



## **Sustainable Affordable Housing Strategies for Solving Low-Income Earners Housing Challenges in Nigeria**

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### **ABSTRACT**

Globally, several studies have affirmed that the population of those who are displaced with respect to housing is on the rise. Developing nations in the continent of Africa to include Nigeria are reportedly not spared of this development. Similarly, the low-income earners have been reported as the worst hit of this global menace. Shanty dwellings, squatter settlements and informal settlements have similarly been reported to be homes to low-income earners who constitute over 90% of the population of Nigeria. This study therefore presented sustainable affordable housing strategies as an emerging concept through which low-income earners housing challenges in Nigeria can be eliminated. The study relied on a systematic review of literature to arrive at its findings. Findings from the study revealed that sustainable affordable housing strategies through which Nigerian low-income earners housing challenges can be addressed can best be explored from the social, economic, environmental, institutional and technological components of sustainable affordable housing. The study calls on the government, stakeholders, policy makers as well as private developers to adopt sustainable affordable housing strategies for low-income housing provision in Nigeria. The study's outcome will contribute to existing body of knowledge in that it will provide useful information with respect to low-income housing provision and equally re-direct research interest on low-income housing in Nigeria and other developing nations.

**Keywords:** Low-Income Earners Housing Challenges; Sustainable Affordable Housing Strategies, Nigeria.

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## 1. Introduction

Virtually all human activities on planet earth revolves around a house. Thus, housing can no longer be seen as just a roof over ones head but instead, it has become a component at the centre of man's evolvment and development [1]. World over, housing has also been adjudged as one of the indices through which the welfare of humans can be measured [2, 3]. Similarly, housing has equally been reported as been potent in the areas of employment generation as well as the development of the economy of nations [4, 5, 6]. However, [7] submitted that only decent houses are capable of delivering the above mentioned benefits. The study added that indecent dwellings are of no benefit to its users and occupiers in all ramifications and spheres. Overall, [8] submitted that decent dwellings are necessary for all.

Housing in spite of its benefits as highlighted in the preceding paragraph has been reported to be in gross undersupply across the globe. To this end, the [9] reported that globally, the population of those who are homeless because they reside in shanty towns and informal settlements stands at 863 million and fast approaching a billion. The [9] similarly affirmed that over 61.7% of the population of Africa are homeless. In Nigeria, a recent study conducted by [10] affirmed that between 17-20 million Nigerians are homeless. Furthermore, an abundance of research evidences have affirmed that the low-income earners are chief among the sufferers of these housing shortages [11, 12, 13, 14, 15, 16]. The studies further reported that the incidence of housing shortages and inadequacies is far worse for low-income earners in developing nations like Nigeria.

Talking about Nigeria, studies has confirmed that the low-income earners who constitute over 90% of its population are displaced with respect to housing as a result of the inability of the low-income earners to afford the cost (rental, building or outright purchase) of housing occasioned by the increasing costs of building materials, deficient policies of housing, cost of land for housing development, increased interests and inflation rates amongst others [17, 18, 19, 20, 21, 22, 23, 24, 25]. Past government efforts targeted at improving the situation of housing for the lower income citizens in Nigeria have been reported to have equally failed as a result of poor implementation, poor funding, inefficient strategies amongst others [24, 26]. In addition, studies have equally affirmed that the effect of the most recent housing policy of Nigeria (NHP 2012) which was premised on the need to provide all Nigerians with affordable homes on a sustained basis and targeted at addressing low-income earners affordability challenges with respect to housing is yet to be felt because of the absence of an operational strategy to drive its operation [18, 26, 27, 28].

Nevertheless, there are growing concerns that addressing all affordability concerns of the low-income earners with respect to housing as set out in the 2012 housing policy of Nigeria is not a guarantee for successful housing for the low-income earners. Similarly, [29, 30, 31, 32] affirmed that focusing on affordability concerns alone without recourse to social wellbeing and sustainability issues in relation to housing for the low-income earners will mean housing without the basic infrastructures and services for the low-income earners. Furthermore, emerging trends in relation to low-income housing have advocated for the need to jointly address sustainability and affordability concerns since low-income earners housing needs have progressed beyond price affordability to other sustainability issues [33, 34, 11,12].

Consequently, it has become crucial to integrate sustainability dimensions into low-income affordable housing as encouraged by emerging studies. When the dimensions of sustainability are integrated into affordable housing in low income housing developments, the concept of sustainable affordable housing is initiated. Housing for the low-income earners that is sustainable and at the same time affordable as reported by [11, 35, 36] therefore is housing that fulfils the needs of housing of the low-income earners whilst conserving their capacities to meet other needs of the future. It entails the process of achieving an enhanced quality of life for the low-income earners through the systematic use of available resources thus ensuring a continuous system of social progress and at the same time sustaining the environment as well as ensuring the steady growth of the economy [37].

However, sustainable affordable housing for low-income earners as a concept has been reported not to have been explored both in research and housing developments in Nigeria and many other developing nations irrespective of its potentials in addressing low-income earners housing challenges [11, 38]. This study therefore, in response to calls for the need to advance a strategy to drive the Nigerian 2012 housing policy as well as emerging research interests on the need to pursue low-income earners housing provision from the perspective of integrating sustainability dimensions into affordable housing if successful housing is envisaged for the low-income earners, is aimed at highlighting sustainable affordable housing strategies through which the perennial low-income earners housing crisis in Nigeria as well as other developing nations with similar characteristics can be addressed. The study is therefore structured thus: Introduction, Methodology, Overview of sustainable affordable housing for the low-income in Nigeria and conclusions.

## **2. Methodology**

The study considered the systematic review of literature as the most suitable strategy to achieve its aim. This is largely due to the fact that previous studies of [39, 40] as cited by [41] have affirmed that a systematic review stands as an essential scientific tool in social science researches that can be adopted to elicit results and as well base a decision on a research involving large publications. Similarly, in carrying out the systematic review, the five (5) step data gathering procedure (development of the questions of the research, identification of related researches, evaluation of the worth and content of the identified researches, aggregation and profiling of the research results and finally, explanation and comprehension of the results of the researches) as advanced by [40] and [42] became necessary.

The procedure which commenced with a comprehensive search and review of articles, conference proceedings, peer-reviewed journal publications and books between March and October 2020 was carried out using Scopus online database as the principal literature source and supported by Google Scholar online database. Scopus online database was adopted as the principal literature source because of its wide range of journal coverage involving special features in keywords searching as well as citation analysis [43] as cited by [41]. Similarly, words such as sustainable affordable housing, sustainable affordable housing in Nigeria, Housing provision for the low-income earners in Nigeria, Housing provision in Nigeria, low-income earners housing challenges in Nigeria were keyed into the search arena and 722, 23, 41, 147, 15 articles were retrieved respectively. Overall, the searches conducted in the two databases generated 948 articles.

The article titles and abstracts were then reviewed for the purpose of identifying those whose full texts will be reviewed and used in the study. This led to the selection of 384 articles. The 384 articles were then rated using the rating system of 3 for very relevant, 2 not so relevant and 1 for not relevant. Articles with rating 3 were eventually reviewed and used for the study as a result of their objectives and the extent of their relevance to the study. The data obtained from the systematic review process were processed using the thematic content analysis strategy. This involved the discussion of the sustainable affordable housing components along the social, economic, environmental, institutional and technological themes as identified from the systematic review. Based on the themes, sustainable affordable housing strategies through which low-income housing challenges can be addressed in Nigeria was presented.

## **3. Sustainable Affordable Housing**

Sustainable affordable housing as a concept emerged from of the integration of the aspects of sustainable housing into affordable housing [11]. Sustainable housing as it were was said to have originated from the concept of sustainable development. Similarly, sustainable development as a concept was reported to have emerged from the report titled "Our Common Future" of the United Nations World Commission on Environment and Development (WCED) [44]. The WCED report which is popularly referred to as the Brundtland Report however defined sustainable development as that type of development that is geared towards securing today's generation needs whilst conserving the

capacities of coming generations to meeting their own needs when they arise [44]. Addressing the needs of today's generation as well as securing the capability of addressing the needs of future generations as contained in the WCED report principally borders on the need to achieve a social, environment and economic balance in the pursuance of developments [45, 46].

Furthermore, [47, 48, 49, 50] studies reported that sustainable housing ideology which emerged through an advocacy drive premised on environmental friendliness in the UK further sought to propagate the need to achieve a social, economic and environmental balance in housing as it is the case with sustainable development. With a view to defining the meaning of sustainable housing, the UN-Habitat (2012) submitted that sustainable housing just like sustainable development is largely concerned with the location of the house, the design and methods of construction adopted, the integration of the house with economic, cultural, social and the environmental fabric of communities. Furthermore, [11, 16, 51] studies submitted that the broad focus of sustainable housing is on the need to achieve as well as secure a balance socially, environmentally and economically in relation to housing.

Affordable housing on the other hand has largely been viewed with respect to cost of housing in relation to income of households [52]. The concept was further seen as the ability of households to secure decent dwellings without having to go through neck breaking financial stresses [53, 54]. Similarly, [55, 56, 57] advanced the 30% benchmark as the qualifying percentages that housing costs must meet for it to be seen as affordable to households particularly the low-income earners. However, insinuations have emerged that tying affordable housing to cost alone as well as specifying the percentage that it should cost with respect to low-income households are being advanced without recourse to the composition of households, the quality of the house as well as neighbourhood features, the size of the house, the location of the house amongst others. To this end, [58, 59] submitted that for affordable housing goals to be realised, then broader issues in addition to cost should be deployed into its assessment and analysis.

Furthermore, emerging studies across the globe have sued for the need to emphasize housing adequacy issues in affordable housing development for the lower income citizens [8, 31, 60, 61]. In addition, [34, 58, 62, 63, 64, 65, 66, 67] studies noted that sustainable affordable housing is initiated when housing adequacy issues otherwise referred to as sustainability dimensions are jointly addressed alongside the income focus of affordable housing. [16, 37, 68] further added that it is crucial for both affordability and sustainability issues to be jointly addressed if successful communities and housing are envisaged for the low-income citizens.

Integrating the concerns of sustainable and affordable housing together to arrive at the concept of sustainable affordable housing is housing type with the potentials of addressing the low-income earners housing challenges globally [33, 16, 68, 69, 70, 71, 72, 73, 74, 75]. The studies added that the concept can lead to an increased supply of infrastructures and amenities to the low-income earners as well as an 80% reduction in the consumption of energy in buildings. Similarly, [76, 77] studies asserted that with sustainable affordable housing, some form of balance can be achieved between nature and human activities without adversely impacting social, economic as well as environmental systems for future generations.

However, Nigeria and other countries in the continent of Africa as well as other developing climes have been reported not to have embraced the concept of sustainable affordable housing in low-income housing provision. [38, 78] studies affirmed that researches as well as developments focusing on the concept of sustainable affordable housing for lower income citizens are non-existing and where they exist, they are at their emerging state in Nigeria and many other developing nations. Also, studies have equally affirmed that even in most developed climes where the awareness of the concept of sustainable affordable housing has reportedly been on, the concepts are most often used interchangeably thus suggesting that there still exist an obvious lack of understanding of the concepts as well as its components [11, 78].

With a view to defining the scope and components through which sustainable affordable housing can be better understood, [79] harped on the need for the inclusion of technology to the existing

focuses of sustainable affordable housing as a result of the impact that building and housing developments have on the environment. [8] corroborating [79] study opined that integrating sustainability dimensions into affordable housing may not be successful if expertise in technology is ignored. [33] equally argued that there is need to consider the institutional/regulatory input alongside the established economic, social and environmental focus of sustainable affordable housing if realistic results are envisaged. Therefore, in the light of the foregoing, sustainable affordable housing focus in this paper shall be accessed through the social, economic, environmental, institutional and technological components as posited by [33, 8, 68, 79]. Similarly, the strategies of sustainable affordable housing through which low-income earners housing challenges can be addressed in this study shall be discussed under the social, economic, environmental, institutional and technological themes.

#### 4. Sustainable Affordable Housing Strategies for Solving Low-Income Earners Housing Challenges in Nigeria

The table 1 below provides a list of sustainable affordable housing strategies through which low-income earners challenges can be addressed in Nigeria and other developing nations. Based on the findings from reviewed literature, five (5) principal components of sustainable affordable housing were identified. They are social, economic, environmental, institutional and technological components.

Through these components, the strategies were discussed.

**Table 1:** Sustainable affordable housing strategies

Strategies		Authors
Social	Promotion of social capital, social inclusion and social cohesion	[80]
	Retrofitting of aged buildings	[81]
	Promotion of high density development/diversity in housing	[33]
Economic	Provision of incentives to developers	[82]
	Development of a robust financial market	[83, 84]
	Provision of housing subsidies/incentives to households	[85]
Environment	Conservation of energy in buildings	[86, 87]
	Development and utilization of local resources	[88, 89]
	Efficient land use and planning	[90, 91]
	Control and reduction of wastes and natural disasters	[92, 93]
Institutional	Private sector Involvement	[83]
	Formulation of sound housing policies	[94]
	Transparent/robust procurement process	[95]
	Decentralization of authority and responsibility	[96, 97]
Technological	Promotion of technological innovation	[98]
	Training and re-training of personnel	[79]
	Promotion of the growth and development of local and rudimentary technologies	[79]
	Promotion of the use of reusable, renewable and recyclable materials	[79]

Source: Authors compilation from systematic review

##### 4.1. Social strategies of sustainable affordable housing

The incidence of income segregation has been reported as one of the challenges standing against the low-income earners access to adequate housing globally [99, 100]. Nigerian low-income earners have been reported to be displaced with respect to housing as a result of their low financial status [18, 17, 20, 19, 23, 25]. The low-income earners as a result of their low financial status are

confined/restricted to city/urban outskirts where infrastructural facilities are absent thus making their housing conditions more like slums. Similarly, low financial status creates an environment where income segregation thrives. However, [80] reported that one of the social strategies of sustainable affordable housing is that it seeks to reduce/eliminate income/wealth segregation through the promotion of social capital, inclusion and cohesion. Social cohesion brings about a sense of belonging, social solidarity and emphasises on the need to interact within families and communities. Similarly, social capital brings about support and co-operation among societies thus leading to the actualization of safety and belongingness needs of households. Additionally, social inclusion brings about the unhindered access of households and families to resources thus leading to the efficient participation and involvement of the households in economic, political and social activities within the community. All of these put together can foster the relationship as well as inter relationship between the low-income, middle income and the high income households thereby reducing drastically, the incidence of income/wealth segregation.

Furthermore, the incidence of poor maintenance culture and abandoned management of public facilities has also been reported as a challenge limiting the low-income earners access to adequate housing globally [101, 102]. Poor maintenance and the abandonment of public facilities has become a common practice in Nigeria and many other African countries [103]. Poor maintenance has led to an increased proportion of aged and deficient infrastructures all around the world [81]. These aged and deficient infrastructures are unfortunately home to low-income earners. Arguments have however been advanced with respect to how to make these aged and deficient infrastructures more suitable and functional. To this end, [81, 104] noted that retrofitting of aged infrastructures to sustainable affordable standards is cheaper and more beneficial compared to outright demolition and reconstruction. The studies added that through the retrofitting of aged infrastructures which is one of the social strategies of sustainable affordable housing, the facades of the infrastructures are retained, more employments are created while an almost 80% reduction in energy usage can be achieved thereby boosting the low-income earners housing conditions.

Additionally, the incidence of inadequate infrastructural development/supply has also been identified as a challenge confronting low-income housing in most African countries [71, 105]. Most African countries have been reported as developing nations and home to most low-income earners across the globe hence, infrastructural development is in limited supply. However, through the practice of high density housing development and the diversity of housing types which are social strategies of sustainable affordable housing as reported by [33], low-income earners housing challenge of insufficient supply of infrastructure can be addressed. Similarly, by practicing high density housing development as well as diversity of housing types, the low-income enjoys proximity to the available infrastructures as well as spend less on other non-housing costs. This strategy equally leads to mixed housing development and by extension equally reduces income segregation.

#### **4.2. Economic strategies of sustainable affordable housing**

Most countries in the world have recognised and empowered the private sector with the responsibility of the provision of housing while the government of these countries simply act as an enabler and promoter. Against this backdrop, [83] reported that the development of housing in the world and most African countries is hampered by the unavailability of incentives to private investors and developers. Private sector players are profit oriented hence, most of their outputs are unaffordable to the low-income. The burden that the cost of housing comes with are transferred by the developers/investors to the households through rent or outright purchase thus making the low-income unable to access existing units [106]. However, [82] noted the strategy of providing investors/developers with incentives (loans, tax rebates etc.) which happens to be one of the economic strategies of sustainable affordable housing if adopted by stakeholders, can help address the challenge and by extension, grant the low-income greater access to housing. Similarly, incentives in the form of flexibility in design can equally go a long way to motivate the investors/developers there by leading to lower housing prices for the low-income [107].

Furthermore, low-income housing in Nigeria has been reportedly trammelled as a result of inflation, high interest rates and high cost of building materials [99, 24, 53]. These challenges have further made housing unaffordable to the low-income. However, with the availability of a stable financial/housing market been an economic strategy of sustainable affordable housing, the issues of high interest rates, inflation rates as well as high cost of building materials can be addressed [103, 95]. The uncertainty of the market system has led to the loss of interest by investors and developers thus leaving only a few investors left in the housing market. Therefore, the stabilization of the market will increase the confidence level of private investors/developers. With a stable market, there is the assurance of the involvement of more private investors/developers. This will help to control inflation rates as well as prices of commodities. Overall, a stable financial/housing market shall certainly empower the low-income and grant them more access to housing.

Additionally, the low financial status of low-income earners in Nigerian has also been reported as one of the reasons why housing is in limited supply to the low-income [108]. Prices of existing housing units in Nigeria are outside the reach of the low-income earners as a result of their poor/weak financial status. However, the provision of housing subsidies in the form of loans and mortgages at lower interest rates to low-income households been another economic strategy of sustainable affordable housing can help to address the challenge [109]. Similarly, [64] noted that the economic focus of sustainable affordable housing is to provide households with incentives in the form of reduced transportation as well as other non-housing costs. Overall, the provision of financial incentives to lower income households shall cushion the economic power of the low-income thereby resulting into better housing for the low-income.

#### **4.3. Environmental strategies of sustainable affordable housing**

Globally, buildings consume close to 40% of energy thus making it the highest consumer of energy [110]. The building and construction industry contributes nearly one third of Global Greenhouse Gas (GHG) Emissions [111]. This has led to serious discomfort both in and within the building. Regrettably, the low-income finds itself in the middle of this discomfort and even suffer more discomfort as a result of the inadequate situation of their dwellings. Against this backdrop, [112] sued for the need for the adoption of energy efficiency strategies in buildings. Similarly, the environmental strategy of sustainable affordable housing seeks to achieve energy conservation in buildings through the encouragement and promotion of the use of energy efficient lighting systems, solar heating technologies, energy efficient heating systems, ventilation and air condition systems, installation of water efficient appliances, rain water harvesting technologies as well as the improvements of the housing envelopes generally [87, 113]. These strategies no doubt can lead to an increase in the housing cost which is already unaffordable to the low-income but however, with an incentive driven housing market, these costs can be , managed [82]. Similarly, [104] submitted that close to 80% reduction in energy consumption can be achieved in buildings that adopt the above mentioned strategies. This will certainly lead to more comfort in the environment both indoors and outdoors for the low-income earners.

Furthermore, the non-utilization of local resources irrespective of their abundance in Nigeria and most African countries has equally been reported as one of the reasons why housing is not in sufficient supply to the low-income [21]. Moreover, imported building materials come at a cost that is obviously outside the reach of the low-income. However, the promotion and use of local resources presents itself as part of the environmental strategies of sustainable affordable housing [88, 89]. Sustainable affordable housing through its environmental strategy, harps on the need to promote the usage of local resources in the form of tax reliefs and incentives to entrepreneurs who are interested in investing along that line. Development and usage of local resources in building will lead to a drastic decline in the price of imported building materials and by extension, the entire cost of housing units thus making it affordable to the low-income. It will also lead to the creation of jobs.

Similarly, land for housing development has also been reported as one of the challenges confronting the low-income earners access to housing in Nigeria [27, 53]. Available lands according to the authors

are been given out at prices that are outside the reach of the low-income. Moreover, high cost of land is a major obstacle to the development of sustainable affordable housing [114]. However, inefficient land use planning could be responsible for this development [96]. As a way out, the efficient use and planning of land which is another environmental strategy of sustainable affordable housing could be employed to address the challenge [90, 91]. In doing this, the government, community and individual land owners are encouraged to give out lands to developers as equity. In turn, the developers upon completion allocates some housing units to the providers of the land. Where the land was provided by the government, the allocated housing units can in turn be given as low-income housing. This will lead to mixed income housing development and effective land use planning [33].

Furthermore, the incidences of natural disaster and high rate of internal displacement have also been reported as been contributory reasons why the low-income earners are displaced with respect to housing in Nigeria [27]. The low-income in Nigeria have become victims of environmental disasters of all kinds as a result of the location of their dwellings. However, this ugly development/trend can be averted. Of the numerous environmental strategies of sustainable affordable housing, one of it seeks to address the occurrences of disasters through the conduct of environmental and geological assessments before the commencement of actual development [92]. Through the assessments, immediate and future harms are known and steps taken to mitigate their occurrence and effect. The cost of the assessment together with the cost of the project may appear high but however, the underlying benefit that the assessment portends makes the undertaking worthwhile. Similarly, the low-income will suffer no additional financial burden arising from the conduct of the environmental assessments since private investors/developers are going to be motivated through incentives.

#### **4.4. Institutional strategies of sustainable affordable housing**

The low-income in Nigeria has been reported to be displaced with respect to housing as a result of over politicization of the system, the lack of political will on the part of the political gladiators, corruption as well as the limited involvement of the private sector [115, 27, 26, 53]. The studies further reported that developed mass houses that were hitherto meant for the low-income were at the long run allocated to high and middle income earners who had no need for them but for the fact that they are allies of the stakeholders in the Nigerian housing sector. The high and middle income earners do later re-sell the housing units and equally put out some for rent. In all, the low-income earners are always schemed out of housing opportunities in Nigeria. However, a key institutional strategy of sustainable affordable housing seeks to empower the private sector in the delivery of mass housing as recommended in the enabling approach [116, 117, 83]. The studies added that with the involvement of the private sector, issues like corruption, politicization that have held the housing sector aback can be addressed.

Furthermore, the housing policy instrument of Nigeria has reportedly been adjudged to be unable to deliver housing opportunities to the low-income as a result of poor operational framework as well as deficient implementation strategies [18, 24, 23]. Similarly, the studies further asserted that the effect of the most current housing policy of Nigeria is yet to be felt by those in the lower income bracket. However, it is the responsibility of the government to formulate the right housing policies [22]. Similarly, [94] submitted that one of the institutional strategies of sustainable affordable housing harps on the need to develop, review and update housing policies from time to time in line with existing realities. The continuous review as well as updating of housing policies in accordance with existing realities as recommended by sustainable affordable housing practices will no doubt go a long way to addressing low-income earners housing needs. A sound housing policy is an all-encompassing housing document in that it addresses issues related to land for housing, building materials, housing types, all income groups and many more [96].

Additionally, government mass housing development has also been plagued by secrecy, favouritism and incompetence. In Nigeria for example, [24, 26, 118, 119] are of the opinion that the incidences of social menace to include the desire for more profit, the employment of unqualified persons to man housing departments and agencies, unreasonable professional charges amongst others has held the



delivery of housing to the low-income down for decades. Furthermore, the studies added that the process leading to the award of contracts are marred with all sort of irregularities. However, with sustainable affordable housing practice, all of these anomalies can be addressed. A key institutional strategy of sustainable affordable housing is centred on a procurement process that is effective and transparent [95]. With a transparent and effective procurement process in place, the incidences of favouritism, incompetence and undue desire for profit can be addressed. This will certainly help in the transfer of government housing projects to those it was intended for (the low-income). Additionally, a lot of cost will be saved when a transparent and effective procurement process is in place the study added.

Furthermore, the time allotted to developmental approval has also hindered the adequate supply of housing to the low-income in Nigeria [33, 26, 120]. The studies added the bureaucratic process as well as the undue delay has led to cost and time overruns. However, with the practice of sustainable affordable housing, these challenges can as well be addressed. An institutional strategy of sustainable affordable housing harps on the need to decentralize planning and approval authorities as well as responsibilities to local authorities [96, 97]. The studies added that by decentralizing and shifting approvals to local authorities, a lot of time can be saved. This would serve as an incentive to developers and overall, more housing units can be delivered to the low-income.

#### **4.5. Technological strategies of sustainable affordable housing**

The incidences of inadequate technological knowhow, wrong comprehension of sustainable technological processes, uncertainty about technological performances as well as the ever changing nature of technology has again been reported as challenges limiting the development of sustainable affordable housing in developing nations [121, 122]. Moreover, the continuous escalation of the prices of building materials coupled with the degradation of the environment due to over exploitation occasioned by developmental activities equally calls for the need to develop and upgrade local resources to sustainable standards. Similarly, upgrading of local resources to sustainable standards requires technology [79]. As a way forward, a key technological strategy of sustainable affordable housing harps on the need to promote technological innovation [98]. This will bring about the needed awareness. Furthermore, another technological strategy of sustainable affordable housing focuses on the promotion of the use of reusable, renewable and recyclable materials [79]. Through this, the environment shall be further conserved and the incidences of disaster can be further managed.

Similarly, the pace at which technology is advancing poses a treat to previous skills [8]. As a result, developers spend more resources to hire and bring in experts in other to cope with technological changes. This development has further chocked the low-income as a result of the cost of the eventual product. However, with the promotion, growth and development of local and rudimentary technologies which is a technological strategy of sustainable affordable housing, many of these challenges can be addressed [79,128]. By promoting the development and growth of local technology, the scarcity of skilled labour can be addressed while direct employments can as well be created. Also, the huge finances spent on hiring as well as bring in experts will be saved. As a result, housing prices shall be drastically reduced thereby increasing the low-income earners access to housing.

#### **5. Conclusions**

Giving the rate at which low-income housing is worsening in Nigeria, the need to consider sustainability dimensions in the development of affordable housing becomes more imperative. Till date, this study found that there is no evidence that sustainability dimensions have been integrated into affordable housing development for the low-income earners in Nigeria. This has to be addressed if meaningful results are envisaged with respect to low-income housing. Similarly, sustainable affordable housing for the low-income harps on the need to jointly tackle the social, economic, environmental, institutional as well as technological issues as they relate to housing. This will certainly enhance the housing quality of the low-income earners and by extension, improve their quality of life

as well as their wellbeing. Therefore, rigorous awareness of the concept has to be embarked upon by the government as well as stakeholders in the Nigerian housing industry by exposing the benefits of the concept with respect to low-income housing to the public. The concerned authorities in Nigeria must as a matter of urgency stimulate and encourage sustainable affordable practices in future low-income housing interventions.

Furthermore, this study gleaned sustainable affordable housing components as well as strategies from literature. Similarly, sustainable affordable housing strategies through which low-income housing can be addressed in Nigeria have been presented. However, the need for more researches on the concept in relation to low-income housing cannot be over emphasized. Therefore, future empirical and contextual researches are encouraged to holistically investigate sustainable affordable housing components, indicators as well as strategies in Nigeria. Future researches are equally encouraged in the area of developing a sustainable affordable housing model or framework for the low-income earners in Nigeria as well as other developing nations.

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