

**FACTORS INFLUENCING BUILDING
CONSTRUCTION PROJECTS COSTS MANAGEMENT
IN COMMERCIAL REAL ESTATE IN
NAIROBI COUNTY, KENYA**

**BY
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**A Research Project Report Submitted in Partial Fulfillment
of the Requirements for the award of the Degree of Master
of Arts in Project Planning and Management of
University of Nairobi**

2017

DECLARATION

This Research Project is my original work and has never been presented for any award in any University.

Signature.....

Date.....

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This Research Project has been submitted for examination with my approval as the university supervisor.

Signature.....

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DEDICATION

This research work is dedicated to the following: My daughter Maryam Rashid, My loving husband Rashid Omar, My Dad and Mum, Mr. and Mrs. Dokata Ramata and my dearest sister Nasibo Ramata for their support, patience, encouragement and prayers towards my successful completion of this course and during the entire period of my study.

ACKNOWLEDGEMENT

I wish to acknowledge my supervisor, Professor Charles M. Rambo whose contribution and supervision led to the successful completion of this research project.

I would like to thank The University of Nairobi for giving me the opportunity to study, my lecturers who guided me through the course and also my colleagues, relatives and friends for continued support and encouragement and above all to give thanks to the Almighty Allah.

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ABBREVIATIONS AND ACRONYMS

AAK	Architectural Association of Kenya
CBD	Central Business District
CETA	Construction Education and Training Authority
CIDB	Construction Industry Development Board
CMA	Construction Management Authority
GOK	Government of Kenya
IQSK	Institute of Quantity Surveyors of Kenya
KABCEC	Kenya Association of Building and Civil Engineering Contractors
KCAA	Kenya Civil Aviation Authority
KFMB	Kenya Federation of Master Builders
MOHEST	Ministry of Higher Education, Science and Technology
MOPW	Ministry of Public Works
NEMA	National Environmental Management Authority
PPDA	Public Procurement and Disposal Act
PPOA	Public Procurement and Oversight Authority
QS	Quantity Surveyor
STD	Standard Deviation
NCA	National Construction Authority

ABSTRACT

Kenya construction industry has been facing enormous challenges in quality assurance from cases of collapsing buildings, unfinished and substandard constructed and uninspected houses. Cases of overruns in cost, schedule, technical quality and safety have also been rampant. The main purpose of this study was to establish factors influencing building construction projects costs management in Commercial Real Estates within Nairobi County in Kenya. The study sought to understand these factors so as to shed more light on why construction projects costs mismanagement is still prevalent in Kenyan construction projects. The study aimed at achieving the following objectives; to determine the extent to which fluctuation of prices of materials influence building construction projects cost management; to examine how human capital expenses influencing building construction projects costs; to establish methods of estimations that influence building construction projects costs management and to assess Project complexities that influence building construction projects costs management in Commercial Real Estate in Nairobi County. The study adopted a descriptive survey research design. The researcher used stratified random sampling technique as the sampling procedure and the respondents includes architects, engineers, quality surveyors, constructors and other professionals in the Commercial Real Estate construction industry. The sample size of 175 respondents was picked using Krejcie & Morgan (1970) sample determination table out of a Target population of 303 Commercial Real Estate Companies within Nairobi County registered with National Construction Authority. The researcher used a structured questionnaire to obtain primary data and used descriptive statistics to analyze data by utilizing means and standard deviation as per the research objectives. Inferential analysis utilized Pearson's correlation analysis to determine the strength between independent variable and dependent variables. The results of data analysis were presented in form of frequency tables for interpretation. From the study findings, the rate of fluctuating of price of materials decreases with increase in the contract amount; that is rate of human capital expenses 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 rates indicating that percentage overrun tend to be lower the higher estimated costs are. From the study $Y = 0.260 + 0.512X_1 + 0.170X_2 + 0.051X_3 + 0.048X_4$. The study recommends the fulfillment of 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. And review of contract documents for grey areas and use of a checklist after every milestone emerged as the most suitable control tools to be used to mitigate the effects of design changes.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Construction industry plays a major role in development and achievement the goals of society. Construction is one of the largest industries and contributes to about 10% of the Gross National Product (GNP) in industrialized countries (Umble & Umble, 2010). Construction industry has complexity in its nature because it contains large number of parties as clients, contractors, consultants, stakeholders, shareholders and regulators. Construction industry is known to be a costly and material depleting industry, due to its complexity and volatility occasioned by varied needs, wants and preferences. No investor would invest in a project that seem to last forever, with indefinite cost or budget (Nicholas, 2011). There is thus a direct co-relation between time and cost of project. Projects are deemed thus because they have definite start and finish time, consume resources and meet certain criterion in satisfaction to the beneficiaries (Sifa, 2009). In a construction project, contracts are based on price or cost and time period needed to finish a project.

The most widely used measures of construction success are time achieved, quality of product and cost at the completion of the project (Cooke-Davies, 2010). Thus contracts must be designed to ensure that each contractual party is capable of performing the obligations set out. The desired output of any contractual arrangement is the successful completion of the given project. And yet during construction process, there are many unexpected events including controllable and uncontrollable factors that can adversely affect or hinder successful completion of projects and cause delay (Vedabrata, 2012).

A study by United Nations Commission for Trade and Development (UNCTAD), (2001) on African construction industry's turmoils and their implications for New Partnership for Africa's Development (NEPAD) identified costly project delays as a major problem and identifies poor project time, quality and cost performance as a major issue (Bellah, 2015). There is, therefore, a need to address the unpredictability

of the successful completion of roads projects in terms of delivery time, cost management and to the standard of quality expected. The stakeholders need to do things differently and to rethink the process through which African construction industry continuously improves performance by questioning the current and emerging project delivery approaches (Aggarwal-Gupta, Deepti, Vohra & Khokle, 2011).

Globally, studies conducted by researchers indicate that most projects fail to achieve their mission within cost constraints. United Kingdom (UK) 2010 statistics showed that 52% of projects had cost overruns in excess of 10% while 45% of projects had time overruns of over 25% (Mbatha, 2016 citing Atkinson, 1991). Same research indicated that similar studies carried out in India showed that 56% of projects had cost overruns in excess of 20% while 49% had time overruns in excess of between 1 and 160 months. Projects were initiated by kings and other leaders to undertake monumental projects to build a name for themselves and their generations to come (Beck, 2009). Ancient structures did not have time limitation or cost limitation. However, causes of delays have been identified in various parts of the world recently such as Malaysia, Saudi Arabia, Jordan, Kuwait, Hong Kong and Thailand (Bellah, 2015 citing Yu & Chan, 2010; Cooke-Davies, 2010). The results reveal that there are differences and similarities as to the causes of delays. Today, those professionals in the construction field no longer cost a design, they design to cost. This means a client states categorically that he or she has (X) amount of money and intends to undertake project (Y). Thus the consultants work out a project to fit within the said amount, and not beyond. This limits creativity and innovation, unlike in the past as stated (The Quantity Surveyor, 2011).

Fluctuation of prices of materials and delays in project completion are a common problem in the construction industry not only with an immeasurable cost to society but also with debilitating effects on the contracting parties. The concept of delay in the substantial completion of construction projects is a global phenomenon. For instance, while evaluating the progress and reports of 28 highway projects constructed during the period 1996-1999 in Jordan, Aggarwal-Gupta *et al.*, (2011) observed that the average ratio of actual completion time to the planned contract duration is 160.5% for road works. Seboru (2006), further citing other scholars also states that the time

frame for major road projects worldwide to reach construction start stage have been observed to range from 10-30 years.

In Palestine, efficient construction projects provide a solid platform for reviving the Palestinian economy and for building a more balance and independent economy during stable political conditions. In 1993, neglect of such systems, services, and institutions, however, has harmed the quality of life of Palestinians and their health and environment (Cooke-Davies, 2010). However, project performance in Palestine has suffered since conflict erupted in September 2010 after the breakdown in Israel-Palestinian negotiation on permanent-status issues. This has led to closures and tight restrictions on movement of people and goods in West Bank and Gaza resulting in a dramatic decline in trade, investment, and employment. In addition this has prevented the planned implementation and has caused problems in performance of projects (World Bank, 2014).

Nigerian construction industry is also faced with the problem of fraudulent practices of kickbacks, supplier manipulations, project delays and completion rate. Oguulana & Bach, (2012) noted that one of the most serious problems the Nigeria construction industry is faced with is the project cost overrun, with attendant consequence of completing projects at sums higher than the initial sum. Political insurgency also affects project implementation negatively, as well as the absorptive capacity as is the case of construction projects in some selected districts of Uganda Yu & Chan, (2010). Yu and Chan further puts it that closure of special account, stalled procurements and expiry of special commitments, totally disrupted Project activities between March and July 2014. According to Vedabrata, (2012) the most important cause of delays in the construction sector in Kenya, is financing by the contractor during the project, changes in designs by the owner or his agent during the construction, delays in contractor's payment and non-utilization of professional construction management.

Studies carried out in Tanzania, Uganda, South Africa and Mozambique on causes and effects of risks, procedures, delays and disruptions in construction projects and managerial and environmental impacts resulting to project costs to project completion by various researchers such as Kikwasi (2012), Bellah, (2015) and Cooke-Davies, (2010) found out the major causes of delays and disruptions as; design changes,

delays in payment to contractors, information delays, funding problems, poor project management, compensation issues and disagreement on the valuation of work done. Conversely, cost overrun have negative social impact, idling of resources and disputes are the main effects of delays and disruptions. The studies suggested that there still exist a number of causes of delays and disruptions and their effects put construction projects at great risk that have an effect on their performance. The studies recommended that adequate construction budget, should be the main focus of the parties in project procurement process.

In developing countries like Kenya, construction projects are the life line of construction plan or programs. Failure of projects irrespective of the sector, whether public or private contribute to irreparable loss to society and to the economy as whole (Murgor, 2008). Delays and non-completion of projects from initial cost plan has been prevalent on construction sites. However, little or no efforts have been made to curtail the phenomenon. There have been numerous documented studies on failed or stalled construction projects (Pinto & Covin, 2013). Completion of projects within schedule is a major contribution towards the competitive edge in organizations. This is based on the realization that the achievement of the targeted objectives is determined by the ability to deliver the targeted output within the stipulated time.

Murgor, (2008) looked into cost overruns in power projects in Kenya; a case study of Kenya Electricity Generating Company Ltd. The research pointed on the many factors that influence or causes cost factors that impede on successful completion of projects on time, budget and quality. Factor analysis of various significant variables from the said survey, revealed eight underlying factors namely; contractor inabilities, improper project preparation, resource planning, interpretation of requirements, works definition, timeliness, Government bureaucracy, and risk allocation as having been significant contributors to overruns (Yu & Chan, 2010). On ranking, Government bureaucracy topped the list while risk allocation was shown to have been least significant. The projects had time overruns ranging from (-4.6% to 53.4 %), while the cost overruns varied between (9.4% and 29%).

Most of the studies carried out show the contractor as the sole cause of cost overruns in project, managerial mishaps as well as tainting the environment. This has been done with the hope that the contractors reap massive proceeds from the project (Vedabrata, 2012). This could be true to some extent, but cannot be substantiated as parties privy to contract have specified and clearly spelt out roles to play for successful implementation of projects (Bellah, 2015). It is the responsibility of the client to pay for all costs of the project. Consultants are tasked with duty to plan, design and ensure proper implementation and supervision of the project. The contractors are tasked with actualizing the client's desire to tangible product that meets set criterion and within certain set out parameters (The Quantity Surveyor, 2011).

1.2 Statement of the Problem

The estimated housing demand in urban areas is approximately 150,000 units per year yet the current supply is about 30,000 units (HASS, 2013). According to KNBS (2013), the sector recorded a growth of 4.8 per cent in 2012 while cement consumption rose by 1.7 per cent (from 3,870.9 thousand tonnes in 2011 to 3,937.3 thousand tonnes in 2012). The total value of new private and public buildings completed went up by 9.6 per cent from KSh 46.4 billion in 2011 to KSh 50.8 billion in 2012. The recurrent problems of project cost management that are widely prevalent in the public sector construction projects (Mwandali, 2009, Karimi, 2011, & Musa, 2010). For example the collapse of a building in Nairobi Ronald Ngala in 2006, Kiambu town in 2009 and 2010, at pipeline Embakasi in June 2011, Kariobangi South in 2016, a sinking building in Ruaka in 2016 and a residential building in Huruma in 2017. Mambo (2013) attributes the collapse to inadequate geotechnical and materials investigations. Charagu (2013) concluded that it is due to deficiency of the designs in construction sector.

The cost of constructing a house has a direct relationship to the final selling price, Glaeser (2004) and World Bank (2011). According to World Bank (2011) report "there is a crucial missing piece of the puzzle towards improving access to housing as the current levels of production are too low and too expensive. A number of studies have been done to investigate factors that determine project implementation (Chan et al., 2008; Anderson et al., 2009; Toorand Ogunlana, 2012). EC (2012) study

identified lack of effective project management as the cause of cost, time and schedule overruns.

Studies carried out by other researchers (Aggarwal-Gupta *et al.*, 2011; Oguulana & Bach, 2012) show the contractor as the main person who causes cost overruns in project, with the guise that the contractor intends to reap skyrocket profits and massive returns from the project (The Quantity Surveyor, 2011). Whereas this could be true to some extent, it cannot be substantiated as parties privy to contract have specified and clearly spelt out roles to play for successful implementation of projects. It is the duty of the client to meet all financial obligations of the project. Consultant's duties are such as responsibility to plan, design and ensure proper implementation, monitoring and evaluation of costs and supervision of the project. The contractors are tasked with actualizing or realization, crystallization of the client's desire or dream to tangible product that meets set criterion and within certain set out parameters.

Lessons could be learned from other countries which have successfully lowered the cost of housing by looking at size, materials, construction techniques, zoning, land acquisition and provision of infrastructure. Increasing the scale of developments will be a crucial factor in lowering cost of housing." Mariano (2011) concurs by noting that while prices have risen significantly over an extended period and population growth has been quite strong, there has been no pick-up in the supply of new housing in Malaysia, these finding reflect the state of Nairobi County.

1.3 Purpose of the Study

The purpose of this study is to establish factors influencing building construction projects costs management in Commercial Real Estate in Nairobi County, Kenya.

1.4 Objectives of the Study

The study used the following objectives;

- i. To determine the extent to which fluctuation of prices of materials influence building construction projects costs management in Commercial Real Estate in Nairobi County.
- ii. To examine how human capital expenses influence building construction projects costs management in Commercial Real Estate within Nairobi County.

- iii. To establish how methods of estimations influence building construction projects costs management in Commercial Real Estate in Nairobi County.
- iv. To assess how Project complexity influence building construction projects costs management in Commercial Real Estate in Nairobi County.

1.5 Research Questions

The research questions in this research study are;

- i. To what extent does fluctuation of prices of materials influence building construction projects costs management in Nairobi County, Kenya?
- ii. How human capital expenses influence building construction projects costs management in Nairobi County, Kenya?
- iii. How does methods of estimations influence building construction projects costs management in Nairobi County, Kenya?
- iv. How does Project complexity influence building construction projects costs management in Nairobi County, Kenya?

1.6 Significance of the Study

The study was significant as it seeks to shed more light on why construction projects cost mismanagement is still prevalent in Kenyan construction projects. The research is intended for applicability by various users or stakeholders such as Government agencies, project managers, contractors, general public, construction management authority, financial institutions, students as well as professional bodies.

The study was determined to identify the areas where urgent action need to be taken to safeguard the interest of the sector. The study may help in application of theoretical training to policy makers to address practical problems in the sector, and to provide insights to today's and the future managers on the importance of construction completion. The study may encourage further researchers on the area to research as it's not exhaustive. The study may also benefit scholars who would wish to undertake further studies aimed at establishing factors influencing construction projects completion.

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

1.7 Basic Assumptions of the Study

The researcher relied on the co-operation of interviewees, and trust that they would be willing to part with pertinent information crucial for this study and that the information given would be accurate, concise and truthfully a representation of the construction industry under study. The researcher assumes that stakeholders would make use of the findings of the study.

1.8 Limitations of the Study

The following limitations may be faced by the researcher during the research study; logistic problems especially reaching out to the management to get authorization for carrying out the study. It may not be easy to convince the management of the organization that the information collected would be treated with utmost confidentiality because organizations fear leaking sensitive information to their competitors. The researcher explored all possible ways to solve or minimize these problems, by getting information from the both the secondary and primary sources. The researcher explained to the management that the information needed were kept secret and used only for educational purposes.

1.9 Delimitations of the Study

This study was set out to analyze the factors influencing building construction projects costs management in Commercial Real Estate, in Nairobi County, Kenya. The researcher narrowed down to 25 companies and more specifically to the companies which had 7 and above as number of employees out of the 303 companies dealing with Commercial Real Estates within Nairobi County registered with National Construction Authority. The specific objectives were: fluctuation of prices of materials, human capital expenses, methods of estimation and to explore project complexity factors that influence building construction projects costs management in Commercial Real Estate, in Nairobi County, Kenya

1.10 Definition of Significant Terms used in the Study

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

Building construction projects costs management: are defined as a construction of buildings undertakings that consume resources such as materials that have cost implications, is time consuming and is placed upon a location on the earth's surface, thus affecting the environment and community at large. It also entails managerial skills to achieve intended end product.

Cost of materials: is defined in this study as an element of agreed upon contract sum or tender sum forming contract that exceeds beyond acceptable allowable limits that affects the project cost, construction cost and cost of funding the project.

Fluctuations of prices of materials: are extra cost incurred to complete project over and above established budget or contract sum without increase in scope and quality of constructed structure.

Methods of estimation: project scheduling methods that have sound basis for evaluating success of project and effectiveness of project organization

Project Complexity: are factors that aid in estimation of project cost management, include nature of client, whether private, public, individual or cooperation; clarity of client's brief at initial stages; project organizational form to be adopted; degree of complexity of design at tendering time; and availability of material required.

1.11 Organization of the Study

This research project report is organized into five chapters.

Chapter One contains introduction, background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, justification of the study, significance of the study, basic assumptions of the study, limitations of the study, delimitations of the study and definition of significant terms used in the study.

Chapter Two comprises of reviewed literature of related studies done by other researchers who covered on fluctuation of prices of materials, human capital expenses, and methods of estimations and to assess Project complexity issues affecting projects. It also captures conceptual framework.

Chapter Three covers introduction to research methodology, research design, target population, sample size and sampling techniques, data collection instrument, validity, reliability of instrument, data collection procedure, data analysis technique and ethical considerations of the study with operational definition of variables.

Chapter Four covers analysis of data, presentation and interpretation. Chapter Five covers summary of findings, discussions, conclusions, and recommendations of the study as well as suggested areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter looks at the review of related literature as documented by other researchers or scholars on factors influencing building construction projects costs management in building construction projects. It also looks at building construction projects, how they are procured, funded and implemented, including organizational structure in relation to how they cause time and cost overruns.

2.2 Building Construction Projects Costs management

Cooke-Davies (2010) states the cost of building construction projects generally can be defined as the cost of any activities carried out to preserve an element or restore it to an acceptable standard and condition but excludes any enhancements other than those demanded by failure to substitute obsolete materials and components. According to Bellah (2015), financial accounting is very important in building maintenance management. As a general principle, the objective of a maintenance management organization is to ensure the continuous provision of the required standards and level of service provided by the buildings at a minimum cost. The maintenance cost is viewed as an overhead on the operations of the building users.

According to Umble & Umble, (2010) a project is successful if it satisfies all three legs of the triple constraint, namely, performance (specification), cost and time. Adam, (2013) in an extensive examination of 20 failing projects over a period of 18 years expanded this criteria of success as: “satisfies stakeholder groups, meets functional requirements, meets quality expectations and requirements, within cost, within deadline, delivers sustained and actual benefits and provides the team with professional satisfaction and learning”. Although the causes for project success and failure have been the focus of numerous research studies, there has been no consensus on the issue. Bhatti, (2013) argue that in spite of extensive research there has been limited convergence on the components and causes of project success.

The word success when applied to projects is very illusive. De Wit, (2013) and many other researchers make a distinction between project success and project management

success. For instance, they contend that project success is measured by comparing the project outcomes to the overall objectives of the project; whereas project management success tends to be measured against the traditional measures of performance, namely, cost, time and quality. Moreover, a further distinction is made between project success criteria and project success factors. In David, & Robert, (2012) view, success criteria refer to the measures by which success or failure of a project or business will be evaluated; whereas success factors are those inputs to the management system that lead directly or indirectly to the success of the project or business.

Cooke-Davies (2012) in a study of 136 European projects executed between 1994 and 2010 by a total of 23 organizations found that there was a strong correlation between schedule delay and cost escalation. However, cost escalation was not primarily caused by simply a schedule delay but due to a lack of a mature scope change process.

It was also found that delivering project success is more difficult than delivering project management success, because it predictably involves aspects which may be beyond the control of the project team. With these second order controls, both goals and methods are prone to change; whereas project management success may be achieved by holding goals constant but changing practices to meet the predetermined goals. Cooke-Davies (2012) argues that the ultimate aim of an organization should be to introduce practices that allow the enterprise to resource fully a portfolio of projects that are rationally and dynamically matched to the corporate strategy and business objectives. This view is further enhanced by Adam, (2013) who contends that projects are not dichotomous, it is not a matter of success or failure, but that there are degrees of success and failure. He identifies four distinct levels of success, each having its own discipline, tools and techniques. Thus, excellence at each level is critical for absolute success.

2.3 Fluctuation of Prices of Materials and Building Construction Projects Costs Management

Fluctuations are defined as an increase or decrease in cost due to legislative or market forces over the quoted price. This is only applicable on labour and material whose contract exceeds 12 months (Oguulana & Bach, 2012). This means that projects that

do not exceed stated period do not qualify to claim for fluctuation or invoke this clause. This is a big risk to the contractor as the effect is borne by the contractor only. Aibinu and Jagboro, (2012) states that variations are introduction of changes on physical characteristics of project design and specifications as well as change of obligations or restrictions imposed by client (Adam, 2013). The researcher found out the causes of variations as: inadequate brief, unsuitable design, design inconclusiveness, inadequate pre-contract planning, professional indiscipline of consultants, non-availability of materials and labour specified for works, unforeseen conditions, discrepancies between two or more contract documents and client's intentions. Variations are efficiency of project by implementing on site productivity and profitability to main contractor.

These can be defined as alterations or modification of design quality or quantity of the works as a result of instructions given by the consultants or client' representatives that cause changes in cost of project or deviation from the contract sum (JBC, 1999). Such changes deviate from what was shown in the drawings, contract bills of quantities or specifications. A risk factor is a negative or positive impact on contract sum (Jacobides, 2012) due to time and cost overruns. Yu & Chan, (2010) attests that once risk is identified, it becomes a management problem. De Wit (2013) argues that construction risks are project specific and should thus be allocated to different parties. Al-Momani, (2010); Waihenya (2011) citing Wright & Taylor (1994) gave the perception as active process of obtaining and interpreting information from environment to provide order and meaning, subjective process influenced by past experience, influenced by level of experience, stake or profit expected from project, geographical region and values and level of risk communication transmitted through news and other sources of information to way they interpret cost factors (Mwangi, 2006). Contractual misallocation of risks is leading cause of construction disputes, thus increase project volatility (Mwangi, 2006 citing Megens, 1997) which impacts on cost overruns on projects.

Inflation is a rise in general level of prices of goods and services in an economy over a period of time. This leads to a reduced purchasing power, thus affecting cost of projects. Mwangi (2006) citing Aje & Jagboro (2003) says it's rare for building works not to have variations. This leads to time and cost overruns. This may lead to better

product, or add no value or wasted money. Cost overruns according to JBC Clause 22 are stated as introductions, omission or addition. Kikwasi (2012) states that quantity surveyors do not design, but are the cost and price specialists. They don't cost control, but cost monitor and report, whose data may be used for cost control. JBC clause 30 states that no variance of over 15% causing 0.01% of contract price without client's approval. Variations are changes of opinion, facts, errors or omissions, alteration in scope of work.

Management styles adopted by the construction and project management teams also vary and have effects on time and costs of projects. Some such methods are Laissez faire, management by objective (MBO), structured management system, management contracting and crisis management. Smith (1999) sites improved effective management of change and clarify project issues from start. Decisions supported through analysis, define and structure of projects continually monitored, clearer understanding of specific risks associated with projects are important (Adam, 2013). Built-up historical data assist future risk management procedures. It is also important to state at contract signing stage what method of dispute resolution mechanism to be employed in case of disputes. Such methods are arbitration, litigation, adjudication, expert determination, court process and out of court settlement.

2.4 Human Capital Expenses and Building Construction Projects Costs Management

The human capital consists of current task-related knowledge and skills has a positive relationship with the success of a construction project (Bellah, 2015). What makes project delivery successful is a topic of much academic debate. It is generally agreed that to be considered successful, a project must be fit for purpose and it must have achieved its delivery targets. Though construction project management literature often considers wider objectives and, the central PM delivery targets remain time, cost and quality. In view of this, the PM discipline has three key responsibilities (Walker, 2004). There are many issues in implementation; however, of central importance is capability. Capability can be viewed as a function of education and experience. If these are deficient, there is a high probability that a project mission will be inappropriately specified from the outset, with the result that time; cost and quality targets will be compromised from the beginning. If this is the case, it is highly

improbable that the resource base will be organized and mobilized to deliver time, cost and quality targets successfully (Nubi, 2001).

Chen (2007) mentions that for a project to be successful there should be adequate fund allocated to finance its completion. Jackson (2010) added that project funds availability is an important factor that influences delivery of a project. Sambasivan and Soon (2007) stated that reports are an essential way of keeping everyone informed and therefore managers should manage the project, plan for the project and monitor. Also the structure of the industry is fragment with increasing number of small companies and consolidation of large companies. Strenman (2012) says that the international construction is dominated by very large contracting firms such as Bechtel, Skanska and Taisei Corporation, who undertake large volumes of work. Construction process is labor intensive includes management of difficult site condition and bulky materials.

David, & Robert, (2012) asserts that capability is an attribute which, although easily defined, is intractable from a measurement perspective. It is an attribute concerned with the qualities that individuals or organizations project possess. It follows that capability addresses whether or not individuals and organizations possess the necessary levels and combinations of knowledge and skill to complete the tasks that they are responsible for. Oguulana & Bach, (2012) argues that a project's performance will be influenced by its human capital is not a new concept. In theory, the higher a firm's stock of human capital, the more successful the construction project will be and the greater its competitive advantage over its rivals will be, and vice versa. The strategic importance of HC in terms of achieving enhanced performance is now becoming increasingly recognized. However, despite this, a precise understanding of how significant HC's role is in determining performance, remains unclear, and is the subject of much research in various industries.

Umble & Umble, (2010) concluded that human capital is not just the people working in an organization. It's a broad combination of their experience, attitudes, abilities, culture etc. For more than three decades researchers from the areas of HRM have been interested in finding the relationship between human capital which includes education, knowledge, experience, and skills and the success of a project. A number

of researches suggest a positive relationship between human capital and success of a construction project.

De Wit (2013) quantified the relative importance of each. His results indicated human skill was the most important, though conceptual and organizational skills were also determined to be significant. Technical skill was considered to be of lesser significance. Bhatti's (2013) work confirms that successful PM must be strongly focused on the mobilization and motivation of human resources. Other resources must be managed, but people represent the primary resource directly influenced by the activities of PM. If people are to be managed successfully, the project manager must rely on knowledge and experience. Working with people involves personal judgment and decision making that is not easily learned and cannot be solely based on systems or tools. A project manager needs to be more socially orientated than functional (Carmelli, 2009).

Human capital is the most valuable asset to any organization. Unlike other assets, People are the only greatest potential asset and the only greatest potential liability that an organization will acquire as it moves about its business (Yu & Chan, 2010). Organizations are comprised of three types of major assets that are needful to an organization's ability to produce goods and services, namely, financial assets, Physical assets and Intangible assets. Intangible assets include intellectual capital, goodwill, and human capital which all help to improve project performance (Kotler, 2010).

The recent literature above has not identified the link between project planning, Managerial support, communication, human resources and monitoring and evaluation and project performance. In addition, only few studies have been conducted in Africa particularly in Kenya creating a dearth gap in existing literature.

Costs of materials overruns are defined in this study as an element of agreed upon contract sum or tender sum forming contract that exceeds beyond acceptable allowable limits that affects the project cost, construction cost and cost of funding the project. Cost overruns are extra cost incurred to complete project over and above established budget or contract sum without increase in scope and quality of constructed structure. It also affects the loan or funds repayment in case of borrowed

financing. Cooke-Davies, (2010) looked at the causes of cost overruns but focused on the Quantity Surveyors' and other consultants' perspective. The researcher described cost overruns in terms of such parameters as extra work, design and specifications change, extended and reduced contract period, delay in preparing detailed drawings, delayed payment, late instructions, financial failure of contracting party, defective materials or works, delayed dispute resolution, differing underground conditions, delays arising from client's supplied items and inaccurate quantities (Jacobides, 2012). Others that are not significant but important are price fluctuations, nominated subcontractors and suppliers, shortage of main contractor materials, third party delays, permits and approvals, incremental/ unpredictable weather conditions, labour and equipment availability and productivity of labour and equipment. These failed to capture the contractor's perspective on cost overruns and their causes and how they impacts on them.

2.5 Methods of Estimations and Building Construction Projects Costs Management

According to Adam (2013), building should be designed in such a way to be simple in maintenance. Design estimations and complexity will prevent maintenance work to be carried out easily, quickly and economically. Major replacement can often be avoided if regular cleaning and minor repair can be carried out without difficulty. For example, maintenance requires some tools to be performed. If the designer does not allow enough clearance to get the tools in and out, this minor problem will get bigger and become major problem. In addition, designer should always avoid permanent fixing of elements, which need continuous maintenance, e.g. such as lamp, carpets.

Contractual misallocation of risks is leading cause of construction disputes, thus increase project volatility (Mwangi, 2006). Inefficiency have led to promulgation of new procurement systems, such as Design and Build, turnkey, package deals, private financing initiative, management contracting and build own operate and transfer. Al-Momani (2010) states that cost and time overruns in Australia in traditional and new procurement systems accounts for 13-19% of cost overruns and 10 to 69% of time overruns (Adam, 2013). New procurement systems give 11% and 13 to 25% respectively. Oguulana & Bach, (2012), many contractors are unfamiliar with these risk factors and do not have experience and knowledge to manage them effectively

and efficiently. There need to be foresight of improving knowledge of the links between risk perception, attitude towards risk objects and actual behavior (Njuguna 2008). Consultants use skills, knowledge and experience with care to ensure clients' interests are protected (Franagan & Norman, 2002).

The third factor that affects prices of residential properties is convenience and accessibility of the property. The level of convenience and accessibility of a place or particular land is determined by how far the property is located from the place of work, shopping centres or any other place that one needs to visit regularly (Thomsett, 2012). The main determinant of how convenient and accessible a place are traffic, road network and road conditions (Simon, 2005). Most people prefer to reside in highly convenient and accessible areas, the demand of the residential houses in these areas increases. The increased level of demand of residential houses then contributes to increase in prices of residential houses. Poorly accessible and inconvenient areas attract few peoples and therefore, low demand on residential property thus low prices.

The contractual requirements, obligations and responsibilities are vested in contract documentation and depending on the type of contract used. The Quantity Surveyor (2000) attests that developers have become more demanding as they have a right to expect timely project completion and with budget despite increasing complexity of projects. De Wit (2013) advices managers or organizations to get locked in situations of cascade of sub-optimal decisions made over time to force an earlier sub-optimal decision to work, personal ego and preoccupation with maintenance of individual power position that blinds managers to make questionable choices. Kikwasi (2012) says that group members and leaders, especially in a systematic project management context behave on the basis of own perceptions more than on the basis of facts. Decision making is based on perceptions. The success of a project is very much dependent on extent to which risks involved can be measured, understood, reported, communicated and allocated to the appropriate parties (Jacobides, 2012). When risks critically and capability of risk management are perceived differently, risk allocation becomes a difficult task. Al-Momani, (2010) gives the causes as unfair risk allocation, poor communication, unrealistic time and quality targets by client and uncontrollable external events. This however fails to capture the contractor's perspective on such risks.

Management styles adopted by the construction and project management teams also vary and have effects on time and costs of projects. Some such methods are Laissez faire, management by objective (MBO), structured management system, management contracting and crisis management. Smith (1999) sites improved effective management of change and clarify project issues from start. Decisions supported through analysis, define and structure of projects continually monitored, clearer understanding of specific risks associated with projects are important (Adam, 2013). Built-up historical data assist future risk management procedures. It is also important to state at contract signing stage what method of dispute resolution mechanism to be employed in case of disputes. Such methods are arbitration, litigation, adjudication, expert determination, court process and out of court settlement.

Bellah (2015) states methods of managing variations by devising appropriate, alternative procedure, negotiation and record. Aibinu and Jagboro, (2012) proposed use of critical path method for resource scheduling technique. Waihenya (2011) gives a proposal for change order-individual responsibility for variations and reasons for variations. Have proposed and approved changes clearly defined. De Wit (2013) time overruns blame on owners and contractor. Extra work means more time. Omission variations means you pay for labour and materials. Functions of procurement are purchasing, expenditure, and receiving, inspection, shipping and subcontracting. Main contractors are prequalified on basis of experience, work capacity and past performance of contractor.

2.6 Project Complexity and Building Construction Projects Costs Management

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

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Project is based on three major pillars, cost, quality and time. Kikwasi (2012) citing Aje & Jagboro (2003) says it's rare for building works not to have variations. This leads to time and cost overruns. May lead to better product, or add no value or wasted money. De Wit (2013) states some of the causes of time and cost overruns as ineffective technology and economic appraisal, no thorough site investigation and market surveys, poor estimates by client and project quantity surveyor due to project brief being inadequate or using un-updated cost data, badly written condition of contract, amendments/addendums, inadequate tender evaluation, excessive variations, disruption or lack of competent contractor/suppliers. Waihenya (2011) citing Kwakye (1994) states that there are methods used in cost estimation, standard of work required, project requirements, contractor past experience with clients and advisors influence, estimators pricing method, difference in quotation prices, purchasing arrangements during procurement and frequency of purchases, settlement of credit accounts on demand, reliability of suppliers, method statement and construction

program are all hinged on complexity of project, which invariably affect time and costs (Oguulana & Bach, 2012). Availability of plants, tools and equipment pertinent for the works also contributes to project time and costs.

Bellah (2015) states that client and architect actions or omissions to sound project planning and control have adverse effects on project's costs. Jacobides, (2012) faulted time estimation method used as unscientific and resulting to difficulties in estimating time-related project costs, i.e., cost of finances, insurances, water, electricity, telephone, assessing and justifying extension of time and difficulty in managing estimated contract period effectively. Also that extra works leads in relative frequency. Kikwasi (2012) attests that cost and time overruns can be minimized by design plans that minimize changes during construction stage and adequate finance planning that limits delay caused by lack of finance and associated problems.

De Wit (2013) states that building cost performance is influenced by QS perception of risk importance of cost factors such as extra works, design and specifications changes, extended or reduced contract period and delay in preparing detailed drawings. Delayed payment, late instructions, financing failure of contracting party, defective material and works, differential underground conditions, delays arising from client supplied items, inadequate quantities and price fluctuations. He suggests that one can apply cost management to mitigate cost overruns. Seboru (2006) researching on roads says that road construction delays are caused by exogenous and endogenous factors. Exogenous factors such as political interference, inflation and interest rate. Endogenous factors such as design change by engineers and inadequate planning and scheduling. All these have effect on time and cost overruns and project complexity.

Talukhaba (2011) states that reflection of poor project time management practices, frustrates process of development, scarce funds tied to unfinished project, mortgage servicing, viable project rendered unviable due to changes in market conditions, society cost and loss of reputation of parties is immeasurable. Pre-construction time overruns reasons are statutory body estimates for permissions, increase competitive tender procedures, financial and economic cost overruns due to short term and long term funding. Short term are land purchase, loan, land development, construction payroll, 'gap' financing, construction loan, depending on size and nature. Gichunge

(2008) citing Grebler (1973) noted that use of unsecured notes/debentures, unsecured commercial bank credit, commercial paper, stock warrants, subordinated convertible debentures and issuance of preferred stocks.

2.7 Theoretical Framework

A Theoretical framework is a set of statements or principles devised to explain a group of facts or phenomena especially one that has been repeatedly tested or is widely accepted and can be used to make predictions about natural phenomena (Orodho, 2012). Theories are analytical tools for understanding, explaining, and making predictions about a given subject matter. It comprises the conceptual framework, theoretical review, and empirical review, critique of the review and the research gap of the study.

2.7.1 Agency Cost Theory

Agency theory is the branch of financial management theory that looks at conflicts of interest between people with different interests in the same assets. This most importantly means the conflicts between: shareholders and managers of companies, shareholders and bond holders (Luthaus, 2012). The theory explains the relationship between principals, such as a shareholders, and agents, such as a company's managers. In this relationship the principal delegates (or hires) an agent to perform work. The theory attempts to deal with two specific problems: how to align the goals and principal of funds management so that they are not in conflict (agency problem), and that the principal and agent reconcile different tolerances for risk.

The case fund managers faced major problems in implementing finance theory, especially with MPT and CAPM when estimating stock returns, and when using optimization routines to find the efficient frontier and the optimum risk, return portfolio. The problems arose, in part, because of the limitations of public domain data and because of the uncertainty implicit in forecasting stock risk and return characteristics. These problems also arose because of the many controversies and fundamental problems facing finance theorists laid the foundations of modern portfolio theory (Minocha, 2005). He stated that investors seek a risk/return trade off by seeking to maximize returns for a given level of risk or to minimize risk for a given level of return. He argued that a portfolio manager needed to know the

weighting of for each of N stocks, N estimates of expected return and of variance of return, and $N(N-1)/2$ estimates of covariance of return between each pair of stocks in the portfolio. This information could be used to generate a large number of feasible portfolios which were dominated by a smaller number of efficient risk/return portfolios lying on the efficient frontier.

Risk averse, rational portfolio managers could choose one of these portfolios to reflect their or their clients risk/return preferences (utility). Given the above input data the portfolio selection problem could be solved to find the optimal solution using a quadratic programming approach. This approach was further simplified by the development of the Capital Asset pricing model by Sharpe and Lintner in the 1960s. They identified a single factor, linear model, in which a company's Beta measured the stock's return volatility relative to that of the market overall. This model reduced the number of covariance (now company to market return) to be estimated to the number of stocks in the portfolio. This much simplified the estimation and portfolio construction decision process.

Jacobides (2012) argued that finance theory tells us what is to be estimated in the form of future risk and return and how estimates for specific shares are to be combined to form estimates for the portfolio as a whole. However, theory does not tell us how to make the estimates of return, variance and covariance. These parameters are not known with certainty and some form of estimation bias is inevitable, given that some combination of historic data and/or forward looking subjective or expectancy data has to be used.

2.7.2 Project Management Competency Theory

The work of McClelland & McBer in the 1980s established the competence theory. The authors defined competency as the underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation. Since then a number of competency frameworks have been developed by different project management institutes.

Crawford (2007), puts a model of competence that integrates knowledge, skills, demonstrable performance, and core personality characteristics, noting the last, personality characteristics, as challenging to develop and assess through training. She

argues that two of the most influential project management standards, the PMBOK, address only the knowledge aspect of competence while a third, Australia's National Competency Standards, draws from knowledge but focuses only on demonstrable performance. Jacobides (2012) study found out that project managers "do not necessarily have the required competence or perform the full activities required to promote and implement the changes that they are leading as part of their projects.

Interest in project management competence stems from the very reasonable and widely held assumption that if people who manage and work on projects are competent, they will perform effectively and that this will lead to successful projects and successful organizations (Thomsett, 2012). Competence is generally accepted, however, as encompassing knowledge, skills, attitudes and behaviors that are causally related to superior job performance. Oguulana & Bach, (2012) stated that professional competence in project management is attained by combination of knowledge acquired from training and its subsequent application and other skills developed in the course of work.

Previous management studies have investigated the impact of competency on performance. Nicholas, (2011) have argued for a competency based performance model for construction project managers where managerial behavior input is appraised and nine performance indicators for PM competency are developed to comprise team building, leadership, decision-making, mutuality and approachability, honesty and integrity, communication, learning, understanding and application, self-efficacy, and maintenance of external relations. In the context of construction project management; it is assumed that if the project manager and the project team have all the required competence for the work then the project implementation will be successful.

2.7.3 Control Theory

Control theory, invented by Ouchi (1979) and Eisenhardt (1985) uses the notion of modes of control to describe all attempts to ensure that individuals in organizations act in a way that is consistent with organizational goals and objectives (Thomsett, 2012) The concept of control is based on the premise that the controller and the controlee have different interests. These different interests will be overcome by the

controller's modes of control (Nicholas, 2011). Modes of control may distinguish between formal and informal mechanisms. Formal modes of control are defined as Behavior control and Outcome control. Behavior control consists of articulated roles and procedures and rewards based upon those rules. Outcome control is mechanisms for assigning rewards based on articulated goals and outcomes. The informal modes of control are carried out by the control modes labeled as clan and self. Clan are the mechanisms of a group sharing common values, beliefs, problems, and these mechanisms work through activities as hiring & training of staff, socialization etc. The control mode of the self is about individually defined goals and can be carried through the mechanisms of individual empowerment, self-management, self-set goals, etc. (Luthaus, 2012).

The theory generally calls for a formalized costs structure, a clear division of labor, and delegation of power and authority to administrators relevant to their areas of responsibilities (Gersup, 2010). Developed at same time as scientific management, Scott notes that administrative theory emphasized management functions and attempted to generate broad administrative principles that would serve as guidelines for the rationalization of organizational activities (Talukhaba, 2011). Administrative theorists looked at productivity improvements from the "top down".

The control theory tend to be based on the concept that the organization is system which has to adapt to changes in its environment as opposed to the bureaucratic system which is seen to be rigid. The systems approach views organization as a system composed of interconnected and thus mutually dependent sub-systems (Pinto & Covin, 2013). It looks at organization as a system with separate parts, where the integration depends on shared norms, values and beliefs. According to Oguulana & Bach, (2012) and Yu & Chan (2010), organizations as systems consist of three basic elements. Namely: components, linking processes and goals. The approach recognizes the dynamic nature of organizational environment.

In the context construction project management the project manager and the project teams have different interests. In order for the project manager to control cost and schedules during the project execution phase, he has to come up with different modes

that ensure that teams are compliant. The control mechanisms and rules must also be aligned with the overall construction goals as well as the goals of individual teams.

2.8 Conceptual Framework

A conceptual framework is necessary to develop in order to depict how the relation is correlated and the direction between the pairs. The conceptual framework outlined below shows the factors influencing building construction projects costs management. A general conceptualization diagram as shown below illustrates that completion of building construction projects is a dependent variable which mean it is the variable whose value depends on another and fluctuation of prices of materials, human capital expenses, methods of estimation and project complexity factors as independent variables which means they are variables whose variation does not depend on that of another while the government policies has a moderating effect which means it affects the strength of the relationship between a dependent and independent variable as illustrated in Figure 1

Independent Variables

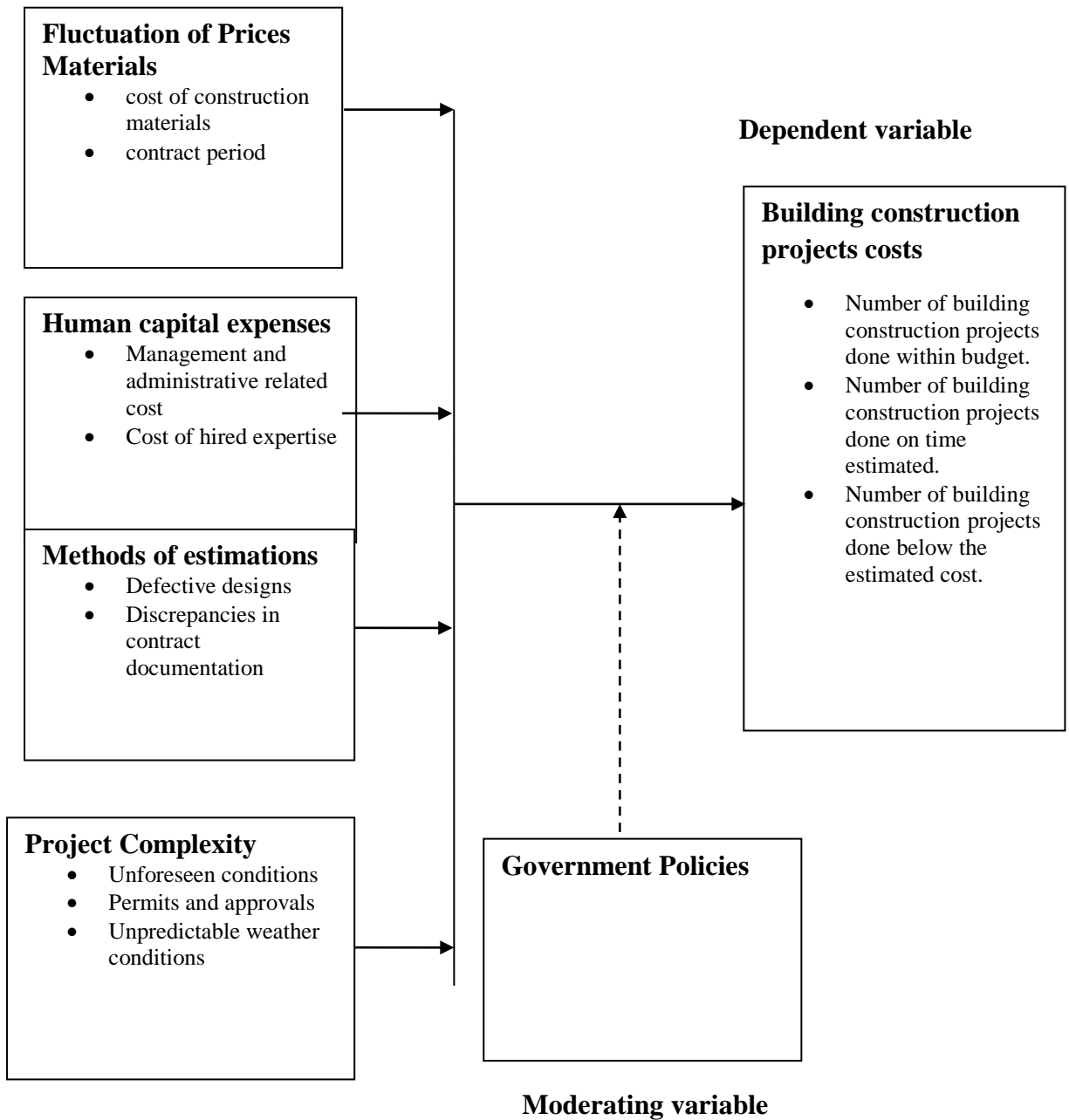


Figure 1: Conceptual framework

2.9 Research Gaps

Kibuchi and Muchungu (2012) studied the contribution of cost factors in the performance of construction projects in Kenya. Nyangilo (2012) did a research on an assessment of the fluctuation of prices materials effects on construction projects' performance in Kenya. Lepartobiko (2012) studied the factors that influence success in large construction projects. From these studies that have been done on performance of construction projects, there is a need for future studies to focus on the factors influencing projects costs management of building construction projects which should be presumed to have higher performance level. It is also recommended to develop performance measurement framework and modeling system in order to measure performance of building construction projects. In addition, it is recommended to study and evaluate the most important factors.

2.10 Summary of the Literature Review

The chapter started with an introduction and went on to look at predictor variables influencing the building construction projects costs. Since the variables influencing the organizations successful delivery of projects are seen to be quite diverse, the study reviewed specific ones which are fluctuation of prices, human capital expenses, methods of estimation and to explore complexity factors. The chapter further looked at other key constructs and concepts that are relevant to the study such as building construction projects costs.

Table 2.1: Matrix Table

Variable	Author (year)	Title of the study	Findings	Knowledge gaps
Fluctuation of Prices of Materials	Ndungu Lukas Mugo (2014)	Cost and time overruns influencing completion of projects in Government funded Tertiary Institutions in Nairobi County.	The findings were summarized as cost and time overruns in projects are as a result of instructions, delays and unrealistic project acquisition, delayed or disrupted communication or late approvals.	There has been a tendency to sideline the roles of contractors and blame them solely as the contributors to time and cost overruns in the guise that they are business-minded and have no recourse for others or consequences that may result in default

	Frimpong, Y., Oluwoye, J. and Crawford, L.(2003)	Causes of delay and cost overruns in construction of groundwater projects in developing countries	From the study, upfront planning efforts as well as developing an appropriate structure, communication systems, control of subcontractor work, coordination effectiveness and risk identification and allocation are highly significant in the completion of building projects.	Cost factors of a project correlates with its completion time. The coordination of the subcontractor's labor, cost and other functions of the project influence the completion process.
Cost of Materials	Yong, K. (2013).	Evaluation of Global Cost Factors Affecting construction Performance in Mozambique,	The study found out that there is a positive relationship between completion of building projects and business related factors, project procedures, project management factors and human related factors	Project managers need to be aware of their project technology preferences and provide the tools and equipment to the project team as they can be more motivated.
cost overruns	Ugwu O.O. and Haupt T.C., (2007)	Key performance indicators and assessment methods for infrastructure sustainability in South Africa construction industry	Procedures comprise the concept of procurement form and the method of tendering that place great dependence on the project team in setting up the building process and bringing the project to a successful conclusion.	There is need for construction process improvement methodology for construction projects
Project Complexity	Radosavljevic, M. and Horner, R.M. (2002)	The Evidence of Complex Variability in Construction Labour Productivity	The study found that control mechanisms of any project and its delivery system such as the bidding of the project as very essential.	This project identified the effect of different project characteristics, which included people, process and project aspects, on the occurrence of contract disputes.
	Anvuur and Kumaraswamy (2007)	Complexity; a Major Management Problem for Construction Projects in East Africa Region; The Case Study of Tanzania	They highlighted that increased complexity, uncertainty, and time pressure in building projects have increased the need for cooperation among different project actors.	Monitoring and evaluation tools that can be used are such as proper planning, organizing, pre-contract management and post-contract management

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the methodology used in the research study. It describes the type of research design that was used, target population, sample size and sampling procedure, Research instruments, a description of tools used in collecting the data, the measurement of variables and the techniques used in analyzing the collected data validity and reliability of data collection instruments, data analysis techniques and ethical considerations.

3.2 Research Design

The research design used was descriptive survey research design aimed at establishing factors influencing building construction projects costs management in Commercial Real Estate within Nairobi County in Kenya. Orodho & Kombo (2002) says that descriptive research studies are designed to obtain information concerning the current situation and other phenomena and wherever possible to draw valid conclusion from the facts discussed. According to Zinkmund (2010), “descriptive research studies are based on some previous understating of the nature of the research problem”. This is a survey research to explore the existing status of two or more variables at a given point in time. These methods were preferred because it allows for prudent comparison of the research findings. Descriptive survey attempts to describe or define a subject often by creating a profile of a group of problems, people or events through the collection of data and tabulation of the frequencies on research variables or their interaction as indicated.

3.3 Target Population

According to Cooper and Schindler, (2006) population refers to the entire group of individuals or objects to which researchers are interested in generalizing the conclusions. Target population refers to the group of individuals or objects to which researchers are interested in generalizing the conclusions. As indicated by national construction authority in their list of registered building construction companies and specifically the ones who deal with Commercial Real Estates within Nairobi County,

there were 303. Geographically located in Nairobi, these 303 commercial real estate companies are engaged in Commercial Real Estates development and regulated by the National Construction Authority.

3.4 Sample Size and Sampling Procedure

3.4.1 Sample size

Morgan Table was used to pick the sample size of 175 respondents from the total population of 303 commercial real estate development companies registered with National Construction Authority. A total of 25 companies with had more than 7 staff members were considered for the sample.

Table 3.1: Sample size

Number of companies to be considered	Number of staff from each company	Total number of respondents
25	7	175

3.4.2 Sampling Procedure

According to Cooper & Schindler (2006), Sampling is a process of selecting a number of individuals or objects from a population such that the selected group contains elements representative of the characteristic found in the entire group.

According to Kothari (2004), stratified random sampling is a probability sampling where each and every item in the population has an equal chance of inclusion in the sample and each one of the possible samples, in case of finite universe, has the same probability of being selected. The researcher used Stratified random sampling technique. As there was need to separate the companies which had more than 7 staffs and the ones that had below 7 staffs for consideration hence need to have the 2 groups referred to as strata.

3.5 Research Instruments

According to Orodho & Kombo (2002), a self-administered questionnaire is the only way to elicit self-report on people's opinion, attitudes, beliefs and values. The researcher developed questionnaires that were used to obtain important information about the population.

The questionnaire comprised of both close-ended and open-ended items. The close-ended contain questions which comprises of Likert-scaled closed-ended question and also a few open ended questions. These types of questions were accompanied by a list of possible alternatives from which respondents are required to select the answer that best describes their situation.

The questionnaire comprised of part A; which comprise of respondents general information; while part B to E comprises of the four factors influencing building construction projects costs management in Kenya.

The questionnaires were distributed by the researcher to respondents to solicit the relevant information.

3.5.1 Pilot testing

According to Mugenda, (2008), Pilot testing is a small-scale trial, where a few examinees take the test and comment on the mechanics of the test. In test development projects of all kinds, the trialing of new items is typically taken into Pilot Testing. They point out any problems with the test instructions, instances where items are not clear, and formatting and other typographical errors and/or issues. In the case of computer-based testing, pilot-test examinees also comment on any issues with the computer interface. Once all issues with the test items and forms have been addressed, the tests are ready for large-scale field testing. The primary purpose of field testing is to construct an initial picture of test validity and reliability. The test is administered to 10 examinees in Nairobi County who were not part of the study and the raw data is used in the psychometric analysis. A pilot study was conducted to find out if the respondents could answer the questions without difficulty. The 10 interviewees conveniently selected from within Nairobi County. The ten respondents were requested to evaluate the statement items for relevance, meaning and clarity. They were asked to evaluate the questions for relevance, comprehension, meaning

and clarity. The instrument was modified on the basis of the pilot test before administering it to the study respondents.

3.5.2 Validity of Instruments

Joppe (2010) provides the following explanation of what validity is in quantitative research where Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit "the bull's eye" of your research object? Researchers generally determine validity by asking a series of questions, and often look for the answers in the research of others.

Orodho & Kombo (2002) describe the validity in quantitative research as "construct validity". The construct is the initial concept, notion, question or hypothesis that determines which data is to be gathered and how it is to be gathered. They also assert that quantitative researchers actively cause or affect the interplay between construct and data in order to validate their investigation, usually by the application of a test or other process. In this sense, the involvement of the researchers in the research process would greatly reduce the validity of a test. Data quality was incorporated in the entire study process especially at the data collection point to include completeness of questionnaires, legibility of records and validity of responses. At the data processing point, quality control included; data cleaning, validation and confidentiality.

3.5.3 Reliability of Instruments

Joppe (2010) defines reliability as the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable

The most popular methods which was used in estimating reliability is the use of measures of internal consistency. The ten questionnaires were pre-tested through a pilot test with individuals from the same organizations to avoid double inclusion of pre-test participants in the main study. Their feedback helped in making vital adjustments to enhance reliability and validity of the study findings. To ascertain the reliability of the data collection instrument were examined by professionals who include researchers and supervisor.

Cronbach Alpha was therefore used to test reliability of the instrument. A coefficient of 0.7 and above shows high reliability of data (Saunders, 2009). The Cronbach Alpha test of the instrument resulted in a value of 0.765 which is greater than 0.7 as indicated in the Table 4.1 below, thus the questionnaires were reliable. This indicates that the data collected using the above mentioned instruments was reliable for analysis.

Table 3.2: Summary of Cronbach’s Alpha Reliability Coefficients for Major Variables of the Study

Constructs/Variable	Number of Statements	Cronbach Alpha	Comment
Fluctuation of Prices of Materials	7	0.800	Reliable
Cost of Materials	10	0.755	Reliable
Methods of Estimations	6	0.831	Reliable
Project Complexity	10	0.780	Reliable

3.6 Data Collection Procedure

The researcher obtained a permit from National Council for Science and Technology based on authorization letter from The University of Nairobi. The data was collected using a self-administered questionnaire and through email. Nevertheless, where it proves difficult for the respondents to complete the questionnaire immediately, the researcher left them with the research assistance to pick on a later date. In the course of piloting, the researcher visited the area of the study and administered the instruments.

The study employed three types of research design, namely: explorative, descriptive, and survey. Explorative design has partly been utilized in the introductory part of the proposal and literature review. The design has also been used to formulate the objectives and research questions. Primary data were collected using semi-structured questionnaires. The questionnaires were administered by the help research assistance in each and every constituency. The questionnaires were used because they allow the

respondents to give their responses in a free environment and help the researcher get information that would not have been given out had interviewers been used. The questionnaire was self-administered to all the respondents. Secondary data refers to the information obtained from articles, books, newspapers, internet and magazines. This design was further used to clarify the phenomena by identifying the factors affecting building construction projects costs in Kenya. Descriptive design was used to analyze the data.

3.7 Data Analysis Techniques

According to Zinkmund (2010), the process of data analysis involved several stages: the completed questionnaires were edited for completeness and consistency, checked for errors and omissions and then coded to SPSS V21. Data was then analysed using descriptive analysis such as descriptive statistics mean scores and standard deviations frequencies distributions and percentages.

The study used both descriptive and inferential statistics to analyzed data from the questionnaires. Simple linear regression and multiple regression analyses were used to establish the nature and magnitude of the relationship between variables and to test hypothesized relationships.

A regression model was used in determining the level of influence the independent variables have on dependent variable. It is on this basis that correlation and multiple regression analysis were used. Multiple regression models attempt to determine whether a group of variables together predict a given dependent variable (James & Frank, 1985). A multiple regression model separates each individual variable from the rest allowing each to have its own coefficient describing its relationship to the dependent variable. This model is therefore adopted because the study had more than one variable.

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3+ \beta_4X_4 + e \dots\dots\dots\text{Equation}$$

1

Where;

Y = building construction projects costs
(Dependent Variable)

β_0	= Constant Term
$\beta_1, \beta_2, \beta_3, \beta_4$	= Beta coefficients
X_1	= Fluctuation of Prices Materials
X_2	= Human capital expenses
X_3	= Methods of estimations
X_4	= Project Complexity
e	= Error Term

3.8 Ethical Consideration

The study was conducted in an ethical manner. The respondents were explained the purpose of the study and they were assured that the information given were treated as confidential and their names will not be divulged. Informed consent was sought from all the participants that agree to participate (Zinkmund, 2010). A research approval was sought. The researcher personally administered the questionnaire to the respondents.

The confidential information were only accessed by the researcher and the supervisor. The respondents were not required to provide any identifying details and as such, transcripts and the final report may not reflect the subjects identifying information such as their names, in this case the collected data will be destroyed.

3.9 Operationalization of Variables

This section analyses the operational definition of variables on the factors influencing building construction projects costs management of Commercial Real Estates within Nairobi County in Kenya. Variable are given in Table 3.3

Table 3.3: Operationalization of variables

Objectives	Variables	Indicators	Scale	Tools of Analysis	Type of analysis
To establish Fluctuation of Prices of Materials that influence building construction projects costs management in Commercial Real Estate within Nairobi County	Fluctuation of Prices of Materials	cost of construction materials contract period	Ordinal Nominal	Tables Mean Standard deviation	Descriptive
To examine human capital expenses influencing building construction projects costs management in Commercial Real Estate in Nairobi County	Human capital expenses	Management and administrative related cost Cost of hired expertise	Ordinal Nominal	Tables Mean Standard deviation	Descriptive
To establish methods of estimations that influence building construction projects costs management in Commercial Real Estate in Nairobi County	Methods of estimations	Defective designs Discrepancies in contract documentation	Ordinal Nominal	Tables Mean Standard deviation	Descriptive
To explore Complexity factors that influence building construction projects costs management in Commercial Real Estate in Nairobi County.	Project Complexity	Unforeseen conditions Permits and approvals Unpredictable weather conditions	Ordinal Nominal	Tables Mean Standard deviation	Descriptive

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter provides an analysis of data collected from the field. The results were presented in tables to highlight the major findings. They were also presented sequentially according to the research questions of the study. Mean scores, standard deviations and mean of mean was used to analyze the data collected. The raw data was coded, evaluated and tabulated to depict clearly the results of factors influencing building construction projects costs management in Commercial Real Estates in Nairobi County, Kenya.

4.2 Questionnaire return rate

Questionnaire return rate indicates the total number of questionnaires that were filled and returned against the total number issued. The researcher distributed 175 self-administered questionnaires to the sampled respondents, 126 questionnaires were dully returned, representing 72% response rate which the researcher found sufficient to proceed with data analysis. Mugenda and Mugenda (1999) stated that a response rate of 55% and above is a good response rate. Table 4.1 below indicates the response rate.

Table 4.1 Response Rate

Category	Frequency	Percentage
Responded	126	72
Did not respond	49	28
Total	175	100.00

The high response rate is attributed to the fact that the researcher worked with a team of very close friends who had the necessary motivation to respond to the questionnaires.

4.3 General Information

The study sought to establish the information on the respondents who participated in the study with regards to the gender of respondents, age, level of education and the period they have been working with the construction companies under real estate. This study made use of frequencies (absolute and relative) on single response questions. These were then presented in tables as appropriate with explanations being given in prose. These are further discussed in the sub-sequent sub themes.

4.3.1 Distribution of respondents by Gender

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 and private projects implementation. The results are presented in Table 4.2.

Table 4.2 Distribution of respondents by gender

Category	Frequency	Percentage
Male	117	92
Female	9	8
Total	126	100.00

Table 4.2 shows that out of 126 respondents who participated in the study, 117(92%) respondents were male while 9 (8%) were female. This means that majority of working in commercial real estate in Nairobi County are male. Gender representation in the industry is biased towards male professionals. Even though the Kenyan constitution desires gender equality, there is still gender disparity exhibited in most of activities and projects.

4.3.2 Distribution of respondents by age

The respondents were asked to indicate their age with the aim of establishing their age bracket. Table 4.3 represents the results of distribution of respondents by age.

Table 4.3 Distribution of Age Group

Age Group	Frequency	Percent	Cumulative Percent
40 and above	55	43.65	43.65
31- 40	66	52.38	96.03
21 -30	4	3.17	99.20
20 years and below	1	0.80	100
Total	126	100.0	

The results presented in Table 4.3 shows respondents of 40 years and above were 55(43.65%), 31 to 40 years were 66(52.38%), between 21 to 30 years were 4(3.17%) while 20 years and below was only 1(0.80%) which was the smallest proportion. The age composition shows that most of the respondents were between 31 to 40 years and therefore had rich experiences in the construction industry of real estates that would account for better management of costs in construction projects as well as also appreciate the importance of the study. All the respondents have the basic knowledge required for cost management of construction projects, this means all the respondents are equipped with the basic cost management skills and since a greater percentage of individuals working in the field have rich experience this adds up to a greater cost management within the building construction of real estates.

4.3.3 Highest Level of Education

The respondents were asked to indicate their academic background, that is the education level. Table 4.4 shows the study findings on the respondents academic background.

Table 4.4 Level of Education of the Respondents

Level of education	Frequency	Percent
Undergraduate Degree	68	53.9
Postgraduate Degree	58	46.1
Total	126	100

From the Table 4.4, 68(53.9%) of the respondents said they had undergraduate degree while 58(46.1%) had postgraduate degree. These findings indicate that all of the

respondents from commercial real estate Development Companies have undergraduate at the bare minimum so the respondents have the basic knowledge to manage cost of construction projects for real estate projects and therefore expected to have better cost management knowledge.

4.4 Building Construction Projects Costs

Respondents were asked their views on the extent to which the following factors influences building construction projects costs management in Commercial Real Estate in Nairobi County. Table 4.5 represents the figures

Table 4.5 Building Construction Projects Costs

Factors Under Consideration	Mean	Std. Deviation
Commitment of all parties to the project	3.0630	.6875
Adequacy of funding	4.1100	.63722
Availability of modern technology and innovation	3.7650	.62081
Poor financial control on site	3.2708	.33903
Changes on physical characteristics of project design and specifications	3.1786	.88581
Industrial relations environment	3.063	.6875
Supplier manipulation and fraudulent practices of kickbacks	3.0559	.32863
Administrative approvals environment	2.5526	.36585
Architect actions or omissions to sound project planning and control have adverse effects on project's costs	3.5579	.43664
Wrong methods of estimation	2.8289	.58073
Mean of Mean	3.2446	

As presented above in Table 4.5 the results of descriptive statistical analysis for building construction projects costs are presented on multiple response questions, the study used Likert scale in collecting and analysing the data whereby a scale of 5 points were used in computing the means and standard deviations. From the table mean and standard deviation were used to test respondent ideas where Standard

deviation is the square root of the variance, it measures the spread of a set of observations. The larger the standard deviation is, the more spread out the observations are while mean is the arithmetic mean across the observations, it is the most widely used measure of central tendency, it is commonly called the average. The mean is sensitive to extremely large or small values.

Specifically, Adequacy of funding was supported with a mean of 4.1100, Availability of modern technology and innovation was supported with a mean of 3.7650, and architect actions or omissions to sound project planning and control have adverse effects on project's costs was supported with a mean of 3.5579. The least significant factor was administrative approvals environment which was supported with a mean of 2.5526.

In comparison to mean of mean wrong methods of estimation has a lower mean than the mean of mean hence it does not have a significant influence as a factors that influences building construction projects costs management while on the other hand Adequacy of funding affects cost management to a higher extent hence more consideration should be done on funding of projects.

4.5 Fluctuation of Prices of Materials

The study aimed at identifying the extent to which the following factors of fluctuation of prices of materials are considered important in the building construction projects costs in real estates within Nairobi County. The Table 4.6 shows the study results.

Table 4.6 Fluctuation of Prices of Materials

Factors Under Consideration	Mean	Std. Deviation
Planned time for project construction	3.2500	0.36986
Average delay because of closures and materials shortage	3.4750	0.30484
Average delay in claim approval	3.1000	0.51611
Availability of resources as planned through project duration	3.0000	0.41611
Speed of information flow	3.3750	0.40484

Factors Under Consideration	Mean	Std. Deviation
Average delay in payment from owner to contractor	3.2200	0.42200
Mean of Mean	3.2367	

From the Table 4.6, the statement on average delay because of closures and materials shortage was strongly agreed with a mean of 3.4750 and also has the higher mean above the mean of meanwhile all the other items under consideration were below the mean of mean. The Speed of information flow was also strongly agreed with a mean of 3.3750. Other significant factors were planned time for project construction as supported with a mean of 3.2500 and average delay in payment from owner to contractor as supported with a mean 3.22. The least significant factors however, were average delay in claim approval as supported with a mean of 3.1000 and availability of resources as planned through project duration with a mean of 3.0000.

Average delay in claims approval is the only item has is below the mean of mean which is 3.2367 which means it is a factor that has no influence or has insignificant influence over the cost management of commercial real estate projects.

4.6 Human Capital Expenses

This section continues to present findings from the questionnaire and specifically focuses on the sections on the Human Capital Expenses influencing building construction projects cost in Nairobi County. The Table 4.7 shows the research findings.

Table 4.7 Human Capital Expenses

Factors Under Consideration	Mean	Std. Deviation
Project manager's commitment to meet quality, cost and time	3.6419	.29589
Cost of compliance to regulators requirements	3.3953	.25971
Project labor cost	3.0930	.31760
Cost of rework	3.3488	.38604
Project overtime cost	3.4186	.36306

Factors Under Consideration	Mean	Std. Deviation
Project manager's commitment to meet quality, cost and time	3.6419	.29589
Cost of compliance to regulators requirements	3.3953	.25971
Regular project budget update	3.3419	.29589
Cost control system	2.0921	.55581
Escalation of material prices	3.5151	.67479
Differentiation of coins	3.5941	.52824
Waste rate of materials	2.9733	.74730
Mean of Mean	3.2414	

From the table above, Table 4.7 the statement that project manager's commitment to meet quality, cost and time was strongly supported with a mean of 3.6419, other significant factors were escalation of material prices (mean=3.5151) and differentiation of coins as shown by a mean of 3.5941. The least significant factor were waste rate of materials by a mean of 2.9733 and Cost control system with a mean of 2.0921.

The mean of mean is 3.24141 which is above the mean for waste of materials, cost control system and project labor cost. This implies that these factors do not have significant influence on the building construction projects costs management.

The project manager need to ensure quality is maintained in order to avoid repercussions that arise from compromising quality like collapse of buildings.

4.7 Methods of Estimations

Respondents of the study were asked to rate the extent at which the following factors conform to Methods of Estimations factors influencing building construction projects costs in Nairobi County. The Table 4.8 shows the study findings.

Table 4.8 Methods of Estimations

Factors Under Consideration	Mean	Std. Deviation
Client's knowledge of construction project organization	3.0000	.28680
Owner's construction sophistication Design team experience	3.4419	.39589
Project manager's adaptability to changes in project plan	3.2558	.38961
Adequacy of plans and specifications Contractor experience	3.5302	.30357
Effectiveness of cost control system	3.3419	.29589
Site management Contractor's cash flow	3.3953	.35971
Cost of variation of orders	3.9100	.63722
Mean of Mean	3.410729	

From the table above, Table 4.8 cost of variation orders was 3.9100, adequacy of plans and specifications Contractor experience with a mean of 3.5302, and owner's construction sophistication Design team experience with a mean of 3.4419. The least is client's knowledge of construction project organization supported with a mean of 3.0000.

The mean of mean is 3.410729 which means cost of variation of order has highest significant influence on the building construction projects costs management of commercial real estates.

4.8 Project Complexity

Respondents of the study were asked to rate the extent at which the following factors conform to project complexity factors influencing building construction projects costs in Nairobi County.

Table 4.9 Project Complexity

Factors Under Consideration	Mean	Std. Deviation
Decision making effectiveness	3.9650	.63722
Clear objectives and scope holding of regular meetings	3.2708	.62081
Project bidding method (price based competitive bidding, negotiated bidding, best value bidding)	3.1786	.33903
Prior project management experience	3.0667	.88581
Developing standard procedures/absence of bureaucracy	2.7650	.84462
Mean of Mean	3.24922	

From the findings above, Decision making effectiveness was the most significant factor as shown by a mean of 3.9650, Clear objectives and scope holding of regular meetings was supported by a mean of 3.2708, project bidding method (price based competitive bidding, negotiated bidding, best value bidding) was supported by a mean of 3.1786, Prior project management experience was supported with a mean of 3.0667 and developing standard procedures/absence of bureaucracy was supported by a mean of 2.7650.

Decision making effectiveness has a high mean over and above the mean of mean of 3.24922 which shows the most significant factor above others factors that influence building construction projects costs management.

Clear and concise way to making decision should be sort since from the above findings it is the most significant.

4.9 Inferential Statistics

Inferential statistics is a type of statistic which deals with making conclusion about a given data which is subjected to random variations. It includes detection and prediction of sampling and observed errors. The researcher applied the below inferential statistics in the data analysis.

4.9.1 Correlation analysis

Two predictor variable are said to be correlated if their coefficient of correlations is greater than 0.5. In such a situation one of the variables must be dropped from the analysis. As shown in table 4.11, none of the predictor variables had coefficient of correlation between themselves less than 0.5 hence all of them were included in the model. The matrix also indicated high correlation between the response and predictor variables, that is Fluctuation of Prices of Materials, Human capital expenses, Methods of estimations and Project Complexity

Table 4.10: Pearson's Correlation

	building construction projects costs	Fluctuation of Prices of Materials	Human capital expenses	Methods of estimations	Project Complexity
building construction projects costs	1.000				
Fluctuation of Prices of Materials	.536	1.000			
Human capital expenses	.752	.618	1.000		
Methods of estimations	.667	.628	.747	1.000	
Project Complexity	.807	.611	.654	.580	1.000

A multivariate regression model was applied to determine the relative importance of each of the four variables with respect to the building construction projects costs in respective organization.

The regression model was as follows:

$$Y = \beta_0 + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + \varepsilon$$

Where:

Y= building construction projects costs

X¹= Fluctuation of Prices of Materials

X²= Human capital expenses

X³= Methods of estimations

X⁴= Project Complexity

β₀ = constant (y intercept)

β = coefficient

ε = error term

4.9.2 Regression Analysis

Analysis in table 4.11 shows that the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) R² equals 0.843, that is, fluctuation of prices materials, methods of estimations, human capital expenses, project complexity leaving only 15.7 percent unexplained. The P- value of 0.000 (Less than 0.05) implies that the model of building construction projects costs is significant at the 5 percent significance.

Table 4.11 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.918(a)	.843	.805	.51038	.843	1.242	4	122	.000

Predictors: (Constant), Fluctuation of Prices Materials, Human capital expenses, Methods of estimations, Project Complexity

Dependent Variable: Building construction projects Costs

Table 4.12 ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	.852	4	.213	1.242	.000
Residual	20.35	122	.171		
Total	22.64	126			

Predictors: (Constant) Fluctuation of Prices Materials, Human capital expenses, Methods of estimations, Project Complexity

Dependent Variable: Building construction projects costs

ANOVA findings (P- value of 0.00) in table 4.12 shows that there is correlation between the predictor variables (Fluctuation of Prices Materials, Human capital expenses, Methods of estimations, Project Complexity) and response variable (building construction projects costs).

Table 4.13 Coefficients of regression equation

		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
(Constant)		.260	.460		0.565	.231
Fluctuation of Prices of Materials	X ₁	.512	.048	.254	2.729	.001
Human capital expenses	X ₂	.170	.045	-.300	3.778	.000
Methods of estimations	X ₃	.051	.023	.113	2.217	.002
Project Complexity	X ₄	.048	.022	.093	2.182	.000

Dependent Variable: Building construction projects costs

The established multiple linear regression equation becomes:

$$Y = 0.260 + 0.512X_1 + 0.170X_2 + 0.051X_3 + 0.048X_4$$

Where

Constant = 0.260, shows that if fluctuation of prices materials, human capital expenses, methods of estimations project complexity all rated as zero, building construction projects costs would be 0.260

$X_1 = 0.512$, shows that one unit change in fluctuation of prices materials results in 0.512 units increase in building construction projects costs

$X_2 = 0.170$, shows that one unit change in human capital expenses results in 0.170 units increase in building construction projects costs

$X_3 = 0.051$, shows that one unit change in methods of estimations results in 0.051 units increase in building construction projects costs

$X_4 = 0.048$, shows that one unit change in project complexity results in 0.048 units increase in building construction projects costs

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, discussion and conclusions drawn from the findings and recommendations made. The conclusions and recommendations drawn were focused on addressing the purpose of the study. The main objective of this research is, therefore, to identify and investigate the factors influencing building construction projects costs management in Commercial Real Estate in Nairobi County, Kenya.

5.2 Summary of findings

The study established that there is a positive correlation on factors that influence building construction projects costs management in Commercial Real Estate in Nairobi County. Descriptive survey design was used to identify factors influencing building construction projects costs in past projects undertaken in Nairobi County. Questionnaire survey was also used to identify the causes and effects. Clients, consultants and contractors were asked to identify the variables of fluctuation of prices, human capital expenses, methods of estimation and to explore project complexity factors. 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.

5.2.1 Fluctuation of Prices of Materials and Building Construction Projects Costs Management

From the survey results almost all respondents agreed on the severity of the effects of fluctuation of price of materials on cost management that is the project owner (client) or end user. Although the degree of effects of price of materials varies on the stakeholders in the construction industry, all the parties involved are influenced by fluctuation of price of materials. The first victim of fluctuation of price of materials would be the project owner since he has envisaged his construction project to be realized within an allocated cost management. Average delay because of closures and

materials shortage is seen as the main factor that influence fluctuation of prices of materials. This need proper and strategic planning by the project procurement team to ensure it does not affect the project.

5.2.2 Human Capital Expenses and Building Construction Projects Costs Management

The second objective sought to establish how human capital expenses influences building construction projects costs management in Nairobi County and the findings of the study showed that human capital expenses affect 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. Human capital expenses clients, whose financial resources are scarce, has many effects and it will be a source of friction between the client and the consultant. When the human capital expenses is due to financial constraints of clients, the construction projects suffer lots of problems which further aggravate the problems of human capital expenses. For projects, human capital expenses will lead to delay as the clients do not have enough financial resources which are ready to be pumped to the construction project which lead to further expenses as a construction project is delayed for a long period of time it will be subjected to inflationary pressure and interests will be accumulated. Project manager's commitment to meet quality, cost and time is seen as the main factor which is very critical for cost management. Cost, time and quality are the three constraints of project management and achieving those leads to successful project management.

5.2.3 Methods of Estimations and Building Construction Projects Costs Management

The third objective sought to establish how methods of estimations influence building construction projects costs management in Commercial Real Estate in Nairobi County. From the findings, these changes have been caused by the following factors: causes initiated by the user s/clients/owners, those initiated by the Architect/consultant, those initiated by the contractor, those initiated by lack of coordination in the project and finally those originated from the differing site conditions. The findings indicate that a number of factors have been responsible for

the change in the initial design these factors vary in the level on which they affect the design change. From the findings respondents slightly agree that causes on the changes of design are initiated by the users/clients/owners while majority strongly agree that the causes of the design change are initiated by the users/clients.

5.2.4 Project Complexity and Building Construction Projects Costs Management

The last objective sought to determine the influence of Project complexities on building construction projects costs management in Commercial Real Estate in Nairobi County. The causes and effects of complexities on the control of construction projects are complex and influenced by numerous interrelated factors. The risks and uncertainty associated with project changes make predictions and planning for design changes a difficult task. Decision making effectiveness is seen as the strongly agreed factor that influence projects costs management. These revolves around the main decision makers as far as the project is concerned.

5.3 Conclusions

This study has demonstrated four factors influencing building construction projects costs management in Commercial Real Estate in Nairobi County, Kenya. Based on the research, it could be concluded that the rate of fluctuating of price of materials decreases with increase in the contract amount; that is rate of human capital expenses 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 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.

Increase in project cost is the main effects being noted for design changes, rated highly. Decrease in productivity, work on hold and disputes for project team members scored lower and are less prevalent. The degradation of productivity is considered a major concern here. This might be explained by good relationship that the project team members build in the construction process, they all want the best for each other for the successful execution of the project. This was however noted to be unique in private contracts which formed the bulk of the approved developments by County government.

In order to find out answers for these research questions, the questionnaires were sent to commercial real estate companies engaged in commercial real estate development, therefore study concludes that $Y = 0.260 + 0.512X_1 + 0.170X_2 + 0.051X_3 + 0.048X_4$

5.4 Recommendations

The study seeks to make recommendations under two broad levels, namely policy recommendations and managerial recommendations. Based on the field survey conducted and the results of the finding presented, the following can be recommended.

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 fluctuating price of materials.

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.

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.

Review of contract documents for grey areas and use of a checklist after every milestone emerged as the most suitable control tools to be used to mitigate the effects of design changes. Freeze of design and use of Work Breakdown Structure were discussed as good tools theoretically but very difficult to implement practically, Design freeze in particular is a good tool to prevent design changes but it's very difficult to prevent since design changes are mostly inevitable

5.5 Areas for Further Research

The study recommends that further research should be done on the effectiveness of the commercial real estate companies in assessing and trying to reduce the gap between the housing supply and demand.

Also on the effects of the delays in real estate housing construction projects to the realization of Vision 2030.

In addition to the above, further on the impacts of partnerships between the government and the various stakeholders on housing provision.

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APPENDICES

Appendix I: Letter of Transmittal

Ramata Amina Dokata,
P.O Box 54327-00200
NAIROBI,

4th Nov, 2016

Dear Respondent,

**RE: FACTORS INFLUENCING BUILDING CONSTRUCTION PROJECTS
COSTS MANAGEMENT IN COMMERCIAL REAL ESTATE IN NAIROBI
COUNTY, KENYA**

I am a Master's student at the School of Continuing and Distance Education, University of Nairobi currently conducting a research study as entitled above.

I wish to inform that you have been selected as one of the respondents to assist in providing the essential data and information for this activity. I kindly request you to spare a few minutes and answer the attached questionnaire. The information obtained will be used for academic purposes only, will be treated with utmost confidentiality and will not be shared with anyone whatsoever. Do not write your name anywhere on the questionnaire.

I therefore request you to respond to all questions with utmost honesty.

Thank you, most sincerely for your support.

Yours Sincerely,

Ramata Amina Dokata

Appendix II: Research Questionnaire

Please tick (✓) the box that matches your answer or fill the space provided

PART A: General Information

Date

.....

1) What is your gender? (tick one)

Male ()

Female ()

2) What is your age bracket?(tick one)

21 -30 ()

31- 40 ()

41- 50 ()

50 years and above ()

3) State your highest level of education?

Certificate (on construction industry) []

diploma []

Undergraduate []

postgraduate []

4) What is your experience in years in the Construction Industry?

0-5yrs ()

5-10yrs ()

11-15yrs ()

16-25 yrs ()

Above 25yrs ()

5) What type buildings have you managed?

Water ()

Building ()

Sub Contracts ()

Labour based ()

Others (specify)

SECTION B: BUILDING CONSTRUCTION PROJECTS COSTS

- 6) Using a Likert 1-5 scale, with 1 being ‘to no extent at all’, 2 being ‘to a small extent’ 3 being ‘to some extent’, 4 being ‘to a high extent’ and 5 being ‘to a very high extent’, to what extent were the following factors influences building construction projects costs in County? Please tick (✓) all as appropriate

Factors Under Consideration	1	2	3	4	5
Commitment of all parties to the project					
Adequacy of funding					
Availability of modern technology and innovation					
Poor financial control on site					
Changes on physical characteristics of project design and specifications					
Industrial relations environment					
Supplier manipulation and fraudulent practices of kickbacks					
Administrative approvals environment					
architect actions or omissions to sound project planning and control have adverse effects on project’s costs					
Wrong methods of estimation					

SECTION C: FLUCTUATION OF PRICES MATERIALS

Using a Likert 1-5 scale, with 1 being ‘to no extent at all’, 2 being ‘to a small extent’ 3 being ‘to some extent’, 4 being ‘to a high extent’ and 5 being ‘to a very high extent’, to what extent were the following time factors considered important in the building construction projects costs in Nairobi County? Please tick (✓) all as appropriate

Factors Under Consideration	1	2	3	4	5
Planned time for project construction					
Average delay because of closures and materials shortage					
Average delay in claim approval					
Availability of resources as planned through project duration					
Speed of information flow					
Average delay in payment from owner to contractor					

SECTION D: COST OF MATERIALS

Using a Likert 1-5 scale, with 1 being ‘to no extent at all’, 2 being ‘to a small extent’ 3 being ‘to some extent’, 4 being ‘to a high extent’ and 5 being ‘to a very high extent’, to what extent were the following financial factors influence building construction projects cost in Nairobi County? Please tick (✓) all as appropriate

Factors Under Consideration	1	2	3	4	5
Project manager’s commitment to meet quality, cost and time					
Cost of compliance to regulators requirements					
Project labor cost					
Cost of rework					

Factors Under Consideration	1	2	3	4	5
Project manager's commitment to meet quality, cost and time					
Cost of compliance to regulators requirements					
Project overtime cost					
Regular project budget update					
Cost control system					
Escalation of material prices					
Differentiation of coins					
Waste rate of materials					

SECTION E: METHODS OF ESTIMATIONS

Using a Likert 1-5 scale, with 1 being 'to no extent at all', 2 being 'to a small extent', 3 being 'to some extent', 4 being 'to a high extent' and 5 being 'to a very high extent', to what extent were the following Methods of Estimations factors influence building construction projects costs in Nairobi County? Please tick (✓) all as appropriate

Factors Under Consideration	1	2	3	4	5
Client's knowledge of construction project organization					
Owner's construction sophistication Design team experience					
Project manager's adaptability to changes in project plan					
Adequacy of plans and specifications Contractor experience					
Effectiveness of cost control system					
Site management Contractor's cash flow					
Cost of variation orders					

SECTION F: PROJECT COMPLEXITY

Using a Likert 1-5 scale, with 1 being ‘to no extent at all’, 2 being ‘to a small extent’ 3 being ‘to some extent’, 4 being ‘to a high extent’ and 5 being ‘to a very high extent’, to what extent were the following Complexity factors influence building construction projects costs in Nairobi County? Please tick (✓) all as appropriate

Factors Under Consideration	1	2	3	4	5
Decision making effectiveness					
Clear objectives and scope Holding of regular meetings					
Project bidding method (price based competitive bidding, negotiated bidding, best value bidding)					
Prior project management experience					
Developing standard procedures/absence of bureaucracy					

Based on your experience and to the best of your knowledge, which additional factors influencing building construction projects costs in Nairobi County, and yet not covering in this questionnaire? Please list two factor below:

.....

.....

.....

Thank you for your time and cooperation

Appendix III: Table for Determining Sample Size for a Given Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size
"S" is sample size.

Source: Krejcie & Morgan, 1970

Appendix IV: Letter of Authority from the University



UNIVERSITY OF NAIROBI
COLLEGE OF EDUCATION AND EXTERNAL STUDIES
SCHOOL OF CONTINUING AND DISTANCE EDUCATION
DEPARTMENT OF EXTRA-MURAL STUDIES
NAIROBI EXTRA-MURAL CENTRE

Your Ref:

Main Campus
Gandhi Wing, Ground Floor
P.O. Box 30197
N A I R O B I

Our Ref:

Telephone: 318262 Ext. 120

14th February 2017

REF: UON/CEES/NEMC/25/185

TO WHOM IT MAY CONCERN

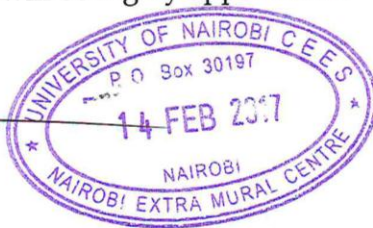
RE: RAMATA AMINA DOKATA - REG NO L50/69064/2013

This is to confirm that the above named is a student at the University of Nairobi College of Education and External Studies, School of Continuing and Distance Education, Department of Extra- Mural Studies pursuing Masters of Art in Project Planning and Management.

She is proceeding for research entitled **“factors influencing building construction project costs management in commercial real estate in Nairobi County, Kenya”**

Any assistance given to her will be highly appreciated.


CAREN AWILLY
CENTRE ORGANIZER
NAIROBI EXTRA-MURAL CENTRE



Appendix V: Authorization Letter From Nacosti



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/17/60964/16192**

Date: **27th March, 2017**

Amina Dokata Ramata
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “*Factors Influencing building construction projects costs management in commercial real estates in Nairobi County Kenya*,” I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **27th March, 2018**.

You are advised to report to **the Chief Executive Officer, National Construction Authority, the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.


BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The Chief Executive Officer
National Construction Authority.


The County Commissioner
Nairobi County.


National Commission for Science, Technology and Innovation is ISO 9001:2008 Certified

Appendix VI: Research Permit

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.
2. Government Officer will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one (1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice.


REPUBLIC OF KENYA


NACOSTI

**National Commission for Science,
Technology and Innovation**

**RESEARCH CLEARANCE
PERMIT**

Serial No.A **13440**

CONDITIONS: see back page

THIS IS TO CERTIFY THAT: **Permit No : NACOSTI/P/17/60964/16192**

MS. AMINA DOKATA RAMATA **Date Of Issue : 27th March,2017**

of UNIVERSITY OF NAIROBI, 0-618 **Fee Received :Ksh 1000**

naïrobi,has been permitted to conduct

research in Nairobi County

on the topic: FACTORS INFLUENCING

BUILDING CONSTRUCTION PROJECTS


COSTS MANAGEMENT IN COMMERCIAL

REAL ESTATES IN NAIROBI COUNTY

KENYA

for the period ending:

27th March,2018



Applicant's Signature

Director General

**National Commission for Science,
Technology & Innovation**