

## Architectural Sustainability Campaign and Financing In Nigeria: The Right Approach

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### ABSTRACT

This paper aims at understanding the level of architectural sustainability awareness among land owners as well as ascertains how many registered practicing architects ever propose sustainable designs to their client. Many researchers in the built environment have heralded the need for sustainable design and construction. The campaign to motivate the adoption of design principles and materials that do not compromise the health of the users and the chances of the future to meet its needs has been addressed by many researchers. However, the current trend in the campaign strategy is actually a one way asymmetrical approach and this might be responsible for the low improvement in sustainable construction in Nigeria. Different authorities have identified poverty as a major challenge of sustainable construction in Nigeria because more than half of the builder barely can afford payment of architects talk more of building sustainably considering its relatively high initial construction cost. This study was conducted in a quantitative manner using the survey method. 50 landlords in Yaba Local Government Area of Lagos were selected through a systematic random sampling technique and 50 registered architects with at least five years professional experience were purposefully selected and data was gathered through a structured questionnaire. The study revealed that over 60% of the architects rarely propose sustainable architectural designs and that 53% of clients who had got sustainable designs reject it for reasons such as cost, too much simplicity, old fashioned and non-suitability with their status. Also, about 53% of the property owners were not aware of sustainable architecture even though about 67% consulted an architecture. Also, most say they cannot afford to construct sustainably and most are ready to get external loan if available to build on their properties. It is therefore recommended that the 7S sustainable approach model be adopted to resolve the imbalance in sustainable awareness and financing in Nigeria.

**Keywords:** Sustainability, Campaign, Financing, Structure and asymmetrical

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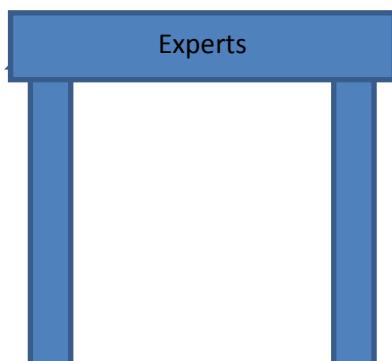
### 1. INTRODUCTION

Different authorities, locally and internationally have offered different conceptual explanation of sustainability. Popular among others are the definitions by the World Commission on Environment and Development (WCED) and that of the American Institute of Architects (AIA). Popularly known as the Brundtland commission, the WCED defines sustainability as the act of meeting the needs of the present without compromising the ability of the future generations to meet their own needs; while AIA defines it as the ability of society to continue functioning into the future without being forced into decline through exhaustion or overloading of the key resources on which that system depends." (Mendler, Odell 2000). To promote and improve sustainable buildings in Nigeria, there is a need for active campaign that highlights the environmental, social and economic impact and relevance of the built environment on earth and the human continual health. Several conferences, workshops, and seminars including countless number of publications locally and internationally have been held advocating for sustainable construction.

Over the years, experts in the field of architecture have continued to sing and remix the songs of sustainable architectural building and designs in the face of the alarming negative impacts buildings have on the human natural environment and by extension, the health of people on earth. However, this paper faults the pattern of operation of the campaigns carried out so far. The trend is one sided and tilted just towards the architects or different kind of engineers. This is because if you design energy efficient materials and people do not know about it, how will they (users) patronize it? If we project reuse, recycled materials, ordinarily who would want such to be used for their buildings without a prior knowledge? Furthermore, how will I accept a design that does not befit the 21<sup>st</sup> century building material trend if I lack the basic knowledge?. Hence, this paper presents a better approach to fill the identified gap.

## 2. THE CURRENT CAMPAIGN TREND

The current trend in the advocacy, call or awareness on sustainable building is inclusive of experts and other stakeholders in the building sector and exclusive of the clients who will foot the bills for their house. Ecologists, urban designers, architects, engineers etc keep organizing programmes to discuss and propose the way forward to achieving an architecturally sustainable Nigeria without considering the need to take it to the grassroots. A tenant today is a landlord tomorrow and there are many land owners who are yet to do anything on their landed properties. The existing campaign strategy is a two way asymmetrical. It is unbalance; there is no message to the clients and as such no feedback. The flow of information is just one sided, all tilting towards experts and this is responsible for the poor improvement in sustainable buildings in Nigeria.



**Fig. 1: Two Way Asymmetrical Sustainable Architectural Campaign**  
(Source: Adelore 2017)

By two way asymmetrical, it connotes that information flow is one sided and unbalance. Architectural firms, government agencies, institutes and institutions of higher learning have emphasized the essence of considering building effects on human health and the physical natural environment. The campaigns include many building stakeholders but there is little or no local literature to reflect that the landowners, or building investors who are not inclined with architectural typologies are carried along. The model above shows all information going up and none are coming down where the “sustainable building novice” operates. That is why it is unbalance.

Experience has shown that architects, in Nigeria especially are like soldiers who must obey the army generals who are the clients. The clients are the army generals because they own the land, they determine the purpose of the building, they decide on the architect, firm and design and most importantly they foot the bills. They tell architects what they want and architects must obey, even when architects decide to advise the clients, the client is still free to accept or reject it. If architects refuse to do what they want, there are other thousands of clients who would design according to client's specifications, but with so many sustainable and structural incoherencies. Supporting this assertion, Naoum (1989) in a study on Influences of Clients, Designers and Procurement Methods in Project Performance concluded that clients have a great weight in determining building performance. In the study, clients were classified into three namely “on-going”, “on-off” and “one-off”. The “on-going” clients are those who are very experienced and have consciously built many projects in the past; the “on-off” are moderately experienced and have handled between two to three projects while the “one-off” are the inexperienced who are just on their first building project. Naoum (1989) noted that “differences in the clients’ experience are important variables in the building process and can critically influence a building project.”

This amplifies the need to extend campaigns to people who have stake in buildings, not excluding low class peoples. A significant number of buildings in Nigeria are owned by the low or middle class citizens. While there may not be exact figure to justify this point, a publication on housing in Nigeria available at <http://housingfinanceafrica.org/countries/nigeria/> revealed that over 64% of Nigerians live in slum conditions which can inferentially mean that there are more houses owned by poor people than rich people. This explains why this paper, proposes the two way symmetrical sustainable architectural campaign model.



**Fig. 2 Two Way Symmetrical Approach to Sustainable Architectural Design and Building Campaign**  
(Source: Adelore, 2017)

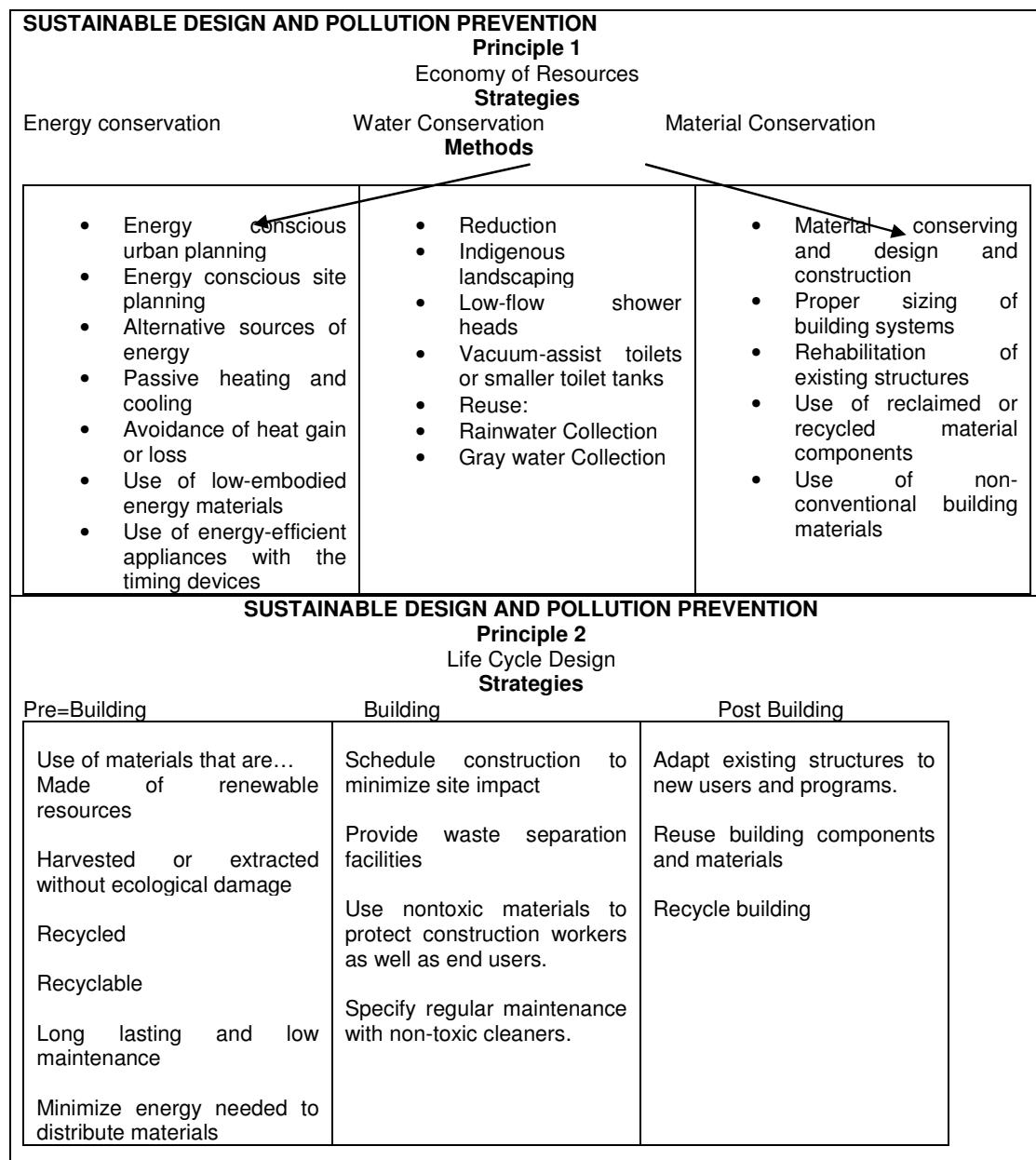
The Two- Way Symmetrical approach to sustainable architecture is a balance situation where the sensitizations comes from the professionals (Architects) to the unprofessional (The client). The information in this case is not just shared, but also gets feedback from the clients who may have one or two questions to ask before they can fully accept the developmental proposals of the expert. It involves the experts taking the information to landlords, even tenants, government officials in ministry of works, etc through a professionally planned sensitization seminar or programme. The advantage of this is that, a consciousness of fairness to the environment would have been created in the minds of these people and as such may selectively consider building sustainably.

Media, radio or television are also strong platforms for agenda setting. It is a strong instrument of change and can easily reach a number of persons through the airwaves. Adoption of media platforms to promote the philosophies of sustainable building as a two way symmetric model will reach more people than the physical ones. The media should be used to create a consciousness in the people by telling them what to think about, and the various dimensions to thinking about it. The media will be a strong instrument to propagate sustainable architectural awareness in form of call in shows, interviews, documentaries, public service announcement, short plays etc.

### 3. SUSTAINABLE ARCHITECTURE IN NIGERIA

Sustainability in Architecture covers so many areas ranging from material types, energy consumption, and water management, thermal, acoustic and visual comfort, site planning, environment, ecosystem, car emissions, radiation, daylighting, and landscaping among so many others. Effective use and management of all the listed is so pivotal for the continual healthy existence of man and organism in their natural habitat, and also minimizes little chance of hazards emanating from uncontrolled use of natural resources. According to the Cairns Regional Council Report on Sustainability (2001), pattern of design and building constructions affect the natural environment, both directly by placing buildings and paved surfaces on previously vegetated areas, and indirectly through extracting resources to create building materials; emitting greenhouse gases in the manufacturing and transportation of materials to the site; and through using energy sources such as electricity once the building is operating.

Grondin (1959) referred to sustainable buildings as Bioclimatic Architecture, he defined the term as a group of design decisions that offer appropriate living conditions within buildings by the minimal use of technical units "the group of machinery" that require energy consumption of non-renewable resources. Also, Munch (2009) says sustainability as a concept is keen on the "attempt to bridge the gap between environmental concerns about the increasingly evident ecological consequences of human activities and socio-political concerns about human development issues" In Nigeria, sustainable architectural buildings have not received so much attention at all. This assertion was supported by Abisuga and Oyekanmi (2014) who remarked that the practice of sustainability in construction is paramount to the preservation of the built environment which is lacking in Nigeria" Architectural practice in Nigeria is improving though, but a close analysis will however reveal that the practice is still very much lagging behind in Nigeria when compared with some ultra-modern communities in developed countries in the world. Studies have shown the deplorable conditions of urban housing in Nigeria. Olutoah (2015).



**Fig. 3 The Economy of Resources Model**

Source: Kim & Rigdon (1998)

SUSTAINABLE DESIGN AND POLLUTION PREVENTION		
Principle 3		
HUMANE DESIGN MODEL		
Strategies		
Preservation of natural Resources	Urban Design and site planning	Design for human comfort
Understand the impact of design on nature  Respect topo-graphical contours  Do not disturb the water table  Preserve existing flora and faun	Avoid pollution contribution  Promote mixed-use development  Create pedestrian pockets  Provide for human-powered transportation	Provide thermal, visual, and acoustic comfort  Provide visual connection to exterior  Provide operable windows  Provide clean, fresh air  Accommodate persons with differing physical abilities  Use nontoxic, non-outgassing materials

Fig. 4: The Humane Design Model; Kim and Rigdon (1998)

#### 4. FINANCING SUSTAINABLE BUILDINGS IN NIGERIA: THE INTEGRATED APPROACH

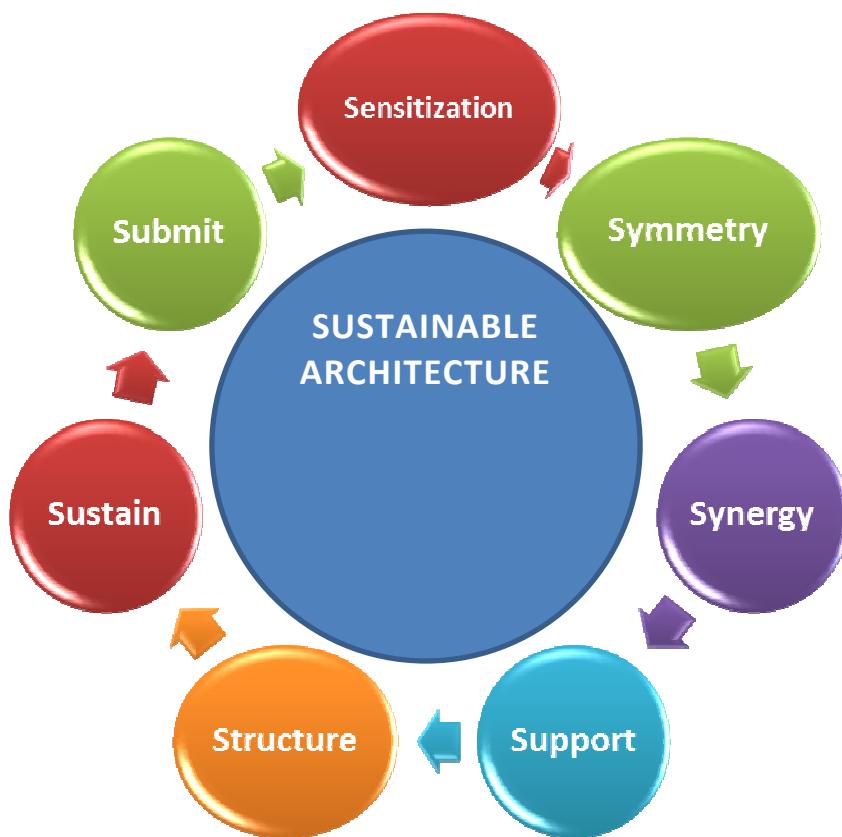
Abisuga and Oyekanmi (2014) identified poverty as a major problem militating against improvement of sustainable buildings. Odebiyi (2010) observed that poverty is more "devastating than the impact of climate change." Also Chemhuru (1998) listed some problems plaguing Africa and poverty is the number one he highlighted. Ajanlekoko (2001) observed that ownership of house is one of the priorities of micro levels for most households. But since most of the people belong to the low income earning groups, it has become very difficult or even unattainable to own house from the peanuts they earn. However, because they quest to own houses tops the scale of preference, quite a large number of them resort to adoption and use of sub-standard building materials without seeking for expertise service or opinion which eventually hinders sustainable development. This situation must have prompted Darko et al (2013) to say "the public are more concerned about the costs than the sustainability aspects"

In the phase of this obvious challenge, it becomes so impossible to achieve a significant improvement of sustainable buildings in Nigeria without intervention from government or firms, stakeholders, investors and policy makers. A better approach is the integrated approach, a kind of partnership between the government and the various land owners, or among firms and government arms or even government alone. It is the belief of this paper that the integrated approach to promoting the proposal, acceptance and construction of sustainable designs will yield so much benefits which shall meet the goals of sustainable architecture. Also, it shall also increase the percentage of those who have houses and this shall be a huge boost to the economy of the nations who adopt it, in this case Nigeria. If the people own the lands and also wants to go sustainable, but do not have the fund, support should be provided. This can be done in three ways. Landlords Loan, Lease or Low cost. Find detailed explanation in S-4 (support) below in the 7S approach to achieving sustainable architectural development in Nigeria.

##### 4.1 The Seven 'S' Approach to Achieving Sustainable Architectural Development in Nigeria

This study has proposed a conceptualized approach to promoting and increasing the number of sustainable buildings in Nigeria and also highlighted the need for synergy between building stakeholders, the government and even clients. This approach, best summarizes the points proposed in this paper both in aspects of campaign and funding. Each of these processes starts with a letter 'S' which explains the name S-Approach. The seven (7) 'S' are: Sensitization, Symmetry, Synergy, Support, Structure, Sustain and Submit. These processes have been designed in a systematic and hierarchical pattern such that one stage leads to another.

S1+ S2+S3 +S4+ S5+ S6+ S7 === Sustainable Architecture.



**Fig. 5 Seven 'S' Approach to Sustainable Architectural Construction, Adelore (2017)**

#### S-1: Sensitization

This is the first stage of the process. The reason why there have been a low compliance with the principles of sustainable architecture is because the information circulation is tilted towards one side, that is, it is one sided. It is as if experts are hoarding the information and its relevance among themselves. The clients and even the residence, either owners or tenants need to know what sustainable architecture is before they can begin to consider and prepare towards compliance.

The experts, architects, institutions, agencies and other key stakeholders of sustainable architecture should carry out this sensitization and the people who own or will own the houses and the residence of such houses or offices should be the targets.

According to development expert, Larner, (1963), developmental projects are first initiated by changing the existing mental structure of the intended beneficiaries of a project. Mental structure is a combination of the mode of thinking, personality, perspective, culture and general way of life of someone. It is also known as the field of experience. Larner (1963) further emphasized that for a new project or innovation to penetrate into people who have already developed their sense of taste and value, there is the need for proper information and sensitization through formal or informal education. The sensitization should be well structured such that it contains the meaning and nature, costs, economic, social and environmental importance of sustainable architectural buildings and the impending present and future dangers of non-compliance to the principles both to the users and the earth as whole. It might be in form of media campaigns, inter-group sensitization.

To sensitize the people both in the urban and rural society, there is a need for an integrated approach. An integrated approach is an approach to sustainable building development that adopts interpersonal, inter-group methods alongside various media campaigns. Meetings of landlords could be called to educate them while various radio or television programs should be developed to allow the people to hear, watch and ask questions about sustainable architecture.

**S-2: Symmetry**

Communication is a two way process and thus any communication that is devoid of feedback is incomplete. This is the stage where the clients, landlords, tenants or residence of the proposed sustainable buildings become the actors. Having listened to the sensitization, there sure must be questions or need for further clarifications. This stage is very important because feedback helps in evaluating whether or not the people are ready to bear the cost ( for construction or as tenants) that come with sustainable buildings. The experts at this stage must make sure they are patient enough to listen to the people and ensure all their answers are met. At the end of the sensitization, the listeners must be given quality time to ask their questions and adequate answers should be provided. If questions are not properly answered or doubts logically responded to, it might affect the essence of the information and make them stick to the old unsustainable building traditions.

**S-3: Synergy**

This is the level of consensus. This stage involves both the experts and clients simultaneously. It is at this stage that agreement, terms of agreement and eventual corporation, investment or partnership will be initiated. Consensus is very important to the overall achievement of sustainable architectural development because the architect is the soldier and the clients are the generals, except there is a level of agreement and acceptance of the principles, an architect cannot do anything.

The agreement can be in different levels. On the part of the land owners it might be that they will build sustainably on another property or renovate an existing building to become environmentally friendly. On the part of the tenants who may not have built any house, they may resolve to seek for the service of a sustainably inclined architect to design for them and build in like with sustainable principles once they acquire a landed property. Also, investors and government as well as other stakeholders must be ready to reach consensus with those who wants or intends to build both do not have the capital to do that. All these agreements, create an environment where sustainable practice is amplified and improved.

**S-4: Support**

This stage is a very important stage of all stages. There can be synergy or acceptance to go sustainable in the construction of houses or offices, but just after then the problem of finance surfaces. Research has shown that one of the factors militating against the propagation or improvement of sustainable housing in Nigeria is poverty. Construction of sustainable architectural buildings is relatively expensive especially at the initial stage and most of the people cannot afford it.

It is at this stage that the government and developers come in to salvage the situation. If the people own the lands and also wants to go sustainable, but do not have the fun, support should be provided. This can be done in four ways, Landlord, Loan, Lease and Low cost



**Fig. 6: Four 'L' to financing sustainable buildings, Adelore (2017)**

The first way is Landlords. The owners of lands or properties should finance the construction of their buildings themselves if they can afford the cost. This is the simplest and best option if the people can afford to provide all the financial requirements for their building. The second alternative is loan. The government can provide loans to interested land owners to build in a sustainable way with a very considerable interest rate and a good timeframe for the repayment, preferably in installment. Banks and other financial institutions can also come in to offer financial assistance to interested clients who cannot afford the initial cost. Once the loan is paid back, the house becomes the property of the client. One of the reasons people fail to take loans is fear of losing their properties if they are unable to pay back with the agreed timeframe. Thus, to eliminate that fear, fair policies need to be put in place which must be documented clearly. Another way is in form of lease. Lease is a form of contract or agreement between two parties over a property which in this case is a landed property. Architectural firms who are into renovations and development of site or even real estate investors fit in at this level. They can build the buildings and take over all income or share the income into percentage as will be agreed. The agreement must clearly show the cost, sharing ratio, and the duration of lease. For this case, the intended structure to be erected should not just be sustainable but also very flexible in such a way that it can be re-adapted for other usages without having to demolition and reconstruct which might lead to more use of resources.

Also, this paper is presenting is the low cost method. The government either at state or federal levels can come in here. Although the Nigeria Building Code has said that state governments should be in charge of buildings in their jurisdiction (NBC 2006), it will be better for federal government especially the Ministry of Works and Housing to be part of this financing strategy. The government should construct several blocks of flats in a very large land area and either sell it out or rent it to people at very low and affordable costs. Take for instance, if the Federal Government constructs like 2000 mix-used sustainable buildings in Badagry or Ikorodu or even Ajah where there are still large land areas, it simply means that Nigeria can boast of 2000 sustainable housing buildings.

**S-5: Structure**

This is the design and construction phase. Once the method of financing the building is determined, the architects can then develop sustainable designs to be constructed. In the design, it is very important to consider the three principles of sustainable building developed by Kim and Rigdon (1989) which are the economy of resources, the life cycle and the humane design. At this stage the material specifications must be purely sustainable and adequately fit into the Nigerian climate zone. Water must be utilized with good system for reuse of gray water and storm water management. Site planning and landscaping must be friendly to the human environment and then the reduction of pollution. The architect should also be more concerned with the pre-building and building phases at this level. The visual, thermal, and acoustic comforts of the users and the implication of their health must be considered.

**S-6: Sustenance**

Another word for this is maintenance. It is like the post building phase of the Life Cycle design developed by Kim and Rigdon (1989). It is the responsibility of the occupants of the building to judiciously utilize the building resources. Such as controlled use of natural water, use of energy efficient materials, daylighting, etc. At this stage, it must be emphasized that recommendations should be made to the occupants on how best to use the resources both during the day and night.

**S-7: Submission**

This stage is more concerned with residential buildings not financed by the owners of the landed property. Houses constructed by the government, developers, estate gurus or other investors should be handed over to the original owners once the payment is completed or the duration of lease expires or any other agreement reached by both parties at the construction stage.

**BENEFITS OF THE 'S' APPROACH TO SUSTAINABLE ARCHITECTURAL CONSTRUCTION**

It is strongly believed that adoption of this model by the Nigerian government or other developing third world countries struggling with financing sustainable construction, the following results will ensue.

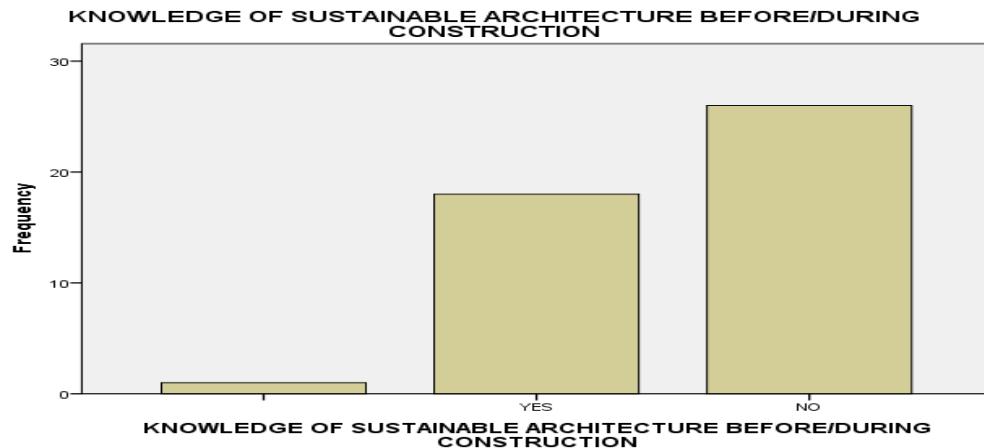
- i. Increased environmental and architectural awareness
- ii. Growth of house ownership by low income earners
- iii. Improvement in sustainable construction in Nigeria
- iv. Enabling environment for public and private partnership on sustainable architecture
- v. Reduction in environmental and hazards as a result of unsustainable construction
- vi. Attract foreign investors into the nation
- vii. Boost manufacturing and importation of energy efficient equipment
- viii. Discourage patronization of unsustainable building materials.

**5. METHODOLOGY**

This study was carried out through a quantitative methodology. Particularly, a survey method was used for the study. Fifty (50) land or property owners were selected via systematic random sampling technique from Abule Oja and Abule Ijesha areas of Yaba Local Government. The street comprises residential and commercial buildings but the paper focused on residential. Also a total number of fifty (50) registered architects with not less than five years professional experience were purposefully (non-random) selected for the study.

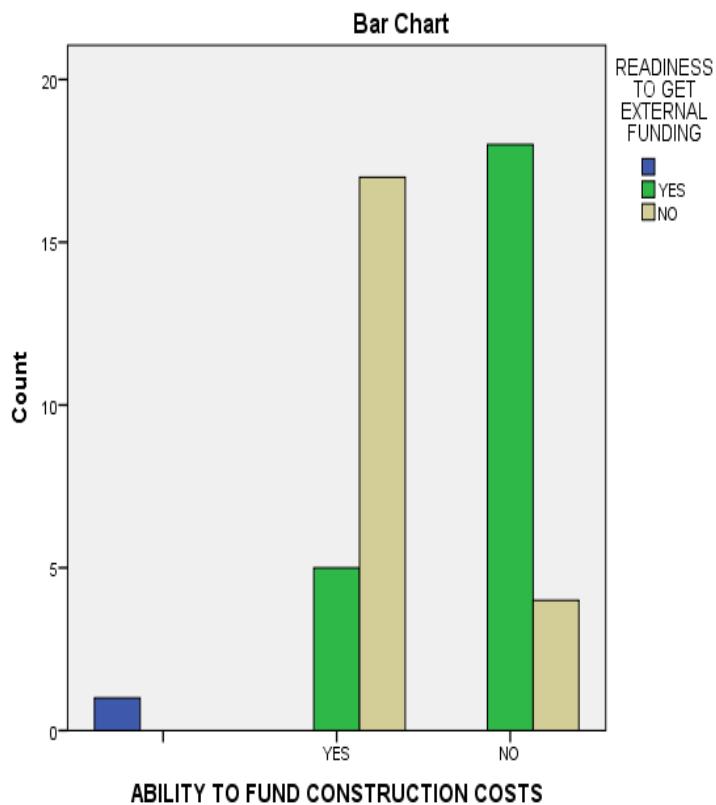
**6. DISCUSSION**

50 landlords and 50 practicing architects were studied quantitatively in this paper. 47% of the property owners sampled were family properties while 40% were owned by direct individuals. Majority of the buildings were constructed between 1997 and 2015 with both accumulating more than 14% of the sample size.



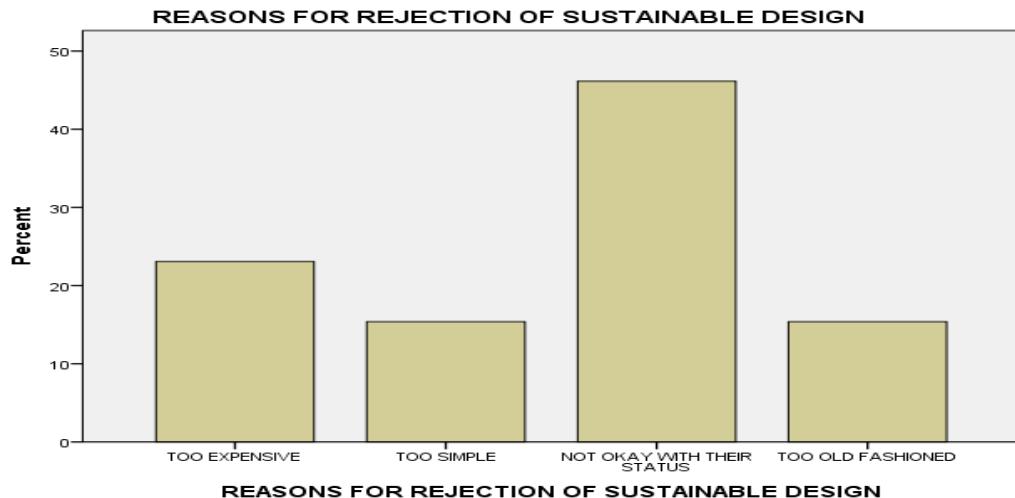
**Fig. 7: Knowledge of Sustainable Architecture Before/During Construction**

The SPPS revealed that 62% of the respondents consulted an architect for designs and construction but 58% had no idea of sustainable architectural construction before and during construction. Presently, 60% of the respondents say they are now aware of sustainable architectural designs and their significance with 40% getting to know through architects. 84% are ready to build sustainably but only half can afford the cost and high 48% ready to get external funding out of which 35% prefer loan while 12% would be ready to lease out for construction of sustainable designs.



**Fig. 8: Cross Tabulation of the property owners readiness to get external funds and their ability to foot the construction cost.**

Data from architects sampled revealed that majority know about sustainable architecture with different areas of focus, some, one most more than one areas of interest. However, only 70% have proposed sustainable design to clients out of which 38% rejected the designs for diverse reasons; 23% due to cost, 15% due to its simplicity, 46% say it's not equal to their socio-economic status while 15% say it's too old fashioned.



**Fig. 9: Reasons for Rejection of Sustainable Design**

Also, it was revealed that the studied architects do not always propose the designs that are sustainably fit for their clients. See table below:

**Table 1: CONSISTENCY OF SUSTAINABLE DESIGN PROPOSAL TO CLIENT**

	Frequency	Valid Percent
ALWAYS	4	8.3
SOMETIMES	2	4.2
REGULARLY	6	12.5
TYPE OF BUILDING	12	25.0
VERY RARE	24	50.0
Total	48	100.0
Missing System	1	
Total	49	

## 7. SUMMARY OF FINDING

From the simple statistical presentation above, it is clear that majority of the land owners without architectural background have no idea about sustainable architectural and most architects do not even propose these earth friendly designs to clients. It is therefore clear that those clients who refuse to accept sustainable designs do it because they do not have an idea about the significance of sustainable architectural designs. Also, poverty, a major construct in this paper, presented as inability to fund construction of buildings remain a strong reason for poor rate of sustainable buildings.

## **8. CONCLUSION AND RECOMMENDATIONS**

From the afore mention, it is therefore concluded that the more the increase in two sided awareness of the existence of sustainable architectural design and construction and its long term benefits to the clients, the higher the chance that the clients will accept or request for sustainable buildings. Also, improved support, based on legal conditions shall boost sustainable housing practices in Nigeria, particularly the residential housing sector.

Thus, this paper recommends the following:

- i. The Nigerian Institute of Architects and other regulatory body in Nigeria and by extension to other countries should organize workshops or seminars for landlords in Nigeria. The media at all levels will also reach out to those who have landed properties but are not yet landlords.
- ii. The federal ministry of works, housing and physical planning should make public service announcements to promote sustainable construction.
- iii. Unsustainable designs proposed for approval should be properly screen in line with standard sustainable parametres before approval or rejection.
- iv. Architects should also regularly propose standard aesthetical designs yet sustainable to clients.
- v. Investors, private stakeholders, government and other stakeholders in construction industries should partner to provide a refundable financial support to clients who cannot afford the cost and are willing.

## REFERENCES

1. Abisuga A. O & Oyekanmi O. O. (2014) "Organizational Factors Affecting the Usage of Sustainable Building Materials in the Nigerian Construction Industry" in Journal of Emerging Trends in Economic and Management Sciences (JETEMS) Vol. 5 (2) pp. 113-119 retrieved from [www.jetems.scholarlinkresearch.org](http://www.jetems.scholarlinkresearch.org) on 1<sup>st</sup> Oct. 2015.
2. Ajanlekoko j. S, (2001 ),Sustainable Housing Development in Nigeria – The Financial And Infrastructural Implication in International Conference on Spatial Information for Sustainable Development Nairobi, Kenya retrieved from <https://www.fig.net/resources/proceedings/2001/nairobi/ajanlekoko-CMWS11.pdf> on March 03, 2017
3. Centre for Affordable Housing Finance Africa: Housing Finance in Nigeria <http://housingfinanceafrica.org/countries/nigeria/>
4. Darko E., Kriti N. , Zeenat N., Andrew S., Varsha D., and Vijaya K.L. (2013) 'Green Building: Case Study' retrieved from [map-sa.net/docs/20140709-11-12-07.pdf](http://map-sa.net/docs/20140709-11-12-07.pdf)
5. Grondin, D. (1959). "Architecture and Climate", Moscow: Mir Publishers, Russia
6. Guner G. A. (2013) Design Parameters and Initiatives for Ecological and GreenDesign in Interior Architecture
7. Kim J.J and Rigdon B. (1998) Introduction to Sustainable Design, a publication of the National Population Centre for Higher Education; University Ave, Ann Arbor.
8. Naoum S.G and Mustapha F.H (1989) Influences of the Clients, Designers and Procurement Methods on Project Performance (pp. 221-228) retrieved from [www.irbnet.de>conda>CIB12593](http://www.irbnet.de>conda>CIB12593)
9. Mandler, S. Odell, W. (2000) "The HOK Guidebook to Sustainable Design", John Wiley & Sons, Inc.New York, 2000.
10. Munch J. (2009) 'Sustainability Assessment of Buildings: A Comparative Analysis of Three Methods: the BRE Environmental Assessment Method, the German Sustainable Building Certificate and the Swan label for Small Houses' Masters' Thesis, Management Engineering, Technical University of Denmark.
11. Sustainable Tropical Building design Guidelines for Commercial Buildings Cairns Regional Council (2011)