**SOCIO-ECONOMIC EFFECT OF BUILDING COLLAPSE**

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ABSTRACT

Over the last 10 years, the incidence of building collapse in Nigeria has become so alarming and does not show any sign of abating. Each collapse carries along with it tremendous effects that cannot be easily forgotten by any of its victim. These include loss of human lives, economic wastage in terms of loss of properties, jobs, incomes, loss of trust, dignity and exasperation of crises among the stake holders and environmental disaster. It can be rightly said that any pursuit of human endeavor has its cost, but the cost being paid in the Nigerian building industry cannot be justified. The fact that Nigeria is undergoing a tremendous transformation in the built environment cannot be over emphasized. This is in line with the growth that is being experience in the infrastructural and building industries all over the world for the effects of technological breakthroughs and consequently the ICT flattened world.

But experiencing negative trends in the Nigerian building industries while other parts of the world are experiencing total improvements brings to fore the need to come out boldly and confront this ugly situation. The world today is facing a lot of other more serious man-made and natural crises such as global climate change which requires greater preparedness than the level on which we are standing today. For these facts, this paper addresses the impacts of building collapse on Nigerian strive for sustainable developmental. Probabilistic model of the linear regression analysis was used to establish the trend of heights and casualties. The results of this research will go a long way in reducing the building collapse phenomenon and the implications on the efforts of the nation

Keywords—Collateral, Construction, Collapse, Building.

` **I. INTRODUCTION**

 Building collapse (BC) in Nigeria is becoming a regular occurrence, each recording great casualties in the number of lives and materials lost. Building collapse is a situation where building which has been completed and occupied, completed but not occupied or under construction, collapses on its own due to action or inaction of man or due to natural event like earthquake, storm, flooding, tsunami or wildfire. It is different from building demolition. There are various causes of building collapse and each case requires expert judgment to decide the cause of its collapse. Rate of building collapse is a reflection of the level of organisation, the performance of the building control activities and degree of sophistication of the construction professionals in a country. Different countries have different building control measures. Most countries control building construction through regulations and codes. The UK’s Building regulations are statutory instruments that seek to ensure that the policies set out in the relevant legislation are carried out. Building regulations approval is required for most building work in the UK. Building regulations that apply across England and Wales are set out in the Building Act 1984, while those that apply across Scotland are set out in the Building (Scotland) Act 2003.All Acts specify how construction is to be carried out and the standard of construction materials. It also stipulates how approval for woks will be given [1], explored the use of case study by examining the causes of six (6) collapsed buildings (CB) across Nigeria. Samples of materials from the sites of the collapsed buildings were taken for testing and analysis, while critical observations were made at the sites to note the conditions of the ground (building base). The study found out that majority of the building collapses in Nigeria were [2] has it that the past few decades in Nigeria witnessed collapse of many buildings in various stages of completion, wherein several lives were lost and properties worth millions of Naira destroyed. Structural collapse occurs all over the world, but the rate of occurrence in Nigeria is what has been giving the concerned stakeholders serious concern. The[2] asserts that several causes of building failure had been attributed to either natural or man-made phenomena. A natural phenomenon may be attributed to earthquakes and typhoons while man-made phenomena consists of disaster which may be borne out of man’s negligence in areas such as soil type, building design and planning for extra loads and stress from strong winds and earthquake for tall buildings, foundation works, quality of building materials, lack or inadequate monitoring of craftsmen and poor quality of workmanship. The [3] and [4] in [5] opined that skill, experience and personal ability of the workmen involved in the building construction is of utmost importance in creating value. He was of the opinion that the so-called ready-made hollow sand crete blocks sold by some block-making industries do not measure up to standard in an attempt to make abnormal profits. Once these lapses are tolerated intentionally or otherwise, the quality of the sub structure or super structure cannot be guaranteed. They are compromised. The National Building Code 2006 is not effective due to lack of enforcement and the Physical Development Departments of states and Federal Capital Territory are just mere agents of corruption allowing all types of construction without building approvals. There is no state in Nigeria, out of the 36 states and the Federal Capital Territory (FCT) that building collapse has not occurred in the past ten (10) years. In some years, building collapse in Nigeria occurred in more than ten (10) places. If not controlled, building collapse can be disastrous.This situation necessitated the evolvement of National Building Code in 2006. Since independence, the Nigeria government has desperately continued to make concerted effort in the area of quantitative (but not qualitative) supply of mass housing through huge budgetary and policy provisions but, surprisingly, the rate at which existing ones are collapsing calls for an urgent attention. The site of building collapse scattered across the length and breadth of Nigeria is quite alarming that it is unimaginable what effects it will have on the building industry and Nigeria economy as a whole. One could imagine what edifices these buildings would have been if only they were constructed accordingly. It has been reported that Nigeria, especially Lagos State has become the “world’s junk-yard” of collapsed buildings worth billions of Naira [5] and [6]. It is quite unimaginable that a county blessed with so great potentials in its construction industry can experience such magnitude of building collapse in 2002 defined building as “an enclosure for spaces designed for specific use, meant to control local climate, distribute services and evacuate waste”. Buildings can be defined as structural entities capable of securing self by transmitting weights to the ground. More so, buildings are defined “as structures for human activities, which must be safe for the occupants”[6]. Several causes of building failure had been attributed to either natural or man-made phenomena. A natural phenomenon may consist of earthquakes and typhoons while man-made phenomena consist of disasters which maybe borne out of man’s negligence may in areas such as soil type, building design and planning for extra ordinary loads and stress from strong winds and earthquake for tall buildings, foundation works, quality of building materials, strict monitoring of craftsmen and quality of workmanship.  Every economic developmentstrategy in a country is aimed at improving the economic, political, and social well-being of its citizenry. The key to development, especially in developing countries lies in four (4) fundamental factors: Population, Natural resources, capital formation (domestic or imported), and technology. Building failure precedes collapse. In [7],[8] and [9] the failure can be defined as defect, flaw, imperfection, deficiency, weakness, shortcoming, mistake, error, kink, bug and fault in building elements and component that make up a building structure. Building collapse in Nigeria is widely reported and occurs mainly in the urban centres in Nigeria. Building collapse results in loss of lives and properties. Nigeria in recent times has experienced building a collapse in worrying scale. Building collapse in particular and structural defects in general have been witnessed and recorded. The types are but to limited to, the following: rooftop parking structure, chimney, escalator, lattice tower, pier, tower, wedding hall, church, highway bridge, bridge, walkway, motorway bridge, suspended bridge and walkway, pavilion, highway overpass, shopping mall, roof collapse and cooling tower. Others are: residential building, wind turbine, crane, guyed mast, gymnasium, theatre, commercial building, stage, office building, stadium and stadium roof, flyover bridge, scaffold, guyed tower, overpass, water park, balcony, embankment dam, free standing tower, hangar and footbridge. Thus, achieving a dynamic and vivacious economic developmentstrategy for meeting  housing needs must include a vibrant building and construction sector whose other highlights must include efforts at ensuring sound and sustainable infrastructural development (transportation-road, rail, air, sea modes), commercial enterprise development (construction of industrial parks and factories), construction of institutionalized buildings, among others. Attaining a sustainable and cost effective building and construction sector requires a proper project management strategy that will ensure building to specification and in using the appropriate materials and labour force. It is obvious, therefore, that the level of success in carrying out building construction activities will depend heavily on the quality of managerial, financial, technical and organizational performance of the respective parties, while taking into consideration the associated risk management, the business environment, and economic and political stability in the host country. The common assessment of the success of building projects is that it must be delivered on time, to budget, to technical specification and as well meet client satisfaction. It is therefore worrisome to note the inadequate housing gap that exist in Nigeria. It is therefore the objectives of the study to: identify remote and immediate cause of building collapse; to identity the types of buildings involved in collapse incidents; to determine the number of collapse buildings; to study factors that influences building collapse; to situate the effects of Building in economic development and to examine strategies that could help prevent building collapse [5],[6] and [7].

II. METHODOLOGY

A.Reseach Approach

Structured questionnaire research instrument for the study. These instruments or tool has questions or items to which individuals can respond. The questionnaire is in no small measure the most frequently used instrument in educational research. The questions were both designed as structured or fixed response questionnaire and the unstructured or open ended questionnaire. The questionnaire was designed to elicit information from the respondents. Questionnaire were administered to obtain information as regards social economic effects of building collapse in Lagos state A suitable design was structured along five points Likert scale type of strongly agree, agree, strongly disagree, disagree, neutral. The questionnaire was divided into five sections.

It is not easy to determine the best presentation opinion: there probably is no one single best option. Each potential approach has its strong point and shortcomings, therefore the approach to be adopted may not be free from critique. However, there is need to employ appropriate method of data analysis so as to accurately process the data that will be collected on this research from the field survey. Based on this assertion therefore, three methods of data analysis will be employed for this research. The aspect of the questionnaire relating to the background of respondents will be analysed using percentage and the other section of the questionnaire will be analysed using relative importance index method.



**I.Remote and immediate cause of building collapse**

The respondents were requested to evaluate the Remote and immediate cause of building collapse by picking their response as appropriate from the options provided in the questionnaire.

From the table below, Improper structure being the major Remote and immediate cause picked by the respondent has a mean value of (0.93), Incompetent contractual workers (0.92), Incompetent temporary workers (0.89), Poor Town Planning endorsement/improvement observing procedure (0.88), Bad Design (0.88), Utilization of inadequate materials and supplies (0.87), Defective development procedure (0.86) Bumbling transformation, change of utilization , poor support culture (0.85) Non-consistence with determinations (0.83), Deficient supervision or review/observing (0.80) and Economic pressures (0.78). The findings indicates that majority of the respondent identified Improper structure as the Remote and immediate cause of building collapse [8] and [9].

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| **Variable**  | **Mean** | **Ranking** |
| Improper structure | 0.93 | 1st  |
| Incompetent contractual workers | 0.92 | 2nd  |
| Incompetent temporary workers | 0.89 | 3rd  |
| Poor Town Planning endorsement/improvement observing procedure | 0.88 | 4th  |
| Bad Design | 0.88 | 5th  |
| Utilization of inadequate materials and supplies  | 0.87 | 6th  |
| Defective development procedure | 0.86 | 7th  |
| Bumbling transformation, change of utilization , poor support culture  | 0.85 | 8th  |
| Non-consistence with determinations | 0.83 | 9th  |
| Deficient supervision or review/observing | 0.80 | 10th  |
| Economic pressures | 0.78 | 11th  |

**II. Strategies could help prevent building collapse in Lagos State**

The respondents were requested to evaluate the Strategies could help prevent building collapse in Lagos State by picking their response as appropriate from the options provided in the questionnaire.

From the table below, Proper presentation and interpretation of working drawing being the major strategies that could help prevent building collapse in Lagos State picked by the respondent has a mean value of (0.91), Adequate supervision (0.90), Carried out site investigation (0.89), Ensure buildings are constructed in accordance to designs (0.89), Avoid the use of quacks and follow specification (0.89) Design strictly to code of practice (0.89) Strictly adherence to working drawing (0.88) Design with experience (0.88) Determination of bearing capacity of soil before designs (0.87) and Produce working drawings before commencing construction on site (0.85). The findings indicates that majority of the respondent identified Proper presentation and interpretation of working drawing as the top strategies could help prevent building collapse in Lagos State [6],[7] and [8].

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| **Variable**  | **Mean** | **Ranking** |
| Proper presentation and interpretation of working drawing | 0.91 | 1st |
| Adequate supervision | 0.90 | 2nd  |
| Carried out site investigation | 0.89 | 3rd  |
| Ensure buildings are constructed in accordance to designs | 0.89 | 4th  |
| Avoid the use of quacks and follow specification   | 0.89 | 5th  |
| Design strictly to code of practice | 0.89 | 6th  |
| Strictly adherence to working drawing | 0.88 | 7th  |
| Design with experience | 0.88 | 8th  |
| Determination of bearing capacity of soil before designs | 0.87 | 9th  |
| Produce working drawings before commencing construction on site | 0.85 | 10th  |

**III. What type of buildings get involved in collapse incidents in Lagos state**

The respondents were requested to evaluate what type of buildings get involved in collapse incidents in Lagos state by picking their response as appropriate from the options provided in the questionnaire.

From the table below, Commercial buildings being the major type of buildings get involved in collapse incidents in Lagos state picked by the respondent has a mean value of (0.75), Uncompleted (0.74), Residential (0.73), Industrial (0.73), Educational (0.72) and Institutional has (0.70). The findings indicates that majority of the respondent identified Commercial buildings as the major type of buildings get involved in collapse incidents in Lagos state [1],[4] and [8].

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| **Variable**  | **Mean** | **Ranking** |
| Commercial  | 0.75 | 1st  |
| Uncompleted  | 0.74 | 2nd  |
| Residential | 0.73 | 3rd  |
| Industrial | 0.73 | 3rd  |
| Educational | 0.72 | 4th  |
| Institutional | 0.70 | 5th  |

**IV. How can building be of an effect to economic development**

The respondents were requested to evaluate how can building be of an effect to economic development by picking their response as appropriate from the options provided in the questionnaire.

From the table below, An abundance of new housing can lower the cost of living for a community, making it attractive to new residents and industries being the major factor on how can building be of an effect to economic development picked by the respondent has a mean value of (0.77), Better housing might lead to higher productivity, by improving health, reducing absenteeism and so forth (0.76), Housing is obviously an investment: costs are incurred over a period of months in order to produce a stream of services that are enjoyed for decades (0.76), The revenues of the state, local, and federal governments can increase as the result of a housing development project. (0.74), The economic impact creates a ripple effect that moves beyond the building-related professions to the entire local economy (0.72) and During downturns in the economy, expenditures in this sector would employ relatively large numbers of people, whose spending would help restore growth (0.71). The findings indicates that majority of the respondent identified An abundance of new housing can lower the cost of living for a community, making it attractive to new residents and industries as the factor on how can building be of an effect to economic development this toes the lines of submission in [3],[5],[6]and [10].

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| **Variable**  | **Mean** | **Ranking** |
| An abundance of new housing can lower the cost of living for a community, making it attractive to new residents and industries. | 0.77 | 1st  |
| Better housing might lead to higher productivity, by improving health, reducing absenteeism. | 0.76 | 2nd  |
| Housing is obviously an investment: costs are incurred over a period of months in order to produce a stream of services that are enjoyed for decades | 0.76 | 3rd  |
| The revenues of the state, local, and federal governments can increase as the result of a housing development project. | 0.74 | 4th  |
| The economic impact creates a ripple effect that moves beyond the building-related professions to the entire local economy. | 0.72 | 5th  |
| During downturns in the economy, expenditures in this sector would employ relatively large numbers of people, whose spending would help restore growth. | 0.71 | 6th  |

**IV. Discussions**

The causes of building failure, from the public view can be summarized under improper design, incompetent contractor, faulty construction methodology, poor Town Planning approval /development monitoring process; non-compliance with specifications/standards by developers/contractors; use of substandard materials and equipment; inadequate supervision or inspection/monitoring, economic pressures, incompetent conversion, change of use of buildings, aged buildings, poor maintenance culture. Data analysis of these factors shows that Improper structure Incompetent contractual workers and Incompetent temporary workers were the three Remote and immediate cause of building collaps**e** witnessed in Lagos [3],[5],[6]and [10].

Furthermore, analysis shows that Proper presentation and interpretation of working drawing, Adequate supervision and carried out site investigation among other respected factors are the top three strategies that could help prevent building collapse in Lagos State. Looking into the type of buildings that are mostly involved in building collapse, analysis shows that Commercial buildings, Uncompleted buildings and residential buildings among other listed types of buildings are the top three mostly involved in building collapse in Lagos state [10],[11],[12] and [13].

Finally, The revenues of the state, local, and federal governments can increase as the result of a housing development project, the economic impact creates a ripple effect that moves beyond the building-related professions to the entire local economy, during downturns in the economy, expenditures in this sector would employ relatively large numbers of people, whose spending would help restore growth and so on this was supported by view expressed in [14],[15],[16] and [17]. Amongst the factors that can building be of an effect to economic development from the the public view, An abundance of new housing can lower the cost of living for a community, making it attractive to new residents and industries. Better housing might lead to higher productivity, by improving health, reducing absenteeism and so forth and Housing been obviously an investment: costs are incurred over a period of months in order to produce a stream of services that are enjoyed for decades, are been seen as benefiting ways the by which building can have a positive effect on economic development [7], [16],[18] and [19].

**V.Conclusion**

It is a concluding fact that Nigeria has witnessed collapsed buildings in various dimensions, either those under construction or those already in existences. Causes were identified as mainly man-made but less often by forces of nature. Corruption as man-made factor manifest in greedy contractors and the tendency of clients or landlords to cheat resulting to the use of substandard materials, use of quacks and poor remuneration for building works and services. The building consultants are guilty of negligence, incompetency, poor supervision and the tendency to allow defective works intentionally for a fee or due to ignorance or inexperience.

These building collapse risks have multifarious factors which were categorized as Economic/Financial risk factors, Socio-political risk factors, Human related risk factors, Physical risk factors, Environmental risk factors and Law/legal risk factors. The negative effects of these risks are: loss of lives, loss of property, and professionals marketability to foreign firms has been devalued, structural damage, environmental damage, etc. It was also discovered that human related risks have predominant effect in the Nigerian economy while law/legal risk factors have the least effect. The National Assembly should be prevailed upon to pass the National Building Code into law as its provisions are comprehensive enough to address the problems of the construction industry. There should therefore be a review of existing building laws that should guide standard code of practice and that should cover all grey areas in order to guarantee safety of buildings.

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