

# Social sustainability under threat: a case of two collapsed buildings in Lagos, Nigeria

A case of two  
collapsed  
buildings in  
Lagos

431

Andrew Ebekozen

*Department of Construction Management and Quantity Surveying,  
University of Johannesburg, Johannesburg, South Africa;  
School of Social Sciences, Universiti Sains Malaysia, George Town, Malaysia and  
Department of Quantity Surveying, Auchu Polytechnic, Auchu, Nigeria*

Clinton Aigbavboa

*Department of Construction Management and Quantity Surveying,  
University of Johannesburg, Johannesburg, South Africa, and*

Mohamad Shaharudin Samsurijan

*School of Social Sciences, Universiti Sains Malaysia, George Town, Malaysia*

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## Abstract

**Purpose** – Housing provision and the neighbourhood's safety are significant social sustainability concerns. If structural issues are not well checked, housing provision and the neighbourhood's safety may become threatened, especially in Lagos State, Nigeria. Thus, this study aims to investigate the perceived root cause of collapsed buildings at the construction stage using two case studies, its effect on social sustainability aspects and suggested measures to mitigate future happening and enhance achieving social sustainability aspects goals.

**Design/methodology/approach** – The researchers collected data from Nigeria's built environment experts and eyewitnesses/employees of selected cases of collapsed buildings. The study adopted a phenomenology type of qualitative research design and analysed collated data via thematic analysis and achieved saturation. The analysed data created three themes.

**Findings** – Results reveal that inadequate heavy equipment and personnel incapacitated relevant government agencies are responsible for handling emergency and rescue during building projects collapse. Preliminary findings show developers' greed and systematic failures as the root cause of Nigeria's building project collapse (BPC). It categorised the root causes into three groups (developer's related-cause, design team related-cause and government entities related-cause). The study suggested measures to mitigate future happening. The emerged measures were grouped into a penalty, regulatory, byelaw act, technical and safety measures.

**Originality/value** – This study contributes to curbing the threat to social sustainability of housing provision in cities. It reveals the underlying perceived root cause of collapsed buildings in Nigeria's building industry.

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Also, it suggested feasible measures to mitigate BPC. These measures may be modified and adopted by other developing countries facing similar challenges.

**Keywords** Building collapse, Nigeria, Policies, Safety, Sustainability

**Paper type** Research paper

## 1. Introduction

The building industry is one sector that has recorded several casualties and property losses via building project collapse (BPC) across the globe. Past studies, such as [Skinbniwski \(2014\)](#), [Mwangi \(2016\)](#) and [Boateng \(2020\)](#) shown that the industry is amongst the leading cases of accidents. The former author reported that in 2003, the International Labour Organisation estimated at least 60,000 yearly fatal accidents occur on construction sites across the globe. The developing countries are the worse hit. The outcome may have created issues of social vulnerability because of the disasters ([Massazza et al., 2019](#)). The actual occurrence of BPC portrays developing countries as having danger-prone construction cultures ([Boateng, 2020](#)). The developed countries are not exempted from building collapse but are not as rampant as developing countries. In June 2021, a portion of a 40-year-old house collapsed in Miami, USA ([Lu et al., 2021](#)). The authors found from the simulation conducted that the collapsed building had a low safety margin, strength and resistance to progressive collapse. It implies that the consequences would be grave for minor local damage due to unanticipated reasons. In Ghana, the use of substandard construction materials, misapplication of standard-compliant construction materials, engagement of low-skilled workers and higher demand for houses in the urban areas were identified as the factors that contributed to cities' building collapse ([Asante and Sasu, 2015](#); [Boateng, 2020, 2021](#)). In Nigeria, the unrelenting cases of BPC have become a source of concern to the stakeholders, especially the safety aspect of the neighbourhood community. On the 1st and 2nd of November 2021, probably structural failure and substandard materials collapsed two buildings. They are 21-storey building and two-storey building, respectively. It took place within 24 h intervals in the Ikoyi and Lekki areas of Lagos State. News Agency of Nigeria reported that the Block B (21-storey) situated at Gerard Road, Ikoyi, Lagos, that collapsed on November 1st, 2021, killed 46 persons while 15 persons were rescued alive ([Agency Reporter, 2021](#)). The two-storey building recorded no death ([Adewole, 2021](#)).

Many studies, such as [Oni \(2010\)](#), [Okeola et al. \(2014\)](#), [Okeke et al. \(2020\)](#), [Falana and Ipidola \(2020\)](#) and [Mrabure and Awhefeada \(2021\)](#) have researched this area and proffered suggestions to prevent future occurrence. Besides crisis keeps reoccurring, how social sustainability are being threatened by the phenomenon of building collapse and the effects of building collapse on social sustainability are areas that need to be addressed. This is because social sustainability goals include access to good food, shelter, fair income, social infrastructure and social recognition ([Bostrom, 2012](#)). [Shirazi and Keivani \(2017\)](#) and [Wan and Ng \(2018\)](#) affirmed several interpretations of sustainability. Environmental, economic and social sustainability is the three-dimensional model widely accepted. The study focussed on social sustainability. [Bacon and Caistor \(2014\)](#) described social sustainability as a process for creating sustainable, successful places that promote well-being, by understanding what people need from their places and work. It combines the design of the physical realm and social world infrastructure to support social and cultural life, social amenities (i.e. buildings/housing), systems for citizen engagement and space for people and places to evolve. Regarding the provision of social amenities (buildings), frequently collapsed buildings, especially in urban locations may threaten social sustainability goals if not addressed. The negative impact of the frequent collapsed building may influence negative economic growth and social equity. Therefore, social sustainable goals, such as access to good food, attractive housing, self-fulfilment, equality of rights and access to social infrastructure, may be

threatened. Proffering measures to mitigate collapsed buildings are germane in ensuring that future generations can have accessible shelters. Though notable efforts amongst standard setters, scholars, planners and practitioners in various sectors, including the built environment sector, to address the often-neglected social aspects of sustainability but not related to collapsed building. This is a theoretical gap and one of the study's motivations.

Mrabure and Awhefeada (2021) affirmed that enforcing the planning law is the major challenge. But these studies were not from the perspective of the spot assessment of the possible cause (preliminary findings). Thus, the need for an exploratory approach to engaging both approaches. This study intends to investigate the preliminary cause of the two recent building projects at Ikoyi that collapsed within 24 h intervals. Experts' opinions will complement the views of the collapsed building projects developer's personnel that survived. Among the possible worldwide measures utilised to mitigate or manage building collapse accidents include sensors (IT) to identify, track, monitor and check for safety decision-making on building sites (Yan and Kim, 2018). Others encourage built environment practitioners to voluntarily comply with building codes and regulations in developing countries (Ahmed and Kabir, 2021). Aini *et al.* (2005) recommended effective and holistic safety and emergency management at the individual, company/firm and government at the state and federal levels. Boateng (2020) suggested broadening interventions to embrace initiatives regarding compliance and enforcement of building regulations. Whether Nigeria's building sector has engaged these measures for possible implementation to mitigate or manage BPC is uncertain. If not, they are worth investigating to reduce or manage potential threats from BPC facing social sustainability of housing provision in Lagos State and, by extension, Nigeria.

However, examining the preparedness of relevant government agencies before, during and after BPC in Nigeria's building industry cannot be over-emphasised. The government agencies include the National Emergency Management Agency (NEMA), Standard Organisation of Nigeria (SON), Lagos State Physical Planning and Urban Development and Lagos Rescue Unit (LRU). Others are Lagos State Emergency Management Agency (LASEMA), Lagos State Fire Service, Lagos State Ambulance Services (LASAMBUS), Lagos State Building Control Agency and Lagos State Physical Planning Permit Authority. Also, studies concerning the root cause of BPC from the perspective of experts and on-the-spot assessment of Nigeria's built environment experts and eyewitnesses/employees of selected cases of collapsed buildings are scarce in the reviewed literature. The research intends to fill this theoretical gap amongst others. Hence, the study investigated the perceived root cause of collapsed buildings at the construction stage and suggested feasible measures to mitigate future happening and social sustainability aspects threatened through the following objectives:

- (1) To evaluate the preparedness of relevant government agencies during BPC.
- (2) To investigate the perceived effect of building collapse on social sustainability aspects.
- (3) To suggest feasible measures to mitigate BPC and enhance achieving social sustainability aspects goals.

## 2. Literature review

An overview of key social sustainability literature is provided in Section 2.1 below. Section 2.2 presents a discussion on building collapse, especially in developing countries. Finally, an assessment of the literature follows in Section 2.3, where the link between social sustainability and building collapse is linked.

### 2.1 Social sustainability

The [United Nations News \(2020\)](#) described sustainability as a concept that controls human mentality concerning safeguarding the current without bargaining for the future. There is no universal definition for the concept “social sustainability”. It depends on the researcher’s perspective or context. The focus is on social sustainability from the perspective of urban environment. In the work of [Bramley et al. \(2009\)](#), social equality and sustainability of neighbourhoods were recommended as dimensions for social sustainability. [Herd-Smith and Fewings \(2008\)](#) and [Almahmoud and Doloï \(2020\)](#) described social sustainability as the engagement amongst personnel, neighbourhood communities, clients and the supply chain to safeguard meeting the demands of present and upcoming populations. The latter authors affirmed that sustainable construction should embrace many aspects of economic, social and environmental necessities to enhance the quality of neighbourhood communities. [Almahmoud and Doloï \(2020\)](#) identified improving local economies, health and comfort, safety and security and culture and heritage as the critical elements of communally sustainable construction projects. [Bostrom \(2012\)](#) found that there are better perceptions than social sustainability for studying all the complexities in the social-environment relationship. It has the potential to be used as a frame to support and improve sustainability projects and planning.

Regarding the safety and security of the neighbourhood as one of the main concerns in the social sustainability literature, [Ma \(2011\)](#) opined that new development should offer consideration to this factor. [Almahmoud and Doloï \(2020\)](#) asserted that casual staff engagement in a neighbourhood could make people worry about safety. It may affect trust and security issues because the causal staff presence has altered the social structure. Safety is pertinent on construction sites and neighbourhood communities because of heavy equipment and materials ([Montalban-Domingo et al., 2019](#)). New project site may affect the safety and security of the neighbourhood ([Ma, 2011](#)). Thus, socially sustainable construction project intends to mitigate these adverse effects by planning to reduce traffic, sustain sufficient supervision to lower risks and include community neighbourhoods in the decision-making ([Wong et al., 2016](#)).

### 2.2 Building collapse

Building collapse is a global phenomenon. The hazard often occurs during construction ([Yan and Kim, 2018](#)). Many factors can cause the collapse of a building. [Lu et al. \(2017\)](#) identified differential settlement of the foundation, corrosion of the reinforcement, long-term waterproofing issue and cracking of the concrete as possible factors. [Lu et al. \(2021\)](#) affirmed that the progressive collapse of a building could be induced by accidental loading. The authors suggested a design with adequate load redistribution capacity after the initial localised failure happens. Several studies, such as [Boateng \(2019\)](#), [Windapo and Rotimi \(2012\)](#), [Okeke et al. \(2020\)](#) and [Alinaitwe and Ekolu \(2014\)](#), asserted that building collapses are more frequent in developing countries. [Boateng \(2020\)](#) opined that building collapse creates a loss of lives and investments, including temporary and permanent injuries. Between 2004 and 2008, [Alinaitwe and Ekolu \(2014\)](#) compiled 122 injuries and 54 deaths from building collapse in Kampala, Uganda. It was majorly human errors such as non-compliance, substandard materials, etc. In Kenya, for the past 20 years, the pattern of building collapse has been predominantly in the urban areas, as reported by World Bank ([Moullier, 2015](#)). [Moullier \(2015\)](#) attributed the root cause to negligence of the stakeholders and drive for huge profit making. In April 2013, an eight-storey building collapsed and recorded 1,129 dead and 2,515 injured persons in Dhaka, Bangladesh ([Hodgson et al., 2016](#)). In Ghana, [Boateng \(2020\)](#) presented a summary of building collapse incidents in urban areas from 2000 to 2019. Human error was found as the major cause. In Lagos, Nigeria, between 1978 and 2008, 112 cases of

collapsed buildings were compiled. Braithwaite (2021) highlighted some collapsed buildings, and the reasons for the collapse were similar. The projects were Reigners Bible Church, Uyo, Akwa Ibom State with a death toll of about 50 people, Lekki Gardens in March 2016 with a death toll of about 34 people and Guest House of the Synagogue Church of All Nations (SCOAN), in 2014 with a death toll of about 116 people.

The Lagos State Physical Planning and Development Authority report from 1978 to 2007 showed the cause of building collapse in 105 cases. They were mainly structural defects and poor materials (Oni, 2010). The author affirmed that structural defect was the major cause, as revealed in the compiled list. The author suggested further engineering analysis to ascertain the remote causes of the structural defects since it was the major root cause of building collapse. The areas of reoccurrence, such as Surulere, Lagos Island and Lagos Mainland, were sand-filled and reclaimed. The frequent collapsed buildings in these locations should not be taken as a coincidence. The author recommended that the government should pass the building codes into law. Mrabure and Awhefeada (2021) found that the law is adequate but there is lax enforcement of these laws. It will enhance the enforcement regarding the standard of building materials and other related issues. Refer to Table 1 for the summary of causes and remedies of building collapse in Nigeria. Referring to Table 1, none of the current published works reported on the spot assessment and engagement of parties involved before the collapse of the building. The existing methodological gap and others will form part of the contribution to the body of knowledge.

### *2.3 Relationship between social sustainability and building collapse*

Several scholars (Bostrom, 2012; Zarghami *et al.*, 2017; Ebekoziem *et al.*, 2021) categorised sustainable development into three pillars: environmental, economic and social. Each pillar is compatible and mutually supportive. However, there is a theoretical gap regarding social dimension, especially with policy related to sustainable development. Despite the trends towards sustainable development, social sustainability has not been addressed, especially regarding collapsed buildings. Thus, a waste of capital accumulation in infrastructure (collapsed building) may hinder social sustainability aspects goals directly or indirectly.

Capital accumulation is one of the key determinants of economic growth. It is the increase in the capital stock of a country, which may arise from any or a combination of the following: investment in new construction projects (residential, commercial, factories, etc.), machinery and equipment, social and economic infrastructure which make it possible for greater national output and income to be achieved (Windapo and Rotimi, 2012). Frequent building collapse may hinder these infrastructures and by extension, affect social sustainability aspects as previously identified in the introduction section. Wan and Ng (2016, 2018) opined that social dimension of sustainability deals with improving human development and rights. Housing (building) is a component of human development and rights. The concept “human needs” was emphasised in the definition of sustainable development given by Brundtland Report and can be categorised in line with Maslow’s (1943) five-level hierarchy. The concept “social sustainability” emerged to consider and support human needs at different levels.

Woodcraft *et al.* (2011) identified four key dimensions of social sustainability. They are voice and influence, social and cultural life, amenities and social infrastructure and adaptability and resilience. The study focussed on the last two key dimensions because of their relationship with physical infrastructure, including buildings and people. Bostrom (2012) identified food, housing, quality of life, happiness, well-being, fair distribution of income and equality of rights, amongst others, as the social sustainability goals to achieve. Thus, because of the relationship between these dimensions and social sustainability, frequent collapsed buildings within the building environment if not checked may negatively affect other social issues such as access to education, health, safety and security, other public

Authors/Years	Major cause of building collapse	Major suggestion
Falana and Ipindola (2020)	Use of substandard materials, faulty design, corruption and developer greed, illegal conversion of the building by the developer, non-adherence to approved building plans and specifications	Professional bodies, especially Council of Registered Engineers of Nigeria and Standard Organisation of Nigeria need to awaken ensure there is an independent monitoring operation to mitigate future BPC. Also, soil investigation and material tests should be made compulsory for high rise buildings
Okeke <i>et al.</i> (2020)	Poor staffing and lack of engagement of building professionals. Also, shoddy planning approval activities, from approval to monitoring with the operational building codes and byelaws	Government should take proactive steps to engage qualified built environment professionals. Also ensure that the planning approval offices do the needful in line with the existing physical development legislation and punish offenders as prescribed in the byelaws
Ibrahim <i>et al.</i> (2019)	Poor workmanship, bad design, substandard materials, non-involvement of registered professionals and use of incompetent contractors	Relevant built environment practitioners should be engaged in project execution, supervision and monitoring from inception to completion. Also, the government agencies charged with regulatory materials should do the needful and erring contractors should be prosecuted
Ede <i>et al.</i> (2017)	Poor concrete practices and technology	Improvement of the existing concrete technology. Tests on the quality of cements must be conducted regularly by the concerned regulatory agencies
Una <i>et al.</i> (2015)	Structural problem due to the presence of smectite in the soils	Soil characterisation should be conducted before the commencement of building. Government should assist developers in cases where smectic contents are high
Oyediran and Famakinwa (2015)	Geotechnical and geological reasons	Soil characterisation should be conducted before the commencement of building, especially for high rise buildings
Okeola <i>et al.</i> (2014)	Substandard materials, poor supervision and excessive loading	Relevant regulatory agencies should reawaken to their responsibility and enforcement of relevant byelaws
Adeleke and Odusote (2013)	Low quality reinforced steel bars	Continuous random test of building materials should be carried out to determine if specifications are deviated. Tests should be conducted on the materials to ensure that they are of the required standards
Kolawole and Akanni (2012)	Low quality reinforced steel bars	Ensure that quality steel bars are used, and sanctions are prescribed for observed corrupt practices
Amadi <i>et al.</i> (2012)	Inadequate pre- and post-construction investigations, under design, poor supervision, use of substandard material	Geotechnical reports be made available before, during and after construction of buildings
Ayedun <i>et al.</i> (2011)	Structural and construction defects, geophysical, and corruption	Stakeholders should regularly conduct awareness and trainings on the dangers and causes of building collapse should be regularly conducted for stakeholders in the built environment and property developers. Safety measures should be encouraged during construction

**Table 1.**  
Summary of selected works on the causes and remedies of building collapse in Nigeria

services and ICT. [Gibberd \(2003\)](#) reinterpreted the idea of sustainability and its application in the built environment and established a Sustainable Building Assessment Tool (SBAT) for developing countries. The tool summarised and categorised the objectives of social dimension of building sustainability into five groups. They are access to public services, including adequate shelter, development improves levels of education and awareness and development processes and benefits are inclusive. Others are: development considers human rights and supports improved health, safety and security and development should support partnerships, social interaction.

### 3. Research method

This study adopted a phenomenology type of qualitative research design. Phenomenology focuses on the interviewees' expertise and experience during data collection ([Creswell and Creswell, 2018](#)). And in line with [Boateng \(2020\)](#). In a similar study, [Boateng \(2020\)](#) adopted interviews and focus group discussions from Ghana's construction experts. The study adopted a new approach. It was achieved via interviews with experts and selected two case studies. It is in line with [Okunola \(2021\)](#) that adopted in-depth interviews to investigate building collapse in Lagos, Nigeria. For the study, some of the participants were workers in the adopted two collapsed building projects and the cases happened within an hour. The researchers adapted this mechanism because several studies have been conducted on building collapse in Nigeria. Besides the problem, the social sustainability aspects have been given adequate attention. More so, experience showed that engaged participants/stakeholders, especially survivors, are not willing to speak on collapsed building/project after a long time from the date of the incident. This might hamper data collection from the field participants due to the sensitive nature of the issues. Thus, a pragmatic approach may provide feasible measures for the root cause, especially in developing countries such as Nigeria. The interviewees engaged were from Lagos because of the rampant occurrence of BPC in the state. Between 1978 and 2008, 112 cases were compiled ([Windapo and Rotimi, 2012](#)). Moreover, as the case studies for this paper, the study adopted the recorded two collapsed buildings within 24 h intervals, 1st and 2nd<sup>November</sup> 2021.

The study adopted thematic analysis through themes to analyse the collated data. A total of 25 semi-structured face-to-face interviews were conducted with the assistance of trained research assistants, and the study strictly observed compliance to the COVID-19 guidelines. The research team interviewed the experts in their office and others interviewed at the scene of the collapsed buildings between 2nd November and 10th November 2021. The study achieved saturation with 25 interviewees. [Table 2](#) shows the years of experience and rank of the participants engaged. The study concealed vital information about the participants for confidentiality reasons. The interviews lasted an average of 55 min. Apart from Participants P4 to P6, others were transcribed verbatim and sought clearance of areas not cleared from the engaged participants ([Saldana, 2015](#)). Referring to [Table 2](#), the rank of the engaged experts shows they are knowledgeable about building collapse in the country. For example, Participants (7, 10, 13 and 16) have been building consultants for over 29 years. The study adopted a snowball sampling technique. It is in line with [Ebekozen \(2020\)](#) and [Ebekozen and Aigbavboa \(2021\)](#) and affirmed that this type of sampling technique permits the investigator to access more interviewees via the support of the participants. The researchers coded the retrieved face-to-face data ([Corbin and Strauss, 2015](#); [Jaafar et al., 2021](#)). A total of 69 codes emerged from the coding and categorised into seven categories. Finally, three themes emerged from the seven categories (preparedness of relevant government agencies, perceived root cause of collapsed buildings and feasible measures to mitigate building projects collapse). [Appendix](#) shows the covering letter and sample of semi-structured questions adopted for the study.

**Table 2.**  
Description of the  
participants  
background

ID	Participant	Years of experience	Rank/Firm
P1	Developers/Building Contractors	25 years	Director, Building Contractor/Developer
P2		31 years	Executive Director, Developing Firm
P3		22 years	Operational Manager, Developing Firm
P4	Survivors/workers	7 years	Mason with a Sub-Contractor
P5		3 years	Labourer with a Sub-Contractor
P6	Structural Engineers	5 years	Mason with a Sub-Contractor
P7		38 years	Director, Structural Engineering Consultant
P8		22 years	Partner, Structural Engineering Consultant
P9		27 years	Managing Partner, Structural Eng. Consultant
P10	Architects	40 years	Principal Director, Architectural Firm
P11		28 years	Director, Architectural Firm
P12		21 years	Partner, Architectural Firm
P13	Builders	29 years	Director, Builders Associates
P14		23 years	Chief Executive Officer, Building Firm
P15		20 years	Technical Officer, Building Firm
P16	Quantity Surveyors	30 years	Senior Partner, QS consultancy firm
P17		25 years	Senior Quantity Surveyor/QS Firm
P18	Geologists	32 years	Senior Partner, Geology Consultancy Firm
P19		25 years	Chief Geologist, Consultancy Firm
P20		Govt. Agencies (Regulatory)	15 years
P21	Govt. Agencies (Emergency)	20 years	Senior Staff
P22		18 years	Senior Staff
P23		24 years	Management Staff
P24		27 years	Management Staff
P25		21 years	Senior Staff

#### 4. Findings and discussion

In Nigeria, especially in Lagos State, the increasing rate of building collapses has become a concern to stakeholders and a threat to social sustainability of housing provision. On 1st November 2021, a 21-storey building suffered a collapse in Ikoyi and recorded many deaths. In less than 24 h, another two-storey building suffered a sudden partial collapse and recorded no death in the Lekki axis. Besides the two incidents reawakened the building collapse menace amongst stakeholders, it gives the study the opportunity to contribute to the scanting literature regarding social sustainability and its impact because of collapsed building projects in developing cities. Lagos State was used as a case study where two buildings collapsed within an hour's interval. It threatens the social sustainability of housing provision, lives, properties and the environment if not mitigated. This is because the goal of social sustainability aspects/dimensions is access to housing. The study adopted these two cases and supplemented them with expert opinions and survivors. Studies regarding preliminary findings of combined experts and spot assessments of possible root causes of collapsed buildings and its effect on social sustainability are scarce. This is part of the study's theoretical contributions to the body of knowledge. This section is divided into two sub-sections. First, the two case studies adopted issues, and lessons learnt, and second, the face-to-face findings and discussion sub-section.

##### 4.1 Case studies

The study engaged two recently collapsed buildings as case studies. The study would explore the root cause of these collapsed buildings. It will give direction to future building projects. They are as follows:



4.1.1 21-storey building in Ikoyi, Lagos. Background: The ongoing building project collapsed on 1st November 2021, at about 2:00 p.m. (West African Time). The project is located at 20, Gerrard Road, Ikoyi, Lagos, as presented in Plates 1 and 2. The 21-storey building is the brainwork of Fourscore Homes. Fourscore Homes is a member of the National Home Builders Registration Council in South Africa and Zurich Building Guarantee in Europe. The project intends to offer luxury high-rise penthouses, duplex, flats and four-bedroom maisonettes for people looking forward to a seven-star experience within the heart of Ikoyi as their living home. The expected delivery date for the project completion was 2022. At the point of collapse (1st November 2021), the building was 80% completed and 65% of the spaces had been sold. The range was US\$1.2m to US\$5m, as reported by Sahara Reporter (Promptnews, 2021).

Issues: The problem started sometime in 2020 when the regulators discovered that Fourscore Homes breached the town planning rules by exceeding the approval for 15-storey building as designed and approved. The Lagos State Building Control Agency carried out an arrest, but there was a compromise from the government officials. The developer continued to work even after the arrest, did not last one day. Also, during the same period, Prowess Engineering Limited, the structural engineering company engaged by Fourscore Homes, withdrew its services at the construction site. The major reason was the shoddy nature of the concrete mix being used by Fourscore Homes. This was confirmed by This Day Reporters (Oghifo and Elumoye, 2021). And cut short the lives of many, including the Director of Fourscore Homes. There was no record to show that the developer (Fourscore Homes) engaged another qualified structural engineering firm to replace the services of Prowess Engineering Limited for the project.



Plate 1.  
Before and after the 21-storey building collapsed in Ikoyi, Nigeria



Plate 2.  
Collapsed 21-storey building

Lessons learnt:

- (1) There is evidence that the regulatory agencies compromised standards. This case study is yet to establish if there was any financial benefit in exchange for the compromise. It is likely that deaths and disasters would be avoidable if the regulatory agencies did the needful via the byelaw of the state.
- (2) Developers should learn to abide by the approved design and follow advice from experts. The developer altered the designed “factor of safety” as alleged, and structural integrity weakened. It was complicated with the lax monitoring by the Lagos State Building Control Agency. Before the developer could construct the 16th, 17th, 18th, 19th, 20th and 21st storeys, where was the agency? It is a project that was not in a hidden location.

#### 4.2 Two-storey building in Lekki, Lagos

*Background:* The ongoing building project partially collapsed in the early morning of 2nd November 2021, after the previous night’s heavy rainfall. The project is in Osapa London, in the Lekki axis of Lagos, as presented in [Plate 3](#). The two-storey building is self-construction for residential. At the point of partial collapse (2nd November 2021), rendering work was yet to commence ([Adewole, 2021](#)).

*Issues:* There was no evidence of an engaged design team for the post-contract administration from the site inspection and observation. It may have enhanced the use of substandard materials and poor supervision. Also, the roof beam may not have been well reinforced.

Lessons learnt:

- (1) The regulatory agencies did not properly check the materials used during construction. From the observation, it shows inadequacies. For instance, there should be a specification for the number of blocks produced per 50 kg cement. Any trace of compromise by the developer should be sanctioned, and the building demolished.
- (2) Developers/clients should engage qualified built environment professionals during the construction stage for expert advice at each stage of the work. It would save costs and lives. This was missing.



**Plate 3.**  
Partial collapse of two-storey building in Lekki, Nigeria

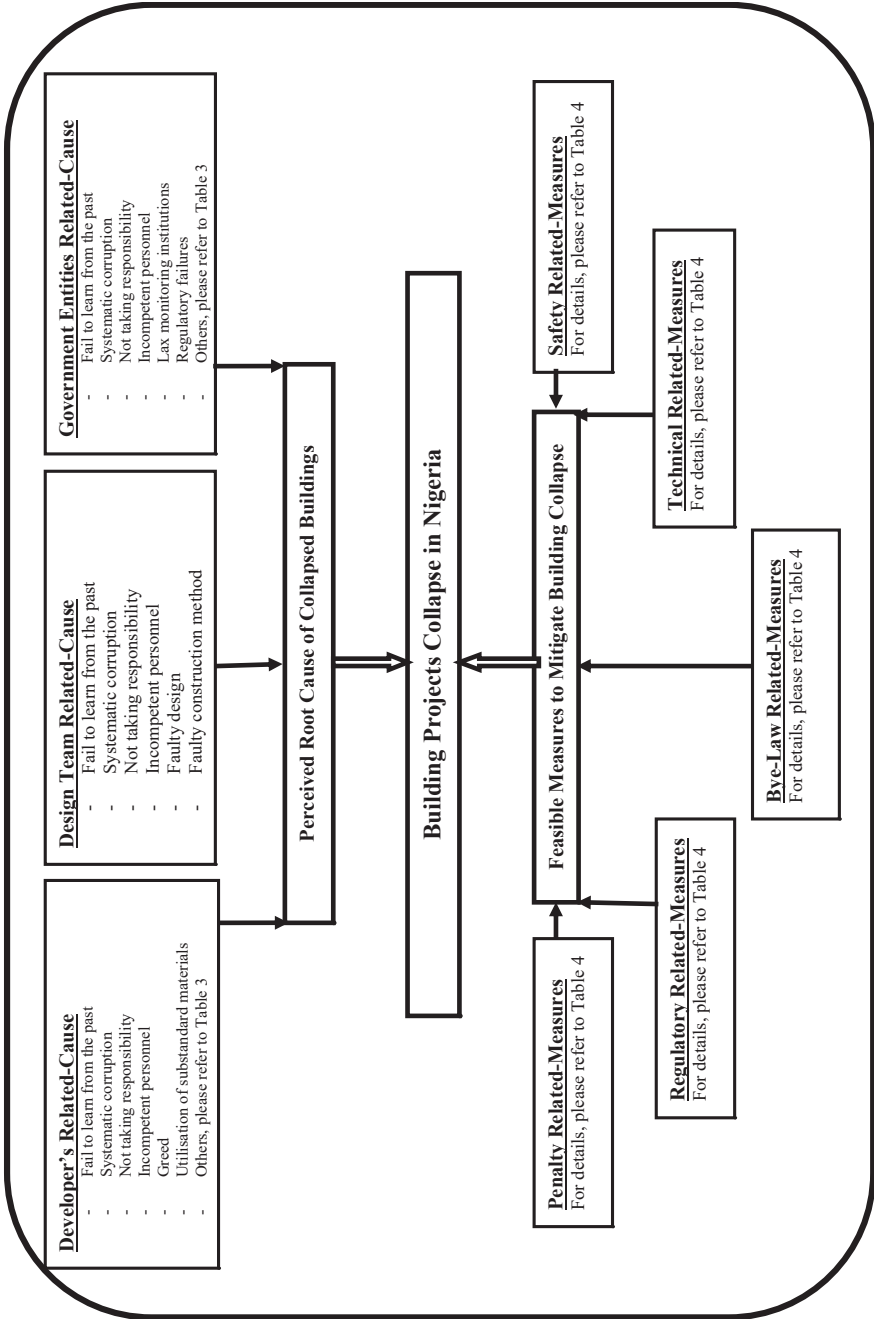
#### 4.3 Findings and discussion from interview data

The sub-section presents results and discussion as emerged from the selected engaged survivors and experts. Three main themes emerged, as previously reported in the methodology section.

*4.3.1 Theme 1: Preparedness of relevant government agencies.* The preparedness of relevant government agencies in the prevention or mitigation of crisis is germane to every society, including the construction sector. This theme assessed the readiness of the relevant Nigerian Government agencies in this respect from the engaged stakeholders' perspective. Findings identify the NEMA at the federal level (South-West Zonal Office) and LASEMA as the agencies in charge of emergency. Others are LRU, Lagos State Fire Service and LASAMBUS. Findings across the board agree that government agencies are incapacitated in equipment and personnel rescuing missions, especially regarding building collapse of frame structures. The timely intervention of construction giants such as Julius Berger and Chinese Civil Engineering Construction Corporation (CCECC) with their equipment facilitated the rescue of the first four survivors (Participants P4, P5, P6, P22 and P25). Findings agree with Akoni (2021a), a reporter with Vanguard Newspaper, who reported that Lagos State Governor, Mr Sanwo-Olu especially appreciated and recognised Julius Berger and the Chinese Civil Engineering Construction Corporation (CCECC). These companies were amongst the first responders to the rescue team.

Participant P6 says, "... we read on the pages of newspaper on the second day of the event that ministry A has directed an agency to assist with the rescue operations at the site. I only saw the giant contractors with their equipment working and removing the rubble ...". The engaged participants from the government emergency agencies rebuffed the claim by Participant P6 and insisted that rescue operations were jointly conducted by all stakeholders at the state and federal levels and are still ongoing, even with a few challenges (Participants P24 and P25). Reports from TrustTV Reporters vindicated Participant P6. Alade *et al.* (2021) reported that an official of the NEMA, commended community members for being responsive and for their courage to begin rescue missions, even before the arrival of the statutory emergency agencies. Many of the victims' families are not satisfied with the pace of rescue operations. Findings agree with the latter authors and report that families were still frustrated and complained about the slow pace of rescue operations. "... going on break for three hours under emergency and no replacement for such team. My observation is the cluelessness of some rescue workers. Improper training and lack of technical know-how to search of this magnitude may have contributed. ..." argued Participant P4. It is a lesson for state and federal emergency agencies. The need to be well prepared for a future accident cannot be over-emphasised. The preparation is pertinent because an accident is part of human living. But this can be mitigated if FEMA, as part of her responsibility, monitors the state of preparedness against disaster and undertakes human capacity development via staff recruitment and training.

*4.3.2 Theme 2: Perceived root cause of collapsed buildings and its effect on social sustainability aspects.* Building collapses in Nigeria, especially in Lagos, have threatened the social sustainability of housing provision, lives and properties. The two recent collapsed buildings stirred the need to explore the possible root cause from combined experts and its effect on social sustainability aspects, "on-the-spot assessment" and Nigerian built environment stakeholders' perspective. The emerged perceived root causes are summarised in the top layer of Figure 1. One germane point that emerged is categorising the root causes into three groups, that is, developer-related-cause, design team-related-cause and the government entities-related-cause as detailed in Table 3. Findings agree that collapsed building will hamper achieving key social sustainability goals such as housing, quality of life, well-being, fair distribution of income and equality of rights, amongst others, associated with the built environment. The extended impact of collapsed buildings on social sustainability aspects may hamper access to public services, ICT, good education, human



**Figure 1.**  
Thematic network  
analysis of building  
projects collapse and  
social sustainability  
aspects threatened in  
Nigeria

**Table 3.** Perceived root cause of collapsed buildings

Developer's related-cause	Perceived root cause	
	Design team related-cause	Govt. Entities related-cause
Fail to learn from the past	Fail to learn from the past	Fail to learn from the past
Systematic corruption	Corruption (unethical practices)	Systematic corruption
Not taking responsibility	Not taking responsibility	Not taking responsibility
Incompetent personnel	Incompetent personnel	Incompetent personnel
Greed	Faulty design	Lax monitoring institutions
Utilisation of substandard materials	Faulty construction method	Regulatory failures
Misapplication of standard		Lax enforcement from the Standard Organisation of Nigeria (SON)
Accelerated demand for houses in cities		Lack of preventive measures
Illegal conversion/addition		Government bureaucracy
		Lax enforcement of National Building Codes
		Political interference
		Enforcement challenges
		Inadequately qualified staff

rights, health and safety (P23 and P25). This is worrisome and calls for concern. This study may be amongst the few studies, if any, that grouped the causes of collapsed buildings and investigated the effect on social sustainability aspects connected with the built environment sector. Findings show that four of the emerged root causes cut across the three categorised groups. They are failing to learn from the past, systematic corruption, not taking responsibility and engaging incompetent staff. Findings agree with [Ayedun et al. \(2011\)](#), [Ede et al. \(2017\)](#), [Falana and Ipindola \(2020\)](#), and [Braithwaite \(2021\)](#). [Ede et al. \(2017\)](#) discovered poor concrete practices and technology, leading to building collapse. It is a component of the refusal to take responsibility by the developer's and design team if engaged during the construction process. [Falana and Ipindola \(2020\)](#) found corruption and greed, faulty design and substandard building materials. The latter two causes are components of the outcomes of refusal to take responsibility from the relevant stakeholders.

Findings show that avoidable disasters (collapsed buildings) happening is a pointer to the level of greed and corruption. Systematic corruption is leaving Nigeria's regulatory agencies struggling to uphold the basic rule of law regarding regulation and compliance (P14). The time for government to take bold steps to ensure the rule of law is the reality for everyone and cannot be delayed (P11), if achieving social sustainability aspects goals is the target in the 21st century (P21). Findings corroborate 2021 Corruption Perceptions Index (CPI) as reported by Transparency International. It was reported that Nigeria is the 154 least corrupt nation out of 180 countries ([Transparency International, 2021](#)). The negative impact of systematic corruption, if allowed to continue in the built environment sector, may hinder achieving other social sustainability aspects and dimensions, such as access to good education, health, safety, human rights and equality. Regarding failure to learn from the past, [Braithwaite \(2021\)](#) highlighted some past collapsed buildings (Reigners Bible Church, Lekki Gardens and SCOAN, amongst others). And the reasons were corruption, defective design, poor workmanship, criminal negligence and substandard construction materials. Though a scientific investigation is still ongoing, evidence from site observation and experts show that the collapsed 21-storey building is within the emerged reasons. Findings disagree with

Okunola (2021). The author found that most collapsed buildings were old residential buildings. The cases in view are different.

Many of the participants tag “systematic corruption” in the country as the root cause. They would negatively impact social sustainability aspects goals associated with the built environment, and by extension, others. Findings agree that collapsed building projects are a threat to achieving social sustainability aspects goals and are majorly caused by human. Participant P11 says, “. . . *this act was not caused by bad planning but the harmful consequences of corruption . . . regulatory agencies compromised standards . . . The site was allegedly shut down sometime in 2020 over a breach of town planning rules; why was the site reopened when the developer reluctantly went beyond the approved 15-storey building? Let us wait for the outcome of the investigation into the matter . . .*” Majority of the participants with the exemption of Participants P20, P21, P22 and P23, are not pleased with the authority response that Fourscore Homes got approval for a 15-storey building but exceeded the approval limit. Participant P2 asks, “. . . *what was the action of the regulatory agency when they discovered that it went beyond the approved plan? Who approved the site reopening after being sealed for about four months? Why is there a conflict in the ownership of the said land? The Lagos State Land Registry owes the public a duty to clear the latter contradiction. The state byelaw is explicit on the consequences . . .*” The regulatory agencies, such as the Lagos State Building Control Agency, should cover their shame. The Lagos State Governor admitted that avoidable mistakes were made from all angles, as reported by Odeyinde (2021). Site safety was absent from such a huge project. A common site register is nowhere to be found (P5, P12 and P18). It indicates that the regulatory agencies are not exempted from this blunder. Many lives have been cut short to their great beyond. The indefinite suspension of the General Manager, Lagos State Building Control Agency may be linked to this so called, “*mistakes were made from all angle saga*”.

Participants P3, P8, P9, P12, P12, P13, P16, P19 and P25 are concerned with the trending letter from Prowess Engineering Limited to Fourscore Homes. Fourscore Homes engaged the former as a consultant for the structural engineering services of the collapsed building. In that letter dated 20th<sup>February</sup> 2020, the engineering firm clearly stated that the ongoing construction’s shoddy nature made them to withdraw their services. Many unanswered questions. Did Fourscore Homes engage a new engineering firm from February 2020 to 1st November 2021? Participant P7 says, “. . . *there were many things that could have gone wrong with the building. I cannot rule out the poor quality of work done, the overloading of six extra floors against the approved design (promoting structural failure), and the lack of professional handling of the project (unethical practices). These led to the sudden loss of lives . . .*” The study’s findings did not excuse the regulatory agencies from the building collapsed saga (lax monitoring and regulatory failures). In fact, the regulatory agencies, especially the Lagos State Building Control Agency should take larger blame. “. . . *The 21-storey building ought to have been demolished after it was established that the developer intentionally and arrogantly defaulted. This is one of the outcomes when stakeholders, including government in the built environment, compromised . . . very unfortunate . . .*” said Participant P16. Findings agree with Okeola *et al.* (2014), Ede *et al.* (2017), Ibrahim *et al.* (2019), and Falana and Ipindola (2020). Okeola *et al.* (2014) found that excessive loading, poor supervision and substandard construction materials can cause building collapse. Ede *et al.* (2017) identified poor concrete practices and technology as possible causes of building collapse. It was the concern of Prowess Engineering Limited to Fourscore Homes, but they willingly refused to listen. Findings show that the disaster management mechanisms to mitigate building collapse are ineffective (Okunola, 2021).

4.3.3 *Theme 3: Feasible measures to mitigate building projects collapse (BPC) and enhance achieving social sustainability aspects goals.* The sub-section presents feasible measures to mitigate building projects collapse (BPC) and enhance achieving social sustainability aspects

**Table 4.** Feasible measures to mitigate building projects collapse and enhance achieving social sustainability aspects goals

Group	Measure
Penalty related-measures	Government should implement the panel's recommendations Identified parties that compromised should face the law of the land Corrupt government officials found guilty should be charged to court as a deterrent to others
Regulatory related-measures	Broaden interventions to embrace initiatives regarding compliance and enforcement of building regulations Encourage voluntary compliance to building codes and regulations
Bye-law related-measures	Create enabling laws and environment to strengthen National Building Codes and enforcement Review existing Bye-laws to global best practices (Massive Reforms)
Technical related-measures	Ensure that high-rise buildings' design allow for alternative load paths or redundancies. It will assist in enhancing redistribution should there be a failure in one point More studies should be encouraged on building safety/collapse in developing countries Professional regulatory bodies should ensure their members do the needful and sanction erring members
Safety related-measures	Use of sensors to identify, track, monitor, and check for safety decision-making Holistic safety and emergency management at individual, company, state and federal levels Make occupational safety procedures mandatory Effective regulatory framework to safeguard the safety of workers

goals. These measures emerged from the data. They are presented in the bottom section of the thematic network analysis in [Figure 1](#). One germane point that emerged is the categorisation of the feasible measures into five groups. Findings agree that proffering measures to mitigate collapsed building projects would in principle enhance achieving social sustainability aspects goals associated with building projects. That is, penalty related-measures, regulatory related-measures, byelaw act related-measures, technical related-measures and safety related-measures, as detailed in [Table 4](#). Findings agree that frequent building collapses can be prevented or mitigated if construction practitioners, including government regulatory agencies, decide not to compromise standards and shun corrupt practices in their service delivery. One possible outcome is achieving social sustainability goals linked with building projects such as good shelters, access to public services, access to good education, fair distribution of income, equality, amongst others. Also, other aspects of social sustainability goals such as growth in GDP, firm's turnover and profit and productivity, cannot be over-emphasised, if collapsed building projects are mitigated within the built environment (P21). Regarding penalty measures, Participant P16 says, "... *the challenge is not to set up panels here and there but enforcing the recommendations of the panel is critical ... if recommendations from previous buildings collapsed panels were strictly implemented and those culpable prosecuted according to the law of the land to serve as a deterrent to others, maybe, the collapsed of the 21-storey building would have been averted ...*" Findings agree with [Adelakun \(2021\)](#). The author found that building collapse has become a routine because of serial failures to punish such infractions properly. Participants P6, P9, P12, P18 and P19 are a concern if unethical government officials, and "power from above" will allow the panel to have a smooth investigation that will yield fruitful findings. Findings agree with [Orizu \(2021\)](#). The author reported that Comrade Timi Frank's alleged plot sabotaged the panel's investigations. The latter claimed to have credible information that the relevant documents from the Lagos State Land Registry to ascertain the property's valid owner was now missing.

Sound regulations are necessary to enforce the implementation of policies and programmes. Findings suggest that the federal government create an enabling law to

strengthen the National Building Code (NBC). The NBC is a mandatory document adopted by development authorities to formulate building byelaw. Government should enforce the byelaws via regular inspections by building inspectors at every stage of construction to ensure conformity with the building code. The outcome will lead to achieving social sustainability goals such as access to good shelter, fair income distribution, equality and recognition. Findings disagree with [Mrabure and Awhefeada \(2021\)](#). The authors affirmed that lax enforcement of the existing Nigerian Urban and Regional Planning Act 1992 (NURPA) and Development Law of Lagos State 2010 (URPDL) contributes to the frequent menace. Participant P12 says, “. . . *It is germane that this should be encouraged because building codes will enforce minimum standards of building materials, qualifications of practitioners, and other issues relating thereto . . .*” If this is allowed, it will curb building collapse in Lagos and by extension, Nigeria. Findings agree with [Ahmed and Kabir \(2021\)](#). They discovered that the codes and regulations can assist to avoid important financial loss from disasters such as collapse of buildings. Participants P2, P8, P11, P13, P17, P19 and P24 suggest a review of the existing byelaws via massive reform to align with the global best practices. The government should drastically address reform of the byelaws and the overhaul of the leadership of the regulatory agencies (Participants 3, P7, P10, P16, P18 and P24). Findings agree with [Adelakun \(2021\)](#). The author suggested that persons that can appreciate the scale of responsibility their job entails should be positioned in the leadership cadre. Also, the reform should create a platform where dissatisfied consultant can report a case to an independent agency such as the professional body against the government agency. The government officials may not action as in the case of approval of 15-storey building but the developer built 21-storey building. There was no action from the government to bring down the structure until the structure came down itself. If there was a platform like that, Prowess Engineering could have saved lives, including that of the developer. [Adelakun \(2021\)](#) reported that the developer said building consultants are “book people” who lack the practical knowledge his business entailed.

The study's findings suggest that developers/property owners should engage construction experts for high rise building projects. Participants P1, P7, P8, P9 and P19 encourage structural engineers to allow alternative load paths or redundancies in their structural design. The role of alternative load paths is to mitigate building failure catastrophically. Participant P8 says, “. . . *in many projects where we have been engaged for site supervision, alternative load paths are missing . . . It may lead to deadliest failure if not well addressed during construction . . .*” Findings agree with [Lu et al. \(2021\)](#), and it argued that the absence of alternative load paths could cause a low level of safety margin. It may lead to grave losses if any minor damage happens due to unforeseen and unpredictable reasons. The professional regulatory bodies, especially the Council of Registered Engineering in Nigeria (COREN), Architects Registration Council of Nigeria (ARCON) and Quantity Surveyors Registration Board of Nigeria (QSRBN), should ensure their members are monitored. Unethical allegations should be investigated, and erring members sanctioned accordingly (P2, P7, P11, P13, P14, P17, P19, P22 and P24). The participants agree that developers can use fourth industrial revolution (4IR) technologies such as sensors to identify, track, monitor and check for safety decision-making. It would help mitigate possible failures in building that would have developed to significant issues if not curbed. Findings agree with [Yan and Kim \(2018\)](#). They discovered that some of the emerging 4IR technologies could enhance decision-making that may curb building collapse accidents on the sites.

## 5. Contribution to theory and practice

From the literature review and study's findings, hazards associated with collapsed buildings threaten to achieve social sustainability aspects goals. Also, it harms human existence in



urban and semi-urban locations if not prevented or mitigated. In the past, many studies have been conducted concerning Nigeria's collapsed buildings and proffered solutions, but there is academic literature paucity regarding collapsed building on social sustainability (one of the pillars of sustainable development). Thus, the need to adopt this new approach, collect data from "on-the-spot" assessment, and supplement with experts' opinions via case studies and face-to-face interviews. This mechanism (methodological gap) is a component of the theoretical contribution to the body of knowledge. An attempt to fill this gap created new constructs such as developer-related-cause, design team-related-cause and the government entities-related-cause. Others are penalty related-measures, regulatory related-measures, byelaw act related-measures, technical related-measures and safety related-measures. Also, the developed thematic network of the main findings, as illustrated in [Figure 1](#), is a component of the paper's implications. From a theoretical perspective, apart from contributing to the scarce academic literature regarding the impact of collapsed building projects on social sustainability aspects goals, this paper offers an evaluation showing the preparedness of relevant Nigeria Government agencies during building projects collapse. Also, the study proffered feasible measures to mitigate BPC and enhance achieving social sustainability aspects goals. Theoretically, this study would advance knowledge regarding the contribution of the effect of collapsed buildings on social sustainability aspects goals in Nigeria and validated the extant root cause via an unexplored dimension.

Concerning the practical implication of the paper for the building industry and property developers, the study confirms that building collapse can be prevented or mitigated to enhance social sustainability aspects goals, such as good shelter, fair income distribution, equality, access to good education, amongst others, if government officials and developers/property owners agree to shun "sharp practices" and say no to "compromise standards". Findings from this study would aid and stir up policymakers and other stakeholders to continue to search for the way forward to reduce the reoccurrence of the incident and enhance achieving social sustainability goals. The relevant government regulatory agencies (federal and state levels) and other stakeholders, such as the built environment professional regulatory bodies should take advantage of the suggested measures that emerged as highlighted in the thematic network. And tabulated in detail measures to prevent or mitigate the reoccurrence of collapsed buildings in the industry. The implementation and enforcement of the NBC are long overdue across the country and should be made compulsory for developers/building owners. This study, by extension, will set the relevant government policymakers to ensure that the outcome and recommendations from the various panels' setup are judiciously implemented for the benefit of the industry. It will form part of the practical implications for Nigeria's collapsed building and, by extension, for other developing countries with similar experience. Likewise, in practice, tackling these root causes will create a channel to either prevent or mitigate collapsed building scenarios by taking responsibility and shunning unethical practices during service delivery.

## 6. Limitations of the study

The study is not without some limitations. First, the study adopted an "on-the-spot" assessment of two case studies and selected experts via qualitative research design covering Lagos State, Nigeria. Second, the sample size is specific to Lagos State, Nigeria. The sample size in this context did not negatively affect the result. The study could adopt the outcome of the results and measures suggested. Proffered measures may be adopted by other countries with similar collapsed building issues. Therefore, further research could be conducted for broader coverage to enhance generalisation of findings and test the constructs (categorised root cause and measures) that emerged.

## 7. Conclusion and recommendations

Collapsed buildings cause enormous damage, including tons of deaths, massive economic loss, social sustainability threats and societal panic. The paper investigated the perceived root cause of collapsed buildings. Data were collected from “on-the-spot assessment” of two selected case studies and supplemented with interviews from experts; to prevent or mitigate the occurrence. The root causes were categorised into three groups (developer-related-cause, design team-related-cause and the government entities-related-cause). The study recommended feasible measures to address the emerged perceived root cause. Also, proffered feasible measures were categorised into five groups (penalty related-measures, regulatory related-measures, byelaw act related-measures, technical related-measures and safety related-measures). In addition, the researchers clearly state that the preliminary findings and recommendations from this research were based on existing information with some assumptions based on the past reports. Thus, the research findings are not anticipated to undermine the government’s independent probe panel, or the internal probe being conducted by the government. Thus, the paper recommended the following measures to either prevent or mitigate the occurrence of collapsed buildings, by extension, enhance social sustainability goals.

- (1) The study recommends that a culpable person (government official or individual) or entity found guilty by the panel’s report should be further prosecuted accordingly. In this instance, unfortunately, the collapsed 21-storey building cut short the life of the director of Fourscore Homes. If the latter is found guilty by the panel set-up, the entity should be prosecuted and damages paid to the victims’ families and government, respectively. It will serve as a deterrent to others.
- (2) The Nigerian Federal Government should create an enabling law to strengthen the NBC. The law will enhance enforcement and ensure the safety of lives and property. Also, apart from overhauling the leadership of the regulatory agencies with personnel not willing to compromise standards, government should enforce the byelaws via regular inspections by building inspectors at every stage of construction to ensure conformity to the building code.
- (3) The paper further recommends that qualified built environment professionals and professional advice should not be under-rated in building projects. Thus, the regulatory bodies, especially COREN, ARCON and QSRBN owe it a duty to ensure an independent monitoring team on building projects. It will avoid a future crisis that might result from avoidable negligence. Also, operators should be encouraged to improve their safety mechanisms on construction sites by utilising of 4IR technologies such as sensors. The sensors identify, track, monitor, and check for safety decision-making.

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### Further reading

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### Appendix

#### Dear Participant,

##### Request for Interview

Housing provision and the neighbourhood's safety are significant social sustainability concerns. If structural issues are not well checked, housing provision and the neighbourhood's safety may become threatened, especially in Lagos State, Nigeria. Therefore, this study is titled: **Social Sustainability Under Threat: A Case of Collapse Buildings in Nigeria**. The following objectives will achieve the study's aim.

- (1) To evaluate the preparedness of relevant government agencies during BPC.
- (2) To investigate the perceived effect of building collapse on social sustainability aspects.
- (3) To suggest feasible measures to mitigate BPC and enhance achieving social sustainability aspects goals.

The interview questions are going to be within the stated objectives. Responses offered by you will be collated and analysed together with engaged interviewees. It will make up the value and contribution to achieving the success of this study. Information provided will be treated with confidentiality.

Thanks for the anticipated participation.

Regards,

Yours faithfully,

(Researchers)

### Basic questions for the participants

- (1) Please, for record purposes, what is the name of your organisation?

- (2) What is your position in the organisation and discipline?
- (3) Please, how long have you been working?
- (4) Please, are you knowledgeable about BPC in Nigeria, specifically Lagos State?
- (5) If yes to question 4, how can you describe the level of preparedness of relevant government agencies during a BPC?
- (6) What is your lived experience regarding building projects collapse in Nigeria's construction industry?
- (7) From your perspective, what is the effect of collapsed building on social sustainability aspects in Nigeria?
- (8) Please, can you identify the source of the perceived root cause of building collapse?
- (9) Please, what role can the key stakeholders play in mitigating these issues?
- (10) What are the social sustainability aspects threatened by building collapse?
- (11) What feasible measures to mitigate BPC and enhance achieving social sustainability aspects goals?
- (12) Please, what can the governments (state and federal levels) do differently to bring this menace to drastic reduction?

#### **About the authors**

Dr Andrew Ebekozen obtained his PhD from the Universiti Sains Malaysia, Gelugor, Malaysia. He is the author/co-author of many peer-reviewed journal articles. Andrew Ebekozen is the corresponding author and can be contacted at: [ebekoandy45@yahoo.com](mailto:ebekoandy45@yahoo.com)

Prof. Clinton Aigbavboa is a Professor in the Department of Construction Management and Quantity Surveying, University of Johannesburg, Johannesburg, South Africa. He is the author/co-author of many peer-reviewed journal articles.

Asso Prof. Mohamad Shaharudin Samsurijan is the Dean, School of Social Sciences, Universiti Sains Malaysia, Gelugor, Malaysia. He is the author/co-author of many peer-reviewed journal articles.