

**FACTORS INFLUENCING COMPLETION OF PUBLIC
BUILDINGS CONSTRUCTION PROJECTS IN MACHAKOS
COUNTY, KENYA**

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**Research Report Submitted in Partial Fulfilment of the Requirements of The
Award of Masters of Arts Degree in Project Planning and Management of the
University of Nairobi.**

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DECLARATION

This research report is my original work and has not been presented for an academic award in any other University.

Signature

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This research project has been submitted for examination with my approval as the University supervisor.

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DEDICATION

To my spouse Irene, my children: Jason, Ken, Stella and Edna for their love and support during the entire period of the study.

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ABBREVIATION AND ACRONYMS

NICs	Newly Industrialised Countries
NCA	National Construction Authority
KPIs	Key Performance Indicators
GDP	Gross Domestic Product
MTEF	Medium Term Expenditure Framework
CSCS	Construction Skills Certification Scheme
CIBD	Construction Industry Development Board
CETA	Construction Education and Training Authority
B.S	Building Services
GOK	Government of Kenya
SLOTS	Singapore List of Trade Subcontractors
ROK	Republic of Kenya
TOC	Theory of Complexity

ABSTRACT

This research study sought to establish the factors influencing the completion of public buildings construction projects in Machakos County, Kenya. The research objectives were; to determine the extent to which payment processes influences completion of public buildings construction projects in Machakos County, to understand the influences of contractors' technical capacity on completion of public buildings construction projects in Machakos County and to determine to what extend communication influences completion of public buildings construction projects in Machakos County. The research sought to answer the questions; to what extend does payment processes influence completion of public buildings construction projects in Machakos County?, to what extend does project communication influence the completion of public buildings construction projects in Machakos County?, and to what extend does contractors technical capacity influence the completion of public buildings construction projects in Machakos County. The research design for this study was descriptive survey which aimed to provide a description for the state of affairs of the problem under investigation through questions designed to solicit the required information. The study was a census of 56 composed of all 30 contractors, all 14 professionals and all 12 project liaison officers representing clients for 30 major public buildings construction projects undertaken within Machakos Sub County of Machakos County since the inception of County governments in 2013. The research instrument used for data collection was a self-administered questionnaire comprising of both closed and open- ended questions. A pilot study was conducted on selected but similar respondents to pre-test the research instrument for accuracy and validity. This was achieved through the assistance of the supervisor and other experienced experts in research field. Data was analysed using SPSS (Statistical Package for Social Scientists) version 22 software and results presented in form of tables. All the factors suggested in the objectives of the study vide: payment processes, project communication and contractors technical capacity were found to influence completion of public buildings construction projects in Machakos County. The study revealed delay of payments in payment processes objective at the 87.5% yes response and 2.51 agree score on the likert as the most significant among the factors followed by technical qualification of staff in contractors' technical capacity objective at 75.0% yes response and 2.54 agree score on the likert. Lastly, effective communication and regular site meetings in project communication objective attracted 72.9% yes response and 2.35 agree score on the likert. On relationship between the factors, it was found that there exists a very weak ($r = 0.017$) correlation between payment processes and completion of projects, a fairly weak correlation ($r = 0.113$) between project communication and completion of public building construction project but the study showed fairly strong ($r = 0.429$) association between contractors' technical capacity and completion of projects. The common believe that projects fail because of inadequate financing was disapproved by the findings that even well-funded projects can fail due to poor the payment processes. The researcher recommended integrated training approach for all parties involved in public buildings construction projects to synchronize their understanding on key construction project implementation issues, particularly payment processes.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The construction industry is as old as civilization itself; spanning back from ancient days of the great pyramids of Egypt, the grant canal of China to the historical spectacle of fort Jesus in Kenya's coast. According to Alfred Swenson and Pao-Chi Chang (2014) people have constructed buildings and other structures since pre-history. Some of the buildings and structures built thousands of years ago are still regarded as remarkable construction landmarks. Alfred Swansea and Pao-Chi (2014) aver that the oldest 'construction drawing' is in the temple of Apollo at Didyma in Italy where an unfinished stone wall was etched with the profiles of columns and mouldings, and the wall was never finished so the drawing was not erased: a rare glimpse into the history of working construction drawings. The construction industry is one of the highest consumers of resources in the world and accounts for 7% of the total world employment opportunities. (Njuguna, 2008)

The construction industry is made up of multi-disciplinary participants who include project managers, clients and contractors. These parties together help in transforming various resources into physical constructed facilities which play a critical role in the process of development. Housing building projects represent one of the largest sectors of the construction industry in most developing economies.(Ahadzie, Proverbs and Olomolaiye, 2008)

Construction projects are a one-off, unique, novel and complex in nature (Westerveld, 2003; Ahadzie, 2008). There are many parties involved in completing a construction project making it even more fragmented (Bertelsen, 2003; Ankrah and Langford, 2005). It is due to these complexities that construction industry has a reputation of an adversarial culture many times leading to failure to achieve completion (Ankrah and Langford, 2005).Furthermore; construction projects heavily involve people and social interaction, and as such, are to be considered 'highly transient human systems' (Bertelsen, 2003).

Every construction project is unique and has its own operating environment and sets of technical requirements (Ahadzie, et.al2008). Throughout the world, the business environment within which construction organizations operate continues to change rapidly and organizations failing to

adapt and respond to the complexity of the new environment tend to experience performance problems hence risk survival problems (Lee, Pena-Mora & Park, 2003). Performance measurement is the heart of ceaseless improvement which all project managers should endeavour to embrace in order to improve their project performance and chances of success. (Luu, Kim, Huynh, 2008).

Although the construction industry has been hailed as an important catalyst to economic growth according to many researchers, it is important to note that the current state of the industry is not all a success story. Project completion and quality issues have frequently punctuated the story of construction as an industry. Construction projects are subject to various constraining factors which affect the effective delivery of a successfully finished product. Ahmed, Azhar, Castillo and Kapagantulla (2002) in a study carried out in Florida State aver delays of construction projects are indeed universal phenomena, almost always accompanied by cost and time overruns.

Machakos County with a population of 1,084,129 million people has seen an un-preceded upsurge in public building construction projects occasioned by the need to create enough office space as well as improvement of existing public buildings infrastructure to cater for the new devolved governments. This has seen the country commit up to 30% of its budget to development, a big percentage of which is going to new buildings. According to the governor of Machakos the county government has an ambitious master-plan that will see the face of the county lifted by the envisioned planned Machakos City that will be provided at attractive lease terms to develop housing to cater for Nairobi city and Konza techno city which is 15 Km from Machakos. Machakos is set to become the dormitory for those two cities and therefore there is certainly a high upsurge in buildings construction activities (Machakos County report, 2013).

However, like any other part of the world Machakos County has had its own share of challenges in meeting the time deadlines of its construction projects. Indeed most of projects currently ongoing have not been performing to expectations in terms of timeliness. Indeed most of the projects started in the last two years are way behind the set time schedules they were meant to be completed (Department of public works and Housing, 2014). Olatunji, (2010) avers that most

projects are eventually completed more or less to specification, although they are seldom on time. Cokins, (2006), Chai and Yusuf (2013), while stressing the importance of completing construction projects on time and within budget argue that “time is essence” and time is “revenue”. This means that any delay in meeting project completion time undoubtedly interprets to loss of revenue. It is against this background that this study investigated the underlying factors influencing completion of public building construction projects in Machakos County, Kenya.

1.2 Statement of the problem

Construction of public buildings is one of the public services where governments channel huge amounts of taxpayers’ money with the aim of enhancing developing through improvement of building infrastructure. In Kenya a constitutional right is granted in the bill of rights chapter (GOK 2010) for citizens to enjoy efficient public services in all sectors. However this has not always been the case in the construction sector. Indeed service delivery in this sector has remained wanting with numerous cases of delayed or, in extreme cases, stalled projects spread throughout the Country. Machakos County has not been an exception and indeed reports indicate that more than 50% of all public buildings construction projects started in the County in the last two years have gone beyond the stipulated completion time (Department of public works- Machakos Count, 2014). Although the government has been making efforts to address the issue by issuing directives and legislations aimed at improving the situation, indications are quite clear that case of delays, cost overruns and below quality deliveries are still rampant.

The need for implementation of project to completion arises from the desire for the project to start serving its intended use and thus recouping some of the monetary investment used. In the event that this is not realized, various outcomes come to play. For instance the cost of implementation will escalate and capital will remain tied in such a project unutilized until it is completed. Approximately 50% of construction projects experience time overruns (Olatunji, 2010). This study therefore was worthwhile in order to get the insight relating to completion of building construction projects.

1.3 Purpose of study

The purpose of the study was to investigate the factors influencing completion of public

buildings construction projects in Machakos County-Kenya.

1.4 Objectives of the study

The aim of the study was to establish the factors influencing completion of public buildings construction projects in Machakos County, guided by the following objectives:

1. To establish the extent to which payment processes influences completion of public buildings construction projects in Machakos County.
2. To establish the extent to which project communication influences completion of public buildings construction projects in Machakos County.
3. To determine the extent to which technical capacity influences completion of public buildings construction projects in Machakos County.

1.5 Research Questions

The study sought to answer the following questions.

1. To what extend does payment processes influence completion performance of public buildings construction projects in Machakos County?
2. To what extend does project communication influence completion of public buildings construction projects in Machakos County?
3. To what extend does contractor's technical capacity influence completion public buildings construction projects in Machakos County?

1.6 Research Hypothesis

The following null hypotheses were tested:

1. **H₀₁**: There is no relationship between payment processes and completion of public buildings construction projects in Machakos County.
2. **H₀₂**: There is no relationship between project communication and completion of public building construction projects in Machakos County.
3. **H₀₃**: There is no relationship between contractual capacity and completion of public buildings construction projects in Machakos County.

1.7 Significance of the study

The government and other stakeholders in the construction industry have for years been involved in formulation policies and procedures aimed at improving projects' performance efficiency but this had not offered lasting solutions to the complex phenomenon of projects delay as has been witnessed from various researches. The findings of this study, will help stakeholders in the construction industry including project implementers; that is, contractors, project managers, (Engineers, Architects, Quantity Surveyors, services Engineers) users and the funding agents to effectively run the process of construction to achieve economical, timely and quality performance. In addition the government can use the findings when formulating new policies for the construction industry. The public will benefit by getting value for their money and through improved economy. Private developers, planners and designers will benefit from the study by getting new methods of doing construction planning and implementation process which will guarantee profitability, the key purpose why entrepreneurs invest in any venture. Researchers are expected to use the acquired findings and data references for further studies on the subject.

1.8 Limitation of the study

The study experienced limitation mainly on time factor. However this was mitigated through the engagement of a research assistant who assisted in data collection hence saving time. Accessibility to some of the contractors posed a challenge since majority of the representatives accessible were reluctant to make decisions. Movement to most of the site where most of the contractors were based also posed a challenge because of the rough terrains and road conditions.

1.9 Delimitation of the study

The study targeted respondents from public buildings construction project implementation agents in Machakos Sub-County-Machakos County. Project implementation agents include clients, project management consultants and contractors. The targeted groups were experts in construction projects who included architects, structural engineers, civil engineers, mechanical engineers, electrical engineers, quantity surveyors, land surveyors and project managers who participated in projects undertaken under the supervision of the county works Officer within Machakos Sub-County since the inception of county governments in 2013. Muguyi (2012) in her

study on factors influencing performance of contractors of Government –funded building projects carried out in Kirinyaga County argues that such a setting is a good study sample as it provides a specific project management environment that has stipulated operations and procedures.

1.10 Assumption of the Study

One of the assumptions of the study is that the respondents gave correct and reliable information. Another assumption is that the selected sample was a reasonable representative of the target population.

1.11 Definitions of Significant Terms

Contractor: Refers to duly registered construction firm that firm that agrees to deploy materials and human resources inputs to execute specified construction project works at an agreed upon price and within a specified time frame to another independent entity called client or project owner

Public Project: Public project generally refers to a building constructions project funded by the government and executed under the supervision of the department of public works including public schools, hospitals and other public utility premises.

Public Buildings: In this report public building refers to buildings constructed using county government money and directly supervised by the county works officer, Machakos as the project manager.

Communication: Within a construction context, is to convey an instruction of influence the actions/behaviors of other, or may involve an exchange of, or request for information during a construction project.

Contractor's technical capacity: Refers to technical qualifications and registration requirements necessary for a contractor to qualify to carry out a public buildings construction. The classification is based on the contractor's technical and managerial expertise, financial capacity and previous performance.

Service Engineers: Refers to engineer in a building construction project dealing with specialized

work like electrical, mechanical air conditioning and other services necessary for the operational usability of a building.

Client: The term client refers to the organization or individual that is procuring the building developing. The client is also sometimes referred to as the employer' as they are the body which employs consultants, contractors and suppliers.

Legal and regulatory environment: is the policy, legal and instructional framework that governs building projects

Contract period: This refers to the time agreed by the drafters of the contract in order to complete the terms of the contract. The contract duration is captured in the project schedule

Project Completion: Refers to execution of projects in accordance with planned project scope, specifications, work program, completion schedules and planned budget.

Project Manager: This refers to the government agency charged with the responsibility of overseeing implementation of public buildings construction projects; in this case the county works officer

1.12 Organization of the Study

The study is organized in five chapters. Chapter one deals with introduction of the study which comprises of the background of the study, statement of the problem, research objectives, research questions and significances of the study. It is also carries explanation on delimitation and limitations of the study, assumptions, definition of significant terms and the outline of the organization of the study report.

Chapter two covers the literature review, with sub-topics containing the introduction, review of relevant literatures materials forming the theoretical framework base, the conceptual framework and the summary.

Chapter three introduces the research methodology. This consists of the research design, target populations, sample size and sample procedure, research instrument and its reliability and validity, data collection procedure, methods of data analysis, the operational definitions of the variables and finally a mention of the ethical considerations of the research.

Chapter four presents detailed analyses of the data that was collected and brings out the interpretation of the findings as was collected from the various respondents and subjected to statistical operations.

Chapter five is basically a summary of the key findings as resented by way of discussion basing on the findings and the relevance to the literature review and objectives of the research study. It also carries the conclusions and recommendations of eth study. The tail end of the report contains a list of references of the study's scholarly literature sources and appendices relevant to the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter closely examines the literatures related to buildings constructions with particular focus on public buildings' construction projects. It touches on the subject of construction as an industry and outlines in details the findings made by other researchers on the subject of public buildings construction projects and what has been discovered about completion of construction projects.

2.2 The Building Construction Industry

The construction industry is taunted as one of the target industries in the world. According to Ahadzieet. al. (2008) building constructions projects particularly represent one of the largest sectors of eth construction industry in most developing economics of the world.

Studies by several researches including Stress man, (1997); BERU, (1972); Edmonds and Miles (1984); Wells (1986); Bon and Croshwaite (2000) found that construction output grows particularly fast, often exceeding the rate of growth of the economy a whole, as countries put their basic infrastructure in place during the early stages of development. This can be replicated in Kenya because of the devolved government system which is just beginning to take off and can be equated with early stages of development, Unlike the manufacturing industry which exhibit high-quality products, timelines of services delivery, reasonable cost of service, and low failure rates the construction industry I mostly punctuated with episodes of cost overruns time extension, poor quality deliveries and conflicts among parties. It should be noted that the construction industry is quite different from other industries in that construction projects are usually larges, built on-site, and generally unique. Time, money, labor, equipment and materials are all examples of the kinds of resources that are consumed by these types of projects. The construction process include setting out, excavation, casting of concrete blinding, the placement of reinforcement, casting of foundations, setting of blocks, casting of lintel, block-laying, placement of reinforcement, placement of pipes for electrical and sanitary works as well as the cast6ing slabs.. If it is a multi-storey building, then the processes are repeated. If it is a non-rising

that is under construction then the next stages will be casting of the ring, placing/fixing of trusses, roofing plastering and painting of the building. A good knowledge of these processes will aid prompt of facility in the form of quick decision taking in response to issue that might cause delays at any of the process. (Harris, McCaffer and Edum-fotwe; 2006)

According to Yoon and Kang, (2000) governments often use construction as the main fiscal policy tool to adjust economic growth, especially at the state and county levels. When the economy is in the expansion phase governments tend to restrict public spending on capital projects and divert money to other uses such as reserves and a rainy day fund. This practice helps to stabilize the construction industry and thus help the overall growth. In the newly industrializing countries (NICs) like Asia and Latin America there has been a dramatic growth in the construction sector as argued by Yoon and Kang. (2000) citing the Republic of Korea as a good example of the increase in construction employment during the process of industrialization. Yoon and Kang, (2000) avers that the construction industry rose from 192,000 in 1962 to 1,004,000 in 1997, before failing temporarily due to the economic crisis in 1998. The share of construction in total employment increased during the same period from 2.5 per cent to an incredible 9.5 per cent. Lu and Fox 2001) say that China has seen a very dramatic increase in employment in the construction industry in the past few decades. The construction workforce was just under 10 million in 1980 and grew to 30 million by 1993, more than doubling its share of the total workforce from 2.3 percent to 5 percent. Mitullah and Wachira (2003) say that the construction around the world.

Wells (2007) has widely discussed the challenge of regulating the informal sector in most developing countries characterized by engagement of casual and temporary workers, direct procurement of construction service without formal contracts and without engagement of registered professional and contractors, use of unregistered enterprises and the prevalence of unfinished structure usually without planning permission. Furthermore, low levels of technology utilization, out-dated construction methods, lack of financial capacity, low investment in research and development, as well as poor communication, poor workmanship, skills shortage and low level of industrialization continue to undermine the potential of construction industry according to Alinaitwe, Mwakali and Hanson, (2006 & 2007). Alinaitwe (2008) argues that the

performance of clients on the supply chain is also questionable, as they frequently delay payment to contractors, and contribute to a majority of variations and variation orders. Moore and Dainty (1999) acknowledge that knowledge, experience and mechanism of interaction among the many parties charged with running and delivery of project must prudence in order to address the challenges faced in project it is important to consider specifically the aspects of cost, time and quality and client satisfaction. In Kenya construction picked up substantially from negative e growth of 2% in 2002 to 6.3% in 2006. During the 2009/2010 financial year, the construction industry contributed 17.5 percent of her Gross Domestic Products. This industry continues to grow to meet the raising demands for housing, industrial, development, infrastructure etc. the importance of the construction industry in the economy has been reflected in various government recognizes infrastructures construction as one of the foundations upon which she will achieve her social, political and economic pursuits (ROK, economic Survey 2014) Currently, Kenya is going through a construction boom. The Government has invested heavily on the construction sector in order to improve e the infrastructure such as road networks, and at the same time provides new residencies for the locals (who are being supported by the banks to get loan to buy apartments/cars). Kenya has a well- developed construction industry. With increase in populations, opportunities exist in the construction of residential, commercial and industrial buildings, including prefabricated low-cost housing. The poor economic performance has not reduced urban growth. Most urban centers have continued to grow as many citizens seek economic opportunities away from the rural areas. Most find some form of employment within the informal economy. A significant number find their way into the informal building industry. ROK, Economic Survey, (2000).

2.3 Key Parties in public Buildings Construction Project

The construction industry has a great diversity of role players, processes and dynamics. It involves several and varied parties each of whom have specified responsibilities to play in order to achieve the required level of project performance. The key parties are clients, project managers and contractors. Their specific functions are as below:

Client- define client as the person or organization responsible for commissioning and paying for

the design and construction of a facility, and is usually, but not always, the owner of the facility being commissioned (Kamara, Anumba, and Evbuomwan, 2002). The client can be the user of the proposed facility, or they may be separate entities. The Client also represents other interest, which include the owner if different, the user and other identified persons, groups or organization that influence, and are affected by the acquisition, use, operation and demolition of the proposed institutions, environmental pressure groups and the neighborhood. Thus, the client “is a body or entity that incorporates other interest group. For public projects the client is the Government or other public bodies of some kind ranging from agencies from the county level to the National level. Most public projects or facilities are built for public use and not sold to others. In order to achieve success on a project, owners need to define accurately the projects objectives. They need to establish a reasonable and balanced scope, budget and schedule. Generally the client will retain a significant level of control over the assessment and appointment of Designers and contractors for a project. The client is the entity which owns and finances the project. The owner engages architects engineering firms, and contractors as necessary to accomplish the desired work. Authors have defined client in many different ways, depending on the perspective e. Boyd and Chinyio (2006) quote (Harm, 2001) and Atkin and Flanagan (1995) who state that ‘a client is someone who freely chooses to avail themselves of a service, and that a client is the initiator of projects and those that contract with other parties for the supply of construction goods or services.”

The project Manager –The project manager is the individual charged with the overall coordination of the entire construction program for the owner, for public buildings construction the projects managers is usually the head of the department charge with building construction works. In Kenya this refers to the Department of public works and Housing. The project manager has under him several professionals who form the buildings construction team. These include architects, engineers and surveyors

The Contractor–The contractor is the person or company engaged to execute the construction work on behalf of the clients. NCA Act defines a contractor as a person who undertakes the construction, installation or erection, for any other person, of any structure situated below, on or above the ground, or other work connected therewith, or the execution, for other person, of any alteration otherwise to any structure or the other work connected therewith, and undertakes to

supply the labor necessary for the work or authorized on behalf of the person for whom the work is undertaken or any other person, to employ or select workmen for employment for the purposes of the execution of the work. In traditional management where the owner, design professional, and contractor are separate companies, the contractor would be termed a main contractor, the main contractor is responsible for delivering a complete project in accordance with the contractor documents in most cases, and the main contractor divided the work among many specialty contractors called sub-contractors. In some cases the sub-contractors are referred to as service contractors because they undertake specialized service within the contractor. In public buildings construction projects there are three key parties involved in the implementation. The government finances the projects through one of its many department or bodies who is referred to as the client in the contract circle. The project manager, a government department or consultant firm supervises the work as undertaken by implementing agency (known as the contractor) to completion ensuring that time quality and financial prudence are maintained.

2.4 Completion of Buildings Construction Project

The construction industry is commonly engrossed with uncertainties, unpredictability and misunderstandings which frequently lead to incompleteness of projects. The net effect of delay in any project, and more so construction projects, is that it can adversely affect the overall performance of the project. The common goal of all parties involved in a project should be to deliver the project within its stipulated time frame at all cost so as to meet the initial project objectives without significant deviations. Davision and Mullen (2009) gave the concept of delay as the extension of time beyond planned completion dates traceable to the contractors, while, Aibinu and Jamboree (2002) defined delay as situation when the contractor and the project owner jointly or severally contribute to the non-completion of the project within the original or the stipulated or agreed contractor period. The duration of project is normally specified by the owner and contractors are responsible for ensuring completion within the owner's timeframe. Construction researchers and practitioners have recently begun to emphasize the need for developing the concept of construction time performance to be used by clients, consultants and contractors.

Nonetheless, delay in construction projects have still been found from articles and research

papers. Similarly, Chalab and Camp (1984) conducted a review on project delays in developing countries during planning and construction stage. In their study, they found that the contractual disagreement caused both delay and cost overruns on the early stages of construction.

Building construction project performance can be measured using the commonly known basic cost-quality-time-triangle (Ali and Rahmat, 2009) and according to Greer (1999), a project is successful if it satisfies all three legs of the triple constraints, namely, performance (specification), cost and time. However, there are challenges that contribute to poor performance of constructions projects. Patroba (2012) highlights some of the challenges as: the weak capacity of the local contractors, poor workmanships and delayed completion of projects. In general, the construction industry is more challenging than other industries due to: its unique nature; every project is one-of a kind; many conflicting parties are involved; projects are constrained by time; money, quality and high risk. Thomsett (2000) in an extensive examination of 20 failing projects over a period of 18 year expended this criterion of success as: “satisfies stakeholder groups, meets functional requirements, meets quality expectations and requirements, within cost, within deadline, delivers sustained and actual benefits and provides the team with professional satisfaction and learning”. In De Wit’s (1988) view, success criteria refers to the measures by which success or failure of a projects or business will be evaluated; whereas success factors are those inputs to the management system that lead directly or indirectly to the success of the project or business, A project is said to be successful or performing when it is completed within budget cost, specified quality, stipulated time and delivered safely (Mbamali, Aiyetan and Kehinde, (2005). Poorly performing project exhibits off estimate project cost, late delivery of projects and sometimes, termination of contract.

However every project has some established key performance indicators (KPIs) against which performance are measured. KPIs are compilations of a data measures used to assess the performance of a constructions operation. It is important to note that no two projects are the same disregard of however similar they appear(Cox et al., 2003). This means that it may not be easy to formulate a universally accepted basis of determining a common performance measurement method. Although the causes for project success and failure have been the focus of numerous research studies, there has been no consensus on the issue. Pinto and Slevin (1987)

argue that in spite of extensive research there has been no convergence on the components and causes of projects success.

However for building projects, there have been studies carried out and attempts made towards development of evaluation models aimed at determining performance factors. (Hendrickson, 2008) avers that there is no universally accepted basic due to the differing complexity, inherent nature and unique characteristics of constructions projects. El-Mashaleh, Minchin, O' Brien, (2007) says benchmarking is a systematic process of measuring one's performances against results from recognized leaders for the purpose of determining best practices that lead to superior performance when adapted and implemented.

Omar, (2006) came up with an extended fashion of the basic model of the traditionally accepted project performance measurement which would normally center on the cost - quality - time triangle by including client satisfaction as fourth measure. Amalraji, Hernani, Ladouceur and Verna, (2007) in an article on projects performance based on energy and utilities projects in Alberta, Canada identifies key performance issue as quality assurance and quality control; project controls and project accounting availability of appropriate labor resources; stretch targets; weather conditions and possible opposition from local communities. Constructing Excellence organization in UK which aims to improve construction performance in built environment developed a set of performance indicators and categorized them into three main groups namely; economic social and environmental perspectives (Constructing Excellence, 2009). Syuhaida and Aminah (2009) classified performance indicator into functional, operational, and professional perspectives. Maniar, (2011) in a study carried out in India identified drivers for success as response planning and utilization prior feasibility analysis to ensure soundness of investments; ensuring compliances to regulatory agencies requirements ; and identification and prioritization of risks in planning and monitoring, resource utilization and skilled project management talent. According to Oakland and Marosszekyk, (2006), increasing the satisfaction of customers and stakeholders through effective goal deployment cost reduction productive it and process improvement has proved to be essential for construction projects developed by Khosravi and Afishari; quality performance; health, safety and environment of the project; and client satisfaction as basis for calculating project success index.

Reviewing the works of Anvuur and Kamaraswany (2006), the performance of the construction industry in Ghana is poor and saddled with several procedure, delayed payment to that of project execution. It is noteworthy that clients “delay in payment to service providers (contractors and practitioners) also affects payment of salaries and thus, wages of their staff. This is because sometimes these delays run into several months and thus, these employers find it difficult to continue paying their staff thus affecting the overall performance of the project. Saqib M., Farooqui and Lodi, (2008) identified six critical success factors for construction projects in Pakistan, namely contractor experiences; site management; supervision and involvement of subcontracting; contractor’s cash flow; effectiveness of cost control system; and speed of information flow (Ashworth (2004) in a World Bank (1984) review in Ghana. The construction industry is a regulator of the economy and that its output “varied more than either manufacturing of GDP for the following countries; Brazil, Columbia, Ethiopia, Federal Republic of Germany, Ghana, Italy, Japan, Kenya, Liberia, Malaysia, Peru, Sri Lanka, Sweden, UK, USA and Zambia” (Raftery 1992). Ofori, Hindle and Hugo (1996) points that output fluctuations of large amplitude introduces production inefficiencies. Generally, development of an efficient construction industry is an objective of policy of every economy. For that reason, a more intensive inquiry into the phenomena of fluctuations in construction activities in any of the sixteen’s countries mentioned in the paragraph above is worthwhile.

In Kenya support for the country’s economy is provided by the construction industry by way of building housing, roads, railways, irrigation schemes, water supply schemes and other (Mbaya 19854). The construction industry of Kenya contributes about 40% of the Gross Capital Formulation (GCF) and about 4% of the Gross Domestic Product (GDP) fell from 6.5% in the 1980S (Mutullah and Wachira 200, Wells 1999) to 4% in the early 2000s. This indicates an overall reduction in construction activity in the 1`990s. In the lasts two and a half decades, construction research in Kenya has focused mainly on the entities that constitute the construction industry-particularly the project, the contractors and labor force-deducing the performance of the industry as a whole from the observations made on its parts. Key areas of research study over this period have been procurement methods (Examples: Kithinji 1988, Mbatha 1993 and Mbaya 1984), project performance –cost overruns, time overruns and labor output (example: Githuge

2000, Talukhaba 1998 and Wachira 1996) and construction business performance –indigenous contractors, marketing and labor practices (example: Bakuli 1986, Gitagi 1992, Magare 1987, Mitulla and Wachira 2003). Construction research attention had been focused on the construction industry as whole. This focused on projects at construction stage looking at how the timeliness of the project completion is affected by payment processes, site communication and contractor's technical capacity.

2.5 Payment Processes and Completion of Construction Projects

Hasmori, Ismail and Said (2012) in their study stated that client's employees wrongfully hold contractors payment in order to obtain some kind of "gift" from contractors before they can release the payment. Ye and Abdul Rahman (2010) identified that clients deliberately delay payment for their own financial advantages. According to the construction Industry working Group on Payment (2007), problems in payment at the higher end of the hierarchy will lead to serious cash flow problems on the side of the contractors. Consultants are also known to cause delays in construction. Factors contributed by consultants include late instructions, poor dimensional coordination, late approval of work, late preparation of interim valuation and certificates for the contractor, as well as late inspection and approval of work. On the part of contractor lack of proper planning of work, lack of material and skilled human resources, poor construction techniques, weather influences as well as labor strikes are potential sources of delay

Based on result analysis by Ye and Abdul Rahman (2010), contractors in Malaysia perceived that delay for few days, say less than 5 working days, is acceptable and that they had no choice in accepting late payment since they are always at the mercy of the clients in this matter. This could be due to the inherent culture of late payment in the Malaysian construction industry that the contractors perceived late payment for a few days to be acceptable. Ye and Abdul Rahman (2010), continue to avers that delays in certification by consultants involved in the project might be a cause of late payment. The parties involved may delay in approving the applicant for payment claim due to certain reasons which may arise because need to maintain certain standards

Hasseb, LU, Dyian and Rabbani (2011) identify four causes of problems that caused delay in construction namely: client problem, service provider problem, source problem and universal

problem. Based on the survey results, client factor is identified as a major factor causing the delay in construction with the inability to make payment due to economic background and lack of financial arrangement for project (Hasseb et al;2011). Other factors include breakdown of equipment and labor disputes). According to Abdul-Rahman, Takim, and Wong, (2009), delay in the completion of construction project is closely for both client and contractor and the overall effect is loss of potential revenue. Generally late payment has been issue of major concern in the construction industry with majority of contractors reporting having faced it almost at all times they undertook a project be they public or private. Most of them say the situation is the same both in private and public funded projects (Hasmori et al 2012). Indeed delays in payment in construction project are a global phenomenon and have adverse effect on any a country's economy. Key aspects for consideration in this include initial accuracy of project estimates and subsequent projects controls and project accounting in relation to scope and schedule (Amalraj et al 2007). Abdul-Rahman, Wang, Takim and Wong (2010) provide a more comprehensive analysis of these issues, categorizing them into payment, cash flow, financial resources and market issues based on previous relevant studies from diverse countries such as Saudi Arabia, Hong Kong, Nigeria, Indonesia, United Kingdom, Ghana, Turkey and USA, and with specific research on the Malaysian experiences (Abdul-Rahman, Berawi, Mohamed, Othman and Yahya, 2006)

For government –funded building projects in Kenya, the main source of funding is the yearly budgetary allocations. The annual budget is prepared under the medium Term Expenditure Framework (MTEF) which is a planning and budget formulation process that attempts to improve decision making policies, priorities and requirements within limited resources constrains (GOL-MOF, 2011). The funds are then channeled through government ministries and other service agencies. Costing for the work is done by Ministry of public works personnel who also carry out periodic valuations and payments certification. Payments are made only for certified works. The contractors are therefore required to have their own financial resources to undertake works. This is usually established during the bids evaluation process with the basis being their qualifications, equipment, experience and company accounts, among other criteria (Moramati-Proinvest, 2011 (b))

2.6 Communication and Completion of Construction Projects

Cherry (1978) defined communication as the process of interaction between individual in which meaning is created and shared. In a construction environment coordination of various stages of construction process relies a lot on parties transferring appropriate and relevant information to each other in order to successfully interpret and implement the project in accordance with the requirements. As the project unfolds and the design is realized, information in the form of drawing, specifications, construction methods and instructions must be communicated from one party to another. Therefore, using an appropriate communication method and communication medium to resolve construction and design problems is essential. The exchange of information needs to be straightforward, fast and reliable and no work should be unnecessary duplicated for the project participants. (Stephen 2006)

Dainty, Moore & Murray (2006) have recognized that the term “communication is itself a multifarious and complex term, which can mean different things in different context and situations. This is certainly the case within the construction industry, where each project demands communication between wide varieties of participants. There seems little doubt that communication plays a vital role in the effectiveness of organizations. Although managers in different industries undertake communication, Drucker (1985) emphasizes the importance of communication for managers, and point outs that communication ability is essential for project success. In project management, the importance of communication is emphasized by Sievert (1986), who says that a high percentage of the problem in working relationship may be attributed to poor communication. It is also important to note engineers and technical personnel spend 50% -75% of their time in communicating verbally.

Many authors identified communication as one of the core indicators in enhancing the practices of team integration in construction projects. As described by Love, TSE and Edwards (2005) communication has been linked to team effectiveness, the integration of work units across organization levels, characteristics of effective supervision, job satisfaction, and overall organization effectiveness. By establishing communication flows, involvement patterns and other behavioral responses to unexpected change events, the nature of any professional and

cultural interfaces can be established Evbuomwan and Anumba (1998) found that lack of communication between all key players in any construction project in a multi-disciplinary team has led to difficulty in the development process for both project management and design implementation levels. In order to reduce the complexity of the design implementation process, high quality communication between the main project offices and on-site must be established Moore and Dainty (1997) added that communication barriers between project teams had left the construction team almost peripheral to the design changes. They further added that by having a multi-disciplinary project team, communication systems can be improved as they will encourage face to face relationship and interaction between team members. Developed effective communication systems throughout the construction supply chain will ensure good reliable flows of information; establishing mechanisms for problem resolution and for generating added-value into projects. This can be implemented by using numerous techniques and tools that could assist the project team to encourage open communication and minimize the barriers to information flow. For example, El-Gohary and El Diraby (2010) suggested that using ICT systems, such as a portal based system, will promote enhanced communication, coordination and collaboration among various disciplines and stakeholders, Jorgenson and Emmitt (2009) further added that facilities and leadership appeared to be a vital technique for achieving effective communication between the construction professionals and other stakeholders.

Sharing information is also seen as a key indicator of team integration practice whereby Baiden, Price & Dainty agrees that project information should be available, open and accessible to all project team members as an input for efficient decision making and in order to create effective integrated project teams. The challenge is to ensure that the right information gets to the appropriate person at the right time. The lack of information or a response from project stakeholders becomes critical for progressing with project decisions. The integrated project teams should be an environment for openness, where shared information is essential for mutual respect and effective collaboration each team member should meet regularly to share information, discuss the project plan, any issues raised and generate ideas in order to achieve the objectives of the project. Integration between all key construction systems that can enhance the information flow between project teams for instance, e-commerce and other electronic systems for example information across the supply chain should be adopted to enhance integration. Information can

be transmitted to all project parties by the centralized system via a centrally accessible location established to store the electronic information, or a network for transferring the electronic information to all parties such strategies to develop IT tools in order to support multi-disciplinary team interaction will contribute to smooth and effective information and knowledge sharing the of communications, standardization and accessibility of information coupled with specific technique can cause significant changes in organizations and a short period of time . It seems clear as Evabuomwan and Anumba (1998) mentioned that there is a need to have total information about the project with each participant in the project having access to the same information.

The importance of communication in the construction industry is so important that problems in construction are sometimes referred to as communication problems in general, Emmerson (1962); Higgin and Jessop (1965); (Latham, 1994). Construction is a fragmented and dynamic sector with a project based nature. This makes that many stakeholders operate in frequently changing sets of relationships which are contractually driven. Insufficient communication creates information vacuum which may end up being filled with rumors. The efficiency and effectiveness of the construction process strongly depend on the quality of communication. In literature four reasons are mentioned why improvements in communication are needed. The first reason is that an improvement in the communication within the building team. In project teams and between project manager and contactors, could reduce failure. Second, more open communication at all levels could lead to innovations and better technical solutions. Third, communication improvement in early phases of projects would positively influence the quality as perceived by all stakeholders involved. Finally, improved communication during the briefing might lead to better decision-making, for example less haste in moving to solutions and better ways of looking at the requirements first. Communication is essential to all business activities; it enables an organization, and is an integral part of the construction process. Beyond the argument, any improvement in communication can improve an organization's operating effectiveness. Good communication within an organization and between organizations contributing to the construction project can improve motivation levels and improve the processes. Conversely, inadequate communication can result in de-motivated workforce and lead to problems in construction.

Given that construction is such a fragmented, dynamic and disparate sector, the challenges of communicating effectively are greater than in most other production environments. Contractually driven relationships, conflict and a lack of mutual respect and trust, all combine to hinder open communication and render the role of the project manager extremely demanding and problematic. Nevertheless, addressing communication in the industry can be seen as a principal enabler for improving the industry in the future. During a project, communication can occur in various directions depending on who is communicating. There is upwards communication to management from own organization and the customer's organization. Lateral communication takes place with customers and within project teams. Machinery needs to be put in place for further communication to take place, either downward communication (from superior to subordinate), horizontal communication (between colleagues) or upward communication (from subordinates to superior). Mehra (2009) stated that communication will always involve more than one person.

There are enough cases of project failure to meet project completion in the construction projects. It has been contended that the diverse and multifaceted natures of construction projects make it "difficult to plan for, forecast, manage and control" Smith, Jaggar (2007). Like any other undertaking, construction project is an investment that should in the end makes economic sense but when they fail to proceed diligently to completion then loss is inevitable. .

2.7 Contractors Technical Capacity and Completion of Construction Projects

Contractual capacity basically means the ability of a contractor to execute the contractual works successfully to completion. Contractual capacity can be reviewed from three main dimensions including financial, managerial and technical according to Ministry of Public Works evaluation procedures. This research will mainly concentrate on the technical aspect of contractual capacity of contractors.

Prequalification is the process used to investigate and assess the capabilities of the contractors to carry out a job if it is awarded to them. One of the major factors that is key to the project completion of the buildings construction project is the technical capacity of the contractor.

Indicators for technical capacity include the education level, experience of the technical staff, plant and equipment and the class of registration of the contract firm according to the Ministry of Public Works evaluation criteria. Different magnitudes of work in terms of complexity and cost, requires appropriate classes of registration of contractors as well as level of technical staff qualification. Contractor prequalification is a decision-making process involving a wide range of decision criteria as well as decision-making parties and has received the attention of several researchers (Moselhi and Martinelli, 1993; Ng, 1992; Herbsman, 1992; Ellis and Herbsman, 1991; Merna and Smith, 1990;). This is normally carried out by a client's representative and eventually leads to be selection of a contractor to carry out implementation of a construction project.

The capacity of the construction industry in many developing countries has been noted to be deficient as has been widely reported (World Bank, 1984; United Nation, 1984; Kirmani, 1988; Wells, 1986). In construction, the formation of joint-venture between local and foreign contractors has been recommended by the World Bank (1981). This is supported by Carrilo (1993), the integration of local and foreign constructors in construction project can facilities the transfer of technology. Studies carried out (Wallender III (1977), Bradbur (1978), Campbell, Marton (1984), indicate their indigenous construction firms in developing counties are mostly characterized by lack of capacity, confidence, motivation and long term aspiration among others. Many are struggling without basic foundation which construction firm's internal strength depends on.

Prequalification provides a client with a list of contractors that are invited to tender on a regular basis. This is the approach most currently used by many countries and in which many and different types of criteria are considered to evaluate the overall suitability of contractors. To gain entry to an approved standing list, a contractor applies initially to the client and is then assessed on grounds of financial stability, managerial capacity, organizational structure, technical expertise and the previous record of comparable construction (Merna and Smith, 1990). It is necessary to consider technical, managerial and financial criteria in the prequalification process. These comprise the applicant's permanent place of business, adequacy of plant and equipment to the work properly and expeditionary, suitability of financial capacity and experience,

performance of work of the same general type and the amount of the proposed contract, the frequency of previous failures to perform contractors properly or fail to complete them on time, the current position of the contractor to perform contracts well, and the contractors relationship with subcontractors, or employees (Hunt, Logan, Corbetta, Crimmins, Bayard, Lose, Bogen, (1996).

Thwala and Phaladi (2009) in their study examined problem facing small contractor in South Africa and found that poor record keeping, lack of effective management, and lack of entrepreneurial skills are major cause of business failure for small contractors. Also Wasi, Bridge and Skitmore (2001) examined the factors affecting the performance of small indigenous contractors in Papua New Guinea; level of cash flow, financial skills, poor communication between the contractors and the clients site representative are the factors affecting the performance of indigenous contractors. In a research conducted on the assets structure of medium-sized building construction contracting firms in Nigeria and its implications on operation, Kehinde and Mosaku, (2006), found that the assets structure of these firms comprise of fixed assets being less than half of the total assets. This means that a greater portion of the total is current assets (held mainly as account receivables that sometimes may not be available within one year). Pre-qualification of contractors is a common practice across projects, yet the investigation on the ability of the selected contractors' performance are:- Soundness of business and workforce; Planning and control; Quality management; Past performance; Risk management; Organizational capability; Commitment and dedication.

Multiple linear regression models reveal that technical expertise, past time in business, work methods and working capital significantly impact on contractor's performance across time, cost and quality success (Munns and Bjeirmi 1996). Another basic requirement is that financial material and human resources are fully available for the implementation. In the United Kingdom there is evidence that the Construction Skills Certification Scheme (CSCS) is viewed by employers as the approach to tackling the skills crisis (Mackenzie et al; 2000). Amongst developing countries, skill certification was pioneered in Singapore but has recently been taken up by the construction Industry Development Board (CIDB) in Malaysia. There are categories of skills registered by the CIDB-skilled and semiskilled workers, construction site supervisors

and construction managers. Applicants have to prove their competence by submitting their relevant certificates or they can be tested on site. In certain trades (e.g. scaffolding) they may be obliged to undergo CIDB courses before registration. In other less developed countries, where many construction workers are illiterate, higher priority would have to be given to practical, as opposed to written tests (Abdul-Aziz, 2001). A variant on the testing and certification of individual skills is the certification and registration of subcontractors. Employers in Singapore set up a scheme in 1993 to register subcontractors, known as the Singapore List of Trade Subcontractors, or SILOTS. The objective was to improve their performance as well as to help them to provide continuous employment and better welfare on public workers. The scheme subsequently received government support with main contractors on public sector projects required since 1996 to engage only SILOTS listed subcontractors (Debrah and Ofori, 1997).

Dlugwan, Nxumalo, Hysteen, and Rwelamila (2002), say that in South Africa the Government has put emphasis to transform the construction sector to allow participation of emerging and small contractor but this was not properly regulated as most of these contractors did not have experience and skills to operate sustainable construction firms. Exacerbating this problem is the inadequate investment skills development across all levels in the sector; despite sufficient funding available from the construction Education and Training Authority (CETA) and specific deficiencies include inadequate recognition of prior learning and work place training. The Construction Industry Development Board (CIDB) was established in 2000 as a statutory body to provide leadership to stakeholders and to stimulate sustainable growth, reform and improvement of the construction sector for effective delivery and the industry's enhanced role in the country's economy. Construction Industry Development Board (CIDB) regulations were that a vibrant and successful construction industry is only possible if those employed within it have the required skills and competency to function effectively in their roles. This initiative is seen by some as a mechanism amongst others to minimize the advent of insolvent situations in the construction industry.

In Kenya according to former Prime Minister Raila Odinga, as quoted in the parliament Plenary Hansard (2011) report of 25.05.2011, "the construction industry has been in shambles and faced with a number of problems. These includes but not limited to invasion by quacks and rogue

practitioner, poor capacity corruption and lack of funding.” To address this situation, a law has been enacted in parliament creating the National Construction Authority (NCA), a body that is mandated with the task of overseeing the regulation of the construction industry. All contractors must be registered with this authority. This saw the enactment of parliament regulation creating the National Construction Authority (NCA). Among the mandates of the NCA is to regulate and control the technical capacity of the contractors. This is to be achieved by; regulating the conduct of all stakeholders in the industry, establishing the qualification of all stakeholders, establishing the experience levels of various stakeholders in the industry, establishing the resources capacity of a given stakeholders to do specified construction works (National Construction Authority Regulations 2012). The Authority is also charged with passing regulations from time to time on the quality of construction offered by contractors and also has powers for accrediting training institutions that offers courses related to construction. However, small constructions like construction of residential homes are not catered for in the Act. When it comes to protection of the local industry from unfair competition, no foreign entity can carry out construction works in Kenya without obtaining the necessary license and regulatory approval. Hilary Patroba (2013) says the emergency of Chinese contractors in Kenya has created some business in this industry, but the Government was being held ransom by cowboy contractors.

The enactment of the national construction authority bill will go a long way in ensuring that only capable and qualified contractors are registered for construction works. One objective the Kenya Government is to strengthen the capacity of Kenya’s construction industry especially in the housing construction which is a labor-intensive activity that will create jobs for youth and the unemployed. Recent discoveries of petroleum oil, natural gas and other minerals are likely to trigger more foreign direct investments inflows. An investment in the construction industry is likely to remain robust against a background of stable interest rates coupled with the on-going government infrastructural projects necessitated by decentralization of services through devolution. Cement consumption, a key indicator in the construction industry grew by 6.9 percent in 2013 (Construction industry development policy: GOK)

2.8 Legal and Regulatory Environment and completion of construction projects

The legal and regulatory framework has an influence on building projects in form of exerting control over the operations of the sector in a country. Laws and regulations should express the

policy of the government; define the scope and functions of the building sector; regulate the requirements of practice for building projects and the working condition; provide guidance and standards that need to be followed; and regulate the distribution of responsibility of various governing authorities of the sector (Mogram, 2010). The institution framework has multiple actors but the Department of Public Works is charged with managing all government and public institutions building works, in liaison with other relevant bodies (Kimani and Musungu, 2010). The contractors operations are also not harmonized despite the establishment of their umbrella body of Kenya Federation of Master Builders in 2010 which does not have a legislative mandate (Moramati – Proinvest, 2011(a)). British Standard (BS) has been the safety guide for Kenya's building sector. Ondari&Gekara, (2013 quoting Kelechi (2004), argue that policy making requires a strong legitimate institutional structure for decision making and policy enforcement.

2.9 Theoretical Framework

This section brings out the overview of the theories upon which this study was anchored. Among the theories found relevant to the study was the Theory of Complexity (TOC) as advanced by Terry William. The other theory that was found applicable is the Theory of Constraints as was developed by Eliyahu in 1980s.

Complexity theory is premised on the study of complex and chaotic systems and how order, pattern, and structure can arise from them. A complex system is defined as one in which many independent agents interact with each other in multiple ways. Waldrop, (1992) suggests analogy to the way the human brain adapts to learn from experience. This theory is befitting the study in consideration of the set-up of construction projects which are a one-off, unique, novel and complex in nature (Westerveld, 2003; Ahadzie, 2008). There are many parties involved in completing a construction project making it even more fragmented (Bertelsen, 2003; Ankrah and Langford, 2005). Terry Williams (2008) shares the view of other scholars on complexity but extends it by one additional dimension of cost estimates. David Berreby maintains that the organization of systems is no accident, but "the results of laws of nature that we don't yet fully understand." Once understood, managers will learn that if left to function on their own, systems organize themselves, bringing about "order for free." In addition to the two components of complexity, vis-à-vis the number of factors and the interdependency of these factors, he introduces the third factor which is uncertainty. He says uncertainty adds to the complexity of a project. Kahane (2004) on the other argues that complexity is deeply rooted in a social

environment. He distinguishes complexity as dynamic and argues that the cause and effect are far apart and it is hard to grasp them firsthand experience. They usually unfurl in unpredictable and unfamiliar ways emanating especially from cost related issues such as design variations. Complexity theory attempts to explain how even millions of independent actors can unintentionally demonstrate patterned behavior and properties that, while present in the overall system, are not present in any individual component of that system.

The theory of constraints opines that organizations face challenges in performance as a result of poor management practices coupled with lack of necessary intervention mechanisms. It also states that all systems operate in an environment of cause and effect. It is based on these beliefs that Eliyahu (2004) recommended identification of the main factors affecting budget estimates in an organization. He then suggested that the managers figure out how to handle the constraints or barrier to success within prescribed budget. By focusing on fixing the main problem, overall performance could be improved (Eliyahu 2004). Baloi & Price (2003) observed that most organizations do not examine their operations holistically but rather only focus on short-term goals when developing cost estimates. This leads to short term goals solutions leaving out the long term goals solutions. The cause-and-effect relationship can be very complex, especially in complex systems such as those of construction projects. Capturing the essence of cause and effect within the system and identifying factors that emulate these relationships are the keys to system performance that can lead to successful completion of projects. By focusing on fixing the main problem, Eliyahu says the overall performance could be improved

There are other theories that can explain this study including classical organizational theory, neoclassical organization and the modern organizational theory. The classical organizational theory includes the scientific approach of Taylor which is based on principles of management, administrative theory of Henry Fayol and Weber's bureaucratic approach which considers the organization as part of the broad society based on principles such as structure, specialization, predictability/stability, rationality and democracy. Weber listed several preconditions for the emergence of bureaucracy. These include the growth in space and population being administered, and the growth in complexity of administrative tasks being carried out and the existence of a monetary economy resulting in a need for a more efficient administrative system (Weber, 1947).

2.10 Conceptual framework

The study examined the relationship between the independent, dependent and other playing variables as identified in the literature review. Independent variables included payment processes, contractors' technical capacity and project communication while moderating variables included legal and regulatory requirements. The independent variable was completion of buildings construction projects as illustrated in Figure 1.

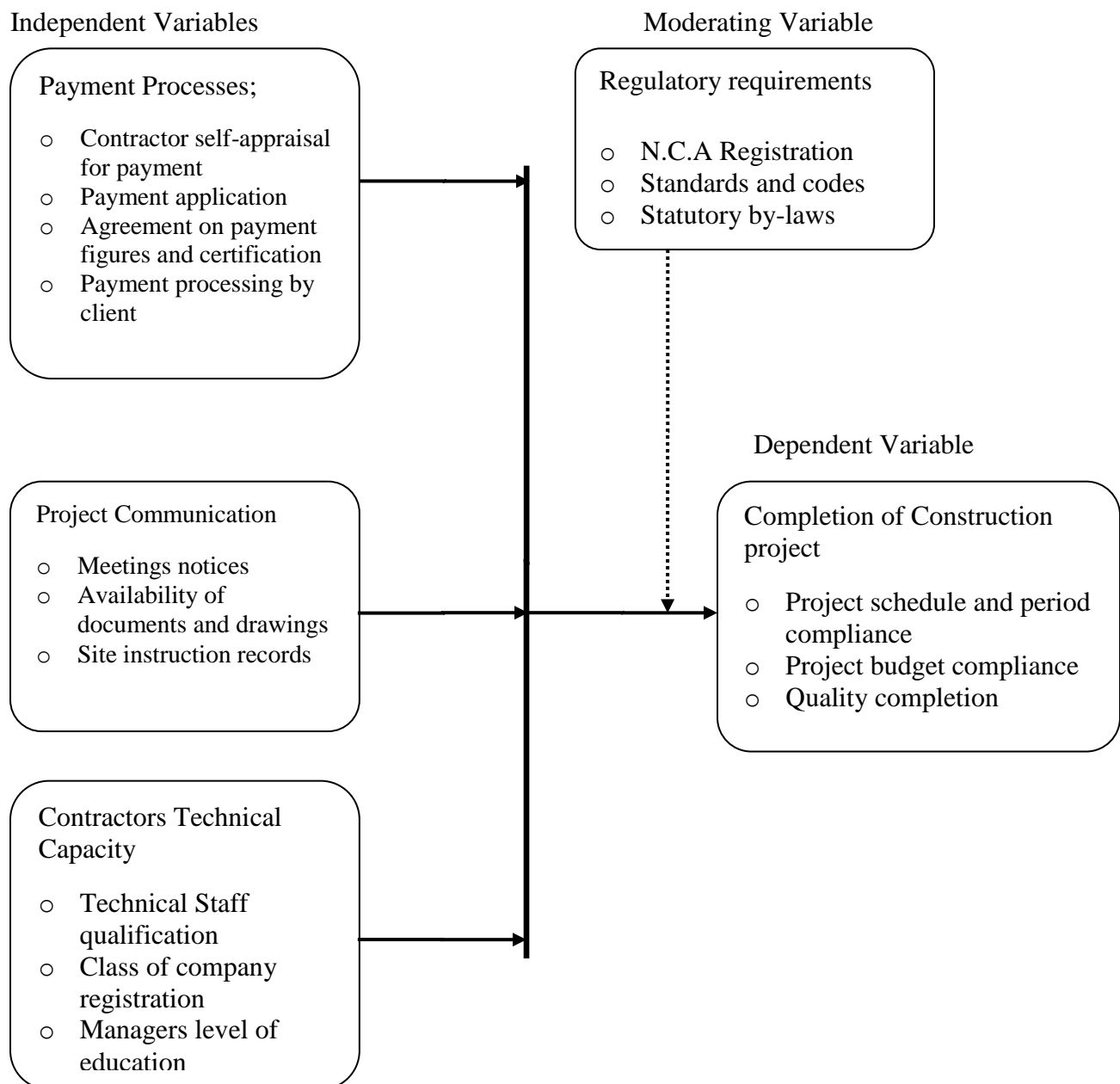


Figure 1: Conceptual Framework

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter of study unveils and justifies the research approach and the methodology used in the study. It shows the research design, sampling and data collection procedures used for the study. It also includes the data collection instruments data analysis and processing procedures used to achieve the research objectives.

3.2 Research Design

A research design is termed as the structure of a research which shows how the major parts of the research jointly address the investigative questions. A research design is the blue print for collection, measurement and analysis of data. (Kothari 2003)

This study used descriptive survey research method. Descriptive research involves gathering data and systematically treating it to present a comprehensive and intelligible inference. A descriptive study is concerned with determining the frequency with which something occurs or the relationship between variables (Cooper and Schindler, 2003). It also gives a causal relationship between dependent variable and the independent variables. The design choice was preferred since the aim of research was to get data from a construction project environment which is complex, interdisciplinary and involving a large number of people interacting in different aspects. Descriptive survey helped to compare the quantitative reasoning of a sample and was a representation of the whole population making a standardized measurement more precise by enforcing uniform definitions upon the respondents. This ensured that similar data was collected from similar demographical groups then interpreted comparatively. Being a descriptive study, the researcher aimed at finding out the extent of influence of payment processes, project communication and contractors' technical capacity on completion of public buildings construction projects in Machakos County, Kenya.

3.3 Target Population

Population is defined as an entire group of individuals, events or objects having common observable characteristics (Mugenda and Mugenda; 2003).

The target populations for this research was 56 consisting of all 14 technical officers (Engineers, Architects, quantity surveyors) based at the county headquarters (Department of Public Works and Housing 2013) , 12 project liaison officers representing each of the 12 departments forming Machakos County government (Machakos County government report, 2013) and 30 contractors undertaking government-funded buildings construction projects under the County Works Officer as the project manager, as were awarded since the inception of County governments in March 2013. (Department of Public Works and Housing, 2013)

3.4 Sampling Size and Sampling Procedure

The researcher adopted a population census mode because of the small size of population that was studied. Mugenda and Mugenda says there is no point of sampling where the population size is small enough to be handled without time and budget strain as this can increase efficiency and reliability (Mugenda and Mugenda, 2003). The target respondents represented all the three parties involved in the implementation of public buildings construction projects, that is, contractors, project managers and clients. These were assumed to have the knowledge and insight of the activities surrounding the buildings construction projects processes and procedures within the area under study.

3.5 Research Instruments

The research instrument used in collecting primary data was a self-administered questionnaire comprising of both closed and open-ended questions. The self-administered questionnaires allowed the respondents to give free and reliable answers at their convenient time without the undue influence of the presence of the researcher. It also had the advantages of maintaining standard or similar questions to all the respondents thus making it easier and cheaper to administer. According to Cargan, (2007) closed-ended questions provide objective quantitative data whereas the open-ended questions provide general subjective insight into the study subject.

3.5.1 Pilot study

A pilot study was conducted on selected but similar respondents to pre-test the research instrument to ascertain whether it yielded the required information and in an accurate manner. The pilot study was conducted in the neighboring Kaiti sub County of Makueni County with five respondents as the rest sample. A pilot study facilitates improvement of the instrument through changing and modifying where necessary and eventually achieving the ultimate aim of obtaining reliable and valid survey data as averred by Fink (2006).

3.5.2 Validity of the Research Instrument

Ndegwa, (2013) defines validity as the degree to which the researcher has measured what he set out to measure. It is the accuracy and meaningfulness of inferences which are based on research results. Validity therefore is whether an instrument is on target in measuring what is expected to measure. To check the validity of the instrument the pilot study was used through the assistance of the supervisor and experienced experts, including peer review by fellow students who were doing similar researches. The instrument was subjected to face validity; content validity test and construct validity test through testing it using the research done in the past.

3.5.3 Reliability of the Research Instrument

Reliability was tested through test-retest technique, whereby the same questionnaire was administered to respondents at two separate points in time and the results compared to get a reliability coefficient. Internal consistency was measured using statistical package to derive Cronbach's alpha, which is a coefficient that measures the consistency of results across items.

3.6 Data Collection Procedure

The data used in the study was from both primary and secondary sources. The questionnaires were distributed to the respondents and personally collected by the researcher with the assistance of a research assistant. Some of the respondents offered to deliver the completed questionnaires to researcher's office based at the county works offices. This method was adopted because

compared to other available methods of data collection like mailing; it was found to be more reliable since a large number of the respondents may have encountered difficulties in readily accessing ICT services from the field where they were based.

3.7 Data Analysis Procedure

Analysis is categorizing, ordering, manipulating and summarizing of data to obtain answers to research questions. The study involved both quantitative and qualitative data. Collected data was organized for analysis by doing data cleaning which involved editing; coding, tabulating, reduction and differentiation. Descriptive statistics and regression was used to analyze quantitative data while regression was employed in testing of relationships between independent and dependent variables. For qualitative data, content analysis method was applied. Frequency tables, were used where to present and explain results. The data analysis method involved the use of descriptive and inferential statistical analysis. The results are presented in form of frequency tables, proportions and means analysis. Correlation analysis was done to determine the degree of association between the variables by application of Pearson's correlation coefficient. Validity of the measurement models was tested using SPSS. The SPSS results of ANOVA helped answer the question as to how the dependent variable is influenced by the independent variables.

3.8 Ethical Considerations

The first ethical issue considered before commencing the field study was to get the necessary permissions from the all relevant authorities including transmittal letter from the University of Nairobi and research permit from the National Commission for Science, Technology and Innovation. Other ethical considerations included letting the respondents participate on their own volition without undue influence. Anonymity was maintained and upheld throughout the research by adopting the doctrine of anonymity and informing the respondents about the purpose of the study's activities in advance. The data collection instrument was designed to ensure respondents of confidentiality and privacy. With respondent to data collection, analysis and interpretation, attempts were made to reference and credit all the sources cited. Plagiarism, fabrication of falsification was avoided while honestly was observed at all levels of study.

3.9 Operationalization of Variables

Table 3.1 is a summary of the systematic process of operationalization of the independent and dependent variables as derived from the set objectives, their indicators, measure, the measurement, the scale and the level of analysis.

Table 3.1: Operationalization of Variables

Item	Objective	Independent variable	Indicators	Measures	Measurement	Data collection method	Measurement scale	Analysis
1	To explore the extent to which payment processes affects the timely completion of public buildings construction projects in Machakos County	Payment Processes	Timely application	Time	Conformance to specified timing	Questionnaire	Nominal	Likert scale
			Timely certificate issuance	Time	Regularity		Nominal	Likert scale Spearman's rank Correlation
			Agreement on Figures	Time	Disputes/lack of		Nominal	Spearman's rank Correlation
			Processing time	Time	Time taken against specified time		Nominal	Likert scale, Spearman's rank Correlation
			Honest self-assessment	Honesty	Honesty		Nominal	Spearman's rank Correlation
2	To determine to what extend project communication affects the timely completion of public buildings construction projects in Machakos County	Project Communication	Centralized information	Type of channel	Centralization	Questionnaire	Ratio	Carl Pearson's rank Correlation
			Timely information		Timing		Nominal	Likert scale
			Source of information		Authority		Nominal	Likert scale
			Channel		Effectiveness			Likert scale
			Meeting attendance		Presence of leaders			Likert scale
3	To determine to what extend Contractors Technical capacity	Contractors Technical capacity	Skills	level	Academic certificate held	Questionnaire	Nominal	Likertscale Pearson's rank Correlation

	affects timely completion of public buildings construction projects in Machakos County		Supervisors qualification	Level	Highest to lowest (1-8)		Interval	Likert scale, Pearson's rank Correlation
			Plant	level	Technical certificate held		Nominal	Likert scale, Pearson's rank Correlation
Item	Objective	Dependent variable	Indicators	Measurers	Measurement	Data collection method	Measurement scale	Analysis
1	To establish the effect of payment Processes, Project Communication, and contractors technical capacity on completion of public buildings construction projects in Machakos County	Completion of buildings construction projects	On schedule project Progress evaluation	Time	Deviation from timelines	Questionnaire	Nominal	Likert scale Carl Pearson's rank Correlation
			Project period	Time	Percentage deviation from project period	Questionnaire	Percentage/Ratio	Carl Pearson's rank Correlation
			Usability on completion	Time	Adherence level	Questionnaire	Percentage/Ratio	Likert scale Carl Pearson's rank Correlation

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

The chapter presents the data analysis on the factors influencing the timely completion of public buildings construction projects in Machakos County, Kenya, a survey of Machakos Sub County. The data collected was subjected to computations and statistical operations to give resultant patterns of measures which were produced in form of tables and percentages and used to determine relationship and draw conclusions relating to the original objectives and hypothesis of the study.

4.2 Questionnaire Response Rate

A total of 56 questionnaires were distributed to the targeted population and the response was as indicated in Table 4.1

Table 4.1: Questionnaire Response Rate

Sector	Target	Response
Client	12	10
Contractor	30	25
Project management	14	13
Total	56	48

Of the 56 questionnaires distributed of 48 were duly filled and returned representing 85.71% response rate which is excellent going by Mugenda and Mugenda (1999). This excellent response rate was attributed to efforts made by the researcher and the research assistant who personally kept in touch with the respondents and collected the questionnaires promptly. The excellent return rate for the project management team can be attributed to the fact that they are housed in one place and easy to access unlike the other two categories of respondents who are scattered in various locations.

4.3 Respondents Demographic Information

This section provides results and discussions of the demographic characteristics of the respondents who participated in the study. It analyses the age bracket, education level, sector representation, the NCA class of registration (for contractors only), the experience in years and finally the profession of each respondent.

4.3.1 Distribution of Respondents by Age Bracket

The study sought to establish the age brackets of the respondents as were categorized in five classes. The responses were as tabulated in Table 4.2.

Table 4.2: Respondents Age Bracket

Age category in years	Frequency	Percent
18-20	1	2.1
21-30	23	47.9
31-40	8	16.7
41-50	10	20.8
Above 50	6	12.5
Total	48	100

The study found that majority of the respondents, 47.9% were aged 21-30 years, 20.8% of the respondents were aged 41 – 50 years, 16.7% of the respondents were aged 31-40 years, 12.5% of the respondents were aged above 50 years and only 1% of the respondents were aged between 18-20 years. This indicates that most respondents were aged between 20 and 30 years, which means they are at the youth age description. This may be attributed to the new job opportunities created on establishment of county governments as well as the constitutional requirement of awarding 30% of all tenders to youth and vulnerable groups.

4.3.2 Distribution of Respondents by Gender

The study sought to establish the respondents' gender. The results were as tabulated in Table 4.3.

Table 4.3: Respondents gender

Gender	Frequency	Percent
Female	9	18.8
Male	39	81.3
Total	48	100.0

The distribution of respondents by gender was 39 male (81.3%) against 9 female (18.8%) This indicates only 18% of the respondents are women. Gender distribution in the construction industry participants was important to show how gender balance campaign is impacting on the industry which according to research by Ndegwa (2013) is a male dominated industry. The male dominance aspect is still persistent and this can be attributed to the stereotype perception that construction industry is a preserve for males.

4.3.3 Distribution of respondents by level of education

The study sought to establish the education level of the respondents. The results were as tabulated in Table 4.4.

Table 4.4: Respondents Level of Education

	Frequency	Percent
Certificate	7	14.6
Diploma	15	31.3
1 st Degree	23	47.9
Post graduate	3	6.3
Total	48	100.0

From the results in Table 4.4, 7 respondents (14.6%) have O level certificate level of education while 15 (31.3%) are diploma holders. 23 (47.9%) are degree holders and only 3 (6.3%) have post graduate qualifications. It was important to establish education level of the respondents so as to ascertain their understanding of the questions, some of which were quite technical. The results indicate that majority of respondents are of degree level of education and all of

respondents hold at least a certificate which suggests they were able to comprehend the contents of the questionnaire and therefore gave reliable results.

4.3.5 Distribution of contractor respondents by NCA class of registration

The research sought to find the NCA class of registration as shown in Table 4.5.

Table 4.5: Contractors NCA Class of Registration

	Frequency	Percent
NCA 1 or 2	4	16
NCA 3 or 4	6	24
NCA 5 or 6	9	36
NCA 7 or 8	6	24
Total	25	100.0

The findings revealed that out of the 25 contractors who responded 4 (16%) were registered in class NCA 1 or 2, 6 (24%) were registered in class NCA 3 OR 4, 9 (35%) were registered in class NCA 5 OR 6, 6 (24%) were registered in class NCA 7 or 8. This means that majority of the contractors were registered in category NCA class 5 or 6. This implies that they have capacity of undertaking medium level jobs costing between 50 and 100 million shillings and were not beginners in the industry therefore were in a position to make informed decisions when filling the questionnaire.

4.3.6 Respondents' distribution by experience

Experience in any industry is important since it reflects the hands on time one has in the industry.

Table 4.6 indicates the respondents' experience in years.

Table 4.6: Respondents Experience in Construction

	Frequency	Percent
less than 5 years	15	31.3
5-10 years	17	35.4
11-15 years	5	10.4
16-20 years	10	20.8
above 20 years	1	2.1
Total	48	100.0

It was important for the researcher to find out the experience pattern of the respondents so as to deduce whether the respondents had the necessary command over the issues they were commending on. Analysis show that 15 respondents (31.3%) have an experience of below 5 years, 17 respondents (35.4%) have an experience of between 5 to 10 years, 5 respondents (10.4%) have an experience of between 11 to 15 years 10 respondents (20.8%) have an experience of between 16 to 20 years while only 1 (2.1%) respondents has an experience of over 20 years. Majority of the respondents have experience of 5 to 10 years while only one respondent has over 20 years of experience. This is a relatively low experience which can be attributed to the findings shown in Table 4.2 which shows majority of the respondents as being in the youth age category.

4.3.7 Respondents' distribution by profession

The study sought to know the distribution of the respondents by profession. This was important in order to know the level of technical profession representation in the construction industry which is largely technical in nature. The results are as shown in Table 4.7.

Table 4.7: Respondents by profession

	Frequency	Percent
Architect	7	14.6
Quantity surveyor	7	14.6
Engineer	13	27.1
Project manager	9	18.8
Others	12	25.0
Total	48	100.0

The results indicate that 7 (14.6%) were architect, 7 (14.6%) were quantity surveyors, 13 (27.1%) were engineers, 9 (18.8%) were project managers and 12 (25%) were representing other professions. A cumulative total of 56.3% of all the respondents are either, architects, quantity surveyors or engineers. This means that most of the respondents were in the technical field.

4.4 Completion of Projects

In this section results and discussions of completion of projects is discussed based on the respondents' opinions on the research questions.

4.4.1 Descriptive statistics

The study endeavored to establish the position as regards issue of whether completion of buildings construction projects always realized on all projects awarded. This was achieved by soliciting the respondents' opinion on the questions based on selected indicators of timeliness of project. The results are as provided in Table 4.8.

Table 4.8: Descriptive Statistics

	N	Range	Minimum	Maximum	Mean
Project completion	48	.08	3.13	3.21	3.1767

From the results in table 4.8, the average score for timely completion of projects was 3.18. In the likert scale measuring interval data, any score above 3 represents disagree. The score thus implies that based on indicators of completion of projects, majority of respondents disagree that projects always realize completion. This result is in agreement with Assaf and Al Heijji (2006) who found that 70% of construction projects experience delays and time overruns.

4.4.2 Specific issues on completion

The study further sought to establish the position of timely completion of project based on specific indicators as indicated in Table 4.9.

Table 4.9: Project completion specific issues

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	TOTAL
	%	%	%	%	%	%
Projects are always completed within the stipulated contract period	4.2	29.2	20.8	33.3	12.5	100
Projects progress evaluation reports are always in agreement with project work schedules	6.3	25.0	25.0	37.5	6.3	100
Usability is always guaranteed immediately on completion and handing over of project	4.2	31.3	18.8	33.3	12.5	100

From Table 4.9, majority (33.3%) of the respondents disagree that projects are completed within stipulated time, majority (37.5%) disagree that project progress evaluation reports are in agreement with project work schedules and majority (33.3%) disagree that usability is guaranteed immediately on handing over to the client. From this analysis majority of the respondents respond in the negative on all indicators of project completion. This indicates that project completion is not always achieved.

4.5 Payment Process and Completion of Projects

The study attempted to find out whether payment processes influences timely completion of projects and the results are as shown in the Table 4.10.

Table 4.10: Payment processes

Opinion	N	Percent
Yes	42	87.5
No	6	12.5
Total	48	100.0

From Table 4.10 (87.5%) of the respondents agree that payment processes influence timely completion of projects while 12.5% disagree. This means that most of the respondents believe that payment processes has bearing on whether projects will be completed on time or not. Karim and Marosszeky (1999) are in agreement with this result, as they say average delay in payment from owner to contractor affects the performance and hence completion.

4.5.1 Specific payment processes issues

On specific issues about payment processes the respondents' opinions are as shown in table 4.11.

Table 4.11: Payment processes issues and completion

	Strongly agree	A agree	Neutral	Disagree	Strongly disagree	TOTAL
	%	%	%	%	%	%
Application for payment by the contractor is not always done on time	10.9	54.3	10.9	19.6	4.3	100
Issue of payment certificates is not always done within stipulated time	15.2	43.5	23.9	13.0	4.3	100
Valuation assessment figures for payment raises disputes between the parties involved	26.1	34.8	15.2	23.9	0	100
Payment certificates are not always honored within the stipulated time	8.7	34.8	30.4	23.9	2.2	100
Contractors are not always honest when doing self-assessment for payment application	17.4	43.5	19.6	19.6	0	100

From results of Table 4.11 majority respondents (54.4%) agree, while minority (4.3%) strongly disagree with the statement that application for payment by the contractor is done on time. On whether payment certificates are done within stipulated time, majority (43.5%) agrees and 4.3% strongly disagree. 34.8% agree that valuation assessment figures for payment do not raise disputes among the parties while none of the respondents strongly disagreed. On the statement on whether payment certificates are honored and processed within the stipulated time majority (34.8%) agreed while 2.2% strongly disagreed. 43.5% agree that contractors are honest when doing self-assessment for payment application. None of the respondents strongly disagree with this statement. This indicates that although payment processes are found to influence timely completion of projects the influence may not be negative.

4.5.2 Ways in which payment processes affect Completion of projects

To get deeper insight on the ways in which respondents thought payments processes affected completion of projects their views were further sought through open - ended questions. Their

responses are given in Table 4.12.

Table 4.12: Ways in which payment processes influences Completion

No.	Ways affecting	Frequency	%ge
1	Delayed payment affects cash flow therefore causing delay.	16	33.3
2	Dispute in valuation causes mistrust affecting smooth supervision	6	12.6
3	Planning of staff payments and materials purchase is smoothened	7	14.5
4	Starting time of the contract project is practical	1	2.1
5	Workers motivation is affected due to unpaid salary	4	8.3
6	Continuous working is not guaranteed without cash	4	8.3
7	Bank credit access is affected	4	8.3
8	Corruption and kick-backs derails project focus	3	6.3
9	Payments helps to cushion currency fluctuation by purchasing materials in bulk	2	4.2
10	Finances and coordination are essential for timely completion	1	2.1

Analysis of results indicated in Table 4.12 indicate that a high percentage (33.3 %) of the respondents in answering the open - ended question said that delay of payments causes delay in projects progress which can lead to eventual failure of project completion. This is in line with findings in section 4.5.

4.6 Project Communication and Completion of Projects

Another objective of the study was to determine the extent to which project communication influences timely completion of projects. Table 4.13 shows the results.

Table 4.13: Project communication and completion

Opinion	Frequency	Percent
Yes	35	72.9
No	13	27.1
Total	48	100.0

From table 4.13, majority of the respondents (72.9%) say project communication influences timely completion of projects while only 27% think it does not. This is in agreement with Drucker (1985) who emphasizes the importance of communication for managers, and points out that communication is essential for timely completion of projects.

4.6.1 Specific project communication issues

On conducting further enquiry on specific issues on project communication, results are as shown in Table 4.14.

Table 4.14: Project Communication and completion of projects

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	TOTAL
	%	%	%	%	%	%
Project information is always communicated from a centralised point	0	12.5	6.3	68.8	12.5	100
Relevant information is always communicated within a reasonable period of time	2.1	8.3	27.1	50.0	12.5	100
Technical instructions are always issued through the project manager	0	14.6	10.4	45.8	29.2	100
The channel of communication used is always agreed and accepted by all parties	4.2	12.5	25.0	43.8	14.6	100
Decision makers of project parties always attend meetings in person	2.1	27.1	16.7	39.6	14.6	100

The results indicate that majority of the respondents (68.8%) disagree that project information is always communicated from a centralized point, none strongly agrees with this statement, 50% of the respondents disagree that technical instruction are always issued through the project manager while only two 2.1% strongly agree with this statement. Majority of the respondents (45.8%) also disagreed that relevant information is usually communicated within a reasonable time and none (0%) strongly agrees. On the statement that the channel of communication used is always agreed and accepted by all parties, majority of the respondents (43.8%) disagree while minority at, 4.2% strongly agree. At the same time 39.6% of the respondents disagree that decision makers of construction project parties attend to site meeting in person while 2.1% strongly agree. It is evident from the results that majority of the respondents disagree with all the statements presented as indicators of site communication meaning that that communication issues presented

affect project completion as emphasized by Sievert (1986), who says that a high percentage of the problems in working relationship may be attributed to communication.

4.6.2 Ways in which project communication affects Completion of projects

On project communication and how it influences completion of projects, respondents' response was sought through an open - ended question and results tabulated as in given in Table 4.15.

Table 4.15: Ways in which project communication influences Completion

No.	Ways affecting	Frequency	Percentage
1	Effective communication enhances coordination leading to fast progress	13	27.1
2	Meetings are used to make and convey crucial decisions and actions necessary for progress monitoring and evaluation.	11	23.0
3	Interpersonal communication creates good relationship resulting to efficiency	7	
4	Lack of co-operation and early consultation leading to project failure	3	
5	The roles of participants in construction projects are clarified through communication	5	
6	Communication between the project and its relevant environment, including the client helps in responding to time line demands	4	
7	Project team becomes cohesive through communication thus working faster.	2	
8	Project team cooperation enhances achievement of project completion	4	

From the results in Table 4.15 the respondents' opinions and how they think project communication influences completion of projects are diverse and include the following: effective communication, decision making meeting, interpersonal communication, early consultation, team cohesion and cooperation. However key among the reasons given is effective communication which is cited by a majority 27.1% as enhancing fast project progress. Site meetings were said to convey crucial information needed for monitoring and evaluation of projects. This was mentioned by 23.0% of the respondents. The findings agree with Shutt(1992) when he says communication on site between the parties can be greatly improved with the aid of site meetings and, that clear communication clarifying roles of stakeholders.

4.7 Contractors Technical Capacity and Completion of Projects

The third objective of the study was to determine to what extent contractors technical capacity affects the timely completion of public buildings construction projects. The study sought to find out whether contractors' technical capacity affected timely completion of projects and the answers to question posed to the respondents produced results as indicated in table 4.16

Table 4.16: Contractors technical capacity

Opinion	Frequency	Percent
Yes	36	75.0
No	12	25.0
Total	48	100.0

From Table 4.16, 75% of the respondents believe that contractors' technical capacity influence completion of projects while 25% believe it does not. This is in line with the National Construction Authority that quality can be achieved by; regulating the conduct of all stakeholders in the industry, establishing the qualification of all stakeholders, establishing the experience levels of various stakeholders in the industry, establishing the resources capacity of a given stakeholders to do specified construction works (National Construction Authority Regulations, 2012).

4.7.1 Specific contractors' technical capacity issues

The study sought to establish the views of the respondents on the listed technical capacity issues and the results are given in table 4.17.

Table 4.17: Technical capacity and completion of projects

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	TOTAL
	%	%	%	%	%	%
Project are done to completion using skilled personnel	10.4	12.5	22.9	45.8	8.3	100
Projects are supervised by qualified personnel	20.8	10.4	20.8	39.6	8.3	100
Construction Projects are done using the correct plant and equipment	18.8	14.6	20.8	37.5	8.3	100
Contractors always maintain enough technical works on site	18.8	18.8	20.8	35.4	6.3	100
Contracts are always awarded to the correctly NCA registered contractors	16.7	43.8	18.8	14.6	6.3	100

On whether projects are done to completion using skilled personnel, 10.4% strongly agree, 45.8% disagree, 22.9% are neutral, 12.5% disagree, and 8.3% strongly disagree. Majority (39.6%) disagree that projects are supervised by qualified personnel while 8.3% strongly disagree with this statement. 37.5% disagree while 8.3% strongly disagree that construction projects are done using the correct plant and machinery, 35.4% disagree that contractors maintain enough technical workers within the site while 6.35% strongly disagree. Finally on this section of technical capacity, 43.8% of the respondents disagree that contracts are awarded to the correctly NCA registered contractors while 6.3% strongly disagree. The above results indicate that most contractors do use qualified personnel, do not use correct equipment, do not maintain enough technical workers on site and but majority are correctly registered with NCA. This may be attributed to the formation of the NCA whose mandate is to regulate and control the technical capacity of the contractors through by establishing the qualifications standards among other mandates (National Construction Authority Regulations 2012).

4.7.2 Ways in which contractors technical capacity influences Completion of projects

The study attempted to find out in which ways contractors' technical capacity influences completion of projects according to the respondents. The results are as shown in Table 4.18

Table 4.18: Ways in which technical capacity influences Completion

No.	Ways affecting	Frequency	Percentage
1	Technically qualified staff gives quality output quality project completion.	13	27.1
2	Compliance to requirements leads to rejection of works thus delaying completion and occupation on completion	11	23.0
3	Use of correct plant and equipment results in quality and speed	6	12.5
4	Use of poor materials causes delay in completion.	4	8.3
5	Training and seminars for staff creates awareness in use of emerging technologies	5	10.4
6	Poor remuneration de-motivates staff reducing efficiency and speed	5	10.4
7	Poor management skills results to poor planning which causes delay of completion	1	2.1
8	Technology acquisition enhances fast project execution	2	4.2

From Table 4.18 the most frequently mentioned reason that can be attributed influencing completion of public buildings construction projects in relation to contractors' technical capacity staff technical qualification mentioned by 27.1% of the respondents. This was said to adversely affect the quality of completion. The other frequently mentioned way in which contractors technical capacity affects completion was compliance to requirements. This attracted 23% of the respondents and was said to affect completion through delay caused by stoppages and delay usage at completion. This concurs with World Bank and other researchers findings that the capacity of the construction industry in many developing counties has been noted to be deficient as has been widely reported (World Bank, 1984; United Nation, 1984; Kirmani, 1988; Wells, 1986).

4.8.1 Descriptive Statistics on Completion Objectives

A general summary on all the objectives was generated and the results are as shown in Table 4.19.

Table 4.19: Statistics on completion

	Payment processes	Project communication	Technical capacity	Project completion
Mean	2.5083	2.3542	2.5458	3.1735
Std. Deviation	.66775	.60528	.91952	.80126
Range	2.80	2.40	3.20	3.33
Minimum	1.00	1.20	1.20	1.67
Maximum	3.80	3.60	4.40	5.00

The general summary indicates that a mean of 3.17 on the likert scale was achieved for timely completion, indicating that majority of the respondents are on the disagree side. These results indicate negation of the presented indicators for all the variables for timely completion.

4.9 Relationship between Factors and Completion of Projects

This section presents findings and discussions of the correlation analysis of the study. It shows the correlation measures in terms of degree or strength of association between various variables. The results are presented in Table 4.20.

Table 4.20: Relationship between factors

		Timely completion of projects	Payment processes	Project communication	Contractor s capacity
Timely completion of projects	Pearson	1			
	Correlation				
	Sig. (2-tailed)				
	N	48			
Payment processes	Pearson	.017	1		
	Correlation				
	Sig. (2-tailed)	.909			
	N	48	48		
Project communicatio n	Pearson	.113	.672**	1	
	Correlation				
	Sig. (2-tailed)	.443	.000		
	N	48	48	48	
Contractors capacity	Pearson	.429**	.320*	.407**	1
	Correlation				
	Sig. (2-tailed)	.002	.027	.004	
	N	48	48	48	48

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.20 shows correlation measures for various variables. An r value of 0.017 for correlation between timely completion and payment processes was recorded, an r value of 0.113 for project communication and timely completion was observed and an r value of 0.429 for contractors' capacity and timely completion was observed. The results indicate that there exists relationships between the dependent and all the independent variable, and also there exists relationships among the independent variables themselves.

4.9.1 Correlation between payment processes and completion of projects

Correlation between payment processes and timely completion of projects was tested and the results are indicated in Table 4.21.

Table 4.21: Correlation between Payment processes and completion

		Timely completion of Payment processes projects	
Timely completion of projects	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	48	
Payment processes	Pearson Correlation	.017	1
	Sig. (2-tailed)	.909	
	N	48	48

There exists a correlation between payment processes and timely completion of projects although the Pearson correlation = 0.017 is not statistically significant at all. Employing 0.05 significance levels, this was supported by a significance value of $0.909 > 0.05$ as shown in table 4.21.

4.9.2 Correlation between project communication and completion of projects

Correlation between project communication and timely completion of projects was tested and the results are indicated in Table 4.22

Table 4.22: Correlation between Project communication and completion

		Timely completion of projects	Project communication
Timely completion of projects	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	48	
Project communication	Pearson Correlation	.113	1
	Sig. (2-tailed)	.443	
	N	48	48

4.9.3 Correlation between Contractors technical capacity and completion of projects.

Correlation between contractors' technical capacity and timely completion of projects was tested and the results are indicated in Table 4.23.

Table 4.23: Correlation between contractors' capacity and completion

		Project timely completion	Contractors technical capacity
Project timely completion	Pearson	1	
	Correlation		
	Sig. (2-tailed)		
	N		
Contractors technical capacity	Pearson	.429**	1
	Correlation		
	Sig. (2-tailed)		
	N		

****.** Correlation is significant at the 0.01 level (2-tailed).

A fair strong correlation exists between contractors' technical capacity and timely completion of projects. Employing 0.05 significance levels, the results indicate that there was relationship between contractors' performance and human resources conditions. The results are statistically significant with a significance value of $0.002 > 0.01$. The Pearson correlation value is 0.429. This implies that use of adequate, technical capacity enhances timely completion of project.

4.9.4 Correlation between factors

Further to the above individual factor correlation results, Table 4.24 shows a general outlook of correlations between each factor both independent and dependent.

Table 4.24: Correlations between factors

		Timely completion of projects	Payment processes	Project communication	Contractor s capacity
Timely completion of projects	Pearson	1			
	Correlation				
	Sig. (2-tailed)				
	N	48			
Payment processes	Pearson	.017	1		
	Correlation				
	Sig. (2-tailed)	.909			
	N	48	48		
Project communicatio n	Pearson	.113	.672**	1	
	Correlation				
	Sig. (2-tailed)	.443	.000		
	N	48	48	48	
Contractors capacity	Pearson	.429**	.320*	.407**	1
	Correlation				
	Sig. (2-tailed)	.002	.027	.004	
	N	48	48	48	48

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

On correlation between each of the factors, the results of Table 4.24 indicate that there exists a strong correlation between payment processes and project communication, employing a 0.01 significance level. The association between them is statistically significant with a significance value of $0.00 < 0.01$. Further, there exists a fairly strong correlation between payment processes and contractors technical capacity employing a 0.05 significance level. The association between them is statistically significant with a significance value of $0.027 < 0.05$ and finally there exists a fairly strong correlation between contractors' technical capacity and project communication, employing a 0.01% significance level. The association between them is statistically significant with a significance value of $0.004 > 0.01$.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses summary of the key findings, conclusions of the study and suggested appropriate recommendations for further research. Conclusions will be made based on the findings as relates to the main objectives the study which were: to understand the influence of payment processes, project communication and contractors' technical capacity on completion of public buildings construction projects in Machakos County, Kenya.

5.2 Summary of Major Findings

The findings of the study based on the objectives of the research are as narrated below.

Based on the first objective the study which aimed to investigate the influence of payment processes on completion of projects, the study revealed that (87.5%) of the respondents said payment processes influenced completion of public buildings construction projects in Machakos County. The respondents also agreed (2.51 on the likert) that payment processes influences completion of public projects. The respondents stated the following as some of the reasons and ways in which payment processes influences completion; delayed payment affects cash flow therefore causing delay, disputes in valuation causes mistrust affecting smooth supervision, planning of staff payments and materials purchase is affected by irregular payments, workers motivation is affected due to unpaid salary, continuous working is not guaranteed without cash, bank credit access is affected, corruption and kickbacks derails project focus, timely payments helps to cushion currency fluctuation by purchasing materials in bulk. The main factor revealed by the study as highly influencing project completion was delay in payments which was mentioned by a majority 33.3 % of the respondents. This was found to affects contractors' cash flow thereby causing delay in project progress.

The second objective was to determine the influence of project communication on completion of public buildings construction projects in Machakos County. On this objective, 72.9% of the

respondents said project communication does influence completion of public buildings construction. This was further backed by a of Likert scale of 2.35 agree of the respondents response. Some of the listed ways included effective communication; regular meetings, interpersonal communication, consultation for clarification of participants' roles, communication between the project and its relevant environment, and team cooperation. The main ways in which project communication was found to influence completion were effective communication and regular site meetings. These were said to enhance coordination through conveyance of crucial decisions and actions necessary for progress monitoring and evaluation resulting in fast progress towards completion of the project.

The other objective was to investigate the influence of contractors' technical capacity on completion of public buildings construction projects. (75%) of the respondents said that contractors technical capacity influences completion of public buildings construction projects. 2.54 score on the likert scale agreed. The issues listed as affecting project completion in terms of contractors technical capacity included the following; technically qualification staff gives quality output quality project completion, compliance to requirements leads to rejection of works thus delaying completion and occupation on completion, use of correct plant and equipment results in quality and speed, use of poor materials causes delay in completion, technology acquisition enhances fast project execution, training and seminars for staff creates awareness in use of emerging technologies, poor remuneration de-motivates staff reducing efficiency and speed. The most significantly reason and way in which contractors' technical capacity influences completion was the technical qualification of the staff which was found to increase output and efficiency leading to quality project completion.

On relationship between the factors, it was found that there exists a very weak ($r = 0.017$) correlation between payment processes and completion of projects, a fairly weak correlation ($r=0.113$) between project communication and completion of public building construction project but the study showed fairly strong($r = 0.429$) association existed between contractors' technical capacity and completion of projects.

5.3 Conclusion of the study

Based on the study findings, conclusions were made that the study fulfilled the research objectives and answered research questions on factors influencing completion of public buildings construction projects in Machakos County and that, the findings reflect the propositions contained in various studies and models as reviewed from literature sources that the factors identified influence completion of buildings construction projects. It is further concluded that each of the factors had a relative influence on completion, of greatest significance being delay of payments in payment processes objective. Project communication was found to influence completion through effective communication and regular site meetings. These were said to enhance coordination through conveyance of crucial decisions and actions necessary for progress monitoring and evaluation resulting in fast progress towards completion of the project. On contractors' technical capacity, technical qualification of the staff was found to affect output and efficiency thus influencing completion of projects.

The study findings revealed a relatively new perspective concerning finances and project completion. The common believe, as confirmed in the literature review has been that projects mostly encounter failure as a result of inadequate financing but the study however clearly brings out a the fact that even well-funded projects can fail to complete due to interference with the payment processes. Technical capacity in terms of qualification of staff charged with implementing construction projects has also come out strongly as another key factor that influences completion of projects. This indicates that completion of projects will depend on the technical and managerial training the workers have acquired.

5.4 Recommendations of the study

On the basis of these findings, it is recommended that in order to achieve completion of projects, payment processes should be given close attention by ensuring that payment obligations are promptly honored by all parties involved in the project. The contract agreement clauses touching on how and when payments should be done must read, understood, respected and correctly interpreted as enshrined in the contract agreement. There should also be prompt and on time payments to avoid cash flow problems on the part of the contractors which results in failure to

honor credit servicing obligations resulting to interference with credit worthiness on part of the contractor. Joint valuations should be carried out to avoid disagreement on the amount to be paid.

On project communication all the parties involved in a construction project should address the issue of effective communication by introducing feedback system whereby receiving and understanding of information can be confirmed. To afford effective communication meetings should be regularized and attended by all decision makers of the project team including the client, project managers and contractors.

The study also recommends that contractors should engage qualified personnel to enhance fast and quality implementation of projects. The training curriculum of buildings construction and management professionals should be reviewed to incorporate current technology and the changing construction environment. On the other hand the government as a key stake holder in the construction industry can use the findings to formulate training curriculum for all stakeholders in the construction industry. Researchers are also expected to use the acquired findings and data references for further studies on the subject.

5.5 Suggestions for further research

This research focused on factors influencing completion of building construction projects at implementation stage. Further research is recommended on the following areas:-

- i. Issues related with project completion at design and procurement stages of the project.
- ii. Integrated training approach for parties concerned with implementation of project undergo a common training to synchronize their understanding of key construction project implementation issues.
- iii. Computer aided applications for project management.
- iv. More elaborate research on contractors' technical capacity to carry out construction projects with a view to reviewing training curriculum for construction personnel

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APPENDIX I: INTRODUCTION LETTER TO RESPONDENTS

MR. PHILIP MUSYIMI MUE

P.O. BOX 1138 – 90100,

MACHAKOS

5th May, 2015.

CELL PHONE: 0722584270

e – mail: muephilipm@gmail.com

Dear Respondent,

RE: INTRODUCTION AND REQUEST FOR YOUR PARTICIPATION IN AN ACADEMICRESEARCH

I am a student undertaking a Masters in Project Planning and Management degree with the University of Nairobi. I am carrying out an academic research on **Factors Affecting the Timely Completion of Public Buildings Construction Projects in Machakos County** and you have been identified as a useful respondent in the study.

Attached herewith please find a questionnaire which you are kindly requested to respond to as honestly and completely as you possibly can. You do not have to include your name in the questionnaire and all information that you may provide will be treated with utmost confidentiality.

Kindly deliver the completed questionnaire to County Works Offices Machakos or send through e-mail, or alternatively call the mobile number provided above for it to be collected at a place of your convenience.

Thank you for your support and co-operation.

Yours faithfully,

Philip M. Mue

Reg. No. L50/73564/2014

**Factors Affecting Completion of Public Buildings Construction Projects in Machakos
County, Kenya.**

INSTRUCTIONS:

1. The questionnaire has six sections and you are kindly requested to respond to all questions.
2. Please tick ($\sqrt{\quad}$) in the appropriate box.
3. Where explanation is requested, kindly be brief and to the point.
4. All information will be treated with utmost confidentiality.

SECTION 1: GENERAL INFORMATION

1. Kindly indicate your age bracket (years)

- | | | |
|-------------------------------------|--------------------------------------|---------------------------------------|
| i. 18-20 <input type="checkbox"/> | ii. 21-30 <input type="checkbox"/> | iii. 31 – 40 <input type="checkbox"/> |
| iv. 41– 50 <input type="checkbox"/> | v. Above 50 <input type="checkbox"/> | |

2. Kindly indicate your gender

- | | |
|-------------------------------------|--|
| i. Male <input type="checkbox"/> | |
| ii. Female <input type="checkbox"/> | |

3. Kindly indicate your education level

- | | | |
|--|--------------------------------------|-------------------------------------|
| i. Certificate <input type="checkbox"/> | ii. Diploma <input type="checkbox"/> | iii Degree <input type="checkbox"/> |
| iv. Post graduate <input type="checkbox"/> | | |

4. Kindly indicate the category you represent?

- | | | |
|------------------------------------|---|---|
| i. Client <input type="checkbox"/> | ii. Contractor <input type="checkbox"/> | iii. Project Manager <input type="checkbox"/> |
|------------------------------------|---|---|

5. Kindly indicate the N.C.A registration category of your firm(for contractors only)

- | | | |
|-------------------------------------|--|--------------------------------------|
| i. 1 or 2 <input type="checkbox"/> | ii. 3 or 4 <input type="checkbox"/> | iii. 5 or 6 <input type="checkbox"/> |
| iv. 7 or 8 <input type="checkbox"/> | v. Not Applicable <input type="checkbox"/> | |

6. Kindly indicate number your experience in the construction field (years):

- i. less than 5 ☐ ii. 5-10 ☐ iii. 11-15 ☐
iv. 16-20 ☐ iv. Above 20 ☐

7. Kindly indicate your professional

- i. Architect ☐ ii. Quantity surveyor ☐ iii. Engineer ☐
iv. Project manager ☐ v. Others ☐ please specify.....

SECTION II: PAYMENT PROCESSES

8. Kindly respond appropriately to the statements below.

KEY: 1. Strongly Agree 2. Agree 3. Neutral 4. Disagree 5. Strongly Disagree

	Statement	1	2	3	4	5
i	Application for payment by the contractor is done on time					
ii	Issue of payment certificates is done within stipulated time					
iii	Valuation assessment figures for payment do not raise disputes between the parties involved					
iv	Payment certificates are honored and processed within the stipulated period					
v	Contractors do a honest self assessment for payment application					

9 Do you think payment processes affects timely completion of public building construction projects?

Yes ☐ No ☐

If Yes, in what way?

SECTION III: PROJECT COMMUNICATION

10 Kindly respond appropriately to the statements below:

KEY: 1. Strongly Agree 2. Agree 3. Neutral 4. Disagree 5. Strongly Disagree

	Statement	1	2	3	4	5
i	Project information is always communicated from a centralised point					
ii	Relevant information is usually communicated within a reasonable period of time					
iii	Technical instructions are always issued through the project manager					
v	The channel of communication used is always agreed and accepted by all parties					
vi	Decision makers of contract project parties attend to site meetings in person					

11 Do you think project communication affects timely completion of buildings construction project?

Yes ☐

No ☐

If Yes, in what way?

SECTION IV: CONTRACTORS TECHNICAL CAPACITY

12 Kindly respond appropriately to the statements below.

KEY: 1. Strongly Agree 2. Agree 3. Neutral 4. Disagree 5. Strongly Disagree

	Statement	1	2	3	4	5
i	Projects are done to completion using skilled personnel.					
ii	Projects are supervised by qualified personnel					
vi	Construction Projects are done using the correct plant and machinery					
vii	Contractors maintain enough technical workers within the site					
viii	Contracts are awarded to the correctly registered contractors as per NCA requirements					

13 Do you think contractors technical capacity influences timely completion of projects

Yes

No

If Yes, in what way.....

SECTION V: TIMELY COMPLETION OF PROJECT

14. Kindly respond appropriately to the statements below:

KEY: 1. Strongly Agree 2. Agree 3. Neutral 4. Disagree 5. Strongly Disagree

	Statement	1	2	3	4	5
i	Projects are completed within the stipulated contract period					
ii	Projects progress evaluation reports are in agreement with project work schedules					
iii	Usability is guaranteed immediately on completion and handing over of the project					

SECTION VI: RESPONDENTS SINGULAR PERSONAL OPINION ON TIMELY COMPLETION OF PROJECTS

14 In your opinion what is the single most important reason that you can attribute to timely completion of public buildings construction projects?

.....

.....

APPENDIX III: RAW DATA

X1 PAYMENT PROCESSES	X2 PROJECT COMMUNICATION	X4 CONTRACTORS TECHNICAL CAPACITY	Y TIMELY COMPLETION
3.2	3.4	3	3.33
1.8	2.6	1.8	3.33
3.2	3.2	3.2	4
2.4	2.4	2.4	3.33
3.6	3.6	3.2	3.33
2.4	2.4	1.6	3
2.4	2.2	2.6	3.33
2.2	2.2	2	2.67
2.6	2.6	1.4	2
3.2	2	3	4
2.4	1.8	1.4	2
1.6	1.6	1.4	3.33
3.4	1.8	3	2.67
2	2.4	2	2.67
3.2	2	1.8	2
2.8	2	1.2	4
1.4	1.8	1.6	2.67
3.2	2.4	4.2	3.33
3.6	3.2	4.2	4
3	3	3.4	4
3.8	3.2	2.2	3
2.4	2	1.6	2.33
2.6	1.6	1.4	1.67
1.2	1.2	1.6	3
2	3	3.4	2
2	2	2.6	2.67
3.2	3.2	3.6	3.33
3.2	3.6	3.4	3.67
2.8	2.6	2.6	3.33
2.4	2.4	2.4	3.67
2.2	2.2	3.8	4
3.2	3.2	3.6	2.33
2.8	2.6	1.8	2.67
2.4	2	2	2.67
2	2	2	5
2.8	2.8	3.2	3.33
1.8	1.4	1.8	1.67
2	2	4.4	4
2.6	2.6	2.8	3.67
3.2	3.2	3	3
2.8	2	3	3.33
1	2	2	3
2	2	1.8	2
1.8	2.2	1.4	2.67
2.4	2	2	5
1.2	1.2	4.2	4.33
2.4	2	2	4
2.6	2.2	4.2	4

APPENDIX IV: CASE SUMMARIES DATA

	Payment processes	Project communication mean	Technical capacity mean	Timely completion mean
1	3.20	3.40	3.00	3.33
2	1.80	2.60	1.80	3.33
3	3.20	3.20	3.20	4.00
4	2.40	2.40	2.40	3.33
5	3.60	3.60	3.20	3.33
6	2.40	2.40	1.60	3.00
7	2.40	2.20	2.60	3.33
8	2.20	2.20	2.00	2.67
9	2.60	2.60	1.40	2.00
10	3.20	2.00	3.00	4.00
11	2.40	1.80	1.40	2.00
12	1.60	1.60	1.40	3.33
13	3.40	1.80	3.00	2.67
14	2.00	2.40	2.00	2.67
15	3.20	2.00	1.80	2.00
16	2.80	2.00	1.20	4.00
17	1.40	1.80	1.60	2.67
18	3.20	2.40	4.20	3.33
19	3.60	3.20	4.20	4.00
20	3.00	3.00	3.40	4.00
21	3.80	3.20	2.20	3.00
22	2.40	2.00	1.60	2.33
23	2.60	1.60	1.40	1.67
24	1.20	1.20	1.60	3.00
25	2.00	3.00	3.40	2.00
26	2.00	2.00	2.60	2.67
27	3.20	3.20	3.60	3.33
28	3.20	3.60	3.40	3.67
29	2.80	2.60	2.60	3.33
30	2.40	2.40	2.40	3.67
31	2.20	2.20	3.80	4.00
32	3.20	3.20	3.60	2.33
33	2.80	2.60	1.80	2.67
34	2.40	2.00	2.00	2.67
35	2.00	2.00	2.00	5.00

36	2.80	2.80	3.20	3.33
37	1.80	1.40	1.80	1.67
38	2.00	2.00	4.40	4.00
39	2.60	2.60	2.80	3.67
40	3.20	3.20	3.00	3.00
41	2.80	2.00	3.00	3.33
42	1.00	2.00	2.00	3.00
43	2.00	2.00	1.80	2.00
44	1.80	2.20	1.40	2.67
45	2.40	2.00	2.00	5.00
46	1.20	1.20	4.20	4.33
47	2.40	2.00	2.00	4.00
48	2.60	2.20	4.20	4.00
Total				
N	48	48	48	48

a. Limited to first 100 cases.

APPENDIX V: RELIABILITY AND VALIDATION STATISTICS

Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.645	4

Validation

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Payment processes	Between Groups	3.529	9	.392	.763	.651
	Within Groups	19.538	38	.514		
	Total	23.067	47			
Project communication	Between Groups	5.218	9	.580	1.836	.093
	Within Groups	12.002	38	.316		
	Total	17.219	47			
Contractors capacity	Between Groups	15.696	9	1.744	2.756	.014
	Within Groups	24.043	38	.633		
	Total	39.739	47			

APPENDIX VI: HISTORICAL CONSTRUCTIONS



Apollo Temple in Didyma Turkey

Source: <http://www.didyma.com/listingview.php?listingID=10>



Fort Jesus -Mombasa

Source: www.mombasainfo.com/.../historical-cultural/fort-jesus

APPENDIX VII: UNCOMPLETED PUBLIC BUILDING CONSTRUCTION



Source: Department of Public Works, Machakos

APPENDIX VIII: NCA CATEGORIES OF REGISTRATION

A		Buildings Contractors	
		Category	Value Limit (KShs)
	1	NCA1	Unlimited
	2	NCA 2	Upto 500,000,000.00
	3	NCA 2	Upto 300,000,000.00
	4	NCA 2	Upto 200,000,000.00
	5	NCA 2	Upto 100,000,000.00
	6	NCA 2	Upto 50,000,000.00
	7	NCA 2	Upto 20,000,000.00
	8	NCA 2	Upto 10,000,000.00
B		Specialist Contractors	
	1	NCA1	Unlimited
	2	NCA 2	Up to 250,000,000.00
	3	NCA 3	Up to 150,000,000.00
	4	NCA 4	Upto 100,000,000.00
	5	NCA 5	Upto 50,000,000.00
	6	NCA 6	Upto 20,000,000.00
	7	NCA 7	Upto 10,000,000.00
	8	NCA 8	Up to 5,000,000.00

APPENDIX IX: RESEARCH PERMIT



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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28th July, 2015


Philip Musyimi Mue
University of Nairobi
P.O. Box 30197-00100
NATROBL

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"Factors affecting timely completion of public buildings construction projects in Machakos County - Kenya."* I am pleased to inform you that you have been authorized to undertake research in Machakos County for a period ending 4th December, 2015.

You are advised to report to the County Commissioner and the County Director of Education, Machakos County before embarking on the research project.

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


DR. S. K. LANGAT, OGW
FOR: DIRECTOR GENERAL/CEO

Copy to:

The County Commissioner
Machakos County.

The County Director of Education
Machakos County.



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