ATBU Journal of Environmental Technology (A'JET)

Volume 6, Number 1, 2013
www.ajol.info/index.php/atbu

A Publication of the
Faculty of Environmental Technology (FET)
Abubakar Tafawa Balewa University, ATBU, Bauchi

ISSN-1596-6305

Cover Design: Y. O. Sadiq & E. U. Kanu
Text Layout: E. U. Kanu

Published by Faculty of Environmental Technology, ATBU Bauchi, Bauchi State, Nigeria
Printed by Altograde Nigeria Limited, Yola.

Integrating Sustainability into The Real Estate Valuation Process: A Nigerian Perspective

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Abstract

The paper sought the perception of Nigerian real estate valuers on sustainable development and how sustainability can be integrated into real estate valuation process in Nigeria. One hundred and sixty Estate Surveyors and Valuers were asked, among others, to rate the significance of a range of sustainability features on the market value of a hypothetical property based on the social, economic and environmental features that make up the triple bottom line of sustainability. The study showed evidences of a growing awareness of the need to mainstream sustainability into the real estate valuation process; though majority of the respondents tended to define real estate sustainability only in terms of its social features leaving out the economic and the environmental features. Nigerian valuers are therefore enjoined to broaden and improve on their present knowledge of sustainability to enable them account for the phenomenon in their valuations as appropriate. The study identified the investors, the government, property occupier, and the estate surveyor and valuer (appraiser), in that order, as the frontline drivers of the sustainability crusade in the country.

Keywords: integration, perception, real estate, sustainability, valuation process.

Introduction

Sustainable development, according to World Commission on Environment and Development, refers to development that meets the need of the present without compromising the ability of future generation to meet their own needs (WCED, 1987). Within efforts undertaken by the global community to achieve more sustainable development, probably no sector has a greater potential role as property and construction (Lorenz, 2006). For instance, in the Organization for Economic Cooperation and Development (OECD) countries alone, the built environment is responsible for between 24 to 40 per cent of total energy use, 30 per cent of raw energy use, 30 to 40 per cent of solid waste generation (OECD, 2003). Property and construction therefore has the largest single share in global environmental degradation and impairment of human well-being. Regretfully, actors within the property market, including real estate valuers and analysts, are slowest in responding to challenges imposed by sustainable development (Lorenz, 2006).

Pearse (2005) argued that adequate pricing of externalities will have impact on both people's behaviour and the improvement of the environment. Lorenz (2006) also opined that success in achieving more sustainable development in property and construction largely depending on progress in integrating sustainability issues into property valuation theory and practice. Unless and until valuers begin to reflect and account for sustainability features in the values of property, investors may not be motivated to incorporate sustainability features into property development.

This study is about the perception and attitudes towards sustainability in real estate valuation from the view point of practitioners in three Nigerian chief administrative and commercial cities of Lagos, Port Harcourt, and Abuja. Real estate valuation is a process of forecasting the future benefits of an interest in property and converting this into a current price. The accuracy of the valuation will depend on the skill and ability of the valuer in understanding the property, the market where it trades, the perception of market participants and having access to relevant information in the right quality and quantity. The study essentially highlights sustainability features that real estate valuers consider most significant in the valuation of a hypothetical sustainable property, and the relevance of the sustainability concept to the appraisal process in particular, and the workings of the property market in general. The study is justified on a number of grounds; it assesses the attitude and capability of Nigerian valuers to reflect sustainability features in properties in their valuations. Given the ongoing global drive for sustainability, it is imperative that Nigerian valuers, like their peers in other parts of the world, appreciate the effects of sustainability features in property and to hone their skills in identifying and capitalizing them into values as well as reporting them in a simple and convincing way. The research is also a cognate contribution to knowledge as the area of discourse is relatively academically recent with only a few empirical investigations to date (Sayce, Sundberg, & Clements, 2010).

The study hypothesized that Nigerian valuers do not recognize or account for sustainability features in properties in their valuations; that they do not employ any of the contemporary methods to value for sustainability; and that they do not require additional training to enable them carry out

successful sustainable valuations in accordance with international best practices.

The study provides answers to the current global call for improved links between property investment, social responsibility and sustainability (Pivo, 2007). It makes modest contribution to the ongoing debate on the conventional versus contemporary methods as the more appropriate valuation method for reflecting sustainability features in property valuation.

Review of Literature

Lynch and Gemini (2007) put the world's wealth at $48 trillion, of which approximately half is real estate. In most countries land accounts for between half and three quarters of national wealth. Property provides space for living and recreation. Production and other economic activities also take place on real property. Property also constitutes a major part of assets value in companies' balance sheets and is extensively used as collateral for corporate debt. Property is the commonest form of asset held by corporate bodies and individual investors. The place of real property in the economic growth and overall well being of any nation cannot therefore be overemphasized. This however comes at a cost. Properties are not known to be socially and environmentally benign commodities (Lorenz, 2006; Pivo, 2005, 2007). The real estate industry is a major source of negative environmental impacts contributing significantly to raw material depletion, harmful gas emissions, solid waste generation and energy use (Addae-Dapaah, Hiang, and Shi, 2009; Goering, 2009; Robinson, 2005; & Lorenz, 2006).

The peculiar nature of properties and the impact of their construction on the environment suggest that sustainability should be a major priority for policy makers and investors in the real estate sector. The Green Building Council research showed, among others, that green building consumes 85% less energy, consumes 60% less water, and generate 69% less waste (Arnel, n.d.). According to a study published in Green Building Market Barometer, 84% of executives in the US construction industry believe that green buildings show better financial performance than non-green building in terms of building values, asking rents, and return on investment. Lutzkendorf (2011) added that sustainable buildings are proving to be less risky, more stable in value, easier to rent and sell.

It is increasingly recognized that property valuation represents a vital link between market value, property performance and the adoption of sustainability in real estate (Sayce et al, 2010). Thus, if major sustainability-related benefits/risks associated with the ownership and use of properties are not consciously and adequately reported and reflected in property valuations, there is a risk that investment decisions are being taken on the basis of incorrect and distorted valuations (Lorenz, 2006).

However, the peculiarities of the property market pose some challenges to widespread acceptance of the concept of sustainability in the property investment, construction and appraisal sectors. For instance, the GVAGrimley's (2008) survey of the attitude of UK's leading institutions and investors to sustainability investment showed that the value of environmental sustainability is not appreciated by both lenders and valuers. The survey shows that both lenders and valuers were unsure of the impact of environmental benefits on the buildings (Fuerst & McAllister, 2010). This implies, among others, that

sustainability is not reflected in valuations with the danger that sustainable properties remain undervalued. Robinson (2005) noted that the mismatch between investment returns and funding ensures that short term gains are paramount considerations in property investment. Therefore, issues relating to non-economic sustainability returns might not be attractive to the real estate investment community and this jeopardizes attempts to mainstream sustainability in the industry. The long term effect of this on real estate investment and financial decisions include a reduction in the potential flow of funds into the sector.

There is therefore the need for a paradigm shift in the way property appraisal is presently carried out. A whole new world of property appraisal is emerging with the development of sustainable property sub-markets, tools, indicators, valuation techniques and approaches; and the new world would require professional valuers who, through the quality of their advice, are able to provide authoritatively the true value that sustainability adds to properties. Interestingly, a number of studies have been carried out to facilitate this change. For instance, Pivo (2007) examined the development of sustainability indicators; while Boyd (2005) and Lorenz (2006) debated on appropriate methodologies. Though it is agreed that attention to environmental and social features were positively perceived by both occupiers and investors of sustainable properties, the question of how to quantify and reflect these impacts in the real estate valuation process remains unsettled (Boyd, 2005; Lutzendorf & Lorenz, 2005; Sayce, Ellison, & Smith, 2004; Kimmet, 2006). While authors like Boyd (2005), Pivo (2005), and Robinson (2005), argued that conventional methods are suitable, others such as Lorenz (2006) are of the opinion that conventional methods will only lead to unbalanced value estimates.

To buttress his support for conventional method of valuation, Boyd (2005) presents a study of the impact of environmental and social sustainability on economic returns to capture the interactions of the triple-bottom line on property investment, and at the same time, ascertaining whether it is possible to quantify the impact of environmental and social characteristics on investment property. The study went further to test whether these features would bring appreciable economic returns to the investor. To achieve this, Boyd employed as case study, the valuation of a 10 year-old prime office building in Brisbane, Australia, using the traditional discounted cash flow (DCF) method. Adopting the simulation technique, Boyd tried to determine the differences in returns between an existing prime grade office property and a similar environmentally and socially enhanced building. This requires testing the model on the cash-flow of the building over a seven-year period under four conditions ranging from the building in existing condition, the building with socially enhanced features, the building with environmentally enhanced features, and the building with both environmentally and socially enhanced environmental features. The study revealed that the building with enhanced features showed the greatest impact; with the internal rate of return (IRR) of 9.53% in its unenhanced state to 9.70% when enhanced. When compared with 9.26% for building with enhanced social features and 9.32% for buildings with both enhanced environmental and social factors, it appears that environmental considerations appealed to the respondents above social features and in fact

above the combination of environmental and social factors. However, because these changes are still minimal, Boyd concluded that the market showed an indication of future demand for enhanced properties. Based on the outcome of this experiment, Boyd resolved that the application of conventional valuation methods in assessing the impact of the triple bottom-line is indeed achievable.

With regards to economic sustainability, Rothschild 2005, as cited by Kauko (2008), while agreeing with the results of earlier studies asserted that economic sustainability cannot be measured through economic efficiency, but rather through economic security and quality of life. Kauko (2008) posited that instead of evolving tools for valuing sustainable real estates, attention should be given to the valuation of sustainable markets. This is based on the premise that sustainable markets, defined in terms of sustainable demand, supply, prices and values, would generate sustainable value, which could then be used as an indicator for sustainability. The ultimate goal of the economic sustainability concepts is to ensure that quality increases, just as price level increases. Kauko (2008) thereafter proposed the measurement (or appraisal) of the economic sustainability of residential real estate by correlating the monetary price of the development with measurements of non-monetary quality together with the affordability and welfare indices. He argued that the most sustainable residential property markets are those where price increases are balanced by an increase in the quality of life, thus producing an economically efficient and economically sustainable real estate market compared to other submarkets in the 3x3 quadrant where price increases are not matched by quality increases and where quality decreases with price decreases.

In his contribution to the debate on the appropriate means of accounting for social sustainability, Kimmet (2006) argued that rather than focusing on appropriate valuation methodology, the adoption of a psychic income premium into valuation practice would deliver a more comprehensive account of social sustainability. Kimmet (2006) defines the psychic income of a provider as the financial premium paid by customers enjoying a psychic benefit. In this wise the sustainable property investment market is viewed as a specialized market catering only for certain types of organizations that value such distinctions. This supposedly ensures that a premium is paid as the psychic income derived from the use of such sustainable properties which (the premium) can be factored into the valuation process, thereby making it easier to adopt any valuation approach considered appropriate. The major concern about Kimmet (2006) proposal is the ascription of monetary value to the psychic income and how to recognize the indicators that measure it.

Using the concepts of price and worth, Robinson (2005) developed an outline valuation process to assist valuers in appraising environmental sustainability. The author used rent, capital growth and psychic income as the indicators of environmental sustainability. A residual valuation analysis of two hypothetical properties showed that the worth of the environmentally sustainable property building is substantially greater than the estimate of price commanded by the conventional building. This means that the application of the concept of worth into the traditional residual method of valuation would generate higher values and benefits for environmentally

sustainable buildings. Robinson (2005) conceded that while this concept can be readily accepted by owner-occupiers; its acceptance in the investment market would depend on the ability of valuers to account for psychic income, improved rental value, technical performance of buildings and improvements in productivity and other occupants' advantages.

Lorenz (2006) provides a useful analysis of the appropriateness of both contemporary and conventional methods to sustainability valuation practice. His contention is that conventional approaches are useful for the valuation of single properties and could therefore be adapted to value such properties for sustainability. On the other hand, contemporary methods such as hedonic pricing, fuzzy logic, and spatial analysis are appropriate for mass valuations and as such are best suited for valuing properties in a sustainable market. Lorenz (2006) particularly drew attention to the real options and hedonic pricing methods. The real options method is favoured for valuing sustainability because it is designed to analyze future opportunities (rather than projecting from current and past transactions), that may arise from a particular parcel of land or building. This makes it particularly suited to account for the increased flexibility and adaptability that sustainable properties have to offer. The hedonic pricing method, on the other hand, is useful in measuring the value that market participants place on different quantitative and qualitative property characteristics; making it easy to measure the relationship between sustainability of construction and observed property prices. Hence, a more scientific basis for the value adjustments required in carrying out sustainable property valuations is offered. However, availability of property transactions databases in the required quantity and quality is recognized as a major constraint against the use of contemporary methods in general, and the hedonic pricing model in particular.

Putting all the results of the studies highlighted above together, it may be right to say that properties in sustainable property markets can be valued with the use of either contemporary or conventional methods and the social and economic features indicating sustainability can be identified and applied in the manner suitable for each method. The development of indicators to capture each feature remains problematic however. The dearth of property transaction databases remains another major impediment to the valuation process, so also is the currently small size of the sustainable market. The situation in emerging markets like Nigeria is compounded by weak regulatory framework, poor property market research, lack of transparency in the workings of the property market, among others, resulting in dearth of relevant information on critical parameters including the discount rate, market comparables, rate of depreciation, outgoings etc.

Study Area

The study covers Nigeria's three chief administrative, commercial and industrial cities of Lagos, Port Harcourt, and Abuja. Lagos metropolis has the most active property market with the highest average property value and stock of investment (Babawale and Koleoso, 2006). More than 90% of the headquarter offices of banks and insurance companies (notable end users of valuations) are located within the Lagos metropolis (Babawale, 2008). Port Harcourt is the capital city of Nigeria's oil-rich Rivers State, the chief Nigerian city in the east, and the seat of several

oil prospecting and allied companies with a vibrant property market. Abuja is Nigeria's federal capital territory with a rapidly developing property market.

The latest directory of the Nigerian Institution of Estate Surveyors and Valuers (2006) showed that approximately 70% of registered firms of Estate Surveyors and Valuers have either their head office or at least a branch office in one of the three cities covered by the study. This is made up of 52% in Lagos, 13% in Port Harcourt, and 7% in Abuja. This suggests that a large proportion of both the providers and the end users of valuations are resident in the study area.

Methodology

The study is based on a survey of one hundred and sixty estate surveyors and valuers practicing in Lagos metropolis, Port Harcourt and Abuja. Respondents were chosen by purposeful sampling technique based on locational clusters. This was done by locating the geographical clusters of real estate valuation firms as Estate Surveyors and Valuers are to be found in clusters or pockets of settlements around major business districts of major urban centres (Babawale, 2008). The study identified four of such clusters in Lagos - Ikeja, Lagos Island, Victoria Island/Lekki and Surulere/Yaba. Two hundred and fifty (250) questionnaires were distributed in all out of which 160 were duly completed and returned. This represents 64% return rate.

In view of the nature of the study, a close-ended questionnaire made up of three sections was designed. Section one is concerned with the personal and professional backgrounds of the respondents. In section two, respondents were asked to rate the significance of 39 sustainability features on the market value of a hypothetical property using a five-point likert scale with 1 denoting 'not significant' to 5 denoting 'significant'. This method is considered appropriate and has been used in a similar study (Addae-Dapaah et al., 2009).

To assess the weight attached to sustainability features, it is necessary to disaggregate each of the triple bottom-lines (social, environment and economic) into their constituent sets of indicators. To generate environmental indicators is relatively easy due to the scale of detailed research that has been carried out in the area in the recent past. However, the development of social and economic sustainability indicators presents special problems due to the paucity of data in these areas. We have therefore had to rely on the variables employed in Boyd (2005). This decision however offers several advantages. One, the study utilizes internationally recognized sustainability indicators, most of which had been pre-tested, thereby providing solid basis for comparing the results of the study with similar studies in other parts of the world. Secondly, even though it is generally difficult to find market-based evidences of the impact of the triple bottom-line on the return from an investment property, these indicators were culled from market data available in Queensland, Australia for the "CRRC Construction Innovation Project" (2004). Thirdly, while we acknowledged that more indicators could be generated for any of the triple bottom-line, we considered it expedient to rely on available, pretested and applicable indicators from a previous study. Lastly, it is acknowledged that advanced countries had established and are testing for environmental compliance in the design and construction of new investment and residential properties

(Australia has the 'Green Star Rating'; USA has 'Leadership in Energy and Environmental Design Assessment Method BREEAM). This study was designed to reflect not only environmental sustainability but also social and economic sustainability; all of which were addressed by Boyd (2005). In agreement with Boyd's argument that the specification of these indicators can be made to reflect the operational nature of the property, the utility of the structure and the market's perception of valuers of the individual measures (Boyd, 2005), we have adjusted the classifications slightly to reflect local perception and attributes. Environmental sustainability has been divided into two: design/construction environmental features and green environmental features. This was done to simplify the questionnaire, so that respondents are able to differentiate between these features. From the original 47 indicators contained in Boyd (2005), we have had to combine a few to simplify or replace some that were found rather too foreign to be of relevance to this study during the pilot study, leaving a total of 39 variables(see table 1, below).

***Table 1**: Indicators for the triple-bottom line features of sustainable properties*

Environmental (Design and Construction) Indicators
1. Connections to designated green space.
2. Suitability of original building materials for refurbishment and façade retention.
3. Condition of air-conditioning plant.
4. Ecological impacts of materials used for construction.
5. Age of building (obsolescence or depreciation of materials).
6. Quality of overall built environment and site use in relation to aesthetics, visual blending and connection contribution of its street frontage and wider precinct.
7. Public transport availability and standard of service.
8. Maximization by property managers of the potential of the environmental design features.
9. Compliance with Health & Safety regulations and appropriate signage.
10. Practical implications (traffic generation, off-street emergency parking and pedestrian management.
11. Proximity to urban spaces (town centers, malls, etc).
12. Availability of appropriate internal circulation such as lifts and escalators
Environmental (green) Features
13. Evidence of alternative energy supplies from renewable sources such as solar panels
14. Absence of indoor air pollutants net
15. Use of ODP or GWP refrigerants
16. Water consumption (potable, hygiene and cooling towers)
17. Fossil fuel energy use
18. Recycling and water capture measures
19. Indoor quality measured by ventilation, natural lighting, individual thermal/cooling control, noise abatement

20. Wastewater reduction
21. Disclosure and transparency of environmental data, regulation compliance, awards, and environmental expenditure of any type.
22. Hazardous and non-hazardous waste and effluents recycling or removal strategies.

Economic Features

23. Enhanced occupant productivity and health.
24. Savings from reduced energy, water and waste.
25. Adequate public liability and service provider insurance.

Social Features

26. Quality of communal service areas
27. Aesthetic implications
28. Wheelchair access
29. Awareness and training of emergency evacuation and
30. Accident first aid procedures for all floor warden
31. Complementary usage of building (compatible tenants)
32. Appropriate training for security and public relations personnel
33. Proximity to childcare facilities
34. Recognition of indigenous people through cultural space and communication of site history
35. Availability of first aid station accessible to all building users
36. Preservation of heritage values
37. Value of artwork as percentage of the fit out
38. Monitoring of stakeholder concerns, views and provisions
39. Supportive use and occupation guidelines for tenants
40. Nature of tenant businesses and naming rights
41. Transparency and disclosure of landlord/tenant contracts and marketing agreements

Source: Adapted from Boyd (2005)

Data Presentation and Discussions

Data analysis is structured into two sections. The first is the analysis of data on the characteristics of the respondents which were presented using descriptive statistics. The second is the analysis of variables using Principal Component Analysis intended to whittle down the number of variables and to demonstrate the weight attached to each cluster of sustainability features. All analyses were carried out with the aid of SPSS.17.

Table 2: *Characteristics of the Respondent Estate Surveyors and Valuers*

Variable	F	%
A. Gender of Valuers		
Male	109	68
Female	51	32
Total	160	100

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Table 2 cont'd from page

Variable	F	%
B. Academic Qualification		
Graduate (HND & B.Sc)	134	84
Others	26	16
Total	160	100
C. Professional Qualification		
Registered Estate Surveyor and Valuers	128	80
Non-Registered	52	20
Total	160	100
D. Experience		
1-5yrs	141	88
6 and above	19	12
Total	160	100
E. Geographical Distribution		
Ikeja, Lagos	39	24
Lagos Island, Lagos	30	19
Victoria Island, Lagos	25	16
Surulere, Lagos	13	8
Other Parts of Lagos	21	13
Abuja	21	13
Port Harcourt	11	7
Total	160	160

The Analysis of Particulars of Respondents

The relatively high proportion of male respondents (68%) in Table 2 reflects the labor force participation rate of males and females in the profession. Majority of the respondents (84%) were graduates (university or polytechnic); and 80% were in the "associate" category of the membership hierarchy of the Nigerian Institution of Estate Surveyors and Valuers (NIESV). Only 12% had over 6 years experience, suggesting that most of the respondents are young in the profession and probably young in age. Of the 160 respondents, 24% were based in Ikeja, 19% in Lagos Island, 16% operated within Victoria Island-Lekki axis, 8% were based in Surulere, while 13% have their offices in other parts of Lagos metropolis. Of the remaining 20%, 7 % practiced in Port Harcourt and 13 % in Abuja.

Principal Component Analysis

The study employed the Principal Component Analysis (PCA) with varimax rotation having been considered appropriate and because it has been employed in studies with similar themes. For instance, it was adopted by Zemeering (2009) in ascertaining the perception of government workers to sustainability programs in the US. Addae-Dappah et al (2009) employed the same technique in assessing the perception of investors and users to sustainable property features in Singapore, while Oven & Pekdemir (2006) used it in establishing office rents determinants in Istanbul. PCA investigates the number of variables that represents a large portion of the total variance (> 70%) and designates them as the core determining factors.

Table 3: *KMO and Bartlet's Test of Spherity*

Bartlet's Test of Spherity	Kaiser-Meyer-Olkin	.666
	Approx. Chi-Square	677.149
	df	139
	Sig.	.000

The appropriateness of the study data was at first confirmed through the Kaiser- Meyer-Olkin (KMO) measure of sampling adequacy, which yielded a score of 0.666 (see Table 3). This is considered sufficiently high and appropriate (Kaiser, 1970, and Addae-Dappah

et al., 2009). In order to carry out PCA, a correlation matrix was generated for the 39 variables; factors were then extracted from the correlation matrix based on their correlation coefficients with the variables. Thereafter, the factors were rotated in order to maximize the relationship between the variables and the factors. The first un-extracted analysis revealed the presence of multi-co linearity (i.e highly correlated variables). Some variables were, as a result, eliminated in order to correct this.

Table 4: *Principal Component Analysis of Variables*

Factor Components	
Factor 1*: Environment-influenced Designs Features.*	
Cronbach's Alpha: 0.824	
Connection to green space	0.720
Condition of air conditioning plant	0.758
Waste-water reduction.	0.697
Maximization of environmental design features	0.615
Aesthetic implications	0.772
Variance (%)	19.759
Factor 2: *Cost- saving factors*	
Cronbach's Alpha: 0.817	
Evidence of alternative energy supplies from renewable sources.	0.824
Accessible communication channels with building stakeholders.	0.691
Reduced water consumption.	0.552
Encouragement of employment of local residents within the building.	0.565
Increased productivity from compliance with health & safety regulations.	0.799
Variance (%)	17.787
Factor 3*: Social Factors*	
Cronbach's Alpha: 0.630	
Lighting power density & peak energy demand.	0.774
Awareness and training of emergency evacuation and requirements in building design .	0.804
Complementary usage of building.	0.570
Appropriate training for security personnel.	0.122
Variance (%)	17.099
Factor 4*: Locational Factors*	
Cronbach's Alpha: 0.648	
Quality of overall built environment and site use	0.743
Proximity to urban spaces (town centers, malls etc)	0.739
Proximity to urban childcare facilities	0.743
Variance(%)	13,330
Total Variance (%)	67.974

The resulting analysis sifted out 22 variables out of the original 39 to leave 17. The latent root criterion suggested a four factor solution, which collectively accounted for 67.974% of the variance within the 17 variables. Cronbach's alpha, a diagnostic measure for consistency of the entire scale was utilized. The generally accepted lower limit of Cronbach's alpha for reliability is 0.70 (Addae-Dappah et al., 2009). Only factors one and two satisfy this condition. However, since four variables were shown to account for the variance, these four factors are adopted for the study. We assume a variable belongs to a factor component with which it has the highest factor loading.

By examining the variables belonging to each factor component, an appellation can be given to each factor as shown in Table 4. Factor 1 was named Environmental-influenced Designs Features. With five variables, Factor 1 accounted for 19.75% of the total variance. From Table 3, respondents showed that the weight attached to features such as connections to green space, condition of air conditioning plant, etc. can have a highly significant impact on property value. This suggests that respondents are aware of environmental issues and also believe that a building with such features would attract higher market value.

The second group of variables clustering under factor 2 is collectively tagged: 'cost-saving factors'. This factor comprises of variables such as accessible communication channels with building stakeholders; reduced water consumption; encouragement of employment of local residents within the building and productivity gains from compliance with health and safety. The factor represents 17.78% of the total variance. This group of variables offers opportunity for reduced cost of operation by cutting down on overheads. Under normal conditions of sales, these factors should come under 'economic' factors that enhance property value through better local interactions and reduced government 'harassments' as a result of adherence to regulations. Thus, respondents agree that cost-saving factors should be given significant weight in valuation for sustainability.

The third group of factors christened 'social factors' affects the ability of occupiers to enjoy human capacity enhancements as a result of occupying the property. The factor collectively account for 17.09% of the total variance. The variables under this factor reflect contemporary social problems: local concern that any conflict that could compromise security of lives and property are forestalled, the need to ensure that man-made disasters (such as fire outbreak) do not affect the property.

In the valuation of conventional properties, locational factors are major factors to consider. Together with accessibility, locational factors place a premium value over other properties enjoying less locational advantage. In this study however, these factors accounted for the least variance amongst the four root criteria. Factors such as quality of overall built environment and site use, proximity to urban spaces (town centres, malls etc) and proximity to childcare facilities account for 13.3% of the variance. However, it is only in this factor that all variables display equally strong component values (see Table 3). It is possible to surmise from the component values of the variables that locational factors are themselves individually strong indicators in the valuation of sustainable properties.

***Table 5**: Qualitative Scenario Analysis*

Cohorts	Sustainable: will reflect higher market value		Not Sustainable: will reflect lower market value		Not Sustainable: this will not reduce the market value	
	Frequency	%	Frequency	%	Frequency	%
High on economic features Low on environmental features Low on social features	80	59.3	38	28.1	7	5.2
High on social features Low on economic features Low on environmental features	77	57	41	30.4	12	8.9
Low on economic features High on environmental features Low on social features	68	50.4	54	40	7	5.2
High on economic features Low on environmental features High on social features	60	44.4	47	34.8	22	16.3
Low on economic features Low on environmental features Low on social features	44	7.4	64	47.4	17	12.6

For the qualitative analysis, we created five sustainability scenarios. Respondents were asked to indicate their 'subjective value' of the hypothetical property, and to express in qualitative terms, the weight attached to the social, economic and environmental features. The results are summarized in Table 5. The cohorts were made of five 'partially sustainable' cohorts and one unsustainable cohort as a control group. Explanatory indicators for each of the social, economic and environmental features were made available to respondents. Among others, the results show that respondents believed strongly that sustainability affects property value. This is evident in the fact that overall, respondents are of the view that the presence of sustainable features will induce higher values or that the absence of sustainable features will result in lower market value.

However, it was found that majority (59.3%) of the respondents tended to believe more (at 59.3%) that if a property is high on economic features, low on environmental

features and low on social features; it would command higher value; while 57% felt that where a property is high on social features, low on economic features and low on environmental features; it would reflect higher market values. In addition, 50% opined that where a property was low on economic features, high on environmental features and low on social features, it would reflect higher market value. More respondents in the control group felt that property that is not sustainable will reflect lower market value. The concession is that sustainability affects property value. Respondents' clear grasp of the sustainability question was further accentuated by a higher percentage of respondents (47.4% to 7.4%) that claimed that a property low on economic, low on environmental and low on social features will not be sustainable. In all the scenario counts, the least number of respondents believed that where these sustainable features are not present, it will not reduce the market value of the property. Respondents therefore believe that the existence of sustainable features (social, economic or environmental sustainability) would enhance the market value of a property. However, when this result is combined with the results of the factor analysis, it appears that respondents tend to define sustainability more in terms of the social indicators and less of the economic and physical features as the social features are rated consistently in both the qualitative and quantitative analyses.

For the quantitative analysis, respondents' views were found clustered more around environmental features than any other, although if taken individually, economic variables achieved significant weights which suggest an appreciation of the economic dimension of sustainability. There is also an appreciation of the environmental features of sustainability given that the environmental variables achieved the highest clustering in the PCA.

The seeming disparity in the qualitative and quantitative analysis could be explained by the fact that a subjective element was introduced into the qualitative design. However, accepting that value is directly suggests that Nigerian valuers are familiar with the issue of sustainability with respect to property values. We can therefore safely reject the hypothesis that Nigerian appraisers are not aware of sustainability features in properties.

Table 6: *Appropriate Method of Valuation*

	F	%
Conventional Methods		
Comparative analysis	64	59.8
Profits	89	83.2
Discounted cash flow method	102	95.3
Residual method	80	74.8
Contractor's method	100	93.5
Contemporary Methods		
Hedonic pricing method	91	85
Fuzzy logic	86	80.4
Autoregressive integrative moving average	97	90.7
Rough set theory	94	87.9
Artificial neutral network	107	100
Special analysis	62	57.9

F= Frequency, % = Percentage

Table 7: *Level of least familiarity and desire for additional training*

	%
Conventional Methods	
Comparative analysis	14
Methods Profits or Accounts method	16
Discounted cash flow (DCF) method	-
Residual method	7
Contractor's method	9
Contemporary Methods	
Hedonic pricing method	9
Fuzzy logic	45
Autoregressive integrative moving average	16
Rough set theory	16
Artificial neutral network	21
Special analysis	25

% = Percentage (In this table, the percentages did not add up to exactly one hundred because some respondents chose more than one option)

For the qualitative analysis, we created five sustainability scenarios. Respondents were asked to indicate their 'subjective value' of the hypothetical property, and to express in qualitative terms, the weight attached to the social, economic and environmental features. The results are summarized in Table 5. The cohorts were made of five 'partially sustainable' cohorts and one unsustainable cohort as a control group. Explanatory indicators for each of the social, economic and environmental features were made available to respondents. Among others, the results show that respondents believed strongly that sustainability affects property value. This is evident in the fact that overall, respondents are of the view that the presence of sustainable features will induce higher values or that the absence of sustainable features will result in lower market value.

However, it was found that majority (59.3%) of the respondents tended to believe more (at 59.3%) that if a property is high on economic features, low on environmental features and low on social features; it would command higher value; while 57% felt that where a property is high on social features, low on economic features and low on environmental features; it would reflect higher market values. In addition, 50% opined that where a property was low on economic features, high on environmental features and low on social features, it would reflect higher market value. More respondents in the control group felt that property that is not sustainable will reflect lower market value. The concession is that sustainability affects property value. Respondents' clear grasp of the sustainability question was further accentuated by a higher percentage of respondents (47.4% to 7.4%) that claimed that a property low on economic, low on environmental and low on social features will not be sustainable. In all the scenario counts, the least number of respondents believed that where these sustainable features are not present, it will not reduce the market value of the property. Respondents therefore believe that the existence of sustainable features (social, economic or environmental sustainability) would enhance the market value of a property. However, when this result is combined with the results of the factor analysis, it appears that respondents tend to define sustainability more in terms of the social indicators and less of the economic and physical features as the social features are rated

consistently in both the qualitative and quantitative analyses.

For the quantitative analysis, respondents' views were found clustered more around environmental features than any other, although if taken individually, economic variables achieved significant weights which suggest an appreciation of the economic dimension of sustainability. There is also an appreciation of the environmental features of sustainability given that the environmental variables achieved the highest clustering in the PCA.

The seeming disparity in the qualitative and quantitative analysis could be explained by the fact that a subjective element was introduced into the qualitative design. However, accepting that value is directly suggests that Nigerian valuers are familiar with the issue of sustainability with respect to property values. We can therefore safely reject the hypothesis that Nigerian appraisers are not aware of sustainability features in properties.

To test the hypothesis that Nigerian valuers do not utilize contemporary methods of to capture sustainability features in properties in their valuation; respondents were asked to indicate which of eleven valuation methods they considered most suitable in valuing a hypothetical sustainable property. According to Table 6, it appeared that respondent valuers were undecided on which of the two categories of methodology to prefer (contemporary or conventional). The reasons for this may include the fact that the respondents were predominantly young in practice (and possibly young in age) and are therefore well exposed, through information technologies and other modern educational media, to new thoughts on valuation practice, including contemporary valuation methods. Because respondents indicated willingness to use modern methods of valuation in appraising sustainable property therefore, the hypothesis that Nigerian valuers would tend not to utilize modern methods of valuation to account for sustainability features in properties is also rejected.

Respondents were also asked to indicate the level of their familiarity with alternative methods of incorporating sustainability in valuation and to state whether they would like to receive further training on the preferred methods. In responding to the question 'which of these methods are you least familiar with? The contemporary methods were rated higher. Respondents also indicated willingness to receive more training in contemporary methods. The hypothesis that Nigerian valuers do not require additional training to carry out sustainable valuation successfully is therefore rejected.

Table 8: *Potential drivers of sustainability in real estates*

	Most likely (Freq%)	**Probable (Freq%)**	**Least likely (Freq%)**
Investors	92.6	5.7	-
Government	63.8	25.4	0.8
Property occupiers	86.7	34.4	14.8
Estate surveyors & valuers	60.7	35.2	0.8
Property owners	69.7	26.2	3.3
Civil society groups	33.7	51.6	9.6
Faith (religious) groups	3.3	24.6	65.6

Respondents were further asked to indicate which of the stakeholders they consider as potential driver(s) of the sustainability crusade in the Nigerian property sector. This was done particularly to ascertain whether respondents were aware of the potential role they (real estate valuers) could play in the drive for sustainability in real estate investment decisions. In the results summarized in Table 8, the investors, property occupiers, property owners, government and estate surveyors and valuers are considered as potentially capable of promoting sustainability in the Nigerian property industry. The choice of the government is particularly understandable given that government role is very visible in the built environment in this part of the world. The government has a crucial role to play in developing standards, rules and regulations that would support and sustain the required drive.

Conclusion and Recommendation

The study was designed to evaluate Nigerian real estate valuers' perception and their level of involvement in the ongoing global sustainable real estate movement. The study also attempted to contribute to the debate on the appropriate methodology for incorporating sustainability into real estate valuation, and also investigated whether Nigerian valuers presently posses the required skill. This was done because of our persuasion that valuers have a key role to play in mainstreaming sustainability into the real estate investment sector in particular, and the built environment in general.

Today, the real estate market represents one of the world's largest investment markets and property is now widely recognized as a distinct asset class (Lorenz, 2006). According to Runde and Thyre (2010), as society's value shift to include sustainability, so too will the way estate decisions are made. Sustainability and green building require the valuer to recognize the influence of a new market force (sustainability) and understand a new set of property characteristics (green features) which are market-specific and change rapidly. The challenge facing the industry as a whole therefore is how to ensure that property values and financial instruments are adjusted to reflect the true market value of sustainable buildings. Whether in the valuation of single sustainable property or valuation of properties in sustainable markets, property valuation has a key role to play in this transformation (Fibre, 2007). Lorenz (2006) laments that most valuations prepared today contain environmental disclaimers as valuers claim no knowledge of environmental conditions by stating that the valuation of the property is made 'as clean'. This has to change. The challenge of creating, maintaining and managing sustainable human settlements has to be met by a set of core stakeholders whose decisions affect the shape, design and investment opportunities in the built environment. Here, the valuer's role is key.

Appraisers have a significant role to play in meeting this challenge by influencing the market and by creating, where necessary, new methods or adapting old ones to meet the various appraisals needs of stakeholders. While it is recognized that appraisers should not lead values (Sayce et al., 2010), their influence on property investment decisions through the advice they provide is undeniable. Incorporating sustainability issues into valuations encourages market participants to appreciate the benefits of sustainable buildings and seek to supply it and demand for it. The

direct link between economic benefits and sustainability encourages them to achieve higher price estimates for the buildings they own or aim to sell. Valuers therefore have to know and account for sustainable features in properties and their ability to rise up to this challenge will determine the place of the valuation profession in a world that is getting increasingly aware of the social and environmental impacts of the property market. The generally accepted accounting principles (GAAP) in the US and the adoption of International Accounting Standards Board (IASB) in the EU are both current and future external factors that would make it imperative for valuers to value for sustainability anywhere across the globe.

In addition to the need for specialized local knowledge, the study suggests that Nigeria real estate valuers have to hone their present skills to qualify them to operate in the emerging globalised market, where his/her ability to value for sustainability will be challenged by the body of rules existing within the local environment, some of which could be shaped by global standards.

Integrating sustainability into property valuation process no doubt posses a great challenge for Nigerian valuers. Paucity of comparative data, limited application of global standards, limited exposure of practitioners, weak local regulatory framework, and paucity of research that should assists in the quantifying and adjusting for valuation variables to reflect sustainability, are some of the issues that are presently giving valuers concern. A drive towards establishing sustainability standards in the construction and management of properties should help to alleviate the problem of suitable data considerably. Post-qualification education and Continuing Professional Development seminar/training for valuers should be designed to help valuers identify the relevant components of a green building, discover green properties resources, and analyze the relevance of green features in the market (Pitts and Jackson, 2008). The linkages between the academia and the industry must also be improved to pool resources at both ends for devising measures that would in the not too-distant time enable valuers live up to expectations (Sayce et al., 2010). On the part of the government, the implementation of Energy Performance Certificate, as we have in some advanced countries already, would help to distinguish green properties in the property market, provide a good tool to characterize green features of the building, and thus help valuers to reckon with them in the valuation process. Without an appropriate, adequate and effective legal framework in place, there is little the market participants can do to promote and sustain the much needed sustainable movement in the country.

References

Addae-Dapaah, K., Liow Kim Hiang, & Neo Yen Shi, S., (2009). Sustainability of sustainable real property development. *Journal of Sustainable Real Estate.1*.203-225.

Arnel T. (n.d.). World Green Building Council. www.world.org/image/stories/pdf/Final_Climate_Action_article.pdf (Accessed October, 2011).

Babawale, G. K. (2008). *An evaluation of the relative impact of factors affecting inaccuracy in residential property valuation in Lagos Metropolis*. (Unpublished doctoral dissertation).

University of Lagos, Lagos, Nigeria.

Babawale, G. K. and Koleoso, H. (2006). *Real estate valuation practice in Nigeria: Implication in a globalizing World: Proceedings of an International.* Conference on the Built Environment: Innovation, Policy, and Sustainable Development. Covenant University, Ota Nigeria.

Boyd, T., (2005).*Can we assess the worth of environmental and social characteristics in investment property?* Paper presented at 11th PRRES Conference, Melbourne, 23-27 January. Melbourne, Australia.

Boyd, T. and Kimmet, P. (2005) *The triple bottom line approach to property performance evaluation.* Paper Presented at PRRES, 23-27January. Melbourne, Australia.

Elliot P & Warren, C. (2005). *The valuation profession in Australia: profile, analysis and future directions.* Paper presented at 11th PRRES Conference, Melbourne, 23-27 January. Melbourne, Australia.

Fuerst, F., & McAllister, P. (2010). *What is the effect of eco-labeling on office occupancy rates in the USA?* Findings in Built and Rural Environments Series. London: Royal Institute of Chartered Surveyors.

Goering J., (2009). Sustainable real estate development: The dynamics of market penetration. *Journal of Sustainable Real Estate.1.*168-201.

GVA Grimley (2008). *Corporate Real Estate Survey.* London: GVA Grimley

Kauko, T. (2008) From modeling tools towards the market itself an opportunity for sustainability assessment? *International Journal of Strategic Property Management,12*, 95 107. http://dx.doi.org/10.3846/1648-715X.2008.12.95-107

Kimmet, P. (2006) *Theoretical Foundations for Integrating Sustainability in Property Investment Appraisal*: Paper presented at 12th Pacific Rim Real Estate Society Conference, Auckland, 22□25 January. Melbourne, Australia.

Lorenz, D. (2006). *The application of sustainable development principles to the theory and practice of property valuations.* (Unpublished Ph.D Thesis). Universidad Karlsruhe.

Lutzkendrof, T. (2011). How to Break the Vicious Circle of Blame? *The Contribution of Different Stakeholders to a more Sustainable Built Environment. Sustainability in Architecture and Construction, (6)*, pp.1-10. http://www.fec.unicamp.br/-parc/vol1/n6/vol1-n6-LUTZKENDORF.pdf.

Lutzkendrof, T. and Lorenz, D. (2005). Sustainable property investment: valuing sustainable buildings through property performance assessment. *Building Research & Information 33*,(3), 212-34.

Lynch, M. and Gemini, C. (2007). 11th Annual World Wealth Report. Http://www.capgemini.com (accessed on 12th May, 2008).

Malgorzata, G. S.(n.d). *Are 'Green Factors' able to drive the real estate value up?* Department of Ecological Economics, Wroclaw University of Economic, Poland.

Motta T.A., & Endsley W.E. (2003). *The future of the Valuation Profession: Diagnostic Tools and Prescriptive Practices for Real Estate Markets.* Paper presented at the World Valuation Congress, Cambridge, United Kingdom.

Oven, D & Pekdemir, A. (2006) Office rent determinants utilizing factor analysis. *Journal of Real Estate Finance and Economics (33)*, 5173. http://dx.doi.org/10.1007/s11146-006-8274-5

Pearse, D. (2005) Do we understand sustainable development? *Building Research and Information, Vol. 34*(3) pp 201-207

Pivo, G. (2005). Is there a future for socially responsible property investment? *Real Estate Issues, Fall*, 16-26.

Pivo, G. (2007). *Exploring responsible property investing: A Survey of American Executives*. Corporate Social Responsibility & Environmental Management. http://dx.doi.org/10.1002/csr.165

Robinson, J. (2005) *Property valuation and analysis applied to environmentally sustainable development.* Paper presented In PRRES, 11th Pacific Rim Estate Society Conference 2005, Melbourne, 23□27. Australia: Melbourne.

Runde, T.P.and Thoyre, S. (2010). Integrating sustainability and green building into the appraisal process, *Journal of Sustainable Real Estate, 2* (1), pp.221-248.

Sayce, S., Sundberg, A., & Clements., B. (2010). Is sustainability reflected in commercial property prices: an analysis of the evidence base. London: Royal Institute of Chartered Surveyors.

Sayce, S. Ellison, L. and Smith, J. (2004) Incorporating sustainability in commercial property appraisal: evidence from the UK', *Australian Property Journal, August* .226-233.

Zeemering, E,(2009). What does sustainability mean to city officials? *Urban Affairs Review 45*, 247-273. . Http://dx.doi.org/.1177/1078087409337297.