Stakeholders' Roles in the Delivery of Sustainable Housing Projects in Lagos State, Nigeria

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Article

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Abstract: The role stakeholders play is fundamental to the realisation of sustainable development. Consequentially, there is need for the major stakeholders to be fully aware of their respective roles. Thus, this paper focused on assessing the Stakeholders roles in sustainable housing projects in Lagos State, Nigeria. Structured questionnaire survey was used to collect data from 259 stakeholders involved in sustainable housing projects in Lagos State, Nigeria. A total of 203 responses were obtained, representing 78% response rate. Primary data regarding the extent of stakeholders awareness of their roles in sustainable housing were collected. The data collected were analysed using mean ranking analysis and analysis of variance (ANOVA). The data collected were used to determine the extent of awareness of the stakeholders' role in sustainable housing projects in Lagos State, Nigeria. The results showed that all the stakeholders were aware of their respective roles in the delivery of sustainable housing projects and were highly conscious of them. Although their extent of awareness was at varying levels, there was no statistically significant difference of opinions amongst the different categories of stakeholders in the delivery of sustainable housing projects. The study concluded that Government and Project Managers have key roles to play as major stakeholders in the delivery of sustainable housing projects. The knowledge of the awareness of stakeholders' roles in the delivery of sustainable housing project provides invaluable information to stakeholders regarding the important roles to focus attention on in achieving sustainable housing projects. The study provides a veritable basis for assessment of sustainable housing project in Lagos State, Nigeria.

Keywords: delivery; housing; projects; roles; stakeholders; sustainability

1. Introduction

In Nigeria, construction is a major sector and the role stakeholders play is fundamental to the realisation of sustainable development. However, it is noted that some of the stakeholders neither know nor understand what is expected of them. This study focused more on the problem of 'who'. i.e., what stakeholder is expected to do what in influencing the implementation of sustainable housing projects? Proper management of the stakeholder largely accounts for the success of projects particularly that of complex projects. The strong cooperation of stakeholders is necessary for the success of sustainable housing projects [1]. Sustainable housing is defined as the creation of structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from design to construction, operation, maintenance, renovation and deconstruction [2]. In other to achieve sustainable housing, there is need for the major stakeholders to be fully aware and involved.

A stakeholder "is an individual, group, or organization who may affect, be affected by, or perceives itself to be affected by a decision, activity or outcome of a project. Stakeholders may be actively involved in the project or have interests that may be positively or negatively affected by the performance or completion of the project" [3]. Studies have shown that stakeholders have a

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significant role to play in the adoption of sustainable housing projects [4]. These stakeholders are classified into internal and external. Internal stakeholders are further classified into demand side (client, financiers, client representatives and end users) and supply side (architects, quantity surveyors, structural engineers, main contractors, sub-contractors and suppliers). External stakeholders are classified into private (local community, local residents, conservationists, environmentalist and archaeologists) and public (regulatory agencies and government agencies).

Stakeholder's influence is dependent on stakeholders' capabilities and roles on a project; therefore, it is germane for stakeholders to understand their roles in order to properly execute their functions for good project performance. The performance in this context as highlighted by [5] in the form of completion within cost, the rate of rework for faulty structures, accomplishment of the project within the stipulated time, the amount of energy efficiency in the building projects, stakeholder's satisfaction, the overall sustainability rating achieved on the project as well as volume of production of sustainable housing projects. In essence, sustainable housing developments have least negative environmental effect through reduction in the consumption of resources and energy, lessen pollution, and expand economic efficiency and social unity [6,7].

It is germane to establish the level of awareness of stakeholders' role by stakeholders. In the work of [8] it was established that stakeholders have capabilities and power. The study attempted to identify and prioritise stakeholders with respect to their influence on a project based on their roles and contributions. However, it is not clearly stated in the study whether stakeholders agree with and understand their roles and contributions before judging their influence based on their contributions to a project. [9] also investigated the role of stakeholder-based management in project success. The work focused on how stakeholders can influence project success through their roles but majority of the stakeholders do not have the understanding of what is expected from them. However, it is very essential for stakeholders to identify and also understand their roles, hence, the reason for this study.

2. Literature Review

2.1. Types of Stakeholders

Normally, stakeholders are of two categories, these are: internal stakeholders and are fully involved in the execution of project. The second category are external stakeholders who are affected by the outcome of the project. Nevertheless, following on the suggestions of [10] stakeholders are best categorized by owing of one or more of three qualities: ability (power) to influence, rightfulness of the relationships amongst stakeholder, and the perseverance of claim. The power quality is the ability of an individual to organize social and political services as well as their power to withdraw belongings from the organization or a team [11]. Lawfully, attribute has two dimensions: normative and derivative [12]. Normative stakeholders are those with moral obligation to the organization, an obligation of stakeholder justice due to other social actors just by feature of being human. Derivatively, legitimate stakeholders are the ones whose activities must be monitored by managers due to their potential impact upon normative stakeholders. Legitimacy is a social good, that is something greater and more shared than ordinary self-assumption, and they can also be explained and agreed upon differently at various levels of social group [10]. Legitimacy could, therefore, be defined by referring to stakeholders that stand some sort of risk relating to the society, either advantageous or injurious. The salience of a stakeholder is dependent on how much a team or an organization depends on that stakeholder compared to other stakeholders. Given this, stakeholders will be more important than the other at different points [13].

Regarding sustainable construction, [14]. categorised four stakeholder groups, they are; (i) regulators, statutory consultees, service providers and councilors; (ii) non-statutory consultees, interest groups and individuals; (iii) property developers and their professional advisors and developer interests; and (iv) end users. Conversely, [15]. and [16]. grouped construction-related stakeholders into two, namely: Internal stakeholders i.e. employees, customers, end-users, financiers, architects, engineers, contractors, trade contractors, material suppliers, etc. and external stakeholders

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i.e. local residents, landowners, environmentalists, archaeologists, regulatory agencies, local and national governments, etc .Discussing further, [10] identified seven classes of stakeholders based on the pattern of possession of the aforementioned attributes of power, legitimacy and urgency. Mitchell's submission is presented in Table 1.

Table I. Classes of stakeholders.

SN	Stakeholder Classes	Brief Description
1	Dormant	Their power is hardly used, they have no legitimate or urgent claim
2	Discretionary	own legitimacy but does not have power or, no force to be pro-active
3	Demanding	own urgent claim but does not have power and no legal connection
4	Dominant	own power and legitimacy, position often matters
5	Dangerous	No legal right but power and urgency, maybe forceful
6	Dependent	Possess legitimate and urgent claims but no power, uses other's power
7	Definitive	Possess power and legitimacy, often part of dominant coalitions, urgent claims receive quick response

Source: [10].

Sustainable procurement involves the contributions of various stakeholders. Freeman (1984) defined stakeholders as "groups or individuals who can have effects on, or are affected by, the objectives of an organization". Similarly, according to the Project Management Institute (PMI) stakeholder "is an individual, group, or organization who may affect, be affected by, or perceived itself to be affected by a decision, activity or outcome of a project. Stakeholders may be actively involved in the project or have interests that may be positively or negatively affected by the performance or completion of the project" [2].

In addition, based on the submissions of [17] stakeholder can be classified as internal and external stakeholders. The internal stakeholders work concertedly to ensure the delivery of the project while the external stakeholders are the individuals or group of people that are affected by the project in a significant way, example is end users. Based on further explanations, it can be said that external stakeholders don't participate directly in project operations but place needs and make provisions as appropriate. Irrespective of stakeholder classification, [18] submitted that they are critical to the success of a project. [8] emphasized the need to understand and effectively utilise the powers and influence of various stakeholders. There is a huge need to analyse the influence of stakeholders so as to better manage the decision making and execution process.

2.2. Construction Stakeholders

In a study on stakeholder impact analysis, [19] identified a range of stakeholders in different types of projects. In a housing project, the identified external stakeholders were Municipality/Permit granting government agency, administrative board, national government, community residents, community/interest groups, the media. In another case project by the same author, national board of housing, rescue service agency, and another government agency was identified. In another case, political groups and community interest groups were identified. Also, [20] developed a stakeholder model that identified project leader, project sponsor, client organization, end users, suppliers, subcontractors, community and external independent concern groups as construction project stakeholders. Typical of any construction project, the interests in the project does not only reside with the client and the professional team. Based on findings from the literature, the professional team on

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a sustainable building project is very similar to the team usually engaged on a conventional project but with a much more significant focus on sustainability matters. The professionals include: Architect, Quantity Surveyor, Civil/Structural Engineer, Project Manager, Mechanical and Electrical service engineer and Builder. The increasing form of fragmentation in construction projects contributes to the complexity of sustainable building procurement; this underlines the importance of firm coherence and incorporation of all stakeholders (internal and external) towards a satisfactory project performance. Figure 1.0 sectionalised all participants in the construction industry and which are; government, developers, clients, buyers/end users, contractors, consultants (architects, other designers, engineers, quantity surveyors) and manufacturers/suppliers. It is essential for construction workers to understand sustainable construction properly so as to give assurance that their distinct preparations and the selections they make that determine the actions of others individuals, contributes as little as possible to the whole problem on the atmosphere [21].

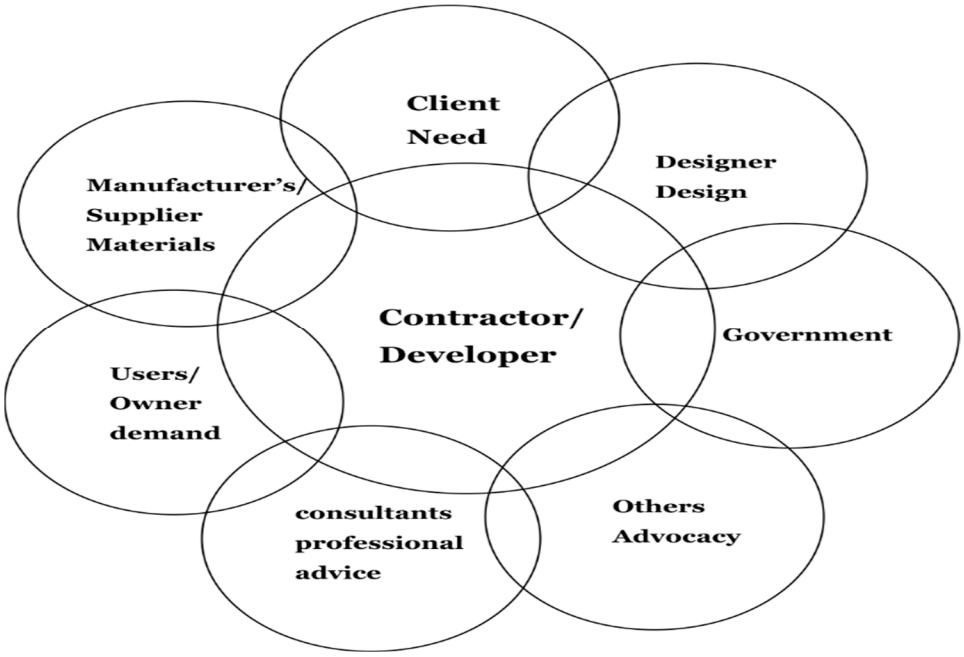

Figure 1.0. Stakeholders for sustainability, Source: [37].

Sustainable procurement involves the contributions of several stakeholders with diverse social, environmental and economic understandings and benefits. To be able to maintain a common focus and ensure the accomplishment of a project, effective communication needs to be maintained among all stakeholders [22]. [23] endorsed the continuous engagement of all stakeholders during the project lifecycle so as to frequently meet their requirements and expectations. A debated example is the Guangz-hou-eShenzhen Hong Kong Express Rail Link Project (Hong Kong section). Despite the socioeconomic awareness of the project to the Hong Kong Special Directorial Region and a general public investigation showed by the government previously, it attracted unusual disapproval from a lot of stakeholders.

The stakeholders are the occupants, the idealistic age group, politicians, regulators, and professionals among others disapproved over family value issues, environmental effect, and value-for money [24]. The "Vicious Circle of Blame" is another relevant concept to the stakeholders' roles in the delivery of sustainable projects. It emphasizes the adverse impacts of blaming each other for project failures. Stakeholders are accountable and responsible for their actions instead of engaging in a blame game. For project success, collaboration and corporation are important aspects and blaming others often tends to create a hostile environment that hinders project progress. By laying the focus on learning and improvement, stakeholders can change setbacks into growing opportunities for project success. Finally, by breaching the vicious circle of blame success and sustainability of projects

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can be promoted while creating benefits to both the environment and the community [25]. Figure 2.0 indicates the Vicious Circle of Blame mentioned by [25].

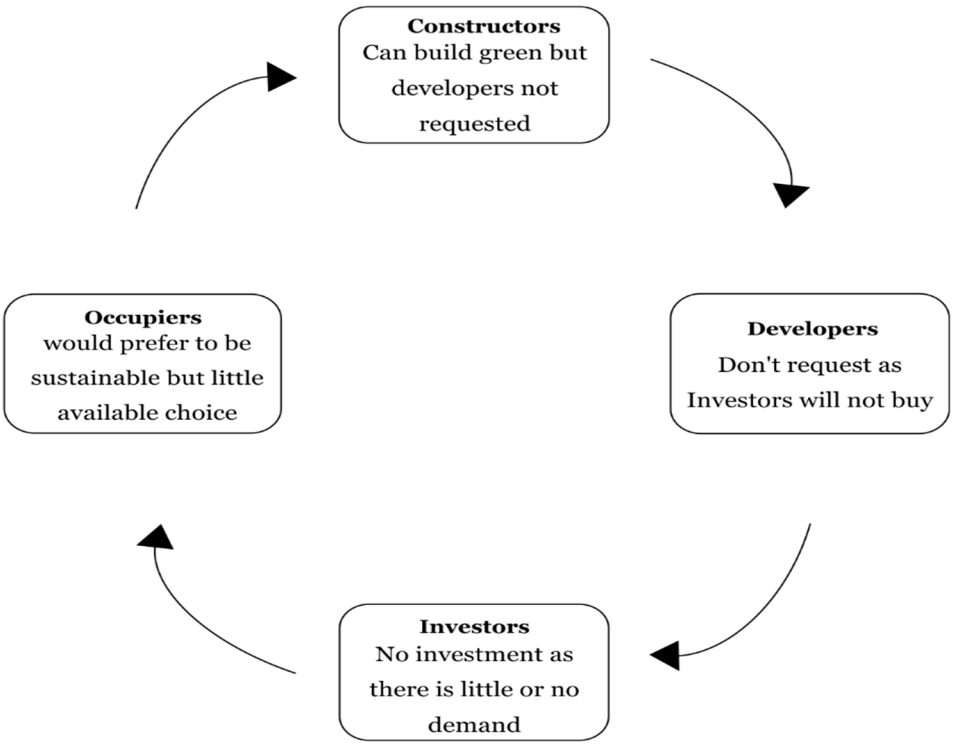

Figure 2.0. Vicious circle of blame**.** Source: [25]**.**

2.3. Influence of Stakeholders on Sustainable Project Delivery

Submissions in the literature such as power/interest model highlights the strength of the influence of stakeholders on the outcome of projects. Basically, stakeholders affect project outcomes via their duties and other forms of contributions on a project. Mendelow's submission is discussed in the next section. [26] proposed a two-dimensional grid for classifying stakeholders' influence. The proposition is popularly called "Mendelow power/interest model". This model classifies stakeholders into four groups: (1) High power/high interest, (2) High power/low interest, (3) Low power/high interest and (4) Low power/low interest. The model (Figure III) looks simply but its underlying principles is great. The theoretical model describes the general influence of a stakeholder to be based on the power and the interest of the stakeholder.

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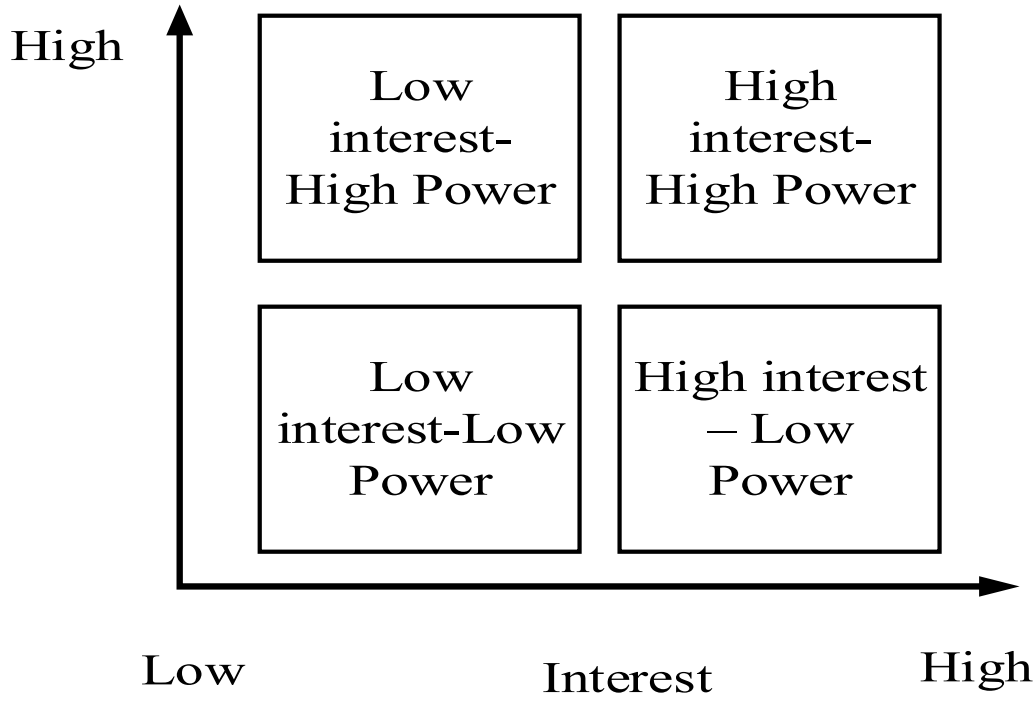

Figure 3.0. Power/interest Matrix**.** Source: [26].

The first perspective is that Mendelow's submission underlying the existence of varying influence by stakeholders on a sustainable housing project. This justifies the conception that stakeholders have deferring influences on the performance of sustainable housing projects. Two, it shows that stakeholders have differing influence on the attainment of the respective stakeholder factors, therefore, the stakeholder with a greater influence will be assigned to take care of the stakeholder factor. How each of the stakeholder factors turn out to affect the project outcome will be attributed as the contribution of the stakeholder to performance.

In the literature, influence is perceived from different perspectives. For instance, [26] opined that influence represents power and power can be measured by 'hierarchical position', 'intelligence, skills and experience i.e. knowledge level', "saliency/importance in the process", and assets i.e. resources of the stakeholder. [36] developed a model for describing stakeholder influence on three theoretical pillars of resource dependency, social network perspective and institutional approach.

2.4. Roles of stakeholders in the Delivery of Sustainable Housing Projects

The construction industry is majorly defined as a principally fragmented sector because of the combination of various stakeholders. The disintegration and complication of communications amongst the various stakeholders with different desires contributes to an already complicated SC agenda which makes implementation difficult [14]. Stakeholders relevant to sustainable construction have been grouped. They comprise of the construction contractor, developers, client, government agency and construction consultants. The roles of these stakeholders are discussed in this section.

2.4.1. Contractor

Contractors constitute the major contributors to environmental and social challenges through their activities. Therefore, they are perceived to have an obvious obligation of leading to achieving a sustainable environment [27]. [28] and [29] identified the following as the roles of contractors in the delivery of sustainable housing projects; taking the lead in achieving a sustainable society through advocacy and other steps, complying with sustainability laws in the operation of their firms, advocating for the delivery and patronage of sustainable buildings, participating in setting sustainable demands and goals, efficiently meeting demands for sustainable practices in the market.

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[27] also identified other roles of contractors to include adopting ethical sourcing strategies for sustainable projects, complying with materials specifications and suggesting better options where possible, simulation of design scenarios to attain sustainability targets and studying and interpreting the supply chain and sourcing standards for sustainable construction.

2.4.2. Government

Government at national and local levels are in a major standpoint to provide laws, guidance and motivations that can coordinate the activities of the construction industry. In addition, governments all over the world often are the major client of the construction industry [14]. From the beginning of the sustainability program, virtually every effort was originated by Governments or focused at them. This is shown by the fact that a several related sustainability investigations in the civilized world make reference to a government initiative as the foundation for modification phenomena being researched [28]; [29]. A better way to pursue sustainable change is for government involvement along the submission of [30] by engaging the essential gravity and motivations on the segment. [31] identified the roles of government regulatory agencies in achieving sustainable housing project to include; providing relevant legislations promoting sustainable constructions, providing guidance favouring sustainable construction, providing and applying necessary incentives for sustainable compliance, initiating and directing sustainability agenda during construction period, funding sustainability teaching, research and development to sensitize the society on the importance of sustainable construction. [30] also identified the roles of government agencies to include design iterations towards sustainability target, evaluating design decisions against sustainability assessment methodologies, monitoring project execution for compliance with agreed sustainability standards, obtaining necessary approvals promoting sustainable construction, drafting and appraising the adequacy of procurement methods and options for sustainable construction. However, some of the government roles are not well known to the government agencies and this is in line with [32] who opined the non-awareness of the following roles; drafting and appraising the adequacy of contractual terms in the light of sustainable construction, outline dispute resolution procedures available for sustainable construction, enforcing ethical sourcing standards for sustainable construction, informing stakeholders on choices of sustainable construction materials, monitoring new knowledge on sustainability and ethical supply chain and partnering with stakeholders to drive public consciousness.

2.4.3. Developers

Set of respondents in the UK construction industry by [29] concluded that developers are the most significant stakeholder in defining SC practices. This approval is hypothetically tricky as some findings such as [31] had proposed that the developers' low level of awareness of SC was a hindrance to SC. Therefore, there are some worries as to if developers have awareness about SC so as to request for it, or if they are concerned adequately to make a difference. [33] identified the roles of developers in the achievement of sustainable housing project to include the following; interest in sustainable construction, contributing sustainable ideas at the briefing stage, constantly updating knowledge on sustainable building, arranging for funding and agreement of funding terms with the other stakeholders, commissioning relevant professionals knowledgeable in sustainable construction, adhering to sound professional advice promoting sustainable construction. Designing sustainably, floor green ratio, harmless gas emissions, clear specification of sustainable features, characteristics, materials and methods, evaluating price decisions in line with sustainable project objectives and defining information required from sustainable stakeholders. [31] also identified the roles of developers to include; appraisal of sustainability credentials of design professionals, identifying and allocating risks associated with sustainable buildings, preparing occupancy guide for end users, preparing post-construction maintenance plan incorporating sustainable features, appraising client's fund acquisition decisions and advising accordingly on benefits of sustainable projects, facilitating stakeholder engagement on general and sustainability matters and compliance with ethical sourcing of sustainable construction materials.

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3. Methodology

3.1. Study Population

The study population comprised of stakeholders involved in LEED and EDGE sustainable housing projects in Lagos State, Nigeria. The identified projects were described as sustainable because they have adopted sustainability principles and obtained an international sustainability rating certification(s) from Leadership in Energy and Enviromental Design (LEED) and EDGE between 2010 and 2020. The target population of respondents comprised of all the stakeholders that participated essentially on the supply side of project delivery. This consists of Architects, Structural Engineers, Quantity Surveyors, Project Managers, Electrical Engineers, Mechanical Engineers and Builders and Government Regulatory Agencies.

3.2. Data Collection

Structured questionnaire survey were distributed to identified 259 stakeholders involved in sustainable housing projects in Lagos State, Nigeria. A total of 203 responses were returned, representing 78% response rate. Primary data regarding the level of importance of key performance indicators on the delivery of sustainable housing projects were collected. The data collected were analysed using mean score analysis alongside analysis of variance (ANOVA). The data collected were used to determine the key performance indicators of sustainable housing projects in Lagos State, Nigeria. The target population of respondents comprised of all the stakeholders that participated essentially on sustainable housing projects in the study area. This consists of Architects, Structural Engineers, Quantity Surveyors, Project Managers, Electrical Engineers, Mechanical Engineers and Builders and Government Regulatory Agencies. The mean score and analysis of variance was adopted for this study. A 6-point Likert-type scale was employed for data collection and a mean analysis was done using the mean score analysis formula given as:

$$MS = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1 + 0n_0}{n_5 + n_4 + n_3 + n_2 + n_1 + n_0} \quad (1)$$

where MS = Mean Score

Where n_0= no of respondent who answered “Not applicable”

n_1 = no of respondent who answered “very low”

n_2 = no of respondent who answered “low”

n_3 = no of respondent who answered “Moderate”

n_4 = no of respondent who answered “high”

n_5 = no of respondent who answered “very high”

ANOVA was used to examine the difference in perceptions of the respondents based on the identified stakeholders.

4. Results

4.1. Respondents’ General Information

Table II below displayed the respondents’ years of experience in sustainable construction and number of projects handled in the last ten years. The Table reveals 66% of the stakeholders had less or equal to 5 years of experience in sustainable construction, 27.1% had between 6 to 10 years of experience, 5.4% had between 11-15 years of experience, 0.5% has between 16-20 years of experience while 1% had between 21-25years of experience; this is an indication that over 70% of the respondents had up to 10years of experience in sustainable construction in the study area, this may not be surprising because sustainable construction is still coming up in Nigeria and not many projects are within the status of sustainable construction, hence the findings of this study. Considering the number of projects handled in the last 10 years, the result of analysis showed that 63.1% of the respondents had handled more than 5 projects in the last ten years while 36.9% of the respondents

had handled less or equal to 5 projects in the last ten years. From Table II which reveals the general characteristics of the respondents, it is evident that the respondents to the questionnaire survey are well educated, professionally qualified and experienced to a good degree in sustainable construction. As such, it can be inferred that the data received from them can be relied upon for this study.

Table II. Profile of Respondents.

Background Information	Parameter	Frequency	Percent	Mean
Type of Organization	Government Agency	39	19.21	
	Contractor	74	36.45	
	Developer	90	44.33	
	Total	**203**	**100**	
Designation of Respondent	Architects	20	9.85	
	Quantity Surveyors	62	30.54	
	Engineers	25	12.32	
	Builders	30	14.78	
	Project Managers	27	13.30	
	Government	39	19.21	
	Total	**203**	**100**	
Background Information				
Years of Construction Industry Experience	1-5 years	48	23.6	11 years
	6-10 years	80	39.4	
	11-15 years	26	12.8	
	16-20 years	26	12.8	
	21-25 years	23	11.3	
	Total	**203**	**100**	
Years of Experience on Sustainable Construction	1-5 years	134	66	5 years
	6-10 years	55	27.1	
	11-15 projects	11	5.4	
	16-20 years	1	0.5	
	21-25 years	2	1	
	Total	**203**	**100**	
Professional Membership of the Respondents	Probationers	52	25.6	
	Corporate Members	111	54.7	
	Fellows	40	19.7	
	Total	**203**	**100**	
Number of Projects handled in the last ten years	1-5 projects	75	36.9	
	6-10 projects	48	23.6	
	11-15 projects	43	21.2	

16-20 projects	17	8.4	10 projects
21-25 projects	20	9.9	
Total	**203**	**100**	

4.3. Discussion of Findings

The objective of this research was set to assess the extent of stakeholders' awareness of their roles in the delivery of sustainable housing projects in Lagos State, Nigeria. The study considered three categories of stakeholders (Government, Developers and Contractors) and examined their roles based on these categories. In order to achieve the objective, the various roles of different stakeholders in the delivery of sustainable housing projects were defined and respondents were requested to provide their experience on the extent of their awareness of these roles. The scorings provided by the respondents were subjected to Mean Score Analysis (MSA) and Analysis of Variance (ANOVA). The result obtained is as presented in Table III.

The result from Table III showed that all the identified roles had mean values of above 3.00 which signifies that the respondents have moderate to high extent of awareness of these 43 stakeholders' roles in sustainable housing projects (3.11≤MS≤3.52). This implies that the stakeholders were aware of these roles in the delivery of sustainable housing projects and could be conscious of them. Taking the different categorized roles into consideration, on contractors' awareness of their roles, Table III shows that respondents in government organisations perceive that complying with the sustainability laws in the operation of their firms is the role which contractors are mostly aware of. It is closely followed by complying with material specifications and suggesting better options where possible, taking the lead in achieving sustainable society through advocacy and other steps, participating in setting sustainable demands and goals, adopting ethical sourcing strategies for sustainable targets.

Similarly, respondents in developers' organisations perceived that taking the leads in achieving a sustainable society through advocacy and other steps and advocating for the delivery and patronage of sustainable buildings are the roles contractors are mostly aware of. These are followed by complying with material specifications and suggesting better options where possible, complying with sustainability laws in the operation of their firm, participating in setting sustainable demands and goals. Contractors perceive that they are mostly of complying with material specifications and suggesting better options where possible with mean score. it is closely followed by taking the lead in achieving a sustainable society through advocacy and other steps, advocating for the delivery and patronage of sustainable buildings and efficiently meeting demands for sustainable practices in the market, complying with sustainability laws in the operations of their firms.

For the overall, the five (5) top Contractors' roles with high extent of awareness include: taking the lead in achieving a sustainable society through advocacy and other steps, complying with material specifications and suggesting better options where possible and complying with sustainability laws in the operation of their firms; advocating for the delivery and patronage of sustainable buildings; and participating in setting sustainable demands and goals. considering various categories of stakeholders surveyed, it is observed that the result followed the same trend although not without little variations.

On government awareness of their roles, Table III also shows that respondents in contractors organisations perceive that monitoring of project execution for compliance with agreed sustainability standards is the role which government are mostly aware of with a mean score. it is closely followed by initiating and directing sustainability agenda during construction period and providing guidance favouring sustainable construction, evaluating design decisions against sustainability assessment methodologies, providing and applying necessary incentives for sustainable compliance. Similarly, respondents in developers' organisations perceive that initiating and directing sustainable agenda during construction agenda is the role government is most likely aware of. These are followed by monitoring project execution for compliance with agreed sustainability standards and providing guidance favouring sustainable construction, evaluating design decisions, obtaining necessary

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approvals promoting sustainable construction. However, government perceive their roles differently. They perceive obtaining necessary approvals promoting sustainable construction with as the most aware of. This is followed by informing stakeholders on choices of sustainable construction materials, providing relevant legislations promoting sustainable constructions. enforcing ethical sourcing standards for sustainable constructions, funding sustainability teaching, research and development to sensitise the society the importance of sustainable construction.

For the overall, the top five (5) government roles with high extent of awareness as assessed by all respondents include initiating and directing sustainability agenda during construction period, monitoring project execution for compliance with agreed sustainability standards, providing guidance favoring sustainable construction, evaluating design decisions against sustainability assessment methodologies and obtaining necessary approvals promoting sustainable construction. Contrary to the rankings of the extent of awareness of these government roles under Contractors and Developers, the Government category of stakeholders showed variations in the rankings of these roles.

On developer's awareness of their roles, Table III also shows that respondents in government organisations perceive that contributing sustainable ideas at the briefing stage is the role which developers are mostly aware of with a mean score. This is closely followed by evaluating price decisions in line with sustainable project objectives, appraisal of sustainability credentials of design professionals, compliance with ethical sourcing of sustainable construction materials, adherence to sound professional advice promoting sustainable construction. Similarly, respondents in contractors' organisations, perceive that contributing sustainable ideas at the briefing stage, adherence to sound professional advice promoting sustainable construction, developing interest in construction are the roles developers are mostly aware of with a mean score.

Table III. Extent of Awareness of Roles of Stakeholders in the delivery of sustainable housing projects based on type of organization.

S/N	Stakeholders' Roles	All		Government		Contractors		Developers		ANOVA	
		MS	R	MS	R	MS	R	MS	R	F Stat	P value
CONTRACTORS' ROLES											
1	Taking the lead in achieving a sustainable society through advocacy and other steps	3.52	1	3.46	3	3.46	2	3.59	1	.338	.714
2	Complying with material specifications and suggesting better options where possible	3.50	2	3.49	2	3.50	1	3.51	3	.006	.994
3	Complying with sustainability laws in the operation of their firms	3.50	2	3.72	1	3.38	5	3.50	4	1.316	.270
4	Advocating for the delivery and	3.47	4	3.36	7	3.39	3	3.59	1	1.088	.339

	patronage of sustainable buildings										
5	Participating in setting sustainable demands and goals	3.43	5	3.46	3	3.35	6	3.49	5	.334	.716
6	Efficiently meeting demands for sustainable practices in the market	3.39	6	3.28	9	3.39	3	3.44	6	.324	.724
7	Adopting ethical sourcing strategies for sustainable projects	3.37	7	3.41	5	3.34	7	3.39	7	.076	.927
8	Simulation of design scenarios to attain sustainability. Targets	3.30	8	3.38	6	3.30	8	3.26	9	.135	.874
9	Studying and interpreting the supply chain and sourcing standards for sustainable construction	3.28	9	3.33	8	3.24	9	3.28	8	.067	.936
10	Update ethical/responsible manufacturing and sourcing standards	3.14	10	3.26	10	3.05	10	3.17	10	.375	.688
GOVERNMENT ROLES											
1	Initiating and directing sustainability agenda during construction period	3.42	1	3.28	5	3.36	2	3.53	1	.901	.408
2	Monitor project execution for compliance with	3.38	2	3.26	8	3.38	1	3.44	2	.332	.718

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	agreed sustainability standards											
3	Providing guidance favouring sustainable construction		3.36	3	3.18	15	3.36	2	3.44	2	.827	.439

Table III. Extent of Awareness of Roles of Stakeholders in the delivery of sustainable housing projects based on type of organization (Cont'd.).

S/N	Stakeholders' Roles	All		Government		Contractors		Developers		ANOVA	
		MS	R	MS	R	MS	R	MS	R	F Stat	P value
	GOVERNMENT ROLES (cont'd)										
4	Evaluating design decisions against sustainability assessment methodologies	3.35	4	3.21	10	3.34	4	3.42	4	.447	.640
5	Obtain necessary approvals promoting sustainable construction	3.34	5	3.44	1	3.27	6	3.36	5	.241	.786
6	Providing and applying necessary incentives for sustainable compliance	3.29	6	3.28	5	3.32	5	3.26	7	.077	.926
7	Inform stakeholders on choices of sustainable	3.27	7	3.36	2	3.22	7	3.27	6	.170	.844

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	construction materials										
8	Providing relevant legislations promoting sustainable constructions	3.23	8	3.33	3	3.22	7	3.20	12	.183	.833
9	Drafting and appraising the adequacy of contractual terms in the light of sustainable construction	3.21	9	3.18	14	3.20	9	3.22	10	.016	.984
10	Enforcing ethical sourcing standards for sustainable construction	3.20	10	3.31	4	3.14	12	3.20	12	.248	.781
11	Outline dispute resolution procedures available for sustainable construction	3.19	11	3.15	16	3.12	13	3.26	7	.259	.772
12	Design iterations towards sustainability target	3.17	12	3.21	10	3.08	14	3.22	10	.312	.733
13	Partner with stakeholders to drive public consciousness	3.17	12	3.21	10	3.05	15	3.24	9	.486	.616
14	Drafting and appraising the adequacy	3.16	14	3.21	10	3.16	10	3.14	14	.032	.969

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	of procurement method options for sustainable construction										
15	Monitor new knowledge on sustainability and ethical supply chain	3.16	14	3.26	8	3.15	11	3.13	15	.147	.863
16	Funding sustainability teaching, research and development to sensitize the society the importance of sustainable construction	3.11	16	3.28	5	3.03	16	3.10	16	.543	.582

Table III. Extent of Awareness of Roles of Stakeholders in the delivery of sustainable housing projects based on type of organization (Cont'd.).

S/N	Stakeholders' Roles	All		Government		Contractors		Developers		ANOVA	
		MS	R	MS	R	MS	R	MS	R	F Stat	P value
DEVELOPERS' ROLES											
1	Contributing sustainable ideas at the briefing stage	3.37	1	3.46	1	3.32	1	3.38	2	.173	.841
2	Adherence to sound professional advice promoting	3.35	2	3.36	5	3.32	1	3.37	3	.024	.976

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	sustainable construction											
3	Constantly updating knowledge on sustainable building	3.34	3	3.31	7	3.24	8	3.44	1	.594	.553	
4	Interest in sustainable construction	3.33	4	3.23	13	3.32	1	3.37	3	.196	.822	
5	Clear specification of sustainable features, characteristics, materials and methods	3.33	4	3.33	6	3.31	4	3.34	5	.015	.985	
6	Evaluating price decisions in line with sustainable project objectives	3.30	6	3.38	2	3.30	5	3.26	10	.151	.860	
7	Appraisal of sustainability credentials of design professionals	3.30	6	3.38	2	3.22	11	3.32	6	.300	.741	
8	Design sustainably – floor, green ratio, harmless gas emissions etc	3.28	8	3.28	11	3.27	7	3.29	8	.004	.996	

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9	Identifying and allocate risks on associated with sustainable buildings	3.27	9	3.15	16	3.28	6	3.31	7	.239	.788
10	Commission relevant professionals knowledgeable in sustainable construction	3.25	10	3.26	12	3.23	10	3.27	9	.019	.981
11	Prepare post-construction maintenance plan incorporating sustainable features	3.24	11	3.31	7	3.24	8	3.21	12	.079	.924
12	Define information required from sustainable stakeholders	3.21	12	3.31	7	3.22	11	3.17	15	.197	.821
13	Appraising client's fund acquisition decisions and advise accordingly on benefits of sustainable projects	3.21	12	3.31	7	3.18	13	3.19	13	.170	.844

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Table III. Extent of Awareness of Roles of Stakeholders in the delivery of sustainable housing projects based on type of organization (Cont'd.).

S/N	Stakeholders' Roles	All		Government		Contractors		Developers		ANOVA	
		MS	R	MS	R	MS	R	MS	R	F Stat	P value
	DEVELOPERS' ROLES (Cont'd)										
14	Compliance with ethical sourcing of sustainable construction materials	3.20	14	3.38	2	3.11	16	3.19	13	.625	.536
15	Facilitating stakeholder engagement on general and sustainability matters	3.17	15	3.13	17	3.12	15	3.23	11	.195	.823
16	Prepare occupancy guide for end users	3.15	16	3.21	15	3.14	14	3.14	17	.041	.960
17	Arranging for funding and agreement of funding terms with the other stakeholders	3.11	17	3.23	13	2.97	17	3.17	15	.699	.498

Developers perceive that they are mostly aware of constantly updating knowledge on sustainable building with a mean score. this is closely followed by contributing sustainable idea at the briefing stage, adherence to sound professional advice promoting sustainable constructions, developing interest in sustainable constructions, clear specification of sustainable features, characteristics, materials and methods. In the overall analysis, assessing the Developers' roles, the top five rated roles from the analysis were contributing sustainable ideas at the briefing stage, adherence to sound professional advice promoting sustainable construction, constantly updating knowledge on sustainable building, interest in sustainable construction and clear specification of sustainable features, characteristics, materials and methods. There is an obvious variation in how each category of stakeholders ranked the extent of awareness of these developers' roles. With highest

MS value of 3.52 out of 5 on the rating scale, it can be inferred that the extent of awareness of these roles was not meeting expectation; hence more effort may need to be put into the awareness drive to improve respondents' understanding of their roles in sustainable housing project for enhanced performance as expected by the general masses. This is in agreement with [34] which established that the level of awareness and understanding of stakeholders' roles in sustainable housing projects requires more attention as this is essential to the implementation of a successful sustainable construction.

[28] acknowledged low level of awareness of the stakeholders identified by his research, it could be argued that there is an improvement in the level of awareness recorded by this study possibly because of time effect; this is expected because built environment is on the process of development and better advancement should be expected if a related research is carried out in the nearest future on the awareness level of the built environment stakeholders and their involvement in sustainable buildings. Also, [29,35,28] as well as Komolafe & Oyewole (2018) recognized the importance of the stakeholder's awareness on different aspects of sustainable built environment. [29], identified government regulatory agencies and the building professionals as stakeholders with relatively high level of awareness in sustainable buildings and users were identified as stakeholders with low level of awareness.

This is also a confirmation of the need for consciousness on the part of all the stakeholders on the state-of-the-art on sustainable built environment and to create more interest in sustainable buildings to as to be able to meet up with the challenges of the competitive built environment in which they are operating. [32], also advocated for an improvement on the knowledge of stakeholders (like contractors and developers) on sustainable construction in Nigeria which corroborate the finding that the level of awareness of the identified stakeholders were not as expected. [22], identified stakeholders as co-creators of value in sustainable urban development, [36], therefore suggested that stakeholder participation, which can be aided by an improved level of awareness, can contribute to enhanced productivity through provision of forums for a dialogue and interactions during the project's development stages. Their participation will therefore result in enhanced project sustainability value created within the built environment.

A further analysis was carried out to examine the differences of opinions of different categories of stakeholders regarding the extent of awareness of stakeholders' roles in sustainable housing projects delivery. This was done using Analysis of Variance (ANOVA). The result of the analysis is as presented in the ANOVA column of Table 5. The result in Table 5 also indicated that no significant difference existed in respondents' perceptions of the extent of awareness of the different categories of stakeholders' roles in the delivery of sustainable housing projects. This is revealed by their F-Stat at $p>0.05$. These Contractors' roles include taking the lead in achieving a sustainable society through advocacy and other steps; complying with material specifications and suggesting better options where possible; complying with sustainability laws in the operation of their firms; advocating for the delivery and patronage of sustainable buildings; participating in setting sustainable demands and goals among others.

The Government roles include initiating and directing sustainability agenda during construction period, monitor project execution for compliance with agreed sustainability standards, providing guidance favouring sustainable construction, evaluating design decisions against sustainability assessment methodologies among others. The Developers' roles include contributing sustainable ideas at the briefing stage, adherence to sound professional advice promoting sustainable construction, constantly updating knowledge on sustainable building, interest in sustainable construction. This implies that all the respondents irrespective of their category perceived the extent of awareness of all Contractors', Government and Developers' roles in the same way. It can be inferred that category of stakeholders has no significant effect on the views of the respondents about the level of awareness of the roles of stakeholders in the delivery of sustainable housing projects.

The top-rated roles as identified by the study are very germane in achieving sustainable housing. For instance, all stakeholders especially developers should really be aware that they need to take the lead in advocacy activities so as to achieve the sustainable society. As being the main drivers of

sustainable construction, they must be at the forefront of making sure every other stakeholder involved in the construction industry see to the implementation of sustainable construction. Observing the next rated role, Contractors must be well aware that in the bid to ensuring sustainable housing, complying with material specifications and suggesting better options should be taken as topmost priority. Their understanding of this role would bring a big shift in the implementation of sustainable housing. As [33], pointed out that one of the main barriers to sustainable project implementation was the lack of existing laws pertaining to the enforcement and regulation of sustainable building, the Government should be well aware of their role in initiating, directing and also maintaining the sustainability agenda during the construction period by enforcing necessary laws and regulations. When all stakeholders are well aware of these roles and prioritizes them, then the goal of sustainable housing would be realised.

5. Conclusion

This paper concluded that the stakeholders are aware of their respective roles in the delivery of sustainable housing projects and were highly conscious of them although their extent of awareness is at varying capacity. From the result, the contractors' roles had high extent of awareness when compared with the government and developers' roles. This study examined the Stakeholders' Roles in the Delivery of Sustainable Housing Projects in Lagos State, Nigeria. It is suggested that further studies could examine the roles of stakeholders of other types of sustainable building project for comparable results. Furthermore, other studies to compare stakeholders' roles on sustainable housing projects between Lagos and other States as well as regional comparison could be instituted.

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