within the budget and minimal external support.

**5.2.3 Expected From Contractors**

Contractors are one of the stakeholders who participate directly on the construction projects; accordingly the following recommendations are expected from contractors.
1. Procure construction materials and other items in collaboration with the client ahead of time. This will ensure short lead time required between different replenishing phases of the construction materials.

2. Solve problems and propose solutions on construction projects proactively. Delay in decision making has been found to be a cause for cost overrun. Through early identification of problems and quick decision making to solve them will help the contractors reduce cost overrun.

3. Minimize adversarial relations with stakeholders on construction projects. Good relationship among the construction parties will help in building a joint collaboration among the actors and minimize frictional relationships which might arise during project implementation leading to delay and cost overrun.

4. Ensure efficient time management through proper resource planning, duration estimation, and schedule development and control; to avoid delay and hence to avoid cost overrun due to delay.

5. Ensure that he employs competent Personnel to ensure the interpretation of drawings is done correctly. This helps in minimizing time wastage and double handling of other related resources. Poor workmanship can result into demolition hence wasting of resources.

6. The most critical in this case, this study tried to capture the challenges public projects suffered in the past five years, many projects suffered time related costs as a result of extended preliminaries, therefore it was noted that most projects were adversely affected by the Post Election Violence (PEV), therefore the government and other stakeholders in the insurance industry should come up with a policies to cushion contractors in the events of such political instability. This will reduce costs drastically because; contractors have a tendency of pricing highly particularly towards the electioneering period because of the uncertainties.
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The Public Procurement and Disposal of Public Assets (PPDA) Act, No 40 (1)


APPENDIX 1: Introduction Letter

Introduction letter

Dear Respondent,

I am a Student of the University of Nairobi and I am conducting a study on the impact of rising building construction cost to effective implementation of public projects-Nairobi county.

Kindly answer the questions below providing relevant and honest information to the best of your ability. You are assured that the information which you will provide shall be used for academic purposes only as well as treated with utmost confidentiality and integrity.

Thanks for your cooperation

Yours Faithfully

Joram O. Mweresa
Appendix 2: Questionnaire

QUESTIONNAIRE

Instructions.

i. Please answer appropriately by ticking in the boxes [ ] and filling in the spaces provided

ii. Please engage your best level honesty and truthfulness for the purpose of making this study a genuine and valid success

Section A: Demographic Information

1. What age bracket do you belong?
   - Below 18 years [ ]
   - 18 – 23 [ ]
   - 24 – 29 [ ]
   - 30 – 35 [ ]
   - 36 – 41 [ ]
   - 42 and above [ ]

2. Sex
   - Male [ ]
   - Female [ ]

4. What is your role in construction?
   - Client [ ]
   - Consultant [ ]
   - Contractor [ ]

5. Years of experience
   - 1-3 [ ]
   - 4-6 [ ]
   - 7-9 [ ]
   - 10 and above [ ]
Section B: Impact of cost over run on project implementation.

1. Does cost overrun affects smooth implementation of public projects?
   Yes [ ]          No [ ]

2. If yes, To what extent does the cost overrun affects Project implementation within the Ministry Of public works Projects?
   0-25%  [ ]
   26%-50% [ ]
   51%-75% [ ]
   76% and above [ ]

3. Based on the following, classify according to their severity on effective implementation of Public Projects, tick where it is appropriate.
   0- I strongly disagree
   1- Disagree
   2- Neutral
   3- I agree
   4- I strongly agree

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<th>Hypothesized variables</th>
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<tbody>
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<td>1</td>
<td>Additional costs due to variations of scope of works</td>
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<td>2</td>
<td>Drastic change in material and labor costs.</td>
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<td>Inflation or increase in the cost of construction materials</td>
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<td>4</td>
<td>Lack of Proper planning and coordination</td>
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<td>5</td>
<td>Additional costs due to variations of scope</td>
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<td>6</td>
<td>Change in foreign exchange rate (for imported</td>
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<td>7</td>
<td>Improper documentations</td>
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<td>8</td>
<td>Costs due to special risks which very often include outbreak of war, Political instability/post election violence and other such risks.</td>
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<td>Inexperienced contractors</td>
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<td>11</td>
<td>Change of specifications</td>
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<td>12</td>
<td>Contractors cash flow problem</td>
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<td>13</td>
<td>Failure to identify problems and institute necessary and timely design and programming changes</td>
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<td>14</td>
<td>Delay in issuing of site instructions</td>
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<td>15</td>
<td>Additions and/or enhancement required by clients or end users</td>
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<td>16</td>
<td>Difficulties in obtaining construction materials in the local market</td>
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<td>17</td>
<td>Ambiguities or discrepancies in tender Documents</td>
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<td>18</td>
<td>Complexity of construction projects</td>
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<td>19</td>
<td>Delay in honoring payments by the client ministry/department</td>
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</table>
1. Who do you think suffer most in the event of delay in project completion?
   Contractor [ ]  Client [ ]  Consultant [ ]

2. Do you agree that cost overrun and delay in completion affect others besides the three key players in the construction industry?
   Yes [ ]  No [ ]

   If yes, Explain further.................................................................................................................................

3. In scale 1-5 what do you think is the most critical resultant of cost overrun on project implementation.

   1- Strongly disagree
   2- Disagree
   3- Neutral
   4- Agree
   5- Strongly agree

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<tr>
<td>Compromised Quality of works</td>
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<td>Phasing of projects due to funding challenges</td>
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<td>Poor relationships between client and other stakeholders/consultants.</td>
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<td>Increased number of stalled projects</td>
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<td>Retrenchment of staff in the building industry</td>
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**Section D: Preferred solutions for effective implementation.**

Which ways do you suggest will help in ensuring smooth implementation of public projects?
Rate using scale 1-5

1- Strongly disagree  
2- Disagree  
3- Neutral  
4- Agree  
5- Strongly agree

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<tbody>
<tr>
<td>Proper project Documentation before tendering.</td>
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<td>Proper selection of qualified contractors</td>
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<td>Prompt decisions making to avoid time wasting during implementation.</td>
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<td>Honoring payments in time</td>
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<td>Reduce government bureaucracy</td>
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<td>Proper Risk allocation before the start of the project</td>
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*Thank you very much*