Global Scientific JOURNALS

GSJ: Volume 11, Issue 9, September 2023, Online: ISSN 2320-9186

www.globalscientificjournal.com

ASSESSMENT OF THE MEASURES FOR BUILDING SUSTAINABILITY PLAN IMPLEMENTATION IN PUBLIC HIGHER EDUCATIONAL INSTITUTIONS IN ONDO STATE, NIGERIA

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ABSTRACT

Buildings are an essential part of a nation's inheritance. Buildings are constructed and planned with the intention of maintaining its original beauty and functionality for both current and future users. New buildings are occasionally built inside the various institutions to enhance educational facilities and to give better quality education, despite the fact that those buildings lack sustainability. Building sustainability plan will improve users' experience and satisfaction and ease the cost of operation and maintenance. This study examines the measures for building sustainability plan implementation in public higher educational institutions in Ondo State, Nigeria. The research adopted a quantitative research method. Data collected from Nine (9) public higher educational institutions in Ondo State, Nigeria using a census with a well-structured questionnaire of 120 distributed across the higher institution and 87 were retrieved which is 72.5% of the total respondents. The collected data were analyzed using Mean item score, standard deviation, ANOVA test and Post Hoc test to examine the significant influence between them. The measures were found to be 'advocacy and awareness', 'availability of standards regulation guidelines and assessment systems', 'financial Incentives', 'enactment of law that facilitate sustainability', 'legislation, and there was a significant difference. It was recommended that, higher institution leaders should pay attention to the measures and encourages it in their institutions.

KEYWORDS: Higher Institution, Building, Sustainability Plan, Measures, Professionals

1. INTRODUCTION

Higher institution buildings constitute a significant part of the Nation's assets (Ofide et al., 2015). Higher institutions are assumed to be the key to the technology, productivity and other factors of international competitiveness and economic growth. For higher institution to be more relevant there is a need for continuous development which changes the consumption habits without reducing their life quality (Mustafa et al., 2015). It has been established by Akinsola et al., (2012) that, from time to time, new structures are being constructed within the various institutions to upgrade educational facilities and provide a better education while those buildings lack sustainability.

Therefore, sustainability plan is needed, to serve as a template for building more efficient and sustainable buildings and remolding existing buildings (Berchin et al., 2017). It will also ease cost of operation and maintenance (Pearce et.al, 2007).

Studies by Al-Saleh et al., (2010) and Aghimien et al., (2018), have documented that projects executed within the Nigerian construction industry are generally characterized by poor sustainability standards in which higher institutions are included. There is a need to look at building sustainability plans in higher educational institutions. However, if a positive change is desired, there is a need to understand the measures for building sustainability plan implementation in public higher institutions.

2. BUILDING SUSTAINABILITY PLAN AND MEASURES FOR ITS IMPLEMENTATION

The changes and challenges faced by higher institutions in the implementation of sustainability plans in their operations and delivery have been a major area of research interest in recent times due to the mass expansion, internationalization, diversification and commercialization of higher educational institution around the world (Nejati et al., 2013).

Building sustainability plan is a tool used to guide the institutionalization of sustainability in higher institution (Lauri et al., 2015). A sustainability plan is different from sustainability policies because it is a longer and more detailed document that aim to guide sustainability implementation. According to Aleixo et al., (2018), the Portuguese government has not yet approved legislation regarding implementing sustainability plans in higher educational institutions.

Several authors highlighted measures to be taken to ensure the implementation of the sustainability plan, which are: assessment report tools and stimulating change in consumption and measurement tools such as strategic metrics to analyze sustainable construction practices (Berchin et al., 2017; Opoku & Ahmed, 2014; and Sfakianaki, 2015). Enactment of laws that facilitate Sustainability, Financial incentives, client demand, advocacy and awareness, legislation and building regulations are also part of the measures for building sustainability plan implementation. Tarila et al., (2017), opined that there should be existing law that facilitate sustainability to embrace the sustainability plan implementation. Likewise, Oke et al., (2019), opined that the adoption of a sustainability plan is a process that begins with awareness and interest, and the level of awareness plays a vital role in the implementation of the sustainability plan (Davies & Davies 2017).

Additionally, Government plays a major role such as the introduction of building codes and other fiscal instruments in the form of building regulations to lead the implementation of building sustainability plans (Aghimien et al., 2018, Wang et al., 2014). Udawatta et al., (2015) also opined that the client's demand directly relates to cost, knowledge, methods, supply and value. Therefore, the aim to assess the measures for implementing sustainability plans in public higher educational institutions in Ondo State, Nigeria with a view to encourage its implementation for sustainable buildings.

3. METHODOLOGY

The research adopted quantitative data collection methods to seek respondents' opinions on the subject matter based on experience with the institutions using a well- structured questionnaire distributed directly to construction professionals in Nine (9) public higher institution in Ondo State, Nigeria. Ondo State was considered as the study area because it has many public higher institutions.

The professionals captured are Builders, Architects, Engineers, and Quantity Surveyors in these institutions whom were asked to rate the measures from the literature on a Likert scale of 5 ranging from strongly agree =5 to strongly disagree =1. The questionnaire captured the respondent's information and opinions on the research topic. The study adopted a census because all the respondent's had the rich information needed for the research. Although the study has some limitations, they include the professionals' busy schedules, which prevented them from having enough time to interact with visitors and the challenges of finding those institutions within the study area.

The data retrieved were analyzed using Mean item score, standard deviation, ANOVA and Post hoc test.The ANOVA test was necessary to determine the significant difference between the measures among the construction professionals, and the result was presented in tables.

4. DATA PRESENTATION

4.1 Response Rates of Questionnaire Survey

A total of 120 copies of the questionnaire survey were administered to the construction professionals working in higher institutions. However, 87 copies of the questionnaire survey were retrieved and deemed useful for analysis. The retrieved rate stood at 72.5% and was adequate for analysis since it exceeds the stated percentage of Moser and Kalton (1999), that a survey's response rate is biased if it is less than 30%.

Table 1: Response Rates of Questionnaire Survey

Professionals	Number Distributed	Number Retrieved
Construction Stakeholders	120	87

4.2 Respondents' Information

The respondent's information, as shown in Table 2, revealed that the respondents have the required education and years of experience to fill out the questionnaire survey and supply accurate information to measure and provide inference for the study.

Table 2: General information of the respondents

Variables	Classification	Frequency	Percentage
Professional Discipline	Quantity Surveying	21	24.1
	Civil Engineering	15	17.2
	Building	4	4.6
	Architecture	9	10.4
	Others	38	43.7
	Total	**87**	**100.0**
Higher academic qualification	ND	28	32.2
	Bachelor	23	26.4
	Masters	33	37.9
	Doctorate	3	3.4
	Total	**87**	**100.0**
Years of professional experience	Less than 5 years	22	25.3
	6 to 10 years	19	21.8
	11 to 15 years	23	26.4
	16 and above	23	26.4
	Total	**87**	**100.0**

4.3 Measures of Building Sustainability Plan Implementation in public Higher Institution.

Table 3 contain the MIS of measures for the implementation of building sustainability plan among the construction professionals in the various higher educational institutions in Ondo state, Nigeria. The analysis shows that advocacy and awareness is highly ranked in all the nine institutions. The result has AAUA ranking first with 4.78 MIS followed by UNIMED with 4.72, FUTA (4.70), OAUSTECH (4.50), RUGPO (4.44), SCHTECH (4.41), FPI (4.40), FECA (4.34), and ACE (4.30).

Another factor that is highly ranked across board is availability of standards regulation guidelines and assessment system. OAUSTECH ranked first with MIS of 4.65, AAUA with 4.60, RUGPO (4.58), FUTA (4.56), FECA (4.42), FPI (4.38), ACE (4.36), UNIMED (4.30), and SCHTECH (4.20). The measures least ranked among the institutions are client's demand and developing regulatory mechanism.

Table 3: Measures of Building Sustainability Plan Implementation in Public Higher Institutions.

ADOPTABLE MEASURES	FUTA	AAUA	UNIMED	OAUSTECH	RUGPO	FPI	FECA	ACE	SCHTECH	OVERALL
Advocacy and awareness	4.70	4.78	4.72	4.50	4.44	4.40	4.34	4.30	4.41	4.51
Availability of standards regulation guidelines and assessment systems	4.56	4.60	4.30	4.65	4.58	4.38	4.42	4.36	4.20	4.45
Financial Incentives	4.45	4.70	4.34	4.38	4.30	4.26	4.10	4.20	4.60	4.37
Enactment of law that facilitate sustainability	4.00	4.50	4.54	4.36	4.30	4.28	4.30	4.16	4.26	4.30
Legislation	3.88	4.78	4.75	4.34	3.95	4.74	3.86	4.22	4.00	4.28
Sensitizing and training project personnel on matter related to sustainability	4.30	4.30	4.58	4.60	4.40	3.90	3.98	4.00	3.96	4.22
Building regulation	4.26	4.50	4.47	4.35	4.00	3.96	3.88	4.10	4.10	4.18
Client's demand	3.80	3.90	4.44	4.34	4.52	4.18	4.05	3.80	3.78	4.09
Developing regulatory mechanism	4.12	4.30	4.20	3.96	3.80	3.91	4.12	3.86	4.00	4.03

4.4 Difference between each Measures of Variables in the building sustainability Plan using ANOVA

Analysis of variance (ANOVA) was conducted to discover if there is any significant difference in the measures for building sustainability plan implementation among the institutions construction professionals. The findings from the output of the ANOVA analysis shows that, there is no significant difference in the measures of building sustainability plan implementation among the construction professionals. Table 4 shows that the significance level is greater than 0.000 ($p>0.000$) which is greater than 0.05. Therefore, there is no significant difference in the mean of the measures of building sustainability plan among the construction professionals.

Table 4: Difference between each Measures of Variables in the building sustainability Plan.

		Sum of Squares	df	Mean Square	F	Sig.
Enactment of law that facilitate sustainability	Between Groups	36.104	19	1.900	3.339	.000
	Within Groups	38.126	67	.569		
	Total	74.230	86			
Availability of standards regulation, guidelines, and assessment systems	Between Groups	9.763	19	.514	1.449	.135
	Within Groups	23.754	67	.355		
	Total	33.517	86			
Sensitizing and training project personnel on matters related to sustainability	Between Groups	23.738	19	1.249	3.028	.000
	Within Groups	27.641	67	.413		
	Total	51.379	86			
Financial incentives	Between Groups	15.769	19	.830	1.310	.207
	Within Groups	42.461	67	.634		
	Total	58.230	86			
client's demand	Between Groups	58.372	19	3.072	4.390	.000
	Within Groups	46.892	67	.700		
	Total	105.264	86			
advocacy and awareness	Between Groups	8.010	19	.422	1.592	.084
	Within Groups	17.737	67	.265		
	Total	25.747	86			
developing regulatory mechanism	Between Groups	37.426	19	1.970	3.943	.000
	Within Groups	33.470	67	.500		
	Total	70.897	86			
Legislation	Between Groups	31.218	19	1.643	2.493	.003
	Within Groups	44.161	67	.659		
	Total	75.379	86			
building regulations	Between Groups	32.186	19	1.694	3.677	.000
	Within Groups	30.871	67	.461		
	Total	63.057	86			

4.5 Post-hoc Tests for Measures for the Implementation of Building Sustainability Plan

The presented data in Table 5 is a post-hoc comparison using the Tukey HSD (Honestly Significant Difference) test, which is used to determine if there are significant differences between means of different groups. In this case, the dependent variable is measures for overcoming the factors limiting the successful implementation of building sustainability plan, and the independent

variable (factor) comprises five (5) categories of respondent's professionals (Quantity Surveyor Civil Engineer, Builder, Architect, and Others). The Table shows the mean difference between each pair of categories, the standard error, the significance level, and the 95% confidence interval. There was a statistically significant difference at the $p < 0.05$ level. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 1 (Quantity Surveyor) was significantly different from Group 3 (Builder). The mean score for Group 2 (Civil Engineer) was significantly different from Group 4 (Architect), and group 5 (Others). The mean score for group 3 (Builder) was significantly different from Group 5 (Others). Group 1 did not differ significantly from group 2, 4 or 5. This implies that construction professionals in the institution do not significantly influence the measures for overcoming the factors limiting the implementation of building sustainability plan in higher educational institutions.

Table 5: HSD Tests for Measures for Overcoming the Factors Limiting the Successful Implementation of Building Sustainability Plan

(I) Professional	(J) Professional	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Quantity Surveyor	Civil Engineer	0.017	0.152	1.000	-0.408	0.442
	Builder	0.108*	0.246	0.030	-0.578	0.794
	Architect	-0.021	0.180	0.150	-0.522	0.480
	Others	-0.014	0.123	1.000	-0.356	0.328
Civil Engineer	Quantity Surveyor	-0.017	0.152	1.000	-0.442	0.408
	Builder	0.091	0.254	0.996	-0.617	0.799
	Architect	-0.038*	0.190	0.004	-0.568	0.492
	Others	-0.031*	0.137	0.007	-0.415	0.352
Builder	Quantity Surveyor	-0.108*	0.246	0.030	-0.794	0.578
	Civil Engineer	-0.091	0.254	0.996	-0.799	0.617
	Architect	-0.129	0.271	0.989	-0.885	0.627
	Others	-0.122*	0.237	0.000	-0.783	0.539
Architect	Quantity Surveyor	0.021	0.180	0.150	-0.480	0.522
	Civil Engineer	0.038*	0.190	0.004	-0.492	0.568
	Builder	0.129	0.271	0.989	-0.627	0.885
	Others	0.007	0.167	1.000	-0.459	0.473
Others	Quantity Surveyor	0.014	0.123	1.000	-0.328	0.356
	Civil Engineer	0.031*	0.137	0.007	-0.352	0.415
	Builder	0.122*	0.237	0.000	-0.539	0.783

Architect	-0.007	0.167	1.000	-0.473	0.459

Dependent Variable: measures for overcoming the factors limiting the successful implementation of building sustainability plan.
Tukey HSD: the mean difference is significant at the 0.05 level

5. DISCUSSION OF FINDINGS

The result of the ranking of the measures of building sustainability plan implementation for public higher educational institution by the respondents through the administration of questionnaire on the nine(9) listed variables gathered from literatures shows that the top five (5) significant measures for overcoming the factors limiting the implementation of building sustainability plan as analyzed are Advocacy and Awareness, avaailability of standards regulation Guildelines and Assessment Systems, Financial incentives, Enactment of law that facilitate sustainability, and Legislation. This finding agrees with Davies & Davies (2017) which established that awareness of sustainable construction plays a vital role in the adoption of the plan.

This survey was also back-up by Wang et al., (2014) that regulations are the main factors that helps implement sustainability plan. The research also pointed on the work of Tarila et al., (2017) that enactment of the law helps to embrace sustainability plan implementation. This finding further collaborated the work of Onososen et al., (2019), which says provision of incentives should be designed by government through tax incentives or subsidies to higher educational institutions. The ANOVA test conducted to establish the significant difference between the overcoming measures among the higher educational institutions construction professionals shows that, there is a significant difference base on the fact that five (5) 0f the measures are significant. Legislation is one of the instruments that can lead to adoption of sustainability plan (Djoko et al., 2014). Implementation of sustainability plan is a process that begins with awareness and interest (Oke et al., 2019).

In addition, the post hoc test was implemented to see if there was a statistically difference in the measures of building sustainability plan among construction professionals. It was revealed that, there is no discernible relationship between the construction professionals and how they view the measures of building sustainability plan. Meanwhile, construction professional should recognize that building sustainability plan requires substantial changes in behavior at all levels (Tarila et al., 2017).

CONCLUSION AND RECOMMENDATION

The study assessed the measures for building sustainability plan implementation in higher educational institutions. The most common measures for the implementing of the building sustainability plan are advocacy and awareness, availability of standards, regulation guidelines and assessment systems, financial incentives, enactment of laws that facilitate sustainability, and legislation. All these will lead to the proper implementation of building sustainability plan.

As a result, the government should develop policies and legislation that will lead to the implementing of the plan, and higher institutions professionals should be enlightened about building sustainability plan.

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