

Building Pathology and Sustainable Housing Delivery in Nigeria

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Abstract

Housing is essential in the socio-economic development of any nation. The increase in population signals a high demand for housing in Nigeria. Sustainable housing delivery is a mirage due to pathology of buildings. Housing stock has not met the requirement of housing demand in Nigeria. Besides, issues of high cost of buildings and longer duration before projects are completed makes housing demand an illusion. This research seeks to examine building pathology and sustainable housing delivery in Nigeria. The study used both qualitative and quantitative methods. Data was collected using questionnaire from the professionals in the built environment. Analysis of Variance was used to analyze the data at 95% level of significance. While chi-square was used to test the hypothesis at 95% level of significance. It was established that sustainable housing delivery depends on strict compliance to housing standards and that sustainable housing delivery depends on proper planning. It was also revealed that inefficiency and ineffective building production processes as well as non-compliance to housing policy is responsible for lack of sustainable housing delivery in Nigeria. In addition, limitation to sustainable housing delivery has increased level of poverty. It is recommended that the building Industry should improve the level of compliance to standards and planning principles to enhanced sustainable housing delivery and monitoring mechanisms should be put in place to ensure compliance to housing delivery in Nigeria.

Keywords: *Building, Delivery, Housing, Pathology and Sustainability*

Background to the Study

The building industry which is a major contributor to Nigerian economy is saddled with housing challenges especially with the influx of people from the rural to urban cities resulting to overcrowding as well as inadequate housing facilities to meet the increasing growth in population. The increase in population signals a high demand for housing in Nigeria. Sustainable housing delivery is a mirage due to pathology of buildings.

The building industry is critical to the Nigerian economy as a driver to national development in terms of shelter and gainful employment (Usman, 2014). Studies have shown that the movement of the administrative capital from Lagos to Abuja brought about expansion in the infrastructural development of the Federal Capital Territory Abuja (FCT) that is driven by both public and private sectors. Pathology of buildings refers to buildings that are defective. Any building that fails or shows a sign of failure including abandoned or incomplete and any building that does not meet the requirement for housing is a threat to the built environment.

In Nigeria, housing demand is far above supply. For instance over 40% of the citizens now live in urban areas (Kabiret al, 2009 in Usman, 2014), creating issues of overcrowding, inadequate accommodation and poor services. The increase in population signals a high demand for housing in Nigeria. Sustainable housing delivery is a mirage due to pathology of buildings. Most houses could not meet the requirement of housing demand. Besides, issues of high cost of buildings and longer duration before projects are completed makes housing demand an illusion.

Housing is essential in the socio-economic development of any nation. It is of the basic need of any national sustainable development. According to Usman, Inuwa, Kolawole, Kwari and Didel (2014) housing sustainability depends on how satisfactory man is being accommodated. A house is defined by UNICEF (2014) as a shelter having a comfortable accommodation, good disposable facilities, having enough ventilation, available water and electricity. Unfortunately most houses that are being occupied don't have these basic facilities and so cannot be considered as comfortable accommodation. These shortcomings in housing and other defects lead to uncertainties.

Objective of the Study

This study is to examine building pathology and sustainable housing delivery. The objectives are to determine the inter dependence of building pathology and sustainable housing delivery and evaluate the planning principles and demystify the importance of professionalism in the effective housing delivery.

Literature Review

Challenges of Building Sustainability in Nigeria

According to Mailafiya (2015), Nigeria remains a monoculture, import dependent rentier economy, largely driven by the dynamics of the global oil market over which it has no control. In a study by World Bank, the Nigerian economy is characterized

regarding jobless growth. A clear indication is that 65% of youths are unemployed (Mailafiya, 2015).

Our limitation to sustainable housing delivery has increased the level of poverty. According to the 2010 Global Monitoring Report of the United Nations Educational, Scientific and Cultural Organisation (UNESCO), about 92% of Nigerians survive on less than \$2 daily while about 71% survive on less than \$1 a day. The Vice President of Nigeria Yemi Osinbajo recently stated that 110 million Nigerians are living under poverty which constituted 62.5% out of 170 million (Mailafiya, 2015). Nigeria is also rated 158 out of 177 on the Human Development Index. This means that most citizens cannot access basic amenities such as clean water, basic health and protection against communicable diseases, decent housing and sanitation, security and access to sustainable livelihood. The most immediate source of the disconnect between Nigeria's wealth and its poverty is a failure of governance at the three-tier levels (Oloyede, 2010). The construction industry accounts for 4% to 5% GDP compared to South Africa 19%, Mexico 17.7% and Ghana 8%. It clearly shows a housing deficit estimated at over 17 million units. This means some 1.2 million housing units needed to be built annually. According to global housing stock in urban areas, 700 – 720 million units are needed annually to cater for the global population (www.urbanobservatory.org).

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The issues on defective buildings, time management, high cost of buildings as well as efficiency and ineffective housing are key factors that affects sustainable housing delivery (Idoro, 2014; Usman et al, 2014). Effective housing choice, for example, greatly increases the probability of housing success especially when it is executed in accordance with sustainable implementation of housing guidelines. From the citations made with regard to housing sustainability, it becomes apparent that sustainable housing management helps avoid failure, collapse and abandonment in the construction industry and other production sectors of the economy.

In Nigeria, the building industry is critical to the Nigerian economy and the need to cater for the increasing population was eminent. However, despite the rapid expansion of the building sector, issues of quality and high costs of repair and maintenance have emerged with collapse of buildings reported (Jambol, 2012). The incidences of building failure and collapse, as well as the alarming loss of life and property, have become major issues of concern in Nigeria (Ike, 2012). The reports of building collapses in Lagos, Port Harcourt and Abuja in the national dailies are references to rely upon.

Methodology

The study was carried out in Abuja where professionals from across the country engage in construction activities. The study employs both qualitative and quantitative techniques. Proportional stratified sampling and purposive sampling techniques was used to select the sample, while stratified sampling technique was used to select the responses from the strata for the data analysis. A total of 2310 population were targeted.

Samples of 341 respondents were selected for the survey. Yamane formula was used to calculate the sample size from the population which agrees with the guideline in Table 1. The various strata were multiplied by the sample and divided by the population to obtain the ratio for each stratum. The sample size was 15% of the population.

Table 1: Guidelines for Sample Size Selection

Population	Sample Size
Small Population	Survey the entire population
500	50%
1500	20%
2000 – 3000	15%
3000 - < 5000	10%
About 5000 or more	400 sample size should be adequate

Source: Adapted from Leedy and Ormrod, 2005; Olatunji, 2010

Olatunji (2010) opined that the major characteristic of the simple stratified random sampling is that all the strata of the population are equally important in size. Proportional stratified sampling is characterized by a population that contains definite strata that appear in different proportion within the population. Olatunji added that a sampling option once chosen, it will not disadvantage any strata for the selection of sample sizes. Leedy and Ormrod (2005) and Gay, 1987 in Usman (2014) affirmed that each member of each stratum has an equal opportunity of being selected. This means that the selection of sample size is done proportionally.

The target population is not uniform because the various categories of professionals may not necessarily be having similar characteristics. This shows individuals within the same profession may not always think the same over a given issue. So the strata used were the Architects, Builders, Contractors, Engineers, Quantity Surveyors and Urban and Regional Planners (Table 2). Stratified sampling technique was therefore used to ensure that the target population was divided into different strata, and that each stratum was represented in the sample population equivalent to its size in the population. This ensured representation of each stratum in the sample thus raising the external validity of the study. ANOVA was used for the analysis of data at 95% level of significance. A questionnaire was designed using likert five point rating to obtain data for this study and the success response rate is shown in Table 4, Appendix A; while Table 5 indicates cronbach's coefficient test for the data. The Cronbach's alpha values for factor category were > 0.70, which means its adequate proof for consistency.

A test for hypothesis on whether there is a significant relationship between pathology of building and sustainable housing delivery in Nigeria. This was based on the research question does pathology of building affects sustainable housing delivery in Nigeria?

Table 2: Target Population Strata and Sample Size for the Study

Professionals	Population Based on Registration	Sample Size
Architects	350	52
Builders	352	52
Engineers	354	52
Quantity Surveyors	354	52
Town Planners	350	52
Contractors	550	81
Total	2310	341

Source: Field Survey, 2013

Results and Discussion

Table 3: One – Way ANOVA Test Results

Objective	F	P – Value	Df	Sig.
1	91.574	0.05	4, 336	0.000
2	72.315	0.05	4, 336	0.000

Source: Field Survey, 2013

Results in Table 3 indicate that there is a significant difference between pathology and sustainable housing delivery in Nigeria ($F = 91.574$; $P < 0.05$; $df = 4, 336$). The study therefore established that sustainable housing delivery depends on strict compliance to housing standards. It is clear that adherence to housing standards ensures sustainable housing delivery. Results also indicate that there is significant relationship between planning and effective housing delivery ($F = 72.315$; $P < 0.05$; $df = 4, 336$). Therefore, effective housing delivery depends on proper planning.

Table 4: Chi – Square Test Results for Hypothesis

H0	Ipha	Sig.	Decision
1	0.05	0.000	Reject
2	0.05	0.019	Reject

Source: Field Survey, 2013

1. H_0 : There is a significant relationship between pathology of building and sustainable housing delivery in Nigeria.

Chi – square results shows that p-value $0.000 < 0.05$ meaning that there is statistical significance difference at 95% level of confidence (Table 4).

Since the p-value 0.000 is less than the chosen alpha value the Null Hypothesis is rejected. This means that there is significant relationship between pathology of building and sustainable housing delivery in Nigeria. It shows that sustainable housing delivery can be improved by complying with policy framework in the built environment.

2. H_0 : There is a significant difference between planning and effective housing delivery in the built environment in Nigeria

Results indicated that p-value $0.000 < 0.05$ meaning that there is statistical significance relationship between planning and effective housing at 95% level of confidence. Therefore, effective sustainable housing is dependent on proper planning.

Defective building processes affect sustainable building delivery in diverse ways. For instance, if a survey is not carried out correctly, it may affect sustainable housing delivery processes; and the possibilities of the building collapsing or facing other structural challenges becomes high. Equally, failure in building may not be observed due to ignorance and lack of compliance. Responses from the various categories of professionals revealed that building pathology affects sustainable housing delivery. The findings indicate that mitigating building defect is a significant factor for sustainable housing delivery. It must therefore be taken into account while improving efficiency and service delivery to clients. The findings are in agreement with (Usman et al, 2014b); Idoro (2012), Nwanchukwu (2008), Nwanchukwu and Fedelis (2010); Usman, Inuwa and Iro (2012) studies hold the same view.

Project performance, as described by Gupta (2010), as the sustainable housing delivery must be completed within budget, specified time, and performed to satisfaction. According to Doloi (2009), in Alzahrani and Emsley (2012) housing sustainability is a fundamental issue to governments, users and communities. They added that sustainable housing delivery involves a multitude of stakeholders. Human, capital and material resources are key elements in the development of any sustainable housing. Stoner & Freeman (1989) in Usman (2006) recognized the role and importance of people in good management. Daft (2010), asserted that management is getting things done through people. However, the job of managers is to give direction to their organizations, provide leadership; and decide how to use organization resources to accomplish goals (Daft, 2010).

Results of the ANOVA test in Table 3 ($F = 72.315$; $P < 0.05$; $df = 4, 336$) which suggest that there is a significant difference between sustainable housing delivery and the planning principles. The study therefore established that sustainable housing delivery depends on proper planning. None adherence to planning principle leads to failure or abandonment of projects. Hence, projects are rarely completed within expected environmental regulations, quality standards, cost, and time schedules. It means that sustainable housing delivery can be improved by good planning. This is confirmed by

the fact that the relationship between planning principle and sustainable housing delivery was statistically significant.

Planning principles are central to the overall sustainable housing delivery; any failure in its adoption adversely affects socioeconomic development of the country for example, the project might face litigation charges from Environmentalists or it might turn out to be a health hazard. The planning principles include, project goal, project activities, design/specification, choosing a strategy, breaking projects to sub-units, determining performance standards, determining proper sequence, designing the project and estimating costs, determining personnel, determining time/schedules, mobilizing funds, and obtaining approvals.

Relevant studies show that the application of modern techniques, project management techniques, planning, scheduling and controlling, are bedrock to sustainable housing delivery (Aniekwu and Audu, 2010; Kedzner, 2000; Gollenbeck, 2008). Krishnamurthy and Ravindra (2010) added that adequate planning must precede the execution of all other managerial functions. Planning facilitates sustainable housing development when project is highly complex, it must be well planned (Bailey et al, 2008; Bamisile, 2008). In Nigeria, poor housing delivery was traced to the inability to plan projects adequately (Achuenet al, 2000; Usman et al, 2012; Saleh, 2004).

Oladimeji and Ojo (2012), assert that it is mandatory to improve efficiency of the Building Industry (BI) as it contributes to the national economy. The BI is an important sector of the economy and it is an engine for growth (Ofori and Han, 2003). Ofori (2014), conducted a study on the BI, and established a relationship between construction and the economy. The relationship includes: contribution of value added in construction to GDP; rate of change of this contribution as the economy develops; proportion of capital formation in the industry to the total economy; and contribution to employment. According to Gupta (2010), planning is deciding where the organization/or project should be going and how it should get there. He added that this requires the appraisal of external and internal changes and constraints, forecasting, setting objectives, developing strategies and policies, and preparing action plans.

Conclusion

Despite housing standards worldwide, its application in Nigeria is yet to be adequately exploited. The study concludes that processes have been faulty and inadequate which cannot be delivered on time, within budget and quality standards. Several questions emerge: Is housing sustainability being observed in the building construction industry in Nigeria? Is sustainable housing delivery seen by industry players as an effective tool that will ensure quality and durability in the housing sector? The study has shown that there is little compliance to the housing standards in Nigeria, hence a serious challenge for sustainable housing delivery.

In conclusion, housing development processes have been faulty which led to building collapses abandonments and delays in sustainable housing delivery. The BI is unable to deliver sustainable housing effectively and efficiently due to poor project management, inadequate planning, and costly project execution.

Recommendations

Based on the findings of this study, the following recommendations are made:

- i. There is the need for Federal Government in collaboration with stakeholders to review the implementation act for best practices in housing delivery system.
- i. The building Industry should improve the level of compliance to standards and planning principles to enhanced sustainable housing delivery
- ii. Monitoring and supervision mechanisms need to be intensified by the 3-tiers of Government and the professional bodies
- iii. Professional bodies and the Federal Government should ensure continuous capacity building in order to improve project compliance

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Appendix A

Table 4: Respondents Response Rate

Profession	Questionnaire distribution	Questionnaire received	Questionnaire success response rate
Architects	350	70	15.15%
Builders	352	70	15.15%
Contractors	550	110	23.81%
Engineers	354	71	15.37%
Quantity Surveyors	354	71	15.37%
Urban and Regional Planners	350	70	15.15%
Total	2310	462	100%

Source: Field Survey, 2013

Table 5: Cronbach's Coefficient Alpha Test

Item	Number of items	Cronbach's alpha
Demographic	7	0.713
Building Pathology	13	0.995
Planning principles	12	0.993
Sustainable Environment	12	0.996

Source: Field Survey, 2013