

**RESIDENTIAL BUILDINGS COMPLIANCE PRACTICES AND PERFORMANCE OF
THE NATIONAL CONSTRUCTION AUTHORITY PROJECTS IN NAIROBI CITY
COUNTY, KENYA**

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D53/OL/21548/2012

**A RESEARCH PROJECT REPORT SUBMITTED TO THE SCHOOL OF BUSINESS IN
PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE
IN MASTER OF BUSINESS ADMINISTRATION (PROJECT MANAGEMENT) OF
KENYATTA UNIVERSITY**

MAY 2022

DECLARATION

This research project report and the content there in is my original work and has been presented to any other university for examinations.

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This research project report is hereby submitted for examination with my prior approval as the supervisor to the candidate.

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DEDICATION

I dedicate this research project report to my loving wife Susan Wangechi Muriithi, my God given mentor and associate in my career and my three Children Bilha, Prince and Precious and whom were also source of encouragement . I acknowledge my parents, John Mbutia and Beth Njeri for their perpetual encouragement and advice. I also dedicate this research report to my colleagues and friends in the housing sector. To my children and future grandchildren, this research report will be a beckon of hope and prosperity.

ACKNOWLEDGEMENT

It is with humility that I thank the Lord, my maker and protector for being with me and helping me to draft this research report. I acknowledge my supervisor Dr. Josphat Kyalo as well as other lecturers in the department of management science for their guidance throughout the process of writing this research report. They are the ones who taught me how to strive through any challenge that came by and how to achieve on such initiatives. I acknowledge my friends among other colleagues at work who in one way or another helped me succeed towards the completion of my studies.

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ACRONYMS AND ABBREVIATIONS

CS	-Cabinet Secretary
DIR	- Department of Industrial Relations
EA	-Environmental Audit
EIA	-Environmental Impact Assessment
EMCA	-Environmental Management and Coordination Act
KPI	-Key Performance Indicator
MDGs	- Millennium Development Goals
NBCF	- National Building Code of Finland
NCA	-National Construction Authority
NHC	-National Housing Corporation
R&D	-Research and Development
PEB	- Pre-Engineered Steel Building
SPSS	- Statistical Package for Social Sciences
USSEC	-United States Securities Exchange Commission
USA	-United States of America
UNDP	- United Nation Development Programme
TFV	-Transformational-flow Value

OPERATIONAL DEFINITION OF TERMS

Residential Buildings -Edifices or houses that have been developed and designed for people to live in or get accommodation as either rentals or private homes

Occupational Ethics Practices - enforcement practices on standards that govern the conduct of employees working in an industry especially in government agencies such as NCA or Ministry of Housing, Lands and Urban Development

User Acceptance Compliance - Enforcement practice or process where customers or tenants verify the condition of a building before buying or paying rent for occupation

Compliance -Fulfilling the legal requirements of a process such as in construction

Building code compliance –practice towards ensuring that rules or a set of laws that govern or specify contractors obey the standards of fulfilling a construction process.

ABSTRACT

The collapse of multi-storey buildings in Nairobi City County has increased with an equal escalation in construction of residential buildings. The performance of the NCA projects in Nairobi city County, Kenya has been questioned due to its poor enforcement of construction compliance. The purpose of this study was to assess the effect of residential buildings compliance practices on performance of the National Construction Authority projects in Nairobi City County, Kenya. The study sought to assess the effect of building code compliance practices, occupational ethics compliance practices; operational building standards compliance practices and user acceptance compliance practices on performance of NCA projects in Nairobi City County. This research used descriptive research design. The target population was all the 403 top, middle and lower level staff currently working in the various departments within the institution, which is in charge of currently over 1011 projects. The sample size of this study was 81. Data collection was done using questionnaires administered by personal approach through drop and pick later method. The data was tested for reliability using Cronbach Alpha coefficient of 0.7 and above. Quantitative data from encoded and analysed using SPSS Version 22.0. Data was subjected to descriptive, relational and inferential analysis. all the four variable (building code compliance practice, occupational ethics compliance practice, Operational building standardization practice and User acceptance compliance practice) has significant and positive effect on the performance of NCA projects with .000, .040, .012, .030 respectively. The study concluded that; the house developers have complied with the building regulations set, the building code was displayed for public approval during construction, there are no signs of cracks in the houses, materials used in constructing the house were the most appropriate and that; the developers clear with the NCA during construction. Developers were also wary of corruption during the construction phase, the private developers conducted EIA before constructing the house, NCA and Nairobi County was consulted before constructing this house and that tenants are informed of all flaws existent in the building. Old standards cause weakness to the building, there are Amendments to Building Control Act and Regulation of multi-storey residences and there are different licensing standards of builders and engineers of residential builders. The study concluded that the residents understand all aspects of the building systems, the agents use an inspection service to inspect buildings before sale to tenants, the residents have accepted the safety models adopted, there is voluntariness in initiating the required number of stories needed in multi-storey buildings, the buildings meet material change of user requirements and that land control was considered during construction. The study recommends that the management at NCA continue with the motive of establishing many more building code compliance practices in Nairobi city for the essence of their efficiency. The NCA managers and stakeholders responsible for operational building standardization practice and occupational ethics compliance practice and take it as an initiative to educate their esteemed clients in the construction industry on the usage of best compliance practices while at the same time enlightening them on occasional problems they might experience due to making poor approaches or applications which could lead to losses of their building investments in the city. In this case, training programmes should be prepared and hire best trainer of trainer teams to ensure that the strategy of compliance does its best.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Worldwide, construction projects of any kind require adequate compliance approaches that when well-done act as deterrence strategies that help foster valuable networking relationship between the regulator body or the regulated organizations and their operations. Adequate compliance is also worldwide used to educate the bodies that regulate so that they continue using models of compliance that encourage firms to perform better every day while meeting high international set standards (Macrory, 2014). For better project performance, best, governments have put up approaches that can prove highly effective in changing the ideological believes that building and construction is just there as a concept to overlook. Better practices help reduce the risks of infringement by contractors and engineers in the building and construction or the housing sector in most states or nations (Harlow *et al.*, 2009). Tough approaches to enforcement, say deterrence advocates, make it rational for government authorities to give a high priority to compliance (Macrory, 2014). Compliance practices are hence considered very essential whenever it comes to project performance enhancement to any sector category or industry.

The California Department of Industrial Relations (DIR, 2016), states that private constructors should follow the law governing public works in all construction works. The department avows that due attention should be given during new constructions, alterations, demolitions, installations, repair and maintenance. Compliance is thus defined as a state of being that is in accordance to the established guidelines, specifications or legislations (Biegelman & Biegelman, 2013). It is the commitment to transparency and accountability as it is required by law in maintaining business integrity (Ramakrishna, 2015). Companies are thus required to have programs, policies and controls in place in order for them to be termed “compliant with rules and laws” (US SEC, 2013).

Mostly, projects associated with public works be they be infrastructural projects that are either constructed by the government or for public consumption requires to be well evaluated and related authorities take full charge and control by ensuring that right measures are adhered to (Minicucci, 2004). According to Ismail (2011) agreements of public works have been entrenched with new international clauses that encompass private buildings. Private developers of infrastructure are seen to benefit from compliance to standards guiding public works (Snape, 2016). Research and development (R&D) is seen as an essential policy in ensuring that the major areas of construction, repair and maintenance technology are adapted in public and private development. Snape (2016) explains that infrastructural projects in the US usually have to undergo and be approved on matters compliance with adequate monitoring and evaluation usually done by the DIR of 2016.

In France, infrastructural development projects as well as residential or commercial building and construction are also governed using regulations drafted by the Ministry of Public Works (Vescovo, Agostiano, Baracco, Pane & Viridia, 2011). Technical rules are used to ensure there is “accessibility, adaptability and visibility of private buildings” (Vescovo *et al.*, 2011). The specifications promote compliance of developers during the architectural process and in installing temporary products in the buildings. Compliance is also required in cultural centres embedded in these establishments to ensure adherence to local and international safety standards. In Australia, the Schedule 8 of the Building Regulations of 2008 shows the kinds of buildings that are exempted from building and occupancy permits. The schedule describes the height and kinds of facilities that are allowed by law to carry exempt certificates. However, most buildings in the Commonwealth are required to comply with the public works regulations that characterize the self-assessment of buildings.

1.1.2 Building and Construction Compliance Practices

Mostly, big cities in the world associate are associated with multi-storey buildings that are manned by a government authority during their construction. Brennan & Law Society of Ireland (2008) defined a city building as a construction that comprises of five or more stories and a basement that is the story. The purpose of a multi-storey construction is increasing the building's floor area without increasing the area of the land upon which the construction is made. Multi-storey buildings are buildings constructed with multiple floors above the ground handling point (Egenhofer and Mark, 2002). Additionally, multi-storey building purpose to save money and reduce expenses while increasing input. Residential multi-storey buildings have arisen due to increase in laxity to enforce building laws. The Local Government of Ireland Act, 1988 provides for the application of building regulations in erection of multi-storey constructions.

According to Roper (2012) more than 24 people were killed in the Brazilian capital after a-two multi-storey building collapsed. Storied buildings in the city centre are 20 to 10 stories-high (Roper, 2012). Northern America, USA metropolitan areas of New York, Washington and Baltimore among others were subject to overcrowding, poor sanitation and jerry-built constructions. Improved multi-storey houses were not considered the priority of the municipal, state or Federal governments. Financing of building constructions was wholly undertaken by individuals and other philanthropists (Roper, 2012).

In Dhaka, the capital city of Bangladesh, there is a lack of building regulations as well as their enforcement. Krämer, Khan & Kraas (2011) indicated that high rise buildings had transformed Bangladesh with inner city constructions ranging from one-story to multi-storey buildings. The materials are hardly strong enough to stand against a storm but they never run out of demand. In

June, 2010; a five-story building in the Tejgaon area of Bangladesh collapsed and killed 20 people leaving scores injured (Krämer *et al.* 2011).

In the African context, a country report done for East Africa on Development and Harmonisation of environmental standards in East Africa found that there are difficulties in enforcing existing laws because some words and phrases are too general hence difficult to interpret and prove in court of law. Implementing and enforcement Agencies tend to implement portions of the law and leave out others sometimes due to conflict of interest. Portions of law are subjective as found in legislation to control pollution with such statements like “...if the officer is satisfied that there is a nuisance...” for which the officers’ satisfaction is very subjective. There was absence of quantified standards and guidelines and penalties very low. The sectoral application of laws, lack of coordination of actions and no feedback mechanism were found to contribute to poor enforcement (UNDP, 2011). In Uganda for example, In the state of Victoria, Australia, the Work Safe which is a Government organization responsible for safety and health was found not to be effective in residential building industry where they turn up only after an accident has occurred. It was noted that in some instances, the organization issued up to three notices before any precaution was taken. Workers worked safe when the officers were present just to avoid being fined (Poustie and Corney, 2018). there was a weakness in enforcement and ignorance of the importance of safety and Health Regulations as stipulated in Factories Act, (1964) and Public Health act (1965) leading to poor building and construction project performance (Hlubega and Kiggundu, 2017).

In Kenya, construction of residential buildings is coordinated by the NCA that was established by the NCA Act No. 41 of 2011. The NCA is mandated with regulating the construction of buildings and coordinating their development (Ndumia, 2015). The NCA also acts as the coordinator of building safety programs within the Nairobi County and the rightful enforcer of building safety

standards on multi-storey development in Nairobi County (Authority, 2002). Chemutai (2015) associates safety in development with achievement of the Millennium Development Goals (MDGs) without showing emphasis on the safety program. The planning and Building Regulations Act of 2009 states that multi-storey domestic dwelling of “up to the 4th floor may each have their own container or may share a container” (RR3.2). Residential buildings “above the 4th floor should share a container fed by chute unless citing” or chute operation is rendered impossible (RR3.2). This necessity is vital as far as water safety of the residents is concerned (Roper, 2012).

The NCA also ensures compliance of residential buildings in regards to their design and construction to building and environmental standards to avoid structural failure (Ndumia, 2015).. Chemutai (2015) states “environmental compliance is compulsory for private house developers” especially now that each country is to continue achieving the Sustainable Development Goals (SDGs). Apart from enforcement, the safety program aims at analysing performance based regulation to verify the functional levels of multi-storey safety (Berenguer, Grall & Soares, 2011).

According to the Concepten (2011), multi-storey buildings have huge requirements for noise protection as compared to single-occupancy houses. Thus, NCA checks on noise pollution that has the ability to dismember walls and partitions between rooms. Moreover, the ceilings and partitioned walls in multistory buildings require tougher designs as compared to single occupancy ceilings. The latter is surrounded by housing structures while the former is surrounded by light-weight matter. Berenguer, Grall & Soares (2011) look at escape staircase as distinguishing aspects of multi-story residential buildings with particular emphasis on fire safety requirements. However, there still lacks statutory provisions that instil a different approach to construction of multi-storey residential buildings. The authority requires engineers and house developers to have a certificate to indicate that the multi-storey residential building complies with the building codes. Building of multi-storey

buildings is guided by regulation enacted by the public works regulation. These buildings house the middle class citizens as well the poor.

1.2 Statement of the Problem

Proper projects performance requires proper planning that is well encoded, well managed, coordinated or controlled, an initiative that requires authorities of different states oversee the enforcement and adherence to some compliance. In the housing sectors, building and construction practices mostly requires such compliance practices by ministries or authorities concern for it is here that contractors and resident owners assume rules and regulations set. While the Physical Planning Act of 1996 (Cap, 286) of the Laws of Kenya together with other planning laws and regulations were enacted to deal with approvals and licensing of developments in Kenya, there are yet so many cases on buildings particularly those meant for human settlement in the urban areas which lack approval and the required authorisation to be put up of which NCA should oversight as projects.

In a similar context, In Nairobi City County, this has been one of the planning system's central weaknesses, where much development proceeds without oversight and in contravention of prepared physical plans. Building codes have often evaded and residential structures are collapsing, killing residents. The collapse of multi-storey buildings in Nairobi County has increased with an escalation in construction of residential buildings at the same time. These edifices have been subject to collapses due to noncompliance of building regulations or poor enforcement strategies. Contrary to section 30 of the Physical Planning Act (Cap 286), majority of stakeholders usually assume most of the processes and approvals relative to land division change of user, approval plans where they

encourage or enhance construction of buildings haphazardly at high densities especially in locations that seem to grow very fast with high public density.

Local studies has been done a case study by Makachia (2015) on Nairobi estates identified that residential houses were inhibited in their formation of “dweller-initiated transformations” on housing designs. A study by Kamau (2010) and Rukwaro (2013) stated that the building codes adopted in Nairobi County were based on foreign procedures and have not been adopted into the current system. A study by Ndumia (2015) reported a low performance of the NCA hence putting to question on the organization’s failure to monitor the construction of residential buildings Engineers and scholars explain the introduction of “new” codes as the reason for noncompliance. There lacks a conceptual argument and relevant specific related studies that elaborates on the specific relationship between the variables reflected in this study; building code compliance, the role of occupation ethics, the effect of operation building standardization or the effect of user acceptance in relation to performance of construction projects. According to the Fox Business News (2015) performance is not addressed in these codes (used in Nairobi) and it only stresses on materials that are expensive. Safety on construction projects must always be ensured and emphasized. None of these studies uniquely elaborated on how a building and construction compliance practice effect the performance of NCA projects, specifically within the City County of Nairobi, hence depicting a research gap. The intent of this study was to assess the effect of residential buildings compliance practices on performance of the national construction authority projects within Nairobi City County, Kenya.

1.3 Objectives of the Study

This section presented both the general and specific objectives of the study;

1.3.1 General Objective

The general purpose or objective of this study was to assess the effect of residential buildings compliance practices on performance of the National Construction Authority projects within Nairobi City County, Kenya.

1.3.2 Specific Objectives

The specific objectives of this study were as follows:

- i. To establish the effect of building code compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya
- ii. To determine the role of occupational ethics compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya
- iii. To evaluate the effect of operational building standardization practice on performance of the National Construction Authority projects within Nairobi City County, Kenya
- iv. To investigate the relevance of user acceptance compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya

1.4 Research Questions

The following research questions had been adopted by the study.

- i. What is the effect of building code compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya?
- ii. What is the role of occupational ethics compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya?

- iii. What is the effect of operational building standardization practice on performance of the National Construction Authority projects within Nairobi City County, Kenya?
- iv. What is the relevance of user-acceptance compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya?

1.5 Significance of the Study

This research study will be significant to the following:

This research will aid the Nairobi County in adopting relevant and updated building codes that will be easily integrated into infrastructural development in the County. It will also help private developers learn the benefit of compliance to building standards that ensure professionalism. The study will help tenants to identify the buildings that are safe for occupancy. In this case, all stakeholders involved in the building activities including the NCA staff as well as the ministry related agencies will be in a position to understand the effect of building and construction compliance enforcement in Kenya and beyond. The NCA staff will be in a position to enhance the performance of their related projects within Nairobi City County and outside. In short, the findings will aim to reduce the number of buildings collapsing due to lack of compliance to public works standards.

The research results of this study will be of significant to the government and policy makers as well as other similar bodies that are associated with oversight. The findings of this study will act as a basis of understanding towards the effect level of each of the building and construction compliance practice. The government on the other end will consider drawing more policies, enforce more operations or revise current strategies towards compliance practices in the housing sector in Kenya.

This findings of this study with the related conclusions and recommendations of the study will also be of significance to future researchers and academicians. In this case, they will use the results, conclusions as well as the recommendations therein as basis for their research in the same field of compliance practices in building and construction sector and how they effect on project performance. The results may also be used to justify or argue against their findings.

1.5 Scope of the Study

The scope this study was the National Construction Authority headquarters at Nairobi city County. The target population was the top, middle and lower level staff currently working in the various departments within the institution. The study also targeted contractors registered with NCA (specifically those in control of projects within the city county whose list was obtained from NCA offices). These are the ones most convers with the residential building compliance practices adopted by the ministry and the authority at large towards enhancing safe construction projects within entire cities and urban towns in Kenya. Hence, the best able to respond to the raised research questions.

1.6 Limitation of the Study

This study was limited to Nairobi City County only; hence, the results will only represent the scenario of the situation on effect of building and construction compliance practices, Kenya. In this case the researcher embarked on a thorough effort to outline, in clear language, all the information in relation to the variables and give a factual account of the findings on the study.

Due to culture and taboos, the researcher may also face a challenge in obtaining valid information since some respondents may fear providing such information not to appear as having a negative motive to the orphaned students. In this case the researcher informed the participants that the data

collected and the results was used entirely for academic purposes only not for any prior investigation and that they would not be required to indicate their names to guarantee their privacy.

Approaching the contractors, NCA staff comprising of the top middle and lower level staff and the executive officials in an effort to collect their opinions may appear to be a limitation of this study. In this case, the researcher obtained and use permit letters which will explain the warrant to undertake the study in accessing NCA Headquarters and contractor offices and agree on specific timelines to meet the participants and engage them on their interest to participate in the study and when to serve them with questionnaires for data collection.

1.7 Organization of Study

This research project report has been structured in five chapters. Chapter one presents the background of the study, statement of the problem, research objectives and the significance of the study. It also presents the scope, limitations and delimitations as well as the basic assumptions of the study. Chapter two presents the literature review on building and construction compliance practices and their relationship towards projects performance and a conceptual framework. Chapter three focuses on the research methodology used in the study and the ethical considerations employed. The last two chapters present the data analysis and the summary of findings respectively.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature review has been presented in the order of; the theoretical review, empirical review, and the conceptual framework and the summary on the research variables in a tabular form.

2.2 Theoretical Review

The following theories were best suited to represent this research study.

2.2.1 Resource-Dependency Theory

This research was guided by the resource-dependency theory whose proponent are (Pfeffer & Salancik 1978). According to the theory, the pressure on land is to turn all available space into housing units.” There is country wide pressure to build houses from every location that has available land. It is this pressure that has increased multi-storey buildings in Nairobi. Safety in the building of multi-storey residential buildings has been neglected with most developers leaving it to the engineers and contractors. Krämer, Khan & Kraas, (2011) state that up-market real estate developers are pressured to turn all available land into housing units with excessive forms of land grabbing and filling. These developers build the residential homes in undesignated land areas using non-standard materials. According to Hackenbroch *et al.* (2009) the plastic industrial area of Islambag area in Bangladesh was illegally turned into a residential place (Kramer *et al.* 2011).

This theory is applicable in this study on the grounds that projects be they private or public requires adequate resources that must be established at the early stages of idea generation to the latter stage of completion. The dependency part of the variable indicates that the activities that utilize the resources must be manageable ones and can be efficiently achieved without undertaking or suffering risks. The efficiency of projects especially the complex building and construction based ones ought

be accompanied with the best Agile project management techniques so as to get best completion ratings and related outcome indicators that explain project performance. Thus value is reflected by project end and not the usual project start while addressing issues of compliance and adherence to standards, principles, ethics and the associated practices for better performance of projects by NCA.

2.2.2 Production Theory

The production theory was proposed by Koskela & Howell (2002). According to the theory production is taken to be a process that is based on better transformation of inputs and outputs at every stage of development. The theorist insists on best approaches towards project management such as in planning, execution and in the control as the core activities besides other support activities such as monitoring and evaluation and efficient communication all through. For control, the thermostat model proposes changing performance levels in order to achieve end results that do not deviate so much with the expected. Economically, the production theory mainly focus on the demand of input and the supply functional- aspects of the output based on technical restraints in production (Valence, 2012).

This theory is applicable to this study on grounds that construction projects require compliance enhancement due to their need of in promoting efficiency and user acceptance. According to Radosavljevic & Bennett (2012) building and construction projects are built on five concepts. They include: construction products and processes, organizations, interactions and relationships, learning and performance. In the production theory, organizations and agencies conducting constructions should have their performance measured by efficiency (Radosavljevic & Bennett 2012). To enhance user acceptance and better performance of the NCA projects, there should be interactions between the construction managers (task groups) and possible tenants to ensure proper adherence to standards.

2.2.3 Transformational-Flow Value Theory

The flow view imbedded in lean production is well translated in the Transformation Flow-Value (TFV) theory introduced by Koskela (1992). This theory goes beyond the transformation view of production to include flow and value. The basis of the traditional view of production is merely transforming inputs to outputs as efficiently as possible. However, TFV theory incorporates three views of production: transformation, flow, and value (Koskela 2000, Ballard et al. 2003, Elfving 2003). The transformation view regards better project outputs as value creation, transforming inputs to outputs in a manner that suits customer expectations. The flow view, advocated by TFV, focuses on reducing and eliminating wastes and other non-value-adding activities from the value stream. The value stream is the sequence of activities in which value is added to product or service as it travels from design through manufacturing until it is delivered to the end project outcome customer(s). Accordingly, TFV is concerned with reducing lead times, decreasing variability, and simplifying processes and enhancing the required compliances especially where project performance is key. Moreover, TFV supports pull production control and continuous process improvement. The value view of TFV theory, answers the voice of the customer by delivering the best possible value to match what is considered valuable from a customer standpoint (Koskela 2000, Ballard et al. 2003). Moreover, TFV theory calls for structuring, executing, and improving production from the combined view of transformation, flow, and value.

The applicability of this theory in this study is based on the concepts of transformation in construction, flow of production and creation of value in building and construction projects by the responsible state ministries, policy makers and agencies (Koskela, Howell, Ballard, & Tommelein, 2002). In this case, compliance practices in the building and construction industry must be of value and well enhanced if authorities like NCA are to succeed towards seeing related projects perform in

the Nairobi city county and its environs. Problems in construction such as design failures that lead to collapses are seen as self-inflicted due to the “prevailing limited view on production” (Koskela *et al.*, 2002). The TFV explains the value of considering client decision making and design management from an extensive view before engaging in construction. Poor production planning before construction is cited as a vital component of design failures that in the end destroys building development. Using the theory, clients are advised to integrate compliance aspects such as safety and ethics compliance, building codes compliance, building standards compliance and user acceptance compliance practices at the commencement of building to the end- as an add on component so as to enhance performance in the building and construction industry.

2.3 Empirical Review

This part of the study presents the empirical research that have been conducted on compliance practices namely; building codes compliance, occupational ethics compliance, building standards compliance and user acceptance compliance practices.

2.3.1 Building Code Compliance Practice and Projects Performance

The building code and its related practices was set up as a development control tool to comprehensively address among others, matters revolving around aesthetics, safety, public health, lifespan and performance of the built environment and their inhabitants (Koskela, 2010). The code and its related requirements, practices and actions clearly outlines the process of application for development permission and erection of buildings. It sets the limit of 30 days as the period within which the authority must communicate to the developer or his agent about the status of the application under. Under clause 9, the code defines the extent of approval including basis of conditions or period within which development must be commenced or tenanted and even grounds for disapproval (Hughes & Ferrett 2011).

For purposes of ensuring safety of both occupants and buildings during and after construction, the code provides for mandatory inspections; that a person who has erected a building shall give to the council notice in writing of its completion to enable a final inspection to be made and a certificate of completion to be issued and that no person shall occupy, use or permit the occupation or use of any building before a certificate of completion has been issued by the council in respect thereof. The regulations further prescribe mandatory enlisting of services of registered architecture and engineers under clause 12 for purposes of design and supervision of certain category of buildings to ensure compliance with the set standards (Biegelman & Biegelman, 2013).

The Building code compliance practice in project management and project performance helps inform the process of building in Kenya, and requires a developer to be aware of various requirements that need to be fulfilled before undertaking the building process. It is important that any developer carries out due diligence on the issues that are likely to be confronted in the process of construction, right from inception of architectural designs, to the commissioning of the completed building; the whole process of receiving building approvals for the said project. The function of the building codes compliance practice is to help contractors and engineers as well as architectures regulate the design of buildings in accordance with health and welfare of personnel (Ching, 2018).

The codes compliance practices together with the related aspects prescribe the best practices and also the performance. However, the building codes do not give the means with which perfect building results can be achieved. In regards to safety, building codes are only associated with fire safety. In a research done by Korhonen & Hietaniemi (2015) the National Building Code of Finland (NBCF) was seen to recognize fire safety as the only safety requirement before construction would progress. The multi-storey building was required to have designs for fire classes as well as areas for

preventing fire scenarios. The planning and Building Regulations Act of 2009 identifies Kenya's building plan development with the colonial government of 1926. Code 95 of 1995 seeks to reduce costs without emphasis on compliance to the building codes to improve the quality of the house. Different countries have different approaches.

Countries such as the USA and Japan are prone to earthquakes and other natural disasters that threaten the solidity of their houses (Kamau, 2010). However, these countries have established building codes that deal with this condition. By use of Pre-engineered steel buildings (PEBs), the USA and Japan are able to withstand the aggressive impact of earthquakes and storms (Kamau, 2010). The PEB construction system forms the basis for the USA building code. However, in Kenya, the building code is founded on the British standard that focuses on concrete and steel beams. The PEB system is the most effective when used in the Kenyan system. However, the PEB system is foreign to Kenya's building code.

Ching (2018) confirms that building codes are adopted and enforced by the local government to regulate the design, construction, alteration and repair of buildings. The purpose of the codes is seen to ensure public safety, health and welfare. The codes profile the occupancy of buildings and set minimum standards for materials, construction methods and safety measures such as fire safety. Although researchers such as Ching (2018) and Kamau (2010) have identified the best-modern building codes there are still challenges that accompany the construction of multi-storey residential buildings (Chemutai, 2015). There is a gap in how developers should comply with the planning and building regulations in the codes. They are also based on foreign procedures that have not been integrated into the Nairobi system. Performance is not addressed in these codes and it only stresses on materials. To fill the research gap, the essence of this study was to establish the establish the

effect of building code compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya.

2.3.2 Occupational Ethics and Projects Performance

Ethical decision making is very crucial in developing a company, organization that values doing what is right. Agencies overseeing construction projects usually set specific ethical practices negated towards arising dissatisfaction from stakeholders and state governments at large. A study by Fedoruk, Cole, Robinson and Cayuela (2015) indicated that the most common unethical conduct is evidenced by the contractors by overpricing, subcontracting, lack of safety ethics, overstatement of capacity and qualifications to secure all of which affect efficiency towards building and construction projects that are user friendly.

Following the collapse of a series of multi-storey residential buildings in 2014 to 2015, the acting Cabinet Secretary (CS) in charge of Land, Housing and Urban Development; blamed the vice on corruption (Daily Mail Online, 2014). The latest building to collapse in the Roysambu region in April 2015 had been designed to handle three floors. The contractor colluded with the county inspectors to allow the construction of six floors in the building. The multi-storey building collapsed killing four construction workers instantly. There exists a gap of knowledge into how the workers and area residents should be involved before any constructions through public participation.

The Governments of Kenya and Uganda spend a huge portion of their national budget into physical infrastructure development (Ekolu, Dundu and Gao. 2014). Multistory residential houses are regulated by laws to ensure they have heat-storing capacities and privacy amenities. Nevertheless, Uganda and Kenya are subject to building collapses as a result of poor planning and unethical conduct by building personnel in adhering to building procedures. No research has been done to

show how the poor integration of ethics has affected the construction of residential multi-storey buildings in Nairobi County.

The Kenya Gazette of 10 Feb, 2006 requires multi-storey buildings to have “a maximum of 35% ground coverage and 0.75 plot ratio.” Building is also regulated by the Environmental Management and Coordination Act (EMCA) of 1999. Section 58 of EMCA provides for new projects to undergo Environmental Impact Assessment while on-going projects undergo Environmental Audit (EA). Fox Business (2015) reported of how an 8 story residential building collapsed on January 5, 2015 killing two people and entrapping eight more in the rubble. Cases of building collapses have arisen in Nairobi with hundreds losing their loves and thousands getting hospitalized. Owners of multi-storey buildings in Nairobi are in the habit of renting while the buildings are half-way built. The year 2015 saw three multi-storey buildings fall in the Nairobi area alone. The Nairobi County Executive distanced itself with claims that the owners were permitted by the County Government to conduct the construction illegally. The intent of this study was to determine the effect of occupational ethics compliance practice on performance of the National Construction Authority projects in Nairobi City County, Kenya.

2.3.3 Operation Building Standards Compliance Practice and Projects Performance

Building standards compliance practice is associated in ensuring that the laid down standards, both local and international are adhered to the latter by the stakeholders involved towards better performance of building and construction projects. Structural collapse of concrete elements at the time of handling, mixing and erection lead to crush. Sometimes contractors want to make extra profit by saving on input costs. This compromises the standard of the concrete mixture and reduces the quality of the structures made. The structures collapse when being handled or erected and cause

injury. Building structures have been known to collapse due to use of substandard materials leading to massive death and injuries (Corney & Poustie, 2012).

In Uganda, a suspended floor slab of a two-storied building which had reached roofing stage at Buziga collapsed and injured two workers (Hlubega & Kiggundu, 2017). The indicators or predictors that may have contributed to the collapse and site injuries were; a) faulty designing, that constituted the use of incorrect items, components as well as inadequate concrete mix strength,; weaknesses in concrete components due to inaccurate modifications; inadequate reinforcing; wrong-cost cutting by the contractor; additional structuring not in the original plan; incorrect lifting associated with wrong erection practices which constituted the unsafe use of rigging; lifting before the concrete component has attained its design level strength,; weakness that resulting from any error encountered while pre-fabricating the concrete integrations among a host of other reasons (Cherono, 2012). The study found that these factors reflect negligence, lack of supervision, not following the approved plans and specifications. Tragic collapse of buildings projects under construction is an experience that is becoming common in Kenya. It is however discouraging how the authorities give a host of excuses when a building collapses. There is therefore a possibility of human errors that that were thought to be the cause factors of the collapse of the building. In 2006 in Nairobi a building collapsed and 16 people died and over 200 were injured (Beintema et al., 2010).

During construction of residential houses projects, fire load regulations are used in Finland within apartment buildings that are not more than 600 MJ/m² (Mikkola, Hakkarainen and Matala, 2013). Ninety five percent (95%) of multi-storey buildings in Finland comply with this law. In Sweden, the fire load value is 80 MJ/m² or 80% of the factual count. This load helps the building to withstand any weight complications as a result of heat. Jacksonville (2014) says that residential multi-storey

buildings should have test-smoke areas and tight fitting entrances and wires that do not require extension cords. Proper construction ensures apartments within the buildings are not overloaded with circuits. Mikkola et al. (2013) reiterates that residential buildings should be located at least 5 to 8 meters apart. This requirement helps to mitigate risks that arise from the proximity of buildings in a neighborhood. However, the technical aspects required by the Finnish law are not directly applicable to the Kenyan situation. There is no research as to how such international standards compliance practices can be integrated into the Kenyan situation to ensure proper the NCA projects performance.

According to the Canada Mortgage and Housing Corporation (CMHC, 2000), Canadian multi-residential buildings were shown to require costly repairs while they were still relatively new (less than 2 years old). Out of the 44 multi-storey residential buildings researched upon, 36 were shown to have moisture-related problems (CMHC, 2000). Constructions were undertaken without considering flashing consideration (Coppola, 2007). Buildings are constructed lacking essentials such as caulking thereby making them susceptible to leakages and rain penetration. The building plans investigated were devoid of clear guidelines. Moreover, insufficient budgets limited the multi-residential homes from considering all major safety concerns leading to difficulties building and construction projects performance.

Various building standards are enforced. To eliminate or minimize the risks, a risk control hierarchy is designed for application to ensure that the control measure which provides the greatest level of safety is selected. It is applied where reasonably practicable in the order a) elimination which involves removal of the specific risk entirely and adopting another way of doing the job; engineering controls whereby machinery or equipment to perform tasks are designed to protect workers from the risks substitution which entails reducing the risk significantly by using alternative

method or process; and hazards. Isolation ensures that the level of exposure of worker to the hazard is kept to a minimum; administrative controls which are most useful in building construction. They include implementing safety procedures and policies to minimize exposure to the risk; PPEs are used when it is simply not possible to use other methods. It can also be used together with the other controls and should always be seen as the last resort (Corney & Poustie, 2008).

Environmental controls are also used to remove hazards if the substance is airborne, or to shield the source, if it is a physical hazard. Physical hazards such as noise, ultraviolet (UV) radiation from arc welding, infrared radiant (IR) heat from hot objects are shielded with some appropriate material for example plywood sheets shield IR and UV radiation, while material that absorbs and reflects sound will provide protection from noise (Queensland Government, 2009). As can be seen, the hazards and risks experienced by workers in the building construction industry are numerous, some of which are serious and can lead to death of the workers. It is also clear that the hazards and risks can be minimized by putting mitigation measures in place and applying the hierarchy of controls (Corney & Poustie, 2008; Queensland Department of Justice and Attorney General, 2008).

Much of building construction is being realized in the developing nations where urbanization rate is very high, income levels are low and workers are employed on very temporally terms. In Kenya building construction workers are not screened for health purposes before they are engaged (Rantanen, 1989). Workers tend to concentrate more on getting and retaining their jobs more than worrying about their health and safety. They lack basic health facilities like drinking water, enough food, first aid and sanitary facilities. This exposes the workers to ill health and malnutrition. They are also prone to contracting communicable diseases like dengue, tuberculosis, cholera and malaria. Lack of eating and sanitary facilities may also lead to health deterioration. Often, workers cannot wash before meals and must eat in the work zone, which means they may ingest toxic substances

transferred from their hands to food or cigarettes. A lack of changing facilities at work sites may result in transmission of contaminants from the workplace to a worker's home (Murie, 2007).

Low levels of education and poor training of workers and managers is another challenge. Building construction has the bulk of the workers engaged for manual labour on daily basis. It is seen as low status, dirty and dangerous job. Most of these workers are the disadvantaged in society with little or no education. Therefore, they may not grasp the importance of health and safety (Murie, 2007). On the other hand, managers who are inexperienced in health and safety systems may adopt a highly complicated system of management procedures and this could be very difficult to administer (Marshall, 2002). To fill the gap, the intent of this research was evaluate the effect of building standardization practice on performance of the National Construction Authority projects within Nairobi City County, Kenya.

2.3.4 User Acceptance Compliance Practice and Projects Performance

User acceptance compliance practice ensures that building and construction projects must please the residential users as indicator of performance. According to a study by Lowry (2002) the effect of user acceptance in enforcing building management systems through the use of questionnaire survey helps a lot. The study worked on the assumption that users or clients were not making the full use of their building facilities and thus had inadequate knowledge to comprehend building compliance. The study used technology models to analyse acceptance and the positive impact of perceived use (Fedoruk, Cole, Robinson & Cayuela, 2015). The study concluded that perceived use was more important as compared to compatibility based on the user's "perceptions for voluntariness." However, Lowry (2002) does not consider the need of safety that is paramount in facilitating user acceptance. The research lays less focus on user acceptance and gives more emphasis to user perceptions to buildings. In addition, it does not discuss the impact of user acceptance to residential

buildings such as multi-storey apartments. Lowry's (2002) research also leaves out details on "material change of user" as required by the Physical Planning Act (Cap 286). The research does not explain land control in relation to construction of residential buildings or towards NCA projects performance at a larger look.

In Australia there was low cooperation between the subcontractors which affects building and construction projects success/performance to a great extent, the Federal government, and workers unions on enforcement of occupational safety and health issues (Petrovic and Perry, 2014). The construction industry has been experiencing a lot of difficulties due to lack of government policies or ineffective policies to support it. For instance, in Sri Lanka government tender procedures based on low prices are sometimes inefficient. Political instability of the country created rapid changes of certain policy decisions taken by the previous governments. For instance, decisions to awarding of contracts were revised in many instances hence affecting the industry and its productivity (Nayanthara, et al., 2015). According to Nayanthara (2015), there is low appreciation of legislation governing safety and health in building construction industry. The laws are not strongly enforced and some contractors are not even aware of their safety and health obligations under the laws. Regulatory bodies on the other hand have limited resources to enable them enforce the laws that are user acceptance friendly. To try fill this gap, the intent of this study was to investigate the effect of user acceptance compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya.

2.4 Summary of Research gaps

The following table presents the literature review summary and the main gaps identified in the study.

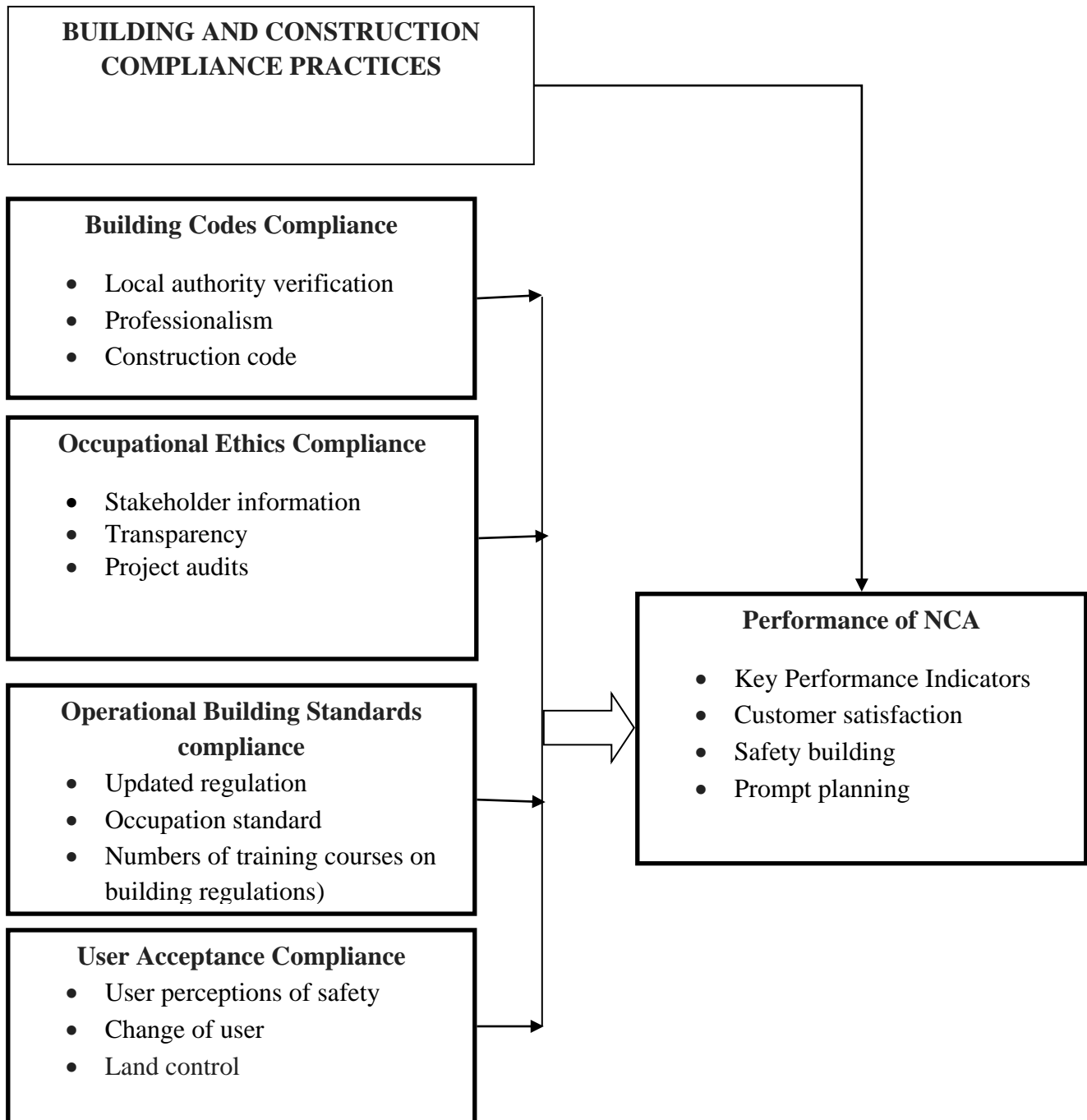
Table 2.1: Research Gap Summary Table

Author (year)	Title	Findings	Research gaps
(Nayanthara, et al., 2015).	Factors affecting decision making in the construction industry in Kenya	Political based factors and lack of adequate policies were highest influencers	Extent of the influence was not well established to elaborate which factors affected the performance of the construction industry; study never relied on performance of related projects
Lowry (2002)	The effect of user acceptance in enforcing building management systems	end users were not using the facilities well for noncompliance	User acceptance indicators lacked of course the study concentrated much on noncompliance measures
Hlubega & Kiggundu, 2017).	Predictors that contribute to the collapse of buildings in urban centres in Kenya	The indicators or predictors that may have contributed to the collapse and site injuries were; a) faulty designing, that constituted the use of incorrect items, components as well	Study was not necessarily on critical indicators, it relied mostly on building standards
Fedoruk, Cole, Robinson and Cayuela (2015)	Ethical practices and their influence on performance of building and construction projects in Kenya	Findings indicated that indicated that the most common unethical conduct is evidenced by the contractors by overpricing, subcontracting, lack of safety ethics, overstatement of capacity and qualifications to secure all of which affect efficiency	No evidence about the extent to which ethical practice influenced projects performance

Source, Author (2021)

2.1 Conceptual Framework

The following diagram was a graphical representation of the relationship between the independent variables used in the research and the dependent variable with an intervening variable in between.



Independent Variables

Dependent Variable

Figure 2.1: Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter contained the research methods used in the research. It covers the research design chosen for the study. It examined the study population and sampling design and size chosen for the research. It indicated the methods of collecting data chosen for the report and describes the data collection procedure. It concluded by giving an analysis of the data and its presentation.

3.2 Research Design

This research used descriptive research design. According to Monsen, Van & American Dietetic Association (2008) descriptive research design is appropriate in confirming hypothesis and devising variable associations. In this case, the design was appropriate since the research describes the application of safety measures on construction of multi-storey residential buildings while describing the cause/ effect of noncompliance. The study was conducted in a short time since it will relied on the building code and measures that are already in place. The research was also relied on already analysed nominal data to enable substantial confirmation of the effect of safety in multi-storey residential buildings around the world. The aim was to assess the effect of residential buildings compliance practices on performance of the National Construction Authority projects in Nairobi City County, Kenya.

3.3 Target Population

The target population in research is defined by Sim & Wright (2002) as the cases that the researcher is interested in. They form the basis for generalizations. The population of this study was the National Construction Authority headquarters at Nairobi City County. The target population were all the 403 top, middle and lower level staff currently working in the various departments within the

institution and in charge of 1011 ongoing construction projects. The study also targeted Nairobi County Housing executives as well as contractors registered with NCA (specifically those in control of projects within the city county whose list was obtained from NCA offices). These are the ones most convers with the residential building compliance practices adopted by the ministry and the authority at large towards enhancing safe construction projects within Nairobi City County. Hence, the best able to respond to the raised research questions. The distribution of the target population was as shown in the table below

Table 3.2: Target Population

Category	Target population
NCA Staff	231
Housing executives	55
Registered NCA contractors	117
Total	403

Source: NCA Statistics, 2021

3.4 Sampling Design

A sample is a set of respondents obtained from a targeted population with an aim of establishing the features of the population Siegel (2013). It refers to a section of the population chosen in order to have a clear representation of the whole population. Sampling is the procedure or technique applied while selecting a sample of the population that is to participate in the research study (Ogula, 2008). According to Creswell (2013), a sampling frame is a list used to define a researcher's population of interest. The sampling frame defines a set of elements from which a researcher can select a sample of the target population.

In the case of this study, the researcher used stratified sampling technique or approach to arrive at a sample size of equal representation of 20% drawn from all the categories of the participants. Dattalo

(2008) stated that the ideal sample size is determined by individual predictors that explain the relationship between variables in a research. Further, Barlett, Kotrlik & Higgins, (2001) state that the accuracy and quality of the research is determined by appropriate, adequate and non-excessive sample sizes. According to Rubin & Babbie (2010) the sample size should be distributed based on the estimated error of sampling in a distribution table. The sample size of this study was therefore be 81 possible respondents as distributed in the table below;

Table 3.3: Sample Size

Category	Target population	Sample size (20%)
NCA Staff	231	46
Housing executives	55	11
Registered NCA contractors	117	23
Total	403	81

Source: Researcher (2021)

3.4.1 Sampling Design

Monsen, Van & American Dietetic Association (2008) explain the simple random sampling method as effective since it gives each entity (individual) in the target population an equivalent opportunity of being included in the sample. This research employed stratified random sampling technique identify the research sample for analysis. The sample size for the research was 81 people.

3.4.2 Data Collection Tools and Techniques

This research used questionnaires in collecting the data among the sampled respondents. According to International Conference on QQML, Katsirikou, Skiadas and ASMDA International Society (2010) questionnaires consist of both closed and open-ended questions that produce both “qualitative and quantitative data.” This research will used questionnaires to get optimum information to aid in data analysis. The questions were prepared and had questions utilizing a Likert

scale. Cargan (2007) states that the Likert scale give consistent answers that enabled the researcher to rightly differentiate and analyse the responses.

3.5 Piloting Test

A pilot study refers to a small-scale is a preliminary experiment carried out to test the feasibility, challenges, duration, and costs of an actual, large-scale experiment, before embarking on an official research undertaking to allow improvements on the study design before the main study can be done (Crowther & Lancaster, 2012). In this case, a pilot study was done where 10% sampled respondents who will be will be requested to participate in the study.

3.5.1 Validity of the Instrument

Validity refers the degree of accuracy of a research instrument in measuring a set of parameters in a given study. In other words, it is the ability of research instrument to provide a truth representation of the variables under investigation in solving a research problem (Robson, 2011). The validity of the research instruments was achieved by running an appraisal session of the chosen instruments by the respective supervisors assigned by the university, who were experts in research methods in their respective fields. In addition, the research instrument were subjected to a review by the study supervisors and a preliminary test to eliminate any errors and inconsistencies that may arise. Next, the necessary improvements were made. For example, ensuring the right sample size for the study had been achieved, and articulating the question in the questions to a plausible level of clarity and relevancy to avoid errors in data collection.

3.5.2 Reliability of the Instrument

A preliminary small-scale study was executed to assess the dependability of the formulated questionnaires. In this case, a pilot study will be done where 10% sampled respondents who were

requested to participate in the study, preferably from a different county. A reliability analysis was subsequently carried out with the help of the Cronbach's Alpha test that has been proven to yield accurate indications of the internal consistency of a particular data set by determining a scale measures a similar construct, and whether the data gathered on each variable has significance on the dependent variable. This helped determine whether the results attained over time and if they are an accurate generalization of the entire population being investigated. If so, then the research instrument is acceptable as reliable tool with regards to research methodology in academic research. Once the data collected from the pre-test study has been subjected to the Cronbach's alpha test, which is essentially a function of its coefficient for testing the internal consistency of data, then, the reliability of the research instrument was ascertained. To measure the reliability of the data to be gathered, Cronbach's alpha will be applied. Cronbach's alpha is a coefficient of internal consistency. Tavakol and Dennick (2011) the viable value of the alpha coefficient in the Cronbach's test ranges from 0.70 to 0.95 in measuring the internal consistency of a data set. Thus, the Cronbach's alpha value that were obtained from the data used in the study provide an indication of the reliability level of the research instrument as above range of 0.70 to 0.95. The table below presents the reliability results.

Table 4.4: Reliability results

Variable	Alpha value
Building code compliance practice	.8600
Occupation standards compliance practice	.7900
Operation building standards compliance practice	.9200
User acceptance compliance standard	.9300

3.6 Data Collection Procedure

Seliger & Shohamy (1990) stated that all data collection procedures in research affected the data under analysis. In addition, Zaza, Wright-De Agüero, Briss, Truman, Hopkins, Hennessy & Pappaioanou (2000) explain that collection of data should first begin by acquiring research permits from head offices. The research employed a research assistant to aid in administering questionnaires and collecting data. The data was collected in a span of one month (30 days) to ensure all participants had time to answer the questionnaires and give appropriate feedback if necessary.

3.7 Data Analysis and Presentation

The process of data analysis involves the coding of data in a format in which the researcher can relate the variables and make connections to arrive at findings that can be reported to enrich existing literature on the research problem of interest. The ordering of information in such a manner allow for the effective recording and communication of findings in furthering the extant literature (Cameron, Sankaran & Scales, 2015). This study used descriptive statistics in carrying out the analysis of the collected data. Descriptive statistics was used to describe data collected from a sample of the target population. The percentages, standard deviation, median and mean were the commonly used parameters used in descriptive statistical analysis. Bickel & Lehmann (2012) asserts that data analysis methods involve the processes of grouping and coding the gathered data into structured sequence with regards to the objectives of the study such that the findings can be effectively presented and interpreted. As such, similar responses that share a common theme or patterns were categorized together. In order to evaluate statistical significance of the independent variables against dependent variables, the researchers used multiple linear regression analysis..

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

Where

Y = Performance of NCA Projects within Nairobi City County

X_1 = Compliance to Building Code Compliance Practice

X_2 = Occupational ethics Compliance practice

X_3 =Operational Building Standards Compliance practice

X_4 = User Acceptance Compliance Practice

ϵ = Error Term

β_0 is the constant of the regression equation or simply the Y intercept.

β_1 , β_2 , β_3 and β_4 are the gradients of the regression calculation, α is the error term which was assigned a mean of 0. Usually, for calculation purposes, it is often assigned a value of 0. For purpose of computation, the value is assumed to be 0.

3.7.1 Normality test

According to the study carried by Kline (2011) observed that normality test is utilized in determining whether a data set is effectively designed by having a normal distribution and to calculate how accurate is the random variable influencing the data set to be effectively and normally distributed. More importantly, the test acts as a form of a model that can be interpreted in various ways, depending on personal's understanding of probability: In statistical terms, the researcher may determine the efficacy of fit of a normal model to the information or data. It is then understood that if the data is well modelled then the fit is regarded to be good in respect to the distribution norms, without necessarily judging other underlying variables. In contrast, frequentist statistical hypothesis tests, information or data is tested against the null hypothesis that is normally distributed.

Further, in Bayesian statistics, normality test is not conducted, but instead, it computes the possibilities that the information or the data obtained from a normal distribution that possesses particular parameters μ, σ (for all μ, σ), and compares that with the likelihood that the data come

from other distributions under consideration, most simply using a Bayes factor (giving the relative likelihood of seeing the data given different models), or more finely taking a prior distribution on possible models and parameters and computing a posterior distribution given the computed likelihoods. Normality of the variables were examined using the Skewness and kurtosis. According to Kline (2011) the univariate normality of variables can be assumed if the Skewness statistic is within the interval (-0.3, 3.0) and the kurtosis statistic lying in the interval (-10.0, 10.0).

3.7.2 Multicollinearity Test

The issue of Multicollinearity may arise if two or more variables was be highly correlated. It may affect the estimation of the regression parameters (Hair et al., 2010). Multicollinearity is a state of very high inter-correlations or inter-associations among the independent variables. It is therefore a type of disturbance in the data, and if present in the data the statistical inferences made about the data may not be reliable. There are certain reasons why Multicollinearity occurs: It is caused by an inaccurate use of dummy variables, it is caused by the inclusion of a variable which is computed from other variables in the data set, and Multicollinearity can also result from the repetition of the same kind of variable. It generally, occurs when the variables are highly correlated to each other. Multicollinearity can result in several problems. These problems are as follows: The partial regression coefficient due to Multicollinearity may not be estimated precisely. The standard errors are likely to be high. Multicollinearity results in a change in the signs as well as in the magnitudes of the partial regression coefficients from one sample to another sample. Multicollinearity makes it tedious to assess the relative importance of the independent variables in explaining the variation caused by the dependent variable (Hair et al., 2010).

In the presence of high Multicollinearity, the confidence intervals of the coefficients tend to become very wide and the statistics tend to be very small. It becomes difficult to reject the null hypothesis of

any study when Multicollinearity is present in the data under study (Hair et al., 2010). Multicollinearity was tested by examining the correlation matrix. Pearson correlation coefficient was used to show the relationship between various pairs of variables.

3.7.3 Heteroscedasticity Test

In statistics, a collection of random variables is heteroscedastic (or heteroskedastic; [a] from Ancient Greek hetero “different” and skedasis “dispersion”) if there are sub-populations that have different variabilities from others. Here "variability" could be quantified by the variance or any other measure of statistical dispersion. Thus heteroscedasticity is the absence of homoscedasticity. The existence of heteroscedasticity is a major concern in the application of regression analysis, including the analysis of variance, as it can invalidate statistical tests of significance that assume that the modelling errors are uncorrelated and uniform—hence that their variances do not vary with the effects being modelled. The study used Breusch-Pagan/Cook-Weisberg test for heteroscedasticity. Homoscedasticity describes a situation in which the error term (that is, the “noise” or random disturbance in the relationship between the independent variables and the dependent variable) is the same across all values of the independent variables. Heteroscedasticity (the violation of homoscedasticity) is present when the size of the error term differs across values of an independent variable. The impact of violating the assumption of homoscedasticity is a matter of degree, increasing as heteroscedasticity increases.

3.7.4 Autocorrelation

Autocorrelation is a characteristic of data in which the correlation between the values of the same variables is based on related objects. It violates the assumption of instance independence, which underlies most of the conventional models. In this case, the researcher carried out the test called the Durbin Watson test that detects the presence of autocorrelation.

3.8 Ethical Consideration

Neumann (2013) refers ethical considerations as all practices and aspects that were considered as a collection of behaviours that are correct as far as the research world views them. They entail the ethical practices from start of a given research to data collection and later on to data analysis and data protection. For the case of this research study, the researcher obtained a research or authorization permit from the National Commission for Science, Technology and Innovation (NACOSTI) one that enabled the researcher to prove that he has met the government standards on matters data collection from the respective NCA Offices. The researcher also picked a data collection letter approved by the school of education, Kenyatta University and an introductory letter from the universities that accompany the research tools. Besides, the researcher applied all the integrity measures as stipulated in terms of respecting the respondents, ensuring no harm, no forceful participation in responses giving, no falsely accusing them or no giving false data, no manipulation or bribing of the respondents and so far. Finally, all data was safeguarded as confidential after analysis.

CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the research findings and discussions as pertains to the effect of building and compliance practices on the on performance of the National Construction Authority projects within Nairobi City County in Nairobi City County, Kenya. The section was guided by the following objectives of the study; to establish the effect of building code compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya, to determine the effect of occupational ethics compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya, to evaluate the effect of operational building standardization practice on performance of the National Construction Authority projects within Nairobi City County, Kenya and to investigate the effect of user acceptance compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya. The SPSS programme was used to compute the measures of central tendency.

4.2 Response Rate

Status	Frequency	Response Rate
Responded	76	94
Not Responded	5	6
Total	81	100

Source: Researcher (2021)

The study targeted a total of 81 possible respondents who constituted the top, middle and lower level management staff working in the various departments at the National Construction Authority offices. Out of the total, 76 questionnaires were returned fully filled up with responses whereas 18 questionnaires were returned in a faulty mode or never got responses for one reason or another thereby giving the study a response rate of 94%. This was adequate according to Mugenda and

Mugenda (2010) who advocates that a response rate of 75% or higher is adequate for an academic research.

4.3 Background Information of the Respondents

Table 4.5: Gender

Gender	Frequency	Percentage
Male	54	71
Female	22	29
Total	76	100

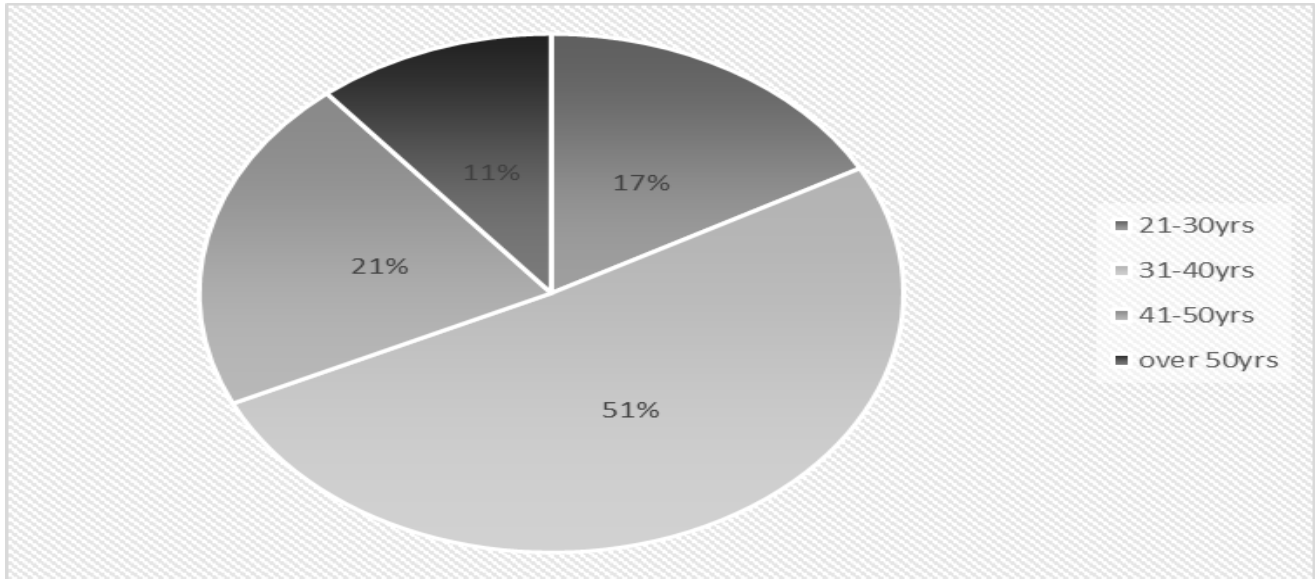
Source: Researcher (2021)

The researcher wanted to establish the gender of the respondents; According to the findings displayed in the table 4.4 above, 71% of the respondents were male whereas the rest were female. This implied that the respondent tried as much as possible to embrace both gender opinions on the raised research questions.

4.3.1 Age Bracket of Respondents

The figure below depicts findings on respondent's age bracket. According to the findings, 51% of the respondents were aged between 31-40 years, 21% were aged between 41-50 years, 17% were aged between 21-30 years whereas 11% were aged over 50 years respectively. This is an implication that most of the respondents who constituted the staff working in the departments at the National Construction Authority offices targeted were middle aged. Similar information is presented in the Figure 4.1 below;

Figure 4.2: Respondents' Age Bracket

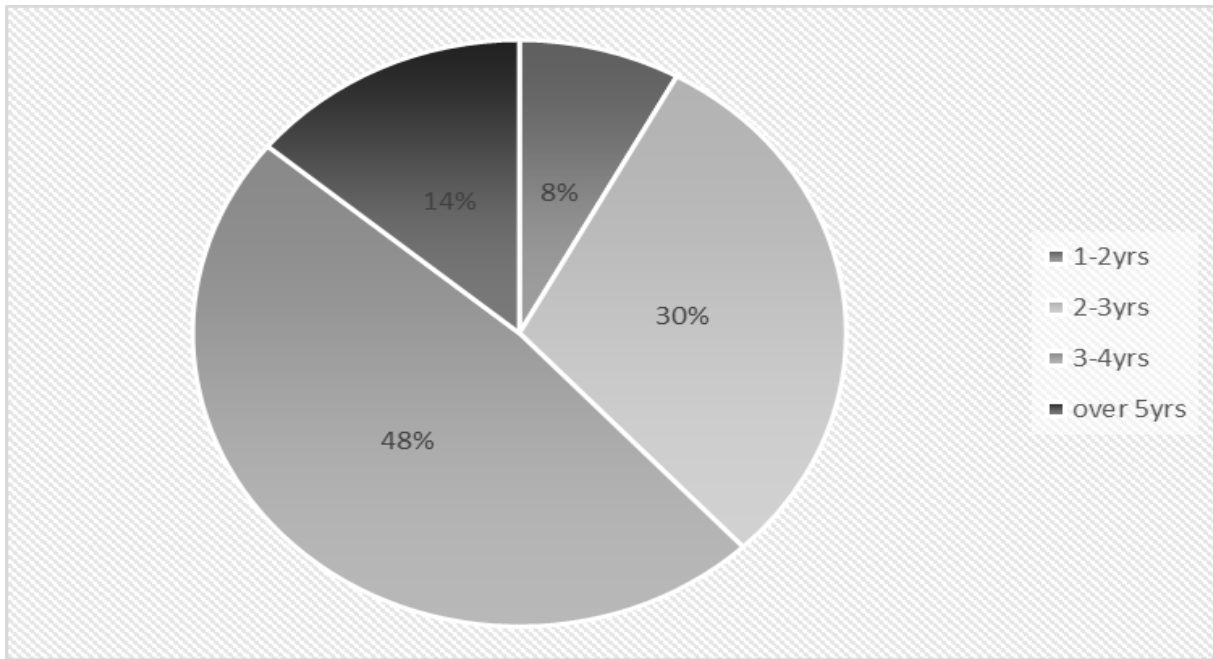


Source: Researcher (2021)

4.3.2 Duration respondents had worked for NCA

The Figure 4.2 below depicts findings on duration respondents had worked for their specific departments at NCA. On this question, majority of the respondents as represented by 47% said that they had worked for NCA for a duration of 3-4 years, 30% said 2-3 years, 14% said 5 years and above whereas a few as shown by 8% said they had worked for the respective NCA offices for a duration of 1-2 years respectively. This was an implication that most staffs had worked for their respective departments at National Construction Authority offices for an adequate time (3-4 yrs) warranting them to understand and answer well on the raised research questions and the themes of the study. Similar information is presented in the figure below;

Figure 4.3: Duration respondents had worked for the NCA



Source: Researcher (2021)

Table 4.6: Highest Level of Education

Education Level	Frequency	Percentage
Secondary level	6	8
College level	29	38
University level	41	54
Total	76	100

Source: Researcher (2021)

The researcher asked the respondents their highest level of education. According to their responses displayed in the Table 4.5 above, 54% of the respondents indicated that they had reached university level, 38% said that they had college level education whereas 8% said that they had secondary level education. The fact that majority of the staff had university and college level education is a clear implication that most had adequate understanding to adequately respond to the raised research questions. Mugenda and Mugenda (2009) advocates that the higher the education level of the

respondents in any given research is a true reflection of how well they understands concepts as requested. The same information is presented in the figure below;

4.4 Building Code Compliance Practices and performance of NCA Projects

4.4.1 Satisfaction level with the building code compliance practice adopted by NCA

Table 4.7: Satisfaction of building code compliance practice adopted NCA

Extent	Frequency	Percentage
Very satisfied	9	12
Satisfied	46	61
Undecided	7	9
Dissatisfied	12	16
Very dissatisfied	2	3
Total	76	100

Source: Researcher (2021)

The researcher wanted to establish the respondents’ extent of satisfaction with the building code compliance practice adopted by the National Construction Authority. On this question, majority of the respondents as shown by 61% were satisfied that with their building code compliance practice adopted by the National Construction Authority, 16% were dissatisfied, 12% were very satisfied whereas others as shown by 9% were undecided respectively. This was an implication that according to the staffs understanding, building code compliance practice and associated aspects were being done in the right way.

Table 4.8: Agreement levels on the effect of Building code compliance practice performance of NCA Projects

Statements	Strongly agree	Agree	Moderately agree	Disagree	Strongly disagree	Mean score	Std. dev
The house developers have complied with the building regulation	29 %	70 %	0%	1%	0%	4.27	0.0347
The building code was displayed for public approval during construction	10 %	88 %	1%	1%	0%	4.07	0.0331
There are no signs of cracks in the houses	8%	90 %	1%	1%	0%	4.05	0.0329
Materials used in constructing the house were the most appropriate	11 %	86 %	1%	1%	1%	4.05	0.0329
Did the developers clear with the NCA during construction	24 %	66 %	4%	3%	3%	4.05	0.0329

Source: Researcher (2021)

The Table 4.7 above depicts findings on the respondent’s level of agreement with the given statements on the effect of building code compliance practice on performance of the National Construction Authority projects within Nairobi City County. According to the findings, majority of the respondents were in agreement that; the house developers have complied with the building regulation as shown by the mean score of 4.27, the building code was displayed for public approval during construction as shown by the mean score of 4.07, there are no signs of cracks in the houses as shown by the mean score of 4.05, materials used in constructing the house were the most appropriate as shown by the mean score of 4.05 and that; the developers clear with the NCA during construction as shown by the mean score of 4.05 respectively. The findings concur with the findings

that building code and its related practices are usually set up as a development control tool to comprehensively address among others, matters revolving around aesthetics, safety, public health, lifespan and performance of the built environment and their inhabitants (Koskela, 2010).

4.5 Occupational ethics compliance practice and performance of NCA Projects

4.5.1 Agreement of occupational ethics compliance practice adopted by the NCA

Respondents were required to indicate their level of agreement with the occupational ethics compliance practice adopted by the National Construction Authority in Kenya. According to the question, majority as shown by 58% were very satisfied about the occupational ethics compliance practice adopted by the National Construction Authority in Kenya, 14% were undecided, 14% were dissatisfied, 11% were undecided whereas 3% were very dissatisfied. This was an implication that the staffs understanding with relation to occupational ethics compliance practice and associated aspects were being done in the right way. The results are displayed in the Figure 4.3 below;

Figure 4.4: Agreement of occupational ethics compliance practice adopted by the NCA

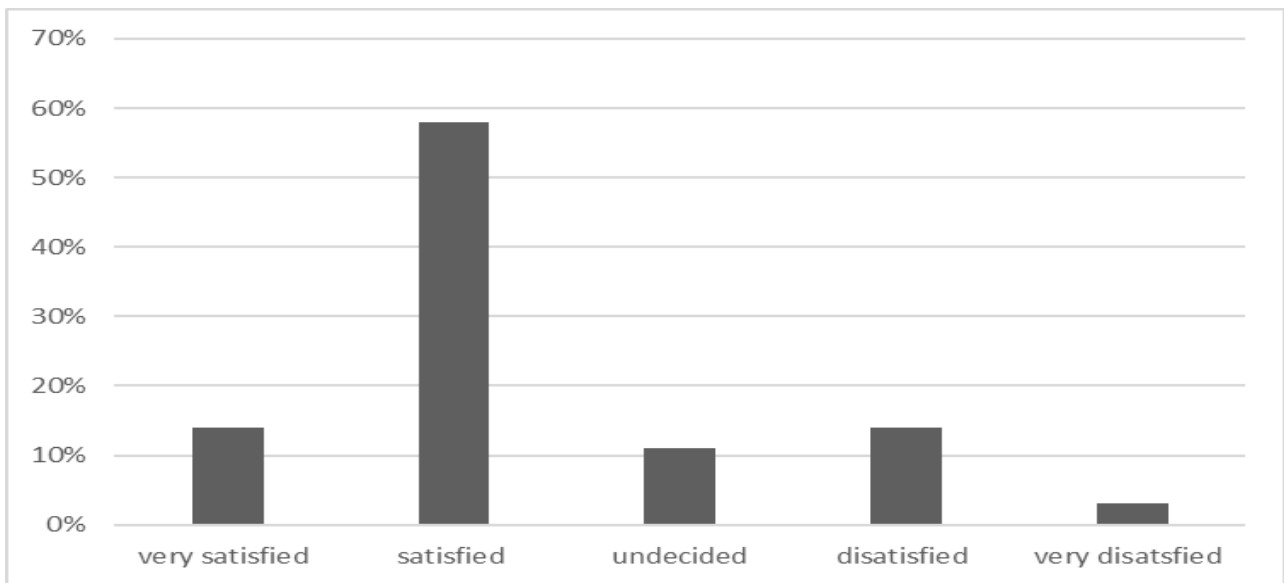


Table 4.9: Occupational ethics compliance practice and performance of NCA Projects

Statements	Strongly agree	Agree	Moderately agree	Disagree	Strongly disagree	Mean score	Std deviation
Developers are wary of corruption during the construction phase	15%	85%	0%	0%	0%	4.14	0.0337
The private developers conducted EIA before constructing the house	15%	84%	1%	0%	0%	4.14	0.0337
The NCA and Nairobi County was consulted before constructing this house	24%	66%	4%	6%	0%	4.08	0.0332
Tenants are informed of all flaws existent in the building	7%	77%	12%	2%	2%	3.85	0.0313

Source: Researcher (2021)

The researcher wanted to establish the respondents' level of agreement on the effect of occupational ethics compliance practice on performance of the National Construction Authority projects within Nairobi City County as depicted in the results in the table above. According to the findings, majority of the respondents were in agreement that; developers are wary of corruption during the construction phase as shown by a mean score of 4.14, the private developers conducted EIA before constructing the house as shown by a mean score of 4.14, the NCA and Nairobi County was consulted before constructing this house as shown by a mean score of 4.08 and that; tenants are informed of all flaws existent in the building as shown by a mean score of 3.85 respectively. According to the literature reviewed and despite the positive responses on benefits of the occupational ethics compliance practice, Fedoruk, Cole, Robinson and Cayuela (2015) indicated that the most common unethical conduct is evidenced by the contractors by overpricing,

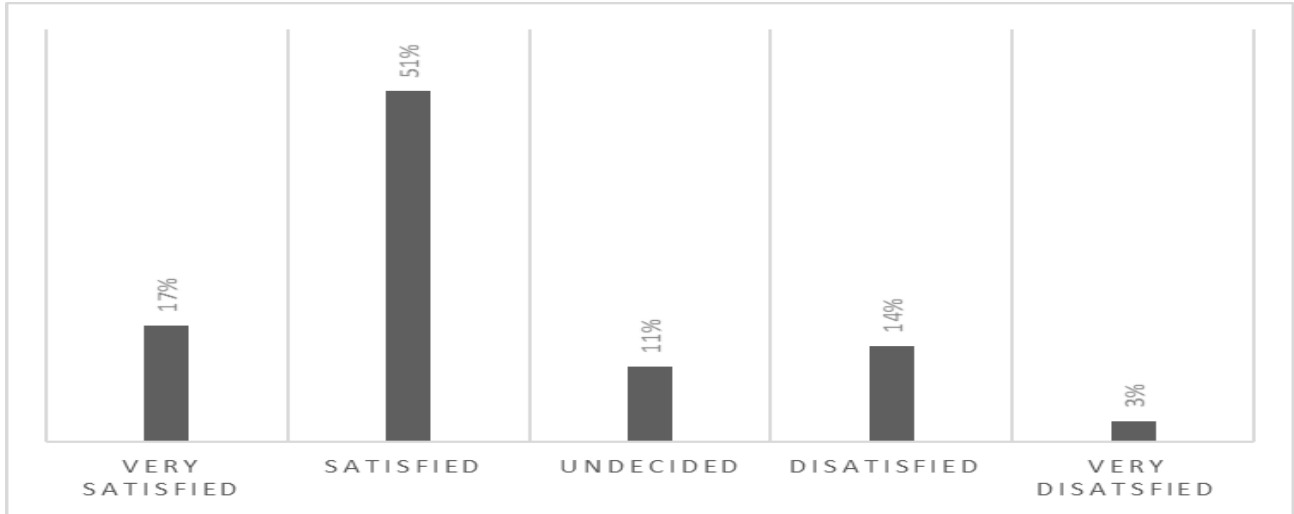
subcontracting, lack of safety ethics, overstatement of capacity and qualifications to secure all of which affect efficiency towards building and construction projects that are user friendly.

4.6 Operational building standardization practice and performance of the NCA Projects

4.6.1 Agreement of operational building standardization practice adopted by the NCA

The researcher wanted to establish the respondents' level of agreement with the operational building standardization practice adopted by the National Construction Authority. According to the findings, 51% of the respondents were satisfied with the with the operational building standardization practice adopted by the National Construction Authority, 14% were dissatisfied, 14% were undecided, 17% said they were very satisfied whereas 3% were very dissatisfied Respondents with the operational building standardization practice adopted by the National Construction Authority. This was an implication that the staffs understanding, operational building standardization practice and associated aspects were being done in the right way. The information is shown in the Figure 4.4 below;

Figure 4.5: Operational building standardization practice adopted by the NCA



Source: Researcher (2021)

Table 4.10: Agreement levels on effect of operational building standardization practice on performance Of NCA projects

Statements	Strongly agree	Agree	Moderately agree	Disagree	Strongly disagree	Mean score	Percentage
The development considered all building standards during construction	23%	69%	4%	3%	1%	4.1	0.0021
Do the old standards cause weakness to the building	24%	68%	4%	3%	1%	4.1	0.0011
There are Amendments to Building Control Act and Regulation of multi-storey residences	24%	64%	7%	5%	0%	4.07	0.0331
There are different licensing standards of builders and engineers of residential builders	18%	70%	12%	0%	0%	4.06	0.0330
The minimum standards for design, construction and performance set by NCA are integrated in building standards	15%	79%	2%	4%	0%	4.05	0.0329
The building regulations contains rules for constructing private and commercial buildings	19%	71%	6%	3%	1%	4.04	0.0020

Source: Researcher (2021)

The Table 4.9 above presents the results concerning the respondents' level of agreement level on effect of operational building standardization practice on performance of the National Construction Authority projects within Nairobi City County. According to the displayed results, majority of the respondents were in agreement that; the development considered all building standards during construction as shown by the mean score of 4.1, the old standards cause weakness to the building as shown by the mean score of 4.1, there are Amendments to Building Control Act and Regulation of multi-storey residences as shown by the mean score of 4.07, there are different licensing standards of builders and engineers of residential builders as shown by the mean score of 4.06, the minimum standards for design, construction and performance set by NCA are integrated in building standards as shown by the mean score of 4.05 and that the building regulations contains rules for constructing private and commercial buildings as shown by the mean score 4.04 respectively. The results concur with the literature that sometimes contractors want to make extra profit by saving on input costs. This compromises the standard of the concrete mixture and reduces the quality of the structures made. The structures collapse when being handled or erected and cause injury. Building structures have been known to collapse due to use of substandard materials leading to massive death and injuries (Corney & Poustie, 2012).

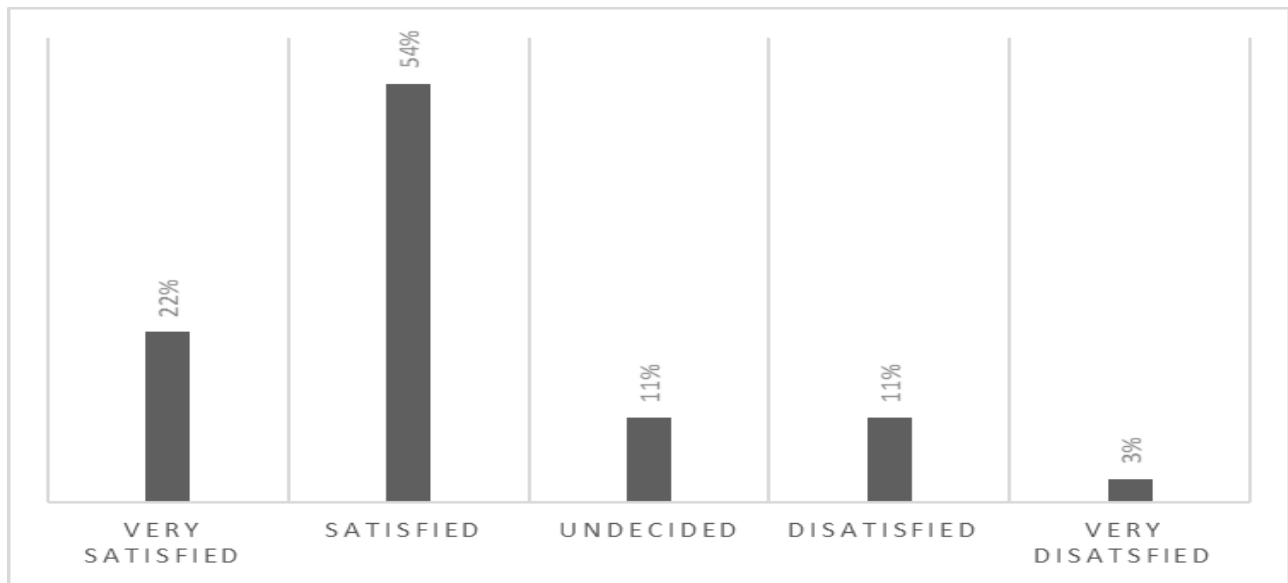
4.7 User acceptance compliance practice and performance of NCA Projects

4.7.1 Satisfaction with the User acceptance compliance practice adopted by the NCA

The Figure 4.6 below depicts findings on respondent's level of satisfaction with the User acceptance compliance practice adopted by the National Construction Authority. According to the results, majority of the respondents 54% indicated that they were satisfied that with the User acceptance compliance practice adopted by the National Construction Authority, 22% said very satisfied, 11% were undecided or equally dissatisfied at 11% whereas 3% were very dissatisfied respectively. This

was an implication that the staffs understanding with relation to User acceptance compliance practice and associated aspects were being done in the right way. The information is presented in the Figure 4.5 below;

Figure 4.6: Satisfaction with the User acceptance compliance practice adopted by the NCA



Source: Researcher (2021)

Table 4.11: Effect of User acceptance compliance practice on performance of NCA projects.

Statements	Very great extent	Great extent	Moderate extent	Little extent	No extent	Mean score	Std dev.
The residents understand all aspects of the building systems	11%	49%	38%	1%	1%	3.27	.2033
The agents use an inspection service to insect buildings before sale to tenants	13%	50%	35%	1%	1%	3.22	.1023
The residents have accepted the safety models adopted by the engineers	7%	77%	12%	2%	2%	3.05	.1110
There is voluntariness in initiating the required number of stories needed in multi-storey buildings	10%	76%	10%	2%	2%	3.00	.0022
The buildings meet material change of user requirements	8%	90%	1%	1%	0%	2.95	.0120
Land control was considered during construction	19%	68%	11%	1%	1%	4.03	0.0020

Source: Researcher (2021)

The Table 4.10 above depicts the results on respondents' level of agreement with the given statements that had to do with the effect of User acceptance compliance practice on performance of the National Construction Authority projects within Nairobi City County. According to the findings, majority of the respondents were in agreement that; the residents understand all aspects of the building systems as shown by the mean score of 3.27, the agents use an inspection service to insect buildings before sale to tenants as shown by the mean score of 3.22, the residents have accepted the safety models adopted by the engineers as shown by the mean score of 3.05, there is voluntariness

in initiating the required number of stories needed in multi-storey buildings as shown by the mean score of 3.00, the buildings meet material change of user requirements as shown by the mean score of 2.95, land control was considered during construction as shown by the mean score of 4.03 respectively. The results agree with the literature reviewed by Nayanthara (2015), there is low appreciation of legislation governing safety and health in building construction industry. The laws are not strongly enforced and some contractors are not even aware of their safety and health obligations under the laws. Regulatory bodies on the other hand have limited resources to enable them enforce the laws that are user acceptance friendly.

4.8 Performance of the National Construction Authority Projects

The study wanted to establish whether respondents think that building and compliance practices have promoted the overall performance of the National Construction Authority projects within Nairobi City County. According to the findings, majority of the respondents 88% were in agreement that building and compliance practices have promoted the overall performance of the National Construction Authority projects within Nairobi City County whereas only a few 12% who stated that building and compliance practices have not promoted the overall performance of the National Construction Authority projects within Nairobi City County. The information is presented in the Figure 4.6 below;

Figure 4.7: Respondents thought on whether building and compliance practices have promoted the overall Performance of the NCA projects.

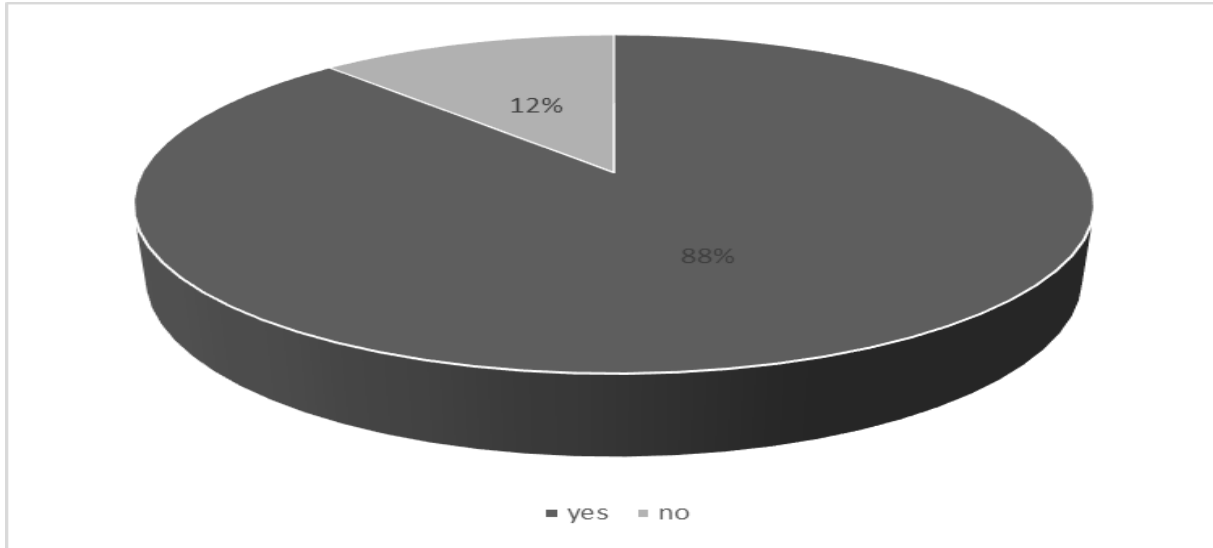


Table 4.12: Performance measures enhanced by building and compliance practices at NCA

Performance Measures	Very great extent	Great extent	Moderate extent	Little extent	No extent	Mean score	Std dev.
Has the NCA satisfactorily handled construction of residential multi-storey buildings in Nairobi	19%	71%	6%	3%	1%	4.04	0.0016
Are ethical checks conducted by the NCA during constructions	15%	70%	13%	1%	1%	3.97	0.0012
Are building contracts for multi-storey residential building investigated by the NCA	14%	71%	13%	1%	1%	3.97	0.0120
Is there a digital system to manage applications for residential developments	17%	68%	8%	6%	1%	3.93	0.0620
Do landlords understand NCA standards and regulatory frameworks	18%	67%	8%	6%	1%	3.85	0.0020

Source: Researcher (2021)

Finally, the study wanted to establish the extent to which performance measures had been enhanced by the adoption and use of building and compliance practices at NCA. According to the results in the Table 4.11 above, majority of the respondents agreed to a great extent that; the NCA satisfactorily handled construction of residential multi-storey buildings in Nairobi as shown by the mean score of 4.04, there are ethical checks conducted by the NCA during constructions as shown by a mean score of 3.97, there are building contracts for multi-storey residential building investigated by the NCA as shown by the mean score of 3.97, there is a digital system to manage applications for residential developments as shown by a mean score of 3.93 and that the landlords somehow understand NCA standards and regulatory frameworks as shown by a mean score of 3.85 respectively.

4.9 Inferential Analysis

4.9.1 Results Based On Model of Estimation

The Table 4.12 below presents the model of estimation on the relationship between the studied variables.

Table 4.13: Model of Estimation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Change	Df	Sig. F Change
1	.897 ^a	.805	.803	.08978	430.1	3	.000

a. Predictors: (Constant), building code compliance practice, occupational ethics compliance practice, Operational building standardization practice and User acceptance compliance practice

b. Dependent Variable: Performance of the National Construction Authority projects within Nairobi City County

Source: Author (2021)

Adjusted R squared is coefficient of determination that shows the changes in the dependent variable as a result of variations in the independent variables. As can be seen from the above Table 4.12, the adjusted R-value was at 0.803, showing a change of 80.3% on dependent variable. This indicates

that the model was a good fit in; building code compliance practice, occupational ethics compliance practice, Operational building standardization practice and User acceptance compliance practice. In addition, the adjusted multiple coefficient of determination of 0.803 indicates the high joint impact of the explanatory variables. It means that 80.3% of changes in performance of the National Construction Authority projects within Nairobi City County are explained by the changes in building code compliance practice, occupational ethics compliance practice, Operational building standardization practice and User acceptance compliance practice whereas 19.7% of changes on performance of the National Construction Authority projects within Nairobi City County are explained by other speculated factors such as location and demographic factors among others. This can be confirmed by the high figure of F value of 430.1, which implies a high joint explanatory ability.

4.9.2 Results based on ANOVA test

The section below presents the Analysis of Variance (ANOVA)

Table 4.14: Analysis of Variance (ANOVA)

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	166.214	3	27.702	3437.147	.000 ^b
	Residual	1.072	133	.008		
	Total	167.286	136			
a. Dependent Variable: <i>On performance of the National Construction Authority projects within Nairobi City County</i>						
b. Predictors: <i>(Constant), building code compliance practice, occupational ethics compliance practice, Operational building standardization practice and User acceptance compliance practice</i>						

Source: Author (2021)

The findings of the ANOVA are as shown in the above Table 4.13. The p-value was at 0.000 which is lower than 0.05. from the regression analysis findings the model was significant when it comes to predicting the On performance of the National Construction Authority projects within Nairobi City

County at 95% confidence level based on predictor variables; building code compliance practice, occupational ethics compliance practice, Operational building standardization practice and User acceptance compliance practice.

4.9.3 Correlations among the various factors influencing on performance of the NCA Projects

The Table 4.14 below presents the correlations among the various predictor variables influencing on performance of the National Construction Authority projects within Nairobi City County.

Table 4.15: Pearson Coefficient Correlations

		<i>Building code compliance practice</i>	<i>occupational ethics compliance practice</i>	<i>Operational building standardization practice</i>	<i>User acceptance compliance practice</i>
<i>Building code compliance practice,</i>	Pearson Correlation	1	.241**	.386**	.359**
	Sig. (2-tailed)		.004	.000	.000
	N	76	76	76	76
<i>Occupational ethics compliance practice</i>	Pearson Correlation	.241**	1	.486**	.441**
	Sig. (2-tailed)	.004		.000	.000
	N	76	76	76	76
<i>Operational building standardization practice</i>	Pearson Correlation	.386**	.486**	1	.927**
	Sig. (2-tailed)	.000	.000		.000
	N	76	76	76	76
<i>User acceptance compliance practice</i>	Pearson Correlation	.359**	.441**	.927**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	76	76	76	76

** Significance level at 95% Level of Confidence

Source: Author (2021)

The researcher used Pearson’s correlation coefficient test at alpha level 0.05 to determine the relationship between each of the independent variables (building code compliance practice, occupational ethics compliance practice, Operational building standardization practice and User

acceptance compliance practice). Table 4.17 indicates a significant association among the study's independent variables building code compliance practice, occupational ethics compliance practice, Operational building standardization practice and User acceptance compliance practice. ($r=0.750$, $p=0.000$). Correlation analysis done also indicates a significant association at the 0.05 level (2-tailed).

4.9.4 Regression model on Factors influencing performance of the NCA Projects

The Table 4.15 below presents the combined regression model on factors influencing performance of the National Construction Authority projects within Nairobi City County.

Table 4.16: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	3.752	.024		154.661	.010
Building code compliance practice	0.899	.009	1.226	99.883	.000
Occupational ethics compliance practice	0.002	.003	.006	.708	.040
Operational building standardization practice	0.580	.032	3.489	81.314	.012
User acceptance compliance practice	0.108	.032	4.688	7.736	.030
a. Dependent Variable: <i>performance of the National Construction Authority projects within Nairobi City County</i>					

Source: Author (2019)

As shown in the Table 4.15, the regression equation model for the study was of the form; $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$. The figures in the above table were generated using SPSS data analysis and established the following regression equation; $Y = 1.226 + 1.226X_1 + 0.006X_2 + 3.489X_3 + 4.688X_4$. The study found that when independent variables (X_1 = Compliance to Building

Code Compliance Practice, X2= Occupational ethics Compliance practice, X3 =Operational Building Standards Compliance practice, X4= User Acceptance Compliance Practice) were kept constant at zero, performance of the National Construction Authority projects within Nairobi City County will be at 3.752. A rise by a unit in building code compliance practice will result to a rise in performance of the National Construction Authority projects within Nairobi City County by a factor of 1.226; a rise by a unit in occupational ethics compliance practice will result to a rise in performance of the National Construction Authority projects within Nairobi City County by a factor of 0.006, a rise by a unit in operational building standardization practice will result to a rise in performance of the National Construction Authority projects within Nairobi City County by a factor of 3.489, while a rise by a unit in User acceptance compliance practice will lead to increase in On performance of the National Construction Authority projects within Nairobi City County by a factor of 4.689. Each of the variable has significant and positive effect on the performance of NCA projects.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions and recommendations on the effect of building and compliance practices on the on performance of the National Construction Authority projects within Nairobi City County in Nairobi City County, Kenya. The specific objectives of the study were; to establish the effect of building code compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya, to determine the effect of occupational ethics compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya, to evaluate the effect of operational building standardization practice on performance of the National Construction Authority projects within Nairobi City County, Kenya and to investigate the effect of user acceptance compliance practice on performance of the National Construction Authority projects within Nairobi City County, Kenya..

5.2 Summary of Findings

It was established that all the four variable (building code compliance practice, occupational ethics compliance practice, Operational building standardization practice and User acceptance compliance practice) has significant and positive effect on the performance of NCA projects with .000, .040, .012, .030 respectively. The studies found out that majority of the respondents as shown by 61% were satisfied that with their building code compliance practice adopted by the National Construction Authority. According to the findings, majority of the respondents were in agreement that; the house developers have complied with the building regulation as shown by the mean score of 4.27, the building code was displayed for public approval during construction as shown by the mean score of 4.07, there are no signs of cracks in the houses as shown by the mean score of 4.05, materials used in constructing the house were the most appropriate as shown by the mean score of

4.05 and that; the developers clear with the NCA during construction as shown by the mean score of 4.05 respectively.

The studies found out that majority as shown by 58% were very satisfied about the occupational ethics compliance practice adopted by the National Construction Authority in Kenya. According to the findings, majority of the respondents were in agreement that; developers are wary of corruption during the construction phase as shown by a mean score of 4.14, the private developers conducted EIA before constructing the house as shown by a mean score of 4.14, the NCA and Nairobi County was consulted before constructing this house as shown by a mean score of 4.08 and that; tenants are informed of all flaws existent in the building as shown by a mean score of 3.85 respectively.

The study found out that 51% of the respondents were satisfied with the with the operational building standardization practice adopted by the National Construction Authority. According to the displayed results, majority of the respondents were in agreement that; the development considered all building standards during construction as shown by the mean score of 4.1, the old standards cause weakness to the building as shown by the mean score of 4.1, there are Amendments to Building Control Act and Regulation of multi-storey residences as shown by the mean score of 4.07, there are different licensing standards of builders and engineers of residential builders as shown by the mean score of 4.06, the minimum standards for design, construction and performance set by NCA are integrated in building standards as shown by the mean score of 4.05 and that the building regulations contains rules for constructing private and commercial buildings as shown by the mean score 4.04 respectively.

The study found out that majority of the respondents 54% indicated that they were satisfied that with the User acceptance compliance practice adopted by the National Construction Authority.

According to the findings, majority of the respondents were in agreement that; the residents understand all aspects of the building systems as shown by the mean score of 3.27, the agents use an inspection service to inspect buildings before sale to tenants as shown by the mean score of 3.22, the residents have accepted the safety models adopted by the engineers as shown by the mean score of 3.05, there is voluntariness in initiating the required number of stories needed in multi-storey buildings as shown by the mean score of 3.00, the buildings meet material change of user requirements as shown by the mean score of 2.95, land control was considered during construction as shown by the mean score of 4.03 respectively.

5.3 Conclusions

The study concludes that the variables are significant and most employees were satisfied with the building code compliance practice adopted by the National Construction Authority. The study concluded that; the house developers have complied with the building regulations set, the building code was displayed for public approval during construction, there are no signs of cracks in the houses, materials used in constructing the house were the most appropriate and that; the developers clear with the NCA during construction respectively.

The study concluded that most employees were very satisfied with the occupational ethics compliance practice adopted by the National Construction Authority in Kenya. It was concluded from the study that developers are wary of corruption during the construction phase, the private developers conducted EIA before constructing the house, the NCA and Nairobi County was consulted before constructing this house and that tenants are informed of all flaws existent in the building.

The study concluded that most staffs were satisfied with the operational building standardization practice adoption by the National Construction Authority. It was concluded from the study that the

development considered all building standards during construction, the old standards cause weakness to the building, there are Amendments to Building Control Act and Regulation of multi-storey residences, there are different licensing standards of builders and engineers of residential builders, the minimum standards for design, construction and performance set by NCA are integrated in building standards and that the building regulations contains rules for constructing private and commercial buildings respectively.

On the effect of User, acceptance compliance practice on performance of the National Construction Authority projects within Nairobi City County, the study concluded that most staff were satisfied that with the User acceptance compliance practice adopted by the National Construction Authority. The study concluded that the residents understand all aspects of the building systems, the agents use an inspection service to inspect buildings before sale to tenants, the residents have accepted the safety models adopted, there is voluntariness in initiating the required number of stories needed in multi-storey buildings, the buildings meet material change of user requirements and that land control was considered during construction.

5.4 Recommendations

The study recommends that the management at NCA continue with the motive of establishing many more building code compliance practices in Nairobi city for the essence of their efficiency especially in time saving and having the best qualifying buildings within Nairobi City and its environs . The study recommends that more security features as per building and construction codes be adopted to ensure that the system is up to date upcoming technology.

The study recommends that the managers and stakeholders responsible for operational building standardization practice and occupational ethics compliance practice and take it as an initiative to

educate their esteemed clients in the construction industry on the usage of best compliance practices while at the same time enlightening them on occasional problems they might experience due to making poor approaches or applications which could lead to losses of their building investments in the city. In this case, training programmes should be prepared and hire best trainer of trainer teams to ensure that the strategy of compliance does its best.

The study recommends that NCA adopt the statistical model that was established in this study in order to be able to establish which alternative best building compliance approaches and can be done to improve on which so as to collectively ensure that all building and compliance practices does the best to the benefit of the institution, the staff and the community in the Nairobi residential.

5.5 Recommendations for Further Studies

This study recommends that further studies be done to establish whether there are other effects of building and compliance practices besides the on performance of the National Construction Authority projects within Nairobi City County studied.

On the same end, further studies should be done to establish whether the building and compliance practices are being utilized in other county government offices besides Nairobi County. In this case, similar study should be done which should include other counties, other real estate firms and house construction companies outside Nairobi County.

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APPENDICES

Appendix 1: Letter of Introduction

Timothy Kimari Mbutia

tkimari@yahoo.com

0723866620

Kenyatta University,

P.O BOX 40441- 00100

Nairobi, Kenya

Dear Sir/ Madam

RE: REQUEST TO RESPOND TO QUESTIONNAIRE

I hereby request your allowance to conduct a study in your institution. I am currently doing research on ‘Assessment of residential buildings compliance practices on performance of the National Construction Authority projects in Nairobi City County, Kenya’. As part of the primary data collection, I will be conducting a survey on compliance, occupational ethics, building standards and user acceptance compliance practices. I will thus need a little of your time to fill out the following questionnaire as the answers are significant to my research. Please find attached the questionnaire. Feel free to add all relevant details when necessary.

Thanks for your assistance

Yours Sincerely

Timothy Kimari Mbutia

Appendix 2: Research Questionnaire

Instruction guide

Kindly take your time and answer all the questions by ticking the appropriate box.

Part A: Respondent's Demographic Information

1. Indicate your gender

a) Male

b) Female

2. Kindly indicate your highest level of education

a) Secondary level

b) College level

c) University level

d) Any Other {.....}

3. Kindly indicate your age bracket

a) Below 30 years

b) 31 to 40 years

c) 41 - 50 years

d) 51-60 years

e) Over 60 years

4. Kindly indicate the duration for which you have worked in this Public Secondary School.

a) 1 - 2 years

- b) 2 – 3 years []
- c) 3 – 4 years []
- d) 5 years and above []

Part B: Building Code Compliance

5. Kindly indicate your level of agreement on the following statements that regard the effect of building Code Compliance on performance of the National Construction Authority projects within Nairobi City County, Kenya. Rate where 1= Strongly Agree, 2 Agree, 3 Moderately Agree, 4 Disagree and 5 = Strongly Disagree

Statement	1	2	3	4	5
The house developers have complied with the building regulation					
The building code was displayed for public approval during construction					
There are no signs of cracks in the houses					
Materials used in constructing the house were the most appropriate					
Did the developers clear with the NCA during construction					

Part C: Occupational Ethics

6. Kindly indicate your level of agreement on the following statements that regard the effect of occupational ethics on performance of the National Construction Authority projects within Nairobi City County, Kenya. Rate where 1= Strongly Agree, 2 Agree, 3 Moderately Agree, 4 Disagree and 5 = Strongly Disagree

Statement	1	2	3	4	5
Developers are wary of corruption during the construction phase					
The private developers conducted EIA before constructing the house					
The NCA and Nairobi County was consulted before constructing this house					
Tenants are informed of all flaws existent in the building					

Part D: Operational Building Standards

7. Kindly indicate your level of agreement on the following statements that regard the effect of operational building standards on performance of the National Construction Authority projects within Nairobi City County, Kenya. Rate where 1= Strongly Agree, 2 Agree, 3 Moderately Agree, 4 Disagree and 5 = Strongly Disagree

Statement	1	2	3	4	5
The development considered all building standards during construction					
Do the old standards cause weakness to the building					
There are Amendments to Building Control Act and Regulation of multi-storey residences					
There are different licensing standards of builders and engineers of residential builders					
The minimum standards for design, construction and performance set by NCA are integrated in building standards					
The building regulations contains rules for constructing private and commercial buildings					

Part E: User Acceptance

8. Kindly indicate your level of agreement on the following statements that regard user acceptance on performance of the National Construction Authority projects within Nairobi City County, Kenya. Rate where 1= Strongly Agree, 2 Agree, 3 Moderately Agree, 4 Disagree and 5 = Strongly Disagree

Statement	1	2	3	4	5
The residents understand all aspects of the building systems					
The agents use an inspection service to inspect buildings before sale to tenants					
The residents have accepted the safety models adopted by the engineers					
There is voluntariness in initiating the required number of stories needed in multi-storey buildings					

The buildings meet material change of user requirements					
Land control was considered during construction					

Part F: Performance of NCA

9. Indicate your level of agreement with the following statements as regarding performance of NCA in Nairobi County.

NB: Use this measure with section 4 as well

Statement	1	2	3	4	5
Has the NCA satisfactorily handled construction of residential multi-storey buildings in Nairobi					
Are ethical checks conducted by the NCA during constructions					
Are building contracts for multi-storey residential building investigated by the NCA					
Is there a digital system to manage applications for residential developments					
Do landlords understand NCA standards and regulatory frameworks					

What are the improvements made by the NCA since inception? Elaborate

Thanks for your participation

Appendix 3: Permit Letter Graduate School



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 1st November, 2021

TO: Timothy Kimari Mbutia
C/o Management Science Dept.

REF: D53/OL/21548/2012

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting of 27th October, 2021 approved your Research Project Proposal for the M.B.A Degree Entitled, **“Assessment of Residential Buildings Compliance Practices and Performance of the National Construction Authority Projects in Nairobi City County, Kenya ”**.

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

A handwritten signature in blue ink, appearing to read 'J. Luvusi', is written over the typed name and title.

JACKSON LUVUSI
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Management Science Department.

Supervisors:

1. Dr. Josphat Kyalo
C/o Department of Management Science
Kenyatta University