

**IMPACT OF DEVOLVED CONSTRUCTION MANAGEMENT PROCESS ON
QUALITY OF PUBLIC BUILDING PROJECTS IN KENYA; A CASE OF BUSIA
COUNTY, KENYA**

BY

WAMALWA CHRISPINUS WASWA MUKOCHE

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DECLARATION

Declaration by the Candidate

This thesis is my original work and has not been presented for a degree in any other University. No part of this thesis may be reproduced without the prior written permission of the author and/or University of Eldoret.

WamalwaChrispinusWaswaMukoche

Signature.....

Date.....

EDU/PHD/TE/008/14

Declaration by Supervisors

This thesis has been submitted for examination with our approval as University supervisors.

Signature.....

.....

Prof. BonventureWanjalaKerre

Date

University of Eldoret, Eldoret, Kenya

Signature.....

.....

Prof. John W. Simiyu

Date

University of Eldoret, Eldoret, Kenya

DEDICATION

The work of this thesis is dedicated to my late Father for his continuous encouragement over my academic endeavors when he was alive. I believe his spirit resides in my academic achievement.

ABSTRACT

The concerns have been expressed by stakeholders in construction industry that construction sector is critical in economic development in Kenya and yet there are frequent instances of buildings collapsing leading to loss of life and property. The major cause to the collapsing of the buildings was identified as non-procedural process executed by private developers who failed to seek approvals and technical input as required by law. The problem of paradigm shift in governance is that every sector has to adjust to fit in the new system of governance. Under devolution, the construction management process of public building projects has been devolved and managed by the committees at the grassroots. This study envisaged non-procedural and uncoordinated construction management process of public building projects in devolved units. Upon this concern, a case study was carried out in Busia County (a devolved unit that experienced the collapse of buildings and perimeter walls) to investigate the construction process of sixty four public building projects. The purpose of this quantitative correlational study was to assess the level of compliance to professional construction management process by four construction parties (Public Works Officers, Procurement Officers, Contractors and Project Management Committees/Clients). The theoretical framework model was developed to guide the study. In this model the roles and responsibilities of the system were given alongside the actors. The role and responsibilities of the four parties in the construction process of the public building projects formed the independent variables of the study. The quality of the projects was the dependent variable of the study. Random and purposive sampling techniques were employed to obtain sample size. Data was collected through use of questionnaires, interviews and observation check lists. Data was statistically analyzed by use of descriptive statistics and chi-square good-for-fit tests. The findings of the study revealed inadequate participation, compliance to specifications and standards and legal framework by the construction parties in the construction process of the public building projects by devolved units. The study concludes that the devolved construction management process is non-procedural and uncoordinated compared to centralized construction management process that is used for national public projects. The non-procedural and uncoordinated construction management process show lack of quality management, professionalism and legal framework which are the major contributing agents of poor quality projects. The study recommends sensitization of the stakeholders in the construction sector on the roles and responsibilities of the construction parties so as to appreciate and respect professionalism in the construction of the devolved projects. The devolved construction management process impacts negatively the quality of public building projects and the government should review the current practices in order to inject professionalism and quality management in the construction process of devolved projects. This in turn will lead to quality projects and avoid the persistency collapsing of private buildings being extended to public buildings by devolved units.

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LIST OF ABBREVIATIONS, ACRONYMS AND SYMBOLS

Ar.:	Architect
BC:	Before Christ
C:	Compliance
CDF:	Constituency Development Fund
CECM:	County Executive Committee Member
CE:	Civil/Structural Engineer
CH:	County Head of procurement
CIOB:	Chartered Institute of Building
CMAA:	Construction Management Association of America
COK:	Constitution of Kenya
CPM:	County Project Manager
CRB:	Contractors Registration Board
CRD:	Citizen Report Card
DH:	Departmental Head of procurement
DRSRS:	Department of Resource Surveys and Remote Sensing
EAC:	East African Community
EE:	Electrical Engineer
EMCA:	Environmental Management and Coordination Act
GC:	General Contractor (Open tender)
GDP:	Gross Domestic Product
GST:	General System Theory
IBM:	International Business Machines Corporation

ILO:	International Labour Organization
KNBS:	Kenya National Bureau of Statistics
LATF:	Local Authority Trust Fund
ME:	Mechanical Engineer
NC:	Non-Compliance
NCA:	National Construction Authority
NEMA:	National Environmental Management Authority
NES:	National Environment Secretariat
NTA:	National Taxpayers Association
NP:	Non-Participation
P:	Participation
PM:	Project Manager
PMBOK:	Project Management Book of Knowledge
PMC:	Project Management Committee
PMI:	Project Management Institute
PPAD:	Public Procurement and Disposal Act
PPSCA:	Permanent Presidential Commission on Soil Conservation and Afforestation
PPDA:	Public Procurement and Disposal of public assets Authority
PWD:	Persons with Disabilities
PWDE:	Persons with Disabilities Enterprises (Reserved)
Qs:	Quantity Surveyor

RMLF:	Road Maintenance Levy Fund
SB:	Supervisor Building construction
SE:	Supervisor Electrical services
SM:	Supervisor Mechanical services
SPSS:	Statistical Package for the Social Sciences
UK:	United Kingdom
UNDP:	United Nations Development Program
WSTF:	Water Services Trust Fund
WE:	Women Enterprises (Reserved tender)
YE:	Youth Enterprises (Reserved tender)
Y & WE:	Youth and Women enterprises

OPERATIONAL DEFINITION OF TERMS

The following are the operational definition of terms for this study

A case is the intensive study of a single case where the purpose of that study is – at least in part – to shed light on a larger class of cases (a population)

A process is a set of interrelated actions and activities that are performed to achieve a pre-specified set of products, results or services

An exploratory study is a valuable means of finding out ‘what is happening; to seek new insights; to ask questions and to assess phenomena in a new light

Construction management is the application of knowledge, skills, tools and techniques to a broad range of activities in order to meet the requirements of a particular project

Descriptive research, also known as statistical research, describes data and characteristics about the population or phenomenon being studied (main inquiry)

Impact is the measure of tangible and intangible effects (consequences) of one thing’s or entity’s action or influence upon another

Infrastructure this is civil (roads and bridges) and non-residential buildings.

Mixed methods research is the research that has come of age. It includes several the major approaches being used today in the social and human sciences

Procurement is a process to secure bidders for each bid package who are qualified, competitive, interested in the work, and capable of doing the work within the project time requirements

Public Building Projects are building structures constructed by public funds and used for public functions e.g. (school structures, public health facilities, public offices etc.).

Public procurement is the purchase of goods, services and works by public authorities or civil service organizations using public funds

Public sector is a sector that deals with the public projects funded by the public funds

Quality assurance is a set of planned and systematic actions to ensure that products and services comply with specified requirements

Quality control is the periodic inspection to ensure that the constructed facilities meet the standard specified in the contract

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CHAPTER ONE

INTRODUCTION OF THE STUDY

1.1 Introduction

This chapter presents the background of the study giving an overview of the construction industry's contribution to Global and National economies. The overview of devolution in Kenya and its impact on construction sector is discussed giving the emphasis on the utilization of devolved public funds in the construction projects. The persistent collapsing of the buildings in Kenya is highlighted. Subsequently the chapter discusses the research problem, the purpose, research objectives, research questions, justification, significance, assumptions, scope and limitations of the study. It also gives the account and development of the theoretical framework that guided the study. Finally it presents the conceptual framework of the study.

1.2 The background of the study

Civilization of man started with provision of shelter and ever since human beings have indulged in some form of construction activity (Chiktara, 2002). This is evidenced by the existence of ancient architectural marvels which are regarded as wonders of the world. These include the pyramids of Egypt, the great wall of China, the Angkor temples of Cambodia and the tower of Babel just to mention a few. Clifford and Richard (2004) argue that man's engineering efforts are recorded by constructed systems such as works to bring water to the population of a city. The purpose of those created systems and structures is to support civilization. These architectural constructions have stood the test of time because of the excellent quality they possess. Man has continued to improve and

engage in superior construction activities with the development of technology. Presently we see high-rise Buildings with excellent finishes and aesthetic values. We see vast dams, irrigation networks, energy conversions and industrial plants being constructed. Great infrastructure facilities like roads, bridges, railways, airports, sea ports, satellite landing stations etc. are being constructed with precision and better safety measures being taken into account.

The global construction industry currently represents about 13% of global GDP and this number will increase to 15% in 2020. Countries poised to undergo the largest growth include China, India, Russia, Brazil, Poland and the US. Construction in developing or emerging markets is set to increase by 110% and infrastructure construction by 128% with China being the primary engine of growth accounting for 20% of this growth. These numbers are projected with the after effects of the financial crisis and subsequent global rescue packages factored in (David, 2013).

Kenya Economic Survey (2014) indicates that new gross domestic product (GDP) figures show that the building and construction sector grew by 5.5 per cent in 2013 compared to 4.8 per cent in 2012. The Kenya National Bureau of Statistics (KNBS) (2013) attributed the expansion to an increase in the value of building plans approved in the sector, which rose to Ksh.243 billion from Ksh.181 billion in 2012. The construction industry is one of the main drivers of Kenya's economic growth and accounts for at least five per cent of the country's GDP. The construction industry provides employment to energetic population and its role in provision of construction products (infrastructure and buildings) cannot be over emphasized. Kenya has recognized the construction sub-sector as key

player in achievement of this vision. Kenya recognizes that human settlement is core to the fundamental goals of the international community (Republic of Kenya, 1999).

The economic growth for Kenya has all it takes to become one of the best performing economies in Sub-Saharan Africa. However, this will be determined by the way the government responds and manages the challenges emerging from the current global economic environment (World Bank, 2015). The World Bank report projects a steady economic growth rate of 5.4 percent in 2015 and it is projected to reach 5.7 percent in 2016. This economic growth is attributed to the heavy investment by the government in construction industry both at the National and County Government levels. The Economic Survey of 2015 indicates that the Building and Construction sector registered an accelerated growth of 13.1 percent in 2014 compared to 5.8 percent in 2013. This is attributed to increased funds allocated to infrastructure development by both levels of Governments. There is no doubt that Kenya as an ambitious country, wishes to push its development agenda through the construction sector.

Devolution in Kenya is the pillar of the Constitution (2010) and seeks to bring government closer to the people, with county governments at the centre of dispersing political power and economic resources at the grassroots. The promulgation of the Constitution of Kenya in August 2010 marked a major milestone in the way the country is governed. It stipulated the dispersal of political power and economic resources from the centre to the grassroots in a process known as devolution. As a result 47 County Governments and the Senate were established following the March 4, 2013, General Election. Devolution is enshrined in Chapter 11 of the Constitution. It legalizes the formation of counties, each with its own government as spelt out in the County

Governments Act, 2012. This Act also created elaborate structures to ensure the full implementation and success of devolution.

County Governments have executive and legislative authority, including the accompanying mandates and powers, to raise revenue, establish policies, plans, budget and governance. Under this Act, the National Government is obliged to support the County Governments. The functions have been devolved alongside the public funds to run them. The new constitution created 48 Government Systems and stated where each would get its revenue and how it would spend the revenue. The National Government gets its revenue from the four main sources, namely Income tax, Excise Tax, Value-Added Tax and Import and Export Duty. The County Governments are supposed to get a minimum 15% from National Government allocation according to the Constitution. The other sources for revenue for County Government are: property rates, entertainment taxes, license fees and direct service fees. It is these other sources that the County Governments should concentrate on to increase their revenue from their county residents so that power can devolve (Njoroge, 2014). This is a paradigm shift in governance structure in Kenya where the political power and economic resources are decentralized to grass root units with some level of autonomy in the way to run their affairs.

In recent times Kenya has experienced rapid spread of construction projects all over the republic through Constituency Development Fund (C.D.F) and Local Authority Trust Fund (LATF). Other devolved funds include; Uwezo fund for empowering Women and Youth, Water Services Trust fund (WSTF) Constituency Bursary Funds, Road Maintenance Levy Fund (RMLF) and County Government allocations from the Treasury. The Government has devolved public funds to reach citizens in the rural areas/settlement.

Devolution of these funds has succeeded politically in the sense that the constituents are managing these funds. Economically in the sense, that the local people get employment through these projects. Quite substantial amount of these funds have been used to develop public buildings in schools, health facilities, administrative offices for local leaders and many other projects as identified by the local people.

There are several challenges associated with the management of devolved funds. The accountability of these funds has been the biggest challenge and stakeholders have come out strongly to ensure the funds are managed prudently. Among the stakeholders, the National Taxpayers Association has been on the forefront to advocate for prudent management of the devolved funds.

The National Taxpayers Association which is a national volunteer-based organization was established to improve the delivery of services and the management of devolved funds for the benefit of all Kenyans. It compiles and disseminates Citizen's Report Card (CRD) on provision of services and management of devolved funds in Constituencies and Local Authorities. The reports show that large amount of money has been allocated to public building projects whose qualities are below expectations. Some money has been allocated to ghost public building projects through corruption. The Citizen's Report Card of 2012 indicates that lack of information to citizens at the Constituency level on management of CDF funds has largely contributed to dismal participation in their selection and implementation of projects resulting to mismanagement of funds by some unscrupulous individuals (NTA, 2012). The report further shows how shoddy jobs of public building projects have been approved by Ministry of Public Works officials through corruption where millions have been paid for poorly constructed projects. Some

of the money has been diverted to settle the political scores instead of serving the intended projects; as such billions of devolved funds have not been put to proper use (NTA, 2012).

The devolved funds have been used in various projects with an aim of improving the livelihood of all Kenyans. Quite substantial amount of these funds is invested in building and construction sector which has experienced challenges in quality management of the production/construction processes. The devolved construction process comes with its effects or influence on the overall quality of the construction products and services. The impact of the devolved construction process can be traced from the time the Constituency Development Funds and other devolved public funds were established through legislation in the National Assembly (CDF act, 2003). The Oxford English dictionary gives two definitions of the word impact: ‘the actions of one object coming forcibly into contact with another’ and ‘a marked effect or influence’. The Business Dictionary defines impact as the measure of tangible and intangible effects (consequences) of one thing’s or entity’s action or influence upon another. The term impact is a concept that is used for many purposes and at all stages of development programming. “In *planning* a programme, discussion about intended impact can be used to clarify a vision through which to build cooperation and coordinate action; assessments of potential impact are used to identify possible risks or adverse effects (i.e., environmental impact assessments); ambitions of impact are used to make decisions about which programmes to fund; they establish expectations of achievement by which success will be defined; and these in turn are used to plan appropriate inputs and strategy” (Hearn&Buffardi, 2016 p.6).

Construction industry in Kenya has experienced persistent problems of building collapse during and after the construction process. In a record of 15 months Kenya has witnessed six instances of collapsing buildings. On January 4th, 2015, six-storey building collapsed in Huruma estate Nairobi killing five people and several others injured. On April 2nd, 2015, seven people were killed and others trapped in a building that collapsed behind Thika Road Mall in Roysambu. The following month of the same year on 11th day, a perimeter wall at South B Mosque collapsed due to heavy rains killing ten people. On March 9th, 2016, a condemned four-storey building collapsed in Zimmerman Nairobi. On April, 28th and May 1st of 2016, a wall at Lenana Road collapsed killing three people and a six-storey building in Huruma estate Nairobi collapsed killing over twenty people and several injured respectively (Standard newspapers, March 19th, April, 28th and May 1st 2016). Busia town in western Kenya had similar experiences as Nairobi city. On 14th August, 2014, a perimeter wall collapsed and killed a toddler in Legio estate. On 9th October, 2015, a four-storey building under construction collapsed and killed three people (Standard newspaper October 9th, 2015).

1.3 Statement of the problem

The Concerns have been expressed through the by main print media and Ministry of Public Works reports that construction sector is critical in economic development in Kenya and yet there are frequent instances of buildings collapsing leading to loss of life and property. The Economic Survey of 2015 indicates that the Building and Construction sector registered an accelerated growth of 13.1 percent in 2014 compared to 5.8 percent in 2013. This is attributed to increased funds allocated to infrastructure development by both levels of Governments.

The reports on collapse of buildings indicate the loss of life and property as well as the causes that led to structural failure and subsequent collapse of the buildings. The collapsed buildings have been reported to be under private ownership where the greedy owners constructed them without following the right procedures (Lidonga, 2015). The plans were not approved and no professionals were involved in the implementation of such buildings. Nyakiongora(2015) established that the services of qualified technical personnel in construction industry who could have detected early warning were not sought as per the requirement. The public buildings before devolution were designed, approved and implemented by the government professionals in construction. These projects stood the test of quality in all aspects. With devolution, the construction management process has been largely left to the local committees to run the process just as it has been the case of private buildings where the owners are left to hire the professionals to manage the construction process.

The problem of paradigm shift in governance brought about with new dispensation is that every sector has to adjust to fit in the new system of governance. Due to this fundamental change, the construction management of public building projects has experienced paradigm shift and yet there is insufficient information on how this transformations relate with the quality of the final product. This is a paradigm shift from construction management of public buildingsbefore devolution where the government professionals (consultants) were involved from the budget making to completion of the project. The current state of affairs is that the powers are invested in the local committees to manage the construction of public building projects and only seek professional supervision from the public works officers. The roles of different parties involved the public buildings

construction have greatly changed with devolution. It is of great interest therefore to explore into devolved construction management process of public building projects. The construction management pillars of planning, organization, control and communication are critical in achievement of the required quality. The participation of parties in construction team is critical to achievement of the required quality. To determine the impact of the devolved construction management process on quality of the project, the study investigated the roles and responsibilities of project management committees (assume the roles of owners), public works officers (consultants), central county procurement entities and contractors (General, Youth, Women and Persons with Disabilities enterprises) in the construction of public building projects.

1.4 The Purpose of the Study

The purpose of study was to assess the impact of devolved construction management process on quality of the public building projects. This was done through assessment of the level of compliance to specifications and building standards by the project management committees, public works officers, procurement officers and contractors. The study examined the roles and responsibilities of Project management committees, County central procurement units, Public works officers and contractual obligations of the open and reserved contracts and how they impact on quality of Public Building projects. The findings of the study shed light on what could be the eminent danger on quality of public building projects and by extension all building projects brought about by devolution. The results further can be used to overcome obstacles that could arise due to devolved economic resources and political power by devolved units (Counties). The information was garnered on budgeting process, design process, procurement,

construction management and built environment management processes as well as contractual obligations of the contractors hired to do the job.

1.5 The Objectives of the Study

The objectives of this study are;

- i. To examine the roles and responsibilities of the parties involved in the construction management process of public building projects and how they impact the quality of these projects.
- ii. To establish how the quality management frame work and policies at the counties contribute towards the achievement of the required standards and specifications (quality) of the public building projects.
- iii. To establish how county laws and regulations on construction sector contribute towards the quality of the public building projects.
- iv. To determine the level of compliance to building specifications and standards (quality) by projects done by devolved units.

1.6 Research Questions

This Study provides the answers to the following research questions.

1. How do the roles and responsibilities of Parties involved in the construction management process impact the quality of the public building projects?
2. Do devolved units (counties) have the quality frame work and policies to guide the construction management process of public building projects?
3. Does the change of roles and responsibilities of the construction team under new dispensation affect the quality of public building projects?

4. Do public building projects under new dispensation meet the expected standards and specifications as per recognized building code?

1.7 Justification of the Study

Infrastructure development is one of government agenda for economic development in Kenya by both levels of Government. The construction of public buildings uses the public funds which require prudent management to realize the value of money. This research is focused on providing the information on construction management process in public building projects funded by taxpayers' money. The study examined the participation of the construction parties (project management committees, public works officers, procurement officers and contractors) in all phases of construction management process to determine their level of compliance to specifications and building standards. In addition the study carried out the physical observation exercise of selected public building projects to determine evidence of poor quality. This thesis; therefore, fills the existing academic gap through provision of information on the operations of construction management process of public building projects in devolved units. The information points out on how devolved construction management process impacts on quality of the public building projects. The assessment of roles and responsibilities of construction parties in the construction management process contributes to knowledge on construction management pillars of planning, organization, control and communication. The findings of the study will help various concerned parties in construction sector as follows; The regulatory agencies (National Construction Authority, National Environment Management Authority, Public Health and Physical planning departments etc.) in developing regulations that will guide the construction sector, the County Government

and Constituency Development Fund Committees in developing the supervision schedules and manuals as well as quality management framework for the construction of projects under their jurisdiction, professional bodies in construction sector in developing specifications, codes and qualification framework to guide the production of construction projects, contractors in adhering to professional practice during the implementation of the construction projects and project management committees in seeking the professional services while managing the construction projects as clients.

1.8 Significance of the Study

The information on devolved construction management process has not been adequately documented. The literature available focuses on the accountability, transparency and corruption issues of devolved funds. The focus on construction management process of the public building projects has been insufficient to determine the impact of devolved construction management process on the quality of the projects. Adherence to the four pillars of construction management (planning, organization, control and communication) by the construction parties is critical in achievement of the quality. This research contributes to the body of knowledge by establishing the level of participation and compliance to professionalism by the construction parties in public building projects. This study derives its rationale from the need to seek solutions to persistent collapse of buildings due to failure to follow the right procedures by clients in Kenya and improvement on quality of public buildings funded by the devolved funds. Further to the above, the roles and responsibilities of construction parties in a project play critical role in achievement of the required quality. The study provides the level of participation and compliance to specifications and building standards by each party involved in the

construction of the public building projects which in turn can be used to determine the contribution of each party towards the quality of the project. Finally, the need for coordination of the activities in construction industry with an aim of achieving standardized public buildings that meet the required quality is recognized by this study.

1.9 Assumptions of the Study.

The following are the assumptions of the study.

- i) The roles and responsibilities of the parties involved in the construction of the public buildings have not changed with devolution.
- ii) The procurement services in the construction of public building projects are professionally carried out.
- iii) The construction process of public buildings is done under the supervision of Ministry of Public Works officials (Consultants) to ensure compliance to building specifications and standards.
- iv) The Contractors understand their obligations in carrying out the construction operations professionally.
- v) The project owners/clients seek services of the consultants whenever carrying public building projects.

1.10 Scope and Limitations of the Study

In Kenya both private and public sectors are involved in construction of projects. It could have been ideal for this study to cover both private and public building projects; however it covered only public building projects due to possibility of accessing the projects without much speculation by the owners. The Study findings are generalized to entire

construction projects funded by devolved funds and by extension to all Government funded projects.

The scope of the study was as follows;

- i) This Study investigated the roles and responsibilities of management committees, public works officers and county central procurement officers and contractors and how they impact the quality of the building projects funded by devolved funds only.
- ii) This Study covered Busia County in the Republic of Kenya.
- iii) The respondents in this Study were legally instituted Management Committee members, Public Works officers, and County procurement officers and registered Contractors by National Construction Authority.
- iv) This Study examined the contractual obligations of open and affirmative action contractors (Youth, Women and persons with disability enterprises) only.
- v) This Study covered projects whose consultants are Public servants employed by the Ministry of Public works or County Governments.

The limitations of the study are as follows

- i) This Study was limited to consider the construction management process of the public building projects by Busia County and its seven constituencies.
- ii) The study involved the current office bearers' as respondents.

1.11 Theoretical Framework

This study recognized the change of governance system as brought about by new constitutional dispensation (COK, 2010). This study therefore is grounded by the systems theory. The term governance has various definitions. Kaufaman (2010) simply defines governance as the traditions and institutions by which authority in a country is exercised. Governance is the way "... power is exercised through a country's economic, political, and social institutions." UNDP defines governance as the exercise of economic, political, and administrative authority to manage a country's affairs at all levels. The working definition for Institute of Governance in Canada is "governance is the art of steering societies and organizations." (United Nations, 2006)

Literature on governance indicate several definitions, most of them are anchored on power/authority, management of affairs/decision-making and accountability. Governance determines who has power, who makes decisions, how other players make their voice heard and how accountability is rendered. Governance defers depending on various types of organizations. This study focused on public sector and in a public sector context, this may be a board of directors, a committee or a project management team.

At the operational level, governance is about strategic aspects of steering the organization, and making the larger decisions about both direction and roles (policies). To operationalize governance, comes in the different styles of governance. The devolution is one of governance style that is being applied in developed democracies. This study did not deal with deeper issues of governance in the theoretical framework but recognized the contribution of decentralization theories as a way of giving the power to people to manage their affairs at the grassroots.

In an organization, governance involves several players working together for socio-economic development in a system that is well known and acceptable to the players. This study was therefore grounded by the systems theory which is one of the most prominent theories in management today (Grimsley, 2015). The notion of a system is as old as the European philosophy. Bertalanffy (1972) stipulates that the notion of a system is pre-Socratics of sixth century B.C. He states that in this philosophy, man in early culture and even primitives of today experience themselves as being thrown into hostile world, governed by chaotic and incomprehensible demonic forces which at least at best may be propitiated or influenced by way of magical practices. From this background, Bertalanffy developed General Systems Theory (GST) which is an emphasized model of general aspects of reality.

Kast and Rosenzweig (1972) pointed out the following as some of the dilemmas in the application of general systems theory to organization and management. The GST focused on organisms rather than Organization. They argue that organisms, the foundation stone of general systems theory, do not contain purposeful elements which exercise their own will whereas an organization consists of elements that have and can exercise their own will. This distinction between the organism and the social organization is of importance. In much of general systems theory, the concern is primarily with the way in which the organism responds to environmentally generated inputs. Feedback concepts and the maintenance of a steady state are based on internal adaptations to environmental forces. This is contrary to a social organization where purposeful elements within may initiate activities and adaptations which are difficult to subsume under feedback and steady state concepts. They further demystified the concept by the GST theory that systems are either

open or closed. They brought in the concept of partiality where some systems are partially open or closed. Although they had raised dilemmas in GST, they agreed that general systems theory provides the macro paradigm for the study of social organizations. It is upon this argument that this study recognized the GST as the foundation of the theory that guided it.

Johnson (2015) states that general systems theory emphasizes the way in which organized systems (human and non-human) respond in an adaptive way to cope with significant changes in their external environments so as to maintain their basic structures intact. This argument provides the perfect scenario for the current situation in Kenya where devolution is seen as a significant external change that has a great impact on the construction management of the public building projects in devolved units. Johnson developed system theory models of decision-making in human groups and organizations emphasizing their interaction with "outside" actors and organizations and concentrate on identifying the particular elements in the environment of the group or organization that significantly affect the outcomes of its decision-making. This model helps the organization to understand its functions, strength and weakness as well as threats and opportunities in achievement of goals for political, social and economic development. This theory model guided the study on aspects of leadership in the project management where decisions made affect the project in all aspects including the quality.

Corlett (2015) developed a theoretical model that explains how an organization works to achieve its aspirations. This theory provides four fundamentally different sets of basic assumptions about how organizations work. He developed four assumptions which he referred to as lenses. He categorized these assumptions as rational, human resource,

symbolic and political. The rational lens pays primary attention to structure, efficiency, rules, roles, and hierarchies. Human resource lens pays primary attention to taking care of people, developing people, and the fit between the people and the structure. In both rational and human resource lenses, change is viewed as unusual, and when it happens it is assumed to be orderly and incremental. In symbolic lens, primary attention is paid to the mutual growth and interaction of the learning individual and the learning organization, the meaning of the organizational experience, organizational culture, and the organization as an open system. Through this lens, change is viewed as normal and often transformational. Finally the political lens pays primary attention to power, conflict, negotiating over scarce resources, the messy marketplace of ideas, and the organization seen as a battlefield. In this lens change is viewed as normal, though often sudden, opportunistic, and unpredictable. This study found the lenses being appropriated for the management of devolved construction management process with a view of providing a road map transiting from the old to new dispensation. The rational and human lenses addressed issues concerning the construction parties in the construction management process as far as decision making was concerned. On other hand the symbolic and political lenses addressed the concerned of the external parties on matters of funding the projects. Therefore the rational and human resource lenses dealt with the internal environment whereas the symbolic and political dealt with the external environment of the construction management process.

Patton and McMahon (2006) agree that Systems theory has been proposed as a potential overarching framework for dealing with many issues in human behavior. They see organization as involving human beings and therefore system theory provides an

adequate framework to deal with issues surrounding the operations of the organizations. The systems concept does not eliminate the functions of management, i.e., planning, organizing, control, and communication. Instead, it integrates these functions within a framework designed to emphasize their importance in creating more effective systems. Due to great diversity of operations and environments, particular missions of organizations differ and each system must be unique or at least have some unique elements. Nevertheless, the illustrative model and its application to the management functions of planning, organizing controlling, and communication can serve as a point of departure in system design (Johnson,Kast and Rosenzweig, 1964).

This study therefore, applied the system theory that addresses the concerns of devolved construction management of the public building projects. This study used the concepts from the GST by Bertalanffy (1972) as the foundation, the concepts of management byJohnson,Kast and Rosenzweig (1964) as the pillars for construction management process and Corlett (2015) theoretical model and Johnson (2015) system theory model of decision making as roof and roof covering respectively. This theoretical framework therefore take the shape of a building project supported by the foundation of the GST with the pillars of construction management functions shielded under the lenses of social organization and decision making process.

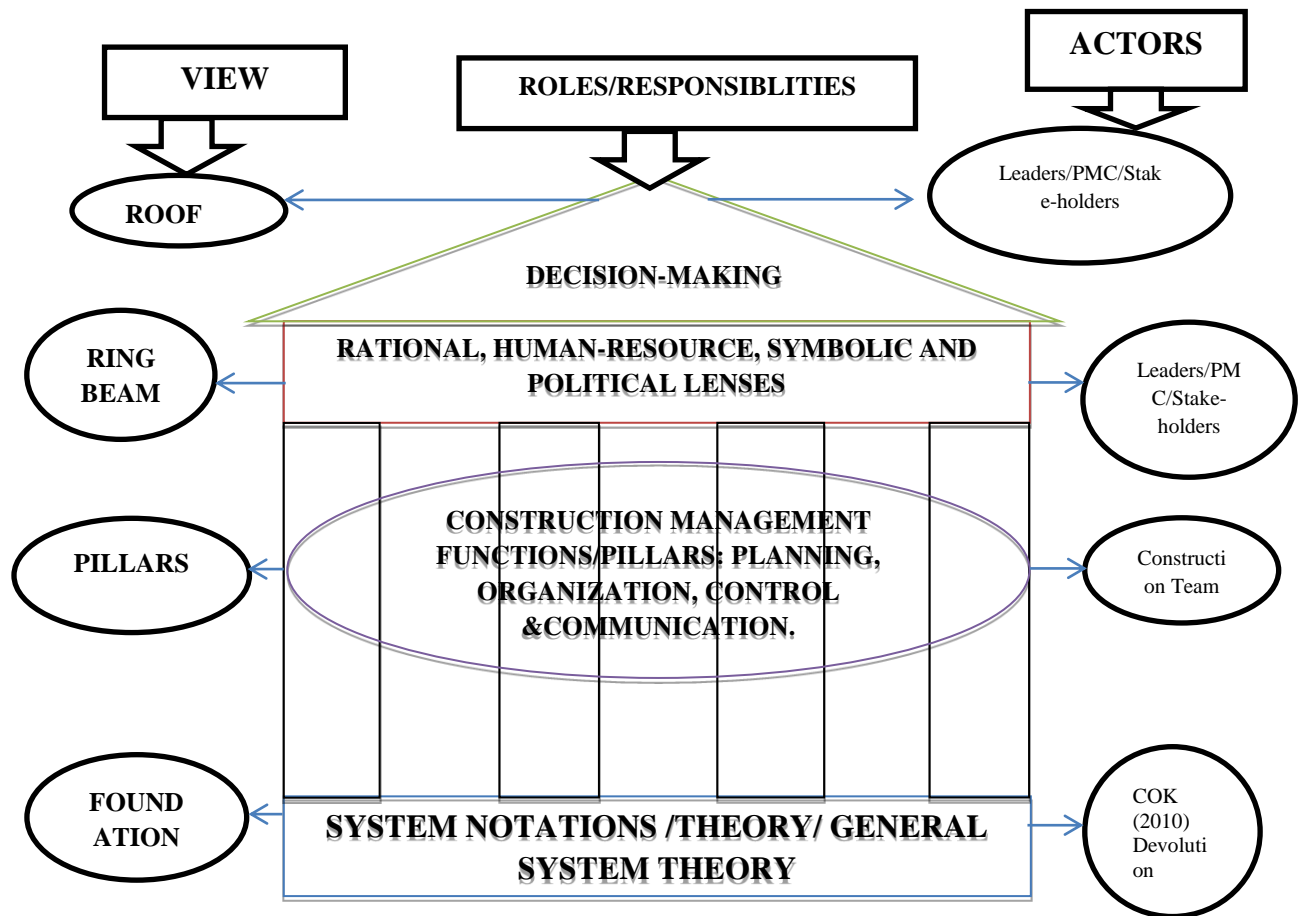


Figure 1.1. The Theoretical Framework Model

The model above represents the theoretical model that was visualized in this study. The foundation of the study was based on the concepts of system theories that have been developed from the conception of European philosophy as described by Bertalanffy (1972). This foundation was critical to this study as it provided the basis from which the study was grounded. The study focused on the construction management process which actually involves the operations and activities that lead to a complete physical project. The construction management in this study was viewed as the pillars supporting the system operations and activities. At the top of the pillars runs a connecting structure comprising of the four assumptions (lenses) through which the organization is viewed.

The topmost part represents a function of decision making which is pyramidal in shape indicating that this function is a preserve of those few at top in the hierarchy of management structure in the organization.

In this model, the roles and responsibilities of the system are given alongside the actors. The role of decision making is done by the Leaders/Project Management Committees/Stakeholders. For example for a public building project they will decide about the type of the project based on the prevailing societal needs. The basis of decision making is guided by the assumptions of rational, human resource, symbolic and political. The roles and responsibilities of construction management in the system are done by the construction team (Project Management Committees, Contractors, Public Works Officers and Procurement Officers). This team is critical in ensuring the quality of the projects is achieved. The Constitution of Kenya (2010) provides the role of devolution of construction management of public building projects. The Constitution of Kenya (2010) is the foundation upon which the system is anchored. The Construction Management Team is viewed as the pillars that support the system. The Leaders/PMC/Stakeholder is viewed as the umbrella or roof of the system that protects the system by making right decisions or vice versa. The focus of this study was the roles and responsibilities of the Construction team which is a system within a larger system of devolved functions.

The paradigm in this study takes a divergence approach from the traditional system approaches/ theories where systems are viewed in general terms of an organization to business approach where the concepts of economy, quality and professionalism are the central nerve of a system. The business organization as a system can be considered as a subsystem of a larger environmental system. In this study therefore devolved construction

management process is seen as a subsystem of a larger environmental system of devolved governance. One of the major changes within business organizations of the future may be the breakdown of traditional functional specialization geared to optimizing performance of particular departments. It is in this context that the paradigm of this study was functionalist. This paradigm has the dimension of objectivists and regulatory (Saunders, Lewis and Thornhill, 2012). Objectivism is the ontological position adopted in the functionalist paradigm. It is regulatory in that the study was concerned with a rational explanation of why a devolved construction management of public building projects impact on quality. The study developed a set of recommendations within the current structure in management. The functionalist paradigm suits this study because it is problem-oriented approach, concerned to provide practical solutions to practical problems. In this study therefore the assumption was that the construction management of public building projects under devolution was a rational entity in which rational explanations offer solutions to rational problem of the projects' quality.

1.12 Conceptual Frame Work

This study recognized the concepts of Project Management Committees as clients fully in charge of identifying the project mobilize resources and finance the project. Public Works Officers as consultants advising the client, constituting the design team, contract document preparation and production and supervision of the project. County Central Procurement entity as supply chain management of the project that is carrying out the procurement services for the project. Contractors as builders should have both financial and technical capacities to carry out the physical realization of the project. Physical

Observation exercise carried out for confirmation of specification and standards. The conceptual frame work is presented as follows:

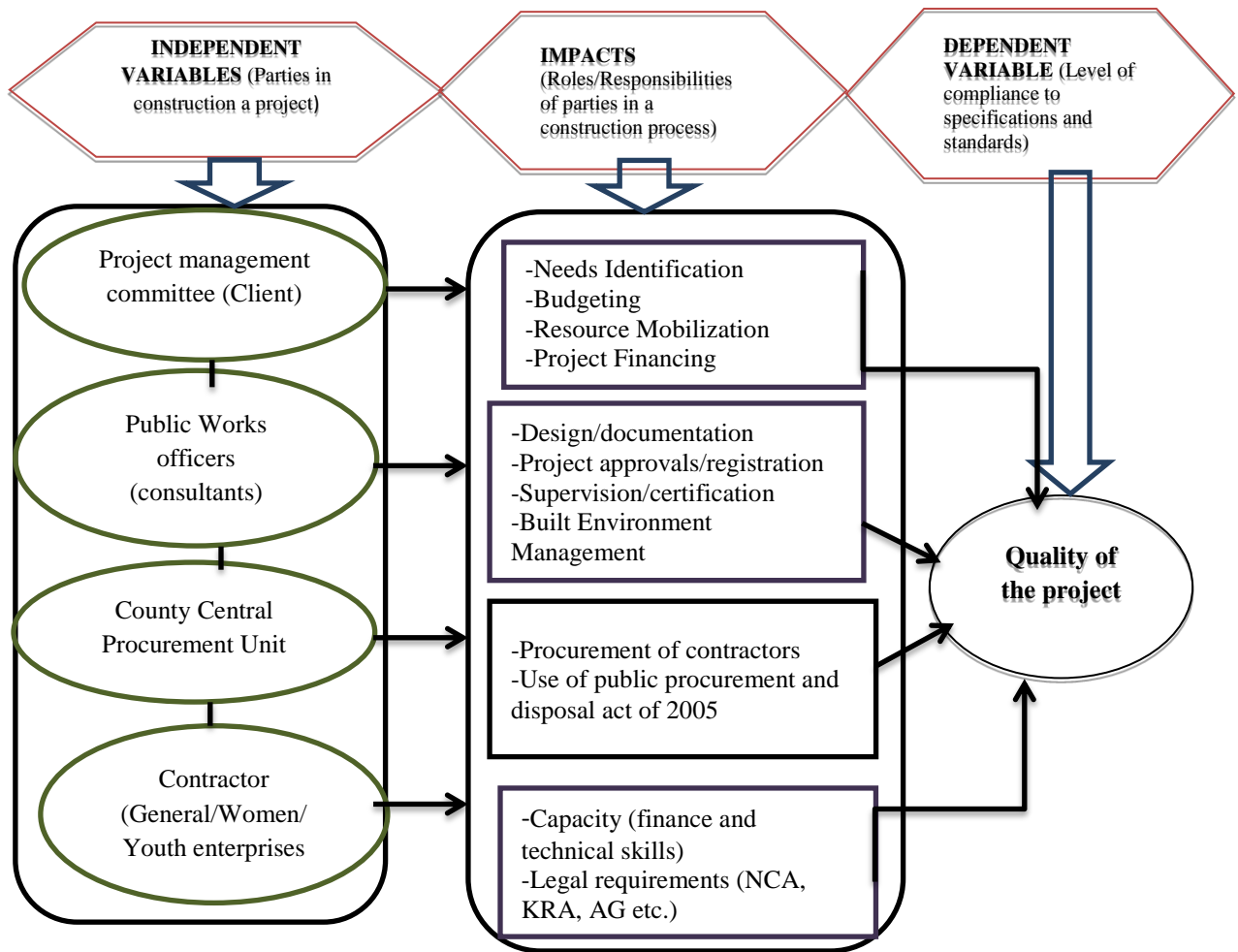


Figure 1.2. The Conceptual Framework

The project management committees assume the responsibilities of the client in the construction team. Their responsibilities include but not limited to needs identification, resource mobilization and funding the project. Failure to carry out these tasks professionally impacts the quality of the projects negatively.

The public works officers assume the responsibilities of consultants for public building projects. They are charged with project design/documentations, approvals/registration, and supervision/certification and built environment management. Failure to involve the consultants in the above tasks compromises the quality of the project.

County central procurement officers are critical in procuring the contractual services for the county projects. They are charged with responsibility of procuring the services of the contractors for public projects. Procurement methods are critical to the quality of the project. The wrong procurement impacts negatively the quality of the project.

The contractor is a key player in the realization of the project. The contractor carries out the physical activities to come up with physical project. He or she needs to have both financial and technical capacities in order to produce the quality projects. The contractor needs to fulfill all legal and professional requirements before being hired to do the job. Failure to select the right contractor, the quality of the projects is greatly compromised. The intervening variables of quality of materials, curing process, mix proportions and weather conditions were controlled by following the proper procedures and having competent parties in the construction management process.

1.14 Summary

The construction industry has been recognized as the prime driver of social economic development. Its contribution to the Global GDP is currently at 13% and is project to reach 15% by the year 2020 (David, 2013). The growth of construction sector in Kenya has been steady since 2013. World Bank (2015) projects a 0.3% growth between the year 2015 and 2016 which is attributed to the increased funds allocated to infrastructure

development by both National and County Governments. In the devolved system of governance, functions are devolved alongside the public funds to run them. There has been a marked rapid spread of construction projects all over the republic through devolved public funds. However, there are concerns raised over the manner these funds are managed and the quality of the projects constructed by these funds. Devolved construction management process is one of the functions that were devolved and has its effects or influence (impact) on the quality of the public building projects. Involvement of professionals in the construction management process is critical to guarantee safety and quality of the project. The study investigated the devolved construction process of the public building projects to provide information for the appropriate interventions in order to meet the required quality. The purpose of the study was to assess the level of compliance to professional construction process in the construction of public building projects by the four parties involved in the construction process. The study examined the roles and responsibilities of the parties involved and their level of participation in the construction management process of the public building projects in Busia County in Western Region of Kenya. The study sort answers to four research questions and achieved four research objectives. The theoretical framework model was developed to guide the study. The study was found to fit in the functionalist paradigm since it was seeking to provide practical solutions to societal problems through prudent management of the construction process of public building projects. The independent variables of the study were the roles and responsibilities of parties involved in the construction management process of the public building projects. The dependent variable was the quality of the public building projects which was a measure to of level of compliance to specifications and building standards.

The intervening variables were controlled by following the proper procedures and having competent parties in the construction management process.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The contribution of construction industry to the economy of any country cannot be doubted however, it is also essential to assess and examine the specific contributions by the parties involved in the construction process to the quality of the projects in the industry. The compliance to the professionalism in the industry is critical to the achievement of quality products and services. This chapter presents the review of the related literature in construction management process. It begins by giving an overview of the construction industry's contribution to Global, Regional and National economies. This provides the view of the constructions industry in terms of its role to Global, Regional and National economic growth and job creation. Subsequently, it presents literature on the construction management process in general and quality management in particular. The chapter also gives an account of legal and regulatory framework of building industry in Kenya. It also provides the account of the challenges of collapsing buildings in Kenya.

2.2 Global Overview of Construction Industry

In the global perspective, the construction industry plays an important role in the global economy. The activities of Construction industry are also vital to the achievement of national socio-economic development goals of providing shelter, infrastructure and employment. It is clear that construction activities affect nearly every aspect of the economy and that the industry is vital to the continued growth of the economy (Oladinrin,

Ogunsemi and Aje, 2012). Construction is a major industry throughout the world accounting for a sizeable proportion of most countries' Gross Domestic Product (GDP) and Gross National Product (GNP). The importance of the construction sector is not only related to its size but also to its role in economic growth.

David (2003) explores the contribution of construction industry on man-made capital (infrastructural development) in UK. In his report to the Construction Industry Research and Innovations Panel he states that, construction's contribution to man-made capital is substantial since a major part of the human created wealth in a country comprises buildings and infrastructure. Built wealth includes but not limited to residences, workplaces, public buildings and infrastructure. The construction sector has long accounted for the major part of manufactured wealth, from some 90% at the time of the Industrial Revolution to around 70% by 2003. In turn, dwellings account for about one-third of manufactured capital stock. Of non-residential capital, infrastructure accounts for nearly two-thirds, and machinery and other assets for one-third.

Durdyev and Ismail (2012) argued that the construction industry has an essential role of Turkmenistan (Central Asia) development with its contribution of 10 percent to the GDP. However, considering it as a new and developing country after breaking up of the Soviet Union, there are factors constraining the construction industry in terms of cost, time and quality. They identified privatization, lack of skilled workforce, immigration regulations, bureaucracy and corruption as main factors constraining the construction industry. Bolkol(2015) studied the causal relation between the construction production and GDP in Turkey. The study revealed that there is no co-integration between variables which means that, there is no long run relationship.

2.2.1 Global construction output verses the employment

Numerous studies have been carried out on the contribution of the construction Industry to the job creation for the global population. The construction output worldwide was estimated at just over \$3,000 billion in 1998 (ILO, 2001). This output is credited to developed nations that contribute 77 percent of the total output. The remaining 23 percent is contributed by the developing nations. The distribution of construction employment was in fact almost the exact reverse of the distribution of output. The high-income countries produce 77 percent of global construction output with 26 percent of total employment. The rest of the world (comprising low- and middle-income countries) produces only 23 percent of output but has 74 percent of employment. It can be deduced from the ILO millennium report that the output distribution is inversely proportional to the employment distribution in both developed and developing nations. The justification to this trend could be due to mechanization of construction sector in developed nations and labour intensive in developing nations.

Wiseman, Roe and Parry (2014) found out that 74% of the employees in the business and 65% of the self-employed operate within the construction sector. Crawford (2016) in a study of Manawatu Region in New Zealand found out that the construction Sector is the major source of employment in the region. It accounted for 6.5% of the total employment in the region. Construction and engineering services industry play an important role in the economic growth and social development of the country. It can be regarded as a mechanism of generating the employment and offering job opportunities to millions of unskilled, semi-skilled and skilled work force. It also plays a key role in generating income in both formal and informal sector. It supplements the foreign exchange earnings

derived from trade in construction material and engineering services (Khan, Umer & Khan2015). Riaz, Din and Aftab (2015) agreed that Construction Industry plays a pivotal role in the economic and social development of Pakistan because of dependence of other industries on construction, significant share of construction in overall employment within the country and overseas, its contribution to GDP and most importantly its potential to grow further. Unfortunately, Pakistan's construction industry is plagued with low skill especially at the craftsmen level. Low skills of the workers contribute to low productivity, poor quality, lesser wages of workers, fewer opportunities for the progression and increase in accidents at construction sites etc.

The available literature shows that construction sector strongly provide opportunities for both formal and self-employment globally. The sector also has great attraction for investment in developing nations.

2.2.2 Construction industry in Asia

Asia is one of the continents that are greatly involved in the construction activities both within and without the continent. Raftery, Pasadilla, Chiang, Hui and Tang (1998) investigated several Asian construction industries and found out that the main trends resulting from globalization are: larger private sector participation in infrastructure projects; increasing vertical integration in the packaging of construction projects; and increased foreign participation in domestic construction. They argue that these trends are helping to polarize the technical, managerial and financial superiority of developed countries and that the developing countries will have to 'leapfrog' this gap in order to minimize their increasing inferiority. They revealed that, in the long term, technology transfer, for example via joint ventures with developed countries such as those in the

construction industries of Japan and China, may fill this gap. The studies concentrated on how to partner with developed countries in order to reduce technological, managerial and financial gaps between developed and developing countries.

Khan (2008) explored the short term dynamic relations as well as long-run equilibrium conditions. He found that there was strong causal relationship between the aggregate economy and the construction sector of Pakistan. The housing and construction sector in Pakistan plays an important role in developing aggregate economy and reducing unemployment. It provides substantial employment opportunities as it contributes through a higher multiplier effect with a host of beneficial forward and backward linkage in the economy.

Khan, Liew & Ghazali (2014) examined the role and performance of construction sector of Malaysia (1991-2010). The results indicated that there was strong correlation between construction sector and economic growth. As a developing nation Malaysia has realized the pivotal role of the construction sector not only in economic growth but also in improving the quality of life and living standards of Malaysian people.

Chiang, Anson & Raftery (2004) presented comprehensive information on Asian construction sector covering quite a number of countries in Asia. China was ranked top in terms of growth and profit overwhelmingly by the respondents. Other Asian countries such as Vietnam, Malaysia, Indonesia, South Korea and India were also among the top ten fastest growing construction markets in the world. In terms of profitability, China, Japan, Indonesia, Malaysia, Vietnam, Singapore, India and Hong Kong were among the top ten. In terms of openness, China, Singapore, Hong Kong, Malaysia, Australia and

South Korea were among the top ten. Last but not least, China was the most attractive construction market in the world, whilst Japan, Singapore, Malaysia, Indonesia, Hong Kong and Vietnam were also among the top ten.

2.2.3 Regional Perspective of Construction Industry

Africa is not left behind in terms of utilizing construction Industry to create wealth for herself. The construction sector experiences varying challenges in the region. The challenges vary from country to country, however lack of technology and financial capacities tend to cut across the region. The region seems to be struggling with the competition from the foreign contractors that has made the local contractors to remain out of the mega projects with big profit margins.

Osei(2013) states that, Construction sector activity is an integral part of country's infrastructure and industrial development. The construction industry also generates substantial employment and provides a growth impetus to other sectors of the economy through backward and forward linkages. He looks at the construction industry in Ghana and pinpoints at the industry's contribution to the economy. The industry is currently characterized by a large number of small contractors and a small number of large foreign contractor dominating the construction market especially in the area of donor- funded projects. Sustainable capacity needs to be built through the strengthening of the local contractors and other actors in the industry without prejudice to their foreign counterparts. Growth and sustainability will not come over night. It can only be achieved through the creation of an appropriate business environment where both local and foreign partnerships can flourish thus facilitating technology transfer. In addition, Darko and Lowe (2016)point out that the construction sector registered impressive growth,

increasing its contribution to gross domestic product (GDP) and employing 320,000 people. It employs 2% of young people in Ghana and provides more training and apprenticeship opportunities to young people than any other sector in Ghana. They further argue that despite the great contribution of the construction sector it has a large skills gap, due in part to training quality, and there is significant unmet demand for skilled artisans.

According to Ogunsemi (2015), the construction industry contributes 3.12% to the GDP of Nigeria. It also accounts for almost 70% of the nation's fixed capital formation and employs approximately 8 million people, which represents about 25% of Nigeria's workforce. Its growth is rising at a steady rate and is predicted alongside Indian construction industry to enjoy higher growth rate than China between 2009 and 2020 in terms of construction output. The industry is characterized by an alarming rate of the repeated collapse of buildings, wastage of economic resources as a result of cost and time overruns poor workmanship and professional incompetence which have left the industry's customers dissatisfied in terms of value addition. Lack of skilled manpower, finance and incompetent professionals were identified as contributing factors hindering the performance of the industry in Nigeria. On the other hand, Aje, Oladinrin & Nwaole (2016) revealed that all the construction professionals (architects, builders, engineers and quantity surveyors) are of the opinion that material availability, labour productivity and level of profit are the most significant factors that highly influence tender price of construction works and consequently affect the success rate of contractors in competitive bidding in Nigeria.

The Contractors Registration Board in Tanzania (2011) noted the challenges facing local contractors; include lack of adequate work opportunities, corruption, lack of credit facilities and inadequate business skills. The CRB emphasized that, in the past the foreign contractors came in country to construct specific projects like roads, airports, harbor works, large building works, and hydropower projects etc. and normally left the country on completion of a project. They were mostly European companies. The foreign contractors were therefore not a threat to the local contractor. Currently, the foreign contractors are bidding for any size of job that is advertised and open to foreign competition. Some of them quote very low prices and particularly for building works. Local firms feel threatened in that although foreign firms constitute about 4% of all registered contractors they execute about 60% of the volume of work in money terms. These foreign firms have the equipment, the working capital and the experience while the local firms have no hope of attaining these assets in the near future.

In Uganda, the Public Procurement and Disposal of Public Assets Authority (PPDA) (2008) outlined limited capacity and lack of professionalism, failures to take advantage of domestic preference in international assignments, Price Escalation, Bid, advance and performance securities, Long Procurement Process, Delayed payments and Un-regulated competition from foreign companies to the local ones as main challenges facing local contractors in Uganda. Katende Alinaitwe and Tindiwensi (2011) identified and prioritized the factors that affect the development of the construction industry. They include; Lack of financial capacity, Research and development in the industry. It was noted that, most construction firms in Uganda lack adequate capital to finance their activities. This implies that firms are reluctant to invest their funds on new technologies

(maintenance and running costs) while still faced with the challenge of actual execution of work. This scenario is further amplified by low profit margins, corruption and continuity of construction work (construction volume handled). The costs of improved technology remain too high for most construction firms to acquire. Firms approached during the research confirmed that they are reluctant to invest in research because of the costs and its immediate impact is difficult to evaluate. On other hand, Kakitahi, Alinaitwe, Landin and Mone (2016) found out that construction-related rework was predominantly attributable to design information omissions, unacceptable workmanship and inadequate supervision of the contractor.

The Rwanda Development Board (2012) carried out the skill survey in the construction sector and the findings indicate that the construction industry in Rwanda is experiencing five critical issues. The issues covered the contribution of the construction industry to Rwanda's economy, reliance to foreign contractors, lack of capacity by the training to provide relevant skills and knowledge, gender discrimination in construction and insufficient ratio of scientist to technicians to artisans. Kazawadi (2014) establishes that the construction sector in Rwanda is very risky because many actors involved lack education, experience, and guidance to undertake whatever it takes correctly and professionally. This is evidenced by several projects that are neither completed on budget nor in time plus reports that reveal the skills gap in the construction sector.

2.3 Construction Sector's contribution to economy in Kenya

The construction sector is indisputably among the key pillars of the Kenyan economy. According to the Economic Survey of 2013, the sector is one of the fastest growing having recorded a growth of 4.8 percent in 2012 compared to 4.3 percent in 2011. The sector accounts for five percent of the gross domestic product (GDP) and employs about 13 percent of the country's total workforce. The level of the sector's importance to the economy is well demonstrated by the amount of money being pumped into it. In 2012, loans and advances to the sector increased by 36.2 percent from Sh50.8 billion in 2011 to Sh69.2 billion in 2012. Overall expenditure for the Ministry of Roads in 2011/2012 financial year stood at Sh91.5 billion and rose to Sh117.6 billion in 2012/13.

According to the economic survey (2014), the world economy is estimated to have grown by 3.0 percent in 2013 compared to the revised growth of 3.1 percent in 2012. The lower performance was observed across most regions and major economic groups. However, the world economy was expected to turnaround in 2014. Growth in Sub-Saharan Africa and the East African Community (EAC) however remained relatively robust with real GDP estimated to have expanded by 5.0 and 6.1 percent; respectively in 2013. This was due to an increase in trade and investment with emerging market economies. In Kenya, the country's Gross Domestic Product (GDP) expanded by 4.7 percent in 2013 compared to 4.6 percent in 2012. This performance was supported by the stable macroeconomic environment for the better part of the year, low and stable inflation supported by improved supply of basic foods, lower international oil prices and lower costs of electricity, infrastructural development and Construction sector. The construction industry grew to 5.5 percent in 2013 compared to 4.8 in 2012. According to the Kenya

National Bureau of Statistics (2014), the level of building and activities in the country is an indicator of the general economic performance due to linkages with most other sectors with corresponding demands for material and labour. With devolution building and construction activities at County levels are intensive.

2.4 Construction Management Process

Construction management process is critical in meeting the required quality of the construction projects. It is the application of processes, methods, knowledge, skills and experience in construction field to achieve the project activities. There are several definitions of construction management; this study used the comprehensive definition by John Bale in the Chartered Institute of Building (CIOB). Bale(2010) defines construction management in an inclusive fashion that addresses six critical aspects of construction industry. The first aspect is concerned with the management of developments, conservation, and improvement of built environment; the second one seen as an exercise at variety levels from the site and project through the corporate organization of the industry and its clients to society as a whole. Thirdly the construction management is seen as embracing the entire construction stream from inception to recycling and focusing upon a commitment to a sustainable construction. Fourthly, it is seen as incorporating a wide range of specialist services. Fifthly the construction management is guided by a system of values demonstrating responsibility to humanity and to the future of the earth. The sixth aspect provides that the construction management is informed, supported and challenged by the independent academic discipline.

The CIOB's an inclusive definition of construction management provides the most relevant broad concerns of this study. The first aspects address the desires of the government to develop infrastructure in every part of the country. This therefore, provides the foot print of infrastructure development. The second aspect outlines the procedures desirable to achieve professionalism in the construction project undertakings. The third aspect provides the flows of activities in the construction process. The fourth aspect addresses the need for use of specialists in the specific component or element of the construction project. This provides the understanding that construction management involves various expertise used in construction process. The fifth aspect is concerned with involvement of the society which is the consumer of the construction products and services. This aspect addresses the ethical values of the society in the construction management of the projects. The sixth and final aspect of the definition provides the academic recognition of construction management. The construction management should address issues of both professional and industrial practices.

The management of the building process is traditionally undertaken on a client's behalf by the architect who then acts as team leader and coordinates the work of other consultant members of the design team. The contractor is selected on some basis of competition (Lam and Chan, 1994). This tradition method is being overtaken with new dynamic innovation and strategies to meet the challenges of meeting quality and delivery on time. The motivation behind the search for an alternative procurement method is generally believed to have come from building clients, who were dissatisfied with the cost, time and quality performance levels obtained when using traditional contracting.

Okoye, Ngwu and Ugochukwu (2015) outline the following as the challenges facing the construction management process. They were Time (Scheduling) Management, Quality Management, Cost Management, and Safety Management. Time was concerned with finishing the projects within the stipulated period and quality management covers following the design specifications and standards. The cost management was concerned with ensuring the project was constructed within the budget and safety management was concerned with the safety of materials, human resource and plant on site. They were ranked as the top management challenges facing construction practice in Nigeria. The study also identified technical skills and other management skills and strategies required for tackling the challenges. It also established that a statistically significance strong positive correlation exist between the rankings of the contractors and professionals.

2.4.1 Phases in Construction Management process

Construction management is a process which involves various phases. Use of terminologies of construction management process or project management process has same meaning as this study is looking at the general principles of management. Therefore in this literature, the two terms may be used to mean the same expression. The construction management process involves a series of activities that are aimed at achieving the end result which is concrete outcome. The concrete outcome is the physical product or service as a result of several phases of a construction process. Duncan, W.R (1993) outlines the five basic phases in project management process. He states that most management models identify three basic management processes that serve to organize the ongoing activity of the enterprise:

- i) Planning-devising a workable scheme to accomplish an objective

- ii) Executing—carrying out the plan
- iii) Controlling—measuring progress and taking corrective action when necessary.

Duncan finds the three phases as lacking the beginning and the end phases. He argues that although there are many variations on this basic model, all view management as an ongoing activity with neither a clear beginning nor an expected end (except as an event to be avoided). Projects, however, are temporary; they have both an identifiable starting point and an emphasis on timely future termination. Projects thus include two additional basic management processes:

- a. Initiating—setting overall project direction and defining project objectives
- b. Closing—formalizing acceptance of the product of the project and bringing the project itself to an end. His model is as in the figure below.

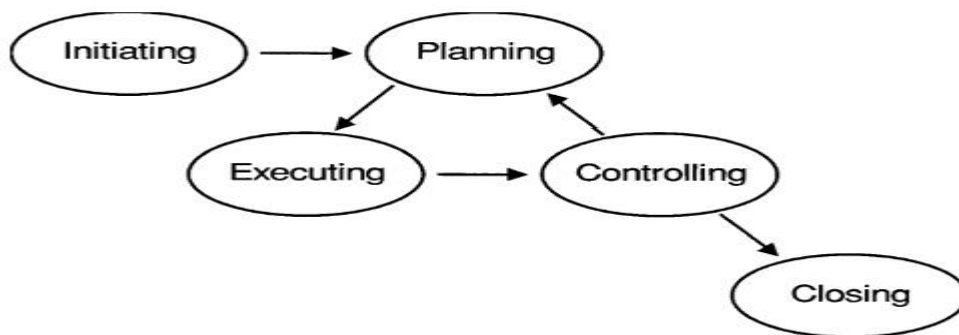


Figure 2.1. Basic Project Management Process

(Source: PMI 2017)

The City of Chandler (Arizona State) in a guide book for project management provides the meaning for the project and its management. Projects have become the new way of

accomplishing and managing business activities. Projects are the temporary assemblage of key personnel designed to accomplish specific business objectives with identifiable customers in mind. A project has a beginning and an end. The project team dissolves once the objectives are met. It is fluid and driven by the specific needs of that business. The project approach to managing business activities should embrace the concepts of change and complexity. Project Management is the process of achieving project objectives (schedule, budget and performance) through a set of activities that start and end at certain points in time and produce quantifiable and qualifiable deliverables (City of Chandler, 2000). In this guide book a comparison of phases in project management between the Project Management Institute (PMI) and the City of Chandler is given in the Table 2.1.

Table 2.1 *The comparison of Project Management phases between PMI and City of Chandler*

PMBOK Phases	City of Chandler Phases
Initiation	Initiation
Planning	Planning
Executing	Execution and Control
Controlling	
Closing	Close-out

(Source: PMI 2017)

The Construction Management Association of America (2009) developed the construction management Standards of Practice which was published the following year 2010. The CMAA 2010 Standards of Practice extensively discusses project management in five basic phases of Pre-design, Design, Procurement, Construction and Post-construction. Esposito (2015), states that according to PMI, “project management is the application of knowledge, skills, tools, and techniques to a broad range of activities in order to meet the requirements of a particular project.” There are five phases of project management and if the lifecycle provides a high-level view of the project, the phases are the roadmap to accomplishing it. The five phases are; project Conception and Initiation, project Definition and Planning, Project Launch or Execution, Project Performance and Control and finally Project close.

2.4.2 Project Management in Construction Projects

In the principle of project management, the construction projects have unique attributes that are specific to the construction industry. Guerin (2012) found that in recognition of the sometimes unique attributes that are specific to the construction industry, the Project Management Institute has (since 2003) published the Construction Extension for the PMBOK Guide. The purpose of the Extension is to improve project management of construction projects by emphasizing those methods and techniques that are particularly important to this subset of projects. Guerin (2012) observes that due to varying construction sites, the projects experience different challenges; however, over budget, poor communication protocol and inadequate control seem to be key challenges to the construction project managers.

2.4.3 Procurement in Construction Projects

The procurement process is critical in ensuring that the client gets his or her value of money. Dom (2012) defines procurement as obtaining by purchase, lease or other legal means, plant machinery, equipment, materials, services and works required by an organization. Udom explains that Construction procurement can be a lengthy and complex process involving different stakeholders, specialized technical information, health and safety regulations, security and insurance issues. It is always important that at an early stage to define the role and legal obligations of the various stakeholders involved in a particular procurement process and to update such obligations as the project progresses. According to the Chartered Institute of Building (2010) procurement is essentially a series of considered risks – each method has individual strengths and weaknesses, which must be carefully calculated by clients and industry alike. There are a number of different types of procurement routes available for clients to select. Each different type of procurement (Traditional, Design and Build, Construction Management, etc) has its own advocates and inherent strengths and weaknesses.

According to the Designing Building Ltd. (2017), procurement is the process of purchasing goods or services. There are many different routes by which the design and construction of a building can be procured. The selected procurement route should follow a strategy which fits the long-term objectives of the client's business plan. Considerations being, speed, cost, quality, specific project constraints, risk asset, ownership and financing. CMAA (2010) provides the goal of procurement as to secure bidders for each bid package who are qualified, competitive, interested in the work, and capable of doing the work within the project time requirements.

The CIOB (2010) carried out the first survey into procurement in Construction Industry in UK. The results indicate that professionals view procurement as absolutely crucial to the delivery of a project on time, on budget and to a high quality, with 87% of respondents of the belief that good procurement is synonymous with a successful project. 82% of respondents believe that “suicide bidding” exists within the industry, a worrying statistic that highlights the dangers of selecting a very low bid at tender stage.

2.4.3.1 Construction procurement methods

Procurement methods are critical in ensuring delivery of better valued projects. The current practice in government strategies is to employ more innovative and effective procurement processes in the construction sector with the aim of deriving the best value from the supply chain (Udom, 2012). The new methods of construction procurement put emphasis on securing maximum appropriate and effective capital costs reductions. In addition due regard is also given to not damaging the lifecycle costs of operation. The common features in the new methods are early involvement of the contractor, transparency and integration. The methods are stated as;

Cost Led Procurement: in this method, the client sets a challenging but realistic cost ceiling and engages one or more supply chain teams in a framework agreement. The team's selection is based primarily on ability to work collaboratively to deliver below the cost ceiling in the first project and to achieve further reductions in the subsequent projects forming part of the client's series of projects.

Integrated Project Insurance: in this method of procurement the client holds a competition to appoint members of an integrated project team based on elements such as

competence, track record etc. The team that is chosen works together to present a preferred solution with cost savings against existing costs benchmarks. This 'solution' goes through a rigorous third party verification process to maintain good value in the project and to ensure that a balanced commercial position has been struck. The unique aspect of this method is that a single insurance policy will cover all the risks associated with the project. One of its major advantage is that it removes the need for adversarial and blame culture as excessive costs overrun is covered by insurance and all that is required for payment where such overruns occur, is evidence of loss rather than the assignment of blame. It is expected that to secure the insurance for a project, the team would have to produce a credible proposal validated by an independent expert assurer.

Two Stage Open Book: Under this model, the client invites suppliers on a framework agreement to bid for a project on the basis of an outline brief and costs benchmark. The bidders (contractor-consultant teams) are chosen at the first stage based on capacity, capability, stability etc. The winning team then produces a proposal on the basis of open book cost that meets the client's stated outcomes and costs benchmark. The model also employs independent expert stage-gate reviews to ensure appropriate definition of scope, outcomes risks etc. with clear recommendations to the client and the contractor where improvements are required.

There are several procurement routes for construction works according to Designing Building Ltd 2017. The 'traditional' procurement route (sometimes referred to as design-bid-build) is a single-stage, fully designed project where the design is developed in detail by a consultant team working for the client and a contractor is then appointed under a lump-sum construction contract which includes penalties for late completion.

The contractor may have no responsibility for any design other than works. The other routes commonly used include:

Construction management is a procurement route in which the works are constructed by a number of different trade contractors. These trade contractors are contracted to the client but managed by a construction manager. The construction manager, acts as an agent for the client, administering and coordinating the contracts. The construction manager is generally appointed early in the design process so their experience can be used to improve the build ability and packaging of proposals as they develop.

Design and build is a procurement route in which the main contractor is appointed to design and construct the works. Design and build can be attractive to clients as it gives a single point of responsibility for delivering the project.

Measured term contracts are used where the client has a regular programme of works that they would like to be undertaken by a single contractor. They are generally used for minor works or for maintenance work.

Partnering is where arrangements are intended to enable full integration of design, construction and operation. Partnering arrangements are linked by bi-party contracts and can include contractors, suppliers and specialist designers. Collective and individual incentive schemes for delivery can be included in cost reimbursement and fee payments. Partnering requires heavy involvement from the client acting as employer and adjudicator of disputes.

Olanrewaju, Anavhe, Aziz, Chen and Han (2016) summarize the procurement methods as shown in Table 2.2.

Table 2.2 Characteristics of some Methods of Procurement

Factor	Characteristics
Build develop and operate	Consortium receives concession to finance, design, and construct and operation project for an agreed time.
Novation	Client consultants prepare initial pre -contract designs but once contractors selected, the contractors is responsible the post-contract design stage.
Management contracting	Work packages let to work contractors and reports management contractors
Cost plus contract	Scope of work not known. Efficient if client has experience staff to overseen the works
Build lease operate and transfer	Private organization design, constructs, and operates facility of leased land. The facility is return back to government after a period of time
Joint venture	A partnership of firms to execute a contract. Each has liability for their contract
Build own and operate	A private firm builds, owns and operates public structure. Government sometime provide some incentives
Build own transfer	a private firm receives a concession to finance, design, construct, and operate as define in the contract

Table 2.2 : Characteristics of some Methods of Procurement (Cont'd)

Turnkey	Contractor/ developer agree to deliver the completed project. Once the project start client has little contribution to make. A well-defined scope of work is not required
Unit price contract	Require complete plans, specifications.
Design and build	Contract design and construct the facility. Client consultant advise on contractor selection and sometime provide some supervisions of works
Construction management	The construction works executed by the trade contractors. Trade contractors' are overseen by construction manager. The contractors has direct contract with clients
Prime contracting	A firm not necessarily in a contractors organize, coordinate all parties in a contract thereby providing single point.
Fees contracting	Operate services for a fee, but investing in the capital
Traditional design, bid and construct	Design function is separate from construction function. Subcontractors report to main contractors. Scope of work clearly defined.
Cost reimbursement	Scope of work not known of defined when contract is entered
Private finance initiative	Comprises of some methods listed here. Collectively PFI is a method for government works. In general, a consortium, will design, delivery and possible operate the facility for a period
Project management	Direct site supervise is require but general administrations

2.4.3.2 Procurement of Construction Works in Public Sector

The public sector deals with the public projects funded by the public funds. Procurement in public sector is one avenue for planning all evils that haunt the construction of public projects. The public sector accounts for quite substantial amount of works in the construction industry. Public sector work accounts for approximately 40% of all turnovers generated by the UK construction industry (CIOB, 2010). The CIOB identified the four key priorities being standardization, reduced cost of procurement, sustainability and public accountability. According to Construction Excellence (2009), collaborative procurement is appropriate method for public sector. It involves the collective purchase by several Departments or organizations of commonly used goods and services and it is one of the most dynamic means by which the public sector funds are freed.

Lawther and Martin (2005) come up with a strategy of public procurement partnership to address the inefficiencies of general procurement. They argue that public procurement does not take place in a societal vacuum. Social, economic and political trends largely define the context in which public procurement takes place. They developed a concept of “21 Century governance” is about public procurement partnership. It is seen as a synthesis of the government approach and the market.

United Nations (2017) defines public procurement as the purchase of goods, services and works by public authorities or civil service organizations using public funds. The public procurement is guided by best value for money, fairness, integrity and transparency, effective international competition and the best interests of the organization principles.

The Public Procurement and Disposal Act, 2005 defines public procurement as the acquisition of any public type of works, assets, services and goods by purchase, rental, lease, license, tenancy, franchise, or by any other contractual means. The Transparency International Kenya (2014) gives an account of public procurement is a key economic activity of any government that significantly impacts how taxpayers ' money is spent and is a function that remains most vulnerable to corruption.

Public procurement in Kenya is guided by several laws enacted to weed out inefficiencies in the procurement process, remove patterns of abuse, and the failure of the public purchaser to obtain adequate value in return for the expenditure of public funds. Such laws include the Public Procurement and Disposal Act, 2005, Public Finance Management Act, 2012, the Public Officers' Ethics Act, 2003 among others. The objective of having these laws has never been fully achieved in practice. The Public Procurement Oversight Authority (2009) defines public procurement as the process through which the Government operates and spends its public resources. It accounts for over 10% of the GDP which makes it a large market for supplies and contractors. It is estimated to consume over 65 % of the national budget.

2.5 Legal and Regulatory Frame work of Building Industry in Kenya

The construction industry in Kenya is governed by several laws covering different players in the industry. The Constitution of Kenya (2010) chapters; five on land and environment, eleven on devolved Government, and twelve on public finance. Architects and Quantity Surveyors act (cap. 525), Engineers (cap. 530), Physical planning act (cap. 286), Public health act (cap.242), Public Procurement and Disposal act of 2005 and National Construction act of 2011. In addition, the building by-law which is a document

that spells out the regulations that should govern the construction industry in Kenya used in implementation of construction projects. These regulations made by a government ministry, county government or corporation to guide the built environment in terms of safety, aesthetics, durability & usability. This document is referred to as a building code.

The Building industry in Kenya is regulated by authorities as follows; National Environment Management Authority (NEMA) for environmental issues and National Construction Authority (NCA) for regulation of Construction Industry. The others include; National Land Commission, County Governments and Ministry for Lands, Housing and Urban Development for land use and planning.

2.5.1 National Environment Management Authority (NEMA)

The National Environment Management Authority (NEMA) was established under the Environmental Management and Coordination Act (EMCA) No. 8 of 1999, as the principal instrument of government in the implementation of all policies relating to the environment. The Authority became operational on 1st July 2002 following the merger of three government departments, namely: the National Environment Secretariat (NES), the Permanent Presidential Commission on Soil Conservation and Aforestation (PPCSCA), and the Department of Resource Surveys and Remote Sensing (DRSRS). The Authority is managed by the Board appointed by the Cabinet Secretary of Environment and Natural Resources.

2.5.2 National Construction Authority (NCA)

The National Construction Authority was constituted under the Act No. 41 of 2011. It was formed with the main aim of consolidating and creating a well-regulated construction industry that will promote sustainable socio-economic development. The authority became operational in June 2014 after publication of regulations. The Authority is managed by the board appointed by the cabinet secretary of Lands, Housing and Urban Development. The functions of NCA are as follows;

- i) promote and stimulate the development, improvement and expansion of the construction industry;
- ii) advise and make recommendations to the Minister on matters affecting or connected with the construction industry;
- iii) undertake or commission research into any matter relating to the construction industry;
- iv) prescribe the qualifications or other attributes required for registration as a contractor under this Act;
- v) assist in the exportation of construction services connected to the construction industry;
- vi) provide consultancy and advisory services with respect to the construction industry;
- vii) promote and ensure quality assurance in the construction industry;

- viii) encourage the standardization and improvement of construction techniques and materials;
- ix) initiate and maintain a construction industry information system;
- x) provide, promote, review and co-ordinate training programmes organized by public and private accredited training centers for skilled construction workers and construction site supervisors;
- xi) accredit and register contractors and regulate their professional undertakings;
- xii) accredit and certify skilled construction workers and construction site supervisors;
- xiii) develop and publish a code of conduct for the construction industry

2.6 Building approvals and Registration procedures

It is mandatory that the parties involved in the building project seek the approval of the building plans and documents before the commencement of the project. First and foremost requirement is for the client to seek the professional services of the consultants registered by recognized professional bodies in Kenya. The consultants include; the Architect, Quantity Surveyor, Engineers (Structural, Mechanical and Electrical), and any specialist for specialized services. The consultants will prepare the required contract documents (Drawings, Specifications, and Bills of Quantities). The client will then seek for project approvals by the Public Health, Physical planning, NEMA and County Government. After the approval, the project should be registered by NCA before the permit for construction works commencement is issued.

Once the client has obtained all necessary approval from the County Government and NEMA, the project must be registered with NCA in Accordance with Regulation 17 of the NCA regulations 2014 that requires that all construction works, contracts or projects either in public or private sector to be registered with the Authority. An owner shall make an application for registration of a project to the Authority in writing within thirty (30) days from the date on which a tender for Construction works, contract or project is awarded to a Contractor registered under this Act. Once an owner has registered the attendant project and paid the levy amount, if applicable, the Authority issues a Compliance Certificate. Upon issuance of the compliance, the contractor commences the construction works (NCA Act, 2011).

2.7 Collapse of Buildings in Kenya

The cases of building failures and consequent collapse of structures in Kenya in major towns and capital city have been reported in both electronic and print media. In these reports, loss of life and properties has been emphasized but the question that has not been answered is who is responsible for the loss and persistent trend of buildings collapsing in Kenya. The collapse of the buildings has been majorly caused by, poor design and non-compliance, greedy property owners, cost cutting and use of sub-standard materials, lack of quality control and incompetent contractors (Lidonga, 2015). Following the collapse of 2 residential buildings within a 30 day period in Makongeni and Huruma estates occasioning a loss of 15 lives, numerous injuries and significant losses of material and investment, the Government of Kenya ordered for an audit of all buildings in Nairobi on 6th January, 2015 and gives the findings within three months. This report was referred to

as Nyakiongora report (2015). The report identified four causes of collapse of the buildings as follows:

- i. The quality of concrete was very poor and there were no proper foundations in some cases showing that the builders did not follow any specifications as required in the construction industry.
- ii. The building stones used were substandard and should not have been used to construct buildings of such magnitude.
- iii. Services of qualified technical personnel in construction industry who could have detected early warning were not sought as per the requirement.
- iv. The buildings collapsed due to use of poor materials, inadequate designs, poor workmanship employed and lack of /no adherence to specifications.

Busia town in western Kenya had similar experiences as Nairobi city. On 14th August, 2014, a perimeter wall collapsed and killed a toddler in Legio estate. On 9th October, 2015, a four-storey building under construction collapsed and killed three people (Standard newspaper, 2015).

2.8 Quality in Building Construction

The volume of construction works in Kenya has increased tremendously with devolved system of governance. Quality is critical in achieving the structural integrity, functional, aesthetic and economic aspects of the building projects. Quality is one of the important key performance indicators of a construction project which may cause cost overrun and time delays. It is the foundation for attaining the socio-economic development of the infrastructure for the society.

2.8.1 Definition of Quality.

The terminology Quality has a variety of definitions, all of which relate to each other but which differ to some greater or lesser degree (Prichard, 2009). The definition of quality depends on the point of view of the people defining it; some view it as “conformance to specification. Others view it as “performance to standards or value paid for the price (Abas, Khattak, Maqsood and Ahmad, 2015). For construction firm quality is nothing but the satisfaction of customers and fulfillment of their requirements within a specified budget.

Quality is defined in relation to the field of specialization. In this study quality is defined in terms of construction industry. Quality is defined as 'fitness to purpose', i.e. in terms of Construction it is providing a building which provides an appropriate quality for the purpose for which it is intended (Fayol, 2016). ISO 8402 defines quality as “the degree of excellence in a competitive sense, such as reliability, serviceability, maintainability or even individual characteristics” (Ashokkumar, 2014, p.38). Quality in this context is defined as the fulfillment or exceeding the expectations of the clients or customers. These expectations are based on the intended use and its cost.

Quality can be expressed as:

$$Q = P / E$$

Where: Q = Quality

P = Performance

E = Expectation

If Q is greater than 1.0, then the customer has a feeling of great satisfaction about the product or service rendered. If Q is equal to 1.0 then there is a balance between the performance and expectations and if Q is less than 1.0 then customer has a feeling of no satisfaction.

2.8.2 Quality assurance and Quality control

Quality assurance is a set of planned and systematic actions to ensure that products and services comply with specified requirements (ISO, 9001). It is referred to as a scheme adopted by a construction company to maintain the standard or quality consistent. It is primarily an internal management system of a construction company. Generally a company maintains a quality assurance chart by specifying various checks at different levels as well as constantly improving its attributes. A quality assurance program may include;

An arranging periodical training for its worker, a good safety Programme, a sound procurement system to get best quality material and suppliers and a reward scheme for innovative work and competitive career progress scheme. It is the responsibility of the contractor to take charge of Quality Assurance of the project under his contractual obligations.

Quality control is the periodic inspection to ensure that the constructed facilities meet the standard specified in the contract. It is usually carried by team of owner's engineers/consultants. The quality control begins with owner's choice of the consultants led by an Architect. The quality control is seen as the responsibility of the client who sets the standards and desires of his or her project. Quality control is the part of quality

management that ensures products and services comply with requirements. It is a work method that facilitates the measurement of the quality characteristics of a unit, compares them with the established standards, and analyses the differences between the results obtained and the desired results in order to make decisions which will correct any differences.

2.8.3 Quality management in Construction Industry

Quality is one of the critical factors in the success of construction projects. Quality of construction projects, as well as project success, can be regarded as the fulfillment of expectations (i.e. the satisfaction) of the project participants. The construction industry has experienced numerous buildings collapsing in major cities and towns. This has raised the concern on how the construction industry in Kenya is managed. This challenge led to enactment of laws to check on the industry. The National Construction Authority Act of 2011 is as a result of the menace of collapsing buildings in Kenya. Quality management in construction industry has been studied extensively in USA, UK, India and Middle East. The studies show factors affecting the quality of construction projects, the barriers and benefits of quality management and quality measurements in construction industry.

Hoonakker, Carayon and Loushine (2010) found out that contractors consider customer satisfaction, management commitment to quality, return business and a skilled work force as the best measures of quality. They argue that contractors' own perceptions of quality and customer satisfaction are the aspects most often associated with quality. Meeting design codes and warranties are less important. The contractors see the lack of quality as a slightly less important problem than safety. The involvement of employee, management

commitment, a skilled workforce and good communication are considered important characteristics for improving quality in construction projects.

Abas, Khattak, Maqsood & Ahmad (2015) outlined the factors that affect the quality of construction projects in various countries as follows.

Pakistan: factors that affect the quality of construction projects are material prices escalation, inflation, procurement, selection of material, lack of communication, and poor on site supervision

India: the factors that affect quality include; bad weather condition, communication problem, lack of project management skills, and low bids due to excessive competition.

Gaza strip: availability of construction materials, political environment, site staff experience and proper documentation significantly affect the quality of construction projects.

Hong Kong: The major factors that affect the quality of building projects are the client, effective project management, building effective construction team, and environment in which project is conducted.

Malaysia: the factors that affect quality include, lack of technical person availability, lack of awareness about quality management system, and lack of trained workers.

Good quality performance makes the construction project successful. The performance can be increased by studying and improving the factors that affect the quality significantly (Abas et al, 2015). Ashokkumar (2014) enumerated nine (9) factors that affect the quality of construction industry in terms of limitations. They include limitations to finance, communication, labour and wage, weather, building plan and construction detail, materials and equipment, time, construction methodology and rule/regulation.

Rad and Khosrowshahi (1998) examined the perspectives of the three parties involved in construction projects on quality. The parties involved are the Client/Owner, the Contractor and the Third party (quality assurance and local authorities). The results show that 35% of the contractors claimed to know about the requirements of the quality for construction projects. The results further showed that 39% of the clients/owners claimed over the quality and only 26% of the third party claimed over the quality of construction projects. The results showed that lack of concern on the side of parties involved in the construction industry on quality is above 60%.

Memon, Abro and Mugheri(2011) through a survey found out that both consultants and contractors realized the importance of quality management in the design and construction phase of project. However, there is lack of quality management procedures in the design and construction process. Consequently the quality of design and construction is affected. Poor quality in design and construction affects the maintenance cost and level of service of the project. They concluded that the consultants and contractors should take some proactive measures in order to improve the quality in the design and execution phase of construction projects.

Newton and Christian (1999) determined the potential to quantify the impact of quality in design and construction upon facility life cycle costs given historical cost data and commonality in design, construction and operational and maintenance. By describing quality in terms of several dimensions rather than a single meaning, the perspective of the designer, contractor, owner/facility manager and user can be incorporated to yield a quality quotient. The relationship between the Quality Quotient and known life cycle

costs will allow for the determination of the degree of quality in a facility and the impact that quality will have on future operational and maintenance costs.

Sysoulath and Jokkaw (2015) found that top ten most significant factors were ranked by local respondent's perspective. It starts from the most significant factors, namely, unskilled labors, improper material usage as the contract, condition for selecting the contractor by the owner, lack of timely supervision, low experience and competency of supervisor, poor experience and competency of project manager on quality planning, lack of quality inspection and control system, low quality drawing and specification, lack of quality assurance system, and poor planning of construction operating procedures and techniques, respectively. On the other hand, top ten most significant factors were ranked by international respondents, namely, unskilled labors, unclear owner's requirements for design (dimension, function, or layout of the project), poor experience and competency of project manager on quality planning, lack of technical and professional expertise and resources to perform task, undocumented construction (in case of changing order during construction), low experience and competency of supervisor, improper material usage as the contract, lack of quality inspection and control system, low experience and knowledge of designers, and the owner's satisfaction regarding quality of construction works, respectively.

2.8 Summary

In the global perspective, the construction industry plays an important role in the global economy. The activities of Construction industry are also vital to the achievement of national socio-economic development goals of providing shelter, infrastructure and employment. Raftery et al (1998) studied the globalization of construction industry in

Asia and found out that increased foreign participation in domestic construction affected the technical, managerial and financial capabilities of the local contractors..Katende et al (2011),Kazawadi (2014) andOsei(2013) agree with above findings in the studies carried out in Uganda, Rwanda and Ghana respectively.

The construction management process is seen as an inclusive fashion that addresses six critical aspects of construction industry (Bale, 2010). The scholars have identified five phases of the construction management process that are critical for achievement of the project's objectives. These phases are; Initiation, planning, execution, control and closing. Basically the construction management process is quite similar to project management the studies show no divergence between the two. The construction/project management is the application of knowledge, skills, tools and techniques to a broad range of activities in order to meet the requirements of a particular project (Esposito, 2015).

Procurement is a process of finding, agreeing terms and acquiring goods, services or works from external source via a tendering or competitive bidding process. Professionals view procurement as absolutely crucial to the delivery of a project on time, on budget and to a high quality, with 87% of respondents of the belief that good procurement is synonymous with a successful project (CIOB, 2010).Procurement methods are critical in ensuring delivery of better valued projects. United Nations (2017) defines public procurement as the purchase of goods, services and works by public authorities or civil service organizations using public funds. The public procurement is guided by best value for money, fairness, integrity and transparency, effective international competition and the best interests of the organization principles.

In Kenya, the construction sector is among key pillars for her economy. It accounts for five percent of her GDP. The industry is governed by several laws covering different players in the industry the most recent law being the National Construction Authority act of 2011. Lidonga (2015) extensively reported on the following as the causes for the building failures; poor design and non-compliance, greedy property owners, cost cutting and use of sub-standard materials, lack of quality control system and incompetent contractors. The Nyakiongora report (2015) identified four causes of collapse of buildings in Nairobi which in principal agrees with what Lidonga (2015) reported.

Quality is defined in relation to the field of specialization. In this study quality is defined in terms of construction industry. Abas, Khattak, Maqsood and Ahmad (2015) outlined the factors that affect the quality of construction projects in Pakistan, India, Gaza strip, Hong Kong and Malaysia. The factors in depth seemed to have emerged as a result of the roles played by different parties in construction process starting from the design stage, procurement and implementation of construction projects. Rad H N and Khosrowshahi(1998) examined the perspectives of the three parties involved in construction projects on quality. The parties involved are the Client/Owner, the Contractor and the Third party (quality assurance and local authorities). Memon, Abro & Mugheri (2011) through a survey found out that both consultants and contractors realized the importance of quality management in the design and construction phase of project. Newton and Christian (1999) determined the potential to quantify the impact of quality in design and construction upon facility life cycle costs given historical cost data and commonality in design, construction and operational and maintenance. Sysoulathand Jokkaw (2015) found the top ten most significant factors that affect quality.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter presents research design and methodology which explains how the investigation was done. The area of study is described giving justification as to why it was chosen. The research plan and its philosophical worldviews are given. The study population, sampling procedures to determine the sample size is explained. Subsequently research instruments and their validity and reliability are described. Finally data collection, data processing and analysis are presented as well as giving a brief on ethical issues of the study.

3.2 Area of the study

The area of the study was Busia County, Kenya that comprises of Teso North, Teso South, Nambale, Butula, Bundalangi, Funyula and Matayos constituencies. Busia County together with Kakamega, Bungoma and Vihiga counties constitute the western region of Kenya. The Republic of Uganda lies to the North, Siaya, Kakamega and Bungoma counties to the South, East and North East respectively. The County covers an area of approximately 1,683 sq.km and is located between latitudes $00^{\circ} 01'$ and $00^{\circ} 47'$ North of Equator and longitudes $33^{\circ} 57'$ and $34^{\circ} 26'$ East of Greenwich Meridian (Mulefu, Mutua and Boitt, 2016). The area has moderate climatic conditions with average temperatures ranging between 20 to 28 degrees Celsius. The Main economic activities in the county is Agriculture practiced at both small and large scale, fishing in areas bordering Lake Victoria in Bunyala and Samiasub-counties, Dairy farming and livestock keeping at a

small scale and Hotel industry showing the potential to grow very fast. The study area was selected on the basis that it had just like Nairobi City County experienced the collapse of buildings and perimeter walls. The persistent collapsing of the buildings in Kenya was the motivating factor for the investigation in the construction management process of public building projects.

The concerns raised on quality of building projects by constituencies aroused the interest for the study on quality. Since devolution, the amount of public funds to construction projects has been substantial and yet every audit be it Social (civil society organization) or Government has shown the concern of poor quality of public building projects as well as misappropriation of the same funds. The collapse of buildings brought the concept of investigating the construction management process by devolved units. The causes for collapse of building were the motivating factors to carry out the study to determine the level of participation and compliance by construction team to procedural and professional construction management practices and principles. The selection of public building projects was based on the use of public devolved funds. These funds are used in the construction of public projects not private ones. The studies have collapsing of private buildings as public building projects government before devolution were carried out under the design and supervision of the government officers. With devolution the responsibility of managing the public projects under devolved units has been given to local project committees at the grassroots. The committees are left to seek the professional services of the public works officers. This study therefore sorts to establish the participation of parties in construction team in the construction process of public

building projects. Busia County was purposely selected from the forty seven counties because there was the occurrence of collapse of building and perimeter wall.

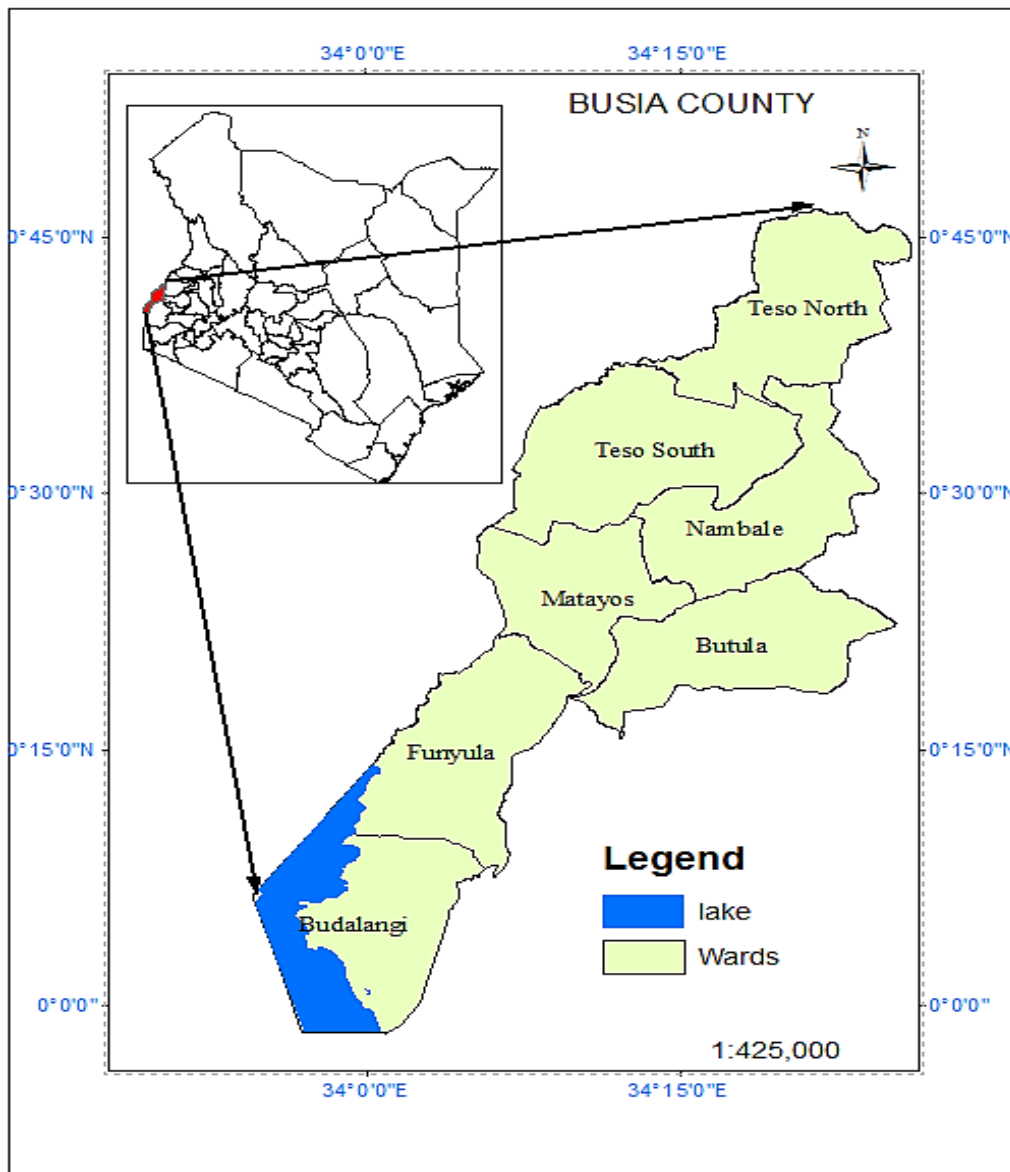


Figure 3.1 Busia County Map

Source: ReserchGate (2008-2018)

3.3 Research design

Research design is the overall plan for connecting the conceptual research problems to the pertinent empirical research. In other words, the research design articulates what data is required, what methods are going to be used to collect and analyze this data, and how all of this is going to answer the research question(s) (Wyk, 2015). Research design involves the intersection of philosophy, strategies of inquiry, and specific methods (Creswell, 2008).

3.3.1 Philosophy of the research design

Research philosophy deals with the source, nature and development of knowledge (Bajpai, 2011). Saunders, Lewis and Thornhill (2012) defined research philosophy using an illustration of a research onion as an over-arching term that relates to the development of knowledge and the nature of that knowledge. The research philosophy contains the assumptions about the way a researcher views the world. Bristow and Saunders (2014) developed a reflective tool for research management called HARP (Heightening Awareness of Research Philosophy). This tool provides guidance to develop research philosophy as a reflective process. The tool provides researcher with the understanding of the three components of research management and how they interact to influence the final findings of the study. The beliefs and assumptions in any research are about the world (ontology), knowledge (epistemology) and values (axiology) (Bristow, 2016).

Saunders, Lewis and Thornhill(2012) gave accounts of four research philosophies; Positivism, Interpretivism, Realism and Pragmatism. This study explored, explained and developed the solutions to the impact of devolved construction management process on quality of the public building projects. The concerns addressed in this study covered the

quality of the physical projects (positivism), the roles of the parties involved in the construction management which basically looked at the personnel involved in the implementation of the project (interpretivism) and the influence of the governance (devolution) on decision making on needs identification and funding of the projects (realism). Based on these concerns, pragmatism philosophy was best suited to address them.

The pragmatists are seen as architects in research management. In this approach they are described as doers; problem solvers or outcome seekers. Pragmatism is abductive and applies mixed research design and methods (Bristow, 2016). Pragmatists argue that the most important determinant of the epistemology, ontology and axiology to adopt is the research question (Saunders, Lewis and Thornhill, 2012). Pragmatists' belief is that positivism, interpretivism and realism none of them will be appropriate to answer all the concerns/questions of a research problem. In seeking to address the problem of impact of devolved construction management process on quality of public building projects, the pragmatism philosophy was therefore more appropriate.

3.3.2 Strategy of inquiry

This study used two methods to fit research problem. The study used mixed methods strategy where the emphasis was given to the methods that led to the achievement of practical solutions and outcomes. Mixed methods research has become popular as the newest development in research methods and in approaches to “mixing” quantitative and qualitative research. The exploratory and descriptive research design was adopted due to the nature of the study requiring use of exploratory and descriptive methods (Creswell, 2012). Exploratory research provided insights into and comprehension of quality of

building projects resourced through devolved funds. Exploratory research is a type of research conducted because a problem has not been clearly defined. Exploratory research helped to determine the best approach to data collection method and selection of subjects. While descriptive research, also known as statistical research, describes data and characteristics about the population or phenomenon being studied. Descriptive research answers the questions *who, what, where, when* and *how*. The descriptive research method was used in data collection of the study. Due to constraints of funds and time, the two methods were applied parallel to each other.

3.3.3 Research Methods and Methodology

The research utilized a number of methods to achieve the objectives. The exploratory research was carried out to determine the projects being undertaken by devolved units. Busia county and its seven constituencies formed the devolved units in the study. This helped in identifying the target population of the study. The roles and responsibilities of the parties involved in the construction process of public building projects formed the independent variables and the quality of the project was the dependent variable. The parties involved were; project management committees, public works officers, county procurement officers and contractors.

The review of the literature related and construction procedures in Kenya provided the ground upon which the factors assessed in the study were developed. The phases in construction management process provided the road map for investigation carried out in the study. Based on observations made in the pilot study, corrections were made on research instruments (questionnaires, interview schedules and observation check list). The instruments were different for each party. However, some sections were similar for

all parties. The emphasis in the instruments was on the participation of the parties in pre-contract, contract and post-contract periods of the project construction process. The parties were rated against the factors considered key for their participation.

The objectives of the study were formulated in a way that they required a quantitative data to be collected to facilitate the determination of level of participation and compliance to specifications, procedures and building standards. The data received from the field was analyzed. The summary of the research design is as shown in figure 3.2.

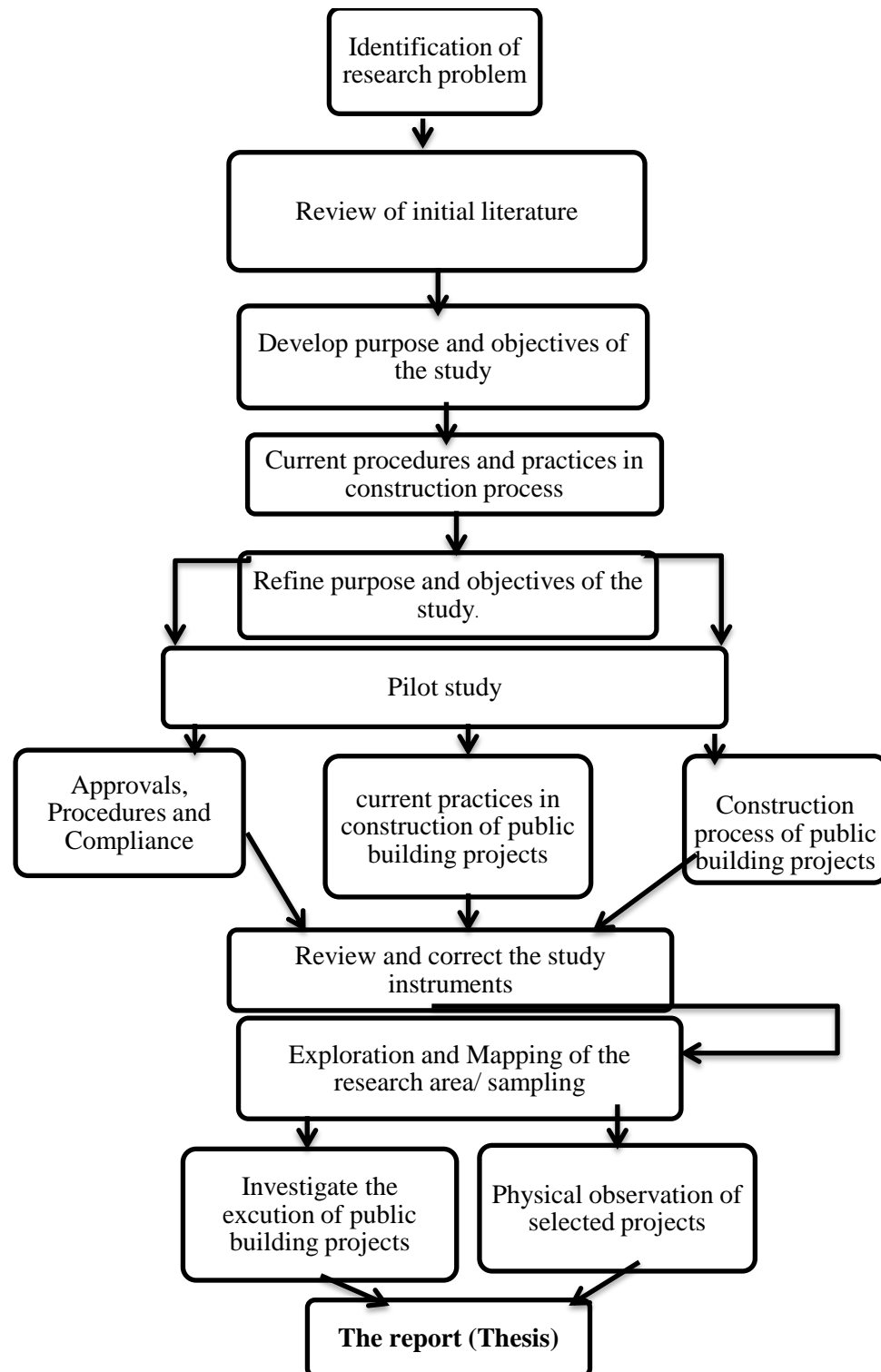


Figure 3.2 Research Design Diagram

(Source- Own formulation 2017)

The research methodology for this study was mainly quantitative implying that the research process was largely deductive. Quantitative research generates statistics through use of large- scale survey strategy using methods such as questionnaires or structured interviews (Catharine, 2007). Kalof, Dan and Dietz (2008) looked at causation in research. Inductive process looks at causal relationships in data whereas deductive process tries to find and describe patterns in the data. Within this general quantitative framework, elements of the qualitative approach were also incorporated to provide alternative insight into the roles and responsibilities of parties involved in the execution of public building projects. This study tried to find and describe the impact of the construction management process on public building projects in devolved units. Starting with basic observations and theoretical insights derived from literature, the research questions were developed and solutions sort by the study. The objectives requirements were met through the research process of comprehensive review of literature related, questionnaires survey and interviews to parties (Project management committees, public works officers, county procurement officers and contractors). This process was enhanced by the physical observation of selected projects and focused group discussion.

Data was presented in tabular and graphical formats. The analysis was undertaken using the descriptive statistics and chi-square tests were carried to determine the goodness-for-fit for the objectives. Table 3.1 presents the summary research design and outcomes.

Table 3.1 The Summary of Research design and outcomes. (Source-Own formulation 2017)

Objectives	Research activities	No. of factors considered
	<u>Project Initiation phase</u>	<u>Twenty two (22)</u>
(i)To examine the roles and responsibilities of the parties involved in the construction management process and how they impact the quality of these projects	i) Evaluation of activities at project identification stage/phase	i) Six(6)
	ii) Assessment of activities during the project design process	ii) Ten(10)
	iii) Comparison of roles and responsibilities before and under devolution.	iii) Six (6)
	<u>Project tendering phase</u>	<u>Seventeen(17)</u>
	i) Evaluate the activities of tender advertisement	i) Five (5)
	ii) Examine how tender evaluation is carried out.	ii) Six (6)
	iii) Assess tender award process.	iii) Six (6)

Table 3.1: The Summary of Research. Design and Outcomes (Cont'd)

<u>Project Implementation phase</u>		<u>Fifteen (15)</u>	
i)	Examine contractual documents	i)	Four (4)
ii)	Evaluate the activities during the construction period.	ii)	Eleven (11)
<u>Built Environment Management phase</u>		<u>Twelve (12)</u>	
i)	Assess the certification process before occupancy of the project	i)	Four (4)
ii)	Evaluate the activities of repair and maintenance.	ii)	Eight (8)
(ii) To establish how quality management framework and policies at the counties and contribute towards the achievement of requires standards and specifications (quality) of public building projects.		<u>Sixteen (16)</u>	
i)	Evaluate the level of compliance to design and approvals	i)	Nine (9)
ii)	Evaluate the level of compliance during the construction period	ii)	Seven (7)

Table 3.1: The summary of Research Design and Outcomes (Cont'd)

(iii) To establish how county laws and regulations on development of county laws, bills construction sector contribute towards the quality of the public building projects.	Assess the existence, enactment and policies, regulations and manuals etc. to guide the construction sector at the county government	<u>Eight (8)</u>
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(iv) To make physical observation of some selected public building projects to determine the level of compliance to building specifications and standards	Assess the quality of the projects observed through examining the standards. The workmanship, cracks, straightness, plumpness and levels were assessed during the observation exercises.	<u>Ten (10)</u>
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(quality)

The results were interpreted to give meaning to the processed data. The results were presented in text, tabular and graphical formats. A more detailed discussion on research strategy follows and it covers research population, sampling, research instruments, validity and reliability of the instruments, data collection, data processing and analysis. At the end, the ethical considerations of the study are highlighted.

3.4 Research Population

This study targeted the population of all building projects resourced through devolved funds in Busia County. This was 70 projects as obtained from the registers at the county approval offices. With an average 10 members of managing committee per project, the total population for the project management committees was determined to 700. The population for the public works officers comprised county Architect, Quantity surveyor, Structural Engineer, Electrical Engineer, Mechanical Engineer, supervisor electrical, supervisor mechanical and supervisor building giving a total 8. The population for contractors was those based in the Busia County as per NCA register and were involved in construction of projects in Busia County. The population of the county central procurement entity was the departmental heads of the chain supply units in county.

3.5 Sampling procedure of the study

The study involved four samples. The purposive sampling was used when selecting the County to be covered by the study out of the 47 Counties in Kenya. Busia County is one of the counties that have experienced the collapsing of the buildings and fence walls. The study applied random sampling technique in selecting the projects that were involved in the study. This was because random sampling is the key to obtaining a representative sample (Mugenda & Mugenda, 2003). Since the study's main inquiry was the quality of public building projects, the sample of projects was done first. The study used purposive sampling technique when sampling the contractors for the projects. The criterion for the selection of the contractors was based on those who were working on public building projects in Busia during the period of the study. Stratified sampling technique was used to determine the sample for the project management committee members. This was based

on the position of the management committee member (Chairman, Secretary and treasurer). The secretary was preferred respondent due to records kept for the projects. The respondents for Public works officials were the county architect, civil/structural engineer, electrical engineer, mechanical engineer and three supervisors (building, mechanical and electrical). The respondents for procurement officers were the county procurement head and department procurement heads whose departments had projects under construction during the period of study.

3.6 Sample size of the study

The Research advisors (2006) developed the table for determining the sample size (**Appendix VII P. 258**). The other constraints envisaged in the study like in depth observation reduced the sample size of the projects involved in the study. In this study, the level of significant testing was at 0.05 hence the confidence level used was 95% which is applicable to surveys in research (Dessel, 2013). The Table 3.2 shows the sample sizes of the study. An average of 70 projects in the county based on the public building projects under construction during the period of the study was taken. The projects selected were from the seven constituencies funded by CDF and county projects funded by the county government of Busia.

Table 3.2 The Study Sample Size

Item description	The Population	The Sample size
Building projects	70	64
Contractors	70	64
PMC/Clients	70	64
Public works officers	08	08
Procurement officers	05	05
TOTAL	223	205

A total of sixty four projects were involved in the study. Each constituency provided eight projects and the county projects were also eight. The sample size for contractors and PMC/Clients was the same as that of the number of projects. The public works officers were; the county works officer (an architect), county electrical engineer, county mechanical engineer, county civil/structural engineer and the three supervisors (building, electrical and mechanical). The procurement officers sampled were five and they included; the head of county supply chain, heads of procurement for education, health, public works/roads and agriculture departments. The departments involved were undertaking building projects at the time of the research.

3.7 Research Instrumentation

The study employed observation schedules, questionnaires, interviews and document analysis as research instruments.

3.7.1 Observation Checklist

The observation schedule was method in which data in the field was collected with the help of observation by the observer. The observation checklist (**Appendix VI P. 257**) in this study was structured to observe the quality of building projects as per laid down standards in construction industry. The units/standards to be observed were clearly defined within the expectations of construction industry specifications and standards. The observation schedules were employed to the sampled building projects resourced through devolved funds.

3.7.2 Questionnaires

Questionnaires contained a set of questions logically related to a problem under study. Questionnaires aimed at eliciting responses from the respondents, in which content, response structure, the wordings of questions, question sequence, etc. were the same for all respondents. The different questionnaires (**Appendices I, II, III and VI Ps. 227, 234, 240 and 248 respectively**) were administered to contractors, public works officers, project management committee members, and procurement officers.

3.7.3 Interviews Schedules

This study employed the interviews as secondary instrument to elicit the information that the two instruments were unable to elicit. Interview guidelines in (**Appendix V P. 255**) served as a suggestive reference or prompter that was relied upon during the interview. The guidelines aided in focussing attention on salient points relating to the study and in securing comparable data in different interviews by the same or different interviewers.

3.7.4 Document analysis

This was employed as secondary tool to determine the procedures used in the implementation of the building projects and authenticate the information elicited by questionnaires and interviews. The documents accessed include; tender adverts/notices, contracts, inspection/supervision schedules, working drawings, county (bills, acts, regulations and policies) and any relevant documents on public building projects.

3.8 Validity and Reliability of the study

Validity is the criteria for how effective the design is in employing methods of measurement that will capture the data to address the research questions. Validity looks at how accurate the data obtained in the study represents the variables of the study (Mugenda andMugenda, 2003). Boudah (2011), more explicitly states that validity is the degree to which the conclusions drawn by the researcher from the results and are not from chance or erroneous sources.

Reliability is the degree to which an assessment tool produces stable and consistent results. It is the degree to which a study can be repeated with similar results (Boudah, 2011). There are two types of reliability: internal and external. Internal reliability is extent that data collection, analysis, and interpretations are consistent given the same conditions. External reliability is the extent to which an independent researcher could replicate the study in other setting.

3.8.1 Validity

Internal validity is a confirmation of the correctness of the study design. Internal validity of this study was achieved through pilot testing of a similar design in Bungoma County.

The pilot testing of the study instrumentation ensured that the instrument was clear and unambiguous. This enabled the researcher to make modifications to an instrument based on results of the pilot study.

External validity is the extent to which the results of the study can reflect similar outcomes elsewhere, and can be generalized to other populations or situations. The study used the techniques of persistent observation and triangulation for external validity of the findings. Persistent observation is about conducting observations consistently and of sufficient duration. Triangulation is about using more than one source of information to confirm a concept or idea (Boudah, 2011) Triangulation of the results enhances the validity of findings. Triangulation validates the methodology by an examination of the results from several perspectives. Focused group discussions were used to validate the findings of the study.

3.8.2 Reliability

Reliability is synonymous with the consistency of a test, survey, observation, or other measuring device. A reliability coefficient is often the statistic of choice in determining the reliability of a test. This coefficient merely represents a correlation, which measures the intensity and direction of a relationship between two or more variables (Heffner, 2014). The reliability coefficient ranges between 0 and 1. If the reliability coefficient is 0, there is no linear relationship between the results and therefore no reliability. If the coefficient is 1, the results are exactly the same and are perfectly reliable. In most cases, researchers attempt to use measures that have a reliability coefficient of 0.8 or better (Boudah, 2011). This study applied Cronbach's alpha which is a statistical formula used to determine reliability based on at least two parts of the test for internal reliability. The

study employed interobserver agreement technique to determine reliability of observation.

$$\frac{\text{No. of Agreement}}{\text{Total observed events}} = \%$$

The results of computation based on the above equation were as follows:

$$\frac{\text{Agreement}}{\text{Total}} \times 100 = \frac{7}{8} \times 100 = 87.5\%$$

Cronbach's alpha for the study was 87.5%

Typically, researchers aim for minimum of 80% reliability on at least 15-20% of observations (Boudah, 2011). For external reliability, the study employed the technique of member checking where the participants in the study actually review the hypothesis, patterns, characteristics, analysis, interpretations and conclusions. They offer suggestions, or confirm or deny ideas. This was done through focused group discussion sessions.

3.9 Data collection

This study used questionnaires, observation schedules and interviews to collect data. The questionnaires were administered to the respondents in person by the researcher and research assistants. The questionnaires were structured to cover factors considered critical for each party in the construction process of public building projects. Adequate questions were raised to collect sufficient data at every phase of construction process. Questionnaires comprised choice options to guide the respondent to provide the right response. They also had a few open-ended questions whose primary purpose was to get the details of the respondents and better insight on some of the study areas. An adequate time was given to the respondents to fill the questionnaires and return them to the

researcher or research assistants. Two weeks period was taken as adequate for respondents to fill the questionnaires. The researcher used the observation schedules which were developed to make physical observation about the qualities of the projects. The expert in construction technology was the co-observer of the researcher for reliability. The guided interviews were used to collect information that questionnaires and observation schedules failed to elicit. For more insight on some issues in the study, focused group discussions were used.

3.10 Data processing and analysis

After data collection, it was processed and analyzed in accordance with research plan. It involved editing, coding, classification and tabulation of collected data so that they were amenable to analysis (Kothari, 2004). Data processing is therefore a series of actions or steps performed on data to verify, organize, transform, integrate, and extract data in an appropriate output form for subsequent use. The collected data was entered in a coded form that used to input the data into the computer for processing. Before the data was entered in the computer for processing, it was thoroughly checked for coding errors and entry mistakes. Data analysis is a process used to inspect, clean, transform and remodel data with a view to reach to a certain conclusion for a given situation (Kalpesh, 2013). It involves actions and methods performed on data that help describe facts, detect patterns, develop explanations and test hypotheses. This includes data quality assurance, statistical data analysis, modeling, and interpretation of analysis results. The responses in this study were analysed statistically using descriptive statistics and the chi-square tests. The Chi-square tests whether a frequency distribution fits a specific pattern (Bluman, 1995). It is nonparametric test that is used to compare frequencies occurring in different

groups or categories, using nominal data (Boudah, 2011). This study applied the Chi-square for goodness-of-fit test.

3.11 Ethical considerations

This study followed due diligence in having all approvals from relevant authorities before carrying out data collection. The respondents were not coerced to participate in the research. The responses given were confidentially treated by the researcher and his team of assistants.

This study was cutting across different ethnic groups and covering some deep rural areas and therefore the challenges of language barrier and mobility was expected. The researcher needed the help of the people conversant with the language who could translate the information into the local languages during the interviews. Since the research problem was covering local public building projects, the challenge of suspicion was expected as why the study was being carried on such projects. The researcher explained the purpose of the study before making observation or administering the research instruments to the respondents. Delays from ministry of public works officials were expected as they were having other official duties. The researcher made arrangements to fit in the schedules of the public works officers.

3.12 Summary

This study covered Busia County in Western Region of the Republic of Kenya. The philosophical view of pragmatism guided the study. The study applied the strategy of mixed methods in looking for answers to the research questions. The study population was 70 building projects. The study used random and purposive sampling techniques.

The dependent variable of the study was the quality of public building projects resourced through devolved funds. The independent variables of the study were the roles played by the contractors, project management committees (clients), public works officials and procurement officers towards the quality of public building projects. The observation schedules, questionnaires, interviews and document analysis instruments were used in data collection. The descriptive statistics and the chi-square tests were applied in data analysis. The pilot study and opinions from research experts were used to determine validity of instruments. The Cronbach's alpha and focused group discussions were used to test the internal and external reliability of the study respectively. The results obtained were used to draw the conclusions and recommendations of the study.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the field exercises outcomes. It consists of four major parts. The first part describes and analyzes data on the roles and responsibilities of the parties involved in the construction process of the public building projects. The second part focuses on the purpose of the study which looks into the level of compliance to specification and standards (quality) under devolved construction process by the devolved units. The third part addresses the laws and policies put in place by devolved units in the construction sector management. The fourth part covers the data obtained from the physical observation.

4.2 General Information

The sampling frame of the study was the public building projects in Busia County which is found in the Western Region of the Republic of Kenya. Busia County has seven constituencies which the study recognized as devolved units carrying out the construction of Public Building projects. In sampling frame therefore, the County Government of Busia together with its seven constituencies formed clusters from which the projects were sampled with each cluster providing eight projects for investigation. The human resource in the construction project management provided unit sample of the study.

The human resource was classified as consultants, procurement officers, project managers (clients) and contractors. The county public works officers are the legally

constituted professional team for public building projects in the county and other devolved units (constituencies). The study recognized the county works officer who is the head of the county public works department as a key respondent. Others were the county quantity surveyor, county mechanical engineer, county structural engineer, county electrical engineer, supervisors building, electrical and mechanical services. These were the consultants in the study. The procurement officers at the County were selected from the Departments that were having Public Building projects. The departments were Education, Public works and roads, Health and Agriculture. The project management sample as well as that of the contractors was based on the Public Building Projects selected from the County and its seven constituencies. A total of sixty four projects were involved in the study. The county projects were eight and each of the seven constituencies had eight projects involved in the study. The contractors were classified as general (open tender) contractors, women enterprises, youth enterprises and Persons with Disabilities enterprises. The total contractors' respondents were sixty eight.

From Table 4.2, 100% of the questionnaires given to the consultants were received back and found to be valid. This was because they are professionals in the construction technology and are knowledgeable in the field. They were therefore able to provide the relevant responses. 80% of the questionnaires given to the procurement officers were received back and found to be valid. The procurement officers were found to be conversant with procurement procedures and gave relevant responses. 91% of the questionnaires given to the county project manager, constituency projects managers and clients (project management committees) were received back of which 83% were found with valid responses. 91% of the questionnaires given to general contractors were

received back and all of them had valid responses. 71% of the questionnaires given to Woman Enterprises were returned of which 29% were found to be valid. 100% of the questionnaires given to the Youth Enterprises were returned of which 43% were found to be valid. 67% of the questionnaires given to Persons with Disabilities Enterprises were received back of which 17 % was found to be valid. Majority of the projects were being handled by General Contractors whereas a few reserved projects were being handled by affirmative action contractors (women, youth and persons with disabilities enterprises). The affirmative 30% of the projects to be reserved for women, youth and persons with disabilities enterprises was being followed. The validity percentage in reserved contractors exhibits lack of experiences and capacity to most of the women, youth and persons with disabilities enterprises. The summary of the Response Rate (RR) is represented in Figure 4.1.

In general therefore the responses received back were slightly above 89% and those found valid were 79%. This was found to meet the threshold for the survey. The response rate of 89% was found adequate for the results of the study to be generalized. The response rate of a survey is very important to the credibility of the research results. Scholars have held varied response rates however the response rate of 60% has been found adequate in most of studies. Fincham (2008) and Johnson & Owens (2013) agree that an average response rate of 60% is adequate enough for the surveys. Baruch (1999) provides 60 ± 20 among the population of employees, managers or professionals as acceptable response rate.

4.2.1 Sample size classification

The study involved respondents of varying roles and responsibilities and therefore it was necessary to classify the respondents in accordance to their respective roles and responsibilities. The sample sizes varied depending on respective parties involved in the construction management of the project. The respondents' distribution is presented in Table 4.1 where different questionnaires were distributed to each party.

Table 4.1 Different Questionnaires Distribution

Party	No. of questionnaires
Consultants	8
Procurement	5
Project management	64
Contractors	64
TOTAL	141

The Table 4.1 shows a total of one hundred and forty one respondents was selected to participate in the study.

The consultants were County public works officers either seconded by the National Government or employed by the County Government. The study used the sample of County works officer, (an Architect), County Quantity Surveyor, County Electrical Engineer, County Mechanical Engineer, County Structural Engineer and County

Supervisors (Electrical, Mechanical and Building). This resulted into having a sample of eight Public works officers involved in the study.

The procurement officers at the County were selected from the Departments that were having Public Building projects. The departments were Education, Public works and roads, Health and Agriculture. The questionnaires were given to the Head of procurement unit at the County and one procurement officer from each of the four departments that had projects. A total of five procurement officers were involved in the study.

The project management committees sample was based on the Public Building Projects selected from county and its seven constituencies. A total of sixty four projects were involved in the study. The county projects were eight and each of the seven constituencies had eight projects involved in the study. The research targeted the chairman, secretary and treasurer of the committees as respondents.

The Contractors for the projects selected were the respondents in the study. They were classified as general (open) contractors, women enterprises, youth enterprises and Persons with Disabilities enterprises. The total contractors' respondents were sixty eight.

4.2.2 The real sample size classification

This part provides the real sample size classification based on the replied questionnaires received by the researcher. The responses on the questionnaires received were the ones involved in data analysis. Table 4.2 provides the summary of the questionnaires replied and received by the researcher. This was for the questionnaires distributed, those received back and those found to be valid. The valid ones were used the data analysis

Table 4.2 Summary of Questionnaires Received

Party	Consultants								Proc.	Project	Contractors					Total	
	Ar	Qs	EE	ME	CE	SE	SM	SB	officers	managers	GC	WE	YE	PWD			
Distrib.	1	1	1	1	1	1	1	1	1	4	8	56	44	7	7	6	141
Received	1	1	1	1	1	1	1	1	1	3	6	52	40	5	7	4	126
Valid	1	1	1	1	1	1	1	1	1	3	5	48	40	2	3	1	111
%Receive					100					80	91	91	91	71	100	67	89
%Valid					100					80	83	91	91	29	43	17	79

The **Table 4.2** shows how 141 questionnaires were carefully distributed to achieve the target of collecting relevant data for the study. 8 questionnaires were given to consultants, 5 questionnaires were given to procurement officers at the county headquarters, 64 questionnaires were given to the project managers (8 to project managers at the county and constituencies and 56 to project committee members at the project site) and 64 questionnaires were given to contractors (44 to general contractors, 7 to youth enterprises, 7 to women enterprises and 6 to persons with disabilities enterprises). The respondents were given two weeks to respond by filling the required information in the questionnaires. A total of 126 (89%) questionnaires were received back and 111 representing 79% were found to have valid responses.

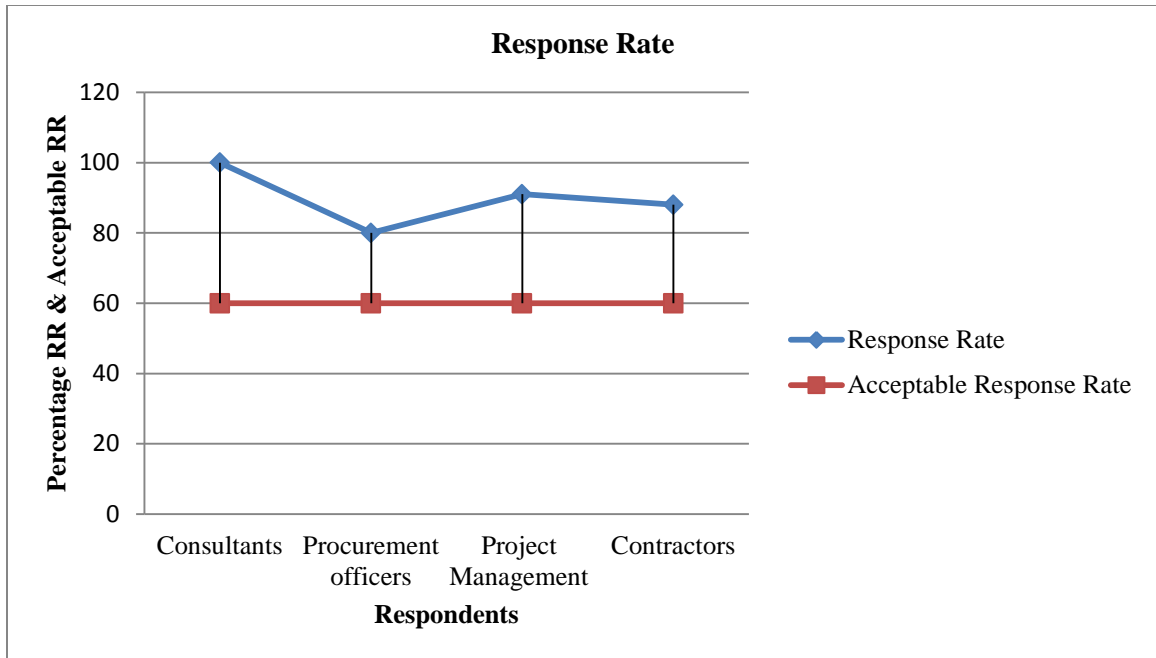


Figure 4.1 Response Rate for the Study

The response is above the acceptable rate of 60%. This was therefore found to be adequate for analysis process.

4.3 Roles and Responsibilities of Construction Parties

This part provides data presentation, analysis, interpretation and discussion concerning the roles and responsibilities of the parties involved in the construction of the public building projects.

4.3.1 Presentation

This part presents data concerning the roles and responsibilities of different parties involved in the construction of public building projects. The data presented was organized to cover Project Initiation, Project Tendering, Project Implementation and Built Environment Management Processes. In each construction process stage, data presentation is done per party involved.

4.3.1.1 Project Initiation

The study focused on the parties that play critical role at this stage of construction process. The parties involved at this stage are the consultants, procurement team and Project management committees/clients. Table 4.3 provides the factors considered in the design stage of the construction process.

Table 4.3 Factors Considered at the Design Stage

Theme	Factors considered
Project identification	1 Needs assessment process done
	2 Stake holders involvement in the process
	3 Project proposal done
	4 Project proposal approval
	5 Resource allocation for the project
	6 Reception of the project funds
Project design process	1 Constitution of the design team
	2 The roles of the design team
	3 Independence of the design team
	4 Experts involvement in the design process
	5 Documentation of the project design
	6 Cost of the project design
	7 Review of the project design

Table 4.3 Factors Considered at Design Stage Cont'd

	8	Involvement of the devolved units in project design
	9	Payment for design/consultancy services
	10	Project design approval
	1	Major challenges with devolution on professionalism
Comparison of roles	2	Major strength with devolution in the design process
and responsibilities.	3	Use of the stakeholders views in the design process
(centralization vs.	4	Policy direction by the executive members of devolved units
devolution)	5	Resource allocation and expenditure
	6	Enforcement of the project design.

Table 4.4 shows the summary of how respondents responded on the questions concerning the project conception and design. The (\checkmark) mark indicates that respondents in a given category agree with the factors considered in the questionnaires whereas the contrary response was indicated by (χ) mark. The (\checkmark) mark was given if the respondents approve the factor and vice versa for (χ) mark.

Table 4.4 Responses for Project Initiation Stage

Party	Factors											
	Identification of the <u>Design process of the project</u>						Roles/responsibilities					
	<u>project</u>						Centralization vs. <u>Devolution</u>					
	1	2	3	4	5	6	1	2	3	4	5	6
Consultants	χ	χ	χ	χ	χ	χ	χ	χ	χ	√	√	χ
Procurement	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ
PMC/Clients	√	√	√	√	√	√	χ	χ	χ	χ	χ	χ
Remarks	PMC/Clients/Consultants/procurement						PMC/Clients/Consultants/procurement					

(Source: Field Survey 2017)

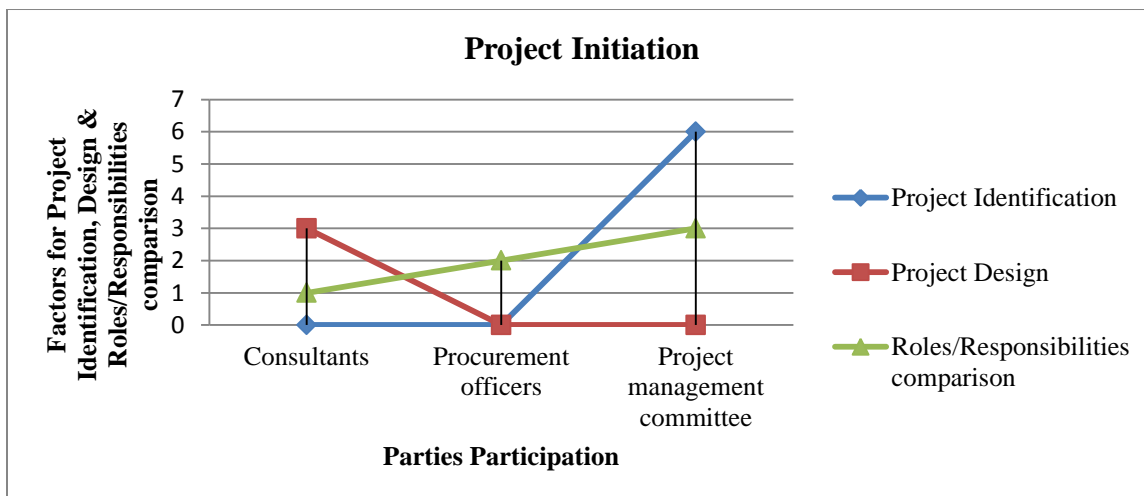


Figure 4.2. Project Initiation

The graph show how the consultants, procurement officers and project management committees participated in the project initiation involving project identification, design and roles/responsibilities comparison.

4.3.1.2 Project Tendering Process

The study focused on the parties that play critical role at this stage of construction process. The parties involved at this stage are the consultants, procurement team and Project management committees/clients. Table 4.5 provides the factors considered in the tendering stage of the construction process.

Table 4.5 Factors Considered during Tendering Process

Theme	Factors considered	
Tender advertisement	1	Prequalification requirements in the advertisement
	2	Methods of tendering used
	3	Cost of tender advert
	4	Circulation of tender advert
	5	Advert timelines
	6	Closing and opening of tenders/bids
Tender evaluation	1	Tender evaluation criteria (PPAD) act 2005
	2	Preliminary evaluation
	3	Technical evaluation
	4	Financial evaluation

Table 4.6 Factors Considered during Tendering Process Cont'd

	5	Affirmative action consideration
Tender award	1	Tender award recommendation
	2	Authority to award tender
	3	Tender award notification/regrets
	4	Tender dispute resolution mechanisms
	5	Major challenges in tender award
	6	Overcoming challenges in tender award

Table 4.6 shows the summary of how respondents responded on the questions concerning the tendering process. The (\surd) mark indicates that respondents in a given category agree with the factors considered in the questionnaires whereas the contrary response is indicated by (χ) mark.

Table 4.7 Responses for Tendering Process

Party	Factors																	
	<u>Tender advertisement</u>						<u>Tender evaluation</u>						<u>Tender award</u>					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Consultants	χ	χ	χ	χ	χ	√	√	√	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ
Procurement	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ	√	√	χ	χ	√	√	χ	
PMC/Clients	√	√	χ	χ	√	√	χ	√	√	√	√	√	√	√	√	√	√	χ
Remarks	Consultants/Procurement officers/PMC/Clients						Procurement/Consultants/PMC/Clients						Consultants/Procurement/PMC/Clients					

(Source: Field Survey 2017)

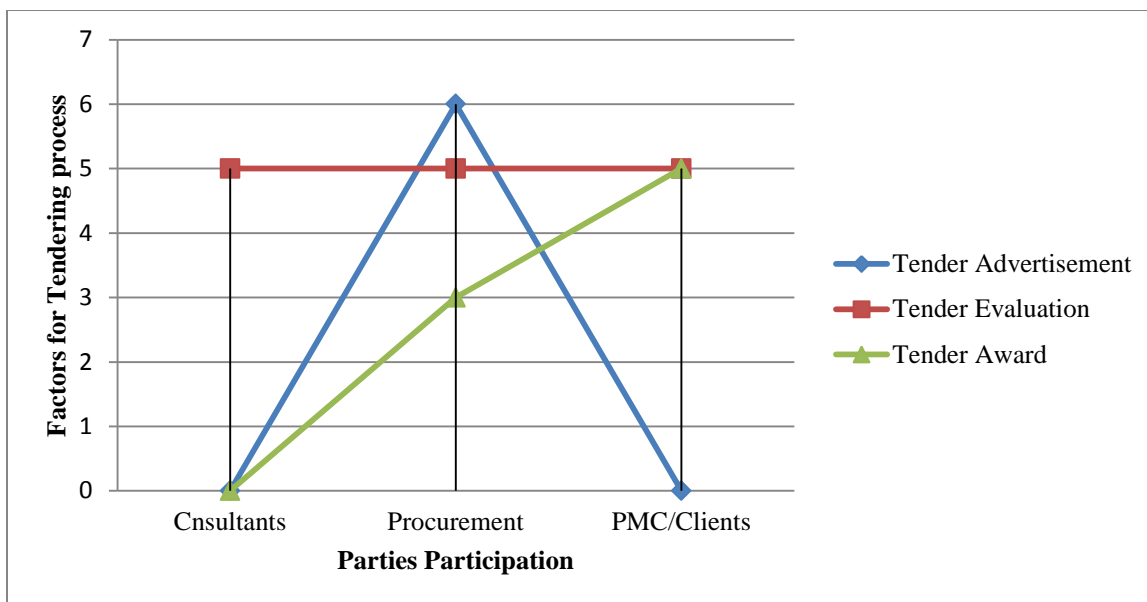


Figure 4.3 Project Tendering Process

4.3.1.3 Project Implementation

The study focused on the parties that play critical role at this stage of construction process. The parties involved at this stage are the Consultants, Contractors, and Project management committees/clients. Table 4.7 provides the factors considered in the Project implementation stage of the construction process.

Table 4.8 Factors Considered during the Project Implementation

Theme		Factors considered
Contractual documents	1	Working drawings (architectural, structural and detail)
	2	Specifications
	3	Bills of quantities
	4	Form of agreement/contract arrangement
Contract Period	1	Appointment of project manager/public works officers
	2	Site handing over/taking over (commencement of construction works
	3	Site organization by the contractor
	4	Site services and conditions
	5	Construction programmes
	6	Contract payment process (valuation and certification)
	7	Quality assurance and control (supervision, material tests, and equipment)
	8	Contractors manpower (supervisors, foremen, skilled and non-skilled)
	9	Progress charts
	10	Inspection schedule and site meetings
	11	Practical completion of the project

Table 4.8 shows the summary of how respondents responded on the questions concerning the project implementation process. The (√) mark indicates that respondents in a given category agree with the factors considered in the questionnaires whereas the contrary response is indicated by (χ) mark.

Table 4.9 Responses for Project Implementation

Party	Factors														
	Contractual documents				<u>Contract Period</u>										
	1	2	3	4	1	2	3	4	5	6	7	8	9	10	11
Consultants	√	χ	χ	χ	χ	χ	χ	χ	√	χ	χ	χ	χ	χ	√
Contractors	√	χ	√	√	χ	√	χ	χ	√	√	χ	χ	χ	χ	√
PMC/Clients	χ	χ	√	√	χ	√	χ	χ	χ	χ	χ	χ	χ	√	√
Remarks	Contractors/Consultants/				Contractors/Consultants/PMC/clients										
	PMC/clients														

(Source: Field Survey 2017)

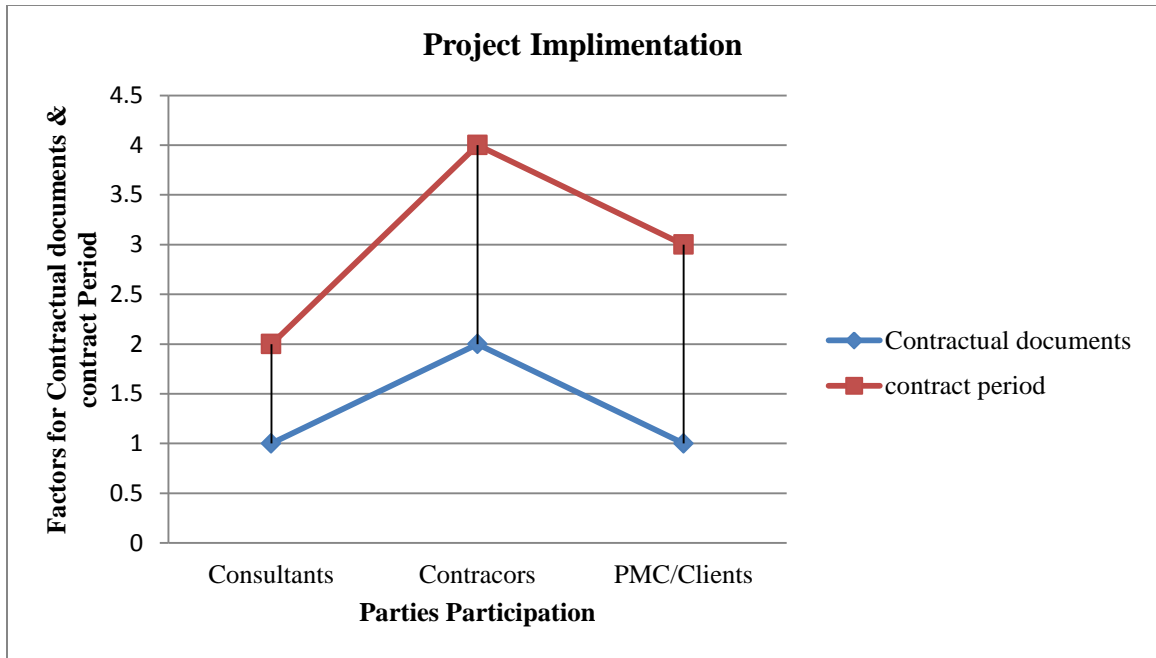


Figure 4.4 Project Implimentation

4.3.1.4 Project Built Environment Management

The study focused on the parties that play critical role at this stage of construction process. The parties involved at this stage are the Consultants and Project management committees/clients. Table 4.9 provides the factors considered in the Project built environment management phase.

Table 4.10 Factors Considered for Built Environment Management

Theme	Factors considered	
Occupancy	1	As built drawings
	2	Occupancy certificates
	3	Safety measures in place
	4	Compliance to NEMA regulations
Repair and maintenance	1	Schedule for maintenance
	2	Repairs carried after defects reliability period
	3	Routine maintenance and cleaning
	4	Appropriate use of the building
	5	Appraisal of the functioning of the building by the users
	6	Stakeholders satisfaction
	7	Community satisfaction
	8	Waste management

Table 4.10 shows the summary of how respondents responded on the questions concerning the built environment management process. The (√) mark indicates that

respondents in a given category agree with the factors considered in the questionnaires whereas the contrary response is indicated by (χ) mark.

Table 4.11 Responses for Built Environment Management

Party	Factors											
	<u>Occupancy</u>				<u>Repair and Maintenance</u>							
	1	2	3	4	1	2	3	4	5	6	7	8
Consultants	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ
PMC/Clients	χ	χ	χ	χ	χ	χ	χ	χ	√	√	√	χ
Remarks	Consultants/PMC/clients				Consultants/PMC/clients							

(Source: Field Survey 2017)

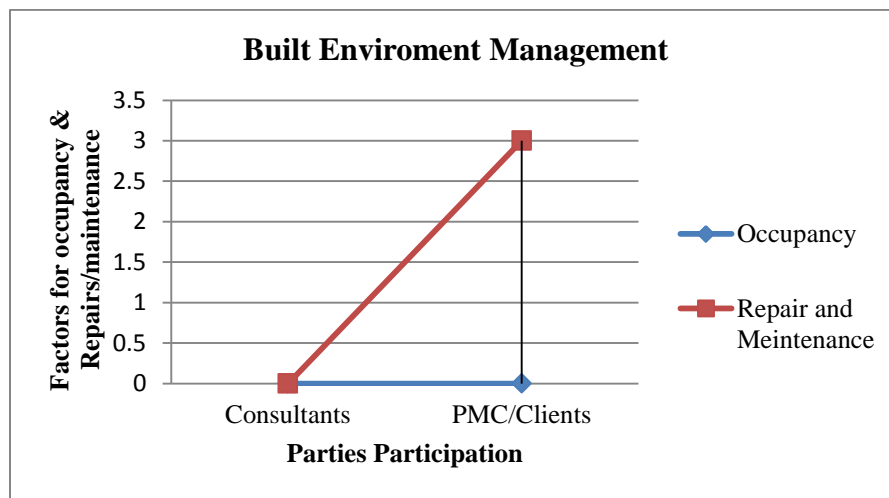


Figure 4.5 Built Environment Management

4.3.2 Analysis

Data analysis in this part was concerned with the roles and responsibilities of different parties involved in the construction of public building projects. The data analysis was organized to cover project initiation, project tendering, project implementation and built environment management processes. In each of the construction process stages, data was analyzed per party involved.

4.3.2.1 Project Initiation

The data analysis on project initiation focused on the parties that play critical role at this stage of construction process. The parties involved at this stage were the consultants, procurement officers and Project management committees/clients. The analysis also covered the comparison of the roles and responsibilities of the parties under devolution and before devolution. The questionnaires covered twenty two well recognized factors considered as critical at the project initiation stage. The factors were given one point for each and questionnaires scored accordingly. The results are given in **Table 4.11**.

Table 4.12 The Scores for Project Conception and Design

Party	Factors						Rank
	<u>Project Identification</u>		<u>Design Process</u>		<u>Role/responsibility comparison</u>		
	expected	score	expected	score	expected	score	
Consultants	6	0	10	3	6	1	4/22
Procurement officers	6	0	10	0	6	2	2/22
PMC/Clients	6	6	10	0	6	3	9/22
Total	18	6	30	3	18	6	15/61

(Source: Field Survey 2017)

4.3.2.2 Project Tendering Process

The data analysis on project tendering focused on the parties that play critical role at this stage of construction process. The parties involved at this stage are the consultants, procurement team and Project management committees/clients. The questionnaires covered seventeen well recognized factors considered as critical at the project tendering. The factors were given one point for each and questionnaires scored accordingly. The results were given in **Table 4.12**.

Table 4.12 Scores for Tendering Process

Party	Factors						Rank
	Tender advertising		Tender Evaluation		Tender award		
	expected	score	expected	score	expected	score	
Consultants	6	1	5	2	6	0	3/17
Procurement team	6	0	5	0	6	3	3/17
PMC/Clients	6	4	5	4	6	5	13/17
Total	18	5	15	6	12	8	19/51

(Source: Field Survey 2017)

4.3.2.3 Project Implementation

The data analysis on project implementation focused on the parties that play critical role at this stage of construction process. The parties involved at this stage are the consultants, contractors and Project management committees/clients. The questionnaires covered fifteen well recognized factors considered as critical at the project implementation. The factors were given one point for each and questionnaires scored accordingly. The results are given in **Table 4.13**.

Table 4.13 The Scores for Project Implementation

Party	Factors				Rank
	Contractual documents		Contract period		
	expected	score	expected	score	
Consultants	4	1	11	2	3/15
Contractors	4	3	11	4	7/15
PMC/Clients	4	2	11	3	5/15
Total	12	6	33	9	15/45

(Source: Field Survey 2017)

4.3.2.4 Project Built Environment Management

The data analysis on project built environment management focused on the parties that play critical role at this stage of construction process. The parties involved at this stage are the consultants and Project management committees/clients. The questionnaires covered twelve well recognized factors considered as critical at the built environment management stage. The factors were given one point for each and questionnaires scored accordingly. The results are given in **Table 4.14**.

Table 4.14 Score for Built Environment Management

Party	Factors				Rank
	<u>Occupancy</u>		Repair and <u>maintenance</u>		
	expected	score	expected	score	
Consultants	4	0	8	0	0
PMC/Clients	4	0	8	3	3/12
Total	8	0	16	3	3/24

(Source: Field Survey 2017)

4.3.2.5 Results for Roles and Responsibilities of Construction Parties

To examine the roles and responsibilities of the parties involved in the construction management process, the chi-square goodness-of-fit-test was applied to the scores obtained from the questionnaires. The summary of the scores are presented in Table 4.15.

Table 4.15 The Results for Roles and Responsibilities of Construction Parties

Stage	Score	
	<u>Score(O)</u>	<u>Expected (E)</u>
Project Initiation	15	66
Project Tendering	19	51
Project implementation	15	45
Built environment management	3	24

From the scores, the researcher tested whether the parties in construction management are involved fully as per laid down procedures. The research claim was that the parties are fully involved in all stages of devolved construction process of public building projects. At $\alpha=0.05$, the claim was tested. The critical value was determined at the degree of freedom of $4-1=3$ and $\alpha=0.05$. The critical value = 7.815 (chi-square distribution tables- **Appendix VIII P. 259**)

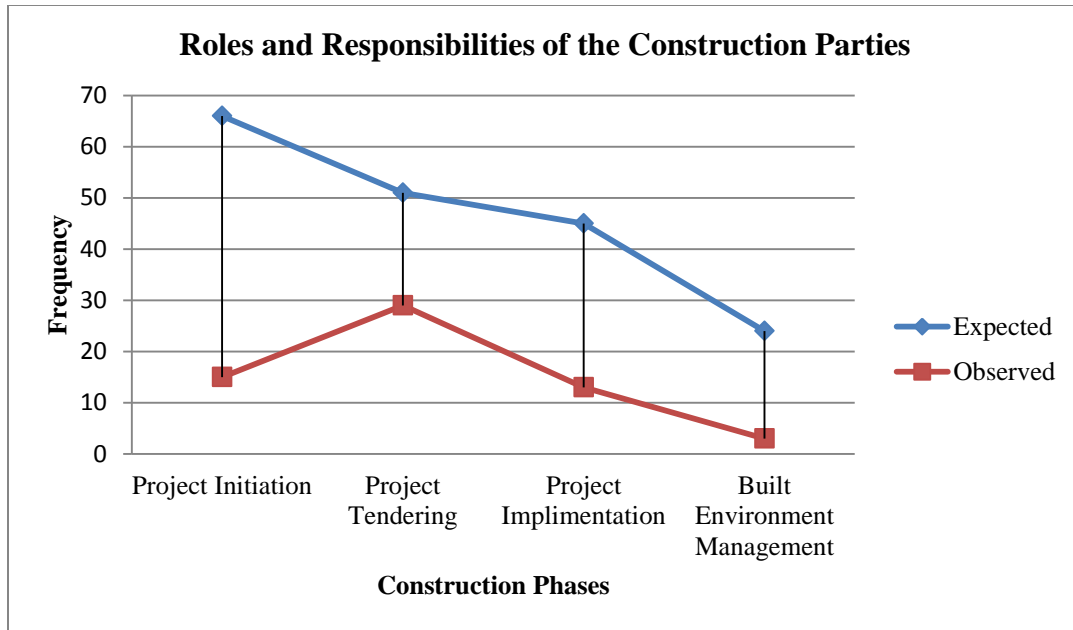
Table 4.16 The Chi-Square source table the results of Roles and Responsibilities of construction parties

Stage	Scores				
	Score(O)	Expected (E)	$O - E$	$(O - E)^2$	$\frac{(O - E)^2}{E}$
Project Identification and Design	15	66	-51	2601	39.41
Project Tendering	19	51	-32	1024	20.08
Project implementation	15	45	-30	900	20.00
Built environment management	3	24	-21	441	18.40
Total					<u>97.89</u>

(Source: Field survey 2017)

Decision: the decision was to reject the claim since $97.89 > 7.815$

From the results there was enough evidence to reject the claim that parties in construction were fully involved in all stages of devolved construction management process of public building projects. The Figure 4.6 shows the observed graph is very much below the expected. The gap between the two graphs show how the results of the Chi-square test for goodness-of-fit-test is not a good it.



NOT A GOOD FIT

Figure 4.6 Results of the Goodness-of-Fit Test for Roles and Responsibilities of the Construction Parties

4.3.3 Interpretations and Discussion

The roles and responsibilities of the parties involved in the construction process of a project are critical in the attainment of the expected outcome of the quality product. In examining these roles and responsibilities, the study recognized the input of each party as significant towards the quality of the project. The study put into consideration the expected practices in construction management process as the standard against which the roles and responsibilities of the parties were assessed.

4.3.3.1 Project initiation

Project initiation provides a platform for the parties to discuss about all aspects of the project before the conceptualization and implementation of the projects. The project is

identified based on the societal needs and resources allocated for its implementation. The study considered 6 factors for the project identification. There were needs assessment, stakeholders' involvement, proposal development/approval, resource allocation and mobilization. After project identification, follows project design documentation. Ten factors were assessed under project design in this study. They were constitution of the design team, the roles of the design team, its independence, design process, documentation, design cost, design review, involvement of devolved units in the design, payment for consultancy services and approval of the design. In addition to the above factors the study undertook comparison of roles and responsibilities of the parties before devolution and under devolution. Among factors of concern are; major challenges with devolution on professionalism, major strength with devolution in the design process, stakeholders' views in the design process, policy direction by executive members of the county government, resource allocation and expenditure and enforcement of the project design.

4.3.3.1a Project identification

Project identification is critical in choosing the correct project to solve the societal problem in a particular community, organization or establishment. The study considered the six factors as shown in the Figure 4.7. Before devolution, public building projects identification involved the Government officials and management of the public institutions. The results in the study indicate no involvement of the Government officials at this stage. The scores of 0 (zero) implied that the consultants and Procurement officers were not involved in the identification of the public building projects within their of area jurisdiction. The scores of 1 (one) implied the Project Management Committees/Clients

are involved in the project identification. The involvement of the PMC/clients in project identification was quite in order and correct. However lack of involvement of government officials whose input on technical advice greatly affected the project initiation phase and usually led to wrong project choice and improper resource allocation. The project identification is the first activity in project initiation and if it is incorrectly executed then the entire process is likely to be affected and corrective measures may prove too expensive.

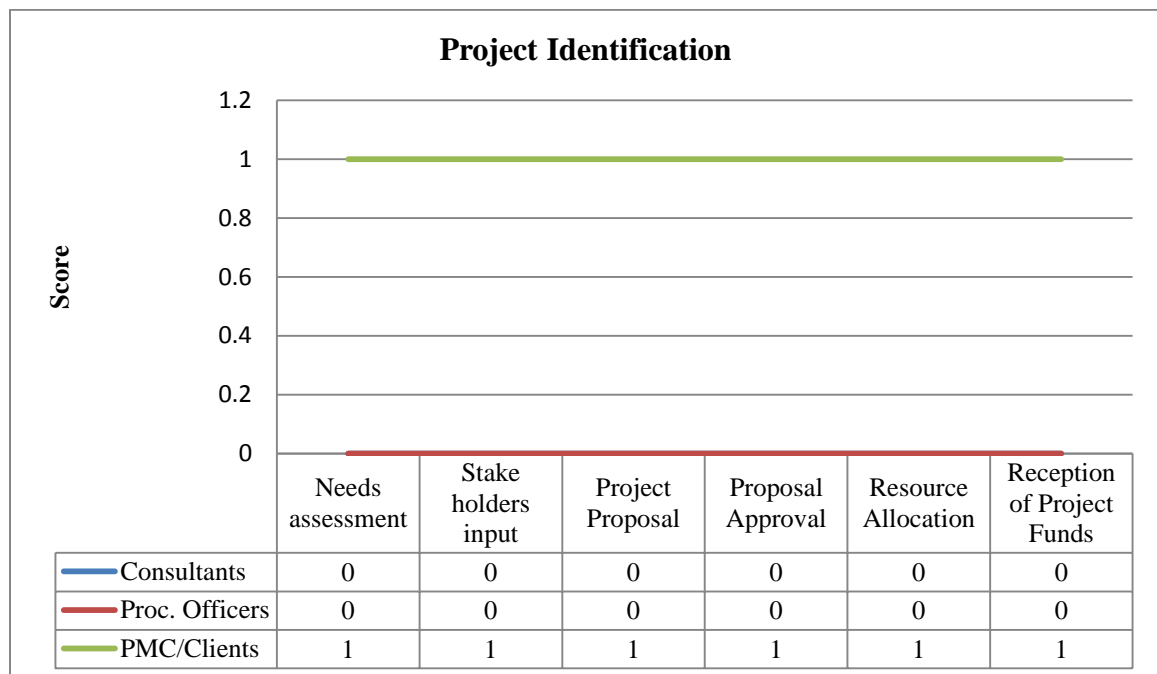


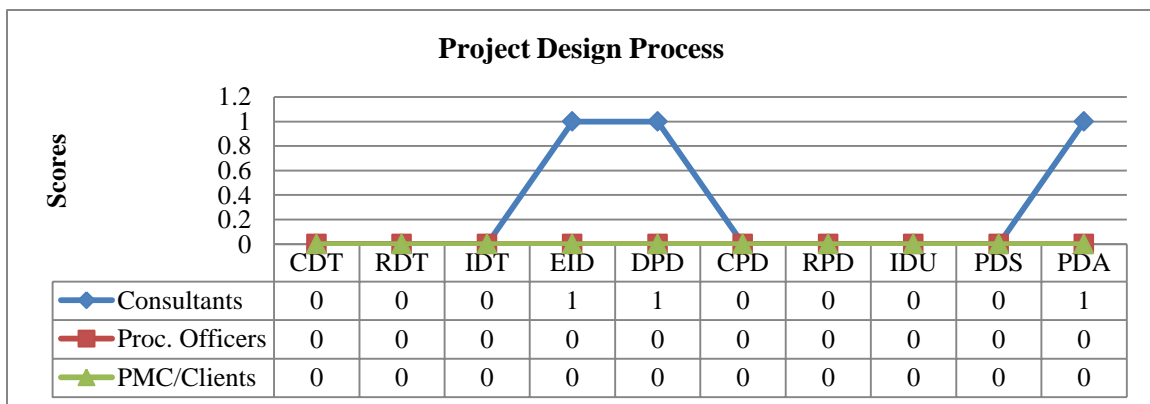
Figure 4.7 Project Identification activities

The graph shows that only the PMC are involved in the project identification activities.

4.3.3.1b Project Design Process

Project design process requires full involvement of both the client and consultants. In assessing the involvement of parties at this stage, ten factors were used as shown in Figure 4.8. Before devolution, the Government officials were fully involved in the

design process of the public building projects. The results in the study indicate some limited involvement of the Government officials at this stage. The scores of 0 (zero) indicated there was no constitution of the design team and therefore all activities concerning the design team was not executed. The availability of the working drawings was the proof of design documentation done by Architect and bills of quantities by the Quantity Surveyor. The Consultants (Public works officers) were involved in the preparation of the working drawings and bills of quantities which are required for approval by the County Governments. From the results of the study, the consultants had limited involvement whereas the Procurement officers and PMC/Clients are not involved at all. Though involvement of the procurement personnel is not emphasized at the design stage, their advisory role on procurement at this stage provides a design that fits in the budgetary allocation of the project. Lack of involvement of the PMC/Clients in the design process negates the efforts stakeholders' input/participation and this may lead to the project failing to meet the needs of the community.



CDT: Constitution of the Design Team- **RDT:** Roles of the Design Team-**IDT:** Independence of the Design Team- **EID:** Experts' input in design- **DPD:** Documentation of the Project Design-**CPD:** Cost of the Project Design-**RPD:** Review of the Project Design-**IDU:** Involvement of the Devolved Units in the Project Design- **PDS:** Payment for Design/Consultancy services-**PDA:** Project Design Approval.

Figure 4.8. Project Design Process

The graph shows that only the Consultants were involved in the project design process.

4.3.3.1c Comparison of Roles and Responsibilities (Centralization Vs Devolution)

Comparison of the roles and responsibilities of the parties in construction process is critical in assessing their impact on quality of the public building projects. In carrying the comparison on parties' roles and responsibilities at project initiation stage, six factors were considered as indicated in Figure 4.9. All parties involved at the project initiation agree that there were major challenges with devolution on professionalism at the project initiation stage. Their professional/technical roles and responsibilities are ignored and instead political interests are given priority.

Consultants seem to be at crossroads between carrying out their professional mandate and serving political interests of the devolved units they are working for. Majority of the public works officers have opted to work for the National Government where their professional service is not interfered with. Those working for devolved units have no clear structure on their roles and responsibilities. There seemed to be a feeling of consultants being used to fulfill some conditions for the release of funds for the projects and once the funds are released, their services were ignored.

The Procurement officers and PMC/Clients agree that devolution has brought in major strength to design process. Their argument was based on the fact that they can give their opinion to consultants about the proposed project. The procurement officers were contented with their involvement in the departmental projects at the design stage. They argued that with devolution, they receive information on projects before they are designed and therefore their input sort in case of their departmental project.

All parties unanimously agreed that the stakeholders' views were not sort at the design stage. What took place in public participation was a few individuals were selected to a meeting to endorse projects without their inputs and users of such projects were usually ignored. All parties further consented that there were no policy directions given by the County Executive Committee Members as far as the quality of public building projects were concerned.

The focus of the CECM for departments with project was on how many and when the projects were completed. There were no policy directives on adequate funding and supervision of public building projects. The department of public works was expected to carry out the activities without policy direction and facilitation. Only the PMC/Clients get to know about resource allocation for project. They were the ones who spend the money with or without the approval of the department of public works. Some PMC/Clients sort the approval of the public works department when were forced to produce the certificate of practical completion by the CDF or County Government. All parties agreed that the enforcement of the project design was practically missing in public building projects. The PMC/Clients and contractors work freely as long as they have the money for the project and drawings from the department of public works or rubber stamped by public works.

The graph in Figure 4.9 show that Consultants agreed with only in one factor, the procurement officers agreed with two factors while PMC agreed with three factors assessed in the comparison of roles and responsibilities. This showed how the roles and responsibilities of parties in construction team have changed with devolution.

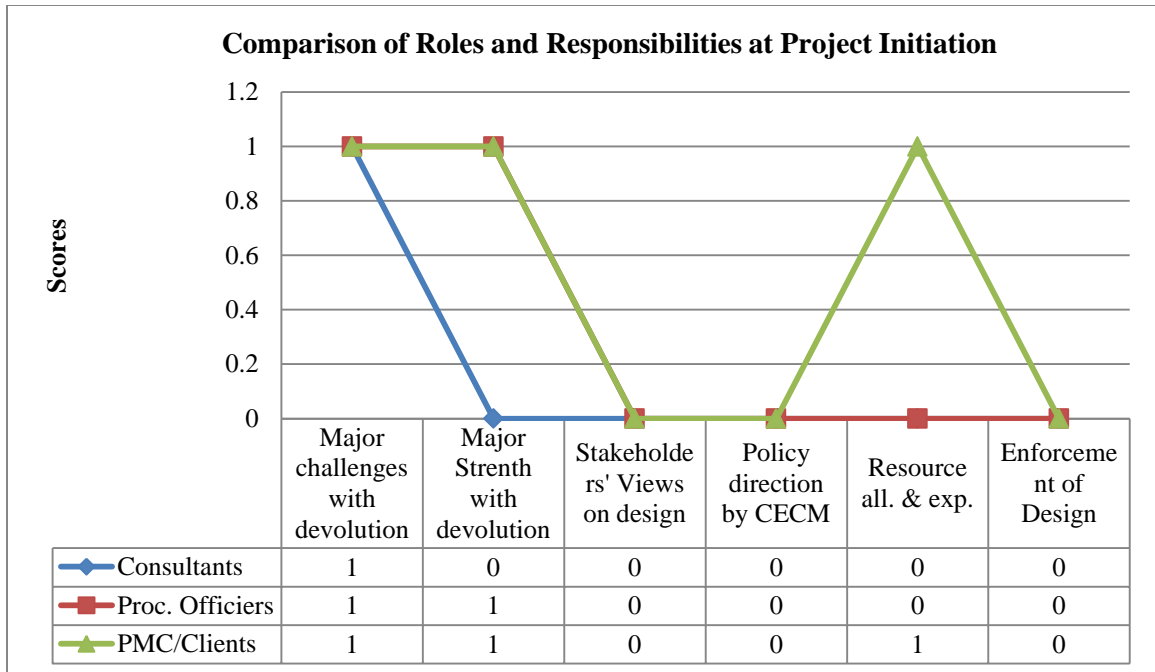


Figure 4.9. Comparison of Roles and Responsibilities before devolution and under devolution

4.3.3.1d Summary of Parties participation at Project Initiation stage

The charts below provide the study findings and expected situation that could represent the ideal practice.

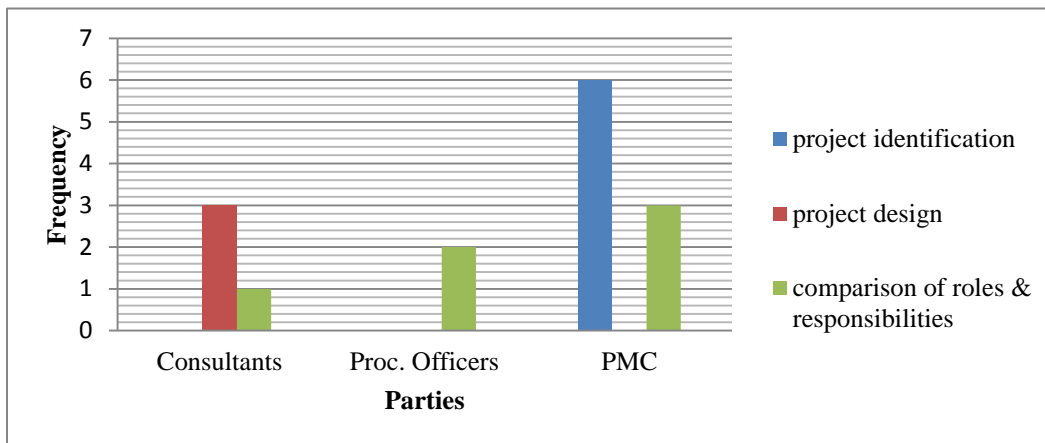


Figure 4.10. Participation of the parties in the Project initiation

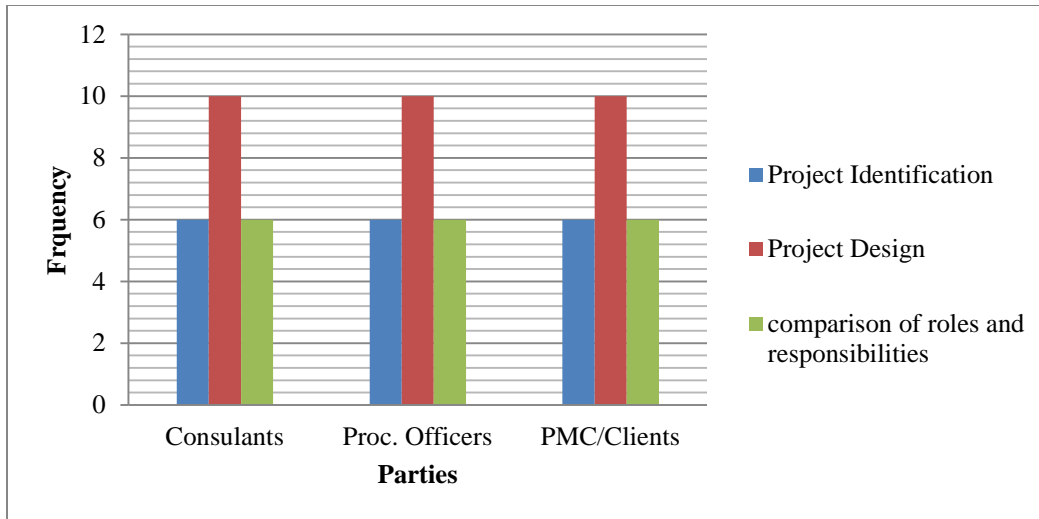


Figure 4.11. Expected participation of the parties at the Project Initiation stage

The results in Figure 4.10 show lack of participation of all parties in all stages of project initiation. Consultants were not involved at the identification stage. Their technical and professional advice at this stage was not sort by the clients who were the project management committees. The consultants were involved in part of the design process. They approved 3 out of 10 factors. There was no constituting of the design team for the projects. The roles for the design team as well as its independence were lacking in the study. The results indicate some involvement of experts (public works officers) at the documentation of the design. This was majorly provision of standardized working drawings and bills of quantities. The design of the project was therefore not paid for but the committees paid for stationary for the drawings and bills of quantities which were reproduced to other clients with a similar idea without even visiting the sites. The designs were never reviewed and paid for. Consultants were finally requested to approve the plans as a requirement by the County Government for payment of taxes.

The procurement officers similarly were not involved in project identification and design. They stated that in most cases they were only involved in the county projects that were centralized at the county departments. The study expected that as experts in financial matters concerning public building projects, it was prudent to seek their input at the project initiation.

The project management committees (clients) were fully involved at the project identification stage. They carried out needs assessment through public forums. The needs were developed into the proposals that were forwarded to the county and constituencies for the approval and funding. They however, stated that when it came to resource allocation it was the prerogative of the County Government or the Constituency Development Fund committees. The funding of the projects especially at the constituency level was done in phases and committees expressed dissatisfaction with underfunding. The project committees who were the clients expressed ignorance of their involvement in the design process of the project. They expected the design to be given by the Public works office on their request.

The results indicated that the roles and responsibilities of the Consultants, procurement officers and project committees under project initiation were inadequate. They all agreed that there were major challenges with devolution on professionalism in construction management process. In comparison of their roles and responsibilities for the consultants before devolution and with devolution, the results indicated great limitation with devolution. On other hand the procurement officers and project management committees have their roles and responsibilities enhanced with devolution.

The study anticipated that, for proper construction management, the three parties would have shared information at the project identification, design and have their roles and responsibilities enhanced with devolution. From the results of the study, this was not the case. According to Dancun (1993), project initiation is critical and it provides the setting out of overall direction and defining of the project objectives. This argument is supported by Esposito (2015) in her five phase model of project management. The study failed to meet the expectation of project initiation which led to poorly designed or not designed at all projects.

The percentage participation of the parties in project initiation is as shown in the pie-charts.

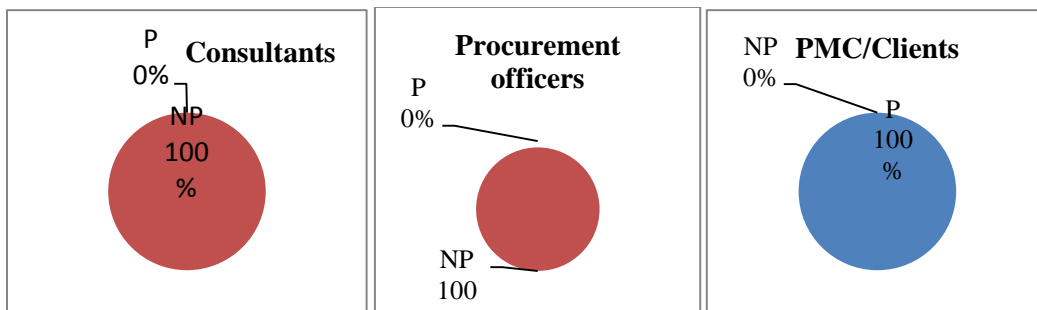


Figure 4.12. Percentage participation of parties in project Identification

The results in Figure 4.12 show that at project identification, the participation of Consultants and Procurement officers was nil whereas the participation of PMC/Clients is 100%.

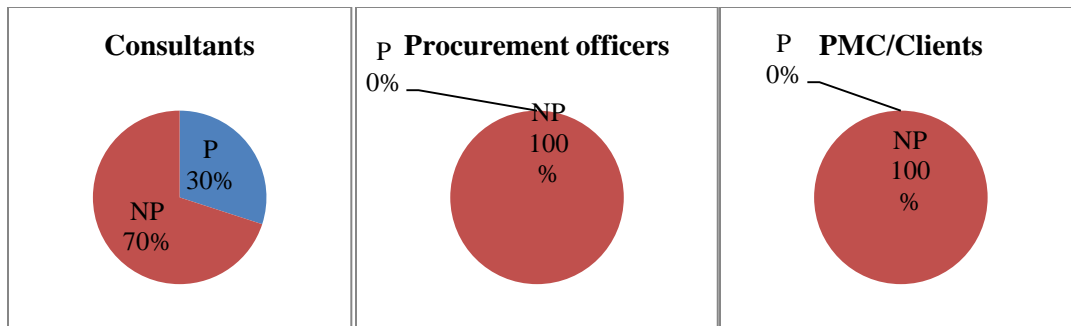


Figure 4.13. Percentage parties' participation in project design process

The results in Figure 4.13 show the non-participatory of procurement officers and PMC/Clients being 100% in design process, a fact that negates the collaborative approach to design process. The consultants' participation in design process was 30%. Since design is majorly a critical stage that requires 100% of consultants' participation, then the study results indicate that the consultants' involvement in design was not adequate.

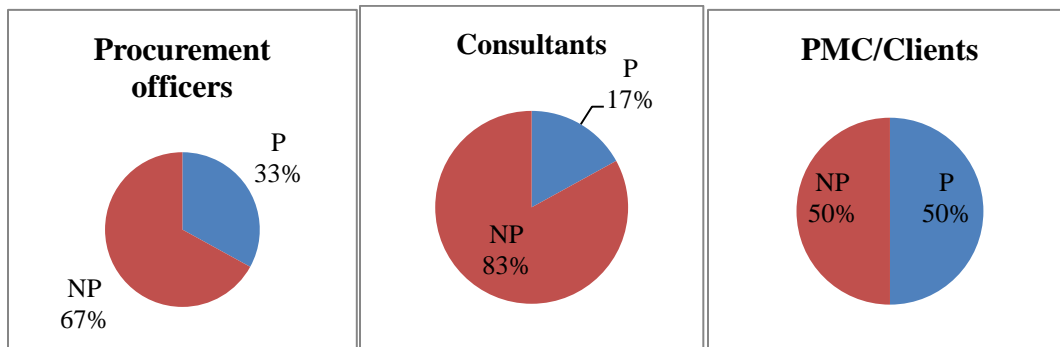


Figure 4.14. Percentage participation of the parties in comparison of role and responsibilities before vs after devolution

The results in Figure 4.14 show that 17%, 33% and 50% for consultants, procurement officers and PMC/Clients percentage participation in roles and responsibilities comparison before and after devolution respectively.

Table 4.17 Percentage participation and non-participation in project initiation

Party	Participation($\sum x/n$)%	Non-Participation($\sum x/n$)%
Consultants	16	84
Procurement officers	11	89
PMC/Clients	50	50

(Source: Field Survey 2017)

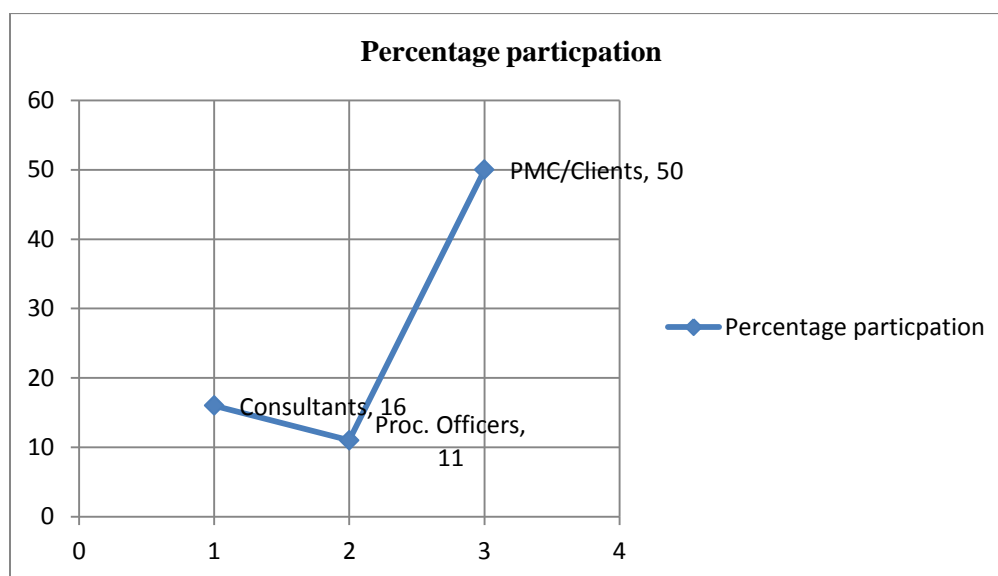


Figure 4.15. Graphical presentation of parties' percentage participation in project initiation

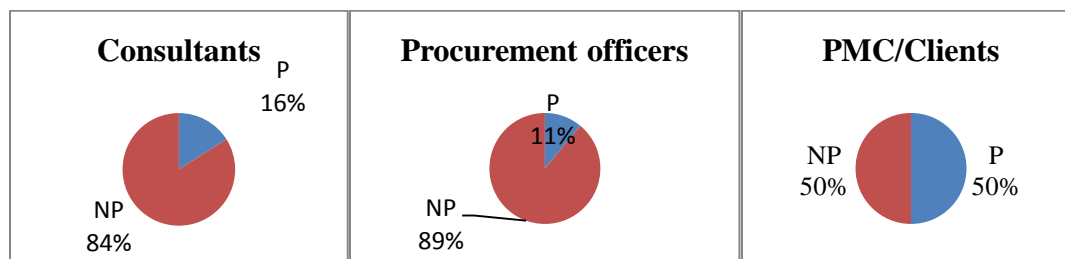


Figure 4.16. Percentage participation /non-participation of parties in project initiation

The results in Figures (4.15 & 4.16) and Table 4.17 show 16%, 11% and 50% for consultants, procurement officers and PMC/Clients in project initiation participation respectively. These percentages are very low for consultants and procurement officers and indicate that use of professionals at the project initiation was inadequate. The results show that the PMC/Clients fail to consult the professionals at the project initiation stage.

4.3.3.2 Project Tendering Process

Project tendering process provides an opportunity for acquiring the services or works for the project. It is basically the procurement process which involves finding, agreeing terms and acquiring goods, services or works from external source through competitive bidding. The study recognized the involvement of the Consultants, Procurement officers and PMC/Clients in tendering process as key in selection of the contractors for the construction of public building projects. Tendering process was divided into three stages. The first stage was Tender Advertisement with six factors that were assessed in the study. The second stage was Tender evaluation with five factors were assessed in the study. The third stage was Tender award with six factors that were assessed in the study.

4.3.3.2a Tender Advertisement

Tender advertisement is about sending a request for prospective contractors to participate in the process. It aims at reaching prospective contractors among which one is selected to carry out the implementation of the project. The study assessed six factors at tender advertisement stage. The findings are as shown in Figure 4.17. The expected results are as shown in Figure 4.18. The zero (0) score indicates failure to participate in the key activity and one (1) score indicates participating in the right activity.

The findings indicated that the consultants were not involved in provision of prequalification requirements before the tender advert was rolled out. They were also not involved in advising on which method of tendering was suitable for the projects. The consultants were only involved at the closing and opening of tenders.

The procurement officers were not involved in tender advertisement which was a big error in the tendering process. They were expected to participate in every aspect of tender advertisement. The study revealed that PMC/Clients formed the tender committees that did the work of procurement officers. The PMC/Clients were involved in setting up the prequalification requirements, deciding the methods of tendering, setting up tender timelines and opening as well as closing of tenders.

The study revealed that the PMC/Clients did not pay for tender adverts and they did not circulate the adverts except hanging a few typed adverts at the proposed site and local administrators' offices. The study anticipated that for proper and acceptable tender advertisement the consultants were expected to lead in setting up the prequalification requirements and advising on methods of the tendering. In addition they were expected to set tender timelines and tender closing and opening.

The graph in Figure 4.17 show none participation of procurement officers in tendering process. The consultants participated only in tender opening and closing exercise. The PMC were four out of six activities. The tendering advertisement exercise was not professionally carried out.

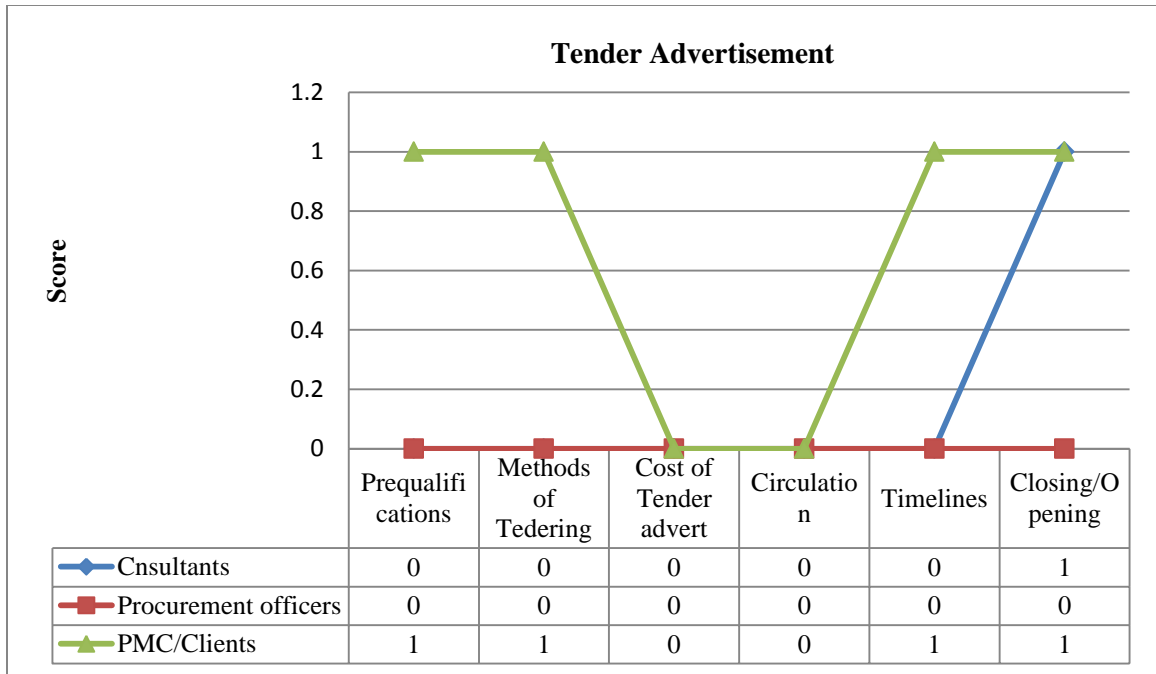


Figure 4.17. Parties' Participation in Tender advertisement

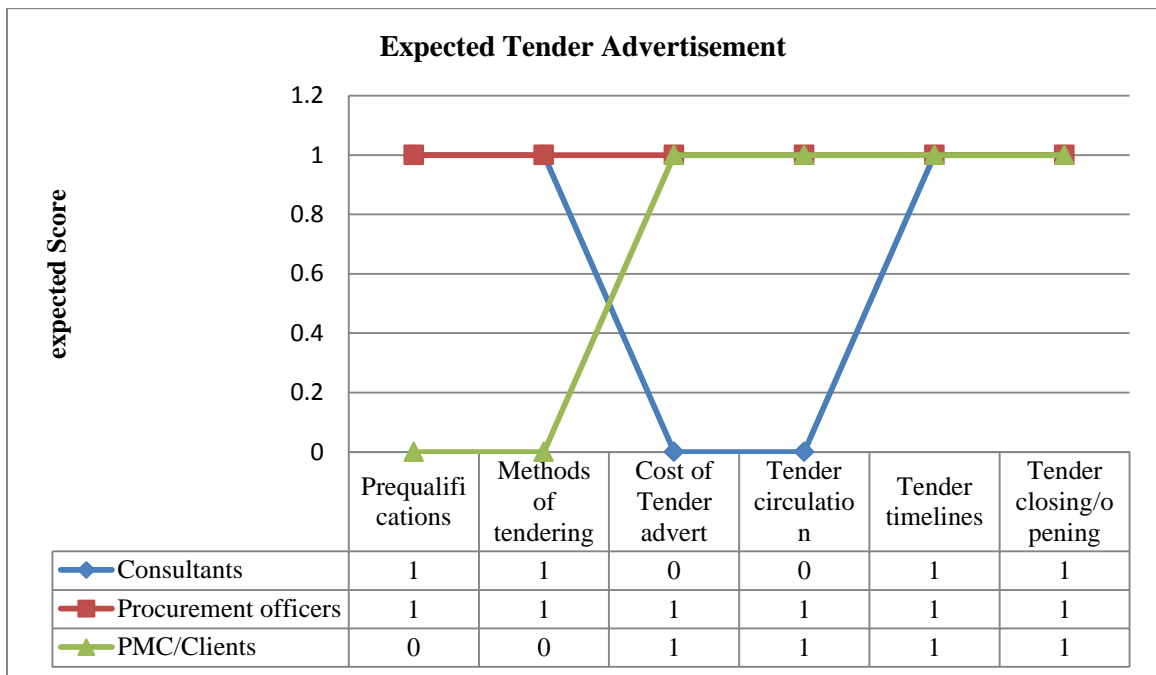


Figure 4.18. Expected Parties' Participation at tender advertisement

4.3.3.2b Tender Evaluation

Tender evaluation was about assessing the bids submitted by different bidders and arranging them in order of merit in accordance to the preliminary, technical and financial requirements. The study assessed five factors and findings summarized in Figure 4.19. The expected results are as shown in Figure 4.20. The zero (0) score indicates failure to participate in the key activity and one (1) score indicates participating in the right activity.

The consultants participated in tender criteria setting as per (PPAD) act of 2005 and preliminary evaluation which usually takes place immediately after tender closing and opening. The procurement officers did not participate in tender evaluation and yet tender evaluation squarely falls under their responsibility. The PMC/Clients participated in tender Technical, financial and affirmative action consideration. This was contrary to the expectation of the study to have them impartial in tender evaluation to avoid influencing the evaluation. The PMC/Clients used the tender committees established by them to do tender evaluation without involving the technical and financial experts.

The graph in Figure 4.19 show that the consultants in two out of five activities of tendering, procurement officers participated in none of the activities in tendering process. The PMC were four out of five activities of tender evaluation. The tendering evaluation exercise was not professionally carried out.

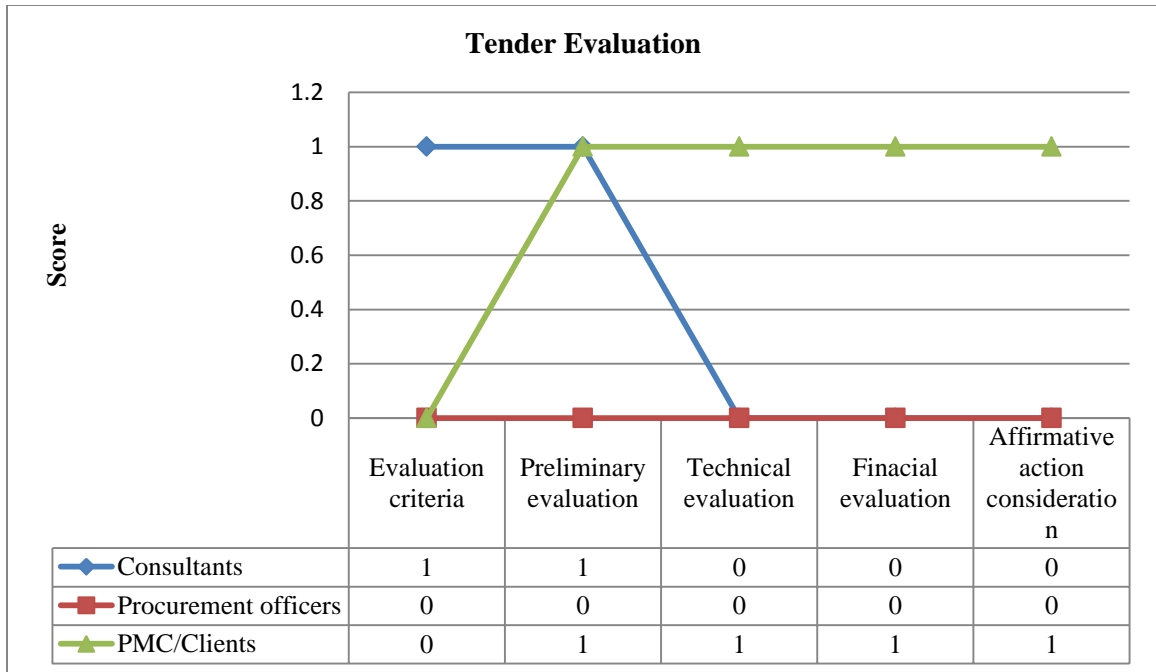


Figure 4.19. Tender Evaluation Process

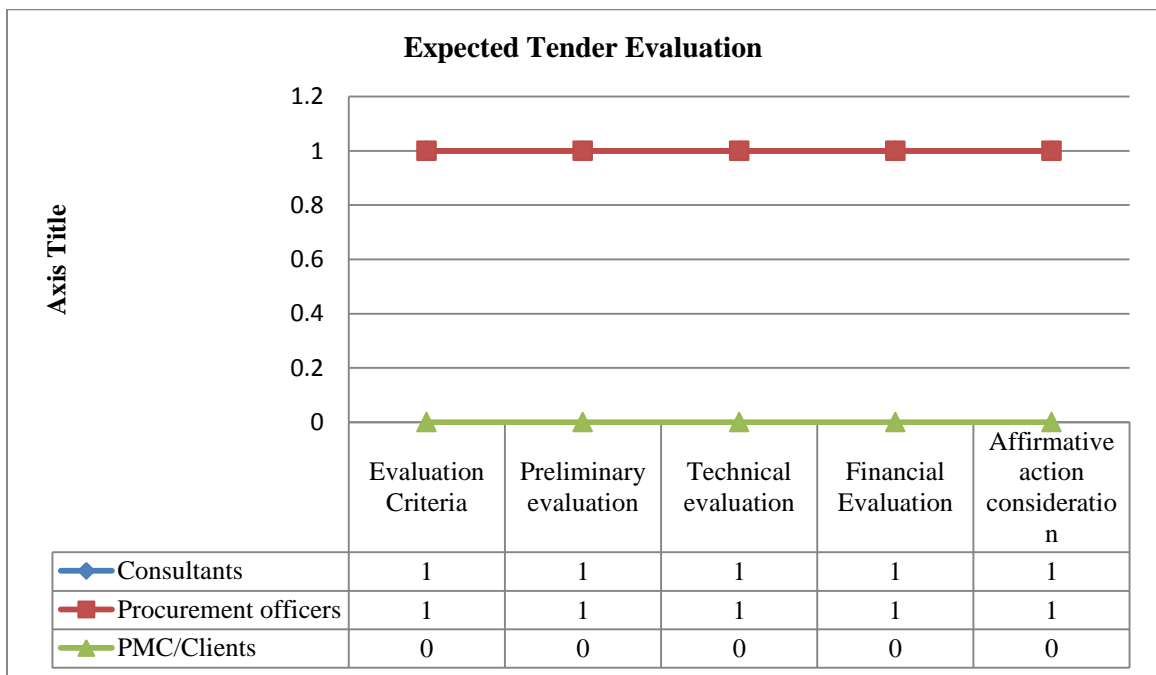


Figure 4.20 Expected Tender Evaluation process

4.3.3.2c Tender Award

Tender award is about making a final decision on who is the winning bidder. The winning bidder was notified of his or her successful bidding and unsuccessful ones were given the regrets. The dispute period of 14 days was given to those who had complaints. After the dispute period, the successful bidder was given an award letter and that marked the end of tendering process. The study assessed six factors and findings summarized in Figure 4.21. The expected results were as shown in Figure 4.22. The zero (0) score indicates failure to participate in the key activity and one (1) score indicates participating in the right activity. The Consultants were not involved in tender award process. The study anticipated that the consultants were to participate in tender award recommendations by giving technical advice and drawing the merit list of the bidders. By avoiding the consultants in tender award process, it gave room for selecting bidders who did not meet the technical aspect. The study further anticipated that the consultants were supposed to be involved in tender dispute resolutions, identify major challenges to tender award and provide means of overcoming these challenges. By avoiding involvement of the consultants in the tender award process, the dispute resolutions and overcoming of tender award challenges remained a big obstacle in selecting the right contractor without political influence. The procurement officers participated in tender award as anticipated by the study. The PMC/Clients participated as expected except for overcoming challenges in tender award. They stated that in some situations the tender award directives were given from CDF managers or County government officers. They argued that for them to receive funding in some situations depended on negotiation as to who should do the work. Therefore in such cases tendering was carried out as a formality.

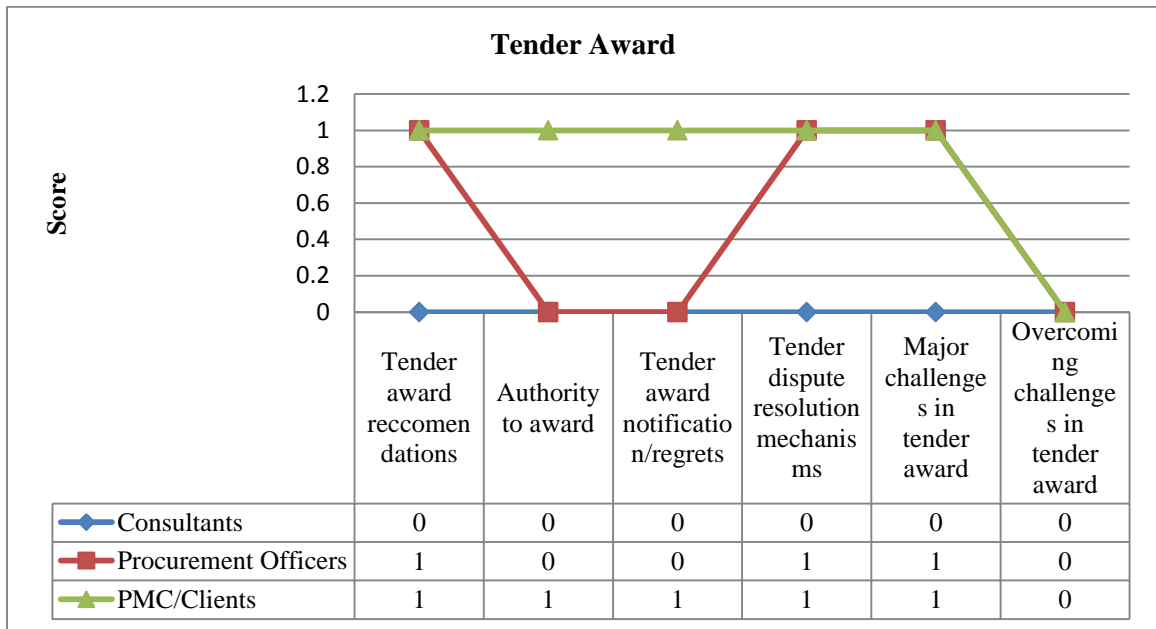


Figure 4.21 Tender Award process

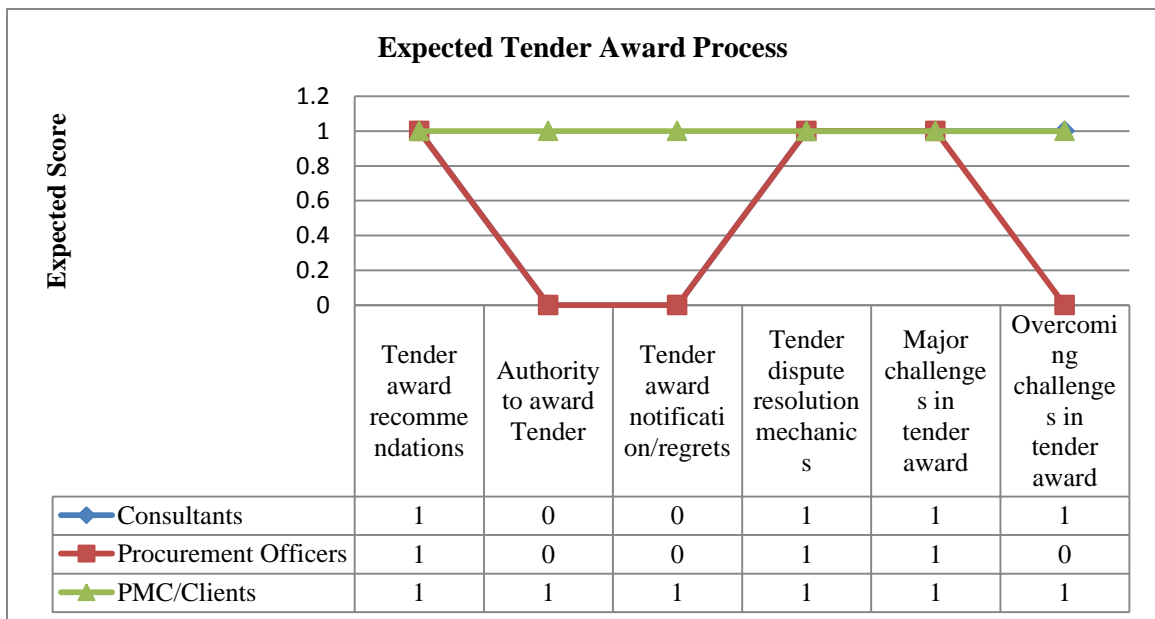


Figure 4.22 Expected participation of parties in tender award process

4.3.3.2d Summary of Parties' participation in tendering process

The study findings for tendering process are summarized in the charts below (Figure 4.23). The results indicated that parties did not participate in the tendering process as expected following what was acceptable standards in procurement. The study established that the procurement system applied in public building projects was the traditional one of the lump sum type. In the traditional approach, the employer accepts that design work will generally be separated from construction, consultants are appointed for design and cost control, and the contractor is responsible for carrying out the works. This responsibility extends to all workmanship and materials, and includes all work by subcontractors and suppliers. The contractor is usually appointed by competitive tendering on complete information, but may if necessary be appointed earlier by negotiation on the basis of partial or notional information (Davis, Love and Baccarini, 2008).

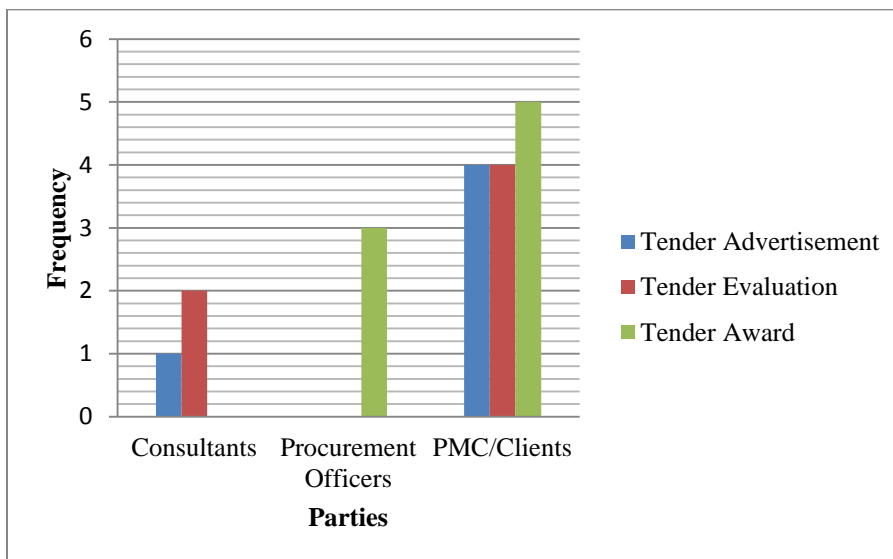


Figure 4.23 Parties' participation in tendering process

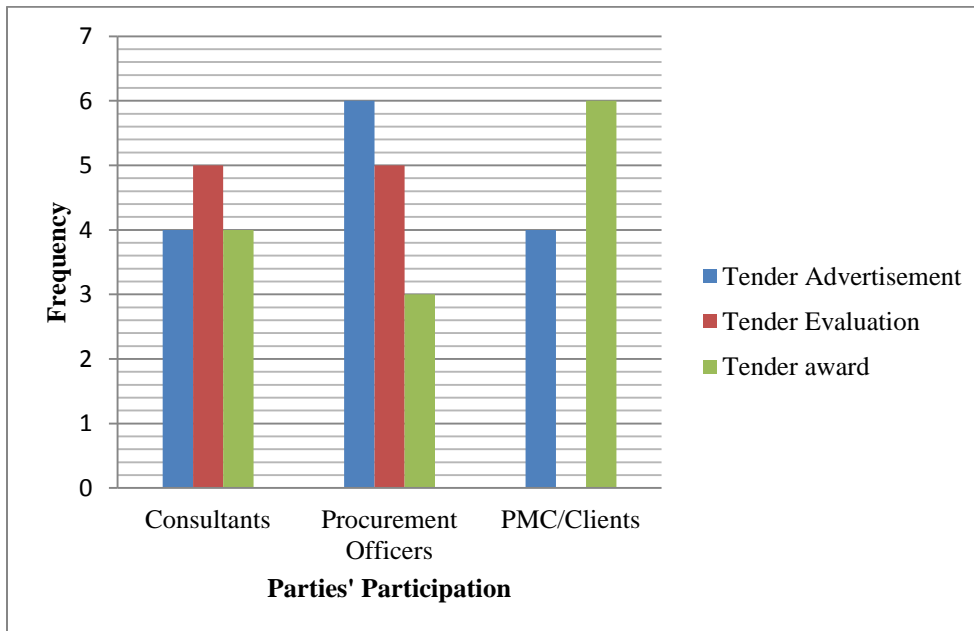


Figure 4.24 Expected Parties' Participation in Tendering Process

Figure 4. 23 shows that the consultants did not participate in tender award, the procurement officers did not participate in both tender advertisement and evaluation. The PMC/Clients participated in the three stages of tendering process and yet were not expected to participate in tender evaluation. Figure 4.24 shows the expected participation for each party in the three stages of project tendering process. The percentage participation of each party in tender advertisement, evaluation and award is shown in the pie-charts (Figures 4.25, 4.26 & 4.27).

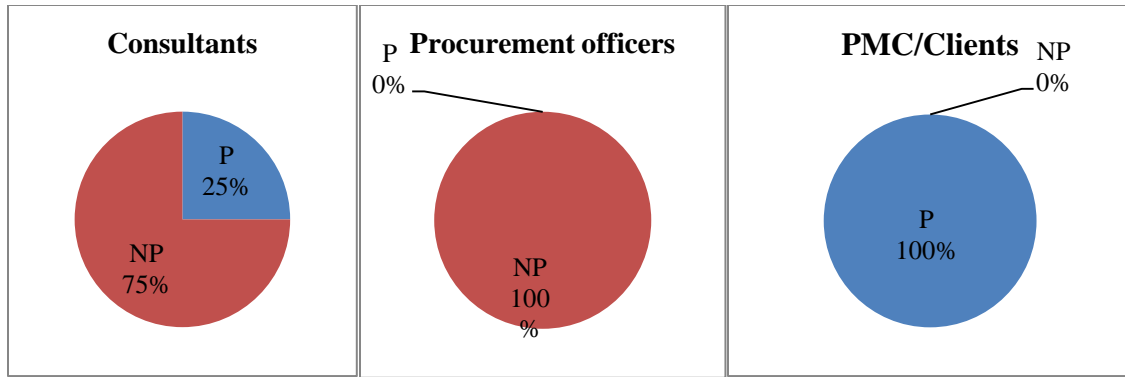


Figure 4.25 Percentage participation of the parties in Tender advertisement

The results in Figure 4.25 show that consultants' participation in tender advisement is 25%, procurement officers' participation was 0 and the PMC/Clients' participation is 100% which was as anticipated by the study.

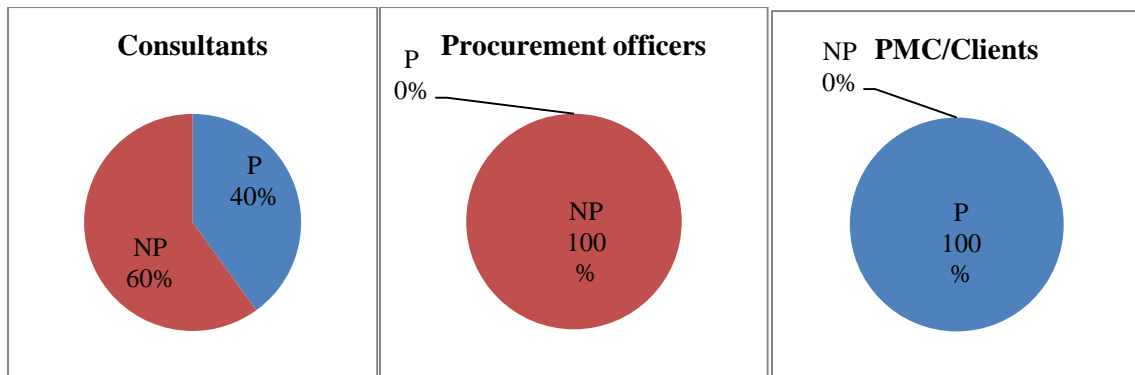


Figure 4.26 Percentage participation of parties in tender evaluation

The results in figure 4.26 show consultants' 40% and 60% participation and non-participation in tender evaluation respectively. The procurement officers did not participate in tender evaluation whereas the PMC/Clients participated fully. The 100% of the PMC/Clients was not anticipated by the study. This therefore implied that the PMC/Clients participated in tender evaluation against the set up roles. Such actions

compromised the evaluation process in the sense the PMC/Clients influence the choice of the contractor instead of waiting for professional recommendations from the consultants and procurement officers.

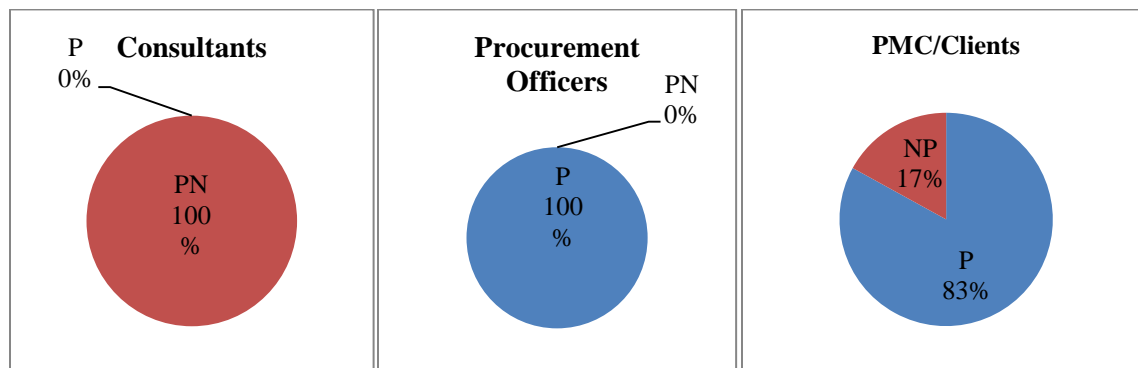


Figure 4.27 Percentage participation of parties in tender award

The results in Figure 4.27 show that consultants did not participate in tender award and percentage participation for the procurement officers and PMC/Clients were 100% and 83% in tender award respectively. This was quite within the expectation of the study except for consultants.

The parties' participation in tendering process is summarized in the Table 4.18. The results are represented in Figures (4.28 & 4.29).

Table 4.18 Percentage participation/non-participation of parties in tendering process

Party	Participation($\sum x/n$)%	Non-Participation($\sum x/n$)%
Consultants	22	78
Procurement officers	33	67
PMC/Clients	92	8

(Source: Field Survey 2017)

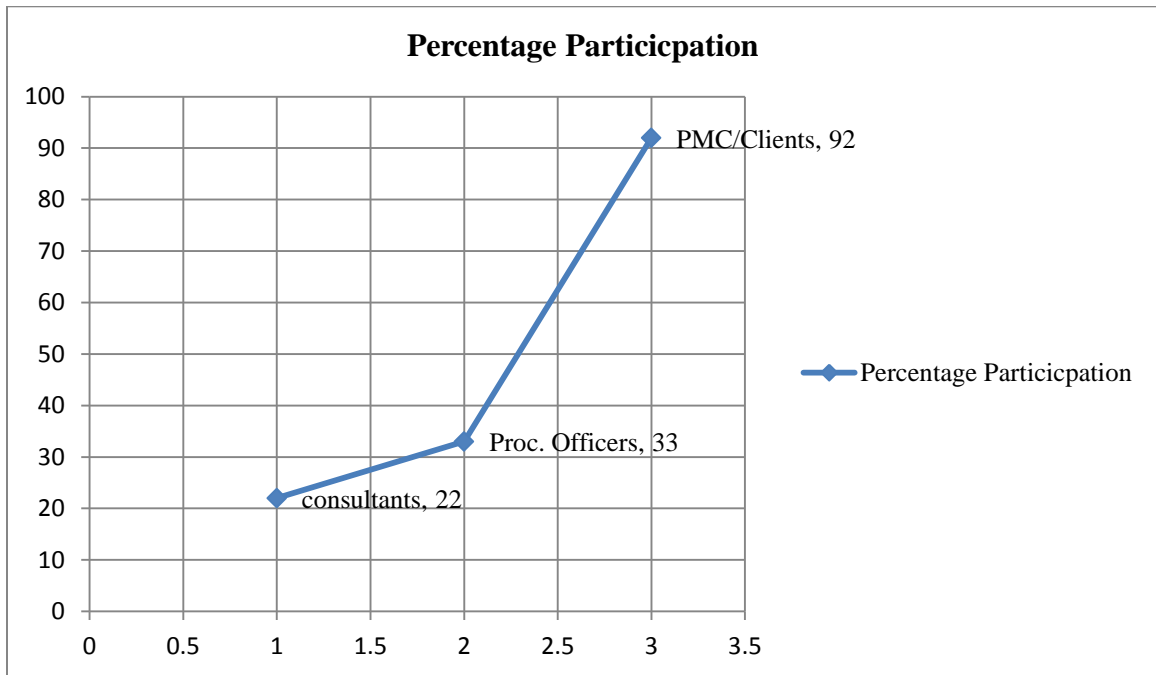


Figure 4.28 Percentage participation of parties in project tendering process

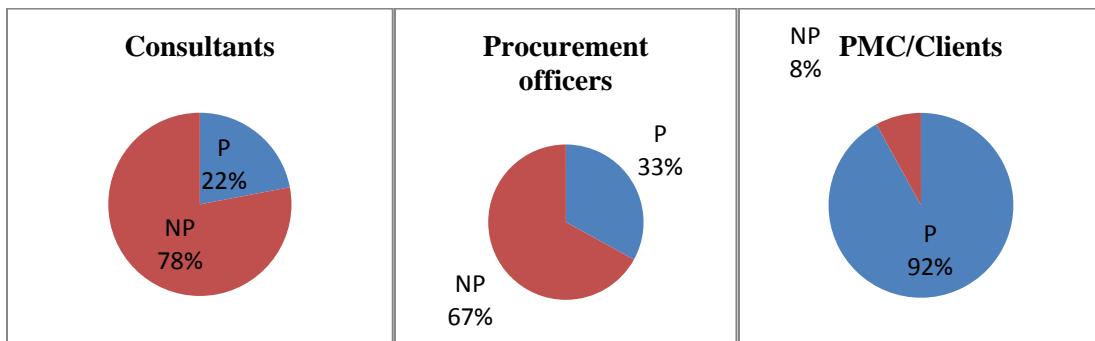


Figure 4.29 Percentage participation/non-participation of parties in project tendering process

In overall the consultants’ participation in tendering process was only 22% which implied that the technical input and professional advice did not reach acceptable level. The procurement officers’ participation was 33% which implied that the professional input on

financial matters was inadequate. The PMC/Clients' participation in tendering process is 92%. In the computation of percentage participation of PMC/Clients, the 100% participation in tender evaluation was ignored as they were not supposed to participate. The participation of 92% of PMC/Clients in tendering process was adequate.

4.3.3.3` Project Implementation

Project implementation involves the operations that bring out the physical project. This stage is critical in the sense that failure to adhere the required standards and specifications automatically leads to poor quality of the project and hence failure to achieve the project objective. The parties involved in this stage are the consultants, contractors and PMC/Clients. The factors assessed in the study fell under contractual documents and activities during the contract period. The contractual documents had four factors assessed whereas contract period activities had eleven factors assessed.

4.3.3.3a Contractual Documents

Contractual documents are essential in giving the direction and objective of project implementation. The contractual documents provide the basis upon which the project implementation process is measured and reviewed. Failure to have these documents, the project implementation will be difficult and legal redress for parties involved will be impossible to execute in case of any dispute. Four factors were assessed are as shown in figure 4.30. The zero (0) score indicates lack of the document and one (1) score indicates availability of the document. The results show that consultants were used to produce the working drawings. The services of the consultants on the other documents (specifications, bills of quantities and form of agreement) were not sort. The contractors were in procession of working drawings, bills of quantities and form of agreement. The

specifications were lacking. The contract form of agreement was based on the negotiated contract sum but not the bills of quantities items. The bills of quantities was used as formality to regularize the tendering process but not used as a contract document. The PMC/Clients were in possession of drawings, unpriced bills of quantities and form of agreement. The contractual documents were expected to be available and in possession of the three parties involved in the project implementation (Figure 4.31).

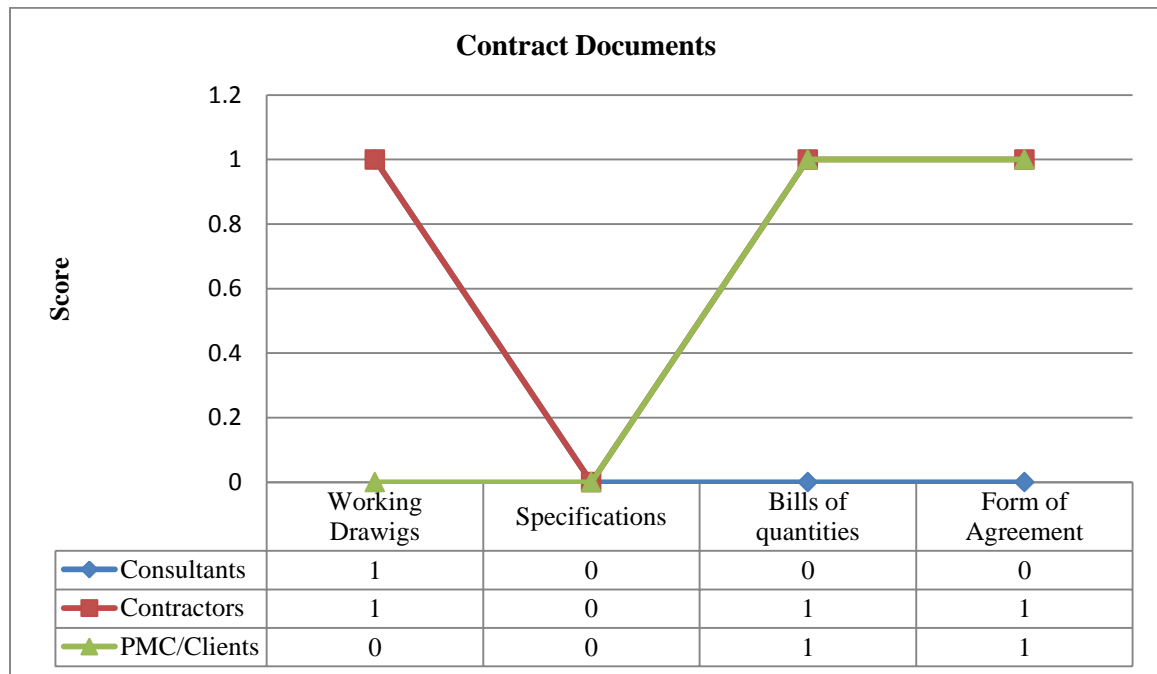


Figure 4.30 Contract Documents

The graph shows that the consultants participated in one out of four factors, contractors participated in three out of four and PMC participated in two out four factors considered under contract documents.



Figure 4.31 Expected Parties possession of contractual documents

4.3.3.3b Contract Period activities

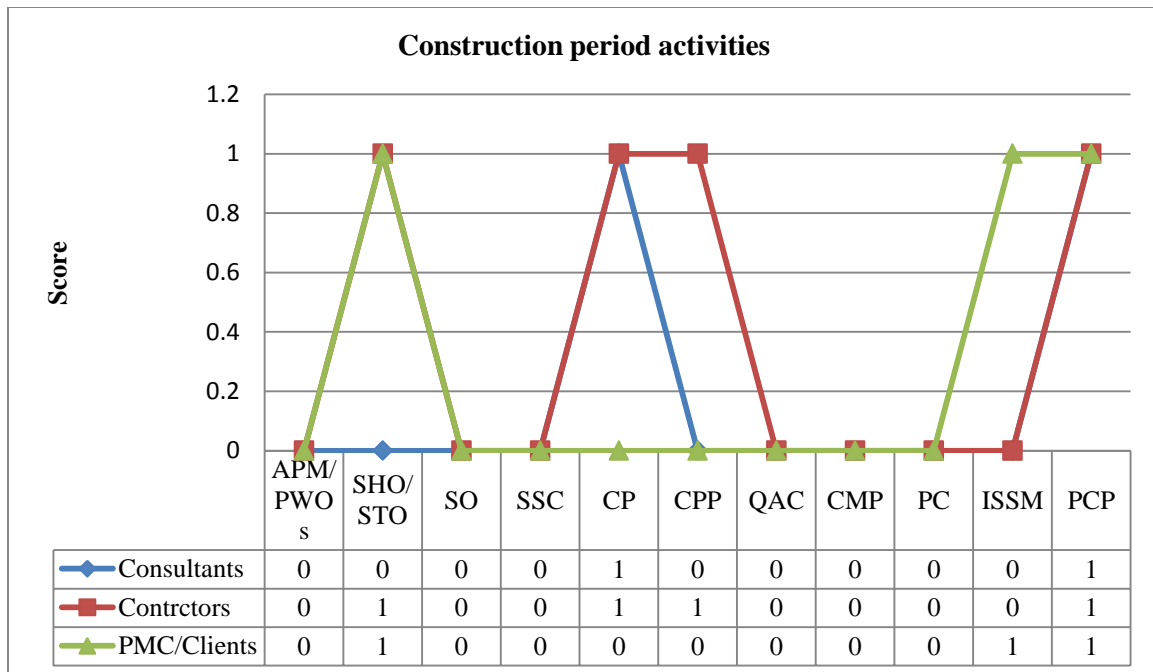
Contract period activities mark the real practical operations to physically construct the project. The study assessed eleven factors under the contract period activities and the results are as shown in Figure 4.32. The zero (0) score indicates lack of the activity by the party during the contract period and one (1) score indicates the party carried out the activity.

The consultants were not appointed by the PMC/Clients as project managers during the construction period. There was no formal appointment for Public Works Officers as project managers for the public building projects. The Consultants/public works officers were not involved in the rest of the activities except for practical completion certificate which was usually asked from the county public works office as a formality for completion of the project and accountability of public funds by the PMC/Clients. In most

cases the public works officers stood their ground not to issue the practical completion certificates for the projects they were not involved from the start.

The contractors were involved in taking over the site from the PMC/Clients, prepared some simple construction programmes, carried out some valuation of the works for payment request and sort practical completion certificates for final payment as required by the law. They stated that they sort for practical completion certificate only when the PMC/Clients ask for it before final payment.

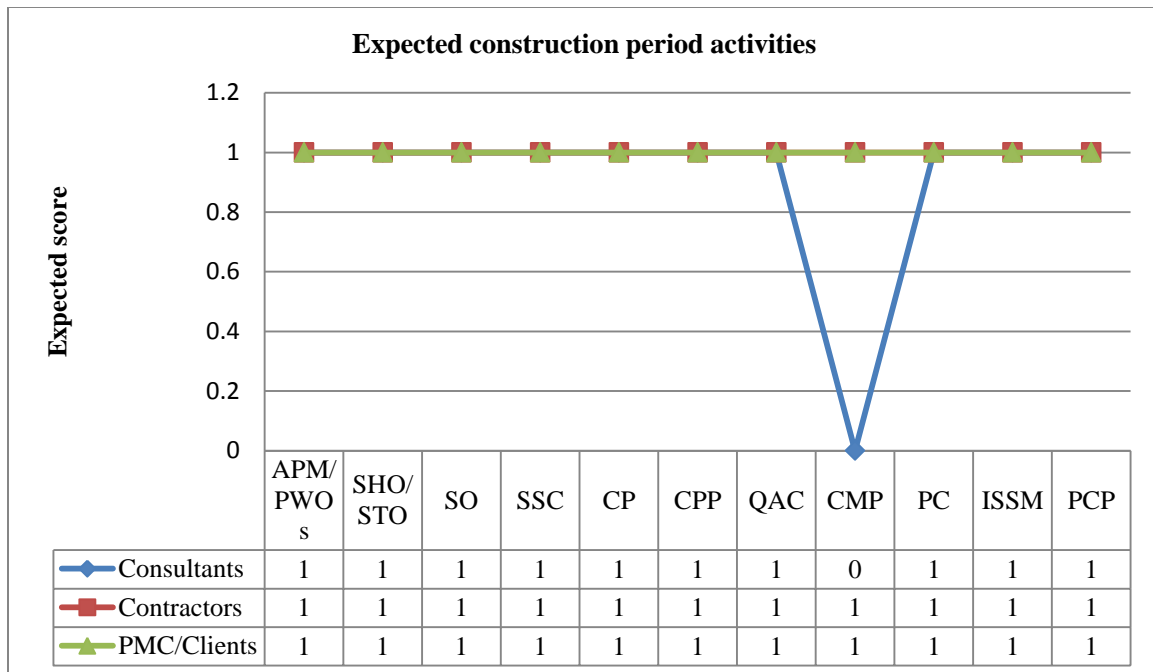
The PMC/Clients did not appoint the project managers and believed that the contractors were supposed to do the construction works without the project manager to save funds. The PMC/Clients were involved in handing over the sites to contractors, held some site meetings after some stages that required payment and asked for certificate of practical completion of the project from the public works office before final payment after the project was completed. They stated that the payments were done as per agreement without professional measurement and valuing of the works done. Figure 4.33 shows the expected participation of parties in the construction period activities.



APM/PWOs-Appointment of Project Manager/Public Works Officers, SHO/STO- Site Handing Over/Site Taking Over, SO-Site Organization by the Contractor, SSC-Site Services and Conditions, CP-Construction Program, CCP-Contract Payment Process (valuation and certification), QAC-Quality Assurance and Control (supervision material tests and equipment), Contractors Manpower (supervisors, foremen, skilled and non-skilled), PC-Progress Charts, ISSM-Inspection Schedule and Site Meetings, PCP-Practical Completion of the Project.

Figure 4.32 Parties' participation in the project construction period activities

The graph shows the participation of the parties in the construction activities. The consultants participated only in two out eleven activities. The contractors participated in four out of eleven activities while the PMC participated in three out of eleven activities. This implied that many activities which critical in both quality assurance and control were not carried out as indicated in the graph in Figure 4.32.



APM/PWOs-Appointment of Project Manager/Public Works Officers, SHO/STO- Site Handing Over/Site Taking Over, SO-Site Organization by the Contractor, SSC-Site Services and Conditions, CP-Construction Program, CCP-Contract Payment Process (valuation and certification), QAC-Quality Assurance and Control (supervision material tests and equipment), Contractors Manpower (supervisors, foremen, skilled and non-skilled), PC-Progress Charts, ISSM-Inspection Schedule and Site Meetings, PCP-Practical Completion of the Project.

Figure 4.33 Expected parties' participation in the project construction period activities

4.3.3.3c Summary of Parties' Participation in Project Implementation

Project implementation is a critical stage where each party involved must participate optimally to achieve the required quality. The findings of the study are summarized in the charts below (Figures 4.34 & 4.35). The results indicate that out of four factors in contractual documents, the consultants and PMC/Clients participate in only one (25%) and the contractor participated in two (50%). In contract period activities, the consultants were involved in only one factor out of expected ten factors (10%), The contractors were involved in four out of expected eleven (36%) and the PMC/Clients were involved in three out of expected eleven factors (27%).

The results show that project implementation was poorly done. Example from the results no party was involved in quality assurance and control which is critical in acquiring the required quality. From the pie-charts in Figures (4.36 & 4.37) show the percentages of participation and non-participation and it is clearly seen that the participation percentage was very low compared to the non-participation. Most critical factors for project implementations were not adhered to and therefore the projects were implemented without following laid down professional procedures.

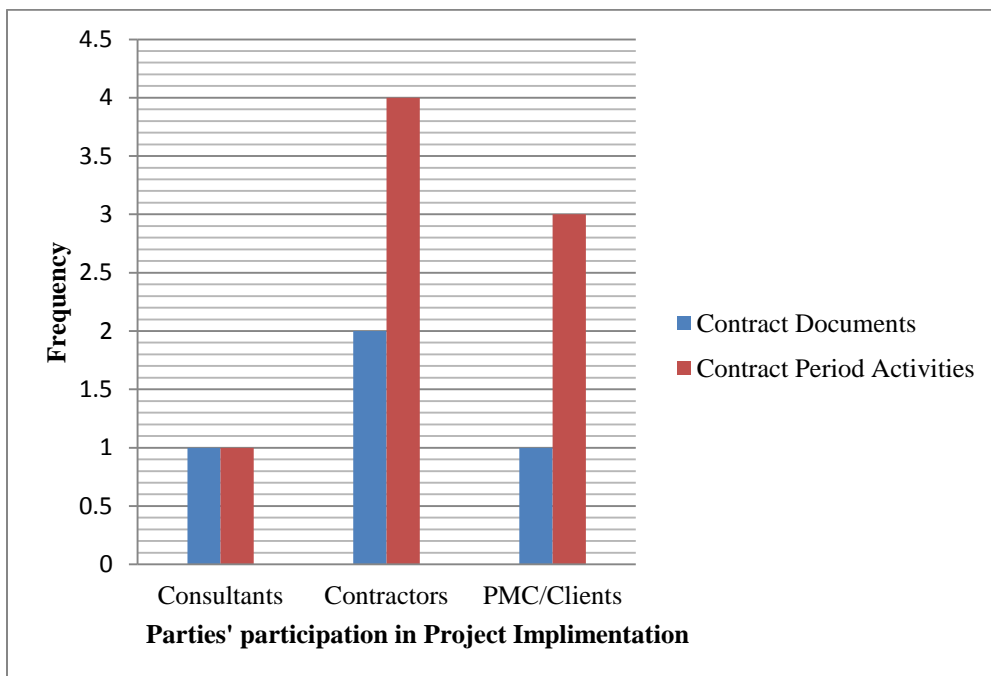


Figure 4.34 Parties' participation in Project Implementation

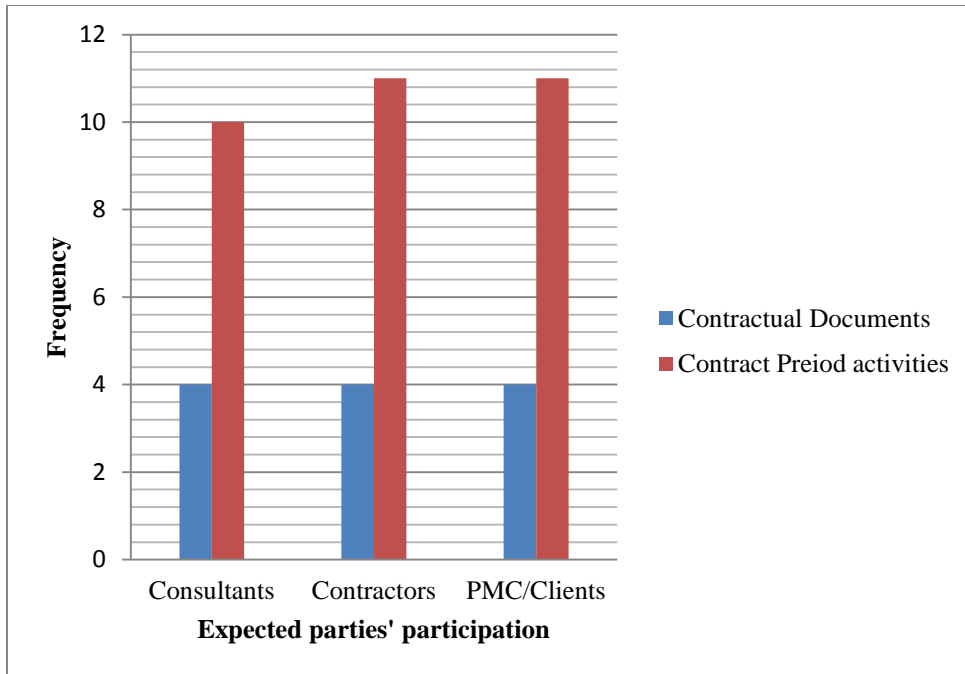


Figure 4.35 Expected Parties' Participation in Project Implementation

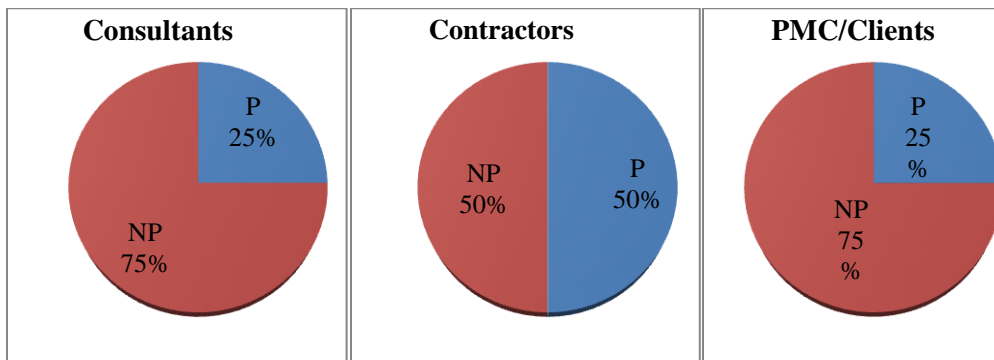


Figure 4.36 Percentage Participation and non-participation in Contractual Documents

The results in Figure 4.36 show percentage participation of 25% for consultants and PMC/Clients and 50% for contractors. The results show that involvement of professionals in the critical stage of contractual documentation was inadequate.

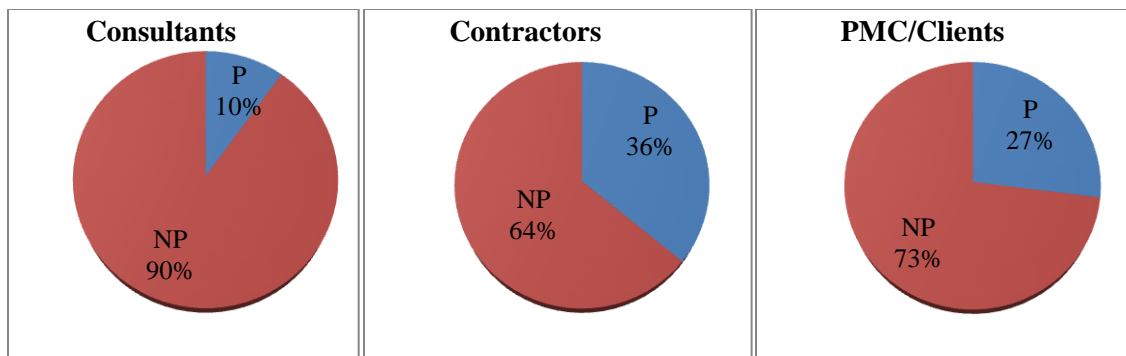


Figure 4.37 Percentage Participation and Non-participation in contract period activities

The results in Figure 4.37 show 10%, 36% and 27% participation of consultants, contractors and PMC/Clients in contract period activities. The stage involves essential activities of quality assurance and control. Inadequate involvement of consultants in contract period activities leads to poor quality projects.

The overall participation of parties in project implementation is summarized and shown in the Table 4.19.

Table 4.19 Percentage participation/non-participation of parties in project implementation

Party	Participation($\sum x/n$)%	Non- Participation($\sum x/n$)%
Consultants	18	82
Contractors	43	57
PMC/Clients	26	74

(Source: Field Survey 2017)

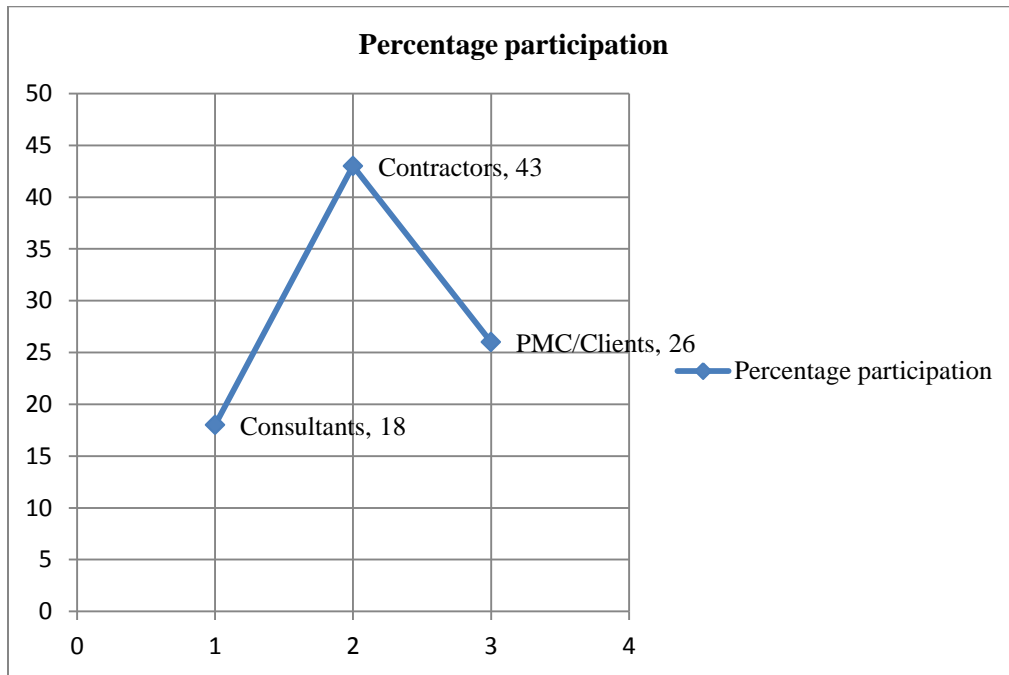


Figure 4.38 Graphical presentation of parties' percentage participation in project implementation

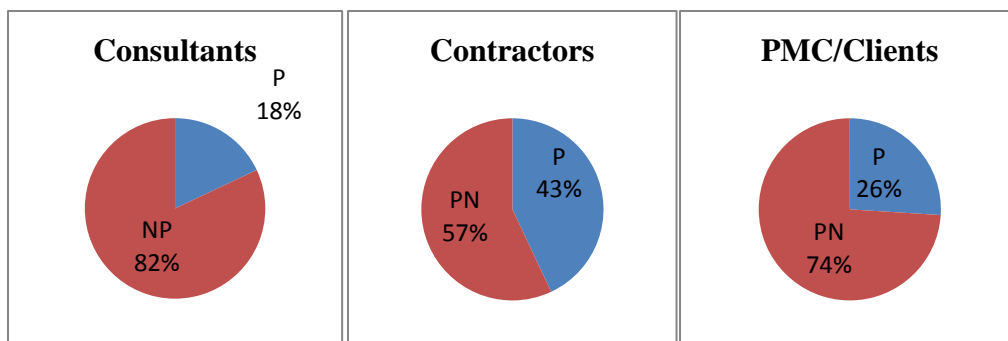


Figure 4.39 Percentage participation/non-participation of parties in project implementation

Figures(4.38 & 4.39) show that 18% participation of consultants in project implementation was realized. Contractors and PMC/Clients participation in project implementation were at 43% and 26% respectively. This participation of parties in

project implementation fell very much below expected percentage participation of 100% for each party. Therefore parties' participation in project implementation was found to be inadequate.

4.3.4.4 Project Built Environment Management

Built environment management is essential practice after the project is completed and occupied. It provides the schedule of how the project is repaired and maintained. This management is carried out by the PMC/Clients with professional input of the consultants. The study classified the built environment management into occupancy with four factors assessed and repairs/ maintenance with eight factors assessed.

4.3.4.4a Occupancy

Upon completion of the project, there comes critical operation of occupancy. This involves putting the project into practical intended use of the project. The study assessed four factors under occupancy and the results are as shown in Figure 4.40. The zero (0) score indicates lack of the activity by the party during the occupancy and one (1) score indicates the party carried out the activity. The study results show that factors under occupancy were not considered at all upon completion of the projects. There were no as built drawings which are requirements upon practical completion of the project. Occupancy certificates, safety measures documentation and NEMA regulation compliance were missing in the projects assessed. The study established that occupancy issues were never raised upon the completion of the public building projects. The consultants were expected to be involved at the occupancy stage to ensure the four factors were achieved before handing over the public building to PMC/Clients for them put the buildings to the intended use. The PMC/Clients on the other hand were supposed to

ensure that all requirements had been approved by the consultants before occupying the public building projects. Figure 4.41 shows the expected parties' participation in occupancy stage.

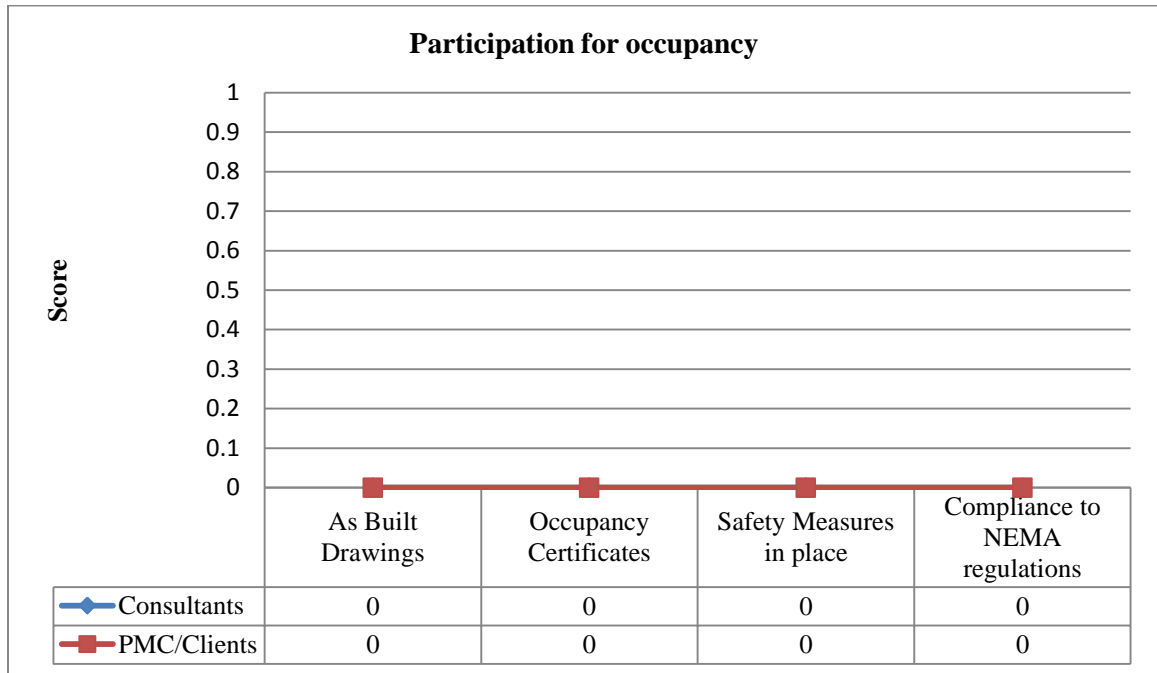


Figure 4.40 Parties' participation in occupancy

The graph shows that both the consultants and PMC did not carry out activities required for occupancy. The parties failed completely with compliance to occupancy. This therefore implies that the buildings were occupied without the necessary approvals.

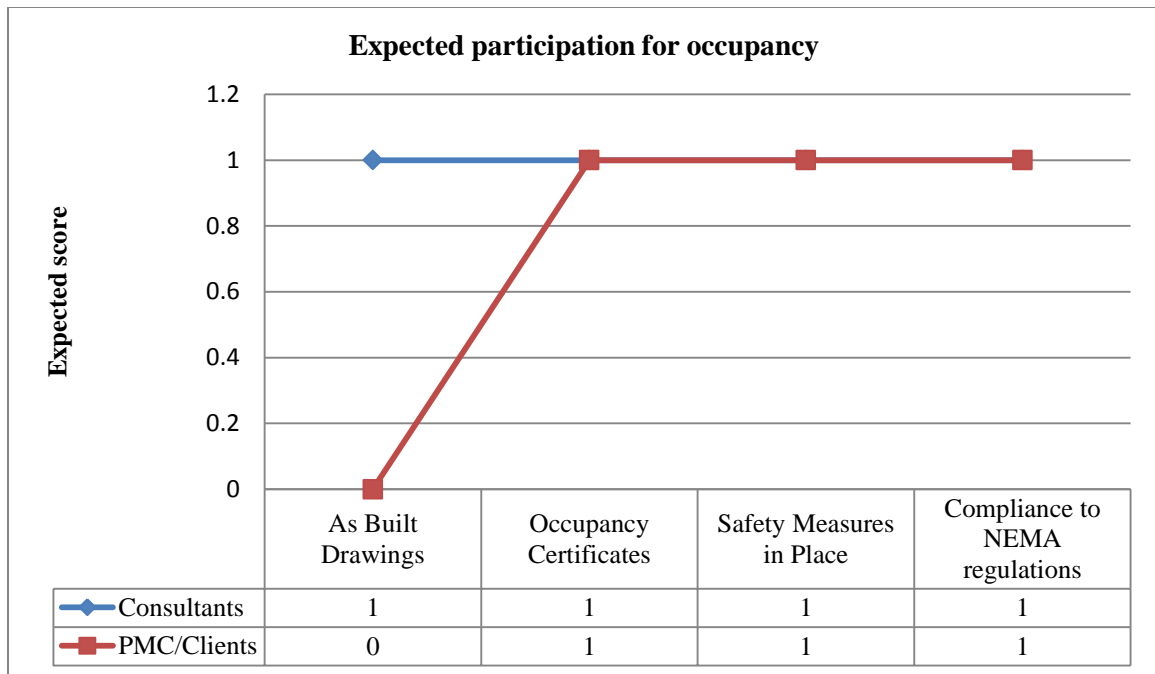


Figure 4.41 Expected Parties' Participation in Occupancy

4.3.4.4b Repairs and Maintenance

The repairs and maintenance is essential in ensuring that the completed building is put to proper use and deterioration of the same is checked regularly. The study assessed eight factors under repairs and maintenance and the results are as shown in Figure 4.42. The zero (0) score indicates lack of the activity by the party under repairs and maintenance and one (1) score indicates the party carried out the activity. The results of the study show lack of participation of the consultants in repairs and maintenance. The consultants were expected to draw up maintenance schedules and assess the repairs if any after defects reliability period. The PMC/Clients were expected to carry out the remaining factors under repairs and maintenance. The results indicate that the public building projects are appraised by users, stakeholders and community at large. There was no evidence of routine maintenance and waste management in the public building projects

upon completion. Figure 4.43 shows the expected parties' participation in repairs and maintenance.

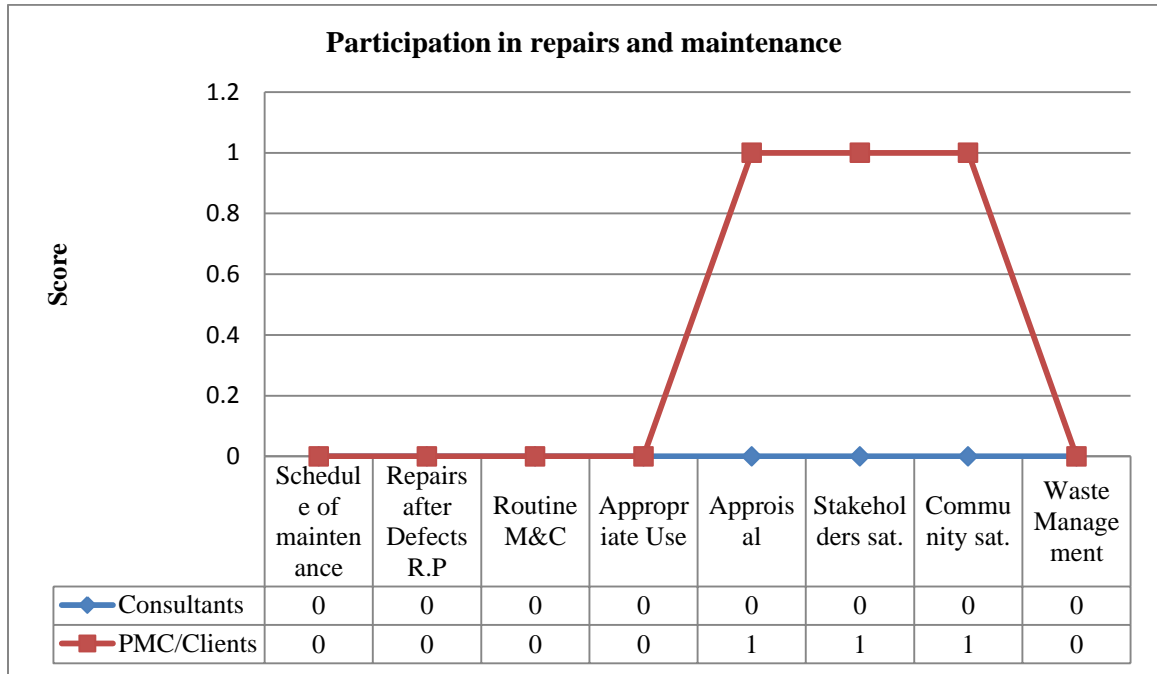


Figure 4.42 Parties Participation in Repairs and Maintenance

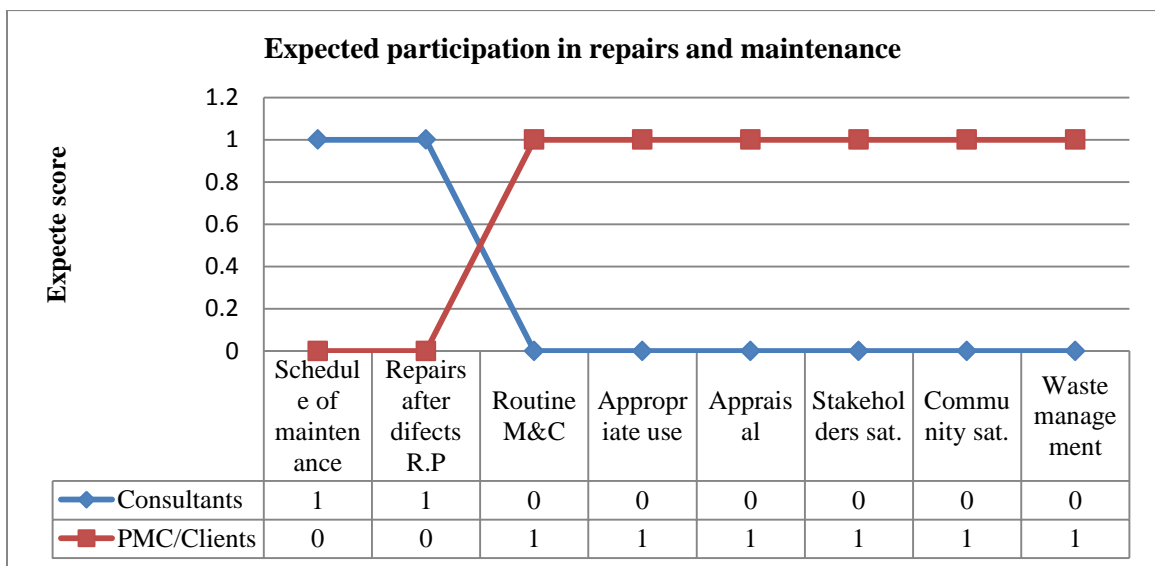


Figure 4.43 Expected participation in repairs and maintenance

4.3.3.4c Summary of Parties Participation in Built Environment Management

Project built environment management involves the proper use of the project, safety measures put in place, proper utilization of energy and repairs/ maintenance of the project. The findings of the study are summarized in the charts below (Figures 4.44 & 4.45). The results indicate that out of four factors in the occupancy, the consultants and PMC/Clients participated in none (0%). The consultants were expected to have participated in two (50%) i.e. as built drawings and approval of occupancy certificates. In repairs and maintenance, the PMC/Clients participated in three out of eight factors representing 37.5%. The consultants were expected to provide the maintenance manuals/schedule which was not the case.

The results show that project as built environment management was not carried out upon the completion of the project. The pie-charts in Figures (4.46 & 4.47) show the percentages of participation and non-participation and it was clearly seen that the participation percentage was very low compared to the non-participation. The study shows 0% for participation of both the consultants and PMC/Clients in occupancy factors. The consultants' percentage participation in repairs and maintenance is 0% whereas the one for the PMC/Clients is 37.5%. From the results, most critical factors for as built environment management were not adhered to and therefore the phenomenon of "as built environment management is none-existence upon the completion of public building projects funded by devolved funds.

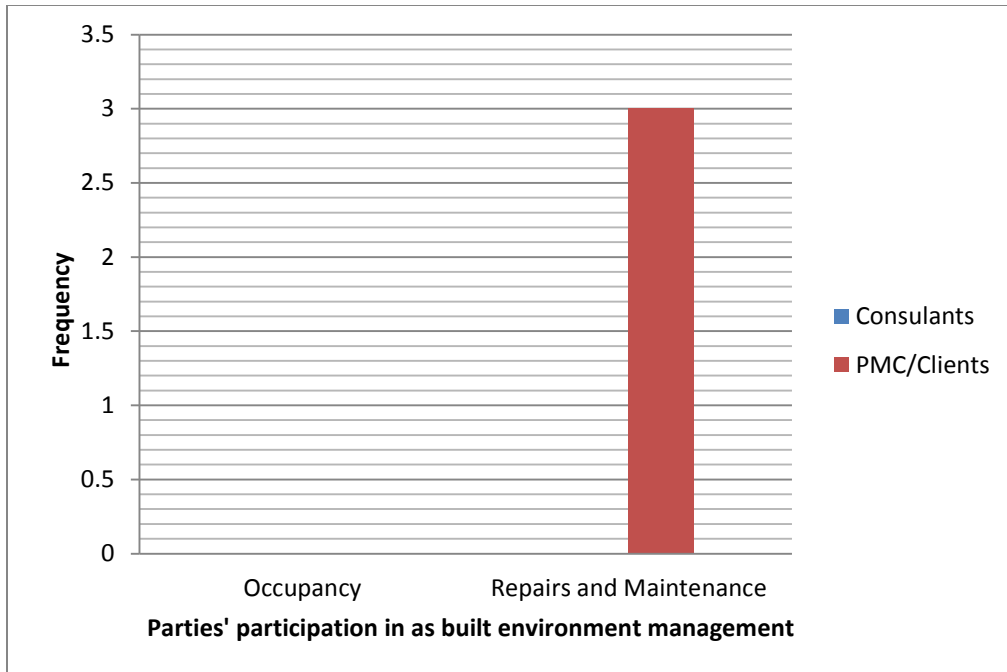


Figure 4.44 Parties' participation in as built environment management

The graph shows that only the PMC were involved in the repairs and maintenance of the building projects. The consultants were not involved at all.

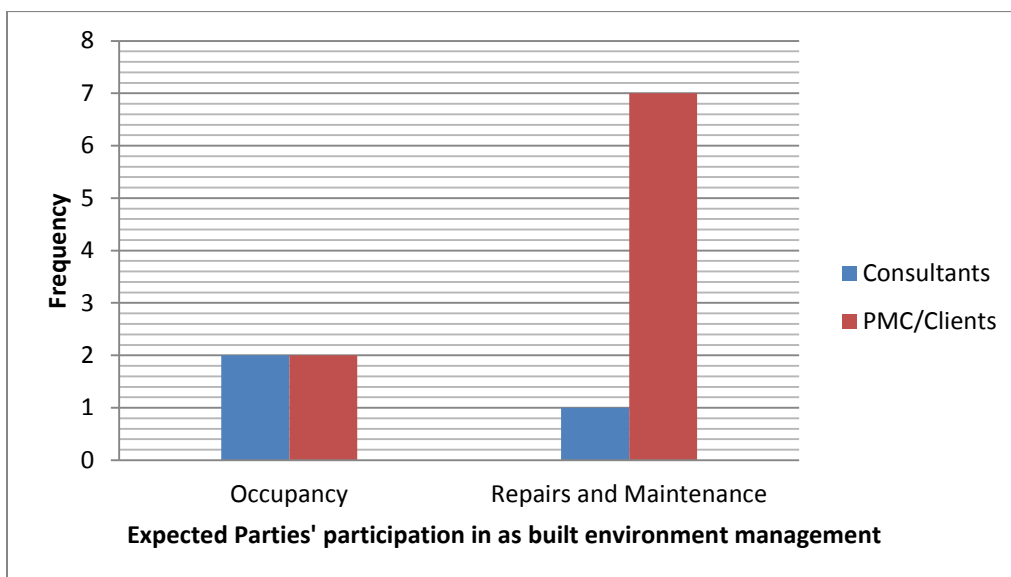


Figure 4.45 Expected parties' participation in as built environment management

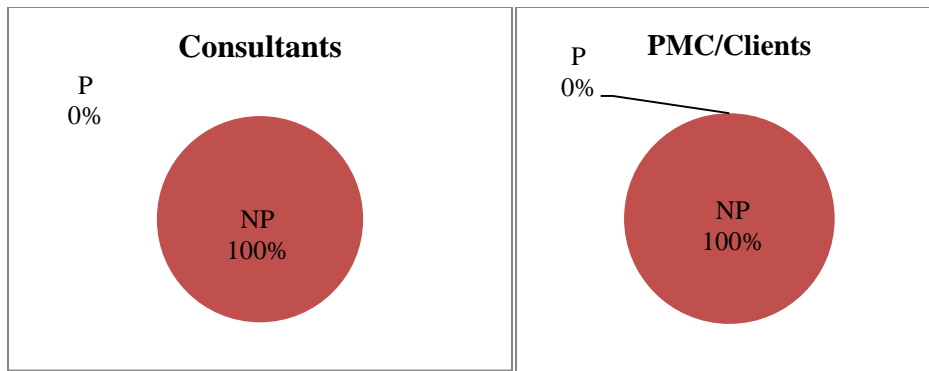


Figure 4.46 Percentage participation and non-participation in occupancy

The results in Figure 4.46 show participation and non-participation of parties in project occupancy factors. The results indicate that the projects were occupied without following expected laid down procedures. Therefore the occupation procedures in public building projects were informal and may be risky to the occupants.

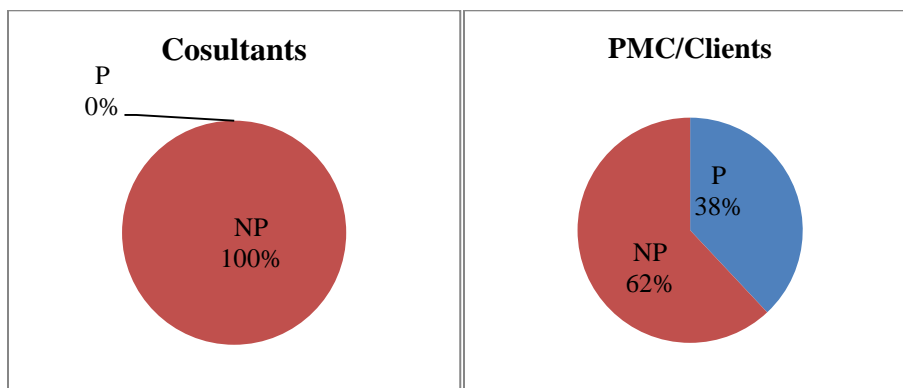


Figure 4.47 Percentage participation and non-participation in Repairs and maintenance

The results in Figure 4.47 show percentage participation and non-participation of the consultants in repairs and maintenance of the public building projects. The PMC/Clients participation was at 38% which is inadequate for expected repairs and maintenance for the public building projects.

The overall percentage participation was computed and the results summarized in the Table 4.20.

Table 4.20 Percentage participation/non-participation of parties in as built environment management

Party	Participation($\sum x/n$)%	Non- Participation($\sum x/n$)%
Consultants	0	100
PMC/Clients	19	81

(Source: Field Survey 2017)

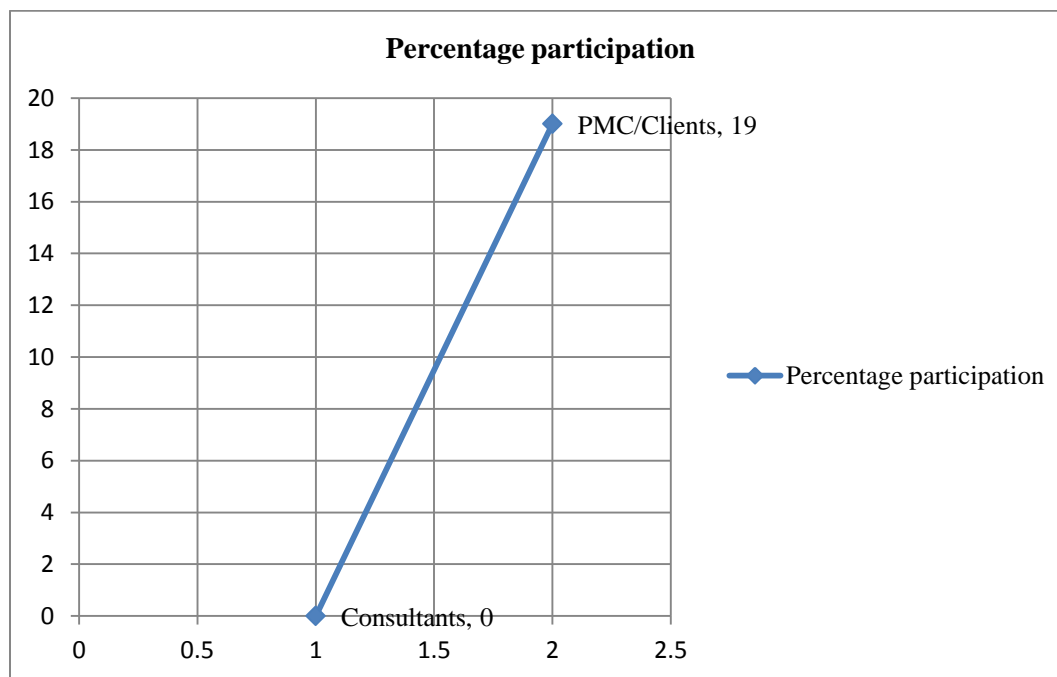


Figure 4.48 Graphical presentation of the percentage participation of parties in built environment management

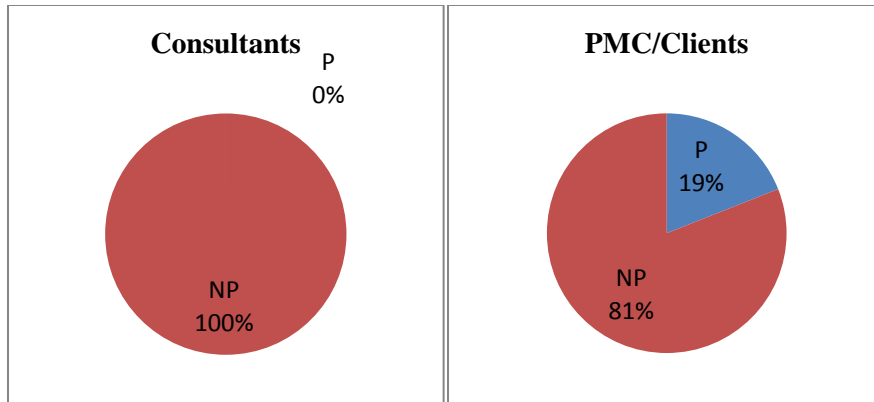


Figure 4.49 Percentage participation /non-participation of parties in built environment management

The results in Figures (4.48 & 4.49) show non-participation of the consultants in built environment management and only 19% participation of the PMC/Clients. The results indicate how a very essential practice was ignored in public building projects. The study established that the PMC/Clients were ignorant about the concept of built environment management. The parties seemed to have stopped their collaborative responsibilities once the project was practically completed and handed over to the PMC/Clients.

4.3.3.5 Summary of results on roles and responsibilities of construction parties

The study assessed the roles and responsibilities of each construction party in the construction process of public building projects. This was done to establish the level of involvement of each party in the construction process against the expected set up factors in construction management process. The construction phases considered were project initiation, project tendering process, project implementation and project built environment management. In each phase specific parties were assessed against the factors

that were considered mandatory for them in carrying out their specific roles and responsibilities. The results are summarized in the Table 4.21 and subsequent pie-charts.

Table 4. 21 Summary of the participation percentages on roles and responsibilities of construction parties of public building projects

Construction phase	Party's participation in percentages (%)			
	Consultants	Procurement officers	Contractors	PMC/Clients
Project Initiation	16	11		50
Project Tendering process	26	33		92
Project Implementation	18		43	26
Project as built environment management	0			19
Average ($\sum x/n$)	15	22	43	47

(Source: Field Survey 2017)

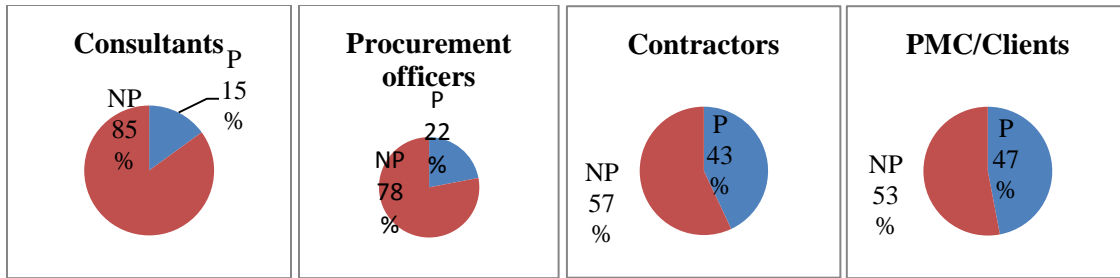
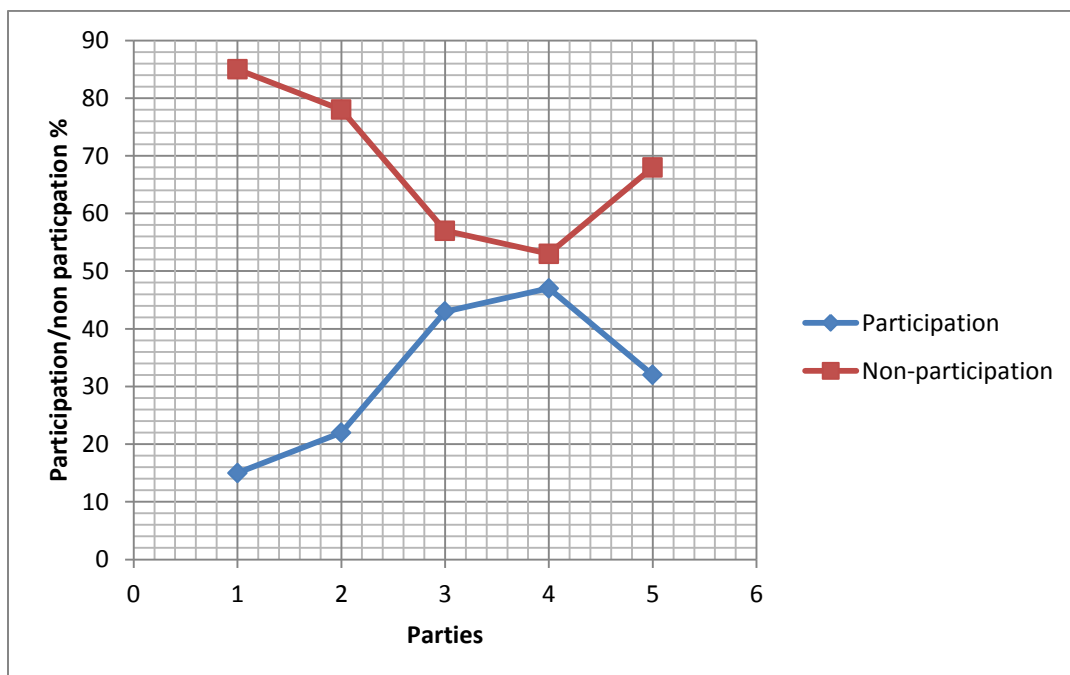


Figure 4.50 Summary of participation percentages of the construction parties in construction of public building projects



Party 1-consultants, Party 2-Procurement officers, Party 3- contractors, Party 4- PMC/Clients Party 5- mean participation

Figure 4.51 Graphical presentation on participation /non participation of the parties in construction process of the public building projects

The results in Figures (4.50 & 4.51) show that parties’ participation was below average (50%) for all parties. The consultants’ participation was at 15% which was very low showing how construction of public building projects were being constructed with

minimal involvement of the consultants (public works officers). At 15% participation of the consultants in a building project implied that the projects were constructed without proper design, supervision and technical input, such projects exhibit poor quality. At 22% of the procurement officers' participation show how procurement for public building projects was poorly done and the value for money was not realized as well as lack of proper financial management. In such scenario there was misappropriation of the funds which led to poor quality projects. Contractors' participation was at 43% and it was only in project implementation. This show how the contractors were not carrying out their obligations fully. They focused on operations that could appear to see them through mere completion of the projects. Critical activities of quality assurance and control such as adhering to building codes and material proportions, workmanship etc. were ignored. Such omissions led to poor quality projects. 47% involvement of the PMC/Clients shows how they were the main players in public building projects construction. They were expected to participate optimally in all phases of construction process, however, they participation dismally in project implementation and built environment management. Since they were the financiers of the projects, failure to participate fully in construction process, the quality of such projects was compromised due to skipping some critical technical and professional inputs from the consultants and other key personnel such as clerks of works. The results of the study found lack of compliance to professional construction process where the four parties involved none of them complied to even 50%. The highest was the party of PMC/Clients with 47%. The second was contractor with 43%. 15% and 22% compliance for the consultants and procurement officers respectively show lack of professionalism in the construction management process of the

public building projects. From graphical presentation the mean participation of the parties was at 32% which is inadequate for production of quality public building projects. 68% for non-participation of parties indicated how the construction of public building projects was being carried out without proper construction process. Failure to comply with professional construction process, automatically led to poor quality projects. The study therefore established that the roles and responsibilities of the construction parties have a great impact on the quality of the public building projects. Lack of full participation of construction parties in the construction of the public building project contributes negatively to the quality of such projects.

The show the similarities with the studies carried out in Hong Kong and Malaysia that found out that the participation of effective team and awareness of quality management by building team contribute positively towards the quality of the following projects (Abas et al, 2015). The results is also in agreement with the those of the studies carried out by Rad and Khosrowshahi (1998) that the three parties (client, contractor and local authorities) are key to quality if projects. Their full participation in project construction management process positively contributes towards the quality of the projects. Memon, Abro and Mugheri (2011) found out that lack of concern on quality of projects by both consultants and contractors is above 60% which contributes negatively towards the quality of the project. These results concur with the ones of this study.

4.4. Compliance to Building Specifications and Standards

This part provides data presentation, analysis, interpretation and discussion concerning the compliance to building specifications and standards by the construction parties.

4.4.1 Presentation

This part provides presentation of data concerning the level of compliance to the required specifications and standards as per the building code. The data presented was organized to cover the compliance to the approvals and registration by the authorized agencies in the building construction sector and compliance to practical implementation of the project by relevant parties in the industry. The presentation of data in this part was based on the real practice in field compared to the expected practice.

4.4.1.1 Project Design and Approvals

The study focused on the expected design standards and approvals before the practical construction the project. This was to establish the level of compliance by the clients to ensure that the project meets the standard requirements before commencement of the construction activities. Table 4.22 provides the factors considered in the project design and approvals.

Table 4.22 Factors Considered for Project Compliance to Design and Approvals

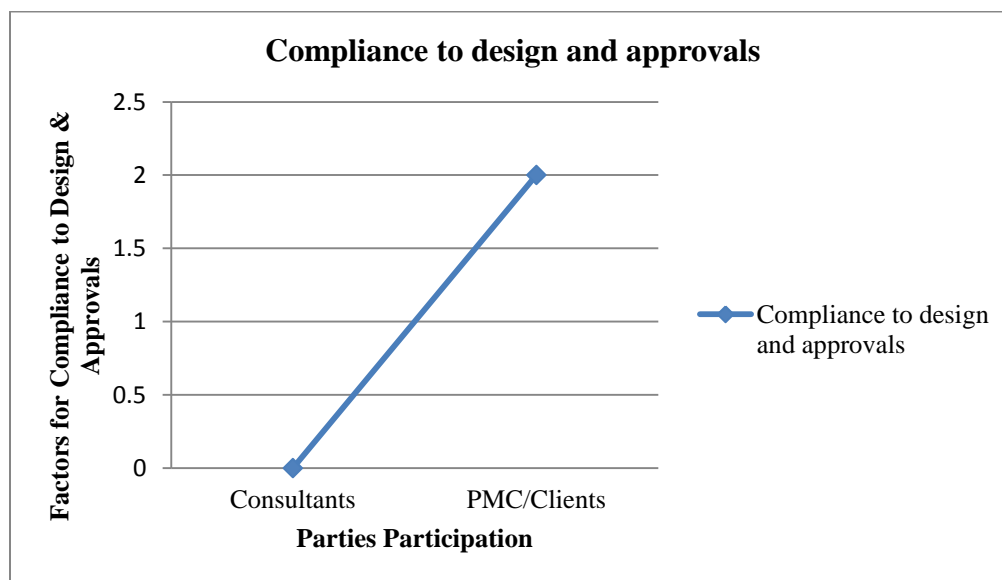
Theme	Factors considered	
Compliance to design and approvals	1	Site soil investigation
	2	Relevant design to suite the site
	3	Size of the rooms, windows, doors, wall thickness, slab thickness etc
	4	Approvals by physical planning department
	5	Approvals by public health department
	6	Approvals by public works department
	7	Approvals and registration by the County Government
	8	Approvals by NEMA
	9	Approvals and registration by NCA

Table 4.23 shows the summary of how respondents responded on the questions concerning the compliance to design and approvals. The (√) mark indicates that respondents in a given category are aware and practice the factors considered in the questionnaires whereas the contrary response is indicated by (χ) mark.

Table 4. 23 Responses for Compliance to Design and Approvals

Party	Factors								
	<u>Compliance to design and approvals</u>								
	1	2	3	4	5	6	7	8	9
Consultants	χ	χ	√	χ	χ	χ	χ	χ	χ
PMC/Clients	χ	χ	√	χ	√	χ	√	χ	χ
Remarks	Consultants/PMC/clients								

(Source: Field Survey 2017)

**Figure 4.52 Compliance to Design and Approvals**

4.4.1.2 Construction Period Compliance

The study focused on the expected construction standards and specifications during the construction process of the project. This was to establish the level of compliance by the clients, the contractors and consultants to ensure that the project meets the required standards during the construction process. Table 4.24 provides the factors considered in the construction process of the project.

Table 4. 24 Factors for Compliance to Building Code and Standards during Construction Process

Theme	Factors considered
Construction period compliance	1 Site preparation (site clearance and stripping)
	2 Excavation to the required depth/firm soil strata)
	3 Foundation requirements (concrete mix, leveling, foundation walling etc.)
	4 Material testing
	5 Super structure requirements (walling, window and door sizes, wall heights, roof work construction, roof covering materials)
	6 Finishes – wall and floor finishes
	7 Painting and decorations

Table 4.25 shows the summary of how respondents responded on the questions concerning the compliance to standards and specifications during the construction period. The (√) mark indicates that respondents in a given category are aware and practice the

factors considered in the questionnaires whereas the contrary response is indicated by (χ) mark.

Table 4.25 Responses for Compliance to Building Code and Standards during Construction Process

Party	Factors						
	<u>Compliance to specifications and standard during the construction</u>						
	1	2	3	4	5	6	7
Consultants	χ	χ	χ	χ	χ	χ	χ
contractors	χ	√	√	χ	√	√	√
Remarks	Consultants/Contractors						

(Source: Field Survey 2017)

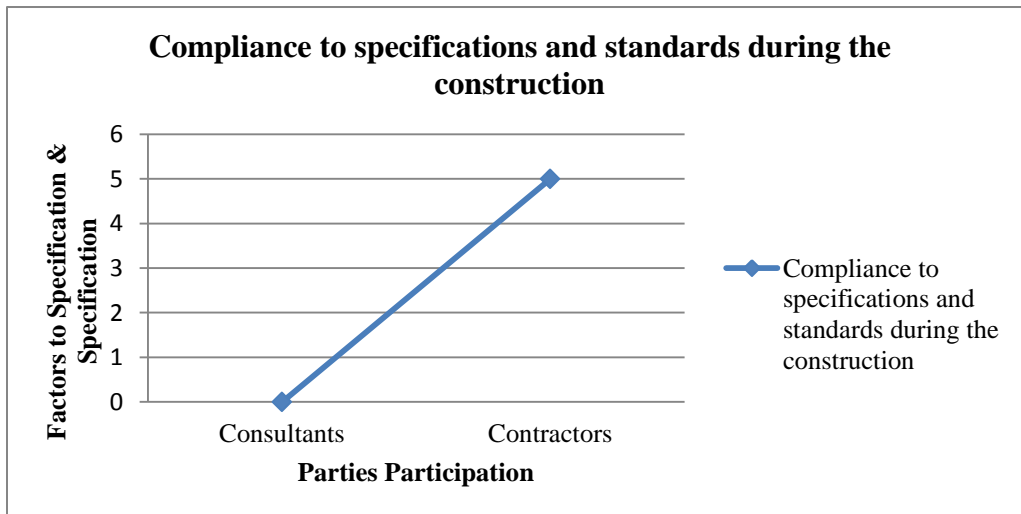


Figure 4.53 Compliance to Specifications and Standards during the Construction Period

4.4.2 Analysis

This part provides data analysis covered in the level of compliance to the required specifications and standards as per the building code. The data analysis was organized to cover the compliance to the approvals and registration by the authorized agencies in the building construction sector and compliance to practical implementation of the project by relevant parties in the industry.

4.4.2.1 Project Design and Approvals

The data analysis on compliance to project design and approvals focused on the parties that play critical role at this stage of construction process. The parties involved at this stage are the consultants and Project management committees/clients. The questionnaires covered nine well recognized factors considered as critical for project design and approvals. The factors were given one point for each and questionnaires scored accordingly. The results are given in **Table 4.26**.

Table 4. 26 The Scores for Project Design and Approvals

Party	Factors		Rank
	Compliance to design <u>and approvals</u>		
	expected	score	
Consultants	9	1	1/9
PMC/Clients	9	3	3/9
Total	18	4	4/18

(Source: Field Survey 2017)

4.4.2.2 Construction period compliance

The data analysis on compliance to procedures and practices during the construction period by the parties (consultants and contractors) was done in this section. The questionnaires covered seven well recognized factors considered as critical for compliance to specifications, standards and procedures during the construction period. The factors were given one point for each and questionnaires scored accordingly. The results are given in Table 4.27.

Table 4. 27 The Scores for Compliance to specifications/standards/procedures

Party	Factors		Rank
	<u>compliance to specifications and standards/procedures</u>		
	expected	score	
Consultants	7	0	0
Contractors	7	5	5/7
Total	14	5	5/14

(Source: Field Survey 2017)

4.4.2.3 Summary of Results for Compliance to Specifications and Standards

To assess the level of compliance to professional construction process in construction of public building projects by parties involved under devolved unit of Busia County in the Republic of Kenya, the chi-square goodness-of-fit-test was applied to the scores obtained from the questionnaires. The summary of the scores are presented in Table 4.28.

Table 4. 28 The Results for Compliance to Specifications and Standards

Stage	Score(O)	Expected (E)
Compliance to designs and approvals	4	18
Compliance to specifications/standards/procedures	5	14

(Source: Field Survey 2017)

From the scores, the researcher tested whether the parties in construction management comply with the specifications, standards and laid down procedures during the construction process of the public building projects under devolved units. The research claim was that the parties complied with specifications, standards and procures in the devolved construction management process of public building projects. At $\alpha=0.05$, the claim was tested.

The critical value was determined at the degree of freedom of $2-1=1$ and $\alpha=0.05$. The critical value = 3.841 (chi-square distribution tables-**Appendix VIII P. 259**).

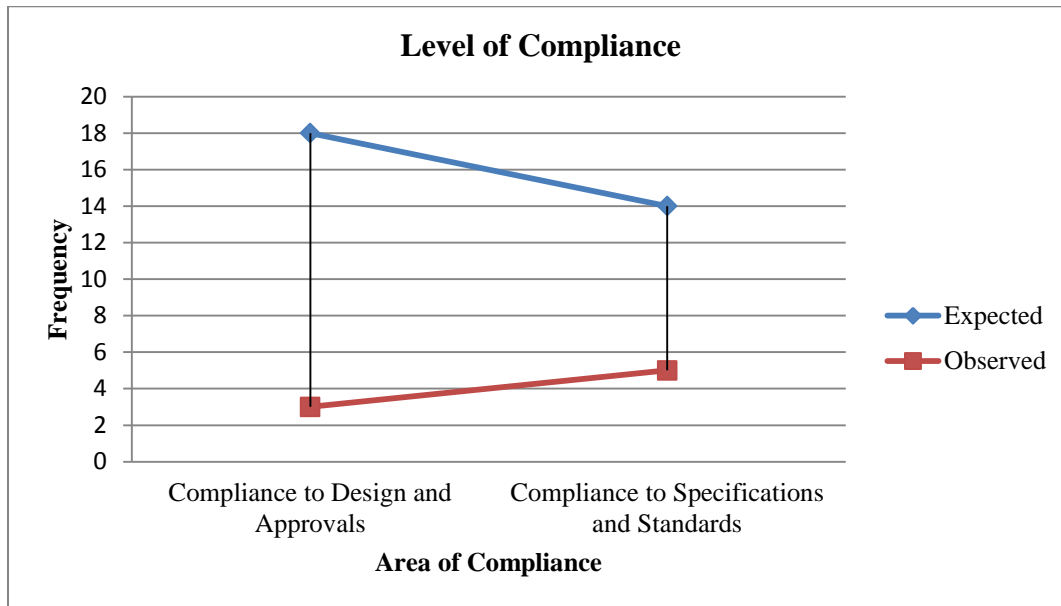
Table 4. 29 The Chi-Square source table for the results of level of compliance

Stage	Scores				
	Score(O)	Expected (E)	$O - E$	$(O - E)^2$	$\frac{(O - E)^2}{E}$
Compliance to designs and approvals	4	18	-14	196	10.89
Compliance to specifications/standards/procedures	5	14	-9	81	5.80
Total					<u>16.69</u>

(Source: Field survey 2017)

Decision: the decision was to reject the claim since $16.69 > 3.841$.

From the results there was enough evidence to reject the claim that parties in devolved construction management process complied with specifications, standards and procedures during the construction of public building projects by devolved units. The Figure 4.54 shows the observed graph is very much below the expected. The gap between the two graphs show how the results of the Chi-square test for goodness-of-fit-test is not a good fit.



NOT A GOOD FIT

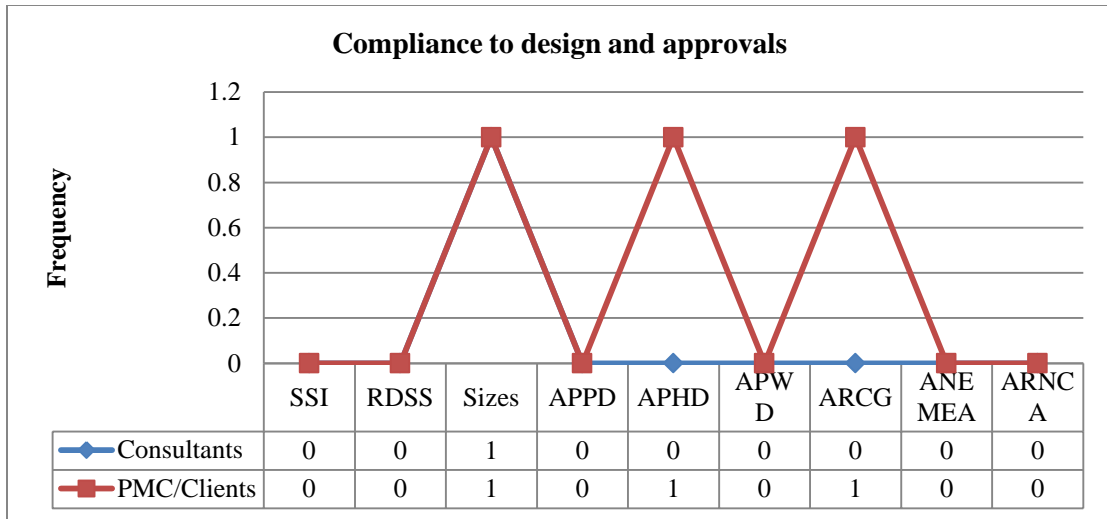
Figure 4.54 Results of the Goodness-of-Fit for Level of Compliance

4.4.3 Interpretation and Discussion

Compliance to specifications and standards is a measure of professionalism in construction process of the public building projects. It is also a measure of quality management and ensures that the primary objective of quality project is achieved. In examining the level of compliance to building specifications and standards, the study assessed 9 factors at the project design and approvals and 7 factors at the project construction period. The study put into consideration the expected practices in construction management process as the standard against which the compliance level of the constructions parties involved was assessed.

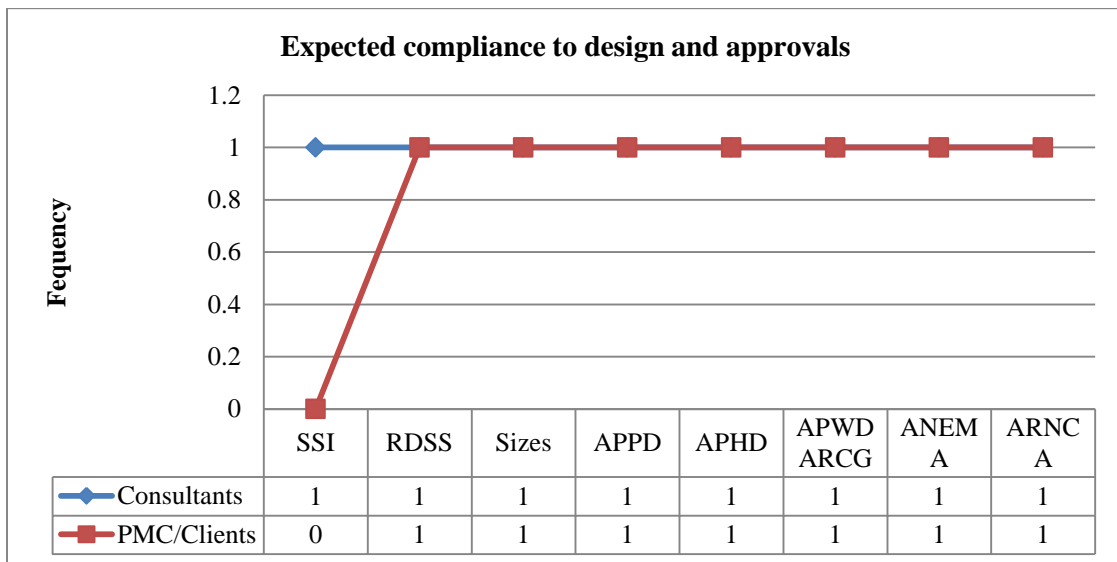
4.4.3.1 Compliance to Project Design and Approvals

Compliance to project design standards and approvals provides an opportunity to clear all malpractices and non-compliance before the practical construction of the project. This provides the client and the consultants an opportunity to shape the project to fit in both technical and financial demarcations of the project. The consultants have the opportunity to give professional input as well advising on alternative solutions to have the project meet the budgetary allocations. In assessing the compliance to project designs and approvals, the study assessed 9 factors; soil investigation, relevant design to suite the site, size, approval by physical planning, public health, public works, county government, NEMA and NCA. The results of the study are as shown in figure 4.55. The zero (0) score indicates lack of the activity by the party under compliance to design and approvals and one (1) score indicates the party carried out the activity. The consultants were involved in production of working drawings covered under the factor of size of rooms, windows, doors, wall thickness, slab thickness etc. The PMC/Clients were involved in seeking the working drawings and approval by the public health department and county government. The rest of the factors appeared strange to PMC/Clients. The Consultants were very much aware of the procedures of design and approvals however, were never requested for their input. The two parties were expected to work together to ensure that the right procedure on design and approvals were followed as shown in Figure 4.56. Failure to carry out soil investigation and design to suite the site indicated that the construction of the public buildings did not follow laid down design procedures which in turn compromise the quality. Lack of approvals by statutory agencies indicated illegal construction process which was risky.



SSI-Site Soil Investigation, **RDSS**-Relevant Design to Suite the Site, Sizes-of Rooms, windows, doors, walls thickness, slab thickness etc. **APPD**-Approvals by Physical Planning Department, **APHD**-Approval by Public Health Department, **APWD**-Approval by Public Works Department, **ARCG**-Approval and Registration by the County Government, **ANEMA**-Approval by NEMA, **ARNCA**-Approval and Registration by NCA.

Figure 4.55 Compliance to design and approvals



SSI-Site Soil Investigation, **RDSS**-Relevant Design to Suite the Site, Sizes-of Rooms, windows, doors, walls thickness, slab thickness etc. **APPD**-Approvals by Physical Planning Department, **APHD**-Approval by Public Health Department, **APWD**-Approval by Public Works Department, **ARCG**-Approval and Registration by the County Government, **ANEMA**-Approval by NEMA, **ARNCA**-Approval and Registration by NCA.

Figure 4.56 Expected compliance to design and approvals

4.4.3.2 Compliance during the construction Period

Construction period involves the operations that bring out the physical project. It is an implementation phase of the construction management process. The contractors and consultants are expected to work hand in hand to ensure the design is followed and the quality of the project is achieved. In assessing the compliance by the construction parties during the construction period, the study used 7 factors. They site preparation (site clearance and stripping), excavation, foundation requirements, material testing, super structure requirements, finishes and painting/decorations. The results of the study are as shown in Figure 4.57. The zero (0) score indicates lack of the activity by the party under compliance during the construction period and one (1) score indicates the party carried out the activity. The results show that the consultants were not involved during the construction period to check on compliance to the standards and specifications. They were left out of operations during the construction and yet it was a crucial phase that the consultants were required to be on site more frequently than before construction period. The contractors did not carry out site stripping on assumption that the operation was unnecessary yet it was essential to remove top soil before excavation of the trenches. The material testing was not done and therefore the material strength could not be established hence the quality of the project being compromised.

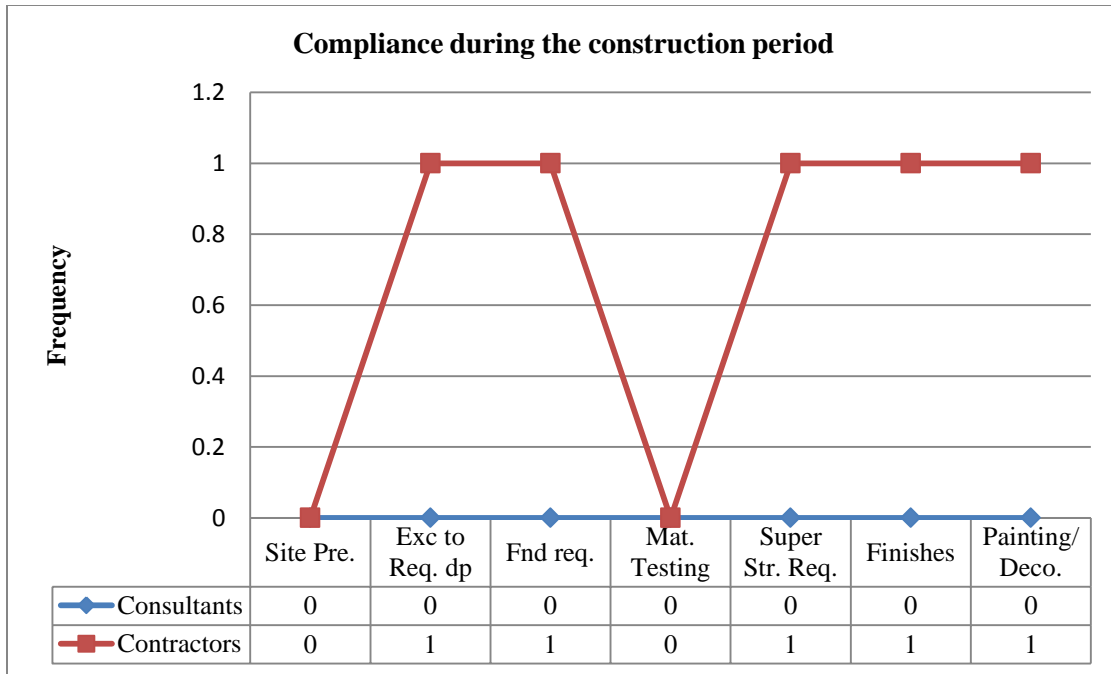


Figure 4.57 Compliance by the parties during the construction period

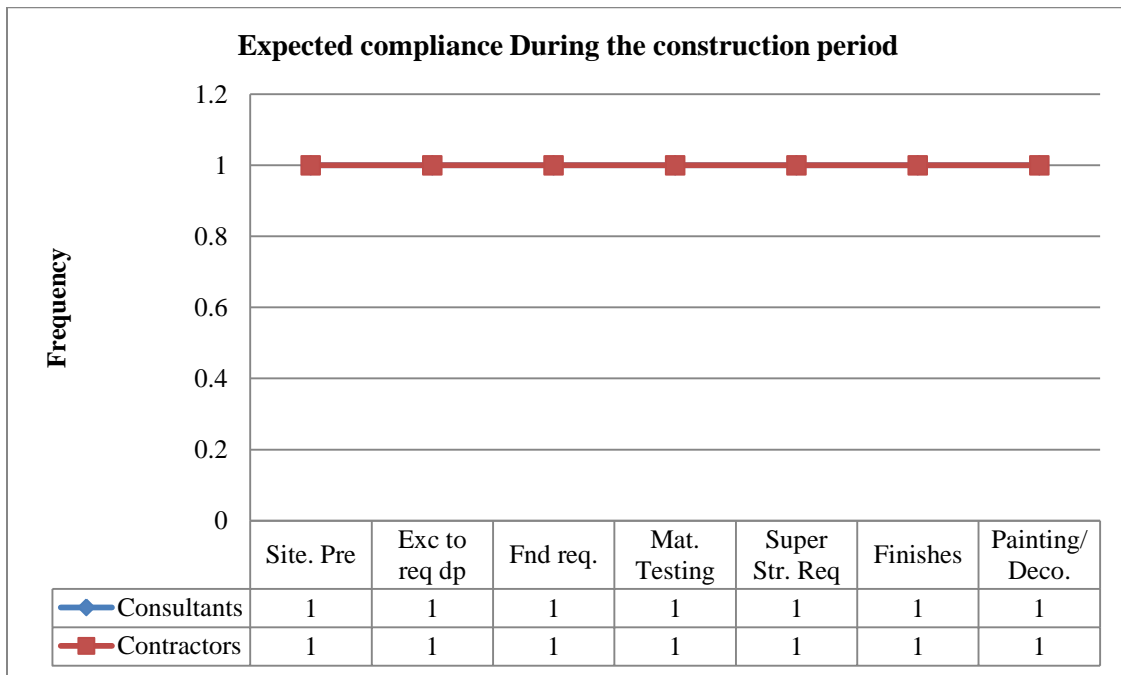


Figure 4.58 Expected to compliance by the parties during the construction period

4.3.3.3 Summary for compliance to building specifications and standards

The results on compliance to the building specifications and standards at the design and approval phase and during the construction period are summarized in the Figures (4.59 & 4.61). The consultants were expected to check on compliance both at the design/ approval and during the construction period. The results indicate that only one out of nine factors assessed at the design/approval stage involved the consultants. This represents 11% compliance on side of the consultants at the design and approval stage. The consultants' participation of checking and observing the compliance to building specifications and standards during the construction period was 0%. The PMC/Clients participated in observing compliance to building specifications and standards at the design and approval stage. The results show that they were involved in three out of eight factors representing 38%. The contractors were expected to ensure compliance to building specifications and standards during the construction period. The results show that they were involved in five out of seven factors assessed representing 71%.

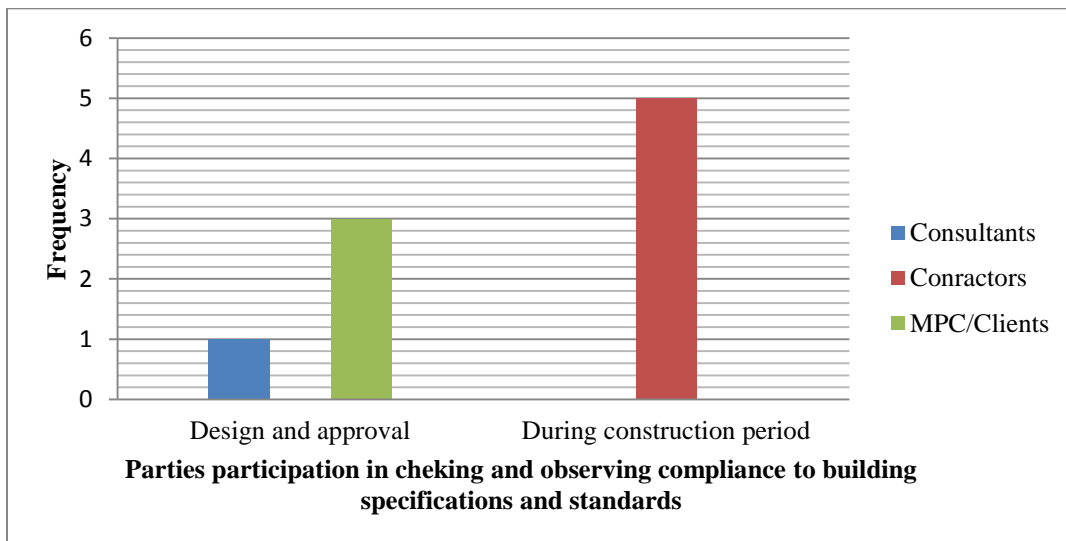


Figure 4.59 Parties' compliance to building specifications and standards

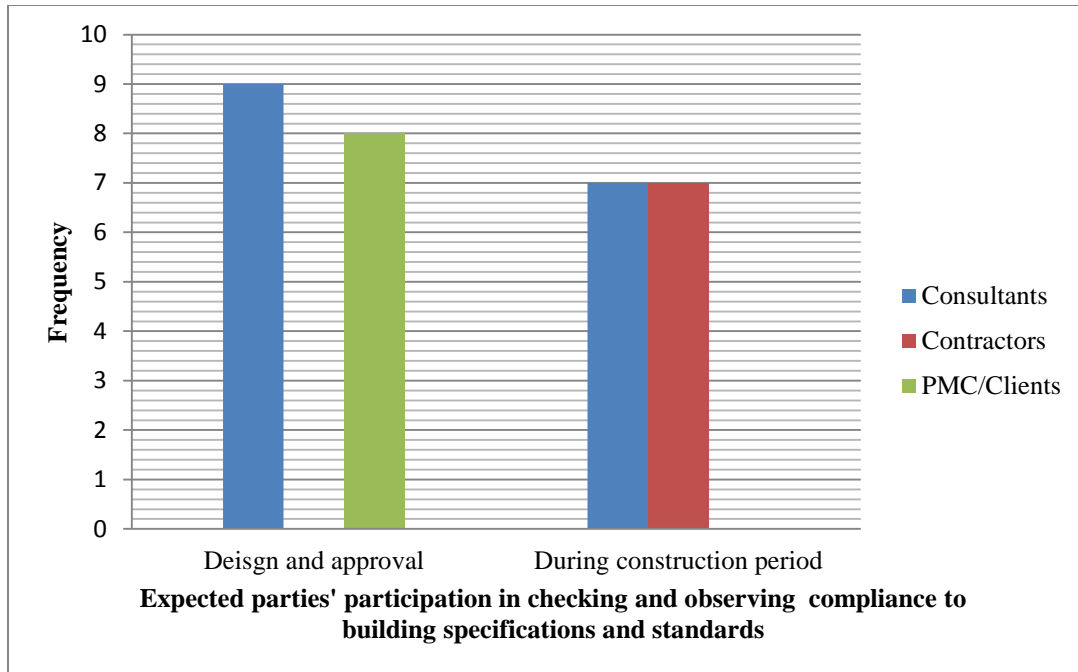


Figure 4.60 Expected Parties' compliance to building specifications and standards

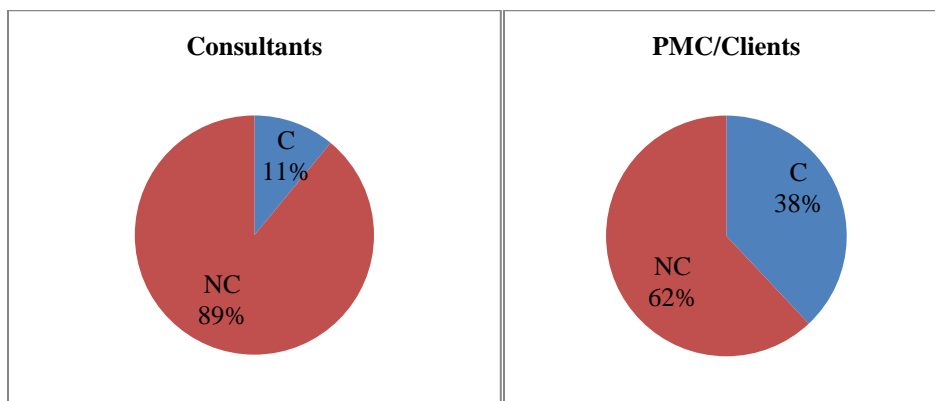


Figure 4.61 Percentage compliance by parties at the design and approval stage

The results in Figure 4.61 show that at the design and approval stage, consultants' compliance and non-compliance was at 11% and 89% respectively. The compliance by the PMC/Clients was at 38% and non-compliance was 62%. This compliance is inadequate and therefore the public building projects were designed and approved

without strict conformity to building specifications and standards. The design procedures were not followed and not all approvals by statutory agencies were carried out.

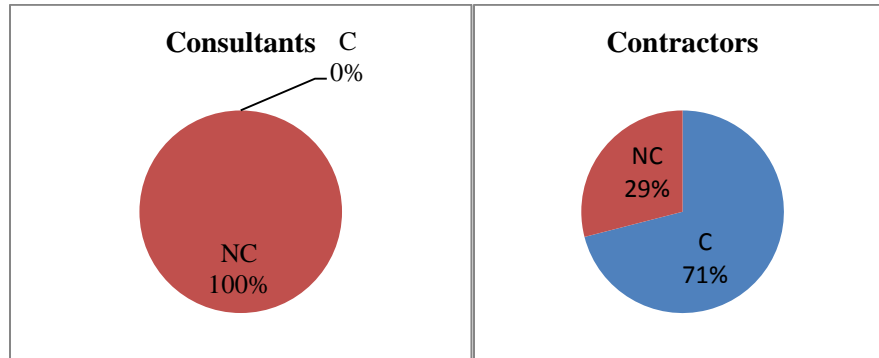


Figure 4.62 Percentage compliance by the parties during the construction period

The results in Figure 4.62 show that during the construction period, the two parties (consultants and contractors) were expected to participate fully in ensuring the compliance to building specifications and standards was observed. The study show that the consultants were not involved in observing adherence to the building specifications and standards during the construction period. The consultants' compliance was at 0% which showed that supervision and inspection were totally lacking during the construction period of the public building projects. The contractors' compliance was 71% which showed that the contractors were not fully compliance and needed the professional supervision and inspection for them to comply fully. The contractors' compliance was good enough; however there was need to strive at 100% compliance by involving the consultants who ensure the contractors' operations are in conformity with the laid down building specifications and standards.

In assessing the level of compliance to building specifications and standards, the results are summarized in the Table 4.30 and subsequent pie-charts.

Table 4.30 Summary of the compliance percentages to building specifications and standards by construction parties

Construction phase	Party's compliance in percentages (%)		
	Consultants	Contractors	PMC/Clients
Design and approvals	11	-	38
Construction period	0	71	-
Average ($\sum x/n$)	5.5(6)	71	38

(Source: Field Survey 2017)

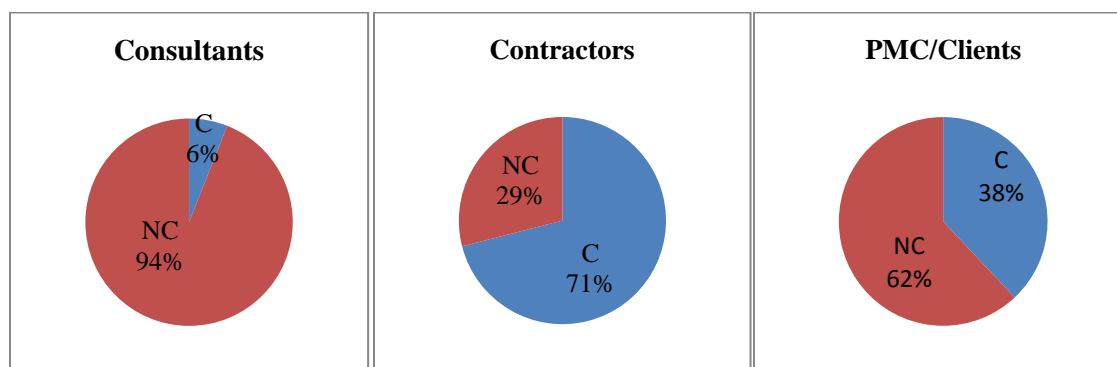
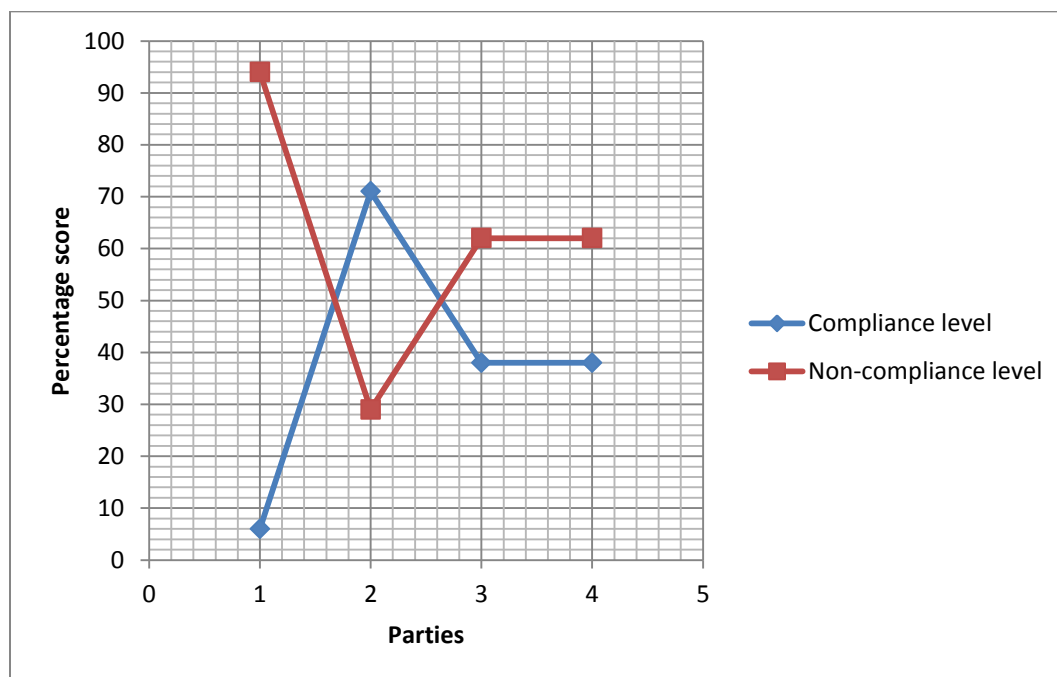


Figure 4.63 Parties' compliance percentage to building specifications and standards in the construction of the public building projects

The results in Figure 4.63 on compliance to building specifications and standards were a reflection of what practically took place in construction of public building projects. The consultants 6% show how the professional input had been ignored in the construction of public building projects funded by devolved funds. The contractors 71% show how they

have been left to work on their own without the professionals these eventually leads to lack of standards and failure to follow the building specifications. The PMC/Clients compliance of 38% indicates that they fail to utilize the professionals who are public works officers to provide the supervision and inspection of the construction process. The results show the failure to use the expected specifications and standards in the construction of public building projects. The results therefore revealed lack of quality management framework and policies that ensure the construction process conforms to the building code. In such construction process, the impact on the quality of the projects is negative.



Party 1-consultants, Party 2- Contractors, Party 3-PMC/Clients Party 4-Average compliance

Figure 4.64 Graphical presentation of parties on compliance

From the graphical presentation in Figure 4.64 only contractors had the compliance of above 50%. The other two parties had the compliance of below 50%. The results show

that the mean compliance for the parties is 38% and the non-compliance mean is 62%. The results indicate that the parties in construction fail to comply with the technical specifications and building standards. These results were in agreement with those found out that quality management by building team impacts the quality of the projects directly. Therefore the building team parties should be aware of quality management practices in order to produce quality projects (Memon, Abro and Mugheri, 2011). Sysoulath and Jakkow (2015) also found out that lack participation of parties in construction team effectively affects the timely supervision, quality inspection and control systems which leads to poor quality projects.

4.5 Legal Framework Guiding the Construction by the Devolved Units.

This part provides data presentation, analysis, interpretation and discussion concerning the legal framework guiding the construction process by the devolved units.

4.5.1 Presentation

This part provides presentation of data concerning the attempts by the devolved units (County Government) to have the policies, bills, acts, laws and regulations to guide the construction of public buildings financed by devolved funds. The part focused on the department of public works which is charged with responsibility of developing the policies, bills and regulations concerning construction sector in the county.

4.5.1.1 Policies, Bills, Acts and Regulations by Public Works Department

The study focused on the existence of policies, bills and regulations developed by the department of Public works. This was to establish the efforts by the devolved units in putting up measures that regulate and guide the construction sector activities in the

county. This was through document analysis. Table 4.31 provides the factors considered in the legal framework guiding the construction in the devolved units.

Table 4.31 Factors Considered for Legal Framework

Theme	Factors considered	
Legal framework	1	Policies on funding of public building projects
	2	Bills developed by the public works department
	3	Acts on construction sector
	4	Regulations developed by the department of public works on construction
	5	Design manuals
	6	Material testing manuals
	7	Supervision/inspection manuals
	8	Construction safety manuals

Table 4.32 shows the summary of how respondents responded on the questions concerning the legal framework to guide the construction sector in the county. The (\surd) mark indicates that respondents in a given category had the documents as per the factors considered in the questionnaires whereas the contrary response was indicated by (χ) mark.

Table 4.32 Responses for Legal Framework

Party	Factors							
	Availability of the legal documents or process for development of legal documents							
	1	2	3	4	5	6	7	8
Public works officers	χ	χ	χ	χ	χ	χ	χ	χ
Remarks	Public works officers							

(Source: Field Survey 2017)

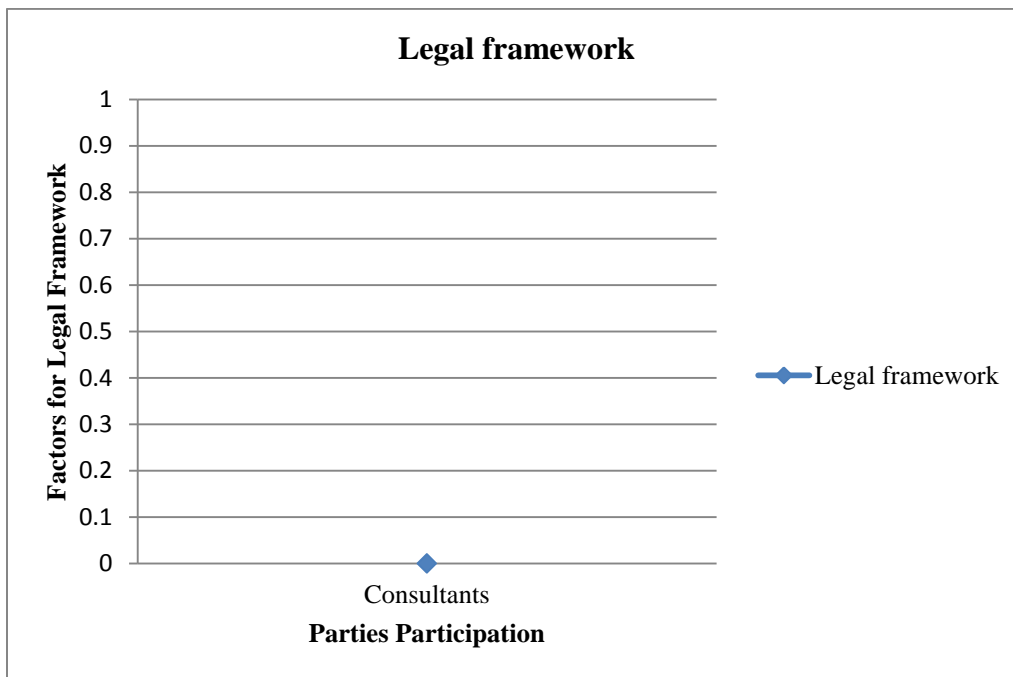


Figure 4.65 Legal Frame work established.

The graph shows that the consultants have not developed any bills, acts, regulations and policies to guide the construction sector at the county.

4.5.2 Analysis

This part provides analysis of data concerning the attempts by the devolved units (County Governments) to have the policies, acts, laws and regulations to guide the construction of public buildings financed by devolved funds. The part focused on the department of public works which is charged with responsibility of developing the policies, bills and regulations concerning construction sector in the county. The questionnaires covered eight well recognized factors considered as critical for legal framework guiding the construction sector. The factors were given one point for each and questionnaires scored accordingly. The results are given in Table 4.33.

Table 4. 33 The Scores for Legal Framework

Party	Factors		Rank
	Availability of legal documents or process of development of legal <u>documents</u>		
	expected	score	
Public works officers	8	0	0
Total	8	0	0

(Source: Field Survey 2017)

From the results in the Table 4.33 shows that the department of public works did not developed any policy, bills, acts and laws covering the construction sector at the county. The Figure 4.66 shows the observed graph is very much below the expected. The gap between the two points show how none of the eight factors were carried out by the department of public works at Busia County.

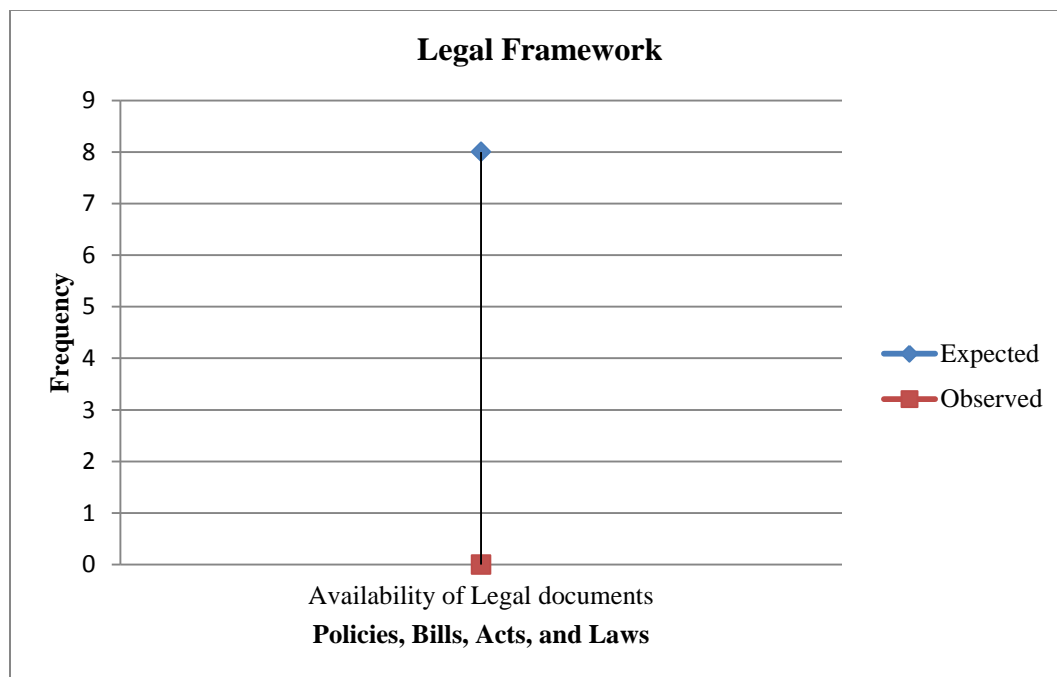


Figure 4.66 Results for the Legal Framework

4.5.3 Interpretation and Discussion

The devolved units (counties) are mandated by the constitution to develop the legal framework to guide the functions of the construction sector within their area of jurisdiction. The study endeavoured to establish the existence of county laws, acts, bills and policies concerning the construction of the public building projects. The department of public works, roads and transport is responsible for the development of laws, acts, bills and policies concerning the construction sector in the county. The study assessed eight

factors; policies on funding of public building projects, bills developed by public works department, acts on construction sector, regulations, design manuals, material testing manuals, supervision/inspection manuals and construction safety manuals. The results of the study are as shown in figure 4.67. The zero (0) score indicates lack of the evidence for the existence of legal documents by the party under legal framework guiding the construction sector and one (1) score indicates there was evidence for the existence of the legal documents. The results show lack of existence of the legal documents and construction manuals developed by the county government. The department of public works in Busia County had not developed policies, laws, bills, regulations and construction manuals to guide the operations of the construction sector. The department operates under the national laws which were violated by the political class whenever perceived to obstruct the political interest.

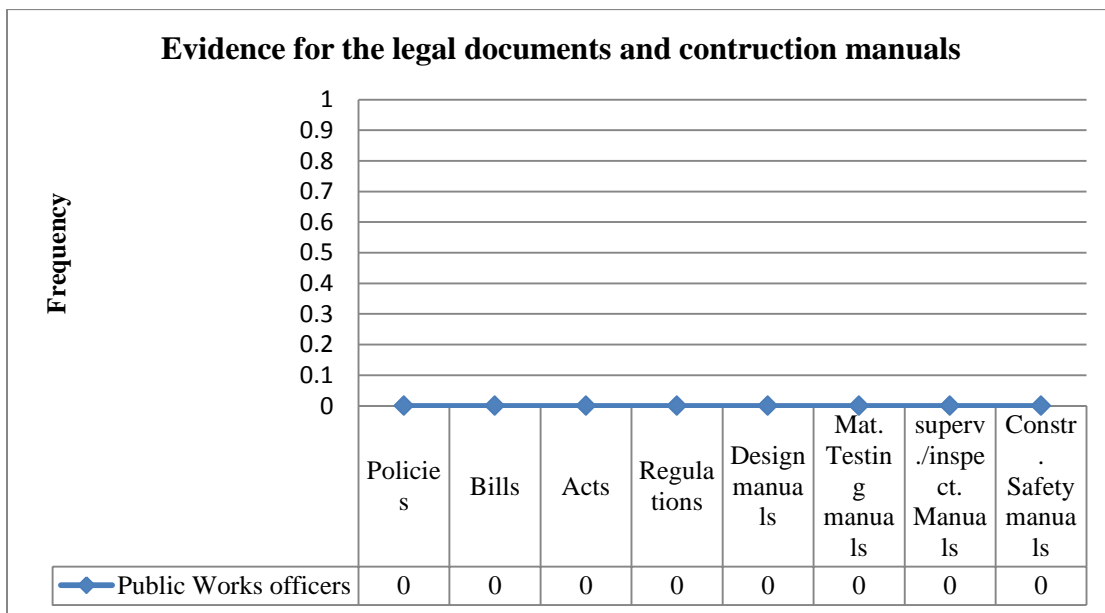


Figure 4.67 Public works officers' involvement in development of legal documents and construction manuals

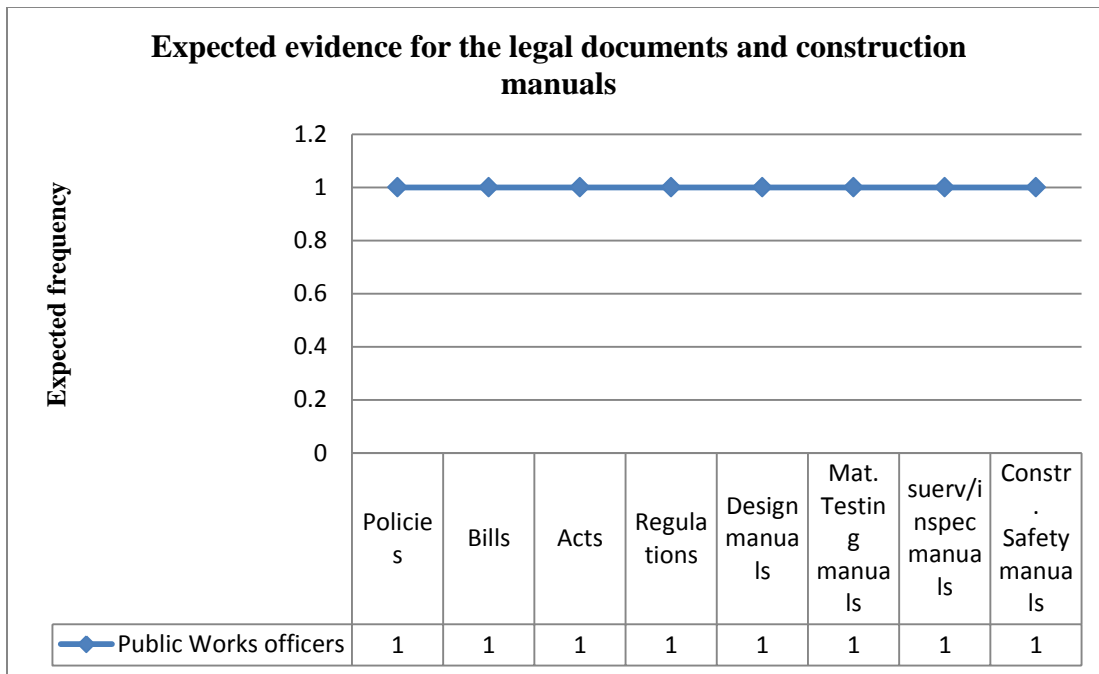


Figure 4.68 Expected Public works officers' involvement in development legal documents and construction manuals

The results show that there was lack of legal framework developed by the counties to guide the construction sector. This therefore implies that there were difficulties in enforcing the professional procedures in the construction management of the public building projects by devolved units. The reports on collapse of buildings in Kenya lack of legal framework to enforce procedural and professional construction management process (Lidonga, 2015 and Nyakiongora, 2015)

4.6 Physical Observation of the Selected Projects

This part provides data presentation, analysis, interpretation and discussion concerning the physical observation exercise carried out on eight selected projects.

4.6.1 Presentation

This section provides presentation of data obtained from the observations made by the researcher on selected projects. The section focused on the workmanship of the project. The observation covered the physical appearance of the structure. The observation was focused to the signs of failure (poor workmanship, cracks, lack of straightness, plumpness and level). Table 4.34 provides the factors considered during the physical observation exercise of the selected projects.

Table 4. 34 Factors Considered during the Physical Observation Process

Theme	Factors considered
Physical observation of the selected projects	1 Evidence of visible cracks and deformation of the structural members
	2 Evidence of exposed coarse aggregates in unfinished columns and beams
	3 Evidence of exposed reinforcement steel bars in unfinished columns/beams
	4 Evidence of lack of plumpness and leveling
	5 Evidence of lack of straightness
	6 Evidence of moisture rise (pilling of paints and moist/wet walls)
	7 Evidence of leaking roofs
	8 Quality of fittings (windows and doors)
	9 Quality of wall and floor finishes (type and workmanship)
	10 Quality of painting (grade of paint used)

Table 4.35 shows the summary of observation results. The (\surd) mark indicates that the evidence of the factor considered was seen, whereas the contrary observation was indicated by (χ) mark. In case the absence of the evidence was positive and was given the score.

Table 4. 35 The Scores Obtained from Physical Observation of the Projects

Projects	Factors									
	1	2	3	4	5	6	7	8	9	10
1	χ	χ	χ	\surd	\surd	\surd	χ	χ	χ	χ
2	\surd	χ	χ	\surd	\surd	\surd	\surd	\surd	\surd	\surd
3	\surd	χ	\surd	χ	χ	\surd	\surd	\surd	\surd	\surd
4	\surd	\surd	\surd	\surd	\surd	\surd	χ	\surd	\surd	\surd
5	\surd	χ	χ	\surd	\surd	\surd	χ	\surd	\surd	\surd
6	χ	χ	χ	χ	χ	\surd	\surd	χ	χ	χ
7	\surd	\surd	\surd	\surd	\surd	\surd	χ	\surd	\surd	\surd
8	\surd	χ	χ	\surd	\surd	\surd	\surd	\surd	\surd	\surd

(Source: Field Survey 2017)

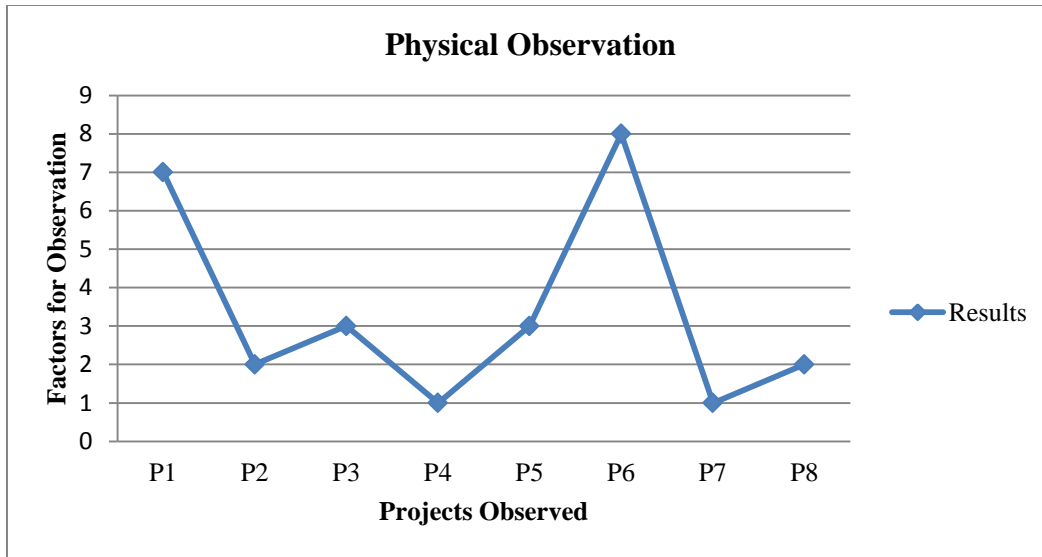


Figure 4.69 Physical Observation on evidence of poor quality factors

4.6.2 Analysis

This part provides analysis of data obtained from the observations made by the researcher on selected projects. The observation was focused to the signs of failure (poor workmanship, cracks, lack of straightness, plumpness and level). The observation checklist covered ten well recognized factors considered as critical for physical observation. The factors were given one point for each and observation check list scored accordingly. The results are given in Table 4.36.

Table 4. 36 The Scores Obtained from the Physical Observation

Projects	Factors		Rank
	Evidence of signs for failure/poor quality		
	expected	score	
1	10	7	7/10
2	10	2	2/10
3	10	3	3/10
4	10	1	1/10
5	10	3	3/10
6	10	8	8/10
7	10	1	1/10
8	10	2	2/10
Total	80	27	27/80

(Source: Field Survey 2017)

To make physical observation of some of the public building projects funded by devolved funds and determine the level of compliance to building specifications and standards (quality), eight projects were selected for observation. Ten factors on the observation checklist were used in the observation process. The chi-square goodness-of-fit-test was

applied to the scores obtained from the observation check list. The summary of the results are presented in table 4.37.

Table 4.37 The Results for Physical Observation

Projects	Factors	
	expected	score
	Evidence of signs for <u>failure/poor quality</u>	
1	10	7
2	10	2
3	10	3
4	10	1
5	10	3
6	10	8
7	10	1
8	10	2

(Source: Field Survey 2017)

From the scores, the researcher tested whether there was evidence of signs of poor quality in the selected eight projects. The research claim was that there was no evidence of signs of poor quality exhibited by the projects that were physically observed against the factors in the observation checklist. At $\alpha=0.05$, the claim was tested. The critical value was

determined at the degree of freedom of $8-1=7$ and $\alpha=0.05$. The critical value = 14.067 (chi-square distribution tables-**Appendix VIII P. 259**).

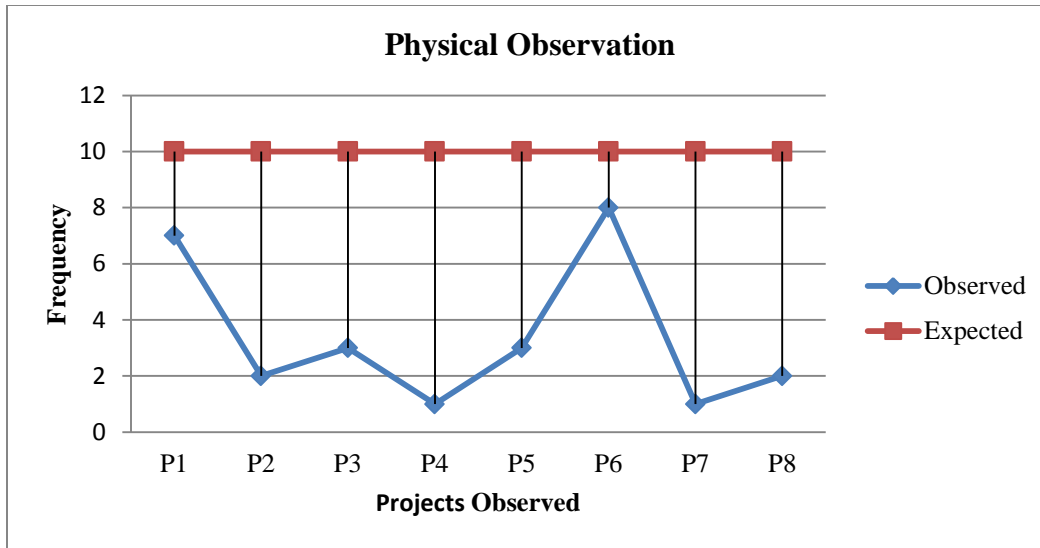
Table 4. 38 The Chi-Square source table for the results of Physical Observation

Project	Score(O)	Expected (E)	$O - E$	$(O - E)^2$	$\frac{(O - E)^2}{E}$
1	7	10	-3	9	0.9
2	2	10	-8	64	6.4
3	3	10	-7	49	4.9
4	1	10	-9	81	8.1
5	3	10	-7	49	4.9
6	8	10	-2	4	0.4
7	1	10	-9	81	8.1
8	2	10	-8	64	6.4
Total					<u>40.1</u>

(Source: Field survey 2017)

Decision: the decision was to reject the claim since $40 > 14.067$

From the results there was enough evidence to reject the claim that there was no evidence of poor quality signs exhibited by the projects that were physically observed against the factors in the observation checklist.



NOT A GOOD FIT

Figure 4.70 Results of the Goodness-of-Fit Test for the Physical Observation of selected projects

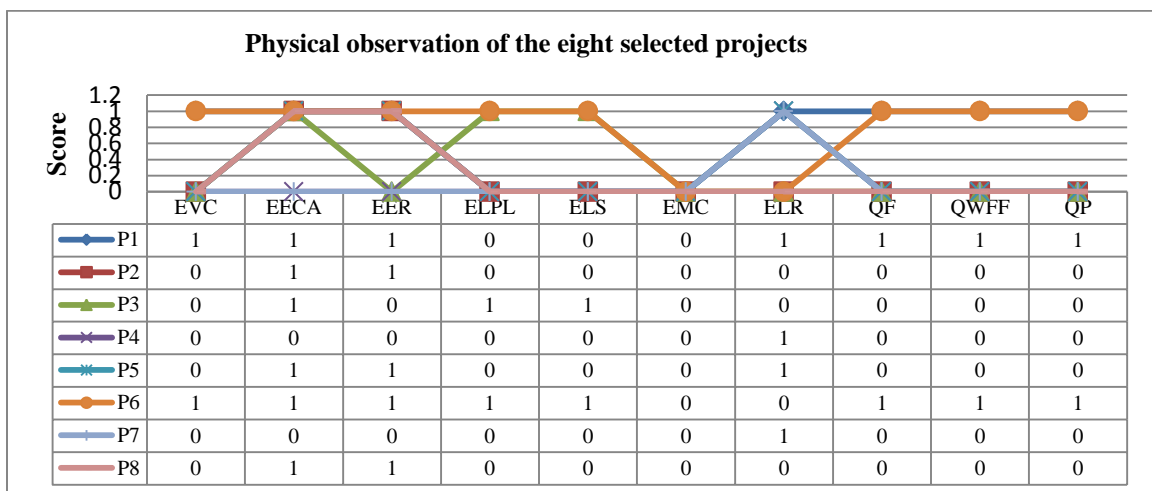
4.6.3 Interpretation and Discussion

The study assessed a few selected projects for physical observation exercise. Eight projects were selected. One project was selected from each of the seven constituencies and one from the county projects for the exercise of physical observation. The results were summarized and shown in Figure 4.71. Ten factors were used as the check list for physical observation exercise. The factors assessed are as follows:

- i) Evidence of visible cracks and deformation of the structural members
- ii) Evidence of exposed coarse aggregates in unfinished columns and beams
- iii) Evidence of exposed reinforcement steel bars in unfinished columns/beams

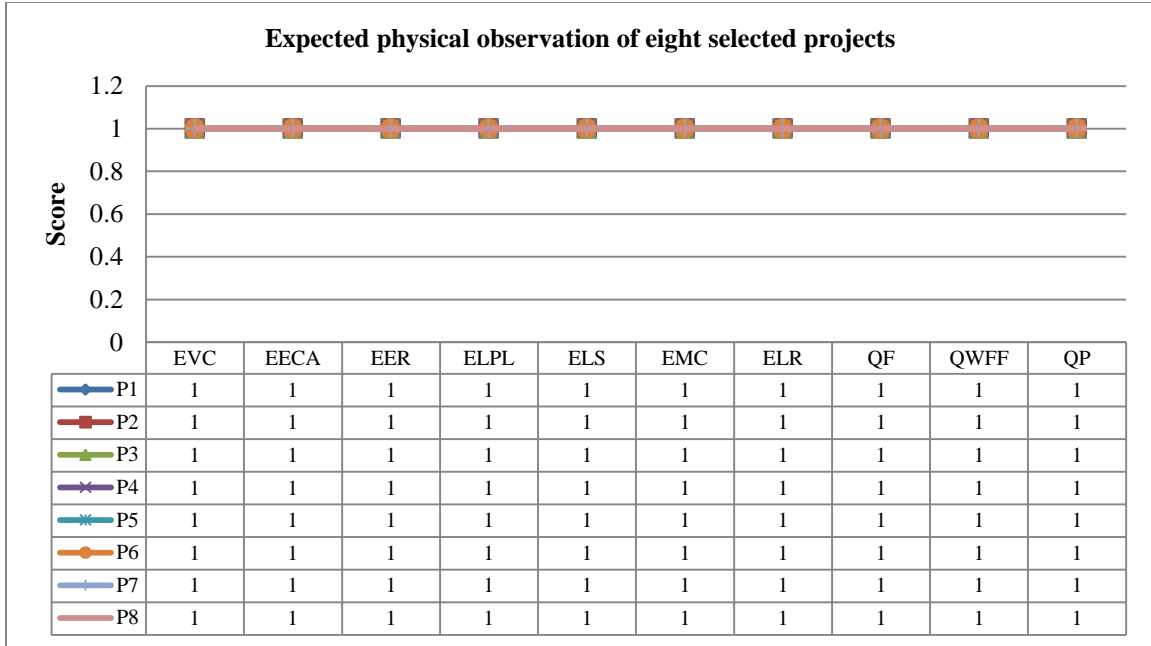
- iv) Evidence of lack of plumpness and leveling
- v) Evidence of lack of straightness
- vi) Evidence of moisture rise (peeling of paints and moist/wet walls)
- vii) Evidence of leaking roofs
- viii) Lack of quality of fittings (windows and doors)
- xi) Lack of quality of wall and floor finishes (type and workmanship)
- x) Lack of quality of painting (grade of paint used)

The zero (0) score indicates observed evidence for the existence factors assessed in the study and one (1) score indicates lack of evidence for the existence of the factors assessed.



EVC-Evidence of cracks and deformation of structural members, **EECA**- Evidence of exposed coarse aggregates in unfinished columns and beams, **EER**- Evidence of exposed reinforcement steel bars in unfinished columns/beams, **ELPL**- Evidence of lack of plumpness and leveling, **ELS**- Evidence of lack of straightness, **EMC**- Evidence of moisture rise (pilling of paints and moist/wet walls), **ELR**- Evidence of leaking roofs, **QF**- Quality of fittings (windows and doors), **QWFF**- Quality of wall and floor finishes (type and workmanship), **QP**- Quality of painting (grade of paint used).

Figure 4.71 Physical observation of the eight selected projects



EVC-Evidence of cracks and deformation of structural members, **EECA**- Evidence of exposed coarse aggregates in unfinished columns and beams, **EER**- Evidence of exposed reinforcement steel bars in unfinished columns/beams, **ELPL**- Evidence of lack of plumpness and leveling, **ELS**- Evidence of lack of straightness, **EMC**- Evidence of moisture rise (pilling of paints and moist/wet walls), **ELR**- Evidence of leaking roofs, **QF**- Quality of fittings (windows and doors), **QWFF**- Quality of wall and floor finishes (type and workmanship), **QP**- Quality of painting (grade of paint used).

Figure 4.72 Expected physical observation outcome on eight select projects

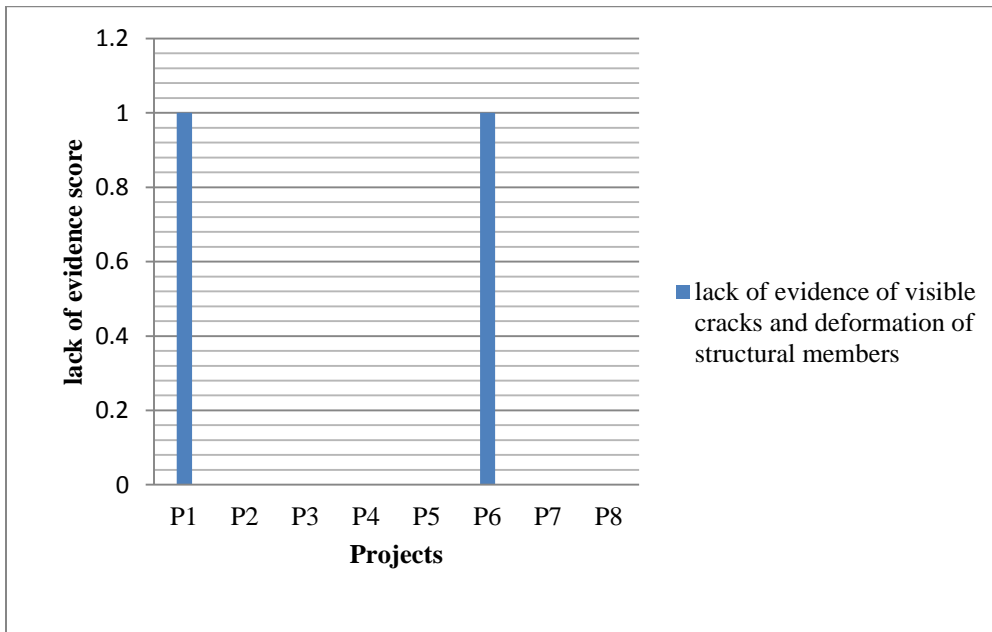


Figure 4.73 Evidence for visible cracks and deformation of the structural members

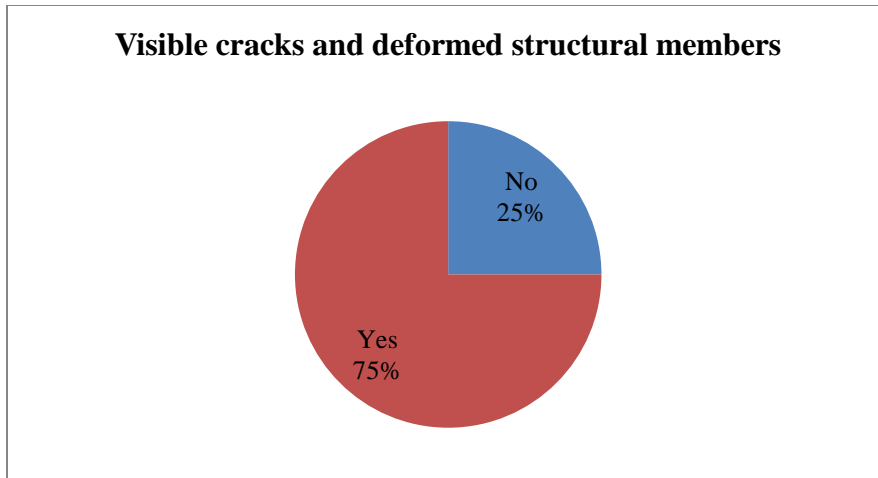


Figure 4.74 Percentage of projects with visible cracks and deformed structural members

The results in Figure 4.73 show that only two projects (P1 and P6) did not show the evidence of visible cracks and deformed structural members. This represents 25% of the projects as shown in Figure 4.74. Therefore 75% of the projects showed evidence of visible cracks and deformed structural members. This showed that 75% of the public building projects exhibit poor quality as far the material proportions and workmanship were concerned.

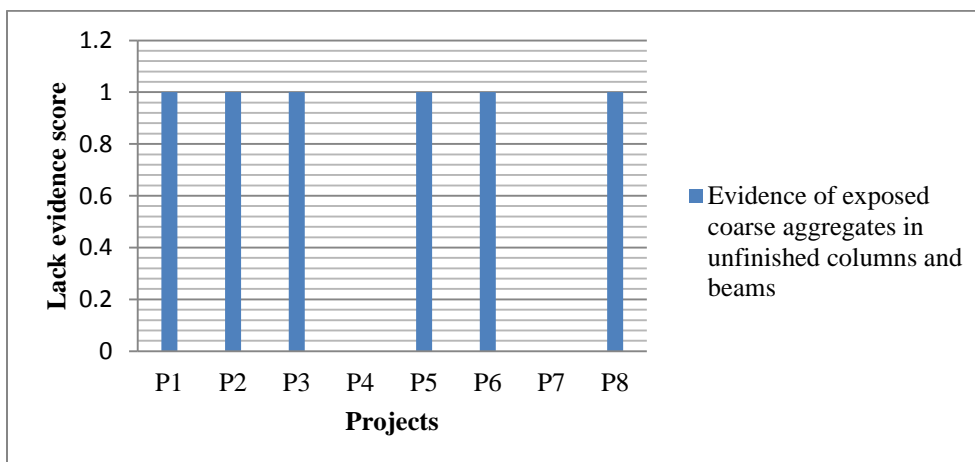


Figure 4.75 Evidence of exposed coarse aggregates in unfinished columns and beams

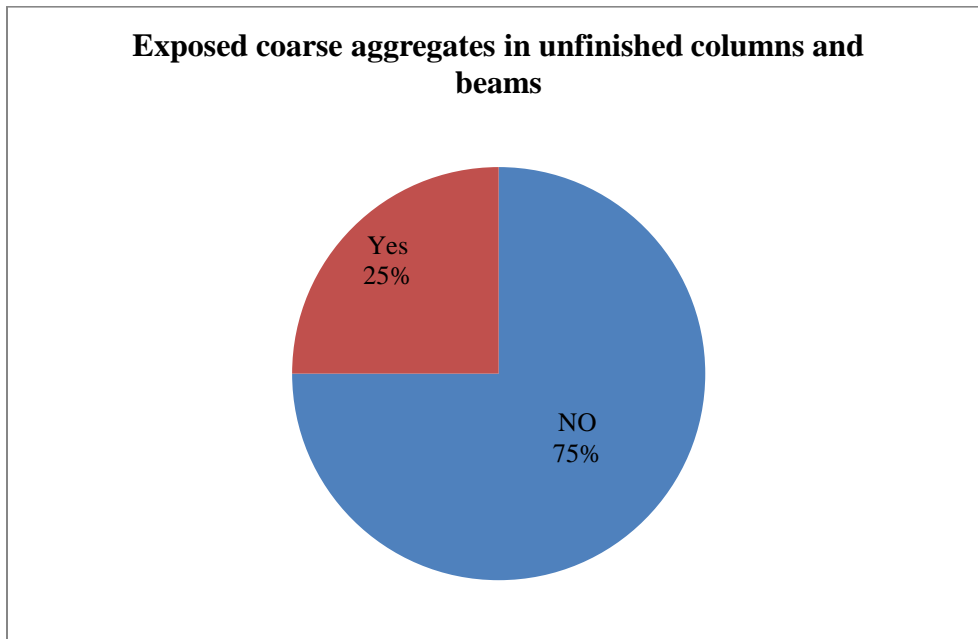


Figure 4.76 Percentage of projects with exposed coarse aggregate in unfinished columns and beams

The results in Figure 4.75 show that two projects (P4 and P7) had exposed coarse aggregates in unfinished columns and beams. This represents 25% of the projects under study as indicated in figure 4.76. The remaining 75% of the projects did not have the exposed coarse aggregates. These results did not show the true position in the assessment because those projects that had been finished could not be assessed under this factor. The results show that 25% of the project assessed exhibited poor workmanship and poor concrete mix.

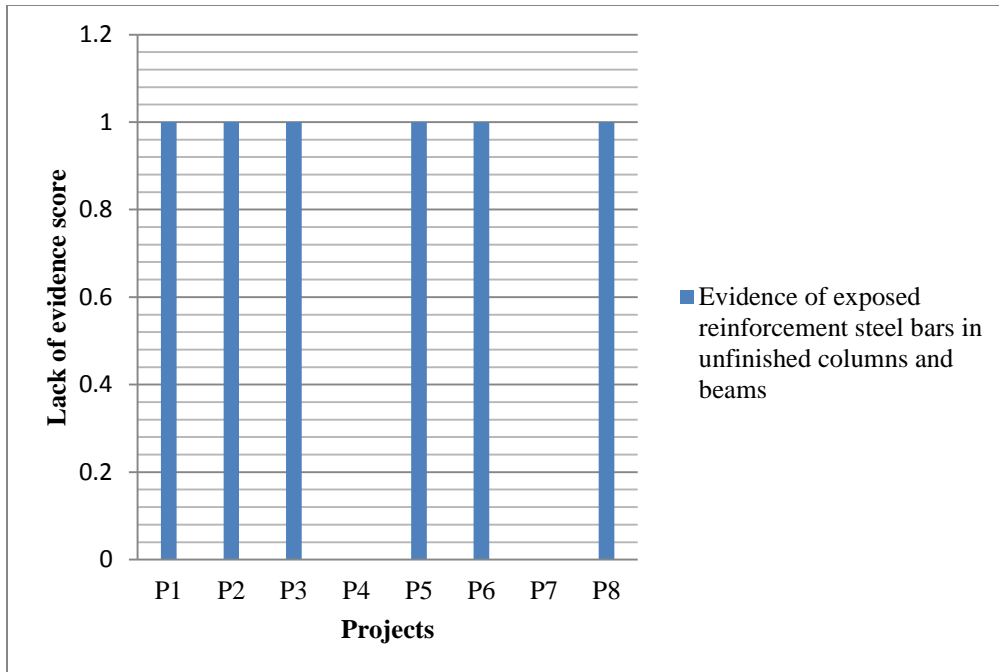


Figure 4.77 Evidence of exposed reinforcement steel bars in unfinished columns and beams

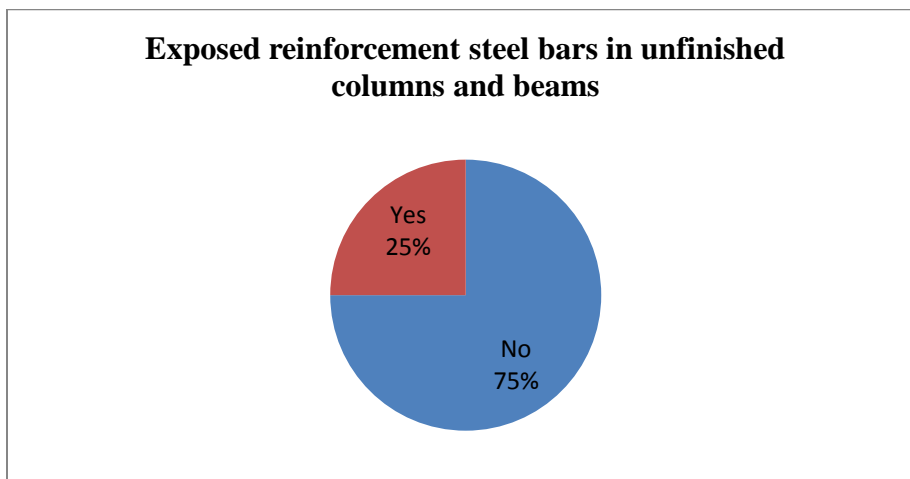


Figure 4.78 Percentages of projects with exposed reinforcement steel bars in unfinished columns and beams

The results in Figure 4.77 show that two projects (P4 and P7) had exposed reinforcement steel bars in unfinished columns and beams. This represents 25% of the projects under

study as indicated in Figure 4.78. The remaining 75% of the projects did not have the exposed reinforcement steel bars. These results did not show the true position in the assessment because those projects that had been finished could not be assessed under this factor. The results show that 25% of the project assessed exhibited poor workmanship and poor concrete mix. These results were similar to those for exposed coarse aggregates in unfinished columns and beams.

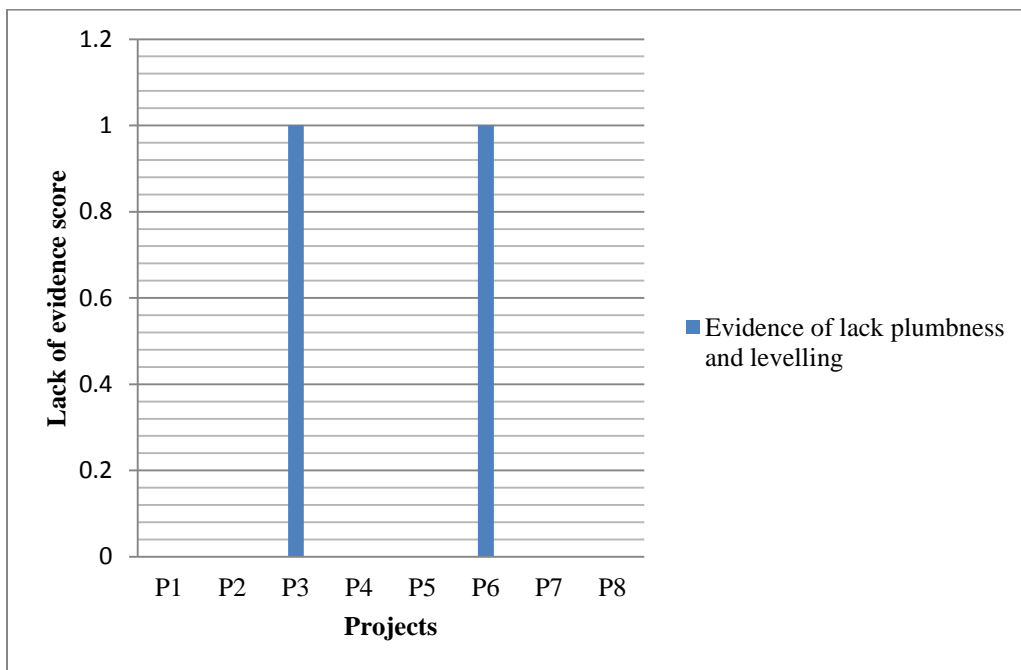


Figure 4.79 Evidence for lack of plumpness and leveling

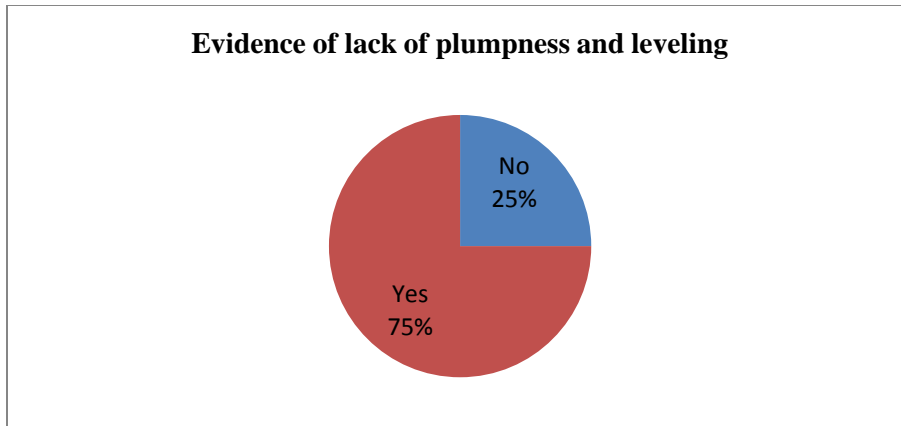


Figure 4.80 Percentages of projects with evidence of lack of plumpness and leveling

The results in figure 4.79 show that two projects (P3 and P6) were plump and level. The remaining six projects showed evidence that they were not plump and level. The projects with required plumpness and levels formed 25% and 75% of the projects therefore failed to acquire the required plumpness and levels as shown in figure 4.80. The results showed evidence of poor workmanship by the operatives.

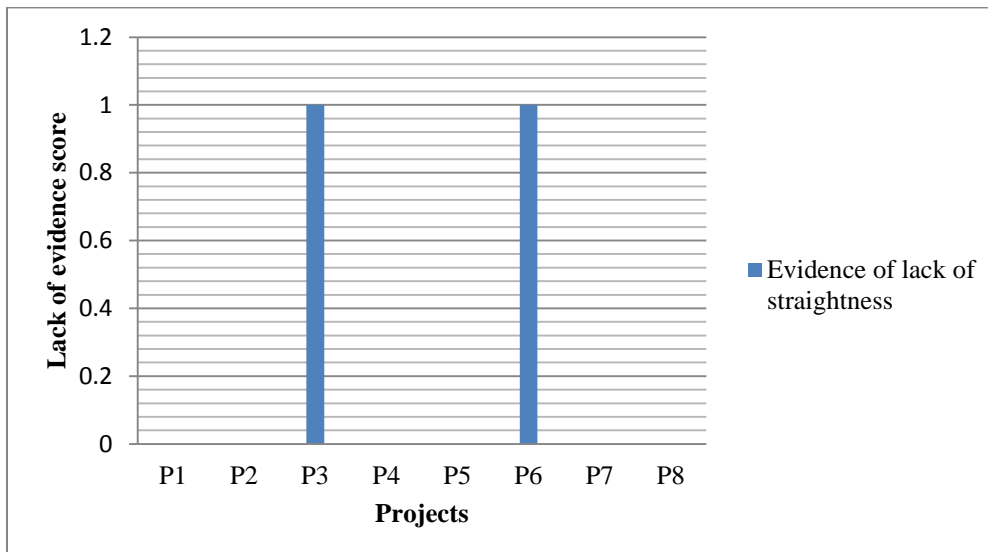


Figure 4.81 Evidence of lack of straightness

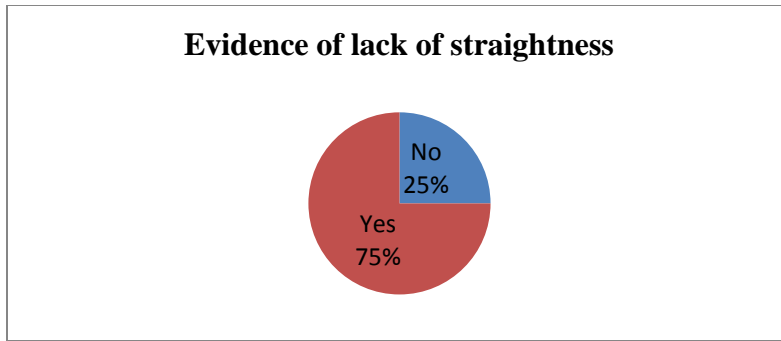


Figure 4.82 Percentage of projects showing lack of straightness

The results in figure 4.81 show that two projects (P3 and P6) were straight. The remaining six projects showed evidence of lack of straightness. The projects with required straightness formed 25% and 75% of the projects therefore failed to acquire the required straightness as shown in figure 4.82. The results showed evidence of poor workmanship by the operatives. These results were similar to those for lack of plumpness and leveling.

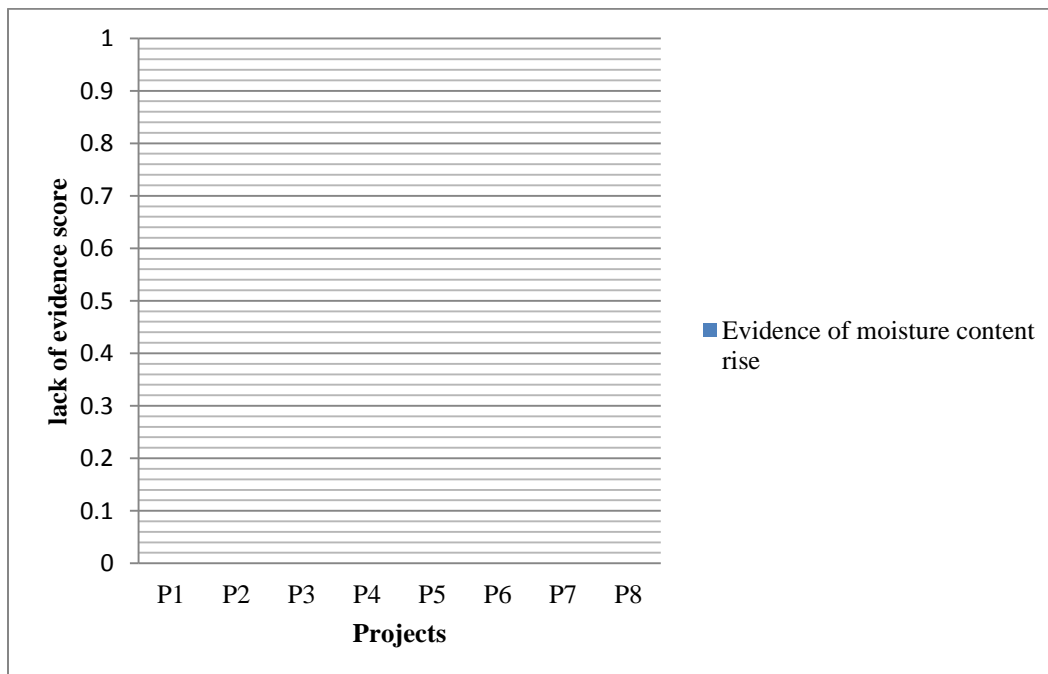


Figure 4.83 Evidence of moisture content rise

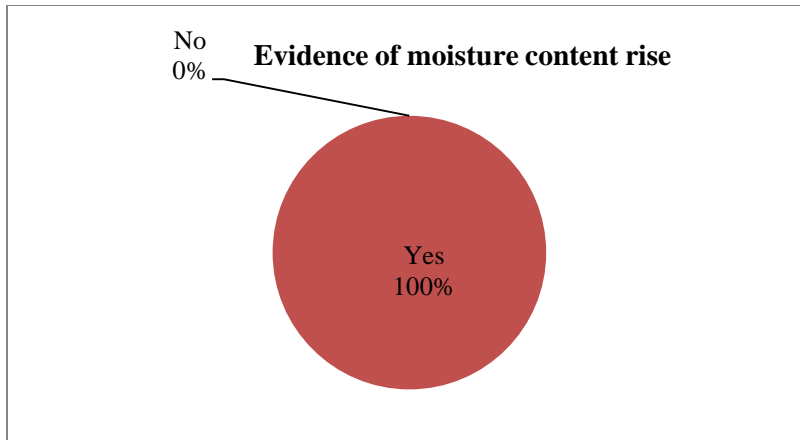


Figure 4.84 Percentage of projects with evidence of moisture content rise

The results in Figure 4.83 show that all projects had evidence of moisture content rise on walls. Therefore 100% of the projected assessed had signs that showed evidence of moisture content rise as shown in Figure 4.84. The results implied that all projects did not have adequate damp proofing materials.

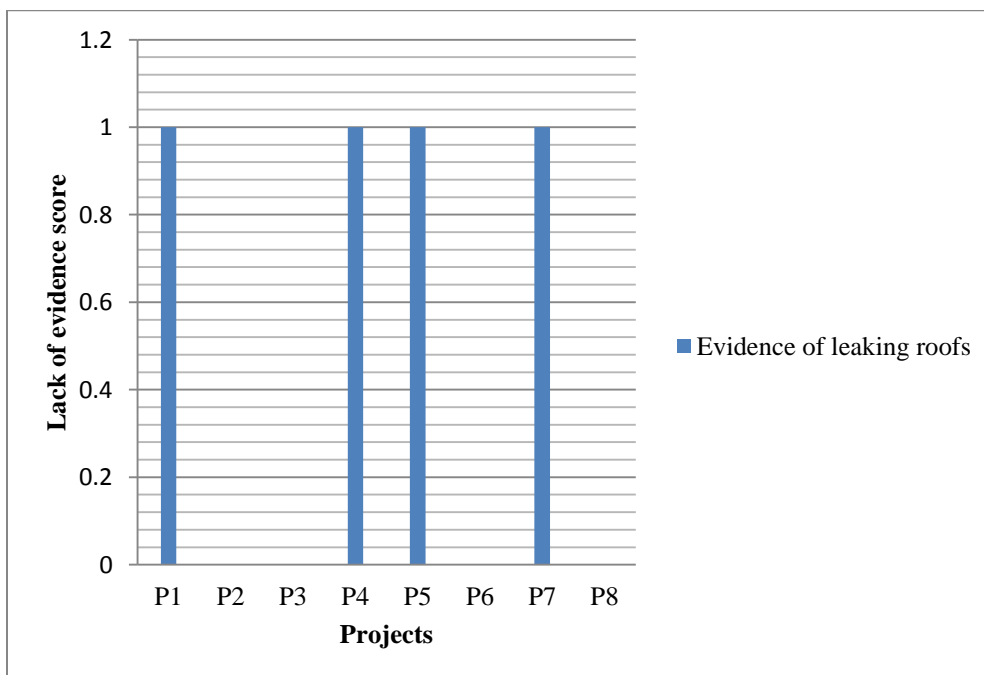


Figure 4.85 Evidence of leaking roofs

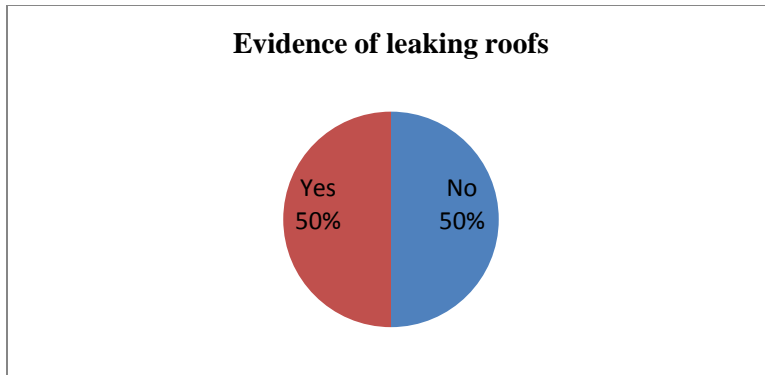


Figure 4.86 Percentage of the projects with evidence of leaking roofs

The results in Figure 4.86 show that four projects had evidence of leaking roofs. The results in figure 4.86 show that 50% of the projects showed the evidence of leaking roofs. The roofs were made of timber frame work and galvanized corrugated iron sheets/ pre-painted corrugated iron sheets. This was as a result of poor workmanship in roof work.

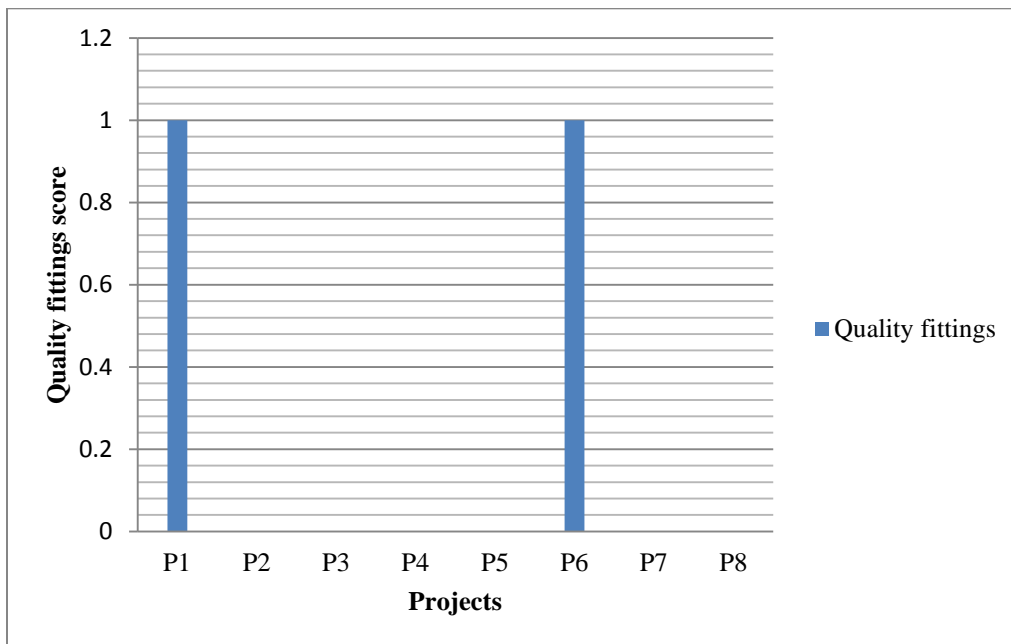


Figure 4.87 Lack of quality fittings

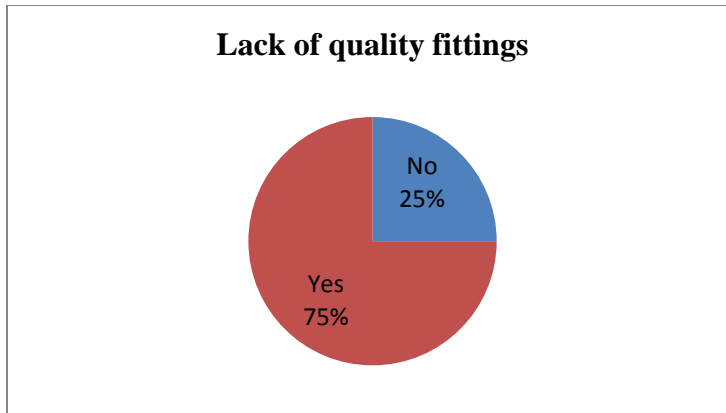


Figure 4.88 Percentage of projects lacking quality fittings

The results in Figure 4.87 show that projects (P1 and P6) had quality fittings (windows and doors). The windows and doors were steel casements of the standard size and materials. They were firmly fixed and secured. This was 25% of the projects as shown in Figure 4.88. The remaining 75% of the projects had fittings that did not meet the standard sizes and materials. They not firmly fixed and secured.

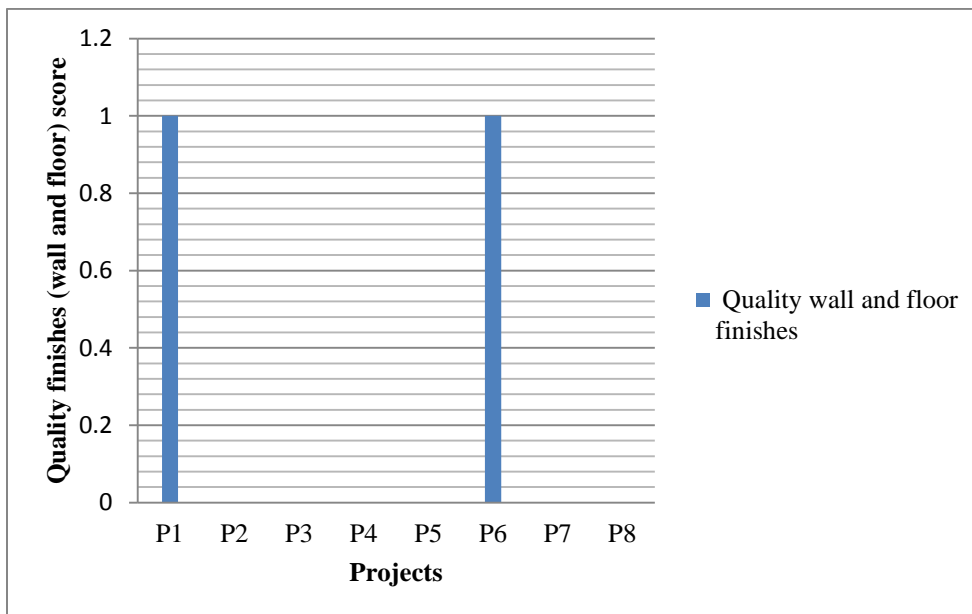


Figure 4.89 Lack of quality finishes (wall and floor)

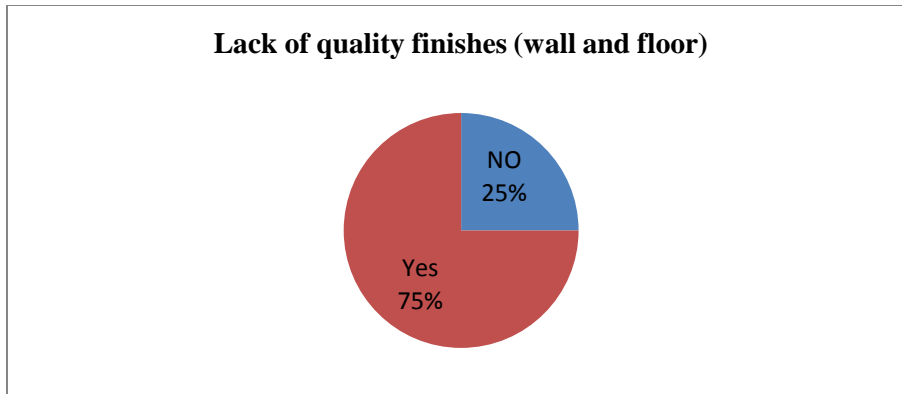


Figure 4.90 Percentage of projects lacking quality finishes (wall and floor)

The results in Figure 4.89 show that projects (P1 and P6) had quality finishes (wall and floors). The plaster was smooth, plump and straight. The floor finish was sand/cement screed, smooth, level and with no cracks. This formed 25% of the projects assessed. The remaining 75% showed poor quality wall and floor finishes as shown in figure 90. They exhibited lack of smoothness, level, plumpness and straightness. There were visible cracks on plaster and floor screed.

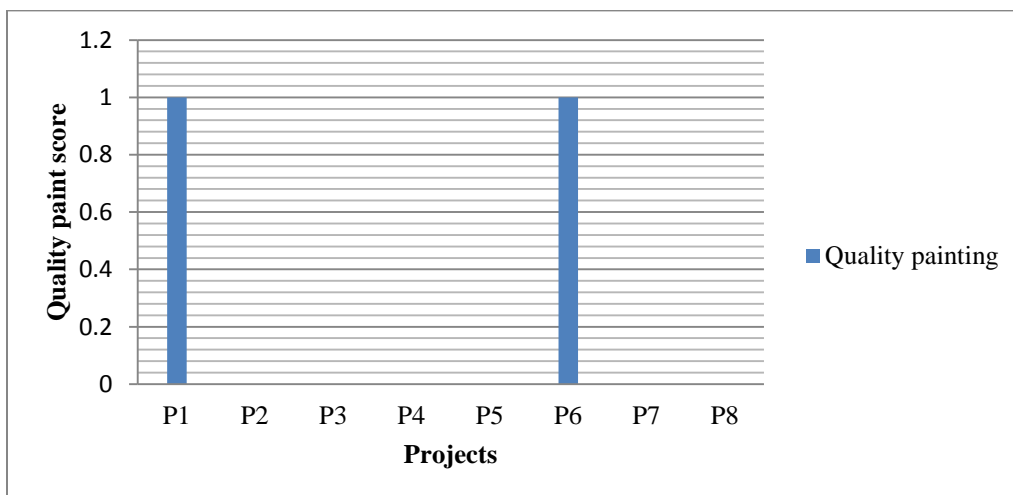


Figure 4.91 Lack of quality painting

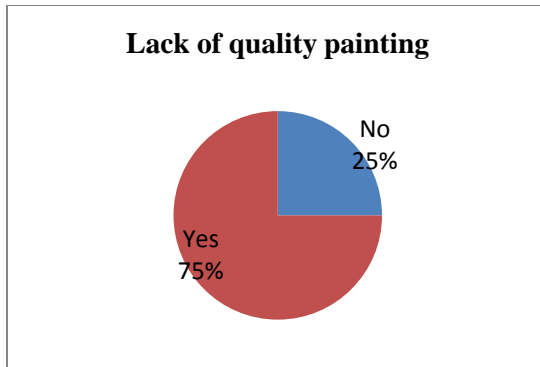


Figure 4.92 Percentages of projects lacking quality painting

The results in Figure 4.91 show that projects (P1 and P6) had quality painting. The paints used were of good quality well spread and uniform colour. This formed 25% of the projects assessed as shown in Figure 4.92. The remaining 75% showed poor painting. They exhibited lack of smoothness and uniform colour. They lacked completed coats of the painting.

4.6.4 Summary of the results on physical observation of the selected projects

The results from the exercise of physical observation were summarized to show the percentage of quality based on the factors assessed for each project. The average percentage was computed to provide the overall quality of the projects assessed. Table 4.39 shows the percentage score for each project during the observation of the selected projects.

Table 4. 39 Project score in physical observation exercise

Project	Score	
	Factors	Percentage (%)
1	7	70
2	2	20
3	3	30
4	1	10
5	3	30
6	8	80
7	1	10
8	2	20
Average	3.375	33.75(34)

(Source: Field survey 2017)

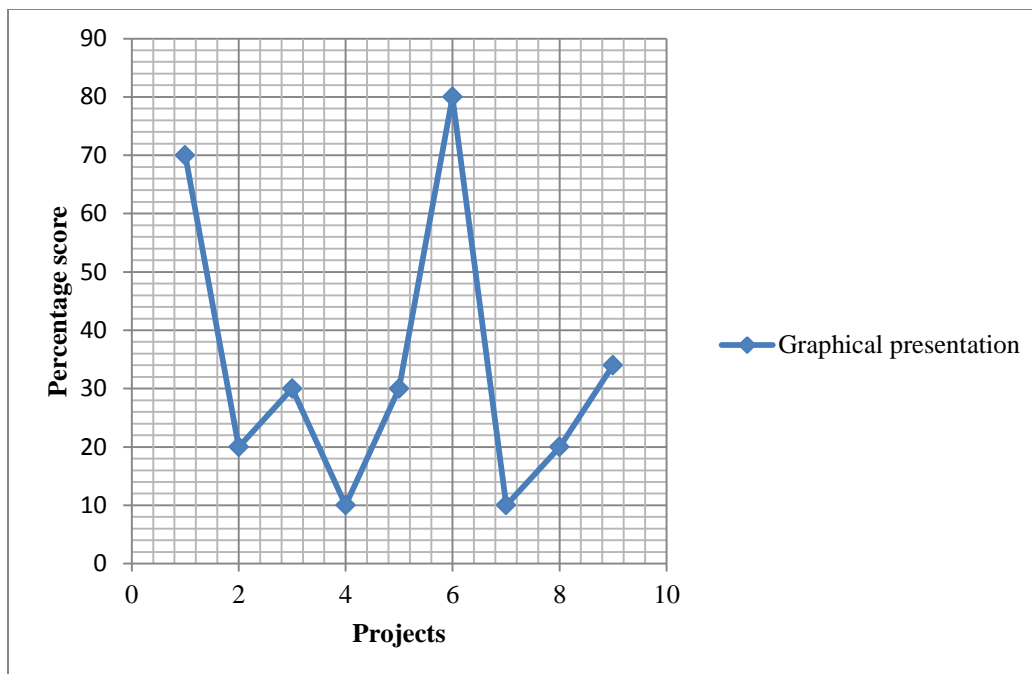


Figure 4.93 Graphical presentation of the results from physical observation

The results in Figure 4.93 show that only two projects (P1 and P6) had the quality level above 50%. They were 70% and 80% for projects 1 and 6 respectively. Project 6 was the best in terms of quality followed by project 1. They were found to have adequate quality. The rest of the projects were found to be below average quality (50%). Projects 4 and 7 were with least adequate quality of 10%, followed by projects 2 and 8 with 20% and finally projects 3 and 5 with 30%. The average of the quality assessment was 34% which is quite inadequate. The results therefore show that public building projects that were physically observed are of the poor quality.

4.7 Summary

The real sample of the study was 141 respondents and 126 respondents returned the questionnaires. The valid responses were 111 representing 79% which was found to meet the threshold for response rate of 60% for the surveys as stipulated by Fincham(2008)

and Johnson and Owens (2013). The data presentation was organized in accordance to the objectives of the study. The data presentation was done in both tabular and graphical forms. The data presentation was organized to follow the construction process from project initiation to project completion.

Data analysis of the study was based on four major parts captured in the data presentation; the roles and responsibilities of construction parties, the level of compliance to the building specifications and standards, the legal framework guiding the construction of public building projects and the physical observation of the selected projects. The data analysis applied the chi-square goodness-of-fit. All test yield to “not a good fit”.

The data of the study was interpreted and discussed. The study assessed the roles and responsibilities of each party in construction of public building projects. The participation of all parties in the construction of the public building projects was found to be below average (50%). The consultants’ participation was found to be the lowest at 15% followed by the procurement officers at 22%. The contractors and PMC/Clients’ participation was found to be at 43% and 47% respectively. The results showed that the parties’ participation in the construction of the public building projects was inadequate and led to poor quality exhibited by the projects.

The results on compliance to building specifications and standards were a reflection of what practically took place in construction of public building projects. The consultants’ participation was found to be at 6% a measure that showed how professionalism was ignored in the construction process of devolved public building projects. The contractors’ participation was at 71% which showed how the contractors work without the input of the

professionals. This was adequate however lack of use of the consultants in most operations led to failure to comply with some of the building specifications and standards. The participation of the PMC/Clients was found at 38% which was below the average. The results revealed the lack quality management framework and policies to ensure that construction of public building projects conform to the building code. Failure to comply with the building specifications and standards led to poor quality projects.

The study established that there was no legal framework put in place by the public works office at the county. There were no policies, acts, laws and bills developed by the department of the public works to guide the construction process in the county. The exercise of physical observation established that out of 8 projects observed, only two projects met the quality above 50%. The remaining six projects had the quality below average. The lowest quality was at 10% which is inadequate to meet the expected quality. The results therefore showed that only 25% of the observed projects had the quality above average and 75% had the quality below average. The results were found to be similar to various studies carried out on quality of the projects (Abas et al, 2015, Lidonga, 2015, Memon, Abro and Mgheri, 2011, Nyakiongora, 2015, Rad and Khosrowshahi, 1998 and Sysoulath and Jokkaw, 2015).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the findings of the study in the sequence of general overview of construction sector in social, economic and political development, roles and responsibilities of the construction parties, quality management framework and policies, County laws and regulations that govern the construction sector and findings on the physical observation exercise of the selected projects. Subsequently the conclusions of the study were drawn and recommendations made.

5.2 Study findings

The findings of the study covered the general overview construction sector, role and responsibilities of construction parties in the construction of public building projects, compliance to the building specifications and standards, the legal framework put in place with devolved units to address the quality of public building projects and the physical observation of the selected projects.

5.2.1 General Overview of Construction Sector

The contribution of the construction sector in the development of all counties and constituencies through devolved public funds has been felt at the grassroots and the citizens are happy with this style of governance. The study established that the sector was offering employment opportunities to the locals. This finding was in agreement with the findings of Wiseman, Roe & Parry (2014), Crawford (2016), Riaz, Din & Aftab (2015),

Darko& Lowe (2016), Ogunsemi (2015) and Osei (2013) who established the importance of construction sector in job creation in different developing countries globally.

This study revealed that the contractors involved in the public building projects were of lower categories with low capacity. The affirmative action contractors had registered the businesses after the constitution of 2010 and therefore they lack experience and capacity to handle projects with bigger scope of works beyond classrooms, simple health facilities and administrative offices. The findings were found to in agreement with those of Katende, Alinaitwe & Tindiwenzi (2011) and Kazawadi (2014) for on local contractors studies carried out in Uganda and Rwanda respectively.

5.2.2 Roles and Responsibilities of the Construction Parties

The findings on roles and responsibilities of the construction parties in the devolved construction management process of the public building projects revealed a big divergence from the centralized construction management of the public building projects that was used before devolution. The level of participation of the parties was assessed and the results show the participation level of all parties being below average (50%). The consultants who form the engine of all professional input had a participation of 15% whereas the procurement officers who are professionals on financial management and procurement had a participation of 22%. This was a great departure from the centralized construction management where the professionals were fully involved in all stages of construction process. The findings show the participation of the contractors and PMC/Clients being at 43% and 47% respectively. This showed that the devolved construction management process did not observe the professionalism in engaging the construction parties.

The contractors failed to carry out the activities by 57% which is a big margin showing how the contractors carry out the construction of the public building outside professional limits. The PMC/Clients' participation was at 47% implying that in carrying out the mandate of being clients they failed to accomplish 53% which was a big margin that compromised the quality by failing to fund some critical operations in the construction process. The average participation of the construction parties in professional construction management process was at 32%. This showed how devolved construction management process had affected greatly the participation of parties in the construction of the public building projects. These findings showed how the devolved construction management process lacked the effective management team, uncoordinated construction process and poor implementation strategies of the public construction projects. The findings concurred with those of Rad & Khosrowshahi (1998) showing lack of concern on the side of construction parties on quality management and Abas et.al (2015) found that factors that affect the construction management in Hong Kong were poor participation of the client, lack of effective project management and effective construction team contributed towards poor quality projects. They also found out that in Malaysia lack of technical personality and lack of awareness about quality management system and lack of trained workers led to poor quality. In Gaza strip they found that the political environment and poor documentation were main challenges to quality management of the construction projects, a fact that this study also established. It was therefore established by this study that the roles and responsibilities of the construction parties in the construction of the public building projects contributed negatively on the quality of the projects. They contributed towards the poor quality public building projects funded by devolved funds.

5.2.3 Level of Compliance to Building Specifications and Standards

The findings on the level of compliance to the building specifications and standards by the construction parties (consultants, contractors and PMC/Clients) in devolved construction management process addresses the concerns of quality management. The findings showed a great divergence from the professional construction management process. The compliance of 6% by the consultants showed how the consultants were ignored in the devolved construction management of the public building projects. The contractors, who enjoyed a compliance level of 71%, were compromised to work without the supervision of the professionals. The sites were lacking the clerk of works who is critical in terms of getting works done professionally on daily basis. The clients' compliance level was at 38% which showed how the project management committees were ignorant about their roles as clients. The average compliance level for parties under compliance to building specifications and standards was 38% which was below average. The findings showed how devolved construction management process failed to comply with the building specifications and standards leading to inadequate quality management process. This automatically led to poor quality projects. These findings concurred with Menon et al (2011) that stated both contractors and consultants must work together to achieve the quality required through quality management at the design and construction phases. Failure to comply with the building specification and standards was evidence to lack of quality management in the devolved construction management process.

5.2.4 Legal Framework Covering the Construction Sector in Counties

The study established that there was no legal framework in the devolved construction management to guide the construction sector operating under devolved units. There was

need to review existing laws or enact new ones to guide the construction sector at the Counties in accordance to the new constitutional dispensation. Since most public building projects were of small size and simple status the study anticipated that the Counties through the department of public works had put in efforts to develop the legal framework that could effectively govern the construction sector at the Counties. This was not the case. The framework was critical in demarcating the boundaries of stakeholders in the construction sector at county levels. Failure to this led to uncoordinated construction sector where construction activities were not coordinated to achieve the required quality. Lack of legal framework led to local small scale contractors failing to build their financial capacity and other challenges of registration with professional agencies. Katende et al (2011) found out that most local contractors lacked capacity in all aspects and there was need for the government to come up with legislation that would build the capacity for the local contractors. This was in agreement by the findings of this study and a contractor who lacks capacity, ends up with shoddy jobs done. Newton & Christian (1999) linked the quality with the costs and therefore the financial capacity of the contractor dictates the quality of the project being undertaken by that particular contractor.

5.2.5 Physical Observation of Selected Projects

The findings of the study from the physical observation showed 25% of the projects observed met the required quality and 75% failed to meet the required quality. From the observation most of the public building projects were done poorly with operatives showing low level of skills in workmanship. The assessment revealed that the constructions were done without supervision and therefore failed to comply with simple specifications and standards. The buildings observed showed poor usage of materials and

weak concrete mix ratios. Sysoulath&Jokkaw (2015) found that poor skills of the operatives, poor usage of materials, ineffective procurement process of a contractor, lack of supervision and inspection were factors that contributed towards poor quality projects. The findings of this study concurred with the above findings.

5.3 Conclusions of the Study

The study purposed to establish the level of compliance to professional construction process of public building projects funded by devolved funds in the republic of Kenya. In so doing, the study examined the roles and responsibilities of the construction parties, their level of compliance to building specifications and standards, established the existence of the legal framework and carried out the physical observation of the selected projects.

The examination to the roles and responsibilities of the construction parties (consultants, procurement officers, contractors and PMC/Clients) revealed a great departure from the centralized construction management process by the devolved units. The devolved construction management process does not allow full participation of parties in construction process. The roles and responsibilities of the parties in devolved construction management are not clear and parties are not coordinated to work as a team. The public building projects are constructed in a non-procedural manner in that parties are involved under the discretion of the PMC/Clients but not as per laid down regulations and procedures of construction industry. Therefore the roles and responsibilities of the construction parties in a devolved construction management process contribute to poor quality public building projects.

The study established that there exists no quality management framework by devolved units as far as the construction management of the public building projects are concerned. This was so as the parties failed to comply with the simple building specifications and standards. The counties and other devolved units that use the public funds have no quality management framework and therefore projects executed under such units find it difficult to achieve the acceptable level of quality. The study therefore concludes that the devolved construction management process lacks the quality management framework and is a contributing agent to poor quality projects.

The study established lack of laws, bills, policies and regulations at the County level to govern the construction sector and yet a big chunk of the public funds are channeled to the development of infrastructure. This shows how wastage is immense in construction sector managed by devolved units. This shows that accountability of public funds in construction sector under devolved units is lacking the seriousness it deserves. The parties can only be held to accountability if there is the legal framework in place. The misappropriation of public funds in construction sector under devolved units is therefore a reality and this leads to nothing else but poor quality projects.

The physical observation of the projects revealed how poor workmanship affects the quality of the public building projects. The findings showed how the technical team is ignored in the construction of public building projects. The construction process under devolved construction management process does not recognize the supervision and inspection processes by Public Works Officers. The construction of the public building projects is done without sufficient technical and professional involvement which leads to poor quality.

The study therefore concludes that the devolved construction management process of public building projects negatively impacts the quality of the project. This therefore calls for urgent correctives measures to be taken by the County Governments to ensure the construction management process attains the professional standards required. The County Governments should take the leading role of making sure that the construction of public building projects follows the professional procedures and complies with building specifications and standards.

5.4 Recommendations of the study

The construction sector is a broad one with a huge stakeholder's interest and it contributes immensely to economic development of any nation, organization, department etc. The sector receives a sizeable allocation both at national and county level for infrastructure development. The constituency development fund has improved infrastructure development at the constituency level. The findings of this study can be used by the stakeholders in the construction industry to take corrective action in order to improve and professionalize the devolved construction management process. This study therefore makes the followings recommendations:

1. The roles and responsibilities of the construction parties should be outlined and the stakeholders in the construction of public buildings sensitized about them so as to bring professionalism in the construction industry in devolved units.
2. The quality management framework should developed by counties to check on the construction of the public building projects and other infrastructure development.

3. The department of the public works at county level should be given full mandate to plan and implement the public building projects to ensure the devolved construction management process is carried out professionally.
4. The county government to should provide the supervision and inspection services to constructions projects at the county level. This will enhance the quality of the public projects. The clerk of works should be hired for public buildings and other construction works at the county to ensure the construction process complies with the building code.

5.5 Recommendations for Future Research

The current research focused on the parties involved in the construction of public building projects which is not sufficient to address other factors that impact on qualities of the public building projects that do not involve parties. The study therefore recommends some future research that could address the limitations of this current study.

1. A similar research to the current one covering both public/private building projects in the County will provide situation experienced by the entire construction sector at the devolved units.
2. The research on funding of the public building projects and how funding impacts the quality of the public buildings. This will address the issues of adequate funding and accountability.
3. The research on political factors that influence the implementation of the public building projects. This will provide in depth study on political perspective of devolved construction management process.

4. Finally a research on challenges faced by the public works officers working under devolved government in discharging their obligations. This will help to streamline the operations at the county level in construction sector and inject professionalism in devolved construction management process.

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APPENDICES

Appendix I: Questionnaires for Public Works Officers Q1

Part One: Respondent details.

Fill in the box below and tick the appropriate answer

NAME		SURNAMEE	FIRST NAME	OTHERS		
SEX		CITIZENSHIP	COUNTY	SUB-COUNTY		W A R D
M	F					
EDUCATION		PROFESSIONAL TRAINING				
KCPE	KSCE	CERTIFICATE	DIPLOMA	DEGREE	MASTERS	P H D
WORK EXPERIENCE			WORK STATION	DESIGNATION	SPECIAL INATION	
0-5YRS	5-10YRS	ABOVE 10YRS				

Part Two: Project details

PROJECT NAME					
CLIENT					
PROJECT COSTS					
ESTIMATED COST		CONTRACT SUM		ACTUAL COST	VARIATION
Kshs.		Kshs.		Kshs.	Kshs.
LOCATION			PROJECT FINANCER		
COUNTY	SUB-COUNTY	WARD	COUNTY	WCEF	CDF
IMPLIMENTATION				CONTRACT	
COMM. DATE	DURATION	COMP.DATE	VARIATION	FULL	LABOUR ONLY
ANY OTHER INFORMATION					

Part Three: Responsibilities and legal framework

a) Responsibilities

Briefly outline the responsibilities of your department/organization/committee/division/office etc in the public building projects constructions.

1.	-----
2.	-----
3.	-----
4.	-----
5.	-----
6.	-----
7.	-----
8.	-----
9.	-----
10.	-----

b) Legal framework

Are there legal frame work/ policies in your county guiding your mandate and powers in the execution of your responsibilities to ensure quality management of the public building projects? Yes/No.

If yes, state the main key areas that have direct influence in addressing the issues of quality management.	
1.	-----
2.	-----
3.	-----
4.	-----
5.	-----
6.	-----
7.	-----
8.	-----
9.	-----
10.	-----

If No, explain giving reasons as do why the framework and policies on quality management of public building projects are not in place. Further explain how you enforce the laws on quality of public building projects.	
1.	-----
2.	-----
3.	-----
4.	-----
5.	-----
6.	-----
7.	-----
8.	-----
9.	-----

10.	----- -----
-----	----------------

Part Four: Technical details

The table below provides details on technical aspect of the project and you are required to respond by ticking the right response. (✓)

S/no.	Description	Involvement		
		Y	N	N S
4.1	Project conception and design			
	i) Were you involved in identifying the project?			
	ii) Were stake holders involved in identifying the project?			
	iii) As an expert, were you involved in the design of the project?			
	iv) Were you involved in the proposal of the project?			
	v) Was your input sought at the project proposal?			
	vi) Was the design your original work?			
	vii) Was the design standard to all projects in the County? E.g. standard ECDE classroom?			
	viii) Were you given the freedom to create your own suitable design?			
	ix) Did you carry out site and soil investigation before the design?			
	x) Did you work as a team at the design stage of the project?			
	xi) Were you the Architect of the project?			
	xii) Were you the Quantity surveyor of the project?			
	xiii) Were you the Engineer of the project?			
	xiv) Was your input sought at the design stage of the project?			
	xv) Were you paid for services you provided at the design stage?			
	xvi) Were you involved in the estimation of the project cost?			
	xvii) Did you guide the estimation process?			
	xviii) Was the amount allocated for the project sufficient?			
	xix) In your own opinion was the project viable in the given circumstances?			
	xx) Did you design first before allocation of funds or you designed to fit available funds?			
	xxi) Were the needs justifiable to the project?			
	xxii) Were the project management committees cooperative with you at the design stage of the project?			
	xxiii) Were you requested to do the design or it is within your mandate and responsibility?			
	xxiv) In comparison with the mandate you had before devolution, are			

	<p>you satisfied with your current mandate professionally?</p> <p>xxv) How do you find your work with change in governance [devolution]: enjoyable?</p> <p>xxvi) -Challenging?</p> <p>xxvii) -Professional?</p> <p>xxviii) -Confusing?</p> <p>xxix) Has your work reduced with devolution?</p> <p>xxx) Has your work increased with devolution?</p> <p>xxxi) The work has remained the same before and after devolution</p> <p>xxxii) Has your mandate for design of projects changed with devolution?</p> <p>xxxiii) In your own opinion has devolution bought sanity in construction industry designs?</p> <p>xxxiv) Are current designs well thought of under devolution?</p>			
4.2	<p>Project approval</p> <p>i) It is the responsibility of the client to seek approvals with relevant authorities</p> <p>ii) As professionals you are only involved in the projects that have been approved by all authorities?</p> <p>iii) Are projects you are involved in registered by NCA?</p> <p>iv) Do you approve drawings prepared by other consultants?</p> <p>v) Are your input sought when approving drawings prepared by other consultants?</p>	Y	N	N S
4.3	<p>Project tendering</p> <p>i) Are you involved in the advertisement of the tenders for projects under BOM, BOG, project management committees?</p> <p>ii) Are involved in the opening of the tenders for the projects under BOM, BOG, Project management committees?</p> <p>iii) Are you involved in the evaluation of the projects under BOM, BOG or PMC?</p> <p>iv) Do you award tenders of the projects?</p> <p>v) Is your input sought when tendering is done by BOM, BOG or PMC?</p> <p>vi) Do you give engineers estimates to contractors during the tender opening?</p> <p>vii) Do contractors seek professional advice from you during tendering period?</p> <p>viii) Have you ever rejected the tenders of affirmative/reserved group due to incompetency of the contractor?</p>	Y	N	N S

4.4	Project implementation	Y	N	N S
	i) Did you enter a contract with the contractor?			
	ii) Were you involved in handing over the site to the contractor?			
	iii) Were you buying the materials for the contractor?			
	iv) Was the contract full contract?			
	v) Were you paying the contractor directly?			
	vi) Were payments done in cash?			
	vii) Were payments done through cheques?			
	viii) Were payments wired to the contractors account if above 1M?			
	ix) Were payments done after evaluation?			
	x) Were you the appointed project manager?			
	xi) Was there clerks of works [COW]			
	xii) Did you supervise the project?			
	xiii) Was the supervision regular? [i.e. weekly]			
	xiv) Were payments approved by you?			
	xv) Did you reject poor works on your own without approval of the client?			
	xvi) Were you invited to inspect the works?			
	xvii) Were you inspecting the quality of construction materials delivered on site?			
	xviii) Were you attending site meetings?			
	xix) Did you by any chance receive some money from contractor as an appreciation?			
	xx) Were you paid for the services rendered?			
	xxi) Were your services expensive for the client?			
	xxii) Were your services needed?			
	xxiii) Were clients cooperative?			
	xxiv) Were clients forceful to ensure contractor does the right job?			
	xxv) Was there any instance of a contractor compromising the committee?			
	xxvi) Was there any instance where the contractor approached the committee to omit some works?			
	xxvii) Were there variations on the works?			
	xxviii) Was the money allocated sufficient for the project?			
	xxix) Were you satisfied with contractors speed and capacity to do the work?			
	xxx) Was the project completed on time?			
	xxxi) Was there any problem during the construction period?			
	xxxii) If yes for [xxxi], was it solved amicably?			
	xxxiii) Were material tests done on the project?			
	xxxiv) In your opinion was the project successful?			
	xxxv) Do affirmative contractors (Y&WE) meet capacity required for preserved tenders?			

xxxvi) Do you approve the affirmative contractors as far as the execution of works professionally is concerned? xxxvii) Do [Y&WE] contractors meet their contractual obligations? xxxviii) Have your mandate and powers to supervise public projects significantly changed with devolution? xxxix) Is devolution of public works beneficial to your professional growth? xl) Does devolved public works beneficial to people at grassroots? xli) Have PMC positively accepted your involvement in the implementation of public projects? xlii) Are you properly facilitated by PMC to carry out your supervisory role? xliii) Do you invite yourself to supervise the project? xliv) Is enforcement arm of the county supportive to enforce specifications and standards of the building code? xlv) Do PMC know anything about the specifications and standards in the building code? xlvi) Do you agree that collapse of building has been due to improper construction process by the clients? xlvii) Lack of enforcement of building code is key factor in improper construction process?			

Any information you perceive as essential and has not been captured ?-----

4.5	Project handing over/taking over	Y	N	N	
		S			
4.6	Project built environment management	Y	N	N	
		S			
	i)	Is the project serving the needs as intended?			
	ii)	Are you satisfied with the function of the project?			

Appendix II: Questionnaires for the Project Management Committees Q2

Part One: Respondent details.

Name of the Respondent-----

Position in the PMC-----

Level of Education-----

Profession-----

Number of years on the PMC-----

Area of representation on PMC-----

Special Interest if any-----

Part Two: Project details

Name of the Project-----

Funder of the Project-----

Brief description of the project-----

Budget of the project in [Kshs].-----

Type of Contract [Labour only/Full Contract] -----

Construction Period [in weeks] -----

Commencement Date-----

Completion Date/Expected date -----

Status of the Project-----

Part Three: Responsibilities and legal framework

a) Responsibilities

Briefly outline the responsibilities of your department/organization/committee/division/office etc in the public building projects constructions.	
1.	-----
2.	-----
3.	-----
4.	-----
5.	-----
6.	-----
7.	-----
8.	-----
9.	-----
10.	-----

b) Legal framework

Are there legal frame work/ policies in your county guiding your mandate and powers in the execution of your responsibilities to ensure quality management of the public building projects? Yes/No.

If yes, state the main key areas that have direct influence in addressing the issues of quality management.	
1.	-----
2.	-----
3.	-----
4.	-----
5.	-----
6.	-----
7.	-----
8.	-----
9.	-----
10.	-----

If No, explain giving reasons as do why the framework and policies on quality management of public building projects are not in place. Further explain how you enforce the laws on quality of public building projects.	
1.	-----
2.	-----
3.	-----
4.	-----

5.	-----
6.	-----
7.	-----
8.	-----
9.	-----
10.	-----

Part Three: Technical details

The table below provides details on technical aspect of the project and you are required to respond by ticking the right response. (v)

S/no.	Description	Involve ment		
		Y	N	N S
4.1	Project conception and design i) Were you involved in identifying the project? ii) Were stake holders involved in identifying the project? iii) After identifying the project did you seek the services of the public works officers to prepare designs and B.Qs? iv) After identifying the project did you seek the services of an expert to write the proposal for funding by County Government? v) Did you pay for project design? vi) Did you pay project proposal? vii) Did discuss preliminary designs with the architect? viii) Did you accept the final design of the project?			
4.2	Project approval i) Did you seek approval by public health department? ii) Did you seek approval by the County Government? iii) Did you seek approval by NEMA? iv) Did you register the project with NCA? v) Did you pay for above [i-iii]? vi) Did you pay for above [iv] vii) Were you aware of the above approvals for construction works? viii) Were you aware of registration of the project by NCA? ix) Were you willing to carry out the above activities?			
4.3	Project tendering i) Did you advertise for the tender to construct the project?			

	ii) Did you use experts in tendering?			
	iii) Did you pick the contractor from the local community?			
	iv) Did you evaluate the tenders?			
	v) Did you award the lowest tender?			
	vi) Did you discuss to the award of the tender?			
	vii) Did those in County Government second the technical people to carry out tendering process?			
	viii) Was the contractor imposed on you by those funding the project?			
	ix) Was the contractor registered with NCA?			
	x) Did the contractor meet all requisite conditions?			
	xi) Did the contractor pay for documents?			
	xii) Did you tender for project manager?			
	xiii) Did you tender material suppliers?			
	xiv) Did tender for labour services?			
	xv) Did you tender sub-contractors?			

4.4	Project implementation	Y	N	N S
	i) Did you enter a contract with the contractor?			
	ii) Were you involved in handing over the site to the contractor?			
	iii) Were you buying the materials for the contractor?			
	iv) Was the contract full contract?			
	v) Were you paying the contractor directly?			
	vi) Were payments done in cash?			
	vii) Were payments done through cheques?			
	viii) Were payments wired to the contractors account if above 1M?			
	ix) Were payments done after valuation?			
	x) Was there a project manager?			
	xi) Was there clerks of works [COW]			
	xii) Was the project supervised by Public Works officers?			
	xiii) Was the supervision regular? [i.e. weekly]			
	xiv) Were payments approved by public works officers?			
	xv) Did you object poor works on your own without approval of public works?			
	xvi) Were you inviting public works officers to inspect the works?			
	xvii) Were you inspecting the quality of construction materials delivered on site?			
	xviii) Were you attending site meetings?			
	xix) Were by any chance receive some money from contractor as an appreciation?			
	xx) Were you paying the services of public works officers?			

	xxi) Were the services of public works expensive for you to pay?			
	xxii) Were services of public works officers needed?			
	xxiii) Were public works officers cooperative?			
	xxiv) Were public works officers forceful to ensure contractor does the right job?			
	xxv) Was there any instance of a contractor compromising the committee?			
	xxvi) Was there any instance where the approached the committee to omit some works?			
	xxvii) Were there variations on the works?			
	xxviii) Was the money allocated sufficient for the project?			
	xxix) Were satisfied with contractors speed and capacity to do the work?			
	xxx) Was the project completed on time?			
	xxxi) Was there any problem during the construction period?			
	xxxii) If yes for [xxxi], was it solved amicably?			
	xxxiii) Were material tests done on the project?			
	xxxiv) In your opinion was the project successful?			

Any information you perceive as essential and has not been captured ?-----

4.5	Project handing over/taking over	Y	N	N S
3.6	Project built environment management	Y	N	N S
	i) Is the project serving the needs as intended?			

	ii) Are you satisfied with the function of the project?			
	iii) Has the project solved the problem?			
	iv) Are the users of the project satisfied?			
	v) Do you have the schedule for maintenance of the project?			
	vi) Is the defects liability period over?			
	vii) Has the project developed any defects?			
	viii) Is the environment within which the project is clean?			
	ix) Does the community around the project appreciate the project?			
	x) Have you received commendations for the work well done?			
	xi) Have other committees borrowed your the idea of similar projects?			
	xii) Do you feel that you achieved your dream through the project?			

Give any information you perceive essential on built environment management and yet not captured in the questionnaire-----

Thanks for your positive response. Be blessed!

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Wamalwa C.W Mukoche

Appendix III: Questionnaires for the Procurement officers Q3

Part One: Respondent details.

Name of the Respondent-----

Position in the Supply chain in the County-----

Level of Education-----

Profession-----

Number of years in the Procurement -----

Area of representation in the Supply chain in the County -----

Special Interest if any-----

Part Two: Project details

Name of the Project-----

Funder of the Project-----

Brief description of the project-----

Budget of the project in [Kshs].-----

Type of Contract [Labour only/Full Contract] -----

Construction Period [in weeks] -----

Commencement Date-----

Completion Date/Expected date -----

Status of the Project-----

Part Three: Responsibilities and legal framework

a) Responsibilities

Briefly outline the responsibilities of your department/organization/committee/division/office etc in the public building projects constructions.	
1.	-----
2.	-----
3.	-----
4.	-----
5.	-----
6.	-----
7.	-----
8.	-----
9.	-----
10.	-----

b) Legal framework

Are there legal frame work/ policies in your county guiding your mandate and powers in the execution of your responsibilities to ensure quality management of the public building projects? Yes/No.

If yes, state the main key areas that have direct influence in addressing the issues of quality management.	
1.	-----
2.	-----
3.	-----
4.	-----
5.	-----
6.	-----
7.	-----
8.	-----
9.	-----
10.	-----

If No, explain giving reasons as do why the framework and policies on quality management of public building projects are not in place. Further explain how you enforce the laws on quality of public building projects.	
1.	-----
2.	-----
3.	-----
4.	-----

5.	-----
6.	-----
7.	-----
8.	-----
9.	-----
10.	-----

Part Four: Technical details

The table below provides details on technical aspect of the project and you are required to respond by ticking the right response. (v)

S/no.	Description	Involve ment		
		Y	N	N S
4.1	Project conception and design i) Were you involved in identifying the project? ii) Were stake holders involved in identifying the project? iii) After identifying the project did you seek the services of the public works officers to prepare designs and B.Qs? iv) After identifying the project did you seek the services of an expert to write the proposal for funding by County Government? v) Did you pay for project design? vi) Did you pay for project proposal? vii) Did you discuss preliminary designs with the architect? viii) Did you accept the final design of the project?	Y	N	N S
4.2	Project approval i) Did you seek approval by public health department? ii) Did you seek approval by the County Government? iii) Did you seek approval by NEMA? iv) Did you register the project with NCA? v) Did you pay for above [i-iii]? vi) Did you pay for above [iv] vii) Were you aware of the above approvals for construction works? viii) Were you aware of registration of the project by NCA? ix) Were you willing to carry out the above activities?	Y	N	N S
4.3	Project tendering i) Did you advertise for the tender to construct the	Y	N	N S

	<p>project?</p> <p>ii) Did you use experts in tendering?</p> <p>iii) Did you pick the contractor from the local community?</p> <p>iv) Did you evaluate the tenders?</p> <p>v) Did you award the lowest tender?</p> <p>vi) Did you discuss to the award of the tender?</p> <p>vii) Did those in County Government second the technical people to carry out tendering process?</p> <p>viii) Was the contractor imposed on you by those funding the project?</p> <p>ix) Was the contractor registered with NCA?</p> <p>x) Did the contractor meet all requisite conditions?</p> <p>xi) Did the contractor pay for documents?</p> <p>xii) Did you tender for project manager?</p> <p>xiii) Did you tender for material suppliers?</p> <p>xiv) Did you tender for labour services?</p> <p>xv) Did you tender for sub-contractors?</p>			
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4.4	Project implementation	Y	N	N S
	<p>i) Did you enter a contract with the contractor?</p> <p>ii) Were you involved in handing over the site to the contractor?</p> <p>iii) Were you buying the materials for the contractor?</p> <p>iv) Was the contract full contract?</p> <p>v) Were you paying the contractor directly?</p> <p>vi) Were payments done in cash?</p> <p>vii) Were payments done through cheques?</p> <p>viii) Were payments wired to the contractors account if above 1M?</p> <p>ix) Were payments done after valuation?</p> <p>x) Was there a project manager?</p> <p>xi) Was there clerks of works [COW]</p> <p>xii) Was the project supervised by Public Works officers?</p> <p>xiii) Was the supervision regular? [i.e. weekly]</p> <p>xiv) Were payments approved by public works officers?</p> <p>xv) Did you object poor works on your own without approval of public works?</p> <p>xvi) Were you inviting public works officers to inspect the works?</p> <p>xvii) Were you inspecting the quality of construction materials delivered on site?</p> <p>xviii) Were you attending site meetings?</p> <p>xix) Were you by any chance receiving some money from contractor as an appreciation?</p>			

	xx) Were you paying the services of public works officers? xxi) Were the services of public works expensive for you to pay? xxii) Were services of public works officers needed? xxiii) Were public works officers cooperative? xxiv) Were public works officers forceful to ensure contractor does the right job? xxv) Was there any instance of a contractor compromising the committee? xxvi) Was there any instance where the contractor approached the committee to omit some works? xxvii) Were there variations on the works? xxviii) Was the money allocated sufficient for the project? xxix) Were you satisfied with contractors speed and capacity to do the work? xxx) Was the project completed on time? xxxi) Was there any problem during the construction period? xxxii) If yes for [xxx], was it solved amicably? xxxiii) Were material tests done on the project? xxxiv) In your opinion was the project successful?			
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Any information you perceive as essential and has not been captured ?-----

4.5	Project handing over/taking over	Y	N	N S
	i) Was the certificate of practical completion issued by public works office?			
	ii) Was certificate of occupancy issued by relevant authorities?			
	iii) Were the required tests for mechanical and electrical services carried out?			
	iv) Were as built drawings prepared and documented?			
	v) Were you as a client satisfied with the overall quality of the project?			
	vi) Were public works involved in the handing over and taking over exercise?			
3.6	Project built environment management	Y	N	N S

xiii)	Is the project serving the needs as intended?		
xiv)	Are satisfied with the function of the project?		
xv)	Has the project solved the problem?		
xvi)	Are the users of the project satisfied?		
xvii)	Do you have the schedule for maintenance of the project?		
xviii)	Is the defects liability period over?		
xix)	Has the project developed any defects?		
xx)	Is the environment within which the project is clean?		
xxi)	Does the community around the project appreciate the project?		
xxii)	Have you received commendations for the work well done?		
xxiii)	Have other committees brought the idea of similar projects?		
xxiv)	Do you feel that you achieved your dream through the project?		

Give any information you perceive essential on built environment management and yet not captured in the questionnaire-----

Part Five: Professional input

1. Has your mandate in chain supply changed with devolution? Yes/No
 If yes, give a brief account-----

2. Do you check on tenders under county government in devolved units like ward community empowerment projects? Yes/No
 If no give reasons -----

3. Do you supervise tendering process in County Government autonomous procurement entities? Yes/No
 If yes which aspect of procurement do supervise-----

4. By any chance do you carry the blame for shoddy jobs? Yes/No

If Yes, what is the remedy?-----

If No, who is responsible?-----

5. From the professional point of view do the affirmative action (Y&WE) contracts succeed? Yes/No

If No, what could be the problem-----

6. Does tendering process have an impact on the quality of the project? Yes/No

If Yes explain how-----

Apart from evaluation criteria as per PPAD act of 2005, what other factors contribute towards the selection of the wining tender?

7. Does the CECM or CO interfere with your procurement process? Yes/No

If yes, what is their interest-----

8. Do affirmative contracts have same success as non-affirmative contracts? Yes/No

If No, what is their main challenge-----

9. Do you have any other information that you consider essential in this study that the questionnaire has not captured? Yes/No

If yes, state the information-----

Thanks for your positive response. Be blessed!

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Wamalwa C.W Mukoche

Appendix IV: Questionnaires for the Contractors Q4

Part One: Respondent details.

Name of the Respondent-----

Name of the company/enterprise-----

Position in the company/enterprise-----

Level of Education-----

Profession-----

Number of years in construction business -----

Area of specialization -----

Category of registration by NCA-----

Classification of the company [general/ Youth enterprise/ Women enterprise/PWD]

Part Two: Project details

Name of the Project-----

Funder of the Project-----

Brief description of the project-----

Budget of the project in [Kshs].-----

Type of Contract [Labour only/Full Contract] -----

Construction Period [in weeks] -----

Commencement Date-----

Completion Date/Expected date -----

Status of the Project-----

3.4 Key personnel (qualifications and experience)

Position	Name/contact	Years of general experience	Years of particular experience in position

Part Four: Project implementation details

The table below provides details on technical aspect of the project and you are required to respond by ticking the right response. (✓)

S/no.	Description	Involve ment		
		Y	N	N S
4.1	Capacity of the company/enterprise			
	i) Do you have enough man power?			
	ii) Do you have sufficient equipment?			
	iii) Do you access credit facilities?			
	iv) Do you hire technical people on permanent terms?			
	v) Do you hire technical people on temporary terms?			
	vi) Do have trained manpower on sites always?			
	vii) Do you regularly get the jobs within a short period? E.g. a period of 6months?			
	viii) Do you have the capacity to handle five projects at ago?			
	ix) Do you have the capacity to handle three jobs and below ago?			
	x) Do you have the capacity to handle only one project at ago?			
	xi) Is your volume of work annually at 4 million and below?			
	xii) Is your volume of work annually at 6 million and below?			
	xiii) Is your volume of work annually at 8 million and below?			
	xiv) Is your volume of work annually at 10million and below?			
	xv) Is your volume of work annually at 15million and below?			

	<p>xvi) Is your volume of work annually at 20 million and below?</p> <p>xvii) Is your volume of work annually at 50 million and below?</p> <p>xviii) Is your volume of work annually at 50 million and above?</p>			
4.2	<p>Project approval</p> <p>i) It is the responsibility of the client to seek approvals with relevant authorities?</p> <p>ii) As contractor you are only involved in the projects that have been approved by all authorities?</p> <p>iii) Are projects you are involved registered by NCA?</p> <p>iv) Are you involved in the approval of the project?</p>	Y	N	N S
4.3	<p>Project tendering</p> <p>i) Are you involved in the advertisement of the tenders for projects under BOM, BOG, project management committees?</p> <p>ii) Are you involved in the opening of the tenders for the projects under BOM, BOG, Project management committees?</p> <p>iii) Are you involved in the evaluation of the projects under BOM, BOG or PMC?</p> <p>iv) Do you award tenders of the projects?</p> <p>v) Is your input sought when tendering is done by BOM, BOG or PMC?</p> <p>vi) Do you get engineers estimates to during the tender opening?</p> <p>vii) Do you seek professional advice from expertise during tendering period?</p> <p>viii) Have you ever been denied the tenders of affirmative/reserved group due to corruption?</p> <p>ix) Do you seek assistance of the political class to win the reserved tenders?</p> <p>x) Have you ever won an open tender?</p> <p>xi) Have you ever been approached to appreciate those who awarded you the tender?</p> <p>xii) Do you negotiate the percentage for the management committee?</p> <p>xiii) Have you ever won a contract without lobbying?</p> <p>xiv) Have you lost any money through lobbying by losing the tender after giving some facilitation?</p> <p>xv) In your opinion is tendering process free and</p>	Y	N	N S

	transparent?			
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4.4	Project implementation	Y	N	N S
	i) Did you enter a contract with the client?			
	ii) Were you involved in handing over the site to the contractor?			
	iii) Were you buying the materials for the project?			
	iv) Was the contract full contract?			
	v) Were you being paid by the PMC directly?			
	vi) Were payments done in cash?			
	vii) Were payments done through cheques?			
	viii) Were payments wired to the contractors account if above 1M?			
	ix) Were payments done after evaluation?			
	x) Was there the appointed project manager?			
	xi) Was there clerks of works [COW]			
	xii) Were you supervised by the project manager?			
	xiii) Was the supervision regular? [i.e. weekly]			
	xiv) Were payments approved before you were paid?			
	xv) Was your poor work rejected by the client?			
	xvi) Were you invited to inspect the works?			
	xvii) Were you inspecting the quality of construction materials delivered on site?			
	xviii) Were you attending site meetings?			
	xix) Did you by any chance give some money as an appreciation?			
	xx) Were you paid for the services rendered?			
	xxi) Were your services expensive for the client?			
	xxii) Were your services needed?			
	xxiii) Were clients cooperative?			
	xxiv) Were clients forceful to ensure you do the right job?			
	xxv) Was there any instance of you requested to compromise works to pay the committee?			
	xxvi) Was there any instance where you were approached by the committee to omit some works?			
	xxvii) Were there variations on the works?			
	xxviii) Was the money allocated sufficient for the project?			
	xxix) Were you satisfied with your speed and capacity to do the work?			
	xxx) Was the project completed on time?			
	xxxi) Was there any problem during the construction period?			

	xxxii) If yes for [xxx], was it solved amicably?			
	xxxiii) Were material tests done on the project?			
	xxxiv) In your opinion was the project successful?			
	xxxv) Do affirmative contractors (Y&WE) meet capacity required for preserved tenders?			
	xxxvi) Has your business in public projects significantly changed with devolution?			
	xxxvii) Is devolution of public works beneficial to your professional and business growth?			
	xxxviii) Does devolved public works beneficial to people at grassroots?			
	xxxix) Have PMC positively accepted your involvement in the implementation of public projects?			
	xl) Do you invite public works officers to supervise the project?			
	xli) Is enforcement arm of the county supportive to enforce specifications and standards of the building code?			
	xlii) Do PMC know anything about the specifications and standards in the building code?			
	xliii) Do you agree that collapse of building has been due to improper construction process by the clients?			
	xliv) Lack of enforcement of building code is key factor in improper construction process?			

Any information you perceive as essential and has not been captured ?-----

4.5	Project handing over/taking over	Y	N	N	S
	i) Was the certificate of practical completion issued by public works office?				
	ii) Was certificate of occupancy issued by relevant authorities?				
	iii) Were there required tests for mechanical and electrical services?				
	iv) Were as built drawings prepared and documented?				
	v) Were you as a client satisfied with the overall quality of the project?				
	vi) Were public works involved in the handing over and taking over exercise?				

Give any information you perceive essential on built environment management and yet not captured in the questionnaire-----

Thanks for your positive response. Be blessed!

.....

Wamalwa C.W Mukoche

Appendix V: Interview Schedules

Introduction

- i) Researcher self-introduction (name, university, and other details) and Research Assistants self-introduction.
- ii) Purpose of the study (purely academic)
- iii) Need for the responses participation in the study.
- iv) Personal details (marked or entered in the table below)

Name	Public Works Officers	Procurement officers	Project Management committees	Contractors
Experience in the construction field (area of specialization)				
Below 2Yrs	3-5Yrs	5-10Yrs	10-15Yrs	Above 15Yrs
Position/Category/etc.				

Body

	Public Works Officers	Procurement Officers	Project Management committees	Contractors													
Roles and responsibilities of construction parties																	
	N F	F A	F D	U D	N F	F A	F D	U D	N F	F A	F D	UD	NF	FA	F D	U D	
Initiation	22																
Identification	6																
Design process comparison	10																
	6																
Tendering Process	17																
Tender advertisement	6																
Tender evaluation	5																
Tender award	6																
Implementation	15																
Contractual documents	4																
Contract period	11																
Built Env. Management	12																
Occupancy	4																
Repair & Maintenance	8																
Compliance to building Specifications and Standards																	
Compliance to Design & Appr.	9																
Compliance during construction period	7																
Legal Framework Guiding the Construction Sector in Devolved Units																	

Legal Framework	8																	

Give other information you think is importance to our today's discussion.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

I take this opportunity to thank you for sparing your valuable time for the interview that has just been concluded.

Thank you

Be blessed.

.....

Wamalwa C.W Mukoche

Appendix VI: Observation Checklist

Observer.....

Project	1	2	3	4	5	6	7	8
Evidence of visible cracks and deformation of the structural members								
Evidence of exposed coarse aggregates in unfinished columns and beams								
Evidence of exposed reinforcement steel bars in unfinished columns/beams								
Evidence of lack of plumpness and leveling								
Evidence of lack of straightness								
Evidence of moisture rise (pilling of paints and moist/wet walls)								
Evidence of leaking roofs								
Quality of fittings (windows and doors)								
Quality of wall and floor finishes (type and workmanship)								
Quality of painting (grade of paint used)								

.....

Wamalwa C.W Mukoche

Appendix VII: The Sample Determination Tables

Required Sample Size[†]

Population Size	Confidence = 95%				Confidence = 99%			
	Margin of Error				Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1141	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1960	5165
10,000	370	727	1332	4899	622	1193	2098	6239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	659	1336	2585	14227
250,000	384	782	1527	9248	662	1347	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16055
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	16584
300,000,000	384	784	1537	9603	663	1354	2654	16586

[†] Copyright, The Research Advisors (2006). All rights reserved.

Appendix VIII: Chi-Square Distribution Tables

Degrees of freedom	α									
	0.995	0.99	0.975	0.95	0.90	0.10	0.05	0.025	0.01	0.005
1	—	—	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	9.236	11.071	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.204	10.645	12.592	14.449	16.812	18.548
7	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955
9	1.735	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.725	26.757
12	3.074	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217	28.299
13	3.565	4.107	5.009	5.892	7.042	19.812	22.362	24.736	27.688	29.819
14	4.075	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000	34.267
17	5.697	6.408	7.564	8.672	10.085	24.769	27.587	30.191	33.409	35.718
18	6.265	7.015	8.231	9.390	10.865	25.989	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	27.204	30.144	32.852	36.191	38.582
20	7.434	8.260	9.591	10.851	12.443	28.412	31.410	34.170	37.566	39.997
21	8.034	8.897	10.283	11.591	13.240	29.615	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.042	30.813	33.924	36.781	40.289	42.796
23	9.262	10.196	11.689	13.091	14.848	32.007	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	33.196	36.415	39.364	42.980	45.559
25	10.520	11.524	13.120	14.611	16.473	34.382	37.652	40.646	44.314	46.928
26	11.160	12.198	13.844	15.379	17.292	35.563	38.885	41.923	45.642	48.290
27	11.808	12.879	14.573	16.151	18.114	36.741	40.113	43.194	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	37.916	41.337	44.461	48.278	50.993
29	13.121	14.257	16.047	17.708	19.768	39.087	42.557	45.722	49.588	52.336
30	13.787	14.954	16.791	18.493	20.599	40.256	43.773	46.979	50.892	53.672
40	20.707	22.164	24.433	26.509	29.051	51.805	55.758	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	37.689	63.167	67.505	71.420	76.154	79.490
60	35.534	37.485	40.482	43.188	46.459	74.397	79.082	83.298	88.379	91.952
70	43.275	45.442	48.758	51.739	55.329	85.527	90.531	95.023	100.425	104.215
80	51.172	53.540	57.153	60.391	64.278	96.578	101.879	106.629	112.329	116.321
90	59.196	61.754	65.647	69.126	73.291	107.565	113.145	118.136	124.116	128.299
100	67.328	70.065	74.222	77.929	82.358	118.498	124.342	129.561	135.807	140.169

Appendix IX: NACOSTI Research Permit



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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

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

Ref. No.

Date:

NACOSTI/P/16/80745/14129

1st November, 2016

Chrispinus Wamalwa Mukoche
University of Eldoret
P.O. Box 1125-30100
ELDORET.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Impact of devolved construction management to quality of public building projects in Kenya. A case study of public building projects in Busia County,”* I am pleased to inform you that you have been authorized to undertake research in **Busia County** for the period ending **28th October, 2017**.

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

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


BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Busia County.

The County Director of Education
Busia County.

CONDITIONS

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



REPUBLIC OF KENYA



National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE

PERMIT

Serial No. **11573**

CONDITIONS: see back page

THIS IS TO CERTIFY THAT:

MR. CHRISPINUS WAMALWA MUKOCHE
of UNIVERSITY OF ELDORET, 0-50200
BUNGOMA, has been permitted to
conduct research in Busia County

Permit No : NACOSTI/P/16/80745/14129

Date Of Issue : 1st November,2016

Fee Received :ksh 2000

on the topic: IMPACT OF DEVOLVED
CONSTRUCTION MANAGEMENT TO
QUALITY OF PUBLIC BUILDING PROJECTS
IN KENYA. A CASE STUDY OF PUBLIC
BUILDING PROJECTS IN BUSIA COUNTY.

for the period ending:
28th October,2017



Applicant's
Signature

[Signature]
Director General
National Commission for Science,
Technology & Innovation

Appendix X: Some of the Selected Observed Projects

(Source: Field survey 2017)



(Source: Field survey 2017)



(Source: Field survey 2017)