

## Research Article

### CREATING AFFORDABLE LOW-RISE MULTIFAMILY HOUSING IN GREATER PORT-HARCOURT CITY, NIGERIA

Okorosa, Biobebe; \*Enwin, A.D

<sup>1</sup>Department Of Architecture, Faculty of Environmental Sciences, Rivers State University, Port Harcourt.

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#### ABSTRACT

In the past decade, the Nigerian economy has deterred to the point where the poverty rate has increased astronomically and the basic necessities of life such as housing have become scarce and sometimes inaccessible to a great percentage of her citizens. According to the National Bureau of Statistics, Nigeria is currently the poverty capital of the world with about 40% of the population living on less than \$1 a day. With increasing population and migration for white collar jobs in the cities, housing demand has increased beyond the reach of the government. However, housing is recognized as a human right by the UN-Habitat, yet Nigeria's low-income households struggle with finding adequate shelter that does not leave them in financial difficulty. Affordable housing globally, impacts the economy of countries by increasing local purchasing power, job creation and tax revenue. This paper investigated the strategies that can be adopted to save costs in the construction of affordable housing considering three building components: the exterior shell, interiors, and services and how innovations in design and construction can reduce the costs of multifamily housing in the Greater Port Harcourt city, Rivers state, Nigeria. Literature on affordable housing and the possible strategies in achieving affordable housing were reviewed and interviews were conducted for professionals in the building industry, who answered few questions identifying that besides the availability and employment of new techniques and materials in these projects, the competence of team members is important. It was suggested that close coordination across the project team throughout a given project period is important to deliver high-quality, environmentally responsible apartments at cheaper costs and future proposals on affordable housing should have complementary facilities that will foster social interaction between users while creating convenience for these users. The policy choices by federal, state, and local governments contributes to the level at which the cost of building affordable housing increases. Constructing safe, healthy, and visually appealing apartments at lower costs in Greater Port Harcourt city, Nigeria is possible, but will require better policies and best practices.

**Keywords:** Affordable Housing, Construction, Environment, Building services.

#### INTRODUCTION

Over the years, the Nigerian economy has deterred to a point where the poverty rate has increased and basic necessities such as housing have become scarce and sometimes inaccessible to a great percentage of its citizens. According to the National Bureau of Statistics, Nigeria is currently the poverty capital of the world with about 40% of her population living on less than \$1 a day (Reuters, 2020). Nigeria also has a high population with youths making up about 32% of the population (National Bureau of Statistics, 2013). Unfortunately, where we have this able-bodied population, there is inadequate management of human capital because of improper investments, leading to high unemployment rate. Apart, from the poor policies that have crumbled the economy, the covid-19, also negatively affected the economy in 2020, with a crash in oil prices and a sharp increase in unemployment due to the down-sizing of manpower in companies both large and small. Housing is recognized by the UN-Habitat, as a human right, yet Nigeria's low-income households struggle with finding adequate shelter that does not leave them in financial difficulty. For a necessity as serious as housing, affordability has been a major limiting factor in Nigeria. Affordable housing also referred to as mass housing or low-cost housing, is a scheme that addresses the housing needs of the low-income households in developing nations like Nigeria where the majority live below the minimum wage and cannot rent a house at the market price. In 2014, the Federal Government of Nigeria launched the first 10,000 affordable housing mortgage schemes under the Nigerian housing finance program in an effort to help bridge the housing deficit

in the country. However, most of the housing schemes that have been delivered to date target the high-end luxury market. Developers who build affordable housing face hurdles ranging from complex subsidy programs, expensive labor and materials, onerous local land use regulations, and, most commonly, community opposition. A great percentage of Neighboring residents often worry that low-cost housing will be unpleasant and may comprise of hulking, compact structures with cheap-looking facades. Though affordable housing developers have budget constrictions, there are strategies that allow them to build apartments that are visually appealing and offer comfort and convenience to their residents while meeting all the necessary requirements of safe, healthy housing.

#### METHODOLOGY

This paper reviews the strategies adopted to save costs in the construction of affordable housing, particularly considering three building components: the exterior shell, interiors, and services, and how innovations in design and construction can reduce the expenses of multifamily housing. To achieve the aim of this research, primary and secondary data on affordable and low cost housing from previous studies were obtained. Interviews were also conducted as a primary source of data.

#### FINDINGS AND DISCUSSION

##### PROJECT A SUPERIOR FASCIA TO THE AREA

The face of a building is its public character, hinting at life behind the windows. Collectively, the shell and structure, including the building's facade, windows, and doors—represent about 25% to 30% of total hard costs. The face of a building is that the biggest thermal barrier in

\*Corresponding Author: Enwin, A.D,

<sup>1</sup>Department Of Architecture, Faculty of Environmental Sciences, Rivers State University, Port Harcourt.

that building. It defines air passage into and out of the building. It also caters to the heating and cooling of a building's interior. Hence, it plays a critical role within the environment. In the history of building and construction, there are rarely excesses that will be removed from the shell and structure to cut back costs. Therefore, an alternative for low-cost housing design and construction focuses on the economy of form and selection of materials that provide the most effective opportunities for balancing costs and performance objectives.

**Approach 1: Facades should be simple while creating disparity through shapes, colors, and materials.**

It is essential for façade materials to be durable, visually appealing, and supportive of environmental objectives. Therefore, design guidelines will often involve a combination of materials and encourage other styles of manipulating facades while creating variation. These features are capable of making construction more expensive especially when the length is added to the façade, thereby, increasing complexity. A less expensive way to create dynamic facades is to pair simple, regular facades with a couple of visual shifts and a mix of high and low cost materials. A warm entrance or an angled exterior wall creates visual interest without substantially increasing facade complexity and length. In some projects, materials not typically related to residential construction like corrugated metals have created cost savings. In others, a low cost material is employed for most of the facade, while the ground floor or another key element has another material to differentiate it. Figures 1 and 2 below show the use of different textures and arrangement of the facade of a proposed social housing unit in Greater Port Harcourt City.



**Figure 1:** Elevation showing the use of different textures and arrangement of the facade of a proposed social housing unit. **Source:** (Reseacher, 2021)



**Figure 2:** 3D drawing showing the use of different brick colors and textures on the facade of a proposed social housing unit in Greater Port Harcourt City. **Source:** (Reseacher, 2021)

**Approach 2: It is important to explore ex-situ construction and new materials.**

There have been tons of thrill about ex-situ construction, a term that refers to both modular housing units and flat-packed elements like structural insulated panels. Off-site construction promises higher-quality construction reduced timelines, and lower costs, yet it is not generally used for multifamily housing in Nigeria. Apartment developers noted several challenges to using these techniques. Firstly, adopting new processes generally takes time. Hence, most developers anticipate learning costs on their first projects and are often cautious of moving far away from already proven methods. Secondly, ex-situ construction may be a regional business. It involves moving ex-situ components over long distances which is expensive. It is understood that modular construction is simpler for little units like studios than for larger apartments. Finally, ex-situ construction requires staging and space for a crane and modules adjacent to the development site, which may be challenging in dense, urban settings. In 2021, the version of the International Code is anticipated to expand utilization of other timber products to taller buildings. Examples from other countries suggest that using alternative timber products could shorten construction timelines because they permit for more prefabrication and reduce interior finish costs. Given current costs, however, innovation within the market-rate housing sector may precede significant use of other timber products in affordable housing.

**A MORE EFFICIENT AND COST-EFFECTIVE INTERIOR SHOULD BE BUILT**

The foundation for an efficient residential building begins with a unit plan. Most projects influence a set of standard unit plans to generate design and construction efficiencies and these ideas for unit efficiency are rarely groundbreaking, however, when deployed across a building, small changes can make more functional and well-organized units. Many developers also noted that interiors are often an area of short-sighted cost-effectiveness which means, reducing finishes and appliances does not cut many costs, and may reduce the durability and environmental quality.

**Approach 1: Propose unit layout and sizes for flexibility and good organization**

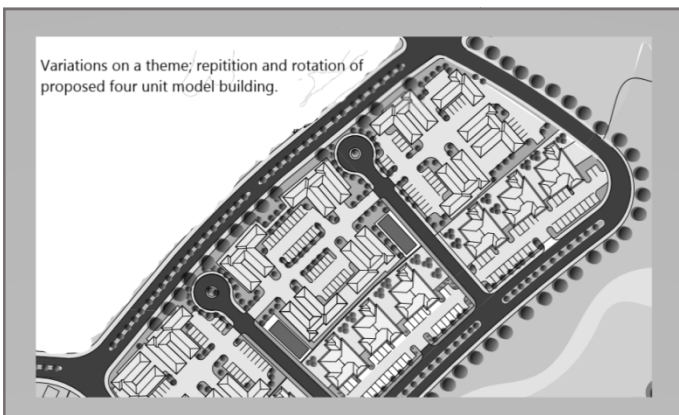
A series of adjustments are often adopted for the creation of more efficient units where areas that have multiple uses can replace spaces dedicated to circulation, studios and one-bedroom units are often planned without hallways with flexible spaces for furniture, instead of walls, to be used to differentiate parts of a unit, the kitchens and bathrooms can align to one wall where plumbing is concentrated, the doors and walls are often reserved for separating spaces that need privacy, like bathrooms and bedrooms. Where possible, the number of interior corners is often reduced to simplify interior framing and can permit developers to fit more apartments in a given building. The decisions made on what amenities to incorporate in individual units are often common and depend upon both regulations and market conditions. Few apartments in Port Harcourt have adequate laundry facilities because space is simply too costly and native Laundromats thrive. In less costly towns, a laundry facility is standard. In some markets, developers could also be ready to identify opportunities for sharing amenities that would allow modest reductions to unit size, like reducing in-unit closet space in favor of shared storage.



**Figure 3:** Floor plan showing reduced circulation spaces and combination of wet walls where necessary. **Source:** (Reseacher, 2021)

**Approach 2: Recycle designs, rotate floor plans, and trim down costs**

Developers in Nigeria already rely on repeated unit layouts to create more efficient designs and a simpler construction process for contractors. Typically, this repetition produces uniformity, but developers can work with architects to use repetitive units and building types more creatively without adding complexity. For example, rotating and mirroring can be used at the building to create variation at little cost. For a proposed social housing project in Rivers state, Nigeria, a combination of different unit type building that is rotated and repeated three times to form the overall development has been designed. Collectively, these buildings created a distinct face on each side of the block, while providing the benefits of a standard drawing set and repeated construction process.



**Figure 4:** Repetition and rotation of multi-family building unit, Port Harcourt, Rivers state. **Source:** (Reseacher, 2021)

**STRATEGIES FOR MORE EFFICIENT BUILDING SERVICES**

A building’s basic services like elevators, mechanical, electrical, and plumbing are discreet but essential. They are also expensive. Incorporating best practices such as stacking and standardizing kitchens and bathrooms for plumbing and developing building layouts that use elevators efficiently can help to regulate the prices of services. However, decisions about services have implications beyond upfront capital costs. Green building performance standards may initially cost more but have the potential to scale back long-term operating costs. They also impact tenants’ health and quality of life which are important outcomes for mission-driven organizations that develop affordable housing. Selecting systems requires a tradeoff between cost, quality, and environmental performance, and the challenge is finding an appropriate set of systems given project costs and priorities. (Hannah, Hoyt, Jenny, Schuetz, 2020)

**Approach 1: Stack, standardize, and simplify**

Observing basic best practices for plumbing can help to regulate costs. When designing a unit, stacking hydro walls for kitchens and bathrooms vertically and placing them back-to-back reduces plumbing complexity and price. Elevators are expensive-to-service line items on a project budget and building codes dictate when elevators are required; typically, buildings above three stories and/or over 12 units. In some cases, the advantages of building a bigger project with elevators will justify the extra costs. For a few smaller projects, it should be possible to scale back or eliminate elevators while still creating an accessible building. For instance, during a single-stair building, four units surround one, central staircase. Ground floor units are accessible, and with no quite three floors, a 12-unit building can have most of its space dedicated to living, instead of circulation.



**Figure 5:** Floor plan for four one-bedrooms around a central stair and landing. **Source:** (Reseacher, 2021)

**Approach 2: Create long-standing investments by financing environmental performance.**

Several affordable housing non-profits want to invest in high-performance envelopes, HVAC, and plumbing systems that would reduce long-term operating costs. The State affordable housing programs can further encourage such investments through scoring systems accustomed to allocate Low-Income Housing Tax Credits as an example. Several developers estimated that while higher-performance systems may cost 3% to five more upfront, reduced operating costs will offset the expense over time. However, both initial costs and future savings can vary considerably across projects, which may complicate the choices of the developers. Furthermore, operating high-performance buildings requires different behavior from building managers and residents. The long-term environmental case for high-performance buildings is obvious, and therefore the economics is usually logical. However, affordable housing developers need more opportunities to share best practices and data on building performance so as to settle on the proper system for their project.

**PRODUCTION OF MORE AFFORDABLE APARTMENTS**

While there are not any resolutions for addressing costs in multifamily construction, interviews conducted with developers, contractors, and designers suggest several factors that will help project teams deliver high-quality, environmentally responsible apartments at cheaper costs. Close coordination across the project team throughout the method is important. Ensuring all team members agree on project goals just like the quality of life for tenants, environmental performance, and affordability keeps the team unified as issues and pressures emerge. Partnership also sets the stage for sharing best

practices on new construction techniques, materials, and systems. Practices that shorten the event timeline translate directly into cost savings. Decisions like working frequently with trusted partners, investing in upfront research to anticipate unknowns, and partial off-site fabrication can reduce costs without compromising quality. Though there are often obtainable best design and construction teams, there tends to be limited ability to enhance housing affordability if the local policy environment creates unnecessary hurdles. Policymakers ought to understand how building codes and zoning laws impact apartment design and construction. The three sorts of regulatory changes that deserve special consideration are:

#### **Reduction of parking requirements.**

Requiring fewer off-street parking spaces is one of the foremost prevailing levers for reducing multifamily construction costs. Reducing parking requirements in zoning laws should be a top action item for cities that have reliable public transportation systems.

#### **Zoning should not prohibit efficiently sized projects.**

Designing a 20-unit building is near as complex and expensive as designing a 100-unit building. Thinning out fixed design costs over more apartments has the ability to reduce per-unit costs. However, zoning rules like maximum building height and floor-to-area ratio often limit a developer's ability to create larger, more economically efficient buildings. Local governments should confirm that zoning laws allow affordable projects to outline.

#### **Make the event process shorter, simpler, and more transparent.**

Local governments that want to encourage affordable development should allow apartments to be built as-of-right, instead of requiring discretionary approvals. Making the project review processes shorter, simpler, and more transparent would help many low and moderate-income households' better opportunities to afford a decent place to live.

### **Conclusion And Recommendations**

Low-rise vertical expansion creates more room for people leading to high density. It is therefore recommended that facilities and amenities such as vocational centers, health and leisure, and commercial facilities that complement residential areas should be available to service the needs of the population while fueling their social lives and interactions with the environment. The policy choices by Federal, State, and Local governments contribute to the level at which the cost of building affordable housing increases. Hence, constructing safe, healthy, and visually appealing apartments at lower costs is possible, but will require better policies and best practices with private sector driven management, under a Public, Private Partnership agreement.

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