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Prevalence, Causes And Possible Remedies To The Incessant Collapse Of Buildings In Kenya. A Strategic Discourse

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ABSTRACT

The study aimed at establishing the prevalence, causes and possible remedies to the incessant collapse of buildings in major urban centres in Kenya. In particular, the contribution of substandard building materials, poor workmanship and noncompliance to housing policy to the collapse of buildings were probed. Data was obtained from a convenient sample of 173 professionals in the housing industry. They included Architects, Valuers, Structural Engineers, Quantity Surveyors and Building Surveyors. Land Surveyors, Developers, Contractors, Planners and Estate agents were also involved in the study. Respondents were drawn from the public sector including Ministry of Lands and Housing, Regulatory Authorities, Professional Associations as well as practitioners in private practice. They completed a self report questionnaire with highly reliable six test variables (α=.772 to .966). Results showed that prevalence of collapse of buildings within the country is high consistent. Substandard building materials, poor workmanship and noncompliance to housing policy were the main causes of the collapse, noncompliance to housing policy contributing the greatest followed by substandard building materials and lastly poor workmanship. When adopted, organization control strategy partially mediated the relationship between the causes and the performance of the industry. It was shown to have the potential to reduce the influence of substandard building materials, poor workmanship and noncompliance to housing policy and thus spur the performance of the housing sector. The study therefore recommends structured adoption of organizational control strategy to help mitigate incessant collapse of buildings and ultimately enhance the performance of the housing industry within the country.

Key Words: Housing Policy, Poor workmanship, Substandard buildings, Substandard materials

INTRODUCTION

The housing industry in Kenya is reported to be witnessing a boom in the last decade. Kenya Bankers Association explained the boom to arise in response to the broad demand characteristics in the market, the new units being put up mainly targeting the middle-end of the market. Even then, the sector is still reported to be facing a number of challenges. The challenges are mainly attributed to quantitative and qualitative aspects of production. With regard to quantity, the sector is reported to be facing a huge yearly housing production deficit. The Ministry of Housing in their report indicate that the country's urban centres face a shortage of 200,000 housing unit annually, with only 50,000 new units being constructed every year (21, 33 & 34).

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Relating to quality and more importantly the theme of this study, the need to produce more housing units has been accompanied by rising cases of collapse of buildings (11, 16) with catastrophic effects. The sector has witnessed an upsurge of substandard buildings constructed to help bridge the housing deficit. Such buildings easily collapse under minimal stress. Within the country, it is estimated that between 2006 and 2014, 17 buildings collapsed spontaneously in Kenya, causing 84 deaths and more than 290 injuries (11, 17). Between 2014 and 2017, about 14 buildings collapsed causing 160 deaths and several injuries besides monumental loss of property, livelihoods and investments (6, 8 & 22).

An analysis of causative factors linked most collapse to construction related, the main cause being builder's carelessness, structural failure, illegal construction, structural defects, poor supervision/workmanship and use of substandard materials (16). Other related causes include faulty structural design or absence of structural design, carelessness, rainstorm or heavy downpour, weak and faulty foundations, excessive loading, illegal conversion and noncompliance with approved building plans (1). Still, some buildings have been reported to collapse due to disregard for building regulations/plans, hasty construction/faulty construction, ignorant/greedy clients, dilapidation and absence of drainage. This study sought to establish the prevalence, causes and role of strategy in mitigating the incessant collapse of buildings.

Substandard Building Materials and Collapse of Buildings

Generally, it has been acknowledged that building materials are a critical resource that largely dictates whether housing units can be realised (20). They are a key driver of construction works and account to over two-third of the total building cost. As a matter of fact, quality of building materials used in construction works and workmanship are the most important predictors of the quality of the resulting building (11). Consequently, poor quality of engineering materials is a key driver of construction of substandard buildings (20). It has been suggested that since building materials are expensive, are sometimes not available and have to be imported, some builders resort to use substandard materials which appear cheap so as to cut down on cost of construction (9, 13). In supporting this observation, Nyangweso (2007) asserts that building materials and by extension cost of construction are capital intensive making decent housing to be out of reach for the majority of the Kenyan people. Yet since such people still would wish to habituate what appears as decent housing, market forces at times collude to provide them with such facilities but at cost that they could afford. To be able to achieve this, quality standards are usually compromised with quality construction materials giving way to substandard materials.

Specifically, records show that materials such as reinforcement rods, steel sections and cement predict the quality of the resulting building and when such materials of substandard nature are used, they can contribute immensely to failure of buildings (29). Aniekwu and Orie (2006) in their study also identified low quality materials as the most important cause of failure of engineering facilities. Similarly, Akinyemi, Dare, Anthony & Dabara (2016) in their study acknowledged that structure failure may result from the quality of the material used for the foundation, which may be of low quality or sub-standard. Kuta and Nyaanga (2014) concluded that safety of buildings is comprised by the entry into the market of building materials that do not meet set standards and that poor quality buildings and the related environment are a reason for concern.

Within the country, quality of engineering materials has been found to be a key driver to construction of substandard buildings which are the casualties in form of collapsed buildings. A study by Kuta and Nyaanga (2014) established that collapsed buildings were mainly

constructed with low quality building materials and incompetent craftsmen rather than professionals. Specifically, an estimated eight out of ten respondents (82.9%) indicated that concrete blocks used in buildings were of substandard materials, 81% suggested that stones used were of poor quality and 77.3% acknowledged that iron rods used was of low quality. Other notable substandard materials according to the respondents include cement (79%), sand (70%) and outdated engineering materials (62%). A regression analysis of the findings showed that quality of materials is statistically significant in explaining the quality standard of buildings in Nairobi (p = 0.002). In confirming this observation, Fernandez (2014) particularly acknowledged that many forensic investigations attribute most building collapse accidents within Nairobi to low-quality concrete. Questworks, a design and engineering firm, in their investigations on causes of collapse of buildings within Nairobi found that contractors steal cement and use less steel to end up with weak structures which are prone to collapse. This study therefore seeks to investigate how strategy can be used to ensure that quality standards are adhered to with regard to use of quality building materials as a way of controlling incessant collapse of buildings in Kenya.

Workmanship and Collapse of Buildings

Evidence show that poor workmanship by design or default is prevalent in construction of buildings in most developing countries and is one of the major causes of building failure. Oluwaseun and Olumide (2013) in a study on causes of building failure in Nigeria observed that the building industry is full of quacks and inexperienced contractors. According to the researchers, their involvement in building construction has led to a lot of collapse in the past and at present. In Kenya, the lucrative nature of the built environment has brought into the sector quacks who are willing and ready to do anything to make quick money (33). The researcher lamented about proliferation of the sector by rogue contractors who use shortcuts to save on costs. Their actions have consequently led to a number of collapsed buildings. As a matter of fact, Kuta and Nyaanga (2014) established that collapsed buildings were mainly constructed by incompetent craftsmen rather than professionals. This observation is corroborated by a report by Institution of Engineers of Kenya who pointed out that the probable causes of collapsing building structures as use of inappropriate specifications, incompetent design, poor workmanship, lack of ethics, poor supervision, misunderstanding between parties to the contract, use of inappropriate materials and unskilled workers.

At the same time the complexity of the construction of buildings involving conceptualizing, designing, managing, organizing and coordinating project requirements including time, money resources, technology and methods (14). All these must be integrated in the most efficient manner possible to complete the projects on schedule, within the budget, and according to the standards of quality and performance specified by the project owner or designer. Such a process demand the concerted effort and collaboration of a team of professional with strong fundamental knowledge of engineering design and management principles, besides knowledge of business procedures, economics and human behaviour (10). In reality, apart from the investor, the construction industry is manned by a team of professionals who include contractors, architects, quantity surveyors, engineers and land and construction economists (9). Usually, they act as initiators, implementers, process monitoring and evaluators guided by existing regulations. The quality of the service they render to a great degree determines the success of project implementation and ultimately the product which is quality housing.

Yakubu and Agapiou (2016) reports on lack of professional involvement in house building construction as a causal factor that impedes implementation. Omeife and Windapo (2013) argued that a lack of professional participation in house building construction affects the implementation of standards, thereby causing building collapse. Taiwo and Afolami (2011)

attributed the collapse of a hotel building to lack of proper supervision to the project both from the professionals involved in the project and the Housing Authority officials in charge of the housing estate where the incident occurred. When contacted, the Housing Authority office could not confirm if the owner of the collapsed hotel had obtained approval in terms of the architectural and structural drawings from them before commencing on the project. At the same time, there were no traces of the approved drawings in the archives of the Housing Authority. In reality, findings indicated that quacks had been used to design, supervise and construct the building. Onwuanyi (2016) commenting on a similar incident concluded that collapse of buildings casts a slur on the competence of the nation's building community of professionals responsible for designing and monitoring construction works at building sites.

Findings by Agapiou, Flanagan, Norman and Notman (1998) observed that at times, the existence of many professional within the industry with competing interests sometimes lead to professional rivalry and mutual suspicious which are causal factors of inefficiency thus collapse of buildings. They noted that as key stakeholders in the built environment; the professionals should develop cordial relationships for the interest of clients and projects, and denounce the frequent practices of opponent attacks, which exist in the construction industry. The study suggested that there should be an interest in making the relationships work to achieve the desired goals among stakeholders, recognizing that cordial working relationships may not be free from constraints, but closer ties among stakeholders in closing the existing gaps and wastages will go a long way in overcoming the obstacles to create trust and to reduce the cost of construction.

Evidence show that despite the existence of highly trained professionals and consultants in the building industry within the country and the presence of industry regulation in major urban areas, implementation of projects do not always meet their goals (13). This is manifested by myriad projects that have cost overrun, delayed completion period and poor quality resulting in collapsed buildings in various parts of the country, high maintenance costs, dissatisfied clients and even buildings which are not functional (18). This study seeks to assess how professionals' contribution can be strategically harnessed to help check the incessant collapse of buildings within the country. It seeks to evaluate the role of strategy in mitigating collapse of buildings in Kenya by limiting the contributions of poor workmanship.

Housing Policy in Kenya

The building process, from planning, design to construction and management is a complex process involving many players some of who have competing or conflicting roles and expectations (11)). To enable synergy, many countries have put in place policy frameworks commonly referred to as housing policy or building regulations. Such policy frameworks are regulatory regime and compliance mechanisms put in place to sustain expected standards (32). They are statutory instruments designed to protect buildings from structural failure, and the people and property inside them from extreme adverse effects. Building regulations stipulate minimum standards for building health, safety and the wellbeing of the occupants and their environments (12). According to Ayedun Durodola and Akinjare (2012) all houses and their construction and management stages are regulated by building codes, which seek to harmonize best practices, materials, methods and processes to achieve a building that is habitable. They involve provisions for registration of contractors, projects, skilled construction workers, construction site supervisors, training institutions, and provisions relating to collection and payment of the construction levy (32).

In Kenya, the State Department of Housing and Urban Development in the Ministry of Transport, Infrastructure, Housing and Urban Development has the overall responsibility to

formulate favourable policies to spur infrastructural development (8). The State Department works closely with the National Construction Authority (NCA) in regulating the industry and building its capacity. Other key contributors include the County Governments' departments in charge of housing as well as professional Associations. These include Associations for Land Surveyors, Project Managers, Architects and designers, Quantity Surveyors, Engineers, Contractors, Builders, Estate and marketing agents and Facility Managers (34). The professional and regulatory bodies that govern the works of these professionals in the Kenya construction industry include Board of Registration of Architects and Quantity Surveyors (BORAQS), Architectural Association of Kenya (AAK), Institute of Quantity Surveyors of Kenya (IQSK), Engineers Registration Board (ERB), National Environmental Management Authority (NEMA) (23).

Specifically, the management of housing construction is regulated by a number of statutes. This includes the following: The Public Health Act, which relates to maintenance of property in a good habitable condition. The workings of this Act spell out the minimum standards to keep the property in and the consequences likely due in default. Secondly, the Landlord and Tenant Act which aims to make provisions with respect to certain premises for the protection of tenants of such premises from evictions or exploitation and other incidentals. It works as a counterpart of the Rent Restriction Act Cap 296 in commercial properties. It spells out the lease terms under the Acts control, maintenance and repair roles, payment of certain charges etc. The Distress for Rent Act is used for the recovery of rent arrears. Other notable statutes include, The Registered Land Act, The Local Government Act, Factories Act, the Building Code, Occupiers Liability, Sectional Properties Act and the Estate Agents Act which governors the property management profession in Kenya (15). In terms of urban development, there are two (2) institutions: one is the Ministry of Land and the other is Ministry of Local Government. These institutions are guided by two key statutes: the Physical Planning Act (Cap 286) and the Local Government Act (Cap 265). There are other laws that govern the physical planning and are found mostly related to land.

However, even with the existence of all these elaborate institutions and policies, reports indicate that a majority of urban centres in developing countries such as Kenya are not planned, and where plans exist, enforcement is absent (19). An inadequate implementation process and manpower for enforcement is another key factor identified. Berrisford (2011) noted that unclear implementation procedures for structural aspects of buildings and inadequate technical manpower within the local authority to enforce implementation of building development were a serious challenge in African cities. In some instances, the Regulatory Framework in developing countries were found to suffer from inadequacies at the boundaries of the responsibilities of its composite agencies and inevitably policy and development aspirations lead to conflicts overlap (23). Disregard for factors contributing to risk, in terms of hazard exposure and unsafe construction, has led to dramatic expansion of vulnerable informal settlements. The failure of building regulation has been compounded by poorly formulated and poorly communicated building codes (11). Corruption of local regulatory authorities, where they do exist, has further compromised implementation of and compliance with safe building and land use principles.

In Nairobi alone, six out of 10 buildings have not been approved by the City Council of Nairobi, which is ill-equipped to handle the large amount of unplanned development taking place (23). AAK, which keeps a record of all registered professionals in the building and construction sector, reported that the number of collapsed buildings could increase if the trend goes unchecked (20). Lack of good leadership, lack of political interest or will, inadequate implementation processes, lack of code awareness, high poverty level, high professional fees

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and insufficient public dialogue were reported to be common challenges to implementation of building regulations for sustainable development of safer cities (34). This study seeks to assess the extent to which strategy can contribute in mitigating the challenges. It sought to investigate the role of organization strategy as an intervention to the prevailing situation.

Organization Control Strategy and Performance of the Housing Industry

Previous studies have illustrated the significant role that organizational control strategy plays in enabling the realization of organizational objectives. Tekavcic, Peljhan and Sevic (2008) in their study on the impact of management control systems strategy interaction on performance management established that organizational control systems influences the implementation and monitoring of strategies, providing feedback for learning and information to be used interactively to formulate strategy further. In essence, a combination of performance driven behaviour and regular use of management control systems was found to lead to improved results. Similarly, Obinozie (2016) in a study on the effects of management control systems and strategy on performance of minority-owned businesses established that financial and nonfinancial-based management control systems and differentiation strategies are significantly positively related to organizational performance. Low-cost leadership strategy was positively related to organizational performance but was not statistically significant. The study thus concluded that an appropriate mix of financial and nonfinancial management control system strategies are necessary to achieve desired organizational performance. Other areas in which effectiveness of organizational control strategy have shown positive outcome include organizational culture, compensation, work behaviour and employees performance (31).

Efficacy of the strategy in mitigating the performance challenges of the housing sector remains largely unknown even though attempt at assessing its performance indicators illustrate existence of challenges. Such include proliferation of substandard buildings which collapse on minimal stress and strain (11, 20). Substandard buildings are said to result from substandard building materials, use of unqualified contractors in construction works leading to poor workmanship (20). Other causes include noncompliance to building code, unprofessional conduct and corruption. Strict enforcement of the building code could ensure adherence to the tenets as laid down by industry stakeholders. In seeking to bridge the existing knowledge gap, this study sought to establish how organization control strategy could be applied to help mitigate the effects of these factors on quality of construction works and consequently enhance organizational performance of the built industry. The study was based on three objectives:

i. Determine the prevalence of collapse of buildings in major towns in Kenya.
ii. Establish the extent to which substandard building materials, poor workmanship and noncompliance to housing policy contribute to collapse of buildings in Kenya.
iii. Determine the mediating influence of organization control strategy in the relationship between causes of collapse of buildings and the performance of the housing industry within the country.

METHODOLOGY

Design: The study was quantitative in nature to allow for examination of the causes and possible remedies to the incessant collapse of buildings within the country. A structured survey research design was adopted in which professionals in the housing industry were provided with self-report questionnaire to share their experiences. The professionals were drawn both from the public and private sector as well as the academia. Those from the public sector included senior officers at the Ministry of Lands and Housing, National Construction Authority. Private practitioners including those from construction firms, professional associations and individual practitioners were also involved in the study.

Participants: Participants included Architects, Quantity Surveyors (QS's), Building Surveyors (BS's), Land Surveyors (LS's) and Town Planners. Structural Engineers, Valuers, Developers, Contractors and Estate Agents were also involved. Respondents were mainly drawn from urban centres within Nairobi, Kiambu, Machakos, Nakuru and Mombasa counties due to the reported cases of collapse of buildings within these counties.

Data Collection Procedure: Necessary approval was obtained from the National Commission for Science, Technology and Innovation. Informed consent was also sought from each study participant through an introductory letter. Subsequently, the questionnaire was distributed to participants.

Measures: Information on the causes and possible remedies to incessant collapse of buildings within the country was sought based on respondents' demographic characteristics, prevalence and causes of collapse of buildings as well as role that organization control strategy could play.

1. *Demographics:* Information on gender, age, area of specialization, educational qualification and work experience was sought.
2. *Prevalence of Collapse of Buildings:* Eight items measured prevalence of collapse of buildings within the country; all ratings made on a 5-point scale (1=strongly disagree to 5=strongly agree). Preliminary analysis established a corrected to total correlation of the indicators of the variable ranging from 0.511 to 0.703 while Cronbach's alpha if item is deleted ranged between 0.781 and 0.836. The Cronbach's alpha of the variable was 0.825. The indicators of the variable were thus deemed reliable for analysis.
3. *Causes of Collapse:* Fourteen items were used to assess the possible causes of collapse of buildings. Elements of the variable were sub-divided into three sub-scales: building materials, workmanship and housing policy. The ratings were made on a 5-point scale. Indicators of building materials had corrected to total correlation ranging from 0.354 to 0.761, their Cronbach's alpha if item is deleted ranged between 0.612 and 0.815 while the sub variable had Cronbach's alpha 0.772 and were thus deemed reliable. For workmanship, the corrected to total correlation of its indicators ranged from 0.469 to 0.747, their Cronbach's alpha if item is deleted ranged between 0.839 and 0.863 while the sub variable had Cronbach's alpha 0.865 and were thus deemed reliable. Lastly, indicators of housing policy had corrected to total correlation ranging from 0.354 to 0.761, their Cronbach's alpha if item is deleted ranged between 0.612 and 0.815 while the sub variable had Cronbach's alpha 0.772 and were thus deemed reliable.
4. *Organization control strategy:* Nine items were used to assess the perceived role of strategy in mitigating incessant collapse of buildings. The ratings were made on a 5-point scale. Indicators of the variable had corrected to total correlation ranging from 0.7763 to 0.908 while their Cronbach's alpha if item is deleted ranged between 0.951 and 0.959. The Cronbach's alpha of the variable was 0.960 and was deemed reliable.
5. *Organization performance:* Eleven items were used to assess the housing industry performance. They assessed market share domain, operational performance and customer perspective. The ratings were made on a 5-point scale. Indicators of the variable had corrected to total correlation of the elements of the variable ranged from 0.465 to 0.841 while their Cronbach's alpha if item is deleted range between 0.917 and 0.933. The Cronbach's alpha of the variable was 0.929 and was deemed reliable.

DATA ANALYSIS

Data obtained was analysed descriptively and inferentially. Mean and standard deviation were used to describe prevalence of collapse of buildings. Logistic regression was used for objective 2 while hierarchical regression for objective 3. Specifically, logistic regression was used to

assess the odds of causes of collapse of buildings. Hierarchical regression analysis was used to assess the mediating influence of organization control strategy in the performance of the housing industry by mitigating collapse of buildings.

RESULTS

Demographic Information and Descriptive

Data was obtained from a convenience sample of 173 respondents who returned fully filled questionnaires. Demographic information reviewed included gender, age, area of specialization, level of education and work experience. Information obtained illustrated that a significant majority (86.0%) were males compared to females (14.0%) implying a male dominated sector. A majority were either 30 to 50 years or above (84.2%) while about three quarters had over 10 years work experience within the sector indicating a sample with vast experience. Except for valuers who were slightly more (42.7%), the remaining respondents were either Architects, Structural Engineers, QS, BS, LS, Developers, Contractors, Planners and Estate agents. About two thirds (65.5%) were graduates, 22.8% had Master's degree, 8.2% were diploma holders while 3.5% had PhD's implying respondents were highly trained professionals.

Objective 1: Prevalence of Collapse of Buildings

The study to begin with sought to establish the prevalence of collapse of buildings in major towns in Kenya. Results show that slightly more than three quarters of respondents (75.4%) felt that the level was high, the remaining proportion maintaining that it was either moderate (21.1%) or low (3.5%). A significant proportion of the respondents indicated that substandard buildings in Kenya are a hidden growing problem that affects millions (M=4.52, SD=0.576), facilities within the low income neighbourhoods are poorly constructed (M=4.52, SD=0.576) and that many buildings in major towns countrywide are death traps due to substandard works (M=4.18, SD=0.874). Similarly, it was the feeling of most of the respondents that urban centres within the country are increasingly witnessing cases of collapse of buildings mainly in the low income neighbourhoods (M=4.51, SD=0.670), that substandard buildings usually collapse due to minimal efforts and strain (M=4.47, SD=0.751) and lives, livelihoods and property are lost when such buildings collapse (M=4.76, SD=0.426). On the whole, prevalence of collapse of buildings was rated highly (M=4.48, SD=0.478, N=173).

Objective 2: Causes of Collapse of Buildings

The second objective sought to identify the causes of collapse of buildings within the country. The contribution of three factors; building materials, workmanship and adherence to housing policy were assessed. Descriptively, results show the contribution of poor workmanship (M=4.47, SD=0.434) to the collapse of buildings was highest. Lack of professional participation in construction works which affects implementation of standards leading to construction of buildings that are prone to collapse (M=4.64, SD=0.529) was also reported. At the same time, competition and conflict amongst professionals' which sometimes compromise provision of quality service leading to collapse of buildings (M=3.87, SD=1.02) was said to contribute to poor workmanship. Mainly, workmanship was compromised by noncompliance with building standards (M=4.65, SD=0.608), poor development of monitoring processes (M=4.45, SD=0.575), incompetent contractors (M=4.43, SD=0.692) and inadequate supervision (M=4.36, SD=0.637). Other contributors to poor workmanship according to the respondents include faulty construction methodology (M=4.28, SD=0.726), use of substandard equipment (M=4.11, SD=0.930) and improper designs (M=4.01, SD=1.01). Generally, respondents felt that city inspectorate department (M=4.69, SD=0.543), contractors (M=4.67, SD=0.507) and project managers (M=4.28, SD=0.802) were the main contributors in encouraging poor workmanship.

Similarly, the contribution of substandard building materials to collapse of buildings was also high (M=4.11, SD=0.742). Respondents indicated that high cost of building materials within the country often lead to use of cheap but substandard materials (M=4.29, SD=0.835). It was also reported that most structural failure results from the quality of materials used in construction works (M=4.16, SD=0.969) and that poor quality of engineering materials is a key driver of construction of substandard buildings (M=4.15, SD=0.836). In generally, a majority of the respondents confirmed that safety of buildings are compromised by the entry into the market of building materials that do not meet standards (M=3.83, SD=1.17). Examples of substandard materials whose use could lead to collapse of buildings include reinforcement rods (M=4.53, SD=0.687), steel sections (M=4.39, SD=0.670) and cement (M=4.21, SD=0.649). Other materials include ballast (M=3.96, SD=0.734), sand (M=3.91, SD=0.787) and hard water (M=3.75, SD=0.850).

Lastly, the contribution of housing policy to collapse of buildings was slightly high (M=3.96, SD=0.420). A majority of the respondents acknowledged that most urban centres within the country are not well planned (M=4.13, SD=0.728) and that where plans exist enforcement is absent (M=4.32, SD=0.654). A significant proportion (M=4.74, SD=0.440) indicated that corruption within the housing industry compromises implementation and compliance with safe building and land use principles. It was also observed that lack of man power for enforcement contributes to inadequate implementation of the housing policy hence substandard buildings (M=3.90, SD=1.12) and that existence of a number of regulatory authorities in the building industry leads to overlap and conflicts limiting quality of construction works (M=3.82, SD=1.08). Major causes of noncompliance to housing policy were reported to be political interference (M=4.32, SD=0.654), inadequate implementation process (M=4.31, SD=0.765), poor leadership (M=4.30, SD=0.717) and lack of building code awareness (M=3.98, SD=0.967).

A logistic regression model was used to assess the odds of each of the factors; building materials, workmanship and housing policy contributing to collapse of buildings. Table 1 presents the findings.

Table1 Causes of Collapse of Buildings

	B	S.E.	Wald χ^2	df	Sig.	Exp(B)
Building materials	1.115	.327	11.629	1	.001	3.048
Workmanship	.891	.508	3.073	1	.080	2.438
Policy	1.281	.611	4.399	1	.036	3.601
Constant	-11.609	3.158	13.515	1	.000	.000

a. Variable(s) entered on step 1: Building materials, Workmanship, Policy.

Substandard building material, poor workmanship and noncompliance to housing policy were the independent variables used in the model. The model was significant, $\chi^2(1) = 58.93$, $p < 0.001$ and the Hosmer and Lemeshow Test confirmed model fit, $\chi^2(8) = 28.85$, p = .100. Cox & Snell R Square predicted a variance of 17.1% while Nagelkerke R Square predicted 28.1% in variation in collapse of buildings explained by the model. The model with independent variables explained 82.7% of collapse of buildings due to the factors, an improvement from the 62.1% initially predicted. Substandard building materials and noncompliance to housing policy significantly predicted collapse of buildings, Wald $\chi^2(1)= 11.63$, p< 0.01, Exp(B) = 3.048; Wald $\chi^2(1) = 4.40$, p=0.036, Exp(B) = 3.601). Though insignificant, workmanship increased the odds of collapse of buildings by 144%.

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Objective 3: Influence of Organizational Control Strategy in the relationship between Causes of Collapse of Buildings and Performance of the Housing Industry in Kenya

The last objective sought to assess the influence of organizational control strategy in the relationship between causes of collapse of buildings and the performance of the housing industry. Influence of strategy was rated relatively high (M=3.37; SD=0.497). It was positively and significantly correlated to building materials (R=0.199; p<0.01), workmanship (R=0.344, p<0.001) and performance of the housing industry (R=0.485, p<0.001). Though insignificant, it was also positively correlated to policy (R=0.140, p=0.066). The mediating influence of strategy in the relationship between causes of collapse of buildings and performance of the housing industry was assessed in a 4 step regression analysis. First, causes of collapse of buildings (CCB) were regressed against performance of the housing industry. The model obtained which was significant, $F(1, 171)=5.20$, p=0.24 indicated that CCB accounted for 13.0% of variation in performance. CCB negatively and significantly predicted performance of the housing sector (β=-0.026, p=0.024). Secondly, strategy was regressed against CCB. The second model was also significant, $F(1, 171)=7.14$, p=0.008 and accounted for 41% of total variance in collapse of building. In the model, strategy negatively and significantly predicted collapse of buildings, (β=-0.112, p=0.008). Similar observation was made with regard to the third model assessing the relationship between strategy and housing industry performance, the model $F(1, 171)=52.62$, p<0.001 accounting for 23.5% of variation in housing industry performance. Strategy was observed to positively and significantly predict the industry performance, (β=0.771, p<0.001). In the fourth model, CCB and strategy were regressed against housing industry performance hierarchically, first by introducing CCB followed by strategy. Introduction of strategy in the CCB and housing industry performance model increased the variation in the industry performance by 21.3%, $F(2, 170)=26.89$, p<0.001 the model being significant. Strategy positively and significantly predicted housing industry performance, (β=0.750, p<0.001). The model illustrated that strategy partially mediates the relationship between CCB and housing industry performance. Table 2 summarizes the findings.

Table 2: Relationship between CCB, Strategy and Housing Industry Performance

Model	R^2	Adjusted R^2	df1	df2	F	Sig.	β	t	Sig.
1	.130	.125	1	171	5.16	.024	-.026	2.28	.024
2	.410	.395	1	171	7.14	.008	-.112	2.67	.008
3	.235	.231	1	171	52.62	.000	.771	7.25	.000
4	.243	.234	2	170	26.89	.000	.750	6.87	.000

The study thus proceeded to assess the effect of organizational control strategy in the relationship between each of the causal factors and the performance of the housing industry using similar hierarchical model. The factors were entered into the model independently followed by strategy and the effect analysed. Results obtained were as summarised in Table 3.

Table 3: Relationship between Factors, Strategy and Housing Industry Performance

Factor	R^2 change	F^2 change	df1	df2	Sig.	β
Building materials	.229	50.89	1	171	.000	.003
Workmanship	.177	41.11	1	171	.000	.369
Policy	.347	52.79	1	171	.000	-.065

Information obtained illustrates that when strategy was entered into building materials and housing industry performance model, there was a R^2 change equivalent to 0.229 implying a 22.9% increase in the performance of the sector. The effect of substandard building materials on the performance of the sector decreased from β=0.142 to β=0.003, the observation being significant. In the workmanship and performance model, the R^2 change was 0.177 implying a

17.7% increase in the performance of the sector due to organizational control strategy, the effect due to poor workmanship decreasing from β=0.600 to β=0.369, the observation similarly being significant. Lastly, when strategy was introduced into policy and performance model, an R^2 change 0.347 implying a 34.7% increase in the performance of the sector due to organizational control strategy was observed, the effect due to noncompliance to housing policy decreasing from β=0.012 to β=-0.065, the observation also being significant.

DISCUSSION

Information on respondents' demographics illustrates that they were highly trained professionals including Valuers, Architects, Structural Engineers, QS's, BS's, LS's, Developers, Contractors, Planners and Estate agents. A majority either had graduate or postgraduate education qualification with only a few being diploma holders. At the same time, a significant proportion had over 10 years work experience deemed long enough to enable them have acquired invaluable work experience. The results are consistent with the observations of Auma (2014) who indicated that the housing industry within the country is manned by highly trained and experienced professionals and consultants. Similarly, Cywinski (2001) observed that the sector demand the concerted effort and collaboration of a team of professional with strong fundamental knowledge of engineering design and management principles, besides knowledge of business procedures, economics and human behaviour.

The first objective sought to assess the prevalence of collapse of buildings within the country. Results showed that prevalence was high. Facilities within low income neighbourhoods in most urban centres were reported to be poorly constructed, urban centres within the country were said to be increasingly witnessing cases of collapse of buildings and that lives, livelihoods and property are lost when such buildings collapse. The results conform to observations of Fernandez (2014) who reported rising cases of collapse of buildings within the country. Corroborating evidence is also attributed to Bassett and Kamunyori (2016), Bullutt and Opiyo (2015), Kazimoto (2016) as well as Mutambo (2016). In general, the researchers agree that reported cases of collapse of buildings within the country are high and lasting solution to the problem is urgently needed.

The second objective sought to establish the extent to which substandard building materials, poor workmanship and noncompliance to housing policy contribute to collapse of buildings. Descriptively, the contribution of workmanship was highest. Inferentially, workmanship increased the odds of collapse of buildings in the country by 144%, the observation however not being as significant as that of other factors. This means that although its contribution is comparatively low, workmanship contributes to the incessant collapse of buildings within the country. Respondents attributed high levels of its contribution to lack of professional participation in construction works which affects implementation of standards leading to construction of buildings that are prone to collapse. Mainly, workmanship was compromised by incompetent contractors, noncompliance with building standards, poor development of monitoring processes and inadequate supervision. The net effect is construction of substandard buildings which easily collapse under minimal stress and strain. The observation is consistent with assertions of Kuta and Nyaanga (2014) who established that poor workmanship is a contributor to collapse of buildings and that collapsed buildings are mainly constructed by incompetent craftsmen rather than professionals. A report by Institution of Engineers of Kenya also pointed out that the probable causes of collapse of building were use of inappropriate specifications, incompetent design, poor workmanship, lack of ethics, poor supervision, misunderstanding between parties to the contract, use of inappropriate materials and unskilled workers (9).

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The contribution of substandard building materials was also high descriptively. Inferentially, it significantly predicted collapse of buildings, the odds being equivalent to 205% due to substandard building materials. According to the respondents' the factor was the second ranked cause of collapse of buildings. In particular, they indicated that poor quality of engineering materials is a key driver of construction of substandard buildings and safety of buildings was increasingly being compromised by the entry into the market of building materials that do not meet standards. Such materials include poor quality reinforcement rods, steel sections, cement and ballast. A study by Kuta and Nyaanga (2014) established that collapsed buildings were mainly constructed with low quality building materials. Fernandez (2014) also acknowledged that many forensic investigations attribute most building collapse accidents within Nairobi to low-quality concrete.

The contribution of noncompliance to housing policy was slightly high. Inferentially, the factor was reported to be the main cause of collapse of buildings within the country, the odds off collapse attributed to the factor being 260%. In particular, a majority of the respondents indicated that most urban centres within the country are not well planned and that where plans exist enforcement is absent. At the same time, it was reported that corruption within the housing industry compromises implementation, compliance with safe building standards and land use principles. Mainly, noncompliance to housing policy was attributed to poor leadership, corruption, political interference and inadequate implementation process. The results agree with previous reports which indicate that a majority of urban centres in developing countries such as Kenya are not planned, and even where plans exist, enforcement is absent (19). Other observers also attribute noncompliance to inadequate implementation process and manpower for enforcement as another key factor. According to them, the failure of building regulation has been compounded by poorly formulated and poorly communicated building codes (18, 20). Corruption of local regulatory authorities, where they do exist, has further compromised implementation of and compliance with safe building and land use principles.

The last objective sought to assess the role that organizational control strategy could play in mitigating the incessant collapse of buildings to enhance the performance of the housing industry. Descriptively, role of strategy was rated high. It was positively and significantly correlated to building materials, workmanship and performance of the housing industry. At the same time, though insignificant, it was also positively correlated to housing policy. This means that application of the strategy could significantly help in mitigating the effects of the causal factors to the collapse of buildings and ultimately the performance of the sector. The regression model used established that organizational control strategy partially mediates the relationship between CCB and housing industry performance. Introduction of organizational control strategy to the individual factors and housing industry performance illustrated a positive change in the performance of the sector due to strategy ranging between 17.7% in the workmanship model to 34.7% for policy model. The effect of each of the factors decreased correspondingly with inclusion of strategy, the change being significant. This illustrates that adoption of organization control strategy has the potential of enhancing the performance of the sector by managing the adverse effects of factors predicting collapse of buildings such as substandard building materials, poor workmanship and noncompliance to housing policy. Peljhan and Tekavcic (2008) had previously established that organizational control systems influences implementation and monitoring of strategies, providing feedback for learning and information to be used interactively to formulate strategy further. Similarly, Obinozie (2016) established that financial and nonfinancial-based management control systems and differentiation strategies are significantly and positively related to organizational performance.

CONCLUSION AND RECOMMENDATION

The study investigated prevalence of collapse of buildings within the housing sector in Kenya, causes of collapse and how organizational control strategy could contribute in mitigating the challenge. It illustrated that the prevalence of collapse of buildings in major towns in the country is high especially within the low income neighbourhoods. Further, findings illustrated that substandard building materials, poor workmanship and noncompliance to housing policy were the causes of collapse of buildings, noncompliance being the greatest significant contributor followed by substandard building materials and lastly poor workmanship. The study also illustrated that organizational control strategy is positively and significantly correlated to building materials, workmanship and the performance of the housing sector. It is also positively correlated to housing policy. At the same time, findings showed that organizational control strategy partially mediates the relationship between the causes of collapse of buildings and the performance of housing sector. With regard to individual causes of collapse, findings illustrated that application of organizational control strategy has the potential to significantly reduce the effect of each of the factor and consequently enhance the performance of the sector. Taken together, findings confirm the significance of organizational control strategy in the performance of the housing sector. In particular, the study illustrates that application of strategy in enforcement of the housing policy could mitigate poor workmanship and use of substandard building materials thus enhancing the performance of the sector. The study therefore recommends application of organizational control strategy by stakeholders. In the process, specific attention should be given to strict enforcement of housing policy.

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