Issues in the Definition and Valuation of Sustainable Buildings in Lagos, Nigeria

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Abstract
The purpose of this paper is to contribute to the academic discourse on the incorporation of sustainability into property valuation practice. The study assesses the criteria guiding the conceptualisation of sustainable buildings as found in academic literature and proposes a holistic, lifecycle based conceptualisation of sustainable buildings; which can then be localised as necessary. The elements from the conceptualisation are then developed into sustainability features of a hypothetical property, which is then used as the basis for the quantitative aspect of the study. The study is based on a survey of practising estate surveyors and valuers in forty two estate firms in Lagos; selected with the use of cluster sampling and surveyed with a semi-structured questionnaire. Data was analysed using descriptive statistics. Analysis revealed that although the investment approach was acknowledged to be the most appropriate method of sustainable building valuation, the most readily available data inputs were for the cost method of valuation. Given the state of market maturity, this implies that the cost method presently remains the most expedient method of valuation of such properties. It was also found that respondent valuers possess limited experience in the valuation of buildings with core environmental features. While there are perceptions of capital and rental value increases attributable to sustainable buildings, there is limited expertise on how to account for sustainability features, and these could affect value judgments. It is recommended that as the sustainable property sub-market grows, specific training for valuers on sustainability, continuous professional development, systematic information gathering and sharing within the market must be strategically carried out to ensure the appropriate capture of the impact of sustainability on property value.

Keywords: Sustainable buildings, Sustainable development, Sustainability, Valuation methods.

1. Introduction

Emerging trends in real estate development in developing countries reveal some discernible drivers for the incorporation of sustainability principles in property design, construction and valuation in the not too distant future.

Projections show that in the housing sector alone, there is a construction market of $200 billion annually, with the largest markets in China, Russia, India, Brazil and Nigeria (Woetzel, Ram, Mischke, Garemo, and Sankhe, 2014). Statistics also show that as at 1999, South Africa was home to over 213,000 commercial sites while India could be the third largest construction market by 2018 with increasing investment in housing, urban renewal and urban development (Research Information, 1999). Further, China has already overtaken the US as the largest construction market globally; and effective regionalisation in Africa and Asia could also drive up construction and real estate activities (Accenture, 2012). The implication of this growth is an increased need for infrastructural development and higher demand for cheaper energy sources, water supply and efficient waste management. New customer preferences for sustainable practices in home construction, neighbourhood management and home maintenance are also imminent. Construction activities therefore present opportunities for sustainable building projects in many parts of the developing world. They are potential drivers for future adoption of sustainable practices in these countries (Baldouf-Cunnington & Hubbard, 2011).

Real estate industry practitioners in these countries will face the challenge of applying the principles of sustainability in their dealings in property throughout the buildings' lifecycle. Practitioners such as Estate Surveyors and Valuers in particular, as advisers to investors and interpreters of property values for various purposes, should expect a redefinition of their roles if they are to remain relevant in the fast changing property sector (Lorenz, 2006).

The purpose of this paper is to contribute to the academic discourse on the incorporation of sustainability into property valuation practice, with particular focus on emerging property market. First, the study provides a literature review of the various conceptualisation of sustainable building. Secondly, using an hypothetical sustainable building case, the study draws from the responses of practising estate surveyors and valuers in Lagos to, ascertain- one, which of the three methods (comparison, cost and investment) valuers would use to carry out asset valuation to determine the capital value of a hypothetical property and why. Secondly, the researchers sought to determine the ease of access to data-inputs needed to carry out the valuation for the subject property. Thirdly, the researchers wanted to ascribe, from the valuers' perceptive, a percentage difference between the capital and rental values of the hypothetical sustainable building and a conventional one and lastly, to determine the level of experience of respondents in the valuation of sustainable buildings.

The study is justified on a number of grounds. Oyalowo (2009) found that globally agreed sustainability principles may have little impact on planning policies at individual country levels. Cooper (1999) and Du Plessis (2005) both argue that current discourse on the environmental performance of buildings has been led by the needs of developed countries and has been completely negligent of the developing world and its peculiar challenges. More specifically, valuation professionals have only recently captured the essence of sustainability on their professional practice (Babawale & Oyalowo, 2011; Lorenz, 2006; Lutzenkerf & Lorenz, 2011). The three dimensions of relevance, geographical coverage and unawareness represents gaps in knowledge and practice that needs to be filled. To remain relevant and competitive in the industry, valuers require an improved understanding of the problems they might encounter as they respond to potentially globalised market challenges. This study will also contribute to the body of existing literature on the sustainable development movement with a particular focus on the less researched emerging property market, such as Nigeria.

The paper is laid out as follows: Section two presents the literature of the conceptualisation of sustainable buildings and thereafter attempts an integrated definition. The third section presents the methods and results of a survey of estate surveyors and valuers in Lagos, Nigeria. Section four concludes the analysis.

2. Conceptualisation of Sustainable Buildings

Sustainable buildings are a product of the sustainable development paradigm; and there are over 500 definitions of sustainable development (Warren, 2009). No attempt is made in this paper to interrogate these definitions as the focus lies in the application of the globally accepted norm of sustainability (meeting today's needs without disenfranchising future needs) into the microcosm of the performance and functionality of the individual building unit. However, not surprisingly, there are also several definitions of sustainable buildings, with each author presenting perspectives relevant to their study area, with the resulting definitions being limited by scope and geography of the author. Yet the incorporation of sustainability into the unit building lends itself to a more holistic approach of conceptualisation. The objective of this section of the paper is to present an integrated, holistic life-cycle based definition captured from an outline of previous definitions of sustainable buildings.

It is possible to identify three trends in the definition of sustainable buildings. First, is the tendency to provide broad conceptualisation of the term. For instance, in their study on the barriers and drivers for sustainable buildings, Hakkinen and

Belloni (2011) adopted ISO 2008 definition of sustainable buildings as follows: The sustainable development of buildings (and other construction works) creates the required performance and functionality with minimum adverse impact, while encouraging improvements in economic and social (and cultural) aspects at local, regional and global levels. This is a very general statement on sustainable buildings that incorporates the three tripods of sustainability (social, ecological and physical); but does not provide crucial description of building components that could guide stakeholders in recognising sustainability. On their part, Lutzenkorf and Lorenz (2006) argued that sustainable buildings should protect the natural environment and ecosystem, basic natural resources, human health and well-being, social values and public goods as well as protect and preserve capital and material goods. All these should be achieved irrespective of the specific function of the building. While these five 'protection areas' are derived from the three tripods of sustainable development, the definition does not also information about the actual features of a sustainable building; being focused instead of performance criteria.

Authors like Kibert (2007), Myers, Reed and Robinson (2007) and Rohde and Lutzenkorf (2009) define sustainable buildings in terms of their characteristic features. Myers, Reed, and Robinson, (2007) defined sustainable buildings as buildings that have been designed with a number of features such as reduced production of CO_2 and other greenhouse gas emissions, reduced water, gas and electricity consumption, waste production, reduced use of precious natural resources, enhanced building occupant health and comfort and reduced environmental footprints. These features combine to make the buildings more sustainable than their conventional counterparts. Kibert (2007) defined sustainable buildings as "buildings that consume significantly less energy, materials and water, provide healthy living and working environment and greatly improve the quality of the built environment". To this, Rohde and Lutzenkorf (2009) add features such as resource and cost efficiency, healthfulness, resistance to obsolescence and higher aesthetic urban, technical and functional qualities.

Attempting a more generalised conceptualization, Lorenz (2006) describes sustainable buildings as buildings that achieve sustainability by 'squeezing more utility owners, users and the wider public out of the lowest possible use of land and throughput of energy and raw materials.' Here, the author captures the sustainability of the building construction process itself. However, like the other definitions, it does not mention the property investor as a crucial stakeholder; neither does it mention the economic functions a sustainable building might serve.

It is also observable that most of the features presented in these definitions are environmentally biased-without due cognizance of social and economic features such a building might serve.

The third trend is to use the terms 'sustainable' and 'green' building synonymously. Providing an historic perspective, as Du Plessis (2005) and Robinson (2005) note that like the concept of sustainable development, sustainability in buildings originally had an environmental bias, with emphasis on the reduction of greenhouse gas emission and associated energy cost savings, hence these buildings were regarded as 'green buildings'. Addae-Dapaah, Liow, and Neo Yen Shi, (2009) define green buildings as ones that are 'aimed at reducing the negative impact of real estate development in both the environment and human health to promote the sustainability of life'. The authors then highlight the features considered appropriate in sustainable buildings as follows: the use of energy-efficient and eco-friendly building materials, quality indoor air for human safety and comfort; promotion of renewable energy, possession of effective control and building management systems, efficient use of water, non-toxic and recycled materials; effective use of existing landscapes and adoption of cost-effective and environmentally friendly ecologies. Because of their environmental bias, this definition is essentially concerned with the social and environmental impacts of sustainable buildings, with minimal regards to the economic performance of the building. Choi (2009) asserts that green buildings should examine impacts at the site, neighbourhood, regional and global levels; thus focusing on the promotion of sustainability in the construction process and not on sustainability in property usage and performance. Salami and Olaniyan (2010) offer a more generalised definition of sustainable building as those buildings that have minimum adverse impacts on the built and natural environment, the buildings, their immediate surroundings and the broader regional and global setting. Charles (2004) defined 'high performance green buildings' as facilities designed, built, operated, renovated and disposed of using ecological principles for the purpose of promoting occupant health and resource efficiency plus minimising the impacts of the built environment on the natural environment. These definitions capture sustainability in the lifecycle phases of buildings, but the economic performance of these buildings as investments are left out of the discourse.

A careful analysis of the content of these definitions reveals several issues. At least two out of the three globally accepted dimensions of sustainability (the social, environmental/physical and economic dimensions) were reflected in most

definitions. This reflects the current trend in identifying sustainability as a relationship between the internal building environment (a social dimension) and building productivity (an economic dimension), rather than emphasis on ecological and environmental issues which had hitherto dominated the discourse on sustainable development. Thus, in defining sustainable buildings in earlier times, the limitations in the interpretation of sustainable development reflected on the definition of sustainable buildings. The three dimensions of sustainable development were visible, but the environment was viewed as the dominant dimension that set the preconditions for the others (Lutzenkerf and Lorenz, 2005). However, the construction and property sectors are investment led, and economic returns should be linked to social and ecological concerns and therefore should be highly visible in any attempt to conceptualise sustainability in buildings. Thus the current trend towards recognizing the three tripods of sustainability in defining sustainable buildings is positive.

Secondly, most authors have sought to integrate the generally accepted definition of sustainable development by the Brundtland commission into the arena of building construction. This approach is considered appropriate, given recommendations that the Brundtland definition of sustainable development needs to be translated to sector-specific and written-out definitions of sustainability in several spheres of construction and urban development (Lorenz, 2005; Oyalowo, 2009). Providing construction and urban development sector-specific definitions presents the opportunity to address what sustainability means for the development of a national building stock, its housing and property industry and the needs of property users. Taking Lorenz (2006) argument for a sound and commonly acceptable sectorial definition of sustainability further, a regional (geographical and economic grouping) dimension has been introduced to the conceptualisation of the term by Du Plessis (2005). This has been necessary to capture the differing perceptions and needs emanating from implementing sustainable development across various geographical and economic development divides. The approach has also been necessary due to the likelihood that a global definition of the components of sustainable building may preclude the perspective of stakeholders (occupiers, investors and government) who reserve the right to judge the performance of buildings from the various perspectives relevant to them: functionality and comfort (occupiers), rental and capital value performance over time (investors) and adherence to standards (government and its agencies). Du Plessis (2005) also notes that a globalised definition fails to take note of certain issues; for example, definitions adopted for a sustainable building in warm-humid climates should be different from that of cold and temperate climates. Further, the

sustainability concerns of countries have been noted to differ according to the level of their economic development. For instance, Bourdeau (1999) found that advanced countries tended to focus on the creation of sustainable buildings in new developments and the upgrading of existing buildings to sustainability standards; Transition economy countries emphasised sustainability in new developments as an opportunity to improve housing shortage and infrastructure (Du Plessis, 2005; Bourdeau, 1999). Developing countries on the other hand, were concerned with the social and economic issues of sustainability (Jay & Bowen, 2011; Babawale & Oyalowo, 2011; Bourdeau, 1999; Satherthwaite, 1999; Drakakis-Smith, 1995)**.** These perspectives reflect the localised nature of the property market across various regions, and suggest that the definition of sustainable buildings should either reflect local and regional geographical alignment, cultural affinity and extent of sophistication of real estate markets or the definition to be offered should be broad enough to be capable of being translated to the various needs of several regions. Both approaches could however create standardisation difficulties, especially when drawing global comparisons. The present paper suggests that comparisons could thereafter be done on like-for-like basis; while cross-country, cross-regional perspectives serve as best practice studies with possibility of policy transfer. We also maintain that localized definitions are capable of being generalised, if an approach that reflects the general life-cycle of buildings is adopted. We therefore, present our conceptualisation of a holistic, lifecycle based definition; which can be localised to capture various local (economic/regional) perspectives. We integrate various aspects of definitions discussed above. The result is to define sustainable buildings as buildings that are developed on a carefully selected site, with design and material specifications that are environmentally friendly, constructed using processes that do not compromise the environment further; it is thereafter operated using energy-efficient and eco-friendly facilities, with minimal occurrence of building related illness for users. A sustainable building improves the quality of the built environment by being resistant to obsolescence, it also preserves its capital and material values; is well integrated with city planning and architectural standards that serves the long term social, economic and environmental requirements of its users, investors, general public, while also achieving a reduced environmental footprint.

This lifecycle approach allows stakeholders to relate to the definition of sustainable buildings at the point relevant to them. Moreover, with a holistic approach to definition it becomes easier to see that achieving sustainability in all buildings (homes, offices, industries, commercial) particularly new construction is possible; so that buildings thereafter become the focus of establishing the linkages

between environmental commitment, human community planning, social equity, technological innovations and long term competitiveness of cities (Goering, 2009). These linkages are generally tested with property valuation exercises, which are required for purposes such as for mortgage value, insurance, capital, sales and letting amongst others. The challenges of valuing for sustainability are presented in the next section.

3. Methods of Valuation of Sustainable Buildings

Property valuation methods can be divided into two: the conventional and the contemporary. The International Valuation Standards Council (2011) recognises three main methods within the conventional methods. These are the market approach, income approach and cost approach. Lorenz (2006) discussed contemporary approaches such as hedonic pricing methods, artificial neural networks, spatial analysis methods, fuzzy logic, auto-regressive integrated moving average method, real options method and rough set method. The present study reviews the three conventional methods as methods of sustainable property valuation in a developing country context. This focus on the conventional methods is based on several considerations. First, it is recognised that conventional methods are best suited for the valuation of single properties while the contemporary methods are mainly suited for mass valuations (Lorenz, 2006). Secondly, valuation methods depend on high quality information from relatively homogenous, vibrant property markets, and their results are generally auto-generated. The methods are also quite impersonal in use, and are not based on physical inspection of the subject property. Their use for sustainable buildings in emerging property markets could also be hampered by the lack of expertise by property valuers. A recent study in the vibrant property market of Lagos, Nigeria showed limited use and demonstrable expertise in the use of contemporary valuation techniques (Babawale & Oyalowo, 2012). With availability of information and required expertise, however, contemporary methods can be used to value future opportunities that sustainable buildings offer with the use of real options method, while the hedonic pricing methods can be used to measure the value that is placed on the qualitative and quantitative attributes of properties, while a number of other methods can be used to understand the relationship between particular buildings or locational features and observed property prices. For now, the contemporary methods are not generally applicable. Thus, the discussion is limited to the three methods in use globally and recognised by the International Valuation Standards Council (IVSC) for property valuation.

3.1 The Market Approach

The market approach utilises a comparison of the sale prices of similar, substitute properties and related market data to determine property value (Lorenz, 2006). It is often regarded as the foundation of all valuation approaches. The IVSC specifies the following steps in the valuation of a property using market approach.

- Consider the transaction prices of recent transactions in identical or similar assets in the market
- Adjust price information from other transactions to reflect any differences in the terms of the actual transaction. Differences are to be adjusted according to the basis of value, differences in the legal, economic and physical characteristics of the assets in the other transaction to the asset being valued.
- Adjustments could be in lump sum or percentages.

The application of the market approach to sustainability valuation would require the valuer to compare expectations of future performance of the subject property with the expectations of buyers and sellers of comparable properties in relevant markets (Lowe & Chappell, 2007). The valuer would have to make relevant and reliable adjustments to the sales prices of existing (green and non-green) buildings. However, valuation accuracy is to be enhanced with the use of already established appraisal techniques to extract or develop adjustments to cost, income and other relevant data. The application of this method for sustainable building is dependent on the available market data.

3.2 The Income Approach

The income approach provides an indication of the value by converting future cash flows to a single current capital value (IVSC, 2011). It is applied to properties that are capable of generating a rental income and for which an investor is the most likely purchaser (Lorenz, 2006). The IVSC recognises three methods of utilising the income approach. First, is the income capitalization method, were an all-risks or overall capitalisation rate is applied to a single period income. Secondly, is the discounted cash flow where a discount rate is applied to a series of cash flows for future periods to discount them to a present value and lastly various options pricing models. Valuation input parameters for this method are extracted through an analysis of comparable sales, comparable properties and of supply and demand relationships (Lorenz, 2006).

The use of the income approach in sustainability valuation would allow the valuer to consider how all the key elements of income, expense, and risk attributes of a property would be affected by the specific sustainability features of the property

being valued (Lowe & Chappell, 2007). The presence of sustainability element can thereafter be reflected by adjusting the risk premium rate. This is because the risk premium calculation is generally undertaken for individual properties and tailored to specific local market conditions and characteristics of the property.

The method also requires analysis of comparable sustainable properties; which are expected to be comparable in terms of similar income-expense ratios, land-value-to-building ratios, risk characteristics and future expectations of income and value changes over time (Lorenz, 2006). The application of this method for sustainable building is therefore dependent on the available market data. But it offers considerable opportunities for valuation variation, due to reliance on value judgements necessitated by the nascent nature of the sustainable property market. (Babawale, 2009; Ludstrom & Gustafsson, 2006).

3.3 The Cost Approach

According to IVSC standards, the cost method is based on the principle that the buyer will pay no more for an asset than the cost to obtain an asset of equal utility whether by purchase or by construction. It is also referred to as the 'Depreciated Replacement Costs DRC' method. Lorenz (2006) lists the steps to valuation using cost approach as follows:

- Assessment of the value of the cost of rebuilding a new building which could perform the function of the existing structure
- Make adjustments to allow for obsolescence and depreciation of the existing building relative to the new hypothetical unit

Its use in valuation of sustainable buildings could therefore take the following steps:

1. Assess the value of the raw land
2. Add the value of the cost of building a sustainable building that could perform the function of the existing building
3. Adjust for obsolescence and depreciation.

The value of the raw land is ascertained using the sales comparison approach. This relies on market data. The cost of constructing a sustainable building can be ascertained through the actual development cost of an existing building or from the bill of quantities prepared for a proposed building. Depreciation can be ascertained through any of the well-known methods, such as straight-line approach, sum-of-the-year digit method, annual sinking fund method and so on.

Lowe and Chappell (2007) note that although this approach has been much neglected, the method should be considered in 'the transitional time' during which the principles guiding valuation of sustainability is being developed. To adopt the cost approach for valuing sustainability, the authors recommend a thorough understanding of the costs associated with sustainable building, and the adjustment of the net income or cash flow to reflect differences between sustainable and non-sustainable buildings.

4. Method

4.1 Sample Population, Size and Technique.

The population for this study are the estate surveyors and valuers who are practising in Lagos Metropolis. The 2006 NIESV directory shows that over 281 registered estate surveying firms are located in Lagos Metropolis. Using the cluster sampling model, questionnaires were administered to 82 designated valuation officers in these firms across five economic nuclei of Lagos Metropolis (Ikoyi, Victoria Island, Ikeja, Central Lagos and Lagos Mainland). A similar method was adopted by Ibiyemi (2009). The survey achieved a return rate of 51%, (that is 42 questionnaires) which translates to 15% of estate firms in Lagos.

4.2 Survey Instrument

A semi-structured questionnaire was designed to elicit maximum attention and understanding amongst respondents. The semi-structured questionnaire is one that comprises of a mixture of open and close ended questions. A hypothetical sustainable commercial property was presented in the first section of the questionnaire. This approach was considered appropriate in order to ensure uniformity of conceptualisation of what a sustainable building is, given the various definitions ascribed to the term. Contemporary sustainable building research such as Boyd and Kimmet (2005), Kauko (2008) and Robinson (2005) have also adopted this method.

To assess the weight attached to sustainability features, it is necessary to disaggregate each of the triple bottom-lines of sustainability- social, environment and economic- into a constituent set of indicators. Pretested variables employed in a previous study (Boyd, 2005) were relied on. However, these indicators were adjusted slightly to reflect local perception and attributes. The indicators are fitted into the description of the hypothetical. The description of the property covered key areas such as building material and façade; design and construction features, environmental features and social features. The descriptions are also capable of

being fitted into the life-cycle categories discussed in section 2 of this paper. In questions 1 and 2, valuers were thereafter requested to ascertain- with reasons- which of the three methods (comparison, cost and investment) they would use to carry out asset valuation to determine the capital value of the property. Respondents were also required to determine the ease of access to data needed to carry out this valuation for the subject property (question 3). Questions 4 and 5 request that respondents provide an estimated percentage difference in the capital and rental values of a sustainable building compared to a conventional one. Finally, respondents were requested to present their actual experience in the valuation of buildings with sustainability features. To achieve this, prominent sustainability features are presented and valuers are asked whether they had ever encountered any of these features in a property valuation exercise. The objective of this question is two-fold. One, to ascertain the level of experience of valuers in the valuation of sustainable properties, and two to determine which dimension of sustainability (economic, social or environmental) is most prominent in the study area. To reduce subjectivity in the responses, valuers were asked to state how they accounted for this feature in valuation exercises.

4.2.1 Reliability and Validity of Research Instrument

A pilot study was conducted using the questionnaire with 3 registered valuers who are engaged in both valuation practice and academics. This is to ascertain the relevance of questions, time required for filling out the questionnaires and simplicity of the questions as well as the reliability of the research instrument. The Test/re-test strategy, a commonly used tool for testing the reliability of a research instrument (Kumar, 1996) was adopted. Similar issues were raised in each of the two tests conducted at four days interval. With this feedback, some questions were restructured in order to simplify the research instrument for the intended respondents.

5. Results

Results were collated and analysed with descriptive statistics. Findings are hereunder presented to fit the research questions.

5.1 Appropriate method of valuation

The International Valuation Standards Council (2011) recognises three main methods within the conventional methods divide. These are the market approach, income approach and cost approach. Respondents were asked to ascertain with justifications which of the three methods (comparison, cost and investment) they would use to carry out asset valuation to determine the capital value of the property.

Table 1: Preferred method for valuing a sustainable commercial property

Valuation Method	Frequency	Percentages	Justifications
Comparison	5	9.8	Commercial nature of property, purpose of valuation
Cost	13	25.5	Lack of comparable for analysis owing to sustainable features of the property, uniqueness of the property, difficulty in ascertaining yield of property
Investment	28	55.0	Income producing nature of property, location in urban area, purpose of valuation
Comparison/ Investment	3	5.8	Uniqueness of property
Cost/Investment	2	3.9	Experience
Total	51	100	

Table 1 above shows that the Investment method was considered the most appropriate for the valuation of the sustainable property by 55% of the respondents. They based their choice on the income producing nature of the property, reinforced by its location in an urban area such that rent can be easily determined, with risk appropriately factored. One respondent stated that 'regular, periodic income is produced on the property in a business and commercial neighbourhood'.

About 26% of the respondents chose cost method as the preferred method for two major reasons. First, the lack of comparable property that is required to determine the yield passing on the property and secondly, the uniqueness of the property as a sustainable building.

Results show that 9.8% of the respondents (9.8%) believed that as the property could be used for both commercial and residential purposes, evidence of market transaction would be easily obtainable. Another reason stated had to do with the purpose of valuation; which is to ascertain the capital value of the property. For this purpose to be achieved, the respondents believed that the valuation exercise would have to be carried out using comparable approach.

However, a few respondents (3.9%) indicated that a combination of the cost and investment method would be appropriate, although the investment method would be the principal method of the valuation. Another group of respondents (5.8%) stated that the combination of the comparison method and the investment method would be appropriate for the study. This choice was on the basis of their

experience in the valuation of sustainable buildings. Although it was stated that the investment method would be the principal method for the valuation while the comparison approach would be used to cross-check the resulting value. Overall, the investment method is therefore considered to be the most appropriate for the valuation of the sustainable building by a majority of the respondents.

5.2 Availability of data for valuation

As shown in section 3 above, there are data inputs required for each valuation approach, whether they are to be utilised in valuing sustainable buildings or conventional ones. Respondents were required to indicate the ease of access they had to data-inputs needed to carry out the valuation for the subject property (question 3). The objective of the question was to ascertain the ease of access to valuation data across the three methods of valuation, bearing in mind that this could, in reality determine the choice of method eventually utilised. Ten valuation inputs were derived from the actual and assumed inputs described in the scope of work for valuation exercises to be found in paragraphs 65 to 68 of the International Valuation Standards Council (IVSC, 2011). Responses were tested for these inputs across the three valuation methods with three options: 'readily available', 'available but have to be adjusted' and 'not readily available.'

Table 2: Availability of data across the three methods of valuation

Valuation Inputs	**Readily Available**	**Available, but have to be adjusted**	**Not Readily Available**
Transaction prices in recent sales of sustainable properties	9 (18%)	30 (59%)	7(14%)
Database of property characteristics to be used for establishing comparable	13(25%)	18(35%)	13(25%)
Current rental income flows of a similar sustainable property	20(39%)	22(43%)	3(6%)
Market derived discount rate to be applied to cash flow of the property	11(22%)	20(39%)	12(24%)
Capitalisation rate to be applied to net income to derive the capital value of the property	18(35%)	21(41%)	3(6%)
Projection of rental income	15(29%)	21(41%)	3(6%)
Cost of construction of a sustainable property	22(43%)	16(31%)	5(10%)
Cost of construction of a normal non-sustainable property	23(45%)	14(27%)	6(12%)
Cost of raw land in an urban area	30(57%)	13(25%)	1(2%)
Rates for the measurement of accrued depreciation	14(27%)	19(37%)	8(16%)

The result shows that the most readily available data for the valuation of a sustainable building was 'cost of land in an urban area' haven being chosen by 57% of the respondents,; followed by 'cost of construction of a conventional non-sustainable property' (45%) and then the 'cost of construction of a sustainable property', having been chosen by 43% of the respondents. While significant proportion of the respondents indicated that data is available, but have to be adjusted for information on 'recent transaction prices of a sustainable property', 'current rental income flows of a similar sustainable property', 'capitalisation rates', and 'projected rental income'.

Market derived indices, such as 'market derived discount rate'; and 'the rate of measurement of accrued depreciation'; were also adjudged to readily available by 24% and 16% of the respondents. Results show that of all the data sets, the least available are 'data on property characteristics required to ascertain comparables,' 'market derived discount rate'; and the 'rate of accrued depreciation'. It is observable that the options for 'availability to data' and 'availability of adjusted data' categories weighed more heavily in percentages than the 'non-readily accessible' options (Table 2). This shows that valuers in the study area have relatively good access to valuation data. However, it is also observed that despite the investment method being considered as the most appropriate method for the valuation exercise, the most readily available data relate to the cost method. This could imply that if faced with the valuation of an actual sustainable building, valuers might recourse to the use of the cost method.

5.3 Estimates of value differences between sustainable and conventional buildings

Respondents were asked (Questions 4 and 5) to provide an estimated percentage difference in the capital and rental values between a sustainable building and a conventional one. This is being done to contribute to the discourse on the economic benefit of sustainable buildings, which can be ascertained through value differentials. It should be noted that the estimations provided here are highly limited to the extent that they represent perception rather than true value differentials, especially since a hypothetical property is the subject of the valuation.

As shown in Table 3 below, a number of respondents (27% and 24% respectively) believed that sustainability increases property rental and capital values by between 10 to 20% respectively; while 10% and 12% believed it would add above 20% to both rental and capital values respectively. Respondents who believed that it

would add less than 10% to rental and capital values constitute 9% and 13% respectively.

A few respondents (14%) believed that sustainability would decrease a building's rental and capital value by less than 10%, while 10% and 12% were of the view that it would make no difference to rental and capital values respectively. It appears therefore that more valuers tended to believe that there is an economic benefit from building sustainably than those who do not.

Table 3: The economic value of sustainable buildings

Change in Property Values		Frequency/Percentage (%) difference in rental value	Frequency/percentage (%) difference in capital value
Increases	Less than 10% increase	5 (9%)	7(13 %)
	10-20% increase	14(27%)	12(24%)
	Above 20% increase	5 (10%)	6(12%)
Decreases	Less than 10% decrease	3(6%)	2(4%)
	10- 20% decrease	1 (2%)	0(%)
	Above 20% decrease	0(0%)	0 (0%)
Neutral	No Difference	5 (10%)	6(12%)

5.4 Level of experience in the valuation of sustainable buildings

Finally, respondents were requested to present their experience in the valuation of sustainable buildings. To achieve this, prominent valuation features were presented to Valuers. These features are adapted from Boyd (2006) and integrated with features of sustainable buildings as summarized from the literatures reviewed in section 1 (appendix 1 and 2; table 4 below). Valuers were then asked whether they had ever valued a property that had these feature. The objective of this question is two-fold: to ascertain the level of experience of valuers in the valuation of sustainable properties (or even properties with sustainable features); and to determine which aspect of sustainability is most common in the study area. To reduce subjectivity in the responses, valuers were also asked to state how they accounted for this feature in the valuation exercise. The experience of valuers in sustainable building valuation is summarised in Table 4 below:

Table 4: Experience of valuers in valuing for sustainability

Features	Sustainability Category	Experienced	Not Experienced
Office building with a facility management unit	Design & Construction	36 (1st)	7 (12th)
Office building located in close proximity to the commercial transport park	Design & Construction	36 (1st)	7 (12th)
Office building with underground parking facility	Design & Construction	31 (2nd)	13 (10th)
Office building that is heavily landscaped with a mixture of paving stones, grasses and shrubs.	Design & Construction	31 (2nd)	8 (11th)
All building staff (car park attendants, floor wardens, general receptionists etc.) are employed from near-by communities.	Social Feature	23 (3rd)	20 (8th)
High rise office building with abundant works of arts as interior décor	Social Feature	21(4th)	20 (8th)
Office building with solar panel facilities.	Environmental (green features)	20 (5th)	23 (5th)
Office building with owner-defined restriction on type of activity by tenant	Social Feature	19 (6th)	20 (9th)
Office building with floor wardens trained in first aid services	Social Feature	18 (7th)	24 (7th)
Office building with water recycling facilities.	Environmental (green features)	17 (8th)	27 (4th)
Office building with internal common crèche service for all staff	Social Feature	15(9th)	25 (6th)
Office building with recyclable waste management facility	Environmental (green features)	12 (10th)	29 (3rd)
Office building depending on natural daylight for lighting rather than electricity	Environmental (green features)	11 (11th)	36 (1st)
Office building with a green roof (grasses and shrubs are planted on the rooftop that captures and makes use of rainwater, reducing the quantity of run-off in the perimeter of the building	Environmental (green features)	8(12th)	35 (2nd)

Majority of the valuers (over 70%) maintained that they had valued office buildings with rich landscaping, buildings in close proximity to commercial transportation facilities, buildings with underground parking facilities and buildings with integrated facility management units. Though these features relate

to physical sustainability, they are features expected to be found in standard high rise office accommodation. It is therefore not surprising that valuers are familiar with these features. A number of the valuers (23) had valued commercial buildings where all building staff are employed from nearby communities, 21 had valued buildings that are ornamented with works of art and 19 had valued buildings whose use were restricted by the owners; all of which are social sustainable features. Similarly, a significant number had also encountered buildings with water recycling facilities and solar panels in previous valuation exercises: both of these are environmental (green) features. However, respondents confirmed their inexperience in the valuation of buildings with core environmental features such as recyclable waste management facilities and office buildings with a green roof.

Thus, results indicate that although valuers have experience in the valuation of buildings with environmental (design and construction features); they are not experienced in the valuation of core green features especially relating to recyclable waste management, energy reduction and management of carbon emission. They are also not experienced in the valuation of social sustainability, for instance with buildings with managed social service provision such as childcare centres. The extent of experience across the three tripods of sustainability could be as a result of limited availability of commercial buildings with core sustainable features in the region, or as a result of lack of valuation instructions for those that exist. On the other hand, this result provides an indication of the prominence of each sustainability feature in the real estate market in Lagos Metropolis. Features such as facility management unit, accessibility factor, landscaped buildings and underground parking facility units all relate to the design and construction aspect of sustainability and from the survey, are found to be the most prominent sustainable feature of buildings in the study area.

To probe further into how valuers account for sustainable features in a valuation exercise, they were asked to explain how the features were integrated into the valuation process. Results are summarised in Table 5 below.

Table 5: Accounting for Sustainability

Features	**Accounting for sustainability***
Office building with a facility management unit	Reduced percentage of depreciation applied to property during valuation. Capitalisation rate was higher to reflect this service. The FM unit was valued as a separate entity. Considered as services so not included in the valuation exercise (2).
Office building located in close proximity to the commercial transport park	It has a negative effect on the value of building due to noise intrusion. Capitalisation rate was lower to reflect accessibility advantage (2). Not considered in the valuation since this advantage would have been reflected in higher rental values (2).
Office building with underground parking facility	Capitalisation rate was lower to reflect this service. Not considered in the valuation exercise since the basement would have been costed as part of the gross floor area and incorporated into the rental value (2). Does not attract special treatment since it is regarded as part of essential facilities for the building (3).
Office building that is heavily landscaped with a mixture of paving stones, grasses and shrubs.	Capitalisation rate was lower. No special accounting since they are parts of the building they have already been factored into the rental value. Valued as external works; elements such as paving stones, grass cultivation, ornaments are costed per square metre (3).
All building staff (car park attendants, floor wardens, general receptionists etc) are employed from near-by communities.	Capitalisation rate was lower to reflect this feature. This is not included in the valuation as they are not part of the building (4).
High rise office building with abundant works of arts as interior décor	Carried out market survey to determine their price and then added to the building value. Noted as furniture, fittings and office equipment. Neglected in the valuation as they are mere fittings. Capitalisation rate is higher to reflect this feature. Regarded as fittings, ornament & embellishment so does not attract value (3).
Office building with solar panel facilities.	Not relevant to value as they are not part of the building (6).
Office building with owner-defined restriction on type of activity by tenant	Categorised as residential/commercial building with different capitalisation rate. It has no effect on the valuation since it is taken into the lease agreement with the tenants.

Office building with floor wardens trained in first aid services	This is a service and is of no effect on the property value as it only affects the service charge. It is not included in the valuation exercise as it is not a part of the building (3).
Office building with water recycling facilities.	Carried out market survey to establish the cost, which is thereafter applied to DRC. Property was regarded as a serviced property and capitalization factor is higher. This is a service and is of no effect on the property value as it only affects the service charge.
Office building with internal common crèche service for all staff	It is taken into the rental value. Not relevant to the valuation (3).
Office building with recyclable waste management facility	Incorporated into the value by getting the cost of installation and cost of incurring the items. This is a service and is of no effect on the property value as it only affects the service charge. Capitalisation rate is higher to reflect this service. It is not included in the valuation exercise as it is not a part of the building (2).
Office building depending on natural daylight for lighting rather than electricity	Negative effect on the rent and overall value of the building. Not included in the valuation. It is an attraction in letting as electricity is needed mainly for equipment.
Office building with a green roof (grasses and shrubs are planted on the rooftop that captures and makes use of rainwater, reducing the quantity of run-off in the perimeter of the building	Regarded as ornament. Multiplying factor would be higher. Applied the cost of construction of roof (2).

***** *This was an open-ended question. Responses have been categorised according to themes. In reporting, responses have been stated as these themes appear. The number of responses reflected in bracket.*

Four scenarios in the valuation of sustainable features emerged from the analysis. In the first scenario, it is regarded as a service which would attract a service charge to be levied on the building occupiers. In this case, the feature is not accounted for in the valuation exercise, as it was believed that its value is captured in the administration of service charge. In the second scenario, the feature is also regarded as a service whose advantage would have been incorporated into the rent passing on the property. In the case of an office building with underground parking facility for instance, two respondents noted that it did not impact on the capital value because the basement would have been costed as part of the gross floor area of the property and thereafter incorporated into the rental value of the property. Thus, the feature is captured in the increased rental value of the property. In the third scenario, a sustainable feature is seen as a service that needs

to be directly captured in the valuation exercise. This is done in two ways. As in the case of the facility management unit, depreciation rates and capitalisation rates could be adjusted to reflect the additional value accruing to the property. The alternative is to cost the feature (e.g the works of art, landscape elements, water recycling plant and water recycling plant) and this additional cost is then added to the building's value.

In the last scenario, the feature is not regarded as a part of the building and is therefore regarded as not relevant to the valuation exercise. The case of a building with solar panel facilities and also a building manned by community-based staff are notable.

It is notable that, with the exception of the green roof, at least one valuer was of the opinion that each sustainable feature was a service that would not be directly captured in the valuation exercise. This indicates that valuers approached the valuation from various perspectives, thus there is no uniformity in the treatment of sustainable features.

5.5 Discussion: Challenges of sustainable building valuation in emerging property markets.

Lorenz (2006) observed that valuation for sustainable buildings can be required for various purposes, including landing, adherence to regulatory controls, investment analysis and determination of the sustainability performance. The instruction for valuation could also occur at various stages in the lifecycle of the building. There is, therefore, the need for valuers to develop expertise in sustainable building valuation. This expertise is based on a proper definition of what constitutes sustainability. This is because of the direct linkage between the building performance and income generation on one hand and the building's features and components on the other hand (Lowe & Chappell, 2007). This requires improved understanding of the concept of sustainable building and valuation process including availability of ample evidence.

Understandably, valuation of sustainable building could be constrained by the lack of comparable, quantitative and reliable data (Hakkinen & Belloni, 2011). The DCF approaches require the property valuer to analyse and interpret current sales and lease transactions and characteristics of comparable buildings against the subject property to make accurate assumptions of the current market climate and its impact upon the value of the subject building (Lutzenkerf & Lorenz, 2006; Myers, Reed, & Robinson,2007). For the income capitalisation approach, the

selection of a capitalisation rate for a particular property is derived from available market data on transactions in similar properties. Properties are also expected to be comparable in terms of similar income-expense ratios, land-value-to-building ratios, risk characteristics and future expectations of income and value changes over time (Lorenz, 2006). Adopting the comparable method, the valuer is faced with two difficulties. First is getting relevant comparable sales price and second is finding comparable sales prices of properties that exhibit sustainability features (Lorenz, 2006). Comparable data is also required when using the cost approach, to ascertain the cost of land, for instance. The application of these methods for sustainable building therefore depends heavily on availability of market data in the right quality and quantity. Given the nascent nature of the sustainable property market, this may prove quite difficult and could mean that valuers would have to resort to subjective estimation. This could lead to the problem of valuation variation identified as a major setback for the valuation industry (Babawale, 2009; Ludstrom & Gustafsson, 2006).

With respect to the most appropriate of the conventional methods, it was found that the investment method took pre-eminence over the others, mainly as a result of the income producing nature of the property, its location in an urban area and the purpose of the hypothetical valuation (to ascertain capital value). However, a number of respondents believed that the cost method is also appropriate, given the lack of comparable properties for analysis and the uniqueness of the property as a sustainable building. However, further enquiries showed that data-inputs needed to carry out the valuation using investment approach need some adjustments in order to be useful. Where market derived statistics were not directly available; valuers would have to utilise their value judgment in order to make these adjustments, increasing the level of subjectivity attached to the exercise. Similarly, even though the cost approach is seen as an alternative approach for ascertaining the value of the property; valuers face the problem of adjustment in the derivation of depreciation rates. While other information needed to carry out the valuation based on cost method was readily available; comparative data for comparison purposes were not readily available. This also reflects the probable scarcity of comparable buildings. This lack of readily available data has been identified by several authors as a potential challenge in sustainability valuation. However, it has been noted (Lorenz, 2006) that the cost approach is to be used if the property is so specialised that there are no comparable properties. This fits with the sustainable building market situation, where sustainable buildings are acknowledged to belong to a special category of property, which are inevitably not traded on the market in the frequency achieved by more conventional

properties. Authors like Myers, Reed, & Robinson, (2007) argue against the use of this approach in sustainable building valuation since 'the property market in advanced countries has matured beyond the point of reliance on costs data."

It could however be argued that while the DCF approaches favoured by Myers, Reed, & Robinson, (2007) are appropriate in matured contemporary property markets; the cost approach could offer an alternative for the sustainable property sub-market; where market sales data are generally acknowledged by both researchers and practitioners to be relatively unavailable. The issue is therefore not of the maturity of the entire property market; but of the level of maturity of the sustainable property sub-market. It is also being argued that the cost approach could as readily be used in the growing sustainable property market of advanced countries and offers a proactive alternative (Lowe & Chappell, 2007) in the drive for encouraging the incorporation of sustainability in the design, construction, maintenance and disposal of sustainable buildings in developing countries**.**

This study reveals that valuers believed that there is a value increase in sustainable buildings, but the level of familiarity of respondents with the physical aspect of sustainability was considerably higher than the ecological aspects of sustainability. It is also interesting to note that across the valuers, all sustainability features were not equally recognised as relevant to the valuation exercise. With the exception of the green roof, at least one valuer maintained that each sustainability feature was not relevant to the valuation exercise. Whereas, when these features were taken together in the overall description of the property, valuers generally acknowledged that an increase in property values would occur to a region of 10 to 20 percent above conventional buildings. The assignment of general increase in the capital value from the general description of the building and the tendency not to recognise individual features as contributory to that increase; indicates that there are differences in the perception of what constitutes sustainability and what does not. This raises the question of localisation, standardisation or generalization of sustainability indicators earlier alluded to in the literature review.

In accounting for the sustainability features, findings revealed clearly that where a feature was discerned as being relevant to the valuation exercise, multiple methods were liable to be used for accounting for that feature. The implication of this would be reflected in substantial valuation variation. This requires that standardisation of sustainability valuation is necessary to ensure uniformity in valuation outcomes.

6. CONCLUSION

Emerging trends in real estate development in developing countries suggest that there are important drivers for the adoption of sustainability principles in the property sector in the not too distant future. Valuers will then be faced with responding to cross-county valuation instructions. However, the valuation of these properties needs to be carried out within a clear framework for the conceptualisation of what sustainable properties are and the appropriate method to be used to value them. An analysis of the content of the definitions of sustainable buildings in the literature reveals that the three globally accepted dimensions of sustainability (the social, environmental/physical and economic dimensions) were partially reflected in most definitions. This reflects the current trend in identifying sustainability as a relationship between the internal building environment (a social dimension) and building productivity (an economic dimension), rather than emphasis on ecological and environmental issues which had hitherto dominated the discourse on sustainable development. Also, most authors have sought to integrate the generally accepted definition of sustainable development by the Brundtland Commission into the building construction sector. However, in subject matter, these definitions were somewhat generalised and related, in their specification of features of sustainable buildings, to the developed countries. This study has brought together elements of previous writers' definitions of sustainability into a holistic definition that could be localised to fit sustainable buildings in any region of the world. Importantly, in recognition of the dynamism of sustainability, a lifecycle dimension has been added to the definition of sustainable buildings. This promotes the notion that sustainability should be incorporated throughout a building lifecycle, not just at the construction and performance stage. The elements of this conceptualisation are then developed into the features of an hypothetical property, which is then used as the basis for the quantitative aspect of the study.

Findings from the survey of estate surveyors and valuers reveal that as is found in developed countries, there are perceptions of capital and rental value increases attributable to sustainable buildings. However, there is limited expertise on how to account for sustainability features. Thus, sustainability features could be prone to being unrecognised in valuation exercises, with the assumption that they are services –whose value to building occupants have been captured by the service charge they pay. This implies that sustainable properties could be undervalued in the study area. However, in the capturing of the property value as a whole, the investment method was regarded as the appropriate method for the valuation of these properties; whereas there was more data information relevant for the use of

the cost method. This suggests that the cost method be considered a more expedient method of valuation for sustainable buildings in the study area. This recommendation is being made in acknowledgement of the currently specialised nature of the sustainable property; with few comparable and limited data for comparison. As the sustainable property sub-market matures, it is recommended that data gathering and information sharing on property transactions is systematically carried out. Estate surveyors and valuers need to be continuously exposed through training on the valuation of these properties to ensure that they possess requisite capability to adequately capture the impact of sustainability on property value.

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Appendix 1

Indicators for the triple-bottom line features of sustainable properties

ENVIRONMENTAL (DESIGN AND CONSTRUCTION) INDICATORS
Connections to designated green space
Suitability of original building materials for refurbishment and façade retention
Condition of air-conditioning plant
Ecological impacts of materials used for construction
Age of building (obsolescence or depreciation of materials)
Quality of overall built environment and site use in relation to aesthetics, visual blending and connection contribution of its street frontage and wider precinct
Public transport availability and standard of service
Maximization by property managers of the potential of the environmental design features
Compliance with Health & Safety regulations and appropriate signage
Practical implications (traffic generation, off-street emergency parking and pedestrian management
Proximity to urban spaces (town centers, malls, etc)
Availability of appropriate internal circulation such as lifts and escalators
ENVIRONMENTAL (GREEN) FEATURES
Evidence of alternative energy supplies from renewable sources such as solar panels
Absence of indoor air pollutants net
Use of ODP or GWP refrigerants
Water consumption (potable, hygiene and cooling towers)
Fossil fuel energy use
Recycling and water capture measures
Indoor quality measured by ventilation, natural lighting, individual thermal/cooling control, noise abatement
Wastewater reduction
Disclosure and transparency of environmental data, regulation compliance, awards, and environmental expenditure of any type
Hazardous and non-hazardous waste and effluents recycling or removal strategies

ECONOMIC FEATURES
Enhanced occupant productivity and health
Savings from reduced energy, water and waste
Adequate public liability and service provider insurance
SOCIAL FEATURES
Quality of communal service areas
Aesthetic implications
Wheelchair access
Awareness and training of emergency evacuation and
Accident first aid procedures for all floor warden
Complementary usage of building (compatible tenants)
Appropriate training for security and public relations personnel
Proximity to childcare facilities
Recognition of indigenous people through cultural space and communication of site history
Availability of first aid station accessible to all building users
Preservation of heritage values
Value of artwork as percentage of the fit out
Monitoring of stakeholder concerns, views and provisions
Supportive use and occupation guidelines for tenants
Nature of tenant businesses and naming rights
Transparency and disclosure of landlord/tenant contracts and marketing agreements

Source: Adapted from Boyd (2005)

Appendix 2

Sustainability Indicators for Hypothetical Building: Sustainability Dimension and Lifecycle Category

Features	**Sustainability Category**	**Lifecycle Category**
Office building with a facility management unit	Design & Construction	Deconstruction, Performance, Whole-term lifecycle
Office building located in close proximity to the commercial transport park	Design & Construction	Predesign (site selection), Performance Whole-term lifecycle
Office building with underground parking facility	Design & Construction	Design, Performance
Office building that is heavily landscaped with a mixture of paving stones, grasses and shrubs.	Design & Construction	Construction, Whole-term lifecycle
All building staff (car park attendants, floor wardens, general receptionists etc.) are employed from near-by communities.	Social Feature	Performance, Whole-term lifecycle
High rise office building with abundant works of arts as interior décor	Social Feature	Design, Performance, Whole-term lifecycle
Office building with solar panel facilities.	Environmental (green features)	Performance, Design,
Office building with owner-defined restriction on type of activity by tenant	Social Feature	Performance, Whole-term lifecycle, Deconstruction.
Office building with floor wardens trained in first aid services	Social Feature	Whole-term lifecycle, Performance,
Office building with water recycling facilities.	Environmental (green features)	Design, Performance, Whole-term lifecycle
Office building with internal common crèche service for all staff	Social Feature	Performance,
Office building with recyclable waste management facility	Environmental (green features)	Design, Performance, Whole-term lifecycle
Office building depending on natural daylight for lighting rather than electricity	Environmental (green features)	Design, Performance, Whole-term lifecycle
Office building with a green roof (grasses and shrubs are planted on the rooftop that captures and makes use of rainwater, reducing the quantity of run-off in the perimeter of the building	Environmental (green features)	Design, Performance, Whole-term lifecycle

Source: *Adapted from Boyd (2006)*