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Assessing the Challenges of Building Collapse in Port Harcourt, Rivers State

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Abstract: *Building collapse is one of the major factors confronting the building industry in Nigerian cities. Several factors are responsible to the stated challenge. However, corruption and political compromise play some roles. Building collapse is observed to be responsible for loss of human lives, materials and environmental pollution. This article aims t assess the challenges of building collapse in Nigerian cities with emphasis on Port Harcourt metropolitan city. A total of 120 questionnaires were administered to heads of households of different income levels within three different residential densities of the study area. Findings revealed that poor monitoring of building approval, lack of proper engagement of professionals within the built environment are responsible factors. It is recommended that the content of building code should be implemented to enhance control and effective development in the building industry.*

Keywords: *comparative, analysis, determinants, Building, Collapse, Cities and nation.*

Introduction

In recent time, many Nigerian cities are experiencing rapid building collapse. This confronting challenge is associated with series of problems ranging from psychological, social economic and even physical in nature. Building collapse is viewed as natural breakdown of building structure at the time of construction or usage. Apart from total loss of finance invested into the building, it mostly results in loss of life and environmental pollution. However, the issue of building collapse is fast realizing prominence in the minds of urban managers, researchers and stakeholders and professionals within the built environment. It is significant to note that building collapse predominantly takes place in the cities especially within residential, commercial and industrial land uses while none or slight is taking place at the rural. Factors like use of substandard materials as well as presence of quack building operators are observed to be deeply involved in the process of building construction. However, as the number of collapse buildings increase in urban areas, millions of populaces continue to inhabit in substandard building and environment. The phenomenon prevails most in residential buildings and neighborhoods found in urban areas where 85% of medium and low income household populate and visible in cities of Nigeria.

In more than three decades, government at all levels (federal, state and local) has enacted the necessary building development and maintenance laws and standard in Nigeria cities. Most prominent is the national building code (NBC, 2006) that specifies building materials, standard, qualification of professional control and agencies in charge of building development

at various levels and the expected responsibilities in building industry. Despite gross efforts as stipulated in the code, the challenges associated with building collapse are increasing and seem to overthrow the statutory bodies regulating building development and its standard in the cities especially in Port Harcourt. Many have investigated into factors responsible for building collapse in some other cities in Nigeria. However, detail research into the challenge of building collapse in the city of Port Harcourt remains invisible. This has created gaps in which this intends to address. Findings from this study will assist to address the effects and causes of building collapse in the building.

However, Chendo and Obi (2011) analyzed the historical and factors responsible for building collapse in Nigeria and outlined directions for the investors found in the building construction sector and how the occurrences affect the physical environment at large which justify this study. However, according to Chendo and Obi (2011), some of the causes involved defective building design, carelessness, and ineffectiveness, out of assembly order, foundation collapses, unusual loads and fraud. Also, natural problems still constitutes some of the acknowledged bases of collapse building within the built environment and suggested permanent measures to expunge the problems. Abimbola and James (2012) consider recent factors responsible for building loses and her inferences on the side of maintenance in developing country like Nigeria. The work unveils how the method of building construction by investors connects the doctrines of maintainable development succeeding the gross presence of building collapses in the Nigeria and other African countries.

Olayinka, Abiodun, Ayodeji, Opeyemi, and Daniel (2017) examined after-erection management method of assets and the way such properties may upgrade to enhance the current building failure in Nigeria. The contemporary investigation adopted previous literature review and structured questionnaires issued to residents of exactly 150 residential and 75 commercial houses in Lagos urban. The evaluation was held with frequency, percentage, mean score Likert. The result showed that manipulation of assets management tasks by building owners and quacks personnel when it concerns management of different buildings are responsible for such problems. The analysis further proved extraordinary stage of displeasure including contributions made available by the unprofessional personnel and uprightness evaluation which is not often conducted by the key stakeholders in th building industry. The analysis to claim that the post building organizations should function and develop an elite domain for expert assets administrators was revealed. The outcome of the study recommends that buildings should be directed to compulsory validity test, and calculation. Oseghale, Ikpo and Ajayi (2015) used primary data on building experts, purposive sampling method, descriptive statistical which comprises frequency, distribution, percentages and mean score in the course of analyzing the roots of building collapse and its impacts on the cost in the failed building Lagos city of Nigeria. The examination shown the most important sources of structural collapse and defection to include poor or bad design, defective building, over reinforcement/ loading, non- control of permitted drawings for development, control of approved drawings but lack -compliance, and unprofessional involvement. Again, they detailed that property holder's loss about thirty eight million three hundred and eighty five thousand, seven hundred and twenty one naira (38,385,721) or one hundred and ninety four thousand, eighty hundred and fifty one dollars ($194,851) seven years ago.

How, between 1974 and 2006, Oke ((2011) conducted a study on the bases and concern of building collapse in Nigeria through the adoption of primary and ancient information of 1974

– 2006.These data were obtained from questionnaire, books, seminar papers, workshop papers, articles and previous cases of structure failure in Nigeria. The statistical analysis were established via tables, bar graphs, Pearson moment correlation coefficient linear regression including 60 collapsed buildings while the result manifested that poor maintenance culture, building design error, poor quality of materials and workmanship, natural phenomenon and excessive loading which accounted 7%, 15%, 52%, 7% and 20%individually determinants of building losses in Nigeria. The exploration also recorded the greatest incidence on individual residential buildings implemented by Nigeria service provider and recommended that government agencies like standard Organization of Nigeria (SON) ought to grown higher effort in disinfecting building materials across the marketplace. That building experts must guarantee accurate direction of bricklayer and proficient check mentation of materials in advance before combination as building component.

In the comparative analysis of building collapse in Abuja, Ibadan, Port Harcourt, Owerri and Lagos Nigeria, Obodoh, Amade, Obodoh, and Igwe (2019) look at the impact of structural collapsed risks towards building stakeholders (major experts in the construction sector, developers, and dwellers) of the completed building in the existing environment of Nigerian. The direction used 1999 as the sample population through the statistical design of Taro Yama and obtained 1860 residents that stood for 93 % questionnaires shared. The matter was presented with frequency tables, pie –charts, bar charts and the findings revealed that, building collapse risks have multifarious factors which were group into financial, socio-political, human connected, physical, environmental and legal risks. Also the investigators recorded impact include loss of property, loss of status and contractors' truthfulness, damage of lives and legal tussle among the investors. The study directed for solutions that drive towards restriction of the entire transitory sources of building failure and the frequent impacts on various income across Nigerians as a developing nation

From the professional data acquired on built environment/ industry as contained in questionnaire, Akaninyene and Saheed (2017) reported the grounds of building collapse and the protective ways that may reduce the incidences, as well as greater rate of its recurrence commonly spread across the vertical and horizontal streets of Nigeria. The research analytical tools include frequency distribution, percentages and mean value. Although the findings revealed that, the key push for buildings failure involved pathetic foundations, wasteful and severe quality control in the area of substandard material usage and management, elimination of the experts, non-appearance and incorrect site analysis, including the arrangement of inexperienced laborers. The measures mapped out by the study were directed towards the management of building construction site by specialists, teaching awareness on the society for the necessity to avoid building failure instead of dealing with locations, engagement of proficient specialist, obtaining of building permit before building erection will be initiated while the inclusion of civil engineer, architects and builders who specialized on structural analysis of buildings and assist to achieve success. Finally, the study managed to shed light on the sufficient acceptance, determinants and the control actions pertaining building fiasco.

Also led to credence is the work of Lewis and Alexander (2018) who analyzed the functional guide and problems of building in Kumasi while gaging Ghana's progress near negligible or naught frequency of building collapse. The study used the stratified random sampling method that nominated 27 out of 35 building inspection officers at Kumasi Metropolitan Assembly (KMA), a semi structured interview guide was also used and the findings publicized that, apart

from lawful stipulated standard, report by developers, building inspection officers were compelled to embark on building environment visitation to gain knowledge about the originators that might started building houses outside notification. They illustrated that developers of many class disrespect all lawful necessities as a result of illiteracy, postponements of building approval, including the encumbrance of conveying building inspections officers at all phases of assemblage. In continuance, they demonstrated that building examiners in Kumasi could not control the degree of building collapse due to limitations involving lack logistics and manpower, unnecessary political interloping along the present environment, as the construction keep on posing danger to the existence of men and housing investment. Their research submitted that Ghana will observe additional structural failures in the recent time when the above-mentioned experiments fail to be resolve. In a way to avoid building failure, the analysis noted compulsorily those edifice inspections within the city of Kumasi and entire Ghana should be armed and authorized by the government.

Within the environmental landscape of Abuja, Lagos , Port Harcourt, Ibadan and Kaduna of Nigeria, Olagunju, Aremu and Ogundele (2013) held analytical study on distorted buildings and narrated how consistent loss of buildings remains a major challenge for professionals and other stakeholders connected with building sector, the clients and building dwellers. However, the ideology of sustaining a permanent elucidation towards the few foundations and impacts of building failure termed to be design, faulty construction, and foundation failure. According to the authors, serious and reasonable recommendations were laid dawn for proper and successful implementation of the counteractive actions. The study finally define breakdown for constructed buildings as the general or partly collapse of a partition or section of an erected building directing the incompetence of finished buildings of achieving safety and stability purposes.

Abimbola and James (2012) had analytical studies on current loss of buildings including the implications of supportable development in Nigeria. The study discovers if the method to erect building sector investor together with the ideologies of ecological improvement and outbreak of building breakdowns all over Nigeria. The investigation revealed about method of construction among separate investors that failed to agree with the sustainable rules, and donates to overall further down the enactment of erected buildings. Their research proffered solution directed on the entire renovation of planning and execution of plans for structural improvement principles and outlines that government at federal level must ensure that principal building investors ought to generate sustainable building processes and apply it for greatest preparation in the entire building sector.

Oloyede, Omoogun and Akinjare (2010) sampled many landlords, academicians and experts in the building sector. The work considered ancient data failed structures in the past including other issues. The analysis established exactly three (3) principal categories of building investors were confirmed. It added that a current challenge in the building industry in relation to collapse of buildings involves loss of lives and properties. The work emphasized that building experts causes building failure by the application of substandard building components, materials, recruitment of unskilled crafts worker and feeble site supervision for workmen on site. According to them, the denunciations on building downfall are cause by non-conformity to building stipulations/criterions, usage of inferior building materials, paraphernalia and the engagement of useless workers. On the side of the academia, building collapse was triggered by poor execution of the relevant acts and widespread of poor work

ethics of Nigerian populations. The work suggested that government should board on pre-emptive way of encouraging the robust political attention directing area town planning experts to establish the legal agenda that will reduce poor assemblage of buildings to reduce the troublesome manners for doing commercial activities in the areas that requires the attention of law courts.

Adebowale, Gambo, Ankeli, and Daniel(2016) evaluated the bases and impacts of building failure towards the nation's economy and the opinion for data that may expect upcoming incidents in the zone under investigation. The researchers found that natural or man-made phenomena and discovered the use of substandard materials, poor workmanship, quacks, poor building code enforcement, and corruption paid enormously when it comes to causes of building disasters. They made a suggestion that stamp out the occurrence of building failure and the manner investors of building industry must abide by the construction code, while standard organization of Nigeria must confirm that all the proficient building materials will be sold for building construction. Secondly, Nigerian government must ensure that every apparatus for severe watching of building sites through the executing of important policies of purification across the construction sectors. Similarly, Oloyed, Omoogun and Akinjare (2010) used structured questionnaire to sample owners of landed property, experts in building industry and previous stories that bothered on building collapse in Nigeria. The result shown that building professionals are blamed usage of low quality building material, engagement of unqualified artesian and weak supervision of building site. Again, the explained that non-compliance with standard, incompetent contractor, non-enforcement and endemic poor work ethic of Nigeria while the study suggested or proffered that, the press should lay additional emphasis enlightening the public more on the dangers of collapsed building.

Ede (2013) used professionals, consultants, contractors and clients to study building Collapse in Nigeria. His findings detailed that regular building failure in the country is increasing on daily basis and the effect is ascetically key; inferior structural strengthening, structural steel and cement used for the production of foundations, columns, beams and slabs inclusive remains the major determinants of building collapse in Nigeria,

Ayedun, Durodola and Akinjare (2012) reported that second-rate building resources, pitiable workmanship nominated by contractors, use of ineffectual servicers, poor building approach, heavy rainstorm, nonfulfillment with specifications/standards by contractors, poor supervision, structural changes, illegitimate translation and superfluities to completed buildings and broken-down buildings in terms of the key factors of building failures across Lagos city. They suggested that enlightenment of the major investor, experts in the building sector and building owners on the integral dangers of structural collapse plus the requisite for safety awareness.

Abimbola (2006) reported that building collapse is an incident that claims life any time a finished structure pulls down its parts or the general components. By such statement, the author obtained important primary and secondary data from the Lagos State Physical Planning and development authority, national bureau for statistics and central bank of Nigeria's annual reports. The study aimed aims at discovery how collapsed buildings may danger sustainable development of the built environment in Nigeria. However, the analysis via qualitative and quantitative statistics disclosed that the categories of designated buildings such as two, three or four floors. The findings further submit that significant negative connexion exist among the quantity of loss buildings and gross domestic product.

Critically, Fagbenle and Oluwunmi (2010) examined the occurrences of building failure in a developing nation like Nigeria. They considered the role of informal industry present. Their result shown that the buildings collapse occur for reasons such hasty construction, low quality workmanship, poor supervision, inexperience ignorance, evasion/ non-adherence with building code of practice and non-execution of quality building, quality and control on construction. Furthermore, their work established that over 70% of the Nigerian population complained of building failure and curtailed informal activities. From the previous studies, the predominant undesirable impacts of building collapse can be classified into four namely: environmental, economic, social and cultural. The causes, consequences, occurrence and scale of these impacts nevertheless, vary from one urban area to another and across the existing urban developed land uses. Approaches that may instructed for the handling of connected issues, challenges and remedies also vary accordingly. But previous studies that manage to categories the impacts of collapse buildings are scanty. This study therefore, seeks to fill this ascertained gap.

Methodology

The study embraced survey research design through identification of the study area. Port Harcourt metropolitan city was sectioned into zones of densities. These are GRA, D Line and Diobu areas. A total of 120 questionnaires were distributed to the residents. The questionnaires were structured to investigate parameters relating to causes of building collapse, effects of collapse, and average number of collapsed buildings in the area.

Table 1.0: Questionnaire administration

S/N	Area	Number	Percent
1	Diobu	57	47
2	D Line	48	40
3	G R A	15	13
	Total	120	100

Source: Field Survey, 2023

The table above reveals that 120 questionnaires were administered targeting heads of household or adult members of the household. The table maintains that 57 representing 47% were administered in Diobu. This is followed by 48 symbolizing 40% which were administered in D Line while 15 representing 13% were administered in Government Residential Area (GRA).

Table 2.0: Causes of Building Collapse

S/N	Causes	Number	Percent
1	Presence of Quacks	30	25
2	Low quality Materials	24	20
3	Poor Monitoring	12	10
4	No Approval	6	5
5	Environmental Factors	9	7.5
6	Corruption	39	32.5
	Total	120	100

Source: Field Survey, 2023

The table above shows that 30 respondents symbolizing 25% revealed that presence of quacks was responsible for the causes of building collapse in Port Harcourt. However, majority of the respondents (39 representing 32.5%) attested that corruption was primarily responsible for building collapse in the study area. Also, 24 symbolizing 20% unveiled that usage of low quality materials while 7.5% complained of environmental factors. It is interesting to note that only 5% affirmed that lack of building approval was responsible for building collapse in the area.

Table 3.0: Effects of Building Collapse

S/N	Effects of collapse	Number	Percent
1	Loss of Lives	54	45
2	Loss of Finance	27	22.5
3	Environmental Pollution	23	19.2
4	Neighbourhood Disorganization	16	13.3
	Total	120	100

Source: Field Survey, 2023

Table 3.0 above portrays effects of building collapse in the city of Port Harcourt. The table shows that 54 out of 120 total respondents representing 45% complained of loss of lives as the effects of building collapse in the study area. The table maintains that 27 symbolizing 22.5% complained of loss of finance. This is closely followed by 23 out of 120 total respondents symbolizing 19.2% ascertained of loss of environmental pollution while 13.3% revealed of gross neighbourhood disorganization resulting from building collapse in the study area as one of the major consequences.

Analytical, Conceptual and Theoretical Frameworks

Theoretical frame works had been postulated by scholars in respect of building collapse factors. For the purpose of this research, critical reflection of layinka, opeyemi, ayodemi and olatunde (2017) analytical framework for post building development and management services. The analytical framework called multi-party task considered structural integrity evaluation, humdrum administration and suggested counteractive tools for shortening the disastrous outcome of building failure. Therefore the system in respect of purposes, issues, circumstances and sanctions and the reputed relationship are detailed. Also the framework suggested that the finished or accomplished buildings should is required or expected to undergo important reliability test earlier and throughout habitation and certificate of fitness most be obtained from the government.

The concept further demonstrated that property owners are required to engage specialized building administrator to handgrip the management of completed buildings. According to the prolongers, mandatory structural integrity assessment assist in determination of certain problems or challenges that were not discovered at the preliminary stages of drawing and implementation stages and may accelerate building failure during or after building occupation. Some of the challenges may be faulty design, poor workmanship and poor supervision, use of substandard building materials, inappropriate substructure, arbitrary alteration, faulty construction and excessive loading. However, when a particular building fails structural test, such building must be certified unfit for human habitation and sanctioned for controlled destruction and rebuilding. But when a building pass integrity test, certificate of

fitness must be approved for human habitation while experts in building /property management instantly embarks on lease administration, space management and building maintenance to escape collapse.

The frame work also detailed that all completed urban buildings requires routine inspection to ascertain the effect and indications of time passage, vertical and horizontal cracks on existing buildings and life-span constituents and remedied through frequent overhaul and upkeep. Whenever report proves inconsistent in the area of maintenance, passageway of time, cracks on building and life span constituents, the building most be subjected to tedious repair and maintenance and planned for episodic structural integrity valuation. But whenever the exercise dictate worrying side by side dilapidation, the building report endorses provisional building integrity evaluation. However, when end product of a particular analysis suggests repaired reinforced or reconstructed property. Any building report about repaired, reinforced or rebuilt properties remains the subjects of designated government actions ascertain fitness and human habitudinal approval. Therefore, this supports the framework for adopting built environment professional in development and management of completed structures. It also criticized the work for not compelling or sanctioning the professionals of building sectors for high financial/construction charges that subject the low income class of the society engaging the quacks during and after buildings construction.

Results and Discussion

Sequel to findings from this study, it is revealed that presence of quacks and corruptions in the building industry are major contributors to building collapse in Port Harcourt. However, many other factors like poor quality materials as well as environmental situations are other factors. It is significant to note that political connections and interests help to reduce basic norms in the building industry. However, effects of building collapse in the city of Port Harcourt are strenuous. These range from loss of human lives, finance, materials and environmental pollution. During evacuation using heavy machines, there is drastic air and noise pollution. Some of the debris also found themselves in the available water bodies.

The Way Forward

Sequel to the analysis conclusion, the work recommended that expert bodies or built environment contributors such Nigeria institute of architects (NIA), builders, town planers and their respected regulating councils should work in synergy with the relevant government agencies in Nigeria for review and putting into practice of all existing building construction and development laws. The current putting into practice of these policies will enhance standard construction outfit that will banish building failure or collapse in Port Harcourt metropolitan city. However, government at various levels should venture into research to proffer lasting solution for building collapse. This is very important in construction industry, proposed built environment and eliminating the undesired loss of human life and valuable properties activated by frequent building collapse. The pressing necessity for consistent generation and collection of professional and non-professional in construction collapse buildings all over the nation. This will qualify professional in construction industry and policy makers develop workaholic strategies on construction standard and management which are capable of expelling building collapse in Port Harcourt.

Conclusion

The analysis showed that purchase of poor building materials, financial problem/construction strategies, political connected problems, building without town planning approval, unprofessional services, change of building usage, manipulation of building management, Natural Forces, meager foundation and unusual load and workmanship and quacks are responsible for building collapse in Port Harcourt.

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