



INFLUENCE OF CONTEXTUAL FRAMEWORK ON MITIGATING BUILDING FAILURES IN KENYA

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ABSTRACT

This study focused on establishing the influence of contextual framework on mitigating building failures in Kenya. The study population was drawn from institutions in both the National and County Governments involved in Policy and Legal formulation, planning and enforcement as well as regulatory professional bodies in the building sector. The total target population was eight hundred and seventy-seven (877) respondents, within the two levels of government. The study used stratified random sampling technique in selecting the sample. The sample size was 275 respondents. Primary data which was largely quantitative and descriptive in nature was collected by use of structured questionnaires. The questionnaire was pilot-tested to test whether the instruments were reliable and valid before administering in the actual study. Descriptive statistics such as frequencies, percentages, the mean, standard deviation and standard errors were used in describing the data. From the findings, bribery mostly takes place during inspections, design and approval stage of the building process thus exposing buildings to failures. It was recommended that penalties and sanction should be imposed on both contractors and building professionals involved in bribery and those who use anothodox construction method and faulty designs respectively to enhance discipline and to reduce building failure in the building sector. Thorough vetting of the building professionals should be done to give them a chance to defend their ethical/moral standing while annual renewal of practicing licenses should not be issued to professionals found guilty of corruption offenses. The study suggested a further research be conducted on the influence of governance framework on mitigating infrastructural project failures in Kenya.

Key Words: Contextual Framework, Building Failures

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INTRODUCTION

In Africa, many countries including Nigeria have experienced the problem of collapsing buildings, which has led to loss of property and lives. The unfortunate incidents have been common in Nigerian cities such as Lagos, Abuja, Port Harcourt, Ibadan, and Enugu (Chendo & Obi, 2010). For instance, about 112 incidents of collapsing buildings have taken place between 1978 and 2008. It has been evident through investigation that the completed and uncompleted Nigerian buildings collapsed because of various causes (Oyegbile, Tat, & Olutoge, 2012). In 2006, an uncompleted three-storey building collapsed in Ghana killing an engineer instantly. Studies have shown that the building owners contracted informal laborers, who did not have knowledge and skills required in the building and construction industry. Bab Berdieynne mosque Mineret collapsed in Morocco, while Ikeja city mall in Lagos Nigeria collapsed in the year 2010.

According to Economic Survey (2016), in 2015, the building and construction industry in Kenya registered 13.6 per cent growth compared to 13.1 per cent recorded in 2014.

The value of reported building plans approved went up from Kshs. 205.4 billion in 2014 to Kshs. 215.2 billion in 2015 representing an increase of 4.8 per cent. The value of reported new buildings completed in Nairobi increased by 15.1 per cent to stand at Ksh. 68.6 billion in 2015. This is due to increase in demand for residential houses, commercial and industrial buildings arising from increase in population, high rate of urbanization and the effect of devolution.

Vibrant building industry in Kenya is primarily guided by the Building Code which dates back to 1968 and other fragmented legislations which carry disjointed provisions. The vibrancy has been caused by rapid urbanization and devolution which has created enormous opportunities for housing development even in far flung areas of the country with

accessibility challenges. Over the last ten years, over 100 cases of building failures and especially collapses have been reported. In Nairobi alone, reports have indicated that over 50% of the buildings are potentially dangerous and could fail anytime due to structural and other failures. Several of such buildings have collapsed on their own, while 30 buildings have been demolished by the state to avert loss of life and property. A total of 256 buildings in the city are earmarked for demolition due to documented failures discovered through scientific testing. A total of 4,690 buildings have been inspected for integrity out of which 640 have been found to be out rightly dangerous. These figures are worrying given that the audit of buildings has only covered a small portion of the city (National Building Inspectorate Report, 2016), and to mitigate these problems a proper governance structure must be put in place.

Nduthu (2012) clearly brings out professional ethics in construction and laments that while there are codes of ethics for virtually all players including contactors, very little is done to ensure that such codes are followed strictly. There are many ways of escaping the nets of ethics in the construction industry. These have led to a near breakdown in the construction industry management and governance system leading to unprecedented building failures. Nduthu (2012) argue that construction is one industry that can never flourish unless there are very clear governance systems to control and check all players within a context of law and accountability.

Statement of the Problem

Building failures have become a global phenomenon attributed to use of substandard building materials and structural deficiencies (Kioko, 2014; Rosetto, 2016). While studying the collapse of Hotel New World in Singapore, Seng (2011) cited poor design and lack of stringent building regulations or standards. McGuire (1974) discovered building failures in Europe is due to progressive failure which are described as the systematic weakening of a

building due to overloading and maintenance neglect overtime. Victoria (2012) suggests that vigorous criteria should be set to inspect the suitability of buildings progressively throughout the life of the buildings while Festus (2012) suggests a stringent set of standards as a cure for building failures in Europe.

In the African region, various scholars including Madu (2005), Fagbenle (2010), Chendo and Obi (2015), Oloyade (2010) and Anthony (2013) who studied the causes of building failures in the west African region, identified structural defects, design faults, material weaknesses, poor workmanship, climatic conditions and even natural factors such as floods and strong winds as major causes of building failure and suggests that proper concrete mixes, approved steel qualities and cross checks in engineering calculations to be the cure. Oloyede (2010) noted that in Nigeria, use of low quality materials and employment of incompetent professionals and artisans are causes of building failures.

In Ghana, Botchway, Afram and Ankrah (2014) notes that it is a design issue and suggested design integrity should be ensured and be supervised by competent professionals during implementation. Abimbola and James (2012), recommends an overhaul of the policies, mainly the building codes to initiate sustainable measures and enforce the industry's best practice. Adewuyi (2010) recommends the establishment of both supervision and inspection units for the entire construction period. A study on Incessant Collapse of Buildings in Nigeria found that 50% of building collapses arose from design faults, 40% from faults related to construction sites, and 10% as product failure (Olagunju *et al.* 2013). In Uganda, the major causes of collapsing buildings have been due to professional negligence rising from corrupt deals (Irumba & Mwakali, 2007).

In Kenya, the report of the Commission of Inquiry to the collapse of Sunbeam building (1996) identified poor workmanship, sub-standard materials, faulty

design, adverse climatic conditions and setting of buildings in unsuitable areas as the major causes which collaborate with studies in other countries. Kenya has experienced increase in building failures over the last 10 years which has killed and maimed many people and destroyed investment. Despite the promulgation of the Constitution of Kenya (2010) which defines the functions of National and County Governments, the establishment of National Construction Authority (NCA) in 2011 and the National Building Inspectorate (NBI) in 2016, the situation has not improved. According to NBI, Building Inspection and Audit Report (Sep, 2019), a total of 14,751 buildings have been audited with 716 requiring immediate integrity testing and 10,648 as unsafe. NBI has tested 97 buildings and demolished 10,070 structures.

The NBI, Building Audit Report (2015), indicates that in the early 80's and 90's, Kenya had almost zero cases of collapsing buildings. However, due to increased demand for residential houses, commercial and public buildings, and as population increases coupled with high rate of urbanization, the trend has changed. In Nairobi for instance, Nairobi's eastlands estates, particularly Umoja, Huruma, Dandora, Kayole, Kariobangi, Donholm, Tena including Zimmerman and Kahawa comprises poorly constructed structures which are imminent disasters. Investors and developers have taken advantage of the high demand for houses and inadequate capacity of County Governments and other institutions to enforce building regulations and therefore sub-standard structures have become the norm rather than the exception. As such, reduction of building failures and eventual collapse are matters of national concern due to loss of human life and loss of investment including environmental degradation.

This research findings sought a solution to this problem by analyzing the contextual framework and their influence on mitigating building failures.

Research Objectives

This study sought to establish the influence of contextual Framework on mitigating building failures in Kenya.

Study Hypothesis

H₀: Contextual framework has no significant influence on mitigating building failures in Kenya

LITERATURE REVIEW

Deontological Theory

The theory was developed by Kant (1945), the theory recognizes that law and morality are deeply connected but are not one and the same. Morality is a measure or depiction of what is good or bad according to a certain culture. Human laws are therefore defined by morality and not necessarily by an authority figure such as government or security agencies. Humans are often guided by their human nature to figure out what laws are and which ones to conform to (Kainz, 2004). The theory describes duties that people have towards one another more so in the housing construction, the person in charge should construct a house that is safe to the one living in. Further this theory is based on the idea that each individual has the power to determine his or her own moral law. This was seen to be of helpful in the housing construction where the morals of the contractor cover the safety of the beneficiaries and to understanding this, individuals must accept the fact that all people are morally free and that each person assigns his or her own duties. The theory described duties as being of two basic types, one which is perfect and the other which is imperfect. Duties can also be positive, in that it requires a person to act in a certain way benefiting the surrounding, or it can be negative, requiring that a person not act in a certain way that will not benefit the other. Perfect duties are absolute and in construction industry the contractor should be guided with the urge to construct an absolute building which suit the users in terms of ventilation, space and accessibility. They should

always be followed and never conflict with one another's interest (Jacobs, 2012).

According to Kant (1945), duties are formed using the categorical imperative, an idea that when assigning duties, each person should create them in such a way that they believe that all people in the world can and should abide by them. This is called the universalizability principle. The theory advocates for the perfect system, while creating powerful absolute laws, generally creates duties that are positive (do not harm), but does not allow for the creation of many negative duties. In effect, perfect duties tell us what not to do but do not direct us to positively engage in any particular actions. Imperfect duties, which include 'positive' duties such as beneficence (the duty to help others) are argued for on slightly different grounds. Since we acknowledge that, all people are capable of creating their own moral law.

According to Frankena (1973), the deontological perspective states what is morally right is not dependent on producing the greatest level of good as opposed to evil, but rather it is determined by characteristic of the behavior itself. Helms and Hutchins (1992) assert that deontology considers the moral value of a behavior to be independent of the outcome since the certainty of these outcomes is questionable at the moment of the decision to act. Deontological thinking is therefore grounded in the belief that actions, in and of themselves, can be determined to be right or wrong, good or bad, regardless of the consequences they produce and this concept is always applied in the buildings. The theory tend to focus on the contextual framework where it tries to explain the sole purpose of law as it tends to provide justice and any law which does not provide justice equally is a bad law. Any law which is good is moral and any moral law is good. The law is a unifier that seeks to create commonness of behavior, (Jacobs, 2012). The application of the theory is that the concept of morality is not subjective and this means that what is good and right is the same

everywhere. Equally what is immoral is same everywhere hence the universal application of law and morals, (Devine, 2000).

The theory is used to understand contextual issues in solving dilemmas in the construction sector based on what is right and morally correct. It is used to understand how compromise in building approval process, inspection and use of unethical practices can

be rooted out from the building sector as well as understanding how they crop up within the circumstances that surround the entire building system. This theory assumes a universal human being who readily accepts what is viewed as right by majority and does not provide scenarios where what is good in one end can be bad and prohibited in the other.

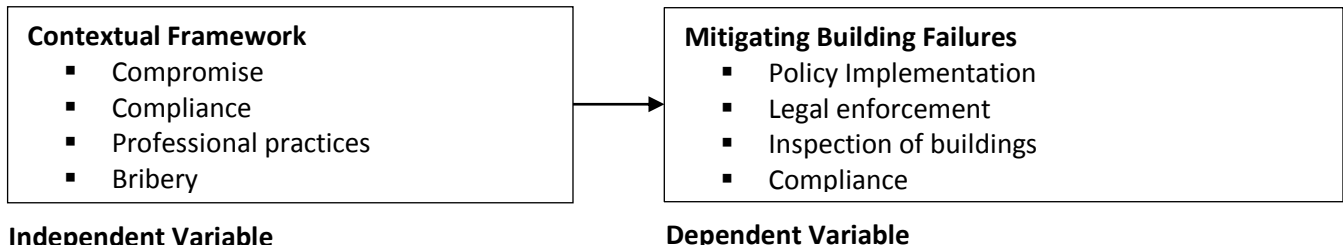


Figure 1: Conceptual Framework

Contextual Framework

Contextual framework is the surrounding circumstances (political, contemporary, historical, social and cultural), factors and inclinations within which something happens, (Your Dictionary, 2017). In this study, contextual framework was applied to mean the circumstances within which building takes place including compromise, compliance and professional ethics. The building industry is exposed to many cultural issues including unethical behavior and unfair competition which are a breeding ground for corruption, (UNCHS, 2001). The circumstances surrounding the occurrence of something can be referred to as the contextual framework. Culture is one of those circumstances which shape procurement and management of business in the building industry, (Rwelamila, 2000). Oded (2013), points out that the construction sector all over the world is ripe with creative ways of avoiding responsibility and evading the arm of law. These creative ways range from ignoring standards and corruptly influencing approvals as well as compromising officials involved in inspection of buildings during or after construction.

Githui (2012) argues that the lives of many Kenyans who occupy buildings for various purposes depend so much on the integrity of the professionals involved in design and supervision of the construction and points out that structural engineers owe a duty of care to occupiers of buildings they design and as such should be ready to take responsibility when fatalities occur as a result of their faults and negligence. Dimuna (2011) argues that collapse of buildings is caused by design and that designs should be checked well before approval. Bowen *et al* (2007) agrees that high levels of morality and ethics should be inculcated in the construction industry in order to curb building failures. Some of the accidents leading to loss of life and property could have been prevented with extra care and responsibility on the side of practitioners and developers. Mutiso (1996) reiterates the alarming role played by corruption and ineptitude in abetting the challenge of building failures and points out various corrupt practices which have led to the quagmire as including; compromise of inspection officials, ignorance of building standards, absentee professionals, incompetent staff approving drawings they can't understand, professionals overlooking

small mistakes as well as the lack of stringent disciplinary mechanism for malpractice.

Architects and Quantity Surveyors Act (Cap 525) provides for the regulation of persons registered to practice as architects and Quantity Surveyors. It also defines practices amounting to professional misconduct and the punitive measures to be taken against the culprits. It establishes the board of registration of Architects and Quantity Surveyors (BORAQS) which is mandated with the duty of maintaining the register of Architects and Quantity Surveyor among others. Similarly, the Engineers Act (Cap 530) carries some disciplinary procedure for malpractice among Engineers. Hinze (2011) concurs that engineers like any other professionals all over the world have a duty to protect life and are bound to certain ethical practices such as; using their knowledge and skill for the enhancement of human welfare and the environment; being honest and impartial and serving with fidelity the public, their employers and clients; striving to increase the competence and prestige of the engineering profession; and supporting the professional and technical societies of their disciplines.

Nduthu (2012) clearly brings out the contextual issue of professional ethics in construction and laments that while there are codes of ethics for virtually all players including contactors, very little is done to ensure that such codes are followed strictly. There are many ways of escaping the nets of ethics in the construction industry. These had led to a near breakdown in the construction industry management and governance system leading to unprecedented building failures.

Mitigating Building Failures

Mitigation is the process of taking reasonable action where possible to avoid additional injuries or losses (Business Dictionary, 2016) in this study, it is used to mean policies, procedures and action taken to lessen and avoid additional injuries and losses as a result of

building failures. Building failures occurs when a building loses it's ability to perform the function for which it was designed. Building failures are categorized in two major forms namely physical and performance failures. Physical or structural failure is attributed to overloading resulting to extensive damage of structural components which may result to total or partial collapse. Performance failure is associated with the loss of ability by non-structural components such as loss of ventilation, excess leakages or dire state of disrepair (Douglas & Ransom 2007).

In order to identify failures, various inspections of buildings are recommended. These include building condition survey, stock condition survey, and schedule of dilapidations, measured survey, schedule of condition, survey of building under construction and survey for alteration. The purpose of such inspections is to ensure that structural defects due to lack of maintenance can be detected and rectified early to keep building structurally sound for continued occupation, particularly as building age, and wear and tear set in (Chanter & Swallow, 2007).

Government of Queensland (2011) provided details of the mandatory inspection of all buildings in order to enable certification for new occupation or continued occupation. The guidelines provided to building owners ensure that their building are in compliance with state requirements for safety and health. The inspections are anchored in the building code and have policy and legal backing for prosecution in case of default. Inspections start from development approval with site inspection for suitability as well as inspection of building plans by professional. Subsequently, foundation inspection, slab and columns inspection which includes walling and final stages inspection encompassing site and drainage inspections are done before occupation certification is given. Remedial measures or condemnation is given where necessary.

City of Chicago (2010) outlines the mandatory requirements for registration of each multiple storey building in the city. It requires that any building containing four (4) or more family units or sleeping accommodations for ten (10) or more must be registered with the building department each year and that any alteration to the same must also be registered with the same body. This registration includes details of the owner, materials used, contractor employed, professionals involved, street address as well as any records for alteration. This registration ensures ease of access in evacuation and tracing of maintenance of the building in the city.

In Kenya, the statistics of buildings which have failed or have been found to have the weaknesses which can cause failure, are of great concern. The National Building Inspectorate (2016) has inspected a total of 4,690 buildings in Nairobi alone out of which 30 houses have been demolished while 1,440 buildings have been classified dangerous and requiring to be demolished. This is a significant number given that it only covers one county and there are 46 other where buildings are yet to be inspected.

The laws are enacted by parliament, and with most government institutions and agencies being established by Acts of Parliament. The Policy makers who formulate such laws, do not accordingly subject them to adequate stakeholders and public opinions before implementation. This thus creates a scenario of inadequate laws governing the industry. Even for the currently existing laws, there are questions of inadequate awareness and compliance with the laws. Similarly, the existing laws and by-laws are disjointed and not harmonized. This research sought to establish gaps in terms of policies and the legal framework in a bid to make recommendations to seal any identified gaps. The inadequate harmonization effect, inadequate capacity and, generally the inadequate legal framework could be a factor that significantly influences mitigating buildings failures.

The institutions that have been put in perspective in this study includes the regulatory bodies and government agencies that are key stakeholders in building sector. These bodies and agencies include the National Construction Authority (NCA), Engineers Board of Kenya (EBK), and Board of Registration of Architects and Quantity Surveyors (BORAQS). Some unethical members for these bodies have been responsible for inadequate designs, non-adherence to approved designs and unprofessionalism in the execution of construction works (GoK, 2010). For the mentioned institutions, the question of capacity to undertake their mandates is of great concern to this study. The capacity is with regard to the availability of equipment and qualified personnel, which is key for the execution of their mandates. The fourth variable that the study explored was the contextual framework which comprises the surrounding circumstances within which building occurs. This is important because building does not occur in a vacuum and there could be other factors which are non-technical in nature. These factors include compromise in design, supervision and inspection of buildings, non-compliance with building policies, regulations and standards, professional ethics and bribery. The study considers these factors to have influence in all stages of building process and could therefore affect the quality of final product.

Several cases of corruption and greed have on several occasions been reported on the part of both the regulatory bodies and property developers, who set aside the adherence to the building code of conduct in a bid to make quick money. Issues of morality feature within this context because even with the existing policies and institutions governing the industry, there is an apparent disregard for adherence to the set standards by clients, professionals and the regulatory agencies.

Empirical Review

From the study of Hannah *et al.* (2014), it was established that in Nairobi County and its

environments, 86.2% of tested sand samples did not meet the allowable maximum impurity contents as spelt out in BS 882 standards. The research asserts that this high level has compromised the integrity of the constructions and could be a cause for collapse of building. As a recommendation to iron out this lack of adherence to standards, Hannah *et al.* (2014) were of the opinion that there is need for improved construction management practices. The professionals within Kenya's construction industry need to enhance inspection of materials for quality purposes. If done, this was deemed to help in avoiding the increased collapses that are projected for the coming years (Hannah *et al.*, 2014). Cheron (2016) singled out poor structural design as a rampant cause of failure of buildings while also bringing out the issue of extra ordinary loading due to buildings being used for the purposes for which they were not designed. Unchecked change of use of buildings could also cause the buildings to collapse under weight of the new use. Developer's malpractices such as reducing levels of concrete mix ratios and downgrading steel requirements to cut cost also cause buildings to eventually give in.

In Mumbai 100 buildings collapsed in the city due to factors ranging from heavy downpour to substandard materials used in the subject buildings. These collapses occurred between 2008 and 2012 and were studied in two phases expanding the causes to include factors like poor workmanship, poor supervision, poor concrete works and mixes as well as poor concrete curing processes, (Bangi & Haris, 2013). Krishnaya (2011) documented the causes of the failure of buildings to include inadequate overlap length of steel rods as well as inadequate number of columns and their spacing and concludes that unsymmetrical wall loads on structures is a major cause of buildings failures. Weak foundations as in a case where columns are based on filled up wells or quarries could result into collapses. Excess deflections and incorrect steel fabrications are causes of collapse

of buildings (Chowdary 2011). Other documented causes of building failures include design omissions, poorly skilled building inspection workers, lack of experience on the side of contractors, compromises in the professional ethics, complexity of building code, miscalculations, omissions in drawings and compressed designs (Constructor, 2011). Common causes of building collapses in India include poor workmanship and incompetent supervision of construction works as well as professional compromises and developers' decisions to skip professional involvement at all stages from design to implementation. Complexity of building codes leading to misinterpretation as well as unchecked or unconfirmed calculations were also found to compound the challenge of collapsing buildings. Impatience with contractors which causes inadequate curing of concrete also causes buildings to collapse, (Kharna, 2013).

Wardhana (2003) studied the importance of strong institutional framework in preventing building failures while looking at causes of building collapses in Asia and points out lack of skill in inspecting ongoing construction works as well as lack of coordination among the involved arms of government. A breakdown between law enforcement and standards forms a large loophole which developers use to circumvent requirements for structural integrity in construction. For various reasons, including cost cutting, developers choose cheap materials and disregard what the professional have prescribed eventually leading to failures. Building designs are also altered along the way and since supervision is hardly sufficient or competent, the changes go unnoticed, no calculations are done to accommodate such changes resulting to deficiency which give way to structural failures, (Ratay, 2005). These sentiments are echoed by Kioko (2014) who points out several causes of building failures in Kenya including that poor workmanship, noncompliance with reinforcement specifications, cost cutting tendencies

by contractors, inadequate planking, substandard materials, wider column spacing, high slenderness ratio, incompetent contractors, faulty construction methodology and poor choice of materials.

Although building maintenance has not been documented widely as a key cause of failure of buildings, Wade (2010) points it as one of the very critical areas requiring focus in addressing building failures. Regular inspection of buildings to identify structural cracks, bending or surging of columns as well as possible infestation of components by dangerous insects or conditions such as damp are required periodically. Establishing a proper quality management framework in the construction industry is an important alternative to reduce the risk of collapsing buildings. Stringent measures are necessary to determine appropriate solutions to avoid future occurrences. Collapsing buildings, both uncompleted and completed, have caused loss of lives and property among the builders and occupants (Ayodeji, 2011). Chattered Institute of Building Surveyors (2010) lays a lot of emphasis on corruption as a major cause of building failures in that sound technical and professional practices are sacrifice for personal gain. The institute cites compromise of approvals, inspections and supervision as a major factor in causing building failures. Buildings which are approved irregularly and are not inspected in accordance with laid down regulations are highly likely to fail. It is even worse when signs of failure begin to emerge because with corruption, even proper documentation of the building process is not easy to come across. Kioko (2014) recommends use of local building codes, employment of qualified professionals and contractors, increased supervision and inspection and improved governance in construction industry to eliminate corruption.

National Corruption and Ethics Survey (2015) placed abuse of office as a form of corruption in Kenya at 54% while projects implementation rested at 41%. This combination might as well explain the building

failures in Kenya where undue influence is exerted in approving projects one can expect shoddy implementation or near total disregard of relevant applicable regulations. In the county governments segment, where approval of building plans, inspection of construction work and development control falls, corruption in the physical planning departments was highest at 14% and only second to health departments at 29%. The building process in Kenya right from conception to implementation presents great incentive and inclination for corruption especially at the approval stage due the huge volumes of applications presented to incompetent and lean staff at county development planning departments. Reasons for building failure includes corruption and bureaucracy, lack of capacity to implement plans and scrutinize development proposals making compliance minimum or non-existence, (Rosetto, 2016).

METHODOLOGY

The study used both descriptive and correlational research designs. The population for this study was drawn from both the National Government and representation from eleven (11) County Governments. Under the National Government the study aimed to gather information from officers of the National Construction Authority (NCA), National Building Inspectorates, Kenya Bureau of Standards, Professional Bodies and Officials of the Ministry of Transport, Infrastructure, Housing, and Urban Development. Also, the study included officers from the County Government and particularly from the departments of planning, compliance and enforcement. This study used the stratified sampling technique.

The instrument for data collection was a questionnaire which was administered to sampled respondents. The structure of the instrument included both closed-ended and open-ended questions. Data processing and analysis were done

based on qualitative and quantitative methods. The qualitative data from the study was subjected to content analysis, categorized, classified and tabulated to support the Quantitative data. Quantitative data was analyzed by use of the Statistical Package for Social Science (SPSS version 22).

FINDINGS

Influence of Contextual Framework on Mitigating Building Failures in Kenya

On situations where bribery occurs leading to building failures, the study findings indicated that inspection of buildings during construction were the main (59%,

n=122) situations where bribery occurred followed by the design approval stage (30%, n=61) while (11% n:23) bribery occurred during certification.

On how building professionals contributed to building failures, the study findings indicated that building professionals majorly (55%, n=114) contributed to building failures through bribery followed by the use of unprofessional practice at 33% (n=69). While 7% and 4% did not comply with building regulations/standards and providing compromise in designs respectively. Compromise in design led to structural failure and eventually total collapse.

Table 1: Factor Analysis on Contextual Framework

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
The existing disciplinary mechanisms for malpractices within the building sector are highly effective	8.741	35.280	35.280
The cases of compromising officials' being involved in the inspection of buildings during or after construction are high	1.848	8.125	43.405
The level of non-adherence to quality assurance in the building sector is high	1.801	8.106	51.511
Technical personnel usually run multiple construction projects at any given time	1.635	7.005	58.516
Most contractors fully adhere to approved building designs and standards	1.541	6.634	65.15
There has been an increased number of bribery related cases in the building sector	1.423	6.421	71.571
There are cases of involvement of unqualified personnel not registered by professional bodies in building designs	1.326	6.258	77.829
All contractors are professionally qualified to handle construction projects	1.259	6.114	83.943
There is required workmanship throughout the construction processes	1.168	5.908	89.851
Agencies managing the building sector are actively instilling ethical culture in the building sector	1.125	5.797	95.648
Technical personnel attached to construction works fully devote themselves in particular constructions site	1.114	2.698	98.346
There is adequate professional inspection of materials during construction process	1.106	1.254	99.600
The existing disciplinary mechanisms for malpractices within the building sector are highly effective	0.500	0.234	99.834
Contractors comply with the set building sector specifications and standards	0.434	0.166	100.00

Following the findings in table 1, the value of the Eigenvalues or amount of variance in the original variables accounted for by each component as given by the 'total' is greater than one in most of the variable except the last two (2) factors; therefore, these factors were dropped in the analysis: The existing disciplinary mechanisms for malpractices within the building sector were highly effective and Contractors complied with the set building sector specifications and standards.

According to Snook, (1996), depending on where one is doing explanatory factor analysis or confirmatory

factor analysis, the cut off point for factor loading is determined by the researcher depending on the eigenvalues obtained during the factor analysis. In this case, the last two factors in the table gave much lower values as compared to the rest hence the cut off for factor loading was set as 1. The dropped factor had a similar meaning to other statements that were already mentioned in the likert scale or they were not making any good sense to the respondents thus reducing redundancy in the data collection instrument.

Table 2: Frequency Distribution on Contextual Framework

Statement		5	4	3	2	1	totals
(where 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4 –agree and 5-strongly agree)							
The cases of compromising officials' being involved in the inspection of buildings during or after construction are high	N	45	79	16	30	36	206
	%	22	39	8	14	17	100
The level of non-adherence to quality assurance in the building sector is high	n	57	53	12	44	40	206
	%	28	26	6	21	19	100
Technical personnel usually run multiple construction projects at any given time	n	65	55	16	34	36	206
	%	32	27	8	16	17	100
Most contractors fully adhere to approved building designs and standards	n	31	47	16	55	57	206
	%	17	24	8	25	26	100
There has been an increased number of bribery related cases in the building sector	n	61	57	18	40	30	206
	%	30	28	9	21	14	100
There are cases of involvement of unqualified personnel not registered by professional bodies in building designs and supervision.	n	53	75	18	34	26	206
	%	26	37	9	16	12	100
All contractors are professionally qualified to handle construction projects	n	32	49	16	53	55	206
	%	19	26	8	23	24	100
There is required workmanship throughout the construction processes	n	34	46	10	63	53	206
	%	17	23	5	30	25	100
Agencies managing the building sector are actively instilling ethical culture in the building sector	n	29	45	16	57	59	206
	%	15	22	8	27	28	100
Technical personnel attached to construction works fully devote themselves in particular constructions site	n	26	38	14	71	57	206
	%	13	19	7	34	27	100
There is adequate professional inspection of materials during construction process	n	30	46	16	56	58	206
	%	16	23	8	26	27	100

The study findings in table 2 indicated that majority of the respondents agreed that there were cases of compromising officials' being involved in the inspection of buildings during or after construction were high (39%, n=79) followed by those who strongly agreed at 22% (n=45). Majority of the respondents totally disagreed that technical personnel usually run multiple construction projects at any given time (32%, n=65) followed by those who agreed at 27% (n=55). The level of non-adherence to quality assurance was high as indicated by (28% n57) while cases of bribery had been increasing. Most contractors were not technically qualified to undertake construction works while there were cases of use of unqualified personnel not registered by professional bodies involved in design and supervision of building construction. Most of the respondents totally agreed (26%, n=57) that most contractors did not fully adhere to approved building designs and standards followed by those who agree at 25% (n=55). The professionals attached to projects did not devote full time to the project and there is no professional inspection of materials during

construction as indicated by (27% n58). There was disagreement that agencies managing the sector instill ethical values in the sector. The study findings were inconsistent with Ahzahar, Karim, Hassan and Eman (2011) who did a study on contribution factors to building failures and defects in construction industry and found that that corruption is the key factor leading to poor works at the construction site.

Regression Analysis on Contextual Framework

Based on linear regression model, the study sought to establish the influence of contextual framework on mitigation of building failures in Kenya. The following hypothesis was therefore tested:

H₀: ContextualFramework has no significant influence on mitigating building failures in Kenya

The study found out that contextual framework explained a significant proportion of variance in mitigating building failures in Kenya, R²= .715. This implied that 71.5% of the proportion in mitigating building failures in Kenya can be explained by contextual factor's covered by the study as indicated in table 3.

Table 3: Model Summary for Contextual Framework

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.796 ^a	.715	.774	1.487

a. Independent variables : (Constant), contextualframework

Table 4: ANOVA for Contextual Framework

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.865	1	7.865	34.286	.000 ^b
	Residual	2.769	10	.256		
	Total	10.634	11			

a. Dependent Variable: Mitigating Building Failures

b. Independent variables : (Constant), ContextualFramework

The study findings in table 4 indicated that the ANOVA model was significance in testing for hypothesis since its p-value 0.000 was less than 0.05 testing at 5% level of significance using a one tail test. The F-value was 34.286 which was greater than 0.05

testing at 5% significance level indicating that the null hypothesis was rejected and the researcher therefore concluded that the contextual framework has a significant influence on mitigating building failures in Kenya.

Table 5: Regression Coefficients for Contextual Framework

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	.852	.990		1.358	.113
	ContextualFramework	.619	.198	.452	7.746	.000

a. Dependent Variable: Mitigating Building Failures

Based on the linear regression model, $Y = \alpha + \beta_1 X_1 + u$, the model therefore becomes; $Y = 0.852 + 0.619X_1 + u$

The findings obtained in table 5 indicated that for very one-unit change in contextual framework, mitigation of building failures in Kenya increased by 61.9% ceteris paribus hence implying a positive influence of contextual framework on mitigating building failures in Kenya. The study found that contextual framework significantly predicted mitigating building failures, $\beta = .619$, $t(1.358) = 7.746$, $p = .000$. This finding implied rejection of the null hypothesis since the p value was less than $<.05$ set by the study and the t value was more than 1.96 at 95% confidence level. The study therefore concluded that the contextual framework significantly influences mitigation of building failures in Kenya.

These findings were supported by chartered institutes of Building Surveyors (2010) which lays a lot of emphasis on corruption as a major cause of building failures in that sound technical and professional practices are sacrificed for personal gain. The institutes cites compromise of approvals, inspection and supervision as a major factor in causing building failures. Buildings which are approved irregularly and are not inspected in accordance with the laid down regulations are highly likely to collapse. Kioko (2014) recommends use of local building codes, employment of qualified professional and contractors, increased supervision and inspection and improved governance in construction industry to eliminate corruption.

CONCLUSIONS AND RECOMMENATIONS

The study determined that compromise and bribery occurred in design, during approval of building plans, inspections of building during construction and certification of buildings leading to building failures in most cases where there was improper construction works. The study also noted professional negligence where building professionals did not adequately follow building policies, building regulations and building standards and that they contributed to building failures through use of faulty designs and by running multiple construction projects at any given time making them pay less attention. Professionals involved in bribery cases did not conduct required inspection and award certificate to buildings that have not met the required standards leading to building failure.

The use of unprofessional ethics among professionals and developers using non-professional to manage construction works were also major challenges. Contractors also bribing inspection officers on the use of substandards materials and following unprocedural construction practices. Professionals, Developers and Contractors must be held accountable and responsible for building failure caused by lack of proper procedure. The ethical values must be calcated among building sector players and the principle of duty of care instilled among the professionals and developers. The laws must have severe penalties and sanctions for professionals negligence and for contractors omission. The policy, law and regulation must clearly define the extent of

each party in design or construction faulty liability and determination of the apportionment of the liability.

The study indicated that there was compromise and bribery in approval of building plans, inspection of buildings during construction and issuance of certificates including completion and issuance of occupation certificate. Also professional negligence in design, bribery and use of unprofessional practices. Contractors ignored the building standards and corruptly influenced approvals and compromise officials involved in inspection of building during or after construction.

The study recommended a one stop approval process involving all approving authorities which include the County, NCA, NEMA and reduce human interface by computerising the approval process. The inspection should be periodic and carried at every stage of construction and where the county lacks adequate

professionals to undertake inspection, this can be contracted to practising professionals or professional bodies. This would minimize compromise in building design which leads to structural failure and total collapse and also bribery in the approval process and non-compliance to regulations/standards. Professional bodies should punish errant profession for any malpractice or negligent on professional design or deregister them from practicing.

Suggested Areas for further Study

This study was about the influence of contextual Frameworks on mitigating building failure and therefore does not address the other branch of the construction sector. The study recommended a research to be undertaken on the influence of contextual framework on mitigating failure and collapse of infrastructure facilities. The infrastructure is a sub-sector which supports the building subsector of the construction industry in Kenya that experiences similar challenge.

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