FACTORS AFFECTING THE PERFORMANCE OF CONSTRUCTION PROJECTS IN MOMBASA COUNTY, KENYA

BY

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DECLARATION

This research report is my original work and has not been presented for a degree or any award in any other university.

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Declaration

This Research project has been submitted for examination with my approval as University Supervisor.

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DEDICATION

This research is dedicated to all the people who inspired, supported and encouraged me. Special thanks go to my dear wife for her inexhaustible support and encouragement throughout my studies at the University. To my late father and mother, may the Lord rest their souls in eternal peace. To my lovely children, I hope this will inspire them to pursue their education and lead successful lives.

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ABBREVIATIONS AND ACRONYMS

AEC	Architectural, Engineering and Construction
AHP	Analytical Hierarchical Process
APPC	Automated Project Performance Control System
B.O.Q	Bill of Quantity
BPM	Building Project Management
CPI	Cost Performance Index
CTP	Construction Time Performance
ECI	Early Contractor Involvement
EPS	Environmental Performance Score
ESI	Early Supplier Involvement
GNP	Gross National Product
IT	Information Technology
KPIs	Key Performance Indicators
PA	Palestinian Authority
PAR	Performance Appraisal and Reporting
PM	Project Management
PMP	Project Management Performance
PPE	Project Performance Evaluation
PPI	Project Performance Indicators
PPMS	Project Performance Monitoring System
SPI	Schedule Performance Index

ABSTRACT

Construction industry contributes significantly in terms of scale and share in the development process for both developed and developing countries. The construction products provide the necessary public infrastructure and private physical structures for many productive activities such as services, commerce, utilities and other industries. The industry is not only important for its finished product, but it also employs a large number of people (directly and indirectly) and therefore has an effect on the economy of a country/region during the actual construction process. The success of a construction project depends on its performance, which is measured based on timely completion, within the budget, required quality standard and customer satisfaction. Construction projects are faced with many challenges before completion causing extensive delays and thereby exceeding initial time and cost estimates. The aim of this research was to identify and evaluate the factors affecting the performance of construction projects in Mombasa County and to identify the severity of these factors. The researcher identified four main factors affecting performance of construction projects which are project manager's competence, aggressive competition during tendering, time allocated to projects and client's interference during construction. Comprehensive literature review was done to gather information on the factors that affect performance of construction project from the previous researchers, followed with structured questionnaire distribution and interview as tools to collect data. Random sampling technique was selected as the appropriate sampling method giving equal chances to the population. Data was coded and analyzed using the SPSS 17.0.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Construction industry plays a major role in development and achieving 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 and it is considered one of the industries on which national prosperity depends (Ejazet al, 2013).The construction industry, which has a huge effect on national economies, features several major players who both improve social living standards and develop the construction sector. These players are clients, contractors, consultants, stakeholders, shareholders and regulators. Each player's project performance is affected by factors that impact every aspect of a construction project (Amusan, L.M. 2012).The construction industry is a very competitive high-risk business. Increasing uncertainties in technology, budgets and development processes create a dynamic construction industry (Kim et al, 2008).

Construction projects are now much more complex and difficult and the construction project team faces unprecedented challenges. The study of project success and critical success factors is means of understanding and thereby improving the effectiveness of construction projects. However the concept of project success remains ambiguously defined in the mind of construction professionals. There is no industry-accepted or standardized definition of project success because the fact is that individual project teams find themselves in unique situations, implying that their definition of success will differ from that of another project team. Project success is a topic that is frequently discussed and yet rarely agreed upon (Chileshe, 2008).The construction industry is usually very large, complex, and different from other industries. The industry needs much investment and involves various types of stakeholders and participants. Construction projects usually need extended time, from one year to several years as per the set objectives.General contractors for construction projects have found that the projects are becoming bigger and bigger, while construction tasks have become more complicated and diversified. Therefore, during a long tenure, there can be many hindrances or barriers that may obstruct its smooth operation. In general, there are five types of construction: Residential building construction, Industrial construction, Commercial building construction, Institutional

construction and Heavy civil construction. Each type of construction project requires a unique team to plan, design, construct and maintain the project.

According to the New Zealand Sectors Report (2013) the construction sector is the fifth largest sector in the New Zealand economy. It employs over170,000 people, 7.6% of the workforce. In 2010 it generated 6.3% of GDP (nominal). The sector employs 36,000 more workers today than in 2002, a 30% increase. The sector is a key driver of economic growth. Production from the sector accounts for around 45–50% of gross fixed capital formation in the economy annually, providing basic infrastructure, housing and commercial, industrial and public buildings.

According to China Engineering News-Record (September 2012) following 30 years of development the Chinese construction industry has continuously strengthened its position as a pillar industry. In 2011, the industry had a total output value of RMB 5.0018 trillion and added value of 1.4014 trillion, accounting for 5.7% of China's GDP, which made it the country's 4th largest industry. Currently, there are over 60,000 construction enterprises of all kinds in China, employing more than 40 million workers. Chinese construction enterprises have notably improved their strength and international reputation. 54 Chinese contractors were listed in the Top 225 large International Contractors worldwide and 37 Chinese enterprises were in the Top 225 Global large Contractors. Leveraging their own resources and technical advantages, many construction contractors have not only accomplished remarkable achievements on the domestic market, but also expand their businesses to the world market.

Indian construction industry has gained far more importance in recent times because of opening up of Indian markets and the arrival of megaprojects for infrastructure development, the performance of Indian construction projects has, however, not been very encouraging. The construction sector accounts for nearly 6% of India's GDP and is emerging as one of the key growth segments in the economy and has grown more than 12% in year 2012-2013 (http: / /www.timesb2b.com).Large investments in infrastructure, particularly transportation and power have almost assured the growth prospects of the business. There were an estimated 7,000 project investments worth $0.371 trillion. The Government's mega highway projects have thrown upfresh opportunities for construction companies in India. But a study conducted by Infrastructure & Project Monitoring Division of Ministry of Statistics and Programme Implementation of India (http: / /www.mospi. nic. In) reports that out of 646 central sector projects which are of the order of more than $4.45 million, costing around $50 trillion and

average project duration of 6 to 7years, about 40% are behind schedule and the delay ranges from1 to 252 months. The schedule overrun in percentage terms as on December 2011 was reported to be 40.23% while the figure for the same as on December 2012 was reported to be 39.9%. One of the world's most famous construction projects is The Great Wall which Started over 2,000 years ago, and still being constructed during the 16th century A.D., the Great Wall was actually a series of walls constructed by different dynasties over the centuries. Stretching over 4,160 miles at its peak, it is estimated that between two and three million men died during its construction. The Great Wall was as much a symbol of imperial power as it was an effective military tool, and is unrivaled to this day as the world's longest construction project. (http://www.greatwall-of-china.com)

In developing countries like Kenya the local construction industry is one of the major economic sectors supporting the Government's national economy.

According toAmusan, L.M. (2012), the construction industry contributes significantly in terms of scale and share in the development process. The construction products provide the necessary public infrastructure and private physical structures for many productive activities such as services, commerce, utilities and other industries. The industry is not only important for its finished product, but it also employs a large number of people (directly and indirectly) and therefore has an effect on the economy of a country/region during the actual construction process. However, many local construction projects report poor performance due to many evidential project-specific causes such as: unavailability of materials; excessive amendments of design and drawings; poor coordination among participants, ineffective monitoring and feedback, and lack of project leadership skills (World Bank. 2010).

The construction sector in Kenya was greatly influenced by European colonialism. The railway line and growing European and Asian influence played a pivotal role in the urbanization process, and subsequently in the construction sector (Agweta, 2008). Trading centers developed along the railway line and they played a very important linkage between the rural areas and the modern urban-based sectors of the space economy. The growing urban populations of the small towns soon triggered an increase in construction activities in both urban and peri-urban centres. The colonial government paid no attention to controlling and regulating the planning and building of these centres. The uncontrolled development has remained to present day and time. This has subsequently become a characteristic feature of those centres even to date. At the time of

independence, there were difficulties facing the construction industry. These difficulties included serious shortage of all kinds and levels of skilled labour, lack of easy means of training, Bottlenecks in the supply chain and scarcity of crucial building materials produced in Kenya. These were worsened by the fact that inappropriate designs were adopted and a serious failure to adapt technologies employed to the level of resources that was available. This was reflected in the rapid increases in prices of deliverables as well as significant and noticeable fall in the quality of work in the sector. Corrective policies were notably missing to make right the wrongs done by the players in the sector. At the time, most firms were predominantly owned and operated by non-citizens, especially the Asians who were earlier used as contract labour from India, and they stayed in Kenya after their contracts expired (Nthenge, 2009).

The Government formed the National Construction Corporation that sought to enable African contractors enter the industry, a very competitive market. Its philosophy was 'learning by doing' whereby the African contractors were to be assisted and trained during the construction process. The functions of National Construction Corporation were to help contractors obtain work, provide them with adequate finance, Assist them with the actual construction process (Nthenge, 2009). In 2011 the Government formed The National Construction Authority to streamline, overhaul and regulate the construction industry in Kenya. The industry has for many years suffered poor legislative framework and has been dominated by quacks and unqualified persons(www.nca.go.ke).Kenya's construction sector provides many opportunities for architectural, engineering, or construction. There is a strong demand for office buildings, hotels, and infrastructure projects. The demand for residential buildings is also high due to the country's growing affluence. There is an upsurge demand by both locals and expatriates for well planned residential areas, quality housing, and amenities (Hass property index 2013).

The real estate sector in Kenya has seen a boom that begun somewhere in the mid to late 2000's because the property market is responding to demand that has been created by the expanding middle class with disposable income and in which people have become able to service their mortgages. In 2012, the property markets in Nairobi and Mombasa, the largest and second-largest cities in Kenya respectively, earned two of first and second positions of 71 cities surveyed globally to outstrip all other Prime International Residential Index locations. They were the only cities in the "southern hemisphere" to have reported double digit property price increases, despite a defying a surge in lending rates and a weak global economy(Hass property index 2013).Some

notable projects in Kenya include the Konza Technology City dubbed "Africa's Silicon Valley" which if completed will be the single largest property development ever done in Kenya. It costs a whooping US$ 14.5 billion after commencing in January 2013 and is to be completed by 2030.Another development is Tatu City which is a property development by Moscow-based Renaissance Partners. The development will cost US$ 2.5 billion; groundbreaking commenced in early 2013. In Mombasa County one of the most notable real estate developments is the English Point Marina in Nyali which will be east and central Africa's first floating pontoon marina. It will offer apartment living in the comfort, luxury and security of a hotel and will be managed by Pinewood Village Beach Resort. Units sold cost between KES. 36 and 150 million (US$ 410,000 – US$ 1.8 million). Despite the high prices, the units are almost sold out. The total cost of the project is about KES. 4.8 billion (US$ 60 million). As of March 2013 the project was 30% complete (Hass property guide, 2014).

1.2 Statement of the Problem

Construction projects face major challenges towards achieving their successful completion. In the development of any country, the construction industry plays vital roles in transforming the aspirations and the needs of its people into reality by implementing various physical structures. A construction project is commonly acknowledged as successful when it is completed on time, within budget, and in accordance with specifications and to stakeholder's satisfaction. Functionally, profitability to contractor's absence of claims and court proceedings and "fitness for purpose" for occupiers has also been used as measures of project success. Successful construction project performance is achieved, when stakeholders meet their requirements, individually and collectively. The level of success in carrying out construction project development activities will depend heavily on the quality of the managerial, financial, technical and organizational performance of the respective parties, while taking into consideration the associated risk management, the business environment, and economic and political stability.

Construction is becoming more complex, a more sophisticated approach is necessary to deal with initiating, planning, financing, designing, approving, implementing, and completing a project. Effects of abandonment of projects are disappointment of the populace/users, low living standard, and unemployment, wastage of resources, decrease in tempo of economic activities and decrease in revenue to government. Abandonment of projects are caused by inadequate planning, inadequate finance, inflation, delayed payment and political factors, incompetent project

managers, wrong estimates, design and inadequate cost control. There are many constructed projects which fail in time performance, others fail in cost performance and others fail in other performance indicators. In addition there are other indicators of performance in construction projects such as project manager's competence, coordination between participants, monitoring, feedback and leadership skills. Therefore this study sought to identify and to evaluate the main factors affecting the performance of construction projects in Mombasa County.

1.3 Purpose of the Study

The purpose of the study was to determine the factors affecting the performance of construction projects of residential and commercial buildings in Mombasa County.

1.4 Objectives of the Study

The study was based on the following objectives:

1. To determine whether project manager's competence influences the performance of construction projects in Mombasa County.
2. To establish whether ccompetition during tendering influences the performance of construction projects in Mombasa County.
3. To assess the extent to which time allocation influence the performance of construction projects in Mombasa County.
4. To establish the extent to which client's demands during construction influences the performance of construction projects in Mombasa County.

1.5 Research Questions

The study was guided by the following research questions:

1. To what extend do project manager's competence influence the performance of construction projects in Mombasa County?
2. To what extend docompetition during tendering influence the performance of construction projects in Mombasa County?
3. To what extend do time allocation influence the performance of construction projects in Mombasa County?
4. To what extend do client's demands during construction influence the performance of construction projects in Mombasa County?

1.6Research Hypothesis

The study was guided by the following research hypothesis:

1. (H$_1$): Project Manager's Competence influences the performance of construction projectsin Mombasa County.
2. (H$_1$): Competition during Tendering influences the performance of construction projectsin Mombasa County.
3. (H$_1$): Time allocation influences the performance of construction projectsin Mombasa County.
4. (H$_1$): Client's interference during construction influences the performance of construction projectsin Mombasa County.

1.7 Significance of the Study

Construction industry has complexity in its nature because it contains large number of parties as clients, contractors, consultants, stakeholders, shareholders, regulators and others. Construction projects in the Mombasa County suffer from many problems and complex issues in performance because of many reasons and factors. This study is very important to identify and to evaluate the main factors affecting the performance of construction projects in the Mombasa County. The practices concerning with the KPIs such as time, cost, project owner satisfaction and safety checklists will be analyzed in order to know the main practical problems of projects performance and then to formulate recommendations to improve performance of construction projects in the County. Because previous studies in the Mombasa County about this topic do not deal with all aspects of construction project performance; this study is important to be considered because it can be used to measure performance in construction projects and can then be used for benchmarking purposes. This will be a key component of any organization move towards achieving best practice in order to overcome performance problem in Mombasa County.

This study will contribute to the project management body of knowledge by uncovering how projects can be effectively managed in Mombasa County. It provides greater insight into the key factors that may impact project success and provides players in Mombasa's construction industry with an understanding of how to achieve outstanding results in their projects. This is important because despite the many studies done on international project management, they may not be applicable to Mombasa's unique construction industry needs. The study would provide important

information that would enable clients, investors and financiers in the construction industry make accurate decisions to avoid loses brought about by persistent project overruns in schedule and budget. The study would enable contractors understand the factors that affect the performance of construction projects improving the effectiveness of construction projects leading to high profitability. The County Government could use the study findings during planning and implementation of County projects to improve on project performance.

1.8   Limitations of the Study

The study faced the following limitations:

1. Limited time due to the working hours in the work place and the distance factor to the construction projects offices to be visited. However this will be overcome by creating time during the weekends and at times travelling late in the evening for information.

2. Lack of adequate funds was a great drawback of the study in terms of meeting all the financial and logistical operations hence compromising a great deal the results of the study due to squeezing of the available resources to meet the research demands. To mitigate this, the researcher proposed to reduce the sample that gives representative information.

3. The time for the research was not be enough for all the research procedures especially for collection of adequate data this is because construction projects may require more than one year for completion. The procedures may be done in hurry so as to complete the research in time. Time constraint will therefore be a great drawback as far as the research results would be concerned.

4. The spread of respondents identified in the sample presented access problems in terms of transport and communication. This was mitigated by use of telephone and e-mail during follow up.

1.9   Delimitations of the Study

The study delimited itself by concentrating on the factors affecting the performance of construction projects in Mombasa County. The geographical scope was selected construction projects in Mombasa County Kenya. The researcher may find it convenient doing the research since he resides in Mombasa County and is familiar with most of the construction projects in this area and this made it easier for him to obtain the required data from the construction sites. The researcher used a consent form seeking the acceptance or rejection of the respondents to

participate in the study and this assured the respondents of their voluntarism in participation in the research. The researcher is set to interview by administering questionnaires to construction managers with knowledge on construction activities and this improved the integrity of the research in terms of quality. The researcher will administer both questionnaire and key informant guide to the respondents in order to obtain both quantitative and qualitative information and this improved the research findings in terms of quality.

1.10   Definitions of Significant Terms

Construction:	Construction starts with planning, design, and financing and continues until the structure is ready for occupancy.
Performance:	The way, in which somebody does a job, judged by its effectiveness.
Manager's competence:	The state or quality of being adequately or well qualified with specific range of skill, knowledge, or ability to perform a task by a manager.
Tendering:	The process of offering Sealed bid or offer document submitted in response to a request for tenders and containing detailed information on requirements and terms associated with a potential contract.
Time allocation:	Time allocation is the allocation of time to different tasks and activities during the construction process.
Client's demands:	The act or an instance of hindering, obstructing, or impeding the progress during construction by creating new or additional demands.
Commit to Invest:	The point at which the client decides in principle to invest in project sets out the requirements in business terms and authorizes the project team to proceed with the conceptual design.
Commit to Construct:	The point at which the client authorizes the project team to start the construction of the project.
Available for Use:	The point at which the project is available for substantial occupancy or use. This may be in advance of the completion of the project.

End of Lifetime of Project: The point at which the period over which the project is employed in its original or near original purpose ends.

1.11 Organization of the Study

This report is organized in five chapters. Chapter one is the introduction which includes the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, statement of the problem, purpose of the study, objectives of the study, research questions, research hypothesis, significance of the study, delimitations of the study, basic assumptions and the definition of significant terms. Chapter two of the study consists of the literature review with information from other articles which are relevant to the researcher. Chapter three entails the methodology to be used in the research. Chapter four data analysis, presentation and interpretation. Chapter five consists of summary of findings, discussions, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

According to Kombo and Tromp (2003) literature review is an account of what has been published on a topic by accredited scholars and researchers. It is a critical look at the existing research that is significant to the work that the researcher will be carrying out. Therefore this chapter presents a review of literature related to construction performance. The researcher attempts to highlight the common factors that affect the performance of construction projects which is an integral guide to the researcher's focus on the independent variables of the study.

2.2 Overview of Construction Performance

Okuwoga (1998) stated that the performance of the construction industry is considered as a source of concern to both public and private sector clients. Karim and Marosszeky (1999) studied performance measurement using key performance indicators (KPIs). KPIs enable a comparison between different projects and enterprises to identify the existence of particular patterns. The specialist contractors hoped that the data trends observed will provide insight into certain inefficiencies that are prevalent in the market. They intend to use the data expose these inefficiencies and as a basis for industry development.

Key performance indicators (KPIs) include factors such as time, cost, quality, client satisfaction, client changes, business performance and safety in order to enable measurement of project and organizational performance throughout the construction industry. This information can then be used for benchmarking purposes, and will be a key component of any organization move towards achieving best practice (DETR, 2000).

Lehtonen (2001) stated that performance measurement is a current issue in academia, as well as in business community. Samson and Lema (2002) stated that KPIs are very important in order to deliver value to stakeholders. So, companies must be sure they have right processes and capabilities in place. The KPIs also allow to trace which processes and capabilities must be competitively and distinctive, and which merely need to be improved or maintained. Performance measurement and its indicators had been studied for several years.

Reichelt and Lyneis (1999) defined performance measurement as a model which treat project as the complex dynamic system. The key performance indicators are identified by DETR (2000) as an applicable indication of project and/or company levels. In some cases the company indicator is the average value of that company's project indicators. Al-Momani (2000) stated that the owner satisfaction for performance can be defined as the gap between what the owner expects and the level of performance they believe is being delivered by the contractors. Lehtonen (2001) stated that performance measurement is a basis for progressive improvement and monitoring of company productivity. Chan and Kumaraswamy (2002) remarked that project performance measurement include time, budget, safety, quality and overall client satisfaction. Thomas (2002) defined performance measurement as monitoring and controlling of projects according to regular basis. Kuprenas (2003) stated that project performance measurement means an improvement of cost, schedule, and quality for design and construction stages. Long et al (2004) stated that a project performance measurement is related to many indicators such as time, budget, quality, specifications and stakeholders' satisfaction.

Navon (2005) defined performance measurement as a comparison between the desired and the actual performances. Ugwu and Haupt (2007) classified the key performance indicators as site-specific and project-specific. Early Contractor Involvement (ECI) and Early Supplier Involvement (ESI) give contractors and suppliers the opportunity to give advice and/or specific ideas earlier to enhance performance. According to previous studies, concepts and definitions, it can be said that the performance measurement is a process include factors as Key Performance Indicators(KPIs) such as time, cost, quality, client satisfaction; productivity and safety in order to enable measurement of current organizational project performance and to achieve significant performance improvements of future projects.

2.3   Failure of Performance in Construction Projects

The failure of any construction project is mainly related to the problems and failure in performance. Moreover, there are many reasons and factors which attribute to such problem. Ogunlana et al, (1996) stated that the construction industry performance problems in developing economies can be classified in three layers: problems of shortages or inadequacies in industry infrastructure (mainly supply of resources), problems caused by clients and consultants and problems caused by contractor incompetence/inadequacies.

Okuwoga (1998) identified that the performance problem is related to poor budgetary and time control. Long et al (2004) remarked that performance problems arise in large construction projects due to many reasons such as: incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Navon (2005) stated that the main performance problem can be divided into two groups: (a) unrealistic target setting (i.e., planning) or (b) causes originating from the actual construction (in many cases the causes for deviation originate from both sources).

Samson and Lema (2002) found that the traditional performance measurement systems have problems because of large and complex amount of information with absence of approaches to assist decision maker understand, organize and use such information to manage organizational performance. Navon (2005) remarked that traditional project performance control is usually generic (e.g., cost control techniques). It relies on manual data collection, which means that it is done at low frequency (normally once a month) and quite some time after the controlled event Occurred (i.e., not in real-time). Moreover, manual data collection normally gives low quality data. Ling et al (2007) remarked that architectural, engineering and construction (AEC)firms may face difficulties managing construction projects performance in China because they are unfamiliar with this new operating environment. Kim et al (2008)stated that international construction projects performance is affected by more complex and dynamic factors than domestic projects; frequently being exposed to serious external uncertainties such as political, economical, social, and cultural risks, as well as internal risks from within the project.

2.4   Construction Management and Project Performance

There is a strong relation between project management and project performance. Management in construction industry is considered as one of the most important factors affecting performance of works. Brown and Adams (2000) studied a new approach to the measurement of the effect of Building Project Management (BPM) on time, cost and quality outputs using 15 `cases' derived from UK data. The evaluation undertaken demonstrates that BPM as it is presently implemented in the UK fails to perform as expected in relation to the three predominant performance evaluation criteria; time, cost and quality. Lehtonen (2001) obtained a model for performance measurement which assist both firms' top management and operational managers for continuous feedback on operational activities. Thomas (2002) stated that documenting and archiving performance data could be useful for future reference, such as for settling disputes on claims, and

in maintenance and repair works. Kupren as (2003)remarked that quantification of the impacts of the project management processes are identified through three steps of analysis: comparison of summary statistics of design performance, proof of statistical significance of any differences and calculation of atleast squares regression line of a plot of design performance measurement versus amount/application of project management as a means to quantify management influence to design phase cost performance.

Cheung et al (2004) studied the project performance related to project managers. It is remarked that development of a Web-based construction Project Performance Monitoring System (PPMS) can assist project managers in exercising construction project performance indicators and can help senior project management, project directors, project managers, etc., in monitoring and assessing project performance. Pheng and Chuan (2006) stated that while project management is only one of the many criteria upon which project performance is contingent, it is also arguably the most significant as people formulating the processes and systems who deliver the projects. Ugwu and Haupt (2007) stated that an adequate understanding and knowledge of performance are desirable for archiving managerial goals such as improvement of institutional transformations, and efficient decision making in design, specification and construction, at various project-level interfaces, using appropriate decision-support tools. Ling et al (2007) investigated project management (PM) practices adopted by Singaporean construction firms. It was determined the performance level of their projects in China; identifies PM practices that led to better performance; and recommended key PM practices that could be adopted by foreign construction firms in China to improve project performance.

2.5   Information Technology and Projects Performance

Information technology technique is very important in the entire world. Information technology (IT) opens new visions in the businesses and industries performance of the world. The construction industry is considered as one of the industries using IT technique such as software management systems, database and communications. For many years, many processes, functions, operations were done difficulty because of absence of IT field. In addition, most of the work was done manually which lead to more cost, time and poor performance. Furthermore, IT usage in the construction industry leads to many changes, innovations and developing in many aspects which lead finally to good and strong performance. There are many benefits and relations of using IT in the construction projects such as: greater use of IT correlates with better project

performance, owners and contractors realize meaningful benefits, IT affects schedule compression beneficially, and overall project cost savings which lead to a success performance of project (Schwegler et al, 2001).

Nitithamyong et al (2004) remarked that information Technology (IT) is now routinely used in the construction industry as a tool to reduce some of the problems generated by fragmentation. The use of IT improves coordination and collaboration between firms participating in a construction project, leading to better communication practices and so good performance. Its benefits include an increase in the quality of documents and the speed of the work, better financial control and communications, and simpler and faster access to common data as well as a decrease in documentation errors.

Thomas (2002) proposed contractor Performance Appraisal and Reporting (PAR) system for reviewing contractor performance at an organizational level. Advancements in World Wide Web techniques provide enhanced capacities to collect compile and disseminate performance-related information to various construction stakeholders in a timely and cost-effective manner. Becerik (2004) stated that the rapid advances of web-based project management and collaboration technology offer new opportunities to improve existing construction project performance. Cheung et al (2004) obtained framework software to measure project performance based on project performance measurement system (PPMS). The system contains four stages which are data entry, database, reporting and action. This system has eight categories to measure performance which are people, cost, time, quality, safety and health, environment, client satisfaction, and communication. Goh (2005) remarked that information technology management leads to performance improvement in the construction industries. For instance, in Singapore 2003, general administration, design, project management, site management was enhanced by using of IT. In addition, there were more advantages as quick working, good quality of work and fast access of information.

2.6   Measurement of Project Performance

Al-Momani (2000) stated that the success of any project is related to two important features, which are service quality in construction delivered by contractors and the project owner's expectations. Managing the construction so that all the participants perceive equity of benefits can be crucial to project success. It is obtained that the complete lack of attention devoted to

owner's satisfaction contributes to poor performance. Declining market shares, low efficiency and productivity, and the rapid construction cost escalation also lead to poor performance. Nitithamyong et al (2004) remarked that the success of construction projects depends up on technology, process, people, procurement, legal issues, and knowledge management which must be considered equally.

Pheng and Chuan (2006) defined project success as the completion of a project within acceptable time, cost and quality and achieving client's satisfaction. Project success can be achieved through the good performance of indicators of the project. So, success refers to project success and performance refers to performance of indicators such as project managers. Wang and Huang (2006) stated that Project success has been widely discussed in the project management (PM) literature. The focus of most studies of project success is on dimensions of project success (how to measure it) and factors influencing project success.

Karim and Marosszeky (1999) stated that performance measurement systems have been one of the primary tools used by the manufacturing sector for business process re-engineering in order to monitor the outcomes and effectiveness of implementation. Brown and Adams (2000) obtained an evaluation framework to measure the efficiency of building project management (BPM) by using conventional economic analysis tools such as time, cost and quality. Lehtonen (2001) stated that performance measurement systems are imminent in the construction firms. Samson and Lema (2002) stated that effective and efficient management of contractors' organizational performance requires commitment to effective performance measurement in order to evaluate, control, and improve performance today and in the future.

Tangen (2004) obtained that performance measurement is a complex issue that normally incorporates at least three different disciplines: economics, management and accounting. Measurement of performance has garnered significant interest recently among both academics and practitioners. Tangen (2004) remarked the choice of a suitable measurement technique depends on a number of factors, including the purpose of the measurement; the level of detail required; the time available for the measurement; the existence of available predetermined data; and the cost of measurement.

Navon (2005) defined performance measurement as a comparison between the desired and the actual performances. For example, when a deviation is detected, the construction management analyzes the reasons for it. The reasons for deviation can be schematically divided into two groups: (a) unrealistic target setting (i.e., planning) or (b) causes originating from the actual construction (in many cases the causes for deviation originate from both sources). Navon (2005) stated that performance measurement is needed not only to control current projects but also to update the historic database. Such updates enable better planning of future projects in terms of costs, schedules, labor allocation, etc. Pheng and Chuan (2006) stated that the measurement of project performance can no longer be restricted to the traditional criteria, which consist of time, cost and quality. There are other measurement criteria such as project management and products.

Cheung et al (2004) stated that New South Wales Public Works Department in Australia launched a Project Performance Evaluation (PPE) framework, which covers a wide range of performance parameters. PPE parameters are communication, time, cost, quality, safety, claims and issues resolution, environment, contract relations. The main purpose of PPE is to extend project performance measures to cover soft parameters also, such as communication and dispute resolution. In the UK, a project performance measurement tool referred to as the Key Performance Indicators (KPIs) was developed by the KPI working group under the UK Construction Industry Best Practice Programme to include time, cost, quality, client satisfaction, change orders, business performance, health and safety. The three major steps in implementing KPIs are as follows: Decide what to measure, Collect data and Calculate the KPIs.

However, both the PPE and KPIs are valuable tools for measuring project performance over a period of time. Anyway, it is obtained from previous study that both methods PPE and KPIs can be used for measuring of performance as the indicators are similar in two methods. In this study KPIs method will be used to measure performance. Iyer and Jha (2005) stated that measuring the performance of any construction project is a very complex process because modern construction projects are generally multidisciplinary in nature and they involve participation of designers, contractors, subcontractors, specialists, construction managers, and consultants. With the increasing size of the project, number of participants in the project also increases. The objectives or goals of all participants need not be same even in a given project. Hence to measure performance of a project without specifying the participant and without specifying the criteria for

judging the performance holds no meaning. Past researchers have employed different criteria such as compliance to schedule, cost and quality to judge the project performance.

Lehtonen (2001) proposed new framework for measuring construction logistics by using two-dimensions in order to improve productivity. The first dimension (use of measures) contains two kinds of measures. One of these kinds is called improvement measures which help construction industry to find out the problems with current practices. These measures are mainly used during development projects. Another kind is called monitoring measures which are used for continuous monitoring of operations. The second dimension of the framework is the focus of measures. It clarifies at which organizational level measures can be used.

There should be information available at the company and project level, as well as at the specific supplier or subcontractor level. Samson and Lema (2002) proposed performance measurement system. The system comprises of construction business perspective including innovation and learning, processes, project, stakeholders, and financial perspective. The indicators developed from perspectives are categorized into three main groups which are drivers' indicators, process indicators and results indicators. The key to the success or failure of the measurement system are leadership commitment; employees' involvement and empowerment; and information coordination and management. Shen et al (2005) presented a method for measuring the environmental performance of construction activities committed by a contractor through calculating the contractor.

2.7 Project Managers Competence and Project Performance

International Project Management Association (IPMA) defined competence as knowledge, experience and personal attitude. Knowledge and experience relate to function and attitude which relates to behaviour (IPMA, 2002). Hornby and Thomas (1989) defined competency as knowledge, skills, and qualities of effective managers, and point to the ability to perform effectively the functions associated with management in the work situation. According to Hogg (1993) the competencies are the characteristics of a manager which lead to the demonstration of skills and abilities and result in effective performance within an occupational area.

Project management action is a key for project success, Hubbard (1990); Jaselskis and Ashley (1991) suggested that by using the management tools, the project managers would be able to plan

and execute their construction projects to maximize the project's chances of success. Then, the variables in project management include adequate communication, control mechanisms, feedback capabilities, troubleshooting, coordination effectiveness, decision making effectiveness, monitoring, project organization structure, plan and schedule followed, and related previous management experience, Walker and Vines (2000).

Ogunlana et al, (1996) recommended the need for focused effort by economy managers and construction industry associations to provide the infrastructure needed for efficient project management and performance. Dissanayaka and Kumaraswamy (1999) stated that the knowledge that would influence potential performance enables project managers to pay special attention to control performance more effectively. Chan and Kumaraswamy (2002) remarked that effective communication and fast information transfer between managers and participants help to accelerate the building construction process and performance. Kuprenas (2003) studied the impact of the use of a project management based organizational structure, project manager training, frequency of design meetings, and frequency of design reports on design phase cost performance. The process of a design team meeting frequency and the process of written reporting of design phase progress were found to be statistically significant in reducing design phase costs.

Navon (2005) stated that data are collected and used for construction managers as a basis to evaluate the project performance indicator's (PPI) actual value to compare it with the planned value and forecast its future value based on past performance. Pheng and Chuan (2006) identified the importance of the working environment variables for the performance of a project manager in the private and public sectors according to three main groups which are job condition, project characteristic and organizational related categories. The result revealed that working hours, physical condition of project site, complexity of project, material and supplies, project size, duration of project and time availability were viewed differently in terms of importance by the contractors and consultants groups. Team relationship was ranked as the most important variable affecting the performance of a project manager. It is obtained that project managers' experiences do not have much effect on how they perceive their working environment.

2.8   Procurement and Tendering and project performance

A number of researchers identified the importance of procurement and tendering. Pocock et al. (1997); Walker (1997); Kumaraswamy and Chan (1999); Walker and Vines (2000). Dissanayaka and Kumaraswamy (1999) defined the scope of procurement as the framework within which construction is brought about, acquired or obtained. Therefore, two attributes are used to measure this factor; they are procurement method, selection of the organization for the design and construction of the project and tendering method procedures adopted for the selection of the project team and in particular the main contractor.

Dissanayaka and Kumaraswamy (1999) remarked that one of the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. Morris (1986) noted that competitive bidding can adversely affect the outcome of major projects and the number of separate contracts in a project is related to the successful project performance. During the parlous economic conditions, it has been quite common for many contractors to be involved in a tender. The lowest tender price, most of the time, will be selected and the contractor, in fact, has pulled down their profit margin in order to meet the lowest price criteria. Indirectly, they will suffer higher risk of making lost money when come to the construction stage. Thus they need to properly plan and control the project, to avoid any mistakes which will incur additional cost.

To safeguard their profit, most of the contractors who were awarded a low price tender, will try to compromise on quality, in order to meet the targeted tender price. Counter proposed of cheaper alternative design by contractors is widely practicing in local construction industry. Some alternative design may only meet the purpose of cost effective and fulfill the basic functionality as compare to original design, but in some instances, it will have better performance than original design. If the number of separate contracts in a project is more than one, the chances of dispute happen in between the parties will be higher if the coordination of interfaces and communication is inadequate.

According to Pheng and Chuan (2006),aggressive competition sometimes forces the bidders to quote low for the project. Once awarded the project they are not motivated enough to do a quality job. To make some profit out of the project they sometime try to use inferior materials and bad technical practices, leading to poor quality. The problem of a low bid is quiet common

in cases of government-owned projects. While it is perfectly logical for the government, being the guardian of public funds, to accept low bids, selection of a low bidder more often than not causes problems to the project. In addition, the low bidder sometimes resorts to subcontracting the entire project to unqualified contractors, leading to poor quality.

2.9 Time Allocation and Project Performance

Chan and Kumaraswamy (2002) remarked that studies in various countries appear to have contributed significantly to the body of knowledge relating to time performance in construction projects over the past three decades, while Iyer and Jha (2005) remarked that project performance in term of cost is studied since 1960s. These studies range from theoretical work based on experience of researcher on one end to structured research work on the other end. Moreover, Pheng and Chuan (2006) stated that there have been many past studies on project performance according to cost and time factors.

Chan and Kumaraswamy (1996) stated that a number of unexpected problems and changes from original design arise during the construction phase, leading to problems in cost and time performance. It is found that poor site management, unforeseen ground conditions and low speed of decision making involving all project teams are the three most significant factors causing delays and problems of time performance in local building works. Okuwoga (1998) stated that cost and time performance has been identified as general problems in the construction industry worldwide. Dissanayaka and Kumaraswamy (1999) remarked that project complexity, client type, experience of team and communication are highly correlated with the time performance; whilst project complexity, client characteristics and contractor characteristics are highly correlated with the cost performance. Reichelt and Lyneis (1999) obtained that project schedule and budget performance are controlled by the dynamic feedback process. Those processes include the rework cycle, feedback loops creating changes in productivity and quality, and effects between work phases. Chan (2001) identified that the best predictor of average construction time performance of public sector projects. This relationship can serve as a convenient tool for both project managers and clients to predict the average time required for delivery of a construction project.

Kuprenas (2003) stated that process of a design team meeting frequency and the process of written reporting of design phase progress were found to be statistically significant in reducing

design phase costs. Otherwise, the use of project manager training and a project management based organizational structure were found to be processes that do not create a statistically significant in reducing design phase costs

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

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

2.10   Client Interference during Construction and Project Performance

Client in a construction project is a main key person who led the project team members. They invest their money into a construction project, and aim to gain some return after the completion of a project. However, the construction industry is one of the most risky industries, where a lot of uncertainties may happen in middle of the construction process, and cause deep impact to the client financial status. According to Cooke-Davies (2002), the performance predicts success and success factors affect performance. In order to identify the "real" success factors of projects, Cooke-Davies highlighted the importance of the clients' attributes in relation to the construction project performance. This corroborates Latham's (1994) statement that "Implementation begins

with clients. Client is at the core of the process and their needs must be met by the industry". The assessment of the effect of the client's attributes on project performance can be classified in terms of the client's type, size, financial stability, experience, organizational structure, duty and attitude.

Client's experience in construction industry has been identified by Nahapiet (1983) as affecting performance. If the client would like to succeed in construction project, they must take on a good deal and more specifying their requirements. Experience client will specify clearly all objectives and requirement that need to be achieved in early stage of construction. Then they will closely control and monitoring project with effectively and efficiency, in order to achieve the project goals that have been set. Banwell (1964) criticized public clients for imposing excessively rigid procedures on the contractor selection process. However Sidwell (1983) found that the private client was more specialized and "in general", achieved improved performance. Some industry players found that the clients in local industry were responsible for delays in issuing approvals, signing contracts and allowing site possession and that they were responsible for the largest proportion of variations, all of which have time and cost implications. Wearne and Ninos (1984) found that effective control of construction was dependent on the client's decisions on the authority vested in his project team. If the client would like to interrupt everything and interfere in all his team members' work, the team members' interest and motivation will reduce and hence affecting the project performance.

2.11   Conceptual Framework

The conceptual framework outlines the dependent, independent and intervening variables as discussed in the literature review and elaborated in the Figure 1 below. It helps one to understand the relationship between the variables of the study.

Independent Variables

Manager's Competence

- Communication System
- Control Mechanism
- Managerial Actions

Competition During Tendering

- Work Experience
- Price Quoted

Dependent Variable

Performance of Construction Projects in Mombasa County

Time Allocation

- Complexity of Project
- Size of Project
- Availability of Funds

Moderating Variable

Client's Interference

- Contribution to Design
- Ability to Make Decisions
- Technical Skills

Government policies

- County by Laws
- NEMA Regulations
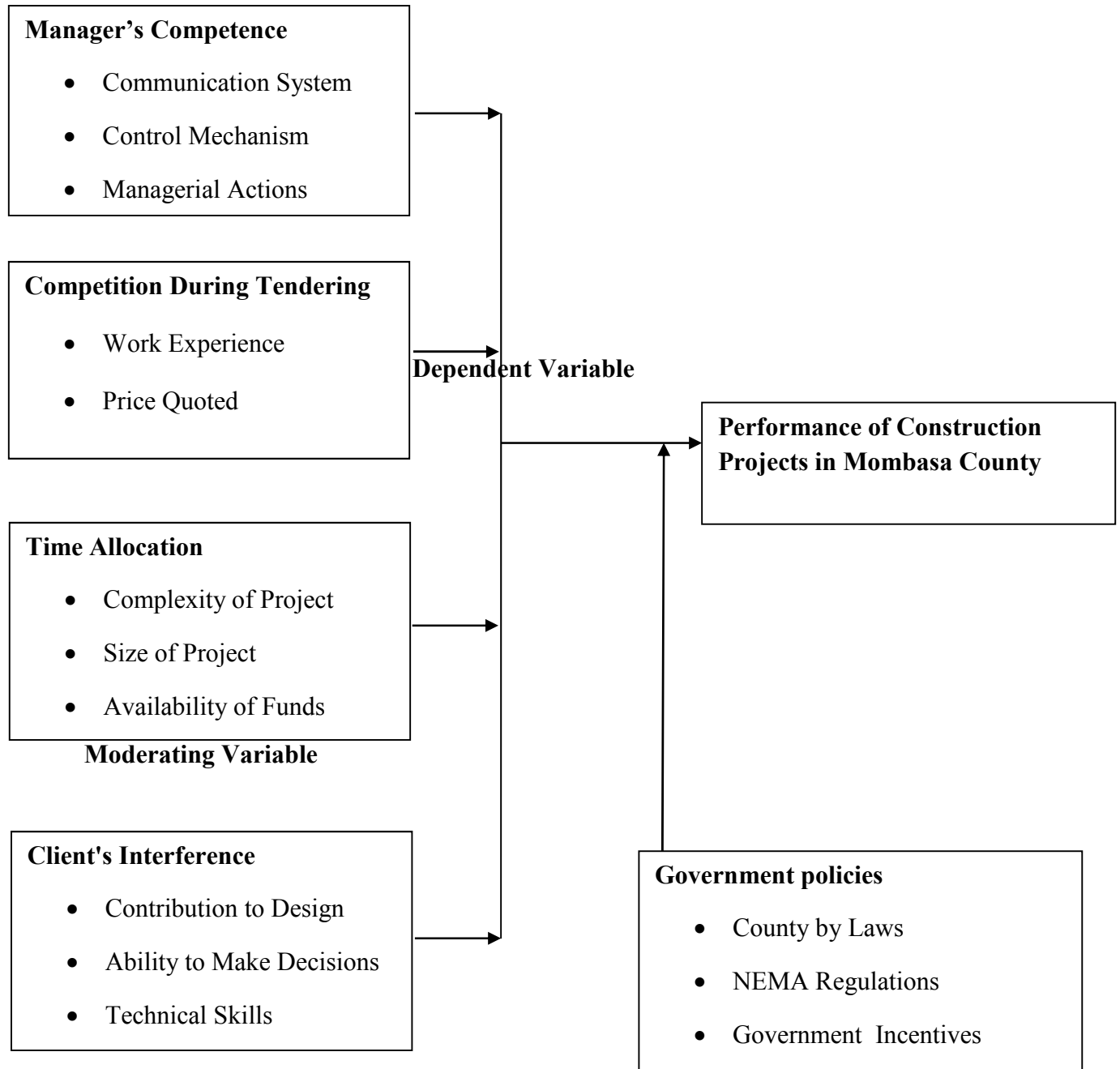- Government Incentives

Figure 1: Conceptual Framework

The main objective of the study was to determine the factors affecting the performance of construction projects of residential and commercial buildings in Mombasa County. In this research a conceptual framework is adopted as illustrated in figure 2.1 below. The dependent variable identified was Performance of construction projects, which may be varied due to the Independent variables. In this research the independent variables were identified as project manager's competence, aggressive competition during tendering, project time allocation and client's interference during construction. The moderating variables and intervening variables are equally important as they directly or indirectly influence the independent variables. These moderating variables and intervening variables include County by laws, NEMA regulations, Government incentives, Technology advancement, Social environment, Political environment and Climate conditions.

2.12   Summary of Literature Review

The literature identifies numerous potential factors that could be affecting construction performance in the world. Although this significant body of knowledge exists, extant review of the literature suggests that there is lack of rigorous theoretical and empirical examination to establish the underlying characteristics of the numerous factors identified, especially with regard to the performance of construction projects in Kenya.Each project is unique, and the construction processes differ from one project to another because of variations in factors such as the physical and economic environment, the team of workers involved, and the duration and location of the project. Cultures are separated by huge gaps defined by traditions and principles; these may hinder comparisons of construction project performances across countries.

According to these previous studies, it can be said that the performance measurement of construction projects is a process involving Key Performance Indicators (KPIs) such as time, cost, quality, client satisfaction; productivity and safety in order to enable measurement of current organizational project performance and to achieve significant performance improvements of future projects. It was obtained that there were many fields and topics which are related to performance such as, construction management, information technology, factors affecting performance of managers, measurement of project performance, and benchmarking. The key performance indicators are used to evaluate performance of construction projects. These indicators can then be used for benchmarking purposes, and will be as a key component of any organization to move towards achieving best practice and to overcome performance problem.

Based on previous studies and literature review, the most important indicators which will be studied in this research are project manager's competence, competition during tendering, project time allocation and client's interference during construction.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology that was used in conducting the study. It describes the study area, research design, target population, sample size and sample selection, the research instruments to be used, their reliability and validity, procedures for data collections, techniques for data analysis.

3.2 Research Design

The research study used simple descriptive survey to gather information on relationship between performance of construction projects and factors affecting construction projects. Descriptive survey is a method of collecting information by interview or administering a questionnaire to a sample of individuals (Orotho, 2003). Survey research uses a selected portion of the population from which the findings can later be generalized back to the population. Surveys are capable of obtaining information from large samples of the population. They are also well suited to gathering demographic data that describe the composition of the sample (McIntyre, 1999). Surveys are inclusive in the types and number of variables that can be studied, require minimal investment to develop and administer, and are relatively easy for making generalizations (Bell, 1996).

3.3 Target Population

A population is a group of individuals, objects or items from which samples are taken for measurement (Kombo and Tromp, 2006). The population of the research was comprised of the project Architects of active construction projects, project Engineers, project managers, and project supervisors in Mombasa County. According to Mombasa County Building and Architecture department 650 proposals for residential and 150 proposals for commercial development were approved for construction in the past 12 months. Therefore the researcher established the target population to be eight hundred (800), and considered this to be adequate in providing data for the study.

3.4 Sample Size and Sampling Procedures

This section will describe how the sample size will be determined. Kochari (2006) defined a sample as a representative part of a population. According to Ngulube (2003) sampling procedure is the process of selecting a specific number of respondents for a study. In this study the most appropriate sampling technique is using formula from Yamane (1967), whichprovides a simplified formula to calculate sample sizes. This formula was used to calculate the sample sizes and is shown below.

A95% confidence level and P = .5 are assumed for Equation. Where n is the sample size, N is the population size, and e is the level of precision.

Mathematically derived Yamane formula

$$n = \frac{N}{1 + N(e)2}$$

Where:

n = required responses

e = error limit

N = sample size

Source: Yamane (1967:258)

Placing information in the formula in diagram at a 95% confidence level and an error limit of 10% results in:

$$n = \frac{800}{1 + 800\,(0.10)2}$$

= 86 responses

Eighty-six responses would therefore be the lowest acceptable number of responses to maintain a 95% confidence level and a 10% error level.

The sample size formulas provide the number of responses that need to be obtained. Many researchers commonly add 10% to the sample size to compensate for persons that the researcher is unable to contact. The sample size also is often increased by 30% to compensate for non-response. Thus, the number of mailed surveys or planned interviews can be substantially larger than the number required for a desired level of confidence and precision.

Random sampling method will be used to select the research respondents. In random sampling, each item or element of the population has an equal chance of being chosen. In this research the

construction sites to be visited will be chosen randomly where they all have an equal chance of participating in the research.

Table 3.1:   Sample Size

Category	Target population	Sample size	Percentage
Residential developments	**650**	**65**	**75.58%**
Commercial developments	**150**	**21**	**24.42%**
Total	**800**	**86**	**100%**

3.5Data Collection Methods

The research used both questionnaires and interview as the source of data. The questionnaires are designed to collect both quantitative and qualitative data. The questions consist of both open ended and closed ended questions .Closed ended questions were used in order to enable precise answers which would be easy and efficient during analysis and interpretation. The questionnaires were self administered and therefore contained questions in simple and straight forward language to enable the easy understanding by the respondents, drop and pick later method was used to administer the questionnaires follow up was done by visits to the site and telephone calls to ensure maximum response.

3.6   Validity and Reliability of the Research Instruments

This section presents test of validity and reliability of questionnaire according to the pilot study. Validity refers to the degree to which an instrument measures what it is supposed to measure (Pilot and Hungler, 1985). Validity has a number of different aspects and assessment approaches. Statistical validity is used to evaluate instrument validity, which include criterion-related validity and construct validity. To insure the validity of the questionnaire, two statistical tests should be applied. The first test is Criterion-related validity test (Spearman test) which measures the correlation coefficient between each paragraph in one field and the whole field. The second test is structure validity test (Spearman test) that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one filed and all the fields of the questionnaire that have the same level of similar scale. To test criterion-related validity test, the correlation coefficient for each item of the group factors and the total of the field is achieved. The p-values

(Sig.) are less than 0.01 for all results, so the correlation coefficients of each field are significant at á = 0.01, so it can be said that the paragraphs of each field are consistent and valid to measure what it was set for. The results of criterion-related validity test can be obtained with more details and tables through appendix.

The reliability of an instrument is the degree of consistency which measures the attribute; it is supposed to be measuring (Polit & Hunger, 1985). The less variation an instrument produces in repeated measurements of an attribute, the higher its reliability. Reliability can be equated with the stability, consistency, or dependability of a measuring tool. The test is repeated to the same sample of people on two occasions and then compares the scores obtained by computing a reliability coefficient (Polit & Hunger, 1985).

3.7   Data Collection Procedures

Data was collected from the construction project offices or from the field during construction activities. Interview guides were administered to the key informants including project managers, contractors, engineers, human resources officers and administrative officers from various construction firms.

3.8   Data Analysis and Presentations

Quantitative data obtained from the open ended questions was coded to facilitate quantitative analysis. The coded data was analyzed by use of descriptive statistics comprising of frequency tables. The hypothesis was tested by use of Chi Square. Data analysis was done by use of SPSS 17.0

3.9   Ethical considerations

According to the Social Research Association (2003) ethical guidelines enable researchers to make individual ethical judgments and decisions that comply with principles of research. The basic ethical principles are autonomy, beneficence, justice, informed consent, privacy, confidentiality and respect for persons. While research may well be intentioned, there is always a possibility that an interaction with the respondents may inadvertently cause psychological, financial or social harm. Singer (2008) notes that, in survey research, the breach of confidentiality and loss of privacy and the effect of such breaches are the most serious risk of harm to respondents. Such a breach may cause loss of employment, reputation, or civil or

criminal suits. In this study, all participants granted their consent during the sampling stage whereupon limited personal information was requested by the researcher to guide the administration of questionnaires.

The researcher ensured that the information provided was safeguarded and not revealed to any third party unless with the informed consent of the member and the participating in the research. The researcher observed ethics in data collection. Permission was sought from the project administration as well as from the respondents with explanations on how the research contributed towards enhancing proper project management methods. Privacy, confidentiality and dignity of the respondents were considered during the research. Names of the respondents were not being exposed and codes will be used instead. A study consent form was signed by the respondents to ensure voluntarism and acceptability to participate in the study. No compensation either financially or materially was given to the respondents for their participation in the study. However they were informed about the importance of participating in such studies.

3.10 Operational Definition of the Variables

Table 3.1: Operational Definitions of Variables

Objective/Research question	Independent Variable	Indicators	Instrument used	Scale
How does project manager's competence influence the performance of construction projects	Project manager's competence	Qualification Experience Managerial skills Communication	Questionnaire	Nominal
How does Aggressive Competition during tendering influence the performance of construction projects	Aggressive Competition during tendering	Work experience Price quoted	Questionnaire	Nominal
To what extend do time allocation influence the performance of construction projects	Time	Complexity of project Size of project Availability of funds Work quality	Questionnaire	Ratio
To what extend do client's interference during construction influence the performance of construction projects	Client's interference	Contribution to design Ability to make decisions Technical skills Rework	Questionnaire	Nominal

CHAPTER FOUR

DATA ANALYSIS PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter describes the process of data analysis, presentation of the results and discussion on information collected. The objectives of the study were to determine whether project manager's competence influences the performance of construction projects in Mombasa County, to establish whether competition during tendering influences the performance of construction projects in Mombasa County, to assess the extent to which time allocation influence the performance of construction projects in Mombasa County and to establish the extent to which client's demands during construction influences the performance of construction projects in Mombasa County

4.2 Response Rate

A total of 86 questionnaires were sent to the field for data collection and they were all completed and returned for analysis. The response rate was therefore 100%. The researcher counted this as a great success in his research as it would enhance the level of accuracy of the research. According to Mugenda, (2003) the bigger the sample size, the more accurate the results of analysis are in terms of representation of the whole population. The data was analysed using SPSS (Statistical Package for Social Scientists). 30 Engineer, 2 Manager, 20 Contractors, 5 Administrators, 10 Architects, 7 Foremen, and, 12 Other employees were considered for the study totaling to 86 respondents.

4.3 Demographic Characteristics and Basic Information of the Respondents

The study wanted to find out the bio data of respondents, age and educational level as shown in the tables below.

4.3.1 Bio-data of the Respondents

The study found out the sex composition of the respondents as shown in the table 4.1 below.

Table 4.1 Gender Composition of Respondents

Gender of the respondents	Frequency	Percent
Female	21	24%
Male	65	76%
Total	**86**	**100%**

Source : Research Findings

The table 4.1 above shows how the respondents were distributed by their gender. The findings show that female respondents were 21 representing 24% and male respondents were 65 representing 76%. It can therefore be concluded that the construction personnel population comprised mostly of males at 76%.

4.3.2 Age Distribution of Respondents

The study sought to find out the age brackets of the respondents in the study and the results were as shown in table 4.2 below.

Table 4.2 Age Distribution of Respondents

Age	Frequency	Percentage
20-29	30	34.88%
30-39	20	23.26%
40-49	20	23.26%
Over 50	06	06.98%
Total	**86**	**100%**

Source : Research Findings

The table shows that majority of the population that participated in the study was between ages 20-29 years making 34.88% .This was followed by 23.26% for ages 30-39 and 40-49 respectively. Those above 50 years made 6.98%

4.3.3 Educational Level of Respondents

The study sought to establish the level of education of the respondents since engineers, foremen, managers, contractors, architects etc. were part of the population.

Table 4.3 Academic Qualification of Respondents

Level of education	Frequency	Percent
Primary	2	2%
Secondary	21	25%
Polytechnic	11	13%
University	50	58%
Other	2	2%
Total	**86**	**100%**

The table 4.3 above shows how the respondents were distributed by their level of education. The information shows that majority of the respondents had university level of education represented by 50 respondents at 58%, 12 respondents at 25% of the respondents had secondary level of education whereas those with polytechnic level of education were 11respondents at 13% and those with primary level of education were only 2(2%). The results show that majority of the respondents in a construction firm are highly educated.

4.3.4 Project Types

The study sought to establish the distribution of construction projects as either residential, commercial or others.

Table 4.4 Distribution of the Project Types

Project type	Frequency	Percent
Residential	45	52%
Commercial	31	36%
Other	10	12%
Total	**86**	**100%**

Table 4.4 above shows how the respondents were distributed by their projects types in the construction projects in Mombasa County. The projects were 45(52%) being residential, 31(36%) being commercial and only 10(12%) being others.

4.4 Role of Project Managers' Competence

Respondents were asked to rate how the following factors related to the manager's competence affect the performance of construction projects in Mombasa county suing a scale of 1-5;where :Strongly disagree = 1, Disagree = 2, Weakly agree =3, Agree =4 Strongly Agree =5 and the following results were obtained.

Table 4.5Project Managers' Competence

Factor	1	2	3	4	5
Manager's qualification is important	0	2	8	30	46
Manager's experience is important	5	10	15	20	36
Manager's management skills are important in a project	2	8	8	35	33
Communication system of project manager is important	4	7	12	33	30

From the table above, 46 respondents strongly agreed/supported the idea that the manager's qualification is important in implementing construction projects,30 agreed, 8 weakly agreed and 2 disagreed with the statement. On the important of Manager's experience, 36 strongly agreed with the idea, 20 agreed, 15 weakly agreed 10 disagreed while 5 strongly disagreed with the statement. 2 strongly disagreed with the statement that, Manager's management skills are

important in a project 8 disagreed, 8 weakly agreed, 35 agreed, and 33 strongly agreed. On the factor that read, Communication system of project manager is important, 4 strongly disagreed, 7 disagreed, 12 weakly agreed, 33 agreed while 30 strongly agreed.

When asked to give the reasons for their views above, 76 respondents argued that if the manager is not competent and experienced, the construction projects could fail both in quality and objectives.10 respondents argued that experience and competence is not important in construction projects implementation but the willingness to perform duties efficiently.

4.4.1 Testing of the hypotheses using chi-square

(H_1): Project Manager's Competence influences the performance of construction projects in Mombasa County.

Table 4.6 Showing Observed and Expected Responses Project Manager's Competence

Scale	SD	D	U	A	SA
Observed (O)	2	8	8	35	33
Expected (E)	86	86	86	86	86

Table 4.7 Showing Chi-Square Testing for the Hypothesis

O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
2	86	-84	7056	82.04
8	86	-78	6084	70.74
8	86	-78	6084	70.74
35	86	-51	2601	30.24
33	86	-53	2809	32.66
				$\sum (O-E)^2/E = 286.42$

$\chi^2{}_C = 286.42 > \chi^2{}_{\alpha \; 0.05}$ 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 286.42 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thatProject Manager's Competence influences the performance of construction projects in Mombasa County.

4.5 Role of Competition

The respondents were asked to give their ratings on the role of competition and market trends and the completion of buildings undertaken in various construction projects using a scale of 1-5;where :Strongly disagree = 1, Disagree = 2, Weakly agree =3, Agree =4 Strongly Agree =5 and the following results were obtained.

Table 4.8 Competition factor

Factor	1	2	3	4	5
Construction company should be selected based on work experience on similar projects	5	4	10	32	35
Tendering and contracting process should undergo many stages as possible to come up with the required contractor	2	4	8	26	46
The lowest bidder should not necessarily be awarded the tender without other factors	4	5	10	28	39
Construction company should be selected based on the staff and equipment capacity	2	5	10	24	45

From the response ratings, 5 strongly disagreed with the fact that Construction Company should be selected based on work experience on similar projects, 4   disagreed with the issue, 10 weakly agreed, 32 agreed while the majority respondents making 35 strongly agreed. On the second factor that read, Tendering and contracting process should undergo many stages as possible to come up with the required contractor, had the respondents in the following ratios: 2 strongly disagreed, 4 disagreed,   8 weakly agreed,   26 agreed and 46 strongly agreed. Respondents on the factor, the lowest bidder should not necessarily be awarded the tender without other factors were, 4 strongly disagreed 5 disagreed   10 weakly agreed   28 agreed 39 strongly agreed. Construction Company should be selected based on the staff and equipment capacity had

respondents as follows: 2 strongly disagreed, 5 disagreed, 10 weakly agreed,   24 agreed and 45strongly agreed.

4.5.1 Testing of the Hypothesis

(H_1): Competition during Tendering influences the performance of construction projects in Mombasa County.

Table 4.9 Showing Observed and Expected Responses on Competition during Tendering

Scale	SD	D	U	A	SA
Observed (O)	2	4	8	26	46
Expected (E)	86	86	86	86	86

Table 4.10 Showing Chi-Square Testing for the Second Hypothesis

O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
2	86	-84	7056	82.04
4	86	-82	6724	78.18
8	86	-76	5776	67.16
26	86	-60	3600	41.86
46	86	-40	1600	18.64
				$\sum (O-E)^2/E = 287.88$

$\chi^2{}_C = 287.88 > \chi^2{}_{\propto\ 0.05}$ 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 287.88 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus; Competition during Tendering influences the performance of construction projects in Mombasa County.

4.6 Role of time.

The respondents were asked to rate the extent to which the factors related to time impacted on construction projects completion and the results below obtained.

Table 4.7 Response on Time

Factor	1	2	3	4	5
Complexity of project should determine the time allocation	7	7	17	23	32
Project size should determine the time allocated to projects	10	11	12	20	33
Availability of funds should be considered when allocating project time	08	11	12	25	30
Time and quality of work should be a priority during project implementation	10	09	16	24	27

The ratings on the influence of time attracted the following,7 strongly disagreed with the factor that complexity of project should determine the time allocation, 7 disagreed, 17 weakly agreed ,23agreed and 32 strongly agreed.10 strongly disagreed, 11 disagreed, 12 weakly agreed,   20 agreed and 33 strongly agreed on the idea that project size should determine the time allocated to projects. On the factor that touched on whether availability of funds should be considered when allocating project time, responses were as follows: 8 strongly disagreed, 11 disagreed, 12 weakly agreed, 25 agreed and 30 strongly agreed. Time and quality of work should be a priority during project implementation factor attracted respondents as follows: 10 strongly disagreed, 09 disagreed, 16 weakly agreed, 24 agreed and 27 strongly agreed.

4.6.1 Testing of the Hypothesis

(H1): Time allocation influences the performance of construction projects in Mombasa County.

Table 4.13 Showing Observed and Expected Responses on Role of Time allocation Scale

Scale	SD	D	U	A	SA
Observed (O)	10	09	16	24	27
Expected (E)	86	86	86	86	86

Table 4.14 Showing Chi-Square Testing for the Third Hypothesis

O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
10	86	-76	5776	67.16
09	86	-77	5929	68.94
16	86	-70	4900	56.97
24	86	-62	3844	44.69
27	86	-59	3481	40.47
			$\sum (O-E)^2/E = 278.23$	

$\chi^2{}_C=278.23>\chi^2{}_{\propto}$ $_{0.05}$: 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 278.23 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus; Time allocation influences the performance of construction projects in Mombasa County.

4.7 Role of Clients Demands

Clients are important because they are the customers whom should be reached by the buildings and structures given by the various construction companies. When asked to give their position on the influence of clients and their demand on projects, the following results were obtained.

Table 4.8 Clients Demands

Factor	1	2	3	4	5
Clients contribution to design minimizes interference during construction	7	9	10	23	37
Information coordination between the client and the contractor is important	5	9	12	29	31
Number of reworks should be minimized as possible	10	10	20	25	21
Client technical skills minimize demands during project implementation.	12	10	18	19	27

The role of clients' demand was rated as follows:7 strongly disagreed with the fact thatclients' contribution to design minimizes interference during construction, 09 disagreed, 16 weakly agreed, 24 agreed and 27 strongly agreed. The factor that said, Information coordination between the client and the contractor is important attracted 5 respondents who strongly disagreed, 09 disagreed, 12 weakly agreed, 29 agreed and 31 strongly agreed. On the factor that said, number of reworks should be minimized as possible, 10 strongly disagreed, 10 disagreed, 18 weakly agreed, 25 agreed and 21 strongly agreed. Client technical skills minimize demands during project implementation attracted respondents as follows: 12 strongly disagreed, 10 disagreed, 18 weakly agreed, 19 agreed and 27 strongly agreed.

4.7.1 Testing of the Hypothesis

(H1): Client's interference during construction influences the performance of construction projects in Mombasa County.

Table 4.15 Showing Observed and Expected Responses on Role of Client's Interference

Scale	SD	D	U	A	SA
Observed (O)	7	9	10	23	37
Expected (E)	86	86	86	86	86

Table 4.16 Showing Chi-Square Testing for the Hypothesis

O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
7	86	-79	6241	72.56
9	86	-77	5929	68.94
10	86	-76	5776	67.16
23	86	-63	3969	46.15
37	86	-49	2401	27.91

$\sum (O-E)^2/E = 282.72$

$\chi^2_C = 282.72 > \chi^2_{\propto 0.05}$: 9.488 at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 282.72 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus Client's interference during construction influences the performance of construction projects in Mombasa County.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study findings, discussions, conclusions and recommendation of the research. The chapter also contains suggestions of related studies that may be carried out in the future.

5.2 Summary of Findings

The research aimed at investigating the factors affecting the performance of construction projects in Mombasa County, Kenya. A number of factors have interacted with the dependent variable that is the performance of construction projects and the responses from the respondents shown below.

In relation to the first objective that sought to determine whether project manager's competence influences the performance of construction projects in Mombasa County, the research indicated that 46 respondents strongly agreed and 30 respondents agreed that Project manager's competence affect the performance of construction projects. Issues like managers' qualification, managers' experience and managerial communication skills interact effectively to act for or against in the implementation process of construction projects. Findings from the study are further supported by the Chi-Square test which accepts the alternative hypothesis thatProject Manager's Competence influences the performance of construction projects in Mombasa County

The information contained in the results related to the second objective that sought to establish whether competition during tendering influences the performance of construction projects in Mombasa County, indicates that over 70% of the respondents agreed and strongly agreed that work experience of the company with relevant project experience should be considered when tendering a project to a company. Therefore there was a strong agreement that relevant work experience of the company was important as far as project performance is concern. Further over 53(61.6%) of the respondents agreed that tendering and contracting process should undergo many stages as possible to come up with the required contractor while 67 of the respondents agreed/strongly agreed that tendering and contracting process should undergo many stages as

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possible to come up with the required contractor .This therefore indicated that competition during tendering is a major factor that affects both the rate and effective completion of construction projects.

The third objective sought to assess the extent to which time allocation influence the performance of construction projects in Mombasa County. The information from the research shows that over 50% of the respondents agreed that time allocation should be determined by project complexity while over 27.9% of the respondents agreed that time allocation should be determined by project complexity and 20.1% of the respondents weakly agreed that time allocation should be determined by project complexity. Therefore there was an agreement that relevant work experience of the company was important as far as project performance is concern. Further information indicates that over 55.8% of the respondents strongly agreed that time and work quality should be considered in project implementation while 20.9% of the respondents agreed that time and work quality should be considered in project implementation, thus the general view that time plays a central role in determining the success or failure of construction projects.

The fourth objective sought to establish the extent to which client's demands during construction influences the performance of construction projects in Mombasa County. The research showed that over 76.6% of the respondents strongly agreed that clients' contribution to design minimizes interference during construction while over 14% of the respondents agreed that clients' contribution to design minimizes interference during construction and only less than 10% weakly agreed that clients' contribution to design minimizes interference during construction. Further the research showed that 31 of the respondents strongly agreed that information coordination between the client and the contractor is important during project implementation while 29 of the respondents agreed that information coordination between the client and the contractor is important during project implementation and 12 of the respondents weakly agreed that information coordination between the client and the contractor is important during project implementation. This therefore indicates that clients' demands during construction influences the performance of construction projects to a greater extent.

5.3 Discussion of Findings

The study has shown that there is a great influence/relationship between the performance of construction projects and the project manager's competence, competition during tendering time allocation and client's demands during construction.

The research indicated that up to 65% of the respondents felt that Project manager's competence affect the performance of construction projects. Issues like managers' qualification, managers' experience and managerial skills communication interact effectively to act for or against in the implementation process of construction projects. This is in agreement with scholars who have thrown their literature behind the role of the manager's competency in projects. According to Hubbard (1990), Project management action is a key for project success. Jaselskis and Ashley (1991) suggested that by using the management tools, the project managers would be able to plan and execute their construction projects to maximize the project's chances of success. Then, the variables in project management include adequate communication, control mechanisms, feedback capabilities, troubleshooting, coordination effectiveness, decision making effectiveness, monitoring, project organization structure, plan and schedule followed, and related previous management experience, Walker and Vines (2000). Ogunlana et al, (1996) recommended the need for focused effort by economy managers and construction industry associations to provide the infrastructure needed for efficient project management and performance.

The information contained in the results related to whether competition during tendering influences the performance of construction projects indicates that over 70% of the respondents agreed and strongly agreed with the indicators surrounding competition. This is in line with the views of Dissanayaka and Kumaraswamy (1999) who remarked that one of the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. Morris (1986) noted that competitive bidding can adversely affect the outcome of major projects and the number of separate contracts in a project is related to the successful project performance. During the parlous economic conditions, it has been quite common for many contractors to be involved in a tender. The lowest tender price, most of the time, will be selected and the contractor, in fact, has pulled down their profit margin in order to meet the lowest price criteria. Indirectly, they will suffer higher risk of making lost money when

it comes to the construction stage. Thus they need to properly plan and control the project, to avoid any mistakes which will incur additional cost.

The information from the research shows that over 50% of the respondents agreed that time allocation should be determined by project complexity while over 27.9% of the respondents agreed that time allocation should be determined by project complexity and 20.1% of the respondents weakly agreed that time allocation should be determined by project complexity. This is in agreement with many scholars who have argued in support of the role of finances construction projects. Chan and Kumaraswamy (1996) stated that a number of unexpected problems and changes from original design arise during the construction phase, leading to problems in cost and time performance. It is found that poor site management, unforeseen ground conditions and low speed of decision making involving all project teams are the three most significant factors causing delays and problems of time performance in local building works. Okuwoga (1998) stated that cost and time performance has been identified as general problems in the construction industry worldwide. Therefore time is central in projects performance no matter how much the other factors have been prevailed.

The research showed that over 76.6% of the respondents strongly agreed that clients' contribution to design minimizes interference during construction while over 14% of the respondents agreed that clients' contribution to design minimizes interference during construction and only less than 10% weakly agreed that clients' contribution to design minimizes interference during construction. This has been supported by many scholars e.g., according to Cooke-Davies (2002), the performance predicts success and success factors affect performance. In order to identify the "real" success factors of projects, Cooke-Davies highlighted the importance of the clients' attributes in relation to the construction project performance. This corroborates Latham's (1994) statement that "Implementation begins with clients. Client is at the core of the process and their needs must be met by the industry". The assessment of the effect of the client's attributes on project performance can be classified in terms of the client's type, size, financial stability, experience, organizational structure, duty and attitude.

Client's experience in construction industry has been identified by Nahapiet (1983) as affecting performance. If the client would like to succeed in construction project, they must take on a good

deal and more specifying their requirements. Experience client will specify clearly all objectives and requirement that need to be achieved in early stage of construction. Then they will closely control and monitoring project with effectively and efficiency, in order to achieve the project goals that have been set.

5.4 Conclusions

From the research study, it was concluded that the project manager's competence influences the performance of construction projects in Mombasa County. In the calculations and testing of the hypothesis for example, the calculated chi-square value of 286.42 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis thus there is an association between Project Manager's Competence and performance of construction projects. This means that the Project Manager's Competence and performance affects the performance of the construction projects.

From the research study, it was also concluded that Aggressive Competition during tendering influences the performance of construction projects in Mombasa County. Both the analytical data and the results from the tested hypothesis have indicated that competition has a great influence on whether the projects will be successful or not.

The extent to which time allocation influence the performance of construction projects in Mombasa County was found to be of Relative Importance and this showed that time allocation for the construction projects had influence in the performance of such projects. This was supported by the calculated chi-square value of 278.23 that was greater than the critical chi-square value at 5% level of confidence.

It was found that the extent to which client's demands during construction influences the performance of construction projects in Mombasa County was of great influence as it supported by the chi-square of value 282.72 that was greater than the critical chi-square value at 5% level of confidence which also showed a strong association between the performance of the construction projects in Mombasa County and the client's interference.

5.5 Recommendations

Based on the findings of the study, the researcher recommends that:

i.   Project managers should be chosen in relation to experience; skilled, non-skilled and with formal education knowledge/qualification, management skills and those with proper

understanding of construction projects so as to make them competitive and relevant in the market today. This way, construction projects will have the right managers leading/governing them and the final results will be effective and timely implementation of these projects.

ii. Aggressive competition during tendering should be encouraged for the construction companies to achieve both quality and effectiveness in their performance. For example, during tendering, a thorough research should be done on the best company to be a warded the tender, its track record and the tendering process should pass both the legal and necessary stages for improved performance.

iii. Complexity of project should determine the time allocation, and, time and quality of work should be a priority during construction projects implementation. Time for resources allocation, planning, and risks management should be set aside/ considered in projects as this greatly influences the end results of construction projects.

iv. Finally, the clients' knowledge on projects, views, taste and preferences should be considered from time to time as this puts the projects in a better position of being implemented and avoids unnecessary setbacks like redoing of the projects due to plans adjustments that lead to extra cost.

5.6 Suggestions for Further Research

It is recommended that further research should be done to develop performance measurement framework and modeling system in order to measure and improve performance of construction projects. In addition, it is also recommended that studies should be done to evaluate the other important factors that influence successful implementation of construction projects in Mombasa County.

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APPENDIX 1

Letter of transmittal

Kaniaru Sammy

P.o Box 90293 - 80100,

Mombasa

May 2013

To whom it may concern

<u>Re: Academic Research</u>

My name is Kaniaru Sammy, a master's student in project planning management at Nairobi University, Mombasa campus.

It is a requirement to undertake a research on particular area of interest. In line with my studies, I am conducting research on factors affecting performance of construction projects in Mombasa County.

This research will use a questionnaire to collect information in order to understand the situation as it is in the subject under review. It is for this reason that I kindly request for your assistance in offering your consent for the interview as well as giving honesty responses to the interview questions.

Looking forward to your corporation.

Thank you

Kaniaru Sammy

0722 808 124.

QUESTIONNAIRE

SECTION A: Bio-Data (Tick where appropriate (√)

   1. Your gender

( ) Male ( ) Female

   2. Your age (in years)

( ) Between 20-29 ( ) Between 30-39 ( ) Between 40-49 ( ) 50 plus

   3. Level of education

( ) K.C.S.E ( ) Diploma ( ) Bachelor's Degree ( ) Master's Degree ( ) Doctorate

   4. Working experience

( ) Below 2 years ( ) 2 – 5 years ( ) 6 – 10 years ( ) 11 – 20 years ( ) 21 – 30 years

( ) 31 years and above

   5. Designation

Engineer ( ) Manager ( ) Contractor ( ) Administrator ( ) Architect ( ) Foreman ( )
Other ( )

  6 .Type of project

Residential construction ( ) Commercial construction ( ) other ( )

SECTION B: Items in Relations to Objectives

Below are numbers of factors affecting the performance of construction projects rated according to their magnitude of their influence, Indicate your position using a scale of:

Strongly disagree = 1, Disagree = 2, Weakly agree =3, Agree =4 Strongly Agree =5

7.**Role of Project Managers' Competence**

Factor	1	2	3	4	5
Manager's qualification important					
Manager's experience is important					
Manager's management skills are important in a project					
Communication system of project manager is important					

8. Give your reasons for the answers in 7

above…………………………………………………………………………………………

…………………………………………………………………………………………………..

9.**Role of Competition**

Factor	1	2	3	4	5
Construction company should be selected based on work experience on similar projects					
Tendering and contracting process should undergo many stages as possible to come up with the required contractor					
The lowest bidder should not necessarily be awarded the tender without other factors					
Construction company should be selected based on the staff and equipment capacity					

10. State how you think time is important in construction projects

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

11. Indicate your degree of rating on the role of time in construction projects.

Factor	1	2	3	4	5
Complexity of project should determine the time allocation					
Project size should determine the time allocated to projects					
Availability of funds should be considered when allocating project time					
Time and quality of work should be a priority during project implementation					

12. Role on Clients Demands

Factor	1	2	3	4	5
Clients contribution to design minimizes interference during construction					
Information coordination between the client and the contractor is important					
Number of reworks should be minimized as possible					
Client technical skills minimize demands during project implementation.					