Awareness and Perception of Office Property Users on Green Building in Lagos, Nigeria

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ABSTRACT

This study examined the level of awareness, medium of awareness and the perceptions of office property users on Green building and their features in Lagos, Nigeria. The study sampled 352 office property users of 176 properties in the property portfolio of Estate Surveyors and Valuers in Lagos. Data was collected with the use of questionnaire administration. Using frequency counts and measures of relative perception index, the study revealed that majority of the users were not aware of green building. Only 23.6% were aware, and the predominant medium of awareness among these few was the Television. It was also revealed in the result that most of the users perceive green building as more of an environmental concept costing more to build and operate. The study concluded that there is need for more sensitisation on green building. Also, a balance information spread, especially on the social and economic benefits of green building is important for successful implementation of green building in the study area.

1. Introduction

In the world over, there have been incessant symptoms manifesting in the environment vis-à-vis global warming, sea level rise, depletion of the ozone layer, climate imbalance, etc. These environmental issues have recently heightened consequent to several human activities that exploit rather than conserve the environment (Boyd, 2007). The startling rate at which the environmental hazards are mounting suggests that the environment is being endangered and might not be safe, especially for the upcoming generations if actions are not taken now.

The built environment is a major contributor to the environmental imbalance (USGBC, 2009; UCL Energy Institute, 2015). Growing awareness about the adverse impacts of use of resources on the environment and concern for national energy security in different parts of the world have therefore led to the momentum to bring about transformation in the construction industry for achieving improved sustainability. This is most evident in the introduction of "green building" concept with its major focal point on ensuring that during building related activities, the environment is conserved and building users' comforts are maximized at the least cost possible (US Green building council, 2003; UKGBC, 2009).

Green building practices are becoming increasingly recognized as a way of mitigating CO_2 emissions and energy consumption, with environmental, economic, financial, and social benefits accruing. In the advanced countries of the world, several advances are being made by policy makers and government organizations to ensure that green building become mainstream but in Nigeria, among other emerging nations, the pace of green building practices is slower than its

contemporaries. Several factors are responsible for this, the most important being inadequate information on the awareness and perception of stakeholders about green buildings, what it stands for, the benefits accruable and what this change in building practices will cost (Olaleye et al, 2015; Tathagat and Dod, 2015).

Widespread consensus on the need for green buildings does not necessarily result in extensive implementation of its practices. Although many stakeholders agree with green building principles, many are yet to grasp their meaning, and fewer have translated this into action (Khalfan, 2006). Mansour and Radford (2014) considers two levels of interaction with a green building: *Initial Perception* and *Extended Interaction*. Initial perception is primarily influenced by the information accessible in the public. Examples of information media that shape initial perceptions include word of mouth anecdotes about the building, media stories, published information, awareness of certification and past experiences with buildings generally. At the second level of interaction (extended interactions), the building stakeholders' experience in the building enhance a clearer picture of the advantages and disadvantages of the building. This includes the evaluation of building competency in terms of some functional and non-functional issues.

Following Mansour and Radford (2014)'s line of thought, green building adoption in Nigeria could be shaped by the information accessible to the stakeholders from various information media and the way this information are being processed in minds could be influenced by past experiences on buildings generally. Oladokun and Ojo (2012) reports that commercial properties in Lagos often pose building, operations and management problems like high cumulative

maintenance problems, electricity and plumbing needs, higher cash flow requirements and cost of construction. Stakeholders are therefore likely to seek better choices like green building, depending on how much information (on how this will better their experience) is available to them and how this information is perceived, interpreted and understood by them. According to Esa (2011) creating awareness is the first and biggest step to ensure that green buildings are here to stay. To communicate effectively to the stakeholders on green solutions to building related challenges, there is need to investigate their level of awareness and current perceptions on green buildings.

Among the stakeholders involved in green building investment, Miosander, Markkula, and Eraranta (2010) point out the importance and leading role of the consumer/users. The authors highlight consumer governing role, and reconfirm the consumer's position as a powerful market force whose interests and perceptions shape the success of green building adoption. There is therefore need to focus on the end users whose changes in demand pattern affects the operations of other relevant stakeholders.

The need to particularly focus on awareness of office property users is informed by the potential contribution of green building to office operational activities (Newsham et al., 2013). MCO Real Estate (2015) records an increasing supply of office properties in Lagos with proportional increase in occupancy rate. This constitutes potential demand for green building in Nigeria. The extent to which this latent demand can be pulled is dependent on the extent of information available, especially on office property users' awareness and perception.

Existing studies (Oladokun et al, 2010; Nwokoro and Onukwube, 2011; Otegbulu, 2011; Abolore, 2012; Oyewole et al, 2012 Olaleye et al, 2015; Komolafe and Oyewole, 2015; Nduka and Ogunsanmi, 2015 and Komolafe et al, 2016), especially in Nigeria have attempted to bridge the information gap on green building. Many however left out users' perceptions despite the importance to adoption of green building practices in Nigeria. This study therefore attempts to fill this gap by examining the awareness and perceptions of office property users on green building. Result from the study is useful in approaching awareness campaign successfully in Nigeria. It will also help in planning result oriented green building investment and implementation strategies in Nigeria.

2.   Literature Review

Perception and awareness of green products has long been studied in the field of marketing which eventually established a sub discipline known as green marketing. In building design and construction practices, perception of green building has received little attention in the literature; instead, numerous studies discuss the users' satisfaction and comfort in green buildings through post occupancy evaluations (Altomonte & Schiavon, 2013; Baird & Field, 2013; Hitchings, 2009; Huang et al., 2012; Lee & Guerin, 2009; Liang et al., 2014). Some of the few existing studies on perceptions on green building include Webb (2005)'s study which inquired into how those that are spreading the message about green buildings in Downtown Orlando area communicate it to stakeholders and the impact of their mode of communications on opinions about green buildings. Using questionnaires targeted at building professionals and potential home buyers, the study discovered that all green building experts hammered more on energy efficiency. In addition, when green buildings were presented as programs targeted at the environment or a form of government intervention, support for green buildings decreased. The findings of this study suggest that public support for green building concepts could be achieved when explained without an association to other public policy issues.

WBCSD (2007) examined the perceptions and attitudes of building professionals and corporate owners and tenants in eight countries (Brazil, China, France, Germany, India, Japan, Spain and the US) on green building. Based on in-depth physical and telephone interview of a total of 1468 respondents across the countries, the study revealed a relatively high level of awareness in all eight countries but low level of actual involvement in green building practices. Also, the respondents generally overestimated the cost premium of green buildings. This study however left out private users in their survey whose opinions are also important in shaping green building adoption.

Brown and Cole (2008) investigated, in a commercial setting, occupants' knowledge of building environmental features and systems, and awareness of control and feedback opportunities available to them. Using a web-based survey to capture knowledge levels as compared to an expert baseline for six office buildings of varying degrees of energy efficiency in the UK, the result reveals that respondents had a poor level of knowledge about how the building worked. In general, respondents were moderately satisfied with the overall comfort of the building environment (rating average 4.95 out of 7).

Jamison (2008) examined the awareness and perception of Washington state residents on green building. Through a random survey of 268 residents in the state, the study discovered that majority of the state residents could hardly identify with the existing green building programs. The study further revealed that many of the residents were only aware of the environmental features of green building and majority claimed ignorance on the meaning of green building. This study, though similar in focus, is based on a more developed economy than Nigeria.

AlSanad, Gale, and Edward (2011) explored the present knowledge, level of awareness and acceptability of the Kuwait's construction industry stakeholders to adopting the concept of green building. This study found out that the level of awareness of sustainability and green construction is considered to be in the "moderate" to "good" range. In Samarasinghe (2012) the awareness of features in green home and the people's perceptions towards living in green home in Sri Lanka was examined. Using both descriptive measures, regression and correlations between variables, the study discovered that building or purchasing green home did not only depend on people's awareness of green features but also determined by health consciousness, the environmental values, socio-economic constrains and habits of people.

Khalfan et al. (2015) examined the perceptions towards environmental, social and economic benefits of sustainable construction amongst contractors in the state of Victoria, Australia. The study adopted descriptive statistics. Findings revealed that perceptions towards the social and economic aspects of sustainable construction were positive, with about 60% of responses demonstrating positive perceptions. Client demand, associated costs of sustainable construction materials and practices and perceptions of employees and workers were perceived as barriers towards implementation of sustainable construction practices. The results also showed that some of the drivers of sustainable development and construction were the availability of environmentally friendly (green) material; financial incentives to clients and contractors; government policy for implementation; and overall environmental awareness within the industry.

A few of Nigeria studies on the subject matter include Ameh, et al (2007), Waniko (2014), Nduka and Ogunsanmi (2015) and Bungwon et al (2016). Ameh et al (2007) discovered that built environment professionals in Nigeria were aware of sustainability principles and sources of information on sustainable building practices were mostly

personal research. Waniko (2014) assessed Nigerian built environment professional's familiarity with green building. The study found that a higher percentage of the respondents were aware of the green practices.

Nduka and Ogunsanmi (2015) investigated the construction professionals' perceptions on green building awareness and accruable benefits in construction projects in Nigeria. The study revealed that most of the building industry professionals in Nigeria were familiar with green building principles and the inherent benefits. The study recommended the establishment of Green Building Council of Nigeria (GBCN) for awareness creation and introduction of guidelines, tools and techniques that will drive green building practices for future project.

Bungwon et al (2016) assessed the level of awareness of property managers and other built environment professionals on green or sustainable buildings in Kaduna, Nigeria. Using qualitative methods, the study revealed low level of awareness by property managers and other built environment professionals. Lack of technological advancement, failure of professional bodies to enlighten their members on new innovations, lack of expertise knowledge of green building and lack of interest from real estate developers were discovered as the major barriers to green building awareness.

It is apparent from the above studies that research on users' awareness and perception has not featured much in existing literature, especially in Nigeria. Most existing researches are tailored towards building professionals and contractors A few existing researches on users are based on post occupancy experiences as noted before. In this study, the awareness of users is examined and their perceptions on green building is studied.

3. Research Method

The target population for this study is office property users in Lagos, Nigeria. The users were reached through the Estate surveyors managing the properties they were occupying. The 2014 directory of the Nigerian Institution of Estate Surveyors and Valuers indicates that there are 440 estate firms in Lagos. One-fifth of the total number (88) was selected randomly and two office properties with detailed management records were selected from each of the sampled estate firms. This totals 176 properties sampled for survey. On each of the selected office properties, two users were purposively sampled, making 352 users. Information were elicited from the users through self-administered questionnaire distributed to the office property users.

The data elicited include users' level of awareness on green building, medium of awareness and perceptions about the features of green building when compared with same property not built to a green standard. From existing literature (Webb, 2005; Jamison, 2008), thirteen distinct indicators of green building which are in line with the triple bottom line concept of sustainability (economic, social and environmental aspects) were coined out for enquiry on users' perceptions of green building features. These features are lower utility costs, cost efficiency, energy efficiency, availability of parks, green belts, hiking trails and landscaping, healthy indoor air, building with recycled materials, more convenient living conditions, higher construction cost, lower environmental hazards, preservation of natural resources, water efficiency, durability, ease of maintenance and use of high-quality materials.

In order to confirm the robustness of the questionnaire and ensure that the instrument has an adequate and representative set of items, the researchers sought the input of experts. Interviews were conducted on the experts to ascertain whether instrument items are adequate to address the research objectives. The experts agreed that the research items are relevant and offered useful suggestions for improvement. Subsequently, the instrument was refined as suggested by the experts before the data collection was undertaken. Out of the 352 questionnaires distributed, 241 were retrieved constituting 68.5% response rate.

Data collected were analyzed using frequency counts, percentages, mean and relative perception index. Frequency counts and percentages were used to analyze the data obtained on level and medium of awareness of green building while mean was used to analyze data on users' perceptions on green building features. To arrive at the mean values, users were asked to rank the variables measuring their perceptions on a five-point likert scale, with weight 1 representing "much less"; 2, "somewhat less"; 3, about the same; 4, "somewhat more" and 5, "much more". The weights assigned to each attribute were multiplied by the frequency of response to the attributes. This is in turn summed together to get the total weight value (TWV) for each feature. The total weight value, when divided by the total frequency of response on each feature gives the mean value for the features as expressed below.

$$\text{(Mean value (MV)} = \frac{TWV}{\sum_{i=1}^{5} F_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where

TWV = total weight value and

F= total frequency of response

The relative preference index on perceptions for each feature was computed by dividing the mean value by the highest weight attributable to each feature, in this case, 5. This is further illustrated in the equation below

$$RII = \frac{MV}{A} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where MV= mean value and

A= the highest weight attributable to each feature: 5

This is then used to rank the features in descending order based on their responses.

The use and suitability of mean value and relative preference index for study of this nature is supported by earlier studies (Johnson and LeBreton, 2004; Badu, Owusu-Manu, Edwards, Adesi and Lichtenstein, 2013) as it aids in finding the contribution a particular variable makes to the prediction of perceptions on green building both by itself and in combination with other predictor variables.

4. Results

The result of this study is discussed in line with the three major focal points of this study as presented in Tables 1 to 3. The first section deals with the level of awareness of the users. This is followed by discussions on the medium through which the users were aware of green building. The concluding part of the result deals with the perceptions of the users on the features of green building.

4.1 Level of Awareness of Green Building

Table 1 presents the result on the level of awareness of users of green building. The table reveals that 15 (6.2%) of the users were very much aware of green building; 42 (17.4%), slightly aware and 184 (76.4%) unaware of green building features. This result indicates that majority of the users were unaware of green building and this is in contrast with some existing Nigerian studies (Ameh et al, 2007; Nduka and Ogunsanmi, 2015) which recorded considerable awareness of building professionals on green building in Nigeria. The non-commensurate level of awareness between users and building professionals could have therefore limited incorporation of green building strategies by the professionals whose activities depend on users' perceptions.

Table 1 Users' Level of Awareness of Green Building

Levels of Awareness	Users Frequency	Percent
Very much aware	15	6.2
slightly aware	42	17.4
Not aware	184	76.4
Total	241	100.0

4.2   Medium of Awareness of Users on Green Building

Table 2 shows the medium of awareness of the users of green building. The table reveals that 47.4% were aware through the Television medium, 24.6% through Websites, 15.8% through friends and family and 12.3% through Newspapers and Magazines. This result shows that majority of the users who were aware of green building got to know about it through the Television. The result conforms with past findings of Jamison (2008) on the Eastern region of the Washington state that users had both initial and follow up contact with green buildings through television adverts.

Table 2 Users' Medium of Awareness of Green Building Features

Medium	Frequency	Percent
Television	27	47.4
Web site	14	24.6
Friend/family	9	15.8
Newspaper/Magazine	7	12.3
Total	**57**	**100.0**

4.3   The Perception of Users on the Features of Green Building

Having inquired into the level and medium of awareness of the respondents about green building, the perceptions of users about green building features and its characteristics when compared to conventional buildings was also sought in order to provide information that will help

in predicting their likely reaction to the adoption of green building in the absence of full intimation with the features. The parameters used were coined out from the features of green building in line with relevant literature. Tables 3 shows the result obtained.

The result as presented in Table 3 indicates that "Lower environmental hazard on green building" attracts a mean value of 4.573; "Preservation of natural resources", a mean value of 4.52, "Availability of parks, greenbelts, hiking trails and landscaping", 4.402; "healthy indoor air", 4.338; "higher construction cost of green buildings", 4.324; "Use of recycled materials in green building", 4.268 and "More convenient living conditions", 4.235. "Water efficiency of green building" has a mean value of 4.207; "Energy efficiency", 4.191; "Use of high quality materials, 4.124; "Durability of green building", 4.072; "Ease of maintenance", 3.83; "Lower utility cost", 3.389 and "Cost efficiency", 3.335.

From the relative perception index, it can be observed that the three features that the users attribute most to green building are its environmental friendliness (Relative perception index (RPI)- 0.9146), tendency to preserve natural resources (RPI- 0.904) and availability of parks, greenbelts hiking trails and landscaping (RPI- 0.8804) in descending order of magnitude. These features are more of environmental features and this therefore implies that users' perceptions are more skewed towards the environmental stand point relative to social and economic stand points. Webb (2005)'s study also has a similar findings as the study discovered that majority of stakeholders in Orlando perceived green building to be more of a program targeted at the environment or more of a government policy. This adversely affected their support for green buildings.

The result also shows that the three least perceived characteristics of green building are its ease of maintenance (RPI- 0.766), lower utility cost (RPI- 0.6776) and cost efficiency (RPI- 0.667) in descending rank order. This finding validates that of Bond and Perrett (2012) who discovered in their study in New Zealand that users perceived green building to be less cost effective than conventional buildings.

Also, it can be observed from the table that the mean values of majority of the green building indicators were above 4 (out of 5). This suggests that users have the right perspective on most of the features of green building. It is however noteworthy that the modal response across the rating scales on most of the indicators fall on "Somewhat more" and this is reflected in the mean values; as most mean values were closer to 4.

5.   Conclusions

This study has discovered a low level of green building awareness

Table 3 Users' Perception on the Features of Green Building Compared to the Same House That is Not Built To a "Green" Standard

5: Much more; 4: Somewhat more; 3: About the same; 2: Somewhat less; 1: Much less									
Frequencies									
Green Building Indicators	5	4	3	2	1	Total	Mean	RPI	Rank
Lower environmental hazard	125	93	0	0	0	218	4.573	0.9146	1
Preservation of natural resources	115	106	0	0	0	221	4.52	0.904	2
Parks, greenbelts, hiking trails, landscaping	95	117	7	0	0	219	4.402	0.8804	3
Healthy indoor air	76	141	2	0	0	219	4.338	0.8676	4
Higher construction cost	68	134	2	0	0	204	4.324	0.8648	5
Built with recycled materials	68	124	13	0	0	205	4.268	0.8536	6
More convenient living conditions	52	169	0	0	0	221	4.235	0.847	7
Water efficiency	42	161	0	0	0	203	4.207	0.8414	8
Energy efficiency	37	157	0	0	0	194	4.191	0.8382	9
High quality material	39	157	13	0	0	209	4.124	0.8248	10
Durability	15	164	2	0	0	181	4.072	0.8144	11
Easy to maintain	23	131	2	26	0	182	3.83	0.766	12
Lower Utility cost	29	80	15	63	1	188	3.388	0.6776	13
Cost efficient	11	123	0	40	20	194	3.335	0.667	14

among the users and the low level of adoption of green building features in the study area can largely be traced to this. Rohracher (2001) noted that the largest barrier to green building is not developing the technology necessary but disseminating it broadly. If green building adoption is to be widely disseminated in the study area, the primary start point is widespread sensitization about the concept and its potential tendencies of constituting solutions to much of the challenges on the use and operation of building features.

Most of the few users that were aware of green building got to know about it through Television. Other information media like Newspapers, Magazines and websites are as well closer to most users in the study area; harnessing these media also is a plausible means of enhancing widespread awareness as a wider range of users and investors can be reached. Word of mouth according to Shrum, McCarty and Lowrey (1995) and Parasuraman (2000) can only be effective as increasing number of investors and users realize and are convinced of the advantages of building green. The lower level of awareness creation through this medium (family and friends) as revealed by this study could be traced to low green building practices in the study area. With increased use and adoption of green building practices however this medium could enhance wider spread if users and other stakeholders are convinced of the advantages.

Most of the users have the impression that green building is more about environmental consciousness and the result from their response shows that the users were more expectant on the environmental benefits of green building. The users particularly had misconceptions about the utility cost of green building as most of them perceive that green buildings cost more to build and operate. This will likely influence their willingness to adopt green building as majority of consumers that will prefer green features given this belief are the environmental conscious consumers. The reason for users' impression about green building in this direction can be traced to the assertions of Sayce et al., (2010) that much of the literature and indeed government and intra-governmental responses have focused on environmental protection and in particular issues surrounding energy and more recently, carbon. According to Bennett (2006), limited understanding of the benefits of sustainable buildings has been a key inhibitor, as many have the perception that whilst it costs more to build or fit out buildings to a sustainable standard there is little to be gained financially to warrant the extra expense. To enhance better response to green building adoption in the study area, there is need to balance the information spread on green building features to cover the social and more importantly, the economic benefits accruable. This will attract the interest of other stakeholders (beyond only the environmental conscious ones), especially when they see it as a viable investment venture.

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