

ASSESSMENT OF GREEN BUILDING INITIATIVES AMONG REAL ESTATE PROFESSIONALS IN ABUJA

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ABSTRACT

Purpose: The study assessed the green building initiatives among real estate professionals in Abuja with a view to identifying the factors affecting its implementation in the built environment.

Design/methodology/approach: The study employed census sampling to sample all the 420 firms in the study area. Responses were received from 339 firms which were analysed for the study. The study employed descriptive statistics (mean score and relative importance index, RII) and inferential statistics (factor analysis), for analysis of data.

Findings: The findings revealed that the professionals were highly aware of the features and benefits of green buildings as RII value between 0.612-0.928. Lack of technology and inadequate qualified designer were ranked 1st and 2nd for factors affecting green building initiatives among professionals at RII values of 0.794 and 0.766 respectively. The result of factor analysis further revealed four component factors that contributed to 87.016% variance in the factor loading. The result further revealed that technical know-how and manpower factor, technological and management factors, educational, financial and innovative factors, and low end-user knowledge and project planning factors were component factors.

Research limitations/Implications: The limitation includes the use of only real estate firms in Abuja without considering the views of other professionals in the built environment.

Practical implications: Awareness of management of green building features and benefits should be promoted among real estate developers as the benefits of green buildings are very important to environmental sustainability.

Originality/value: The identified factors contributed to 87.016% of variance of the factor loadings, indicating that the factors identified were considered by the professionals as factors affecting the implementation of green building initiatives.

Keywords: Green buildings; real estate; awareness; benefits; factors.

1. INTRODUCTION

Green building concept has been gaining popularity in the developed world to serve as a means to lessen the environmental impact of not only existing building stock but also in the constructions of new ones (David and Olabode, 2015). Green building design and construction according to Kats (2003) involves the practice of using resources more

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efficiently while creating healthier and more energy-efficient buildings (Green Building Solutions, 2013). According to RICS (2010) "Green or sustainable buildings use key resources like energy, water, materials, and land more efficiently than buildings that are just built to code. With more natural light, and better air quality, green buildings typically contribute to improved productivity, health and comfort of people and environment (Oladokun, Gbadegesin & Ogunba, 2010). Green building has also been characterized as building with a conscious effort to minimize negative and emphasize on positive impacts for both the indoor and outdoor environment. It touches all aspects of the building process from demolition, design, site placement, construction, renovation, operation, and maintenance (Olaleye, Ayodele, & Komolafe 2015).

The components of green building according to Zhang, Plattern and Shen, (2011) are energy efficiency and renewable energy; environmentally preferable building materials and specifications; waste reduction; toxins reduction; indoor air quality; and smart growth (development and conservation strategies that protect the natural environment. Event such as World commission on Environment and Development (WCED 1987) Rio Earth Summit of 1992, Maastricht Treaty of 1992, Kyoto Conference on Global warming of 1997, Johannesburg Earth summit of 2002, Washington Earth observation summit of 2003, UN-HABITAT Conference on promoting and Fostering Green Building Rating System (GBRS) in Africa 2010, Africa Development Forum of 2012, Swiss Asian Environmental forum 2013 and Brussel Green Week Conference of 2014 has been organized globally in the past to increase awareness of environmental impact of buildings and sustainable goals within the built industry in the world.

1.1. Objectives of the Study

The objectives of this paper are to examine:

- i. the level of awareness of features of Green Building Features Among Estate Professionals,
- ii. the awareness of benefits of green building initiatives, and
- iii. factors affecting the effective management of Green Building Features among real estate professionals in Abuja Nigeria.

2. LITERATURE REVIEW

Several scholars have given different views about the adoption of the green building initiatives across the world. Green buildings provide incremental benefits such as lesser operating costs, improved health and productivity, and constructive environmental externalities (Kats, 2003). This is consistent with the finding from Zhang (2017), who highlighted five types of incremental advantages connected with green buildings: decreased operating costs, greater comfort, health, and productivity, enhanced corporate reputation, higher market value and positive environmental externalities. There is no conclusive answer to whether developing and operating green buildings is more expensive than the traditional operating cost approach. While some researchers claim that green building is more expensive (Chan *et al.*, 2009; Shi *et al.*, 2013), other data suggest that green building may contribute little or no additional expense to the non-green method (Matthiessen & Morris, 2004). This is consistent with the finding from Kats *et al.* (2003) that the majority of the additional cost of green building is not in 'hard costs' (that is, installation expenses for green parts and materials), but rather in 'soft costs' (that is, extra-time expenses for design, planning, and construction).

The purpose of green building is not limited to decreasing environmental and economic consequences, but also to improving human health and wellbeing (World GBC, 2021). According to Park and Yoon (2011), indoor air quality improves due to low CO₂ concentrations and contaminants, as well as high ventilation rates by up to 8%. Moreover, appropriate sound insulation might be utilised to improve focus, particularly in school and residential buildings. This is consistent with MacNaughton *et al.*'s (2016) finding that improvements to the built environment, including ventilation, lighting, and

materials, have resulted in improved indoor environmental quality (IEQ) in green buildings. These facts serve to make our living and working environments healthier and more comfortable (Al-Sulaili, 2018). A recent study by Xue *et al.* (2019) discovered that biophilia design could play an important role in helping green building rating tools (GBRTs) address human health and wellbeing by restoring and strengthening the relationship between man and nature. The potential benefits of green building in Nigeria conducted by Dairu, Dania and Adejoh (2014) revealed that reduced capital costs, reduced operating costs, market benefits, health and productivity gains, and reduced liability risk were the perceived benefits from implementing green building practices.

According to Wells *et al.* (2018), NZEB (net-zero energy building) is a building with certain features that equal energy generation to use and considers reducing energy demands and energy expenses that equal zero or net-zero greenhouse gas (GHG) emissions. NZEB is also defined as a building that consumes the same or less energy than it produces each year. It is critical to initiate a time-period review for NZEB annually (Wells *et al.*, 2018). The biggest amount of energy required for heating is in the winter due to lower solar gains, and it might be offset near the end of the year as renewable energy will be produced during the summer (Abu Grain & Alibaba, 2017). Furthermore, passive methods serve as a crucial element in pursuing zero energy building design goals (Li *et al.*, 2013). It directly impacts thermal balance and lighting loads, which impact the building's electromechanical systems. This result shows a significant indirect decrease in energy usage for heat control, lighting, and ventilation, which is well balanced by renewable energy systems (Garde *et al.*, 2014). According to Albatayneh (2021), optimising various design variables such as flat roof construction, natural ventilation rate, and window shading control schedule can help reduce energy consumed for heating and cooling loads. The 'nearly zero' quantity of energy required should be provided to a 'very substantial extent by renewable energy sources on-site or nearby.

Furthermore, Hu and Qiu (2019) discovered that energy savings are highly dependent on mechanical system advancement by improving mechanical units' efficiency or lowering the unit utility cost. Magrini *et al.* (2020) further explained the possibilities of improving the NZEBs by converting to Positive Energy Buildings (PEBs) with the aim of meticulously improving the design and sizing of the building ecosystem and the plant system by generating electricity from renewable sources that are more sustainable for maintaining the cost in the future.

Issues relating to factors affecting the management of green building initiatives have been widely discussed among scholars. Adegbile (2013) opined that the costs, financial risks, and lack of demand for sustainable buildings far outweigh the benefits. In a report conducted by Berman (2001), it was found that among half a dozen Californian developers interviewed in 2001, green buildings cost 10-15% more than conventional buildings. As noted by Olaleye, Ayodele and Komolafe (2015), uncertainty of outcomes and benefits are common barriers to successful implementation of sustainable practices. In other words, the lack of interest in green building practices must have arisen out of inadequate knowledge of the potential benefits (especially long run) and high level of uncertainty about the actual benefits derivable from green building practices. Nwokoro and Onukwube (2011) revealed that important factors considered for sustainable construction include quality of working conditions, strengthening and enforcement of relevant laws and regulations, and design for flexibility and adaptability. The results of occupiers' preference with respect to existing building components and services to ascertain the level of their appreciation of green elements carried out by Otegbulu, (2011) revealed that incidences of flooding, loss of property, and poor electricity were traced to unsustainable building design. It is on this note that this study assesses the level of awareness, benefits and factors affecting applicability of the initiatives of green building practice among the professionals in real estate in Abuja. Darko *et al.*, (2017) examined the critical barriers and drivers of GRB technologies, and evident that opposition to change, a lack of familiarity and awareness, and higher charges are the major barriers, whereas; financial and other market-based incentives, greater information on the costs

and benefits of GRB technologies, green labelling and information dissemination are essential for the uptake of GRB practices.

Qureshi Memon and Khoso (2019) carried an assessment of GRB in Pakistan and showed that most of the key actors in the construction industry have no understanding of GRB. Mostly, respondents were unaware of assessment tools and energy rating as and emphasized the role of government in promoting GRB practices. Saleh *et al.*, (2020) investigated the influential and environmental factors in Qatar regarding intentions to adopt GRB practices, and found that subjective norm, and perceived behavioural control have significant influences on intentions to adopt GRB practices. Ijigah and Akanni (2024) investigated the barriers hindering the widespread adoption of green building technologies in Nigeria's construction sector. Random sampling method was used to collect information from the respondents. A sample size of three hundred and eighty four (384) questionnaires were distributed through an online link and three hundred and eighty-four (384), which equates to a hundred (100%) percent of questionnaires distributed. The mean score and sum were employed in for ranking the professionals experience in the field with various barriers and their severity. High ratings for technology awareness amongst professionals, and availability of a skilled workforce were revealed among other.

Siddiqui., Adamu., Ebohon. and Aslam (2024) identify the factors affecting the intention to adopt GRB practices by extending theory of planned behaviour (TPB). Using non-probability purposive sampling technique, data was gathered from consultant and contractor engineers in the construction industry through a questionnaire. The analysis was done using partial least square-structural equation modelling (PLS-SEM) technique on a useful sample of 290. Findings revealed that the core constructs of TPB (that is, attitude, subjective norms, and perceived behavioral control) significantly affect the intention to adopt GRB practices.

3. METHODOLOGY

The study utilized structured questionnaires to collect relevant information from total population of 420 registered estate surveying and valuation firms in Abuja (NIESVS Directory, 2024). The study employed census sampling techniques due to the relatively small number of firms and 339 questionnaires were retrieved. The study utilised descriptive method of data analysis such as mean score and relative important index to determine the most weighted variables and most important variable items upon which the ranking would be based. The study employed descriptive method of data analysis such as frequency distribution table, chats, mean score and relative important index (RII).

$$\text{Percentage}(\%) = \frac{\text{NUMBER OF OBSERVATION}}{\text{TOTAL NUMBER OF POPULATION}} \times 100 \quad \dots \text{Equation 1}$$

A five-point Likert scale was employed with the scales defined as Strongly agree=5, Agree =4, Undecided =3, Disagree =2, strongly Disagree =1. The weighted mean score was used to measure features, benefits and factors affecting green building initiatives. this is defined by the formula:

$$\text{Weighted mean score} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{n_5 + n_4 + n_3 + n_2 + n_1} \quad \dots \text{Equation 2}$$

Where n is number of respondents who answers Strongly agree =5, Agree =4, Undecided =3, Disagree =2, strongly Disagree =1

$$\text{Relative Important Index (RII)} = \frac{\text{weighted mean}}{\text{ideal score}} \quad \dots \text{Equation 3}$$

Factor analysis was employed to achieve objective three. The reason is to harmonize all the factors using principal component analysis (PCA) which is the technique used to reduction large number of factors. Factor analysis (Principal Component Analysis) is a statistical method used to describe variability among observed, correlated variables in

terms of a potentially lower number of unobserved variables called factors. Factor analysis aim to reduce the dimensionality of a set of data and the model is provided as follows:

$$y_{ij} = v_j + \lambda_{j1} \eta_{i1} + \lambda_{j2} \eta_{i2} + \dots + \lambda_{jk} \eta_{ik} + \dots + \lambda_{jm} \eta_{im} + \varepsilon_{ij} \quad \dots \text{Equation 4}$$

where v_j are intercepts, λ_{jk} are factor loadings η_{ik} are factor values ε_{ij} are residuals with zero means and correlations of zero with the factors.

4. PRESENTATION AND DISCUSSION OF RESULTS

The response on demographic information is presented in Table 1. 51% of the sampled majority respondents were male, 95.9% fall within the age bracket of 41-50yrs. 94.4% had first degree or higher national diploma. 35.4% majority of the respondent were associate of institution (ANIVS). 33.3% were registered estate surveyor and Valuers (ANIVS RSV) while 16.5% and 14.7% were registered fellow and probationers respectively. 94.4% majority of sampled respondents had between 16-20years working experience.

Table 1: Demographic Information of Respondents

Demographic Information		Frequency	Percent
Gender	Male	166	49.0
	Female	173	51.0
	Total	339	100.0
Age	18-30yrs	-	-
	31-40yrs	14	4.1
	41-50yrs	325	95.9
	51-60yrs		
	61yrs and above		
	Total	339	100.0
Academic Qualification	ND		
	HND/B.tech/Bsc	320	94.4
	Masters	5	1.5
	PhD	14	4.1
	Total	339	100.0
Professional Status	FELLOW	56	16.5
	ANIVS RSV	113	33.3
	ANIVIS	120	35.4
	PROBATIONER	50	14.7
	Total	339	100.0
Years of Experience in Built Industry	10years and below	-	-
	11-15yrs	5	1.5
	16-20yrs	320	94.4
	21yrs and above	14	4.1
	Total	339	100.0

The descriptive analysis of level of awareness of feature of green building practices is presented in table 2. Low energy lighting design and better orientation is most aware feature of green building with highest relative awareness index of 0.928. Cost-effective and environmentally friendly technologies was the second most aware feature of green building practice with awareness index of 0.89. The use of renewable energy and natural

resources along with effective use of existing landscape were the third and fourth the most aware features of green building at relative awareness index of 0.888 and 0.84 respectively. Quality air for human safety both indoor and outdoor air and proper control and efficient building management system had high awareness index at 0.802 and 0.714 respectively. There is low awareness of use of recycle building material for friendly environment and efficient use of water resource with as low awareness index was recorded at 0.67 and 0.689 respectively as compared to the awareness of other features. Finally, the result revealed that the relative awareness index for all the features of green building were above 0.65. This indicates that there is high level of awareness of feature of green building across the sampled professionals.

Table 2: Awareness of Features of Green Building Features

Features	Total (%)	MS	RII	RANK
The use of energy-saving efficient and eco-friendly equipment	339(100)	3.67	0.738	5
Low-energy lighting design and better orientation	339(100)	4.64	0.928	1
Use of recycle building materials for friendly environmentally.	339(100)	3.35	0.67	7
Quality air for human safety both indoor air and outdoor air	339(100)	4.01	0.802	5
Use of renewable energy and natural resources	339(100)	4.44	0.888	3
Proper controls and efficient building management system.	339(100)	3.57	0.714	6
Efficient use of water resources	339(100)	3.43	0.686	8
Effective use of existing landscapes features	339(100)	4.20	0.840	4
Cost-effective and environmentally-friendly technologies	339(100)	4.45	0.89	2

The result of perceived level of awareness of benefits associated with green building practice features is presented in Table 3. The Quality indoor air for human safety and comfort, maximum use of natural day-lighting and Low-cost building management system were ranked first the most aware benefits of green building practice by the professionals at 0.642 index. Awareness of benefit of low energy consumption through use of natural ventilation rather than air-conditioning was ranked second as the most aware benefit of green building practice at 0.640. lower environmental impact building materials and low cost of energy lighting design were ranked third and fourth the most aware benefit of green building practice at 0.638 relative index. Increase management productivity and effectiveness is ranked fifth at 0.63 relative index. Use of gray-water recycling for landscape and WCs and minimizing site impact through sensitivity to site ecology were ranked the same 6th at 0.612 each. There is relatively low level of awareness of benefits of green building practice as relative importance index is found below 0.65. By implication, there is low level of awareness of benefits of green building practice.

Table 4 revealed the factors affecting the effective management of green building features. The factors were measured on five Likert scale and result revealed that there is high level relative important index across the factors such that lack of technology specification had highest relative importance index and was ranked first at 0.79 relative important index. Inadequate designer ability is ranked second as the most important factor at 0.766 relative important index. low green team education training and low team motivation were ranked third and fourth at 0.75 and 0.752 respectively as most important factors affecting the effective management of green building features. Lack of Project Expert and ability was ranked fifth at 0.740. Poor Stakeholders' active participation and Poor cost management sixth 0.734 simultaneously.

Table 3: Awareness of Benefits of Green Building Features

Benefits	Total	MS	RII	Rank
Low energy consumption through use of natural ventilation rather than air-conditioning	100(339)	3.21	0.642	2
Low cost of energy lighting design	100(339)	3.19	0.638	4
Lower environmental impact building materials.	100(339)	3.20	0.64	3
Quality indoor air for human safety and comfort	100(339)	3.23	0.646	1
Maximum use of natural day-lighting	100(339)	3.23	0.646	1
Low-cost building management system.	100(339)	3.23	0.646	1
Use of gray-water recycling for landscape and WCs	100(339)	3.06	0.612	6
Minimizing site impact through sensitivity to site ecology	100(339)	3.06	0.612	6
Increase management productivity and effectiveness	100(339)	3.15	0.63	5

Effective collaboration and communication; Good trust relationship among stakeholders; and Project management support were rated 7th, 8th and 9th with relative important index of 0.726, 0.72, and 0.716 respectively as important factors. Effective government policies and regulatory has relative important index of 0.718 and was ranked 10th. Owner active participation and commitment; Worker's experience and objectives; and effective Feedback had the same relative importance index of 0.71 and were ranked 11th the most successful factors for the adoption of green building practice initiative for mortgage finance. End user Participation and Advanced machinery and innovative technology had 0.708 relative important index and was ranked 12th position as the least important success factor. By implication, all the success factors had relative important index over and above 0.65 acceptability benchmark.

The result of the suitability test of the data set is carried out using KMO and Bartlett's test as presented in Table 5. KMO value measures the proportion of variance in the variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis may be useful with the data. For this study, the result revealed that the p-value at 0.00 is less than 0.05 indicating that KMO value at 0.88 is statistically significant. In other words, it indicates that the data is normally distributed and adequate for factor analysis.

Bartlett's tests the hypothesis that correlation matrix is an identity matrix, which would indicate that your variables are unrelated and therefore unsuitable for structure detection. For this study, the result of chi-square revealed that the variables are correlated at p-value (0.00) less than 0.05 level of significance. Therefore, the value chi-square at 623.32 is statistically significant. By implication, the result is found suitable for the factor analysis.

The result of total variance explained is presented in Table 6. The result revealed that 87.016% variance in the factors can be explained by four components factors while the remaining 12.984% is due to loss of information. The components that have 1 and above eigen values were extracted. Out of 23 components, 4 components were extracted and the total cumulative variance of 87.016%

Table 4: Factors Affecting the effective management of Green Building Features

Factors	Total	MS	RII	RK
Ineffective government policies and regulatory	100(339)	3.56	0.712	10
Poor Owner participation and commitment	100(339)	3.55	0.710	11
Lack Technology	100(339)	3.97	0.794	1
Inadequate Project management support	100(339)	3.58	0.716	9
Lack of Project Expert and ability	100(339)	3.70	0.74	5
Inadequate qualified Designer	100(339)	3.83	0.766	2
Worker's inexperience	100(339)	3.55	0.710	11
Lack of Clear project goal and objectives	100(339)	3.60	0.72	8
Low End user Participation	100(339)	3.54	0.708	12
Poor Stakeholders' active participation	100(339)	3.67	0.734	6
Poor Effective Collaboration and Communication	100(339)	3.63	0.726	7
Lack Good trust relationship among stakeholders	100(339)	3.60	0.720	8
Low Team motivation	100(339)	3.76	0.752	4
Low Green team education and training	100(339)	3.77	0.754	3
Ineffective Feedback	100(339)	3.57	0.710	11
Poor cost management	100(339)	3.67	0.734	6
Lack of machinery and innovative technology	100(339)	3.54	0.708	12
Poor risk management	100(339)	3.55	0.710	11
Low level of awareness	100(339)	3.83	0.766	2
Shortage of GB designers	100(339)	3.55	0.710	11
Inadequate grant for GB management	100(339)	3.60	0.72	8
Inadequate Fund	100(339)	3.67	0.734	6
Poor project planning and control	100(339)	3.80	0.726	7

Table 5: KMO and Bartlett's test

Kaiser-Meyer Olkin measure of sampling adequacy		0.888
Sig.		0.000
Bartlett's test of sphericity	Approx. Chi square	623.32
	Df	91
	Sig.	.000

Table 6: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumul. %	Total	% of Variance	Cumul. %	Total	% of Var.	Cumul. %
1	11.157	48.509	48.509	11.157	48.509	48.509	8.468	36.817	36.817
2	4.919	21.388	69.897	4.919	21.388	69.897	4.798	20.861	57.679
3	2.152	9.356	79.252	2.152	9.356	79.252	4.149	18.041	75.720
4	1.786	7.763	87.016	1.786	7.763	87.016	2.598	11.296	87.016
5	.867	3.770	90.786						
6	.593	2.578	93.363						
7	.559	2.430	95.794						
8	.295	1.285	97.078						
9	.193	.841	97.919						
10	.139	.606	98.525						
11	.137	.596	99.121						
12	.061	.264	99.385						
13	.053	.229	99.615						
14	.047	.205	99.820						
15	.027	.119	99.939						
16	.008	.033	99.972						
17	.006	.028	100.000						
18	2.008E-015	8.729E-015	100.000						
19	2.401E-017	1.044E-016	100.000						
20	7.143E-019	3.106E-018	100.000						
21	-8.233E-018	-3.580E-017	100.000						
22	-5.740E-017	-2.496E-016	100.000						
23	-7.099E-016	-3.087E-015	100.000						

The result of rotated factors was presented in Table 7. There are components factors extracted at 1.0 and above. Component factor one comprises 10 variables, component factor two comprises of 6 variables, components factor 3 comprises of 5 variables while component factor 4 comprises of 2 variables. These components' factors were renamed along with eigen values and percentage variance in Table 8.

The analysis of the rotated factor components is presented in Table 8. The first component factor is named technical know-how and manpower factor with highest eigen value and variance at 11.157 and 36.817. the second component factors is named technological and management factors with eigen value and rotated variance at 4.919 and 20.861 respectively. the third component factor is named Educational, Financial and Innovative Factors with eigen value and rotated variance at 2.152 and 18.041 respectively. While the fourth component factor is named low end-user knowledge and project planning factor with eigen value and rotated variance at 1.786 and 11.296 respectively. The total cumulative variance amounted to 87.016% of which first factor component comprised 36.817%, second component factor comprised 20.861%, third component factor comprised about 18.041%.

Table 7: Rotated Component Matrix

Factors	Component			
	1	2	3	4
Ineffective government policies and regulatory	.900			
Poor Owner participation and commitment	.926			
Lack Technology		.828		
Inadequate Project management support	.925			
Lack of Project Expert and ability	.926			
Inadequate qualified Designer		.595		
Worker's inexperience	.928			

Factors	Component			
	1	2	3	4
Lack of Clear project goal and objectives	.842			
Low End user Participation	.			.832
Poor Stakeholders' active participation	.876			
Poor Effective Collaboration and Communication			.739	
Lack Good trust relationship among stakeholders	.	.906		
Low Team motivation	.838			
Low Green team education and training			.916	
Ineffective Feedback		.900		
Poor cost management	.838			
Lack of machinery and innovative technology			.916	
Poor risk management		.900		
Low level of awareness	.931			
Shortage of GB designers			.914	
Inadequate grant for GB management		.668		
Inadequate Fund			.650	
Poor project planning and control				.688

Tables 8: Table Analysis of rotated factors affecting the effective management of Green Building Features

Components	Rotated Group factors	Total	% Variance
Factor 1	Technical know-How and Manpower factors	11.157	36.817
	Ineffective government policies and regulatory		
	Poor Owner participation and commitment		
	Inadequate Project management support		
	Lack of Project Expert and ability		
	Worker's inexperience		
	Lack of Clear project goal and objectives		
	Poor Stakeholders' active participation		
	Low Team motivation		
	Poor cost management		
	Low level of awareness		
Factor 2	Technological and Management factors	4.919	20.861
	Lack Technology		
	Inadequate qualified Designer		
	Lack Good trust relationship among stakeholders		
	Ineffective Feedback		
	Poor risk management		
	Inadequate grant for GB management		
Factor 3	Educational, Financial and Innovative Factors	2.152	18.041
	Poor Effective Collaboration and Communication		
	Low Green team education and training		
	Lack of machinery and innovative technology		
	Shortage of GB designers		
	Inadequate Fund		

Components	Rotated Group factors	Total	% Variance
Factor 4	Low user knowledge and project planning factor Low End user Participation Poor project planning and control	1.786	11.296

The result found that level of awareness of feature of green building features is high among the professional. the result further revealed that Low energy lighting design and better orientation is, cost-effective and environmentally friendly technologies the use of renewable energy and natural resources along with effective use of existing landscape among others were the most common feature of green building identified among respondents. The study showed that awareness of benefits associated with green building features is found high. the result further revealed that the Quality indoor air for human safety and comfort, maximum use of natural daylighting, Low-cost building management system, low energy consumption through use of natural ventilation and low cost of energy lighting design were the most aware benefits of green building features among others by the professionals. The study revealed that lack of technology specification, Inadequate designer's ability, low green team education training, low team motivation, Lack of Project Expert ability, Poor Stakeholders' active participation and Poor cost management have been identified as important factors affecting the effective management of green building features among others and this finding is consistent with Olaleye, Ayodele and Komolafe (2015); Nwokoro and Onukwube (2011); and Otegbulu, (2011). The result of factor analysis identified four component factors that contributed about 87.016% variance in the factor loading. The result further revealed that technical know-how and manpower factor, technological and management factors, Educational, Financial and Innovative Factors, and low end-user knowledge and project planning factor were identified as component factors, this finding is therefore consistent with Darko *et al.*, (2017).

5. CONCLUSION AND RECOMMENDATIONS

In conclusion, the study understood that there is high level of awareness of green building features and benefits among the sampled professionals, by implication, the knowledge of green building is not new to build professionals in the study area. The study understood that lack of technology specification, Inadequate designer's ability, low green team education training, low team motivation, Lack of Project Expert ability, Poor Stakeholders' active participation and Poor cost management were identified as most important factors affecting the effective management of green building features in real estate industry in Abuja, Nigeria. furthermore, the study understood that factors such as technical know-how and manpower factor, technological and management factors, educational, financial and innovative factors, and low end-user knowledge and project planning factor were identified as component factors were key to sustainable green building initiatives. The study recommends that awareness of management of green building features and benefits should further be promoted among real estate developers and other real estate stakeholders and mandating green building initiatives into real estate design plans for future environmental, psychological and healthy sustainability.

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