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MODELLING THE EMPIRICAL RELATIONSHIP BETWEEN GREEN TECHNOLOGY PRINCIPLES AND SUSTAINABILITY OF INFRASTRUCTURE DEVELOPMENT IN NIGERIA

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ABSTRACT

Purpose: The global call for sustainability of construction projects in particular and the built environment in general demands that the construction professionals should have adequate knowledge of green technology and implement same in infrastructure development. The aim of the study was to establish the empirical relationship between green technology principles and sustainability of infrastructure development in Nigeria using structural equation modelling approach.

Design/methodology/approach: The study adopted survey research approach. Four hundred and fifty construction professionals were purposively selected from Abuja, Lagos, Port Harcourt, Uyo, and Enugu in Nigeria. A total of 346 copies were received giving a response rate of 76.68%. Data were analysed using descriptive statistics and structural equation modelling. The model estimation and modification, verification and validation were carried out. The values of Chi-Square/Degree of Freedom, the Goodness of Fit, Root Mean Square Error of Approximation, Comparative Fit Index, Tucker Lewis Index, Normed Fit Index, Incremental Fit Index, and Relative Index are 1.976, 0.983, 0.062, 0.966, 0.971, 0.963, 0.959 and 0.974 respectively. The values of these model fit indices showed a satisfactory model fit.

Findings: The results reveal that green technology principles have a direct and positive influence on the sustainability of infrastructure development in Nigeria ($\beta = 0.89$). The extent of implementation of green technology principles has corresponding influence on environmental and social sustainability of infrastructure development. Empirically, green technology accounts for 74 % of the changes or variability of the sustainability in infrastructure development. Specifically, green technology principles account for 58.1%, 62.1%, 61.6%, 48%, and 57% of the variability in air pollution, noise pollution, re-provision of habitat (re-green/tree planting), safe management of wastes, and extent of encroachment at dump site respectively. This study concludes that the extent of implementation of green technology principles among construction professionals positively influenced the sustainability of infrastructure development.

Research limitations/Implications: The limitations include the use of only four Cities in Nigeria. There is need to increase the number of cities and geopolitical zones as well as the sample size. The contribution to knowledge is that this study empirically established the relationship between green technology and sustainability of infrastructure development.

Practical implications: It is recommended that construction professionals and relevant stakeholders in the built environment implement green technology principles for eco-friendly, socially responsible, and economically viable infrastructure development.

Originality/value: The study revealed the percentage contributions of the green technology to sustainability of infrastructure development in Nigeria.

Keywords: Modelling; Empirical Relationship; Green Technology Principles; Sustainability; Infrastructure Development.

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1. INTRODUCTION

Research activities are mostly focused on the challenge of global climate change. Perhaps the most obvious and compelling requirement for an eco-friendly, smart, and sustainable design that can decrease the negative effects of climate change and global warming on the environment is present. And this can be attributed to mistakes like faulty design and use of practices or principles that unquestionably do not take the environmental consequences into account. In a research, statistics showing that 10–30% of existing species are endangered and probably will go extinct due to human activities like construction operations highlighted a huge, and mainly irreversible, loss in the biodiversity of life on Earth. (Jenny, 2017; Jurrian, 2014).

Regional environmental concerns have emerged as a result of rising carbon dioxide emissions (Schumacher et al., 2020). According to Connolly-Boutin and Smit (2016) and Muller *et al*. (2014), Africa has been particularly badly struck by the effects of climate change, including excessive heat, drought, flooding, sea-level rises, and unpredictable rainfall. Heatwaves have reached record heights and have varied greatly across the continent (Olivia *et al.,* 2017). These changes are more than the average for the entire world. According to Olivia *et al*. (2017), Africa will suffer substantially higher temperatures over the next 50 years than the continent's historical average. According to Connolly-Boutin and Smit (2016), these temperature variations have increased the spatial and temporal spread of infectious diseases in addition to causing floods and droughts. These environmental pollutions have negative implications on the standard of living and overall wellbeing of the people. However, according to Michael and William (2013), the problem with human beings is not pollution, but rather finding and utilising sustainable design and green technology principles. Humans would not need to consider waste, pollution, and scarcity if they were to create goods, tools, and plants with greater intelligence from the start. A nice setting can be created with sustainable design that can withstand a great deal of limitless reuse. Daily design decisions are made with the influence on sustainable development in mind. There are many issues that prevent effective sustainable design from being implemented in a construction project. In order to address the issues, practical rules should be followed and critical solutions to the problems must be found. The government is making numerous attempts to comprehend environmental related issues, minimise carbonization, take climate change risks into account, and minimise the impact of its operational actions in order to address this issue (Hafner *et al*., 2020; Muhammad *et al*., 2019). In response to these worries, the government has an Agenda 2030 to pursue sustainable development based on the Paris climate agreement, according to Tolliver *et al.* (2020). To increase sustainable development, the government and everyone involved in the built environment must be inventive and give greater attention to environmental preservation and economic growth (Guild 2020).

Construction stakeholders must develop new ways to carry out projects in the built environment in a more sustainable way due to a paradigm shift in the industry. Sustainable development in all its forms will be facilitated by developing and putting into practice green principles. The 'triple bottom line' of a building's ecological, social, and financial performance is referred to as sustainable building practices, and construction stakeholders worldwide are reforming their corporate structures to execute these practices (Lee *et al*., 2014). According to Ogunbode *et al*. (2017), the adoption and promotion of sustainable construction practices by industry professionals is necessary for a more sustainable built environment. Studies on the evaluation of the use of green technology principles at the level of construction projects revealed some degree of variation. In various locations, various measurement systems employed various evaluation or measurement criteria. However, according to Ujene and Oladokun (2017), all evaluation criteria were centred on employing appropriate environmental management practises, including green design, the use of renewable energies, advanced and recycled materials, and the use of sustainable construction methods. Other factors include the experts' use of environmentally friendly building materials, carbon footprint, ethical purchasing, community involvement, training, a flexible work environment, and biodiversity (Thivaharan, 2015).

1.1. Objectives of the Study

Evidence from the literature revealed that there has been little research on the actual connection between green technology principles and the sustainability of infrastructure development in Nigeria. It was essential to create a prediction model utilising the structural equation modelling approach in order to close this gap in the literature. The specific objective of the study is to:

i. Determine the empirical link between the use of green technology principles and the sustainability of infrastructure development in Nigeria.

2. LITERATURE REVIEW

Sustainability is a wide, nuanced notion that has become one of the key issues in the construction sector. According to Diaz-Sarachaga *et al.* (2017), the concept of sustainability entails improving people's quality of life so they can live in a healthy environment with better social, economic, and environmental conditions. Construction professionals' perceptions of green building awareness and potential benefits in construction projects in Nigeria's Lagos metropolitan were evaluated by Nduka and Ogunsanmi (2015). The findings showed that the majority of Nigeria's building industry experts are conversant with the fundamentals of green technology. Onososen *et al*. (2019), however, asserted that one of the main obstacles to the adoption of green building principles in Nigeria is the lack of understanding about green building among the built population.

Waziri *et al*. (2015) conducted research on Nigeria's use of green construction techniques. The study found that while sustainable building practices are somewhat applied at the individual, project, they are barely implemented at the firm levels. The study also found that Nigerian built environment experts are only at a moderate degree of adopting green construction practices overall. One would anticipate that there would be a high level of implementation of green technology concepts given the high level of awareness of these principles among Nigerian building professionals. The level of application of green technology concepts is still at a moderate level, according to data in the literature.

Green technology is the creation and use of concepts, ideas, things, tools, and systems that protect or conserve resources and the environment. The use of renewable resources is encouraged, and the detrimental effects of human activity are minimised and reduced (Izvekova, Roy, and Murgul, 2016). According to Darko and Chan (2016), "green technology" is also a term for environmentally friendly technologies that rely on non-conventional energy sources to power non-toxic cleaning agents.

According to Ahmad, Thaheem, and Anwar (2016), "green building" is the practice of designing buildings that are resource and environmentally friendly from planning to design, construction, operation, maintenance, renovation, and demolition. This includes everything from the choice of building materials to the location of a building. Construction companies have been responding slowly to increasing demands placed on "green projects" in order to comply. However, contractors have the power to embrace the green movement's tenets and work to promote proactivity throughout the sector.

According to Ahn *et al*. (2013), green technology principles are integrated practices that greatly reduce the environmental impacts of construction activities. Green technology, according to Kamana and Escultura (2011), is the result of a design that prioritises increasing the sufficiency of resource use, including energy, water, and materials, while minimising the effects of construction activities on human health and the environment over the course of the infrastructure's lifecycle. Green technology is a branch of engineering that applies environmentally friendly ideas to building. According to Swarnkar and Singh (2016), it entails applying eco-friendly design, construction, and maintenance concepts. The principles of green technology also include the use of materials that can be recycled or repurposed, natural lighting, ventilation, and passive solar designs, efficient water use through recycling and water harvesting, use of renewable energy sources like solar and photovoltaic systems, and the use of recyclable materials.

Other green technology concepts examined in this study included effective waste management and disposal, a decrease in the amount of new building, the use of energy-efficient air conditioning and lighting equipment, and the use of on-site renewable energy sources. The use of recycled and environmentally friendly building materials, the use of non-toxic and recycled/recyclable materials, efficient water recycling, indoor air quality improvement for human safety and comfort, and the use of rapidly developing technologies are additional green technology principles. These include measurement and verification plan to ensure energy and water savings, reduction of building footprints to minimise environmental impact, minimal disturbance to landscapes and site conditions, and use of fast renewable resources, non-toxic, recycled/recyclable construction materials, effective water recycling, enhancement of indoor air quality for human safety and comfort, and use of recycled and ecologically friendly building materials (Singh 2018; Leontev 2019).

Applying green technology to the building sector has a variety of benefits. According to Elizabeth (2019), even while purchasing and using green technology may initially be more expensive, long-term returns are far more likely. These technologies are specifically designed to efficiently and effectively maximise resources, which lowers overall expenses.

According to Elizabeth (2019), practical sustainable features in building design and construction can reduce costs, reduce impact on the environment, and produce value that lasts. First and foremost, protecting natural resources, eliminating the negative effects of construction activities on environmental safety by using recyclable or reusable materials, and changing the production pattern to lessen waste and pollutants are the highest priorities in the construction of environmentally friendly buildings.

In addition to its economic and social advantages, green infrastructure development can be characterised as long-term initiatives aiming at maintaining, safeguarding, effective and efficient utilization of resources, and protecting the environment in several sectors (Tolliver *et al*. 2020). Green development shows how progress is made through harmony between the economy and the environment. Environmental change, energy demands, and the financial crisis are the three main threats to the global economy that green development addresses (Mohd and Kaushal 2018).

According to Russ *et al*. (2018), the development of infrastructure can benefit from green technology principles in terms of the environment, economy, and society. Given the significant impact that building projects have on the built environment, green technology has become a crucial component of sustainable construction projects. When applied to both modern and cutting-edge facilities and structures, its values have a notable positive impact (Aboginije *et al.*, 2019).

3. METHODOLOGY

This study establishes an empirical link between the degree to which green technology concepts/principles are being applied and Nigeria's infrastructure development sustainability. Purposive sampling was employed to obtain the sample for this investigation, which adopted a survey design. A total of 450 building experts from Nigeria's Abuja, Lagos, Port Harcourt, Uyo, and Enugu were purposefully chosen. The volume of infrastructure development in each city determined the cities that were chosen. Age, years of experience, educational background, and professional affiliation were the selection factors for professionals. The researchers emailed copies of the structured questionnaire to the architects, builders, and civil engineers who work in the building industry. The specialists were chosen based on their prior experience in infrastructure management. The registered professionals' database was used to choose the building industry experts. The questionnaire had three sections. The first section is comprised of information about the respondents. The second and third sections are implementation of green technology principles and sustainability of infrastructure development in Nigeria respectively. The data used in the study were collected using a five-point scale of 1 to 5 (Kazaz *et al.*, 2008). Scale 1 represents very low implementation/sustainability and scale 5 represents very high implementation/sustainability. Methods of data analysis included simple percentage, and Structural Equation Modelling (SEM). The simple percentage was used to analyse the information about the respondents, the questionnaire distribution and response rate, and the Structural Equation Modelling (SEM) was used to establish the empirical relationship between the level of implementation of green technology principles and sustainability of infrastructure development in Nigeria.

4. PRESENTATION AND DISCUSSION OF RESULTS

This section consists of the result of analysis of the respondents' characteristics, the questionnaire distribution and response rate, the model fit indices and the results of the structural equation modelling (SEM).

4.1. Characteristics of the Respondents

The results of the analysis of the sex, age, educational qualification, and work experience of the respondents are presented in figure 1- 5 respectively

Sex of the Respondents

Figure 1 displays the outcome of the examination of the characteristics of the respondents. The findings indicate that 90% of the study's construction professionals are men and only 10% are women. This suggests that men make up the majority of the professionals in this survey. It demonstrates the workforce's predominance of men in the construction sector.

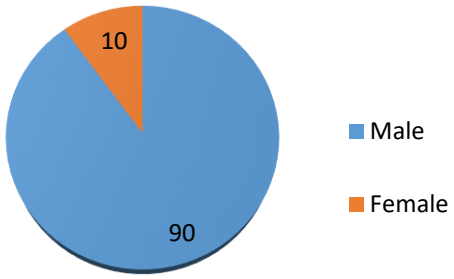

Figure 1: Sex of the Respondents

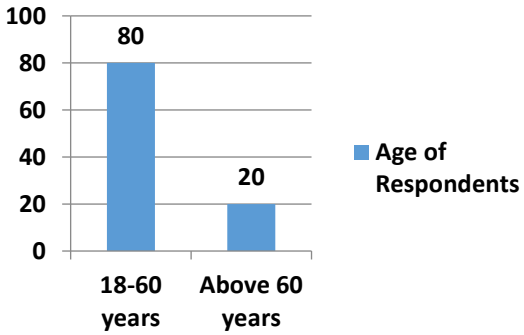

Figure 2: Age of the Respondents

The age distribution of the construction industry experts that took part in this survey is shown in Figure 2. It shows that whereas 20% of professionals are beyond 60 years old, 80% of professionals are between the ages of 18 and 60. This shows that the bulk of the professionals who took part in this study are still in their prime for employment.

Educational Qualification

The results in Figure 3 show that 10 %, 40 %, 40 %, and 10 % of the construction experts who participated in this study hold HND, BSc, MSc, and PhD respectively. The outcome in figure 3 further demonstrates that all the experts who took part in this study were properly trained and knowledgeable enough to take part. Additionally, it suggests that the data obtained from them can be trusted.

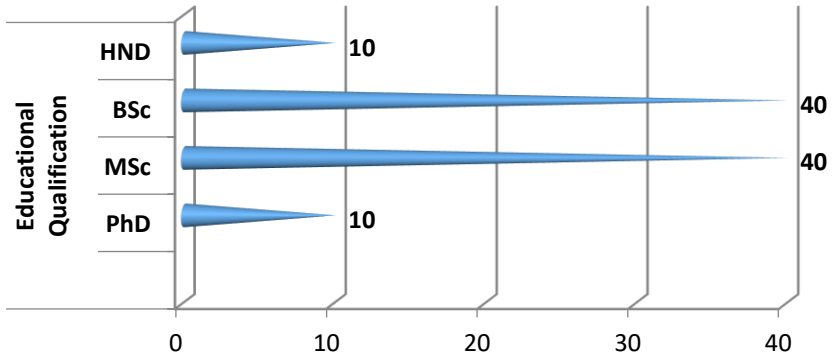

Figure 3: Educational Qualification

Work Experience

The outcome shown in Figure 4 demonstrates that the experts have a wealth of professional expertise. Most of the respondents have over twenty years of experience working in the construction business. As a result, the data collected from them is reliable and suitable for the study.

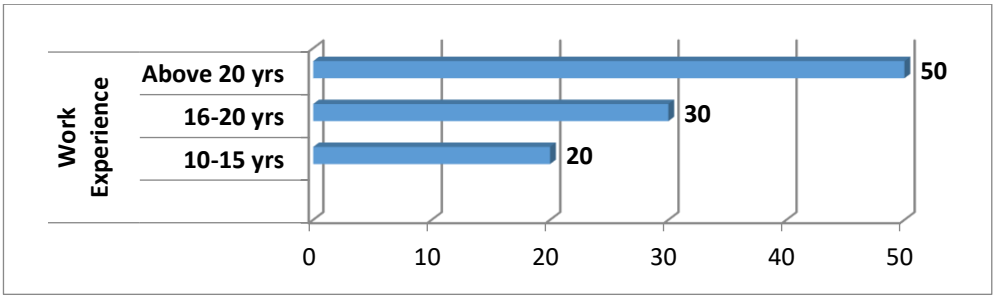

Figure 4: Work Experience

4.2. Questionnaire Distribution and Response Rate

Figure 5 displays the distribution and response rate for the survey. The researchers purposively picked 450 construction industry professionals, and then distributed questionnaire to them. 346 copies in total were received, translating to a response rate of 76.68 %. This suggests that the response rate is acceptable and good. According to Groves (2006), a response rate of at least 50 % is regarded appropriate for analysis and reporting, a response rate of 60% is good, and a response rate of 70 % is very good. The results are consistent with his theory.

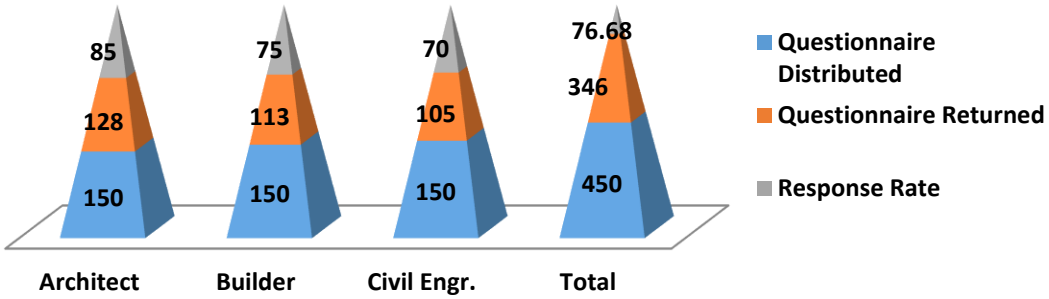

Figure 5: Questionnaire Distribution and Response Rate

4.3. Structural Equation Modelling (SEM) for Establishing Empirical Relationship between Green Technology Principles and Sustainability of Infrastructure Development in Nigeria

Empirical relationship between green technology principles and sustainability of infrastructure development in Nigeria was established using structural equation modelling. Model estimation, model verification, and final model validation are among the procedures.

Model Estimation

The study used the maximum likelihood estimate (MLE) to identify the particular contrast between the parts. The underlying dimensions that produced contrast patterns between the variables were revealed using the promax rotation technique. Additionally, the promax rotation approach was chosen due to the enormous amount of data involved and since it took into consideration variable correlation. The outcome revealed that KMO was 0.810, confirming the suitability and sufficiency for carrying out factor analysis on the data set. This result exceeds the KMO and Bartlett's test cutoff of 0.5. This demonstrated that conducting factor analysis on the data set was both appropriate and adequate.

Data grouping was not the purpose of the investigation. At an early point, classifications based on the literature were created to categorise green technology principles and sustainability of infrastructure development. The preparatory phase has already indentified green technology principles and indicators of sustainability of infrastructure development. In this investigation, PCA was used to condense the variables and identify the tiniest components that accounted for the majority of the variances in the data set. No component had fewer than three variables in relation to other components, according to the matrix of components that was rotated. Additionally, it was discovered

that each variable's correlation coefficient (r) was higher than 0.5. This showed a significant correlation between the variables. This also satisfied the prerequisite outlined in the literature (Tabachnick and Fidell, 2007).

Verification and Validation of the Final Model

The model fit indices were used to validate the final model. Table 1's findings demonstrated that the final model's model fit indices met the standards established by the literature. The findings demonstrated that the estimates were within the anticipated ranges. Chi-square/degree of freedom, goodness of fit, root mean square, approximation error, Tucker-Lewis index, normed fit index, incremental fit index, and relative index tests gave the following values: 1.976, 0.983, 0.062, 0.966, 0.971, 0.963, 0.959, and 0.974, respectively. These model fit indices' values indicated a good model fit. This study was in tandem with Schumacher and Lomax (2004), Zulu (2007), Hair *et al*. (2010), and Byrne (2010) that used many model fit indices to determine the overall fitness of the model.

Table 1: Model Fit Indices (developed by the authors)

Model Fit Indices	Recommended	Source(s)	Final Model	Remark
X^2/Degree of freedom	< 2	Byrne, 2001	1.976	satisfactory
Goodness of fit (GFI)	0 – 1	Bagozzi and Yi, 2012	0.983	satisfactory
Root Mean Square Error of Approximation (RMSEA)	≤ 0.10	Tabachnick and Fidell (2007)	0.062	satisfactory
Comparative Fit Index (CFI)	> 0.9	Kline, 2005	0.966	satisfactory
Tucker Lewis Index (TLI)	≥ 0.90	Bagozzi and Yi, 2012	0.971	satisfactory
Normed Fit Index (NFI)	0 – 1	Doloi *et al.*, 2011	0.963	satisfactory
Incremental Fit Index (IFI)	0 – 1	Molenaar *et al*., 2000	0.959	satisfactory
Relative Fit Index (RFI)	0 – 1	Doloi *et al.*, 2011	0.974	satisfactory

The estimated standardised regression weight, standard errors, and p-values are displayed in Table 2. The feasibility of parameter estimates, the appropriateness of standard errors, and the statistical significance of parameter estimates are further criteria that evaluate the model's suitability. The parameters were examined to make sure the estimations were accurate. The estimates' accuracy indicates that each estimate has the proper values and signs. In doing so, estimates with correlation coefficients higher than one (1) were avoided. The appropriateness of the standard error is another important factor to consider when assessing the model's suitability. Table 2 shows that the standard error values are low, which suggests a good model.

The squared multiple correlations of each model variable are displayed in Table 3. Table 3 showed that the degree of application of green technology principles explains a significant percentage of the variability in the sustainability of infrastructure construction. Each estimate in table 3 implies that a particular variable is regarded as a dependent variable. For instance, if the squared multiple correlation for the sustainability of infrastructure development is 0.670, then the degree to which green technology principles are being applied accounts for 67% of the variability in the sustainability of infrastructure development.

Table 2: Standardized Regression Weights: (Group number 1 - Default model)

			Estimate	**S.E**	*P*-value
SID	<---	GTP	.818		
SOCS	<---	SID	.311		
ENVS	<---	SID	.223		
GTP10	<---	GTP	.167	.048	***
GTP9	<---	GTP	.833	.050	***
GTP8	<---	GTP	.614	.049	***
GTP7	<---	GTP	.678	.053	***
GTP5	<---	GTP	.756	.047	***
GTP3	<---	GTP	.798	.048	***
GTP2	<---	GTP	.775	.048	***
GTP1	<---	GTP	.743	.049	***
ENVS11	<---	ENVS	.755	.058	***
ENVS10	<---	ENVS	.692	.055	***
ENVS7	<---	ENVS	.786	.051	***
ENVS6	<---	ENVS	.789	.052	***
ENVS5	<---	ENVS	.763	.052	***
SOCS6	<---	SOCS	.636	.049	***
SOCS4	<---	SOCS	.788	.049	***
SOCS3	<---	SOCS	.572	.052	***

Table 3: Squared Multiple Correlations: (Group number 1 - Default model)

Code	Sustainability Constructs and Dimensions	Estimate
GTP	Green Technology principles	.000
SID	Sustainability of infrastructure development	.670
SOCS	Social sustainability	.097
ENVS	Environmental sustainability	.050
SOCS3	Standard of living	.327
SOCS4	Public and private sector investment	.621
SOCS6	Bio-diversity and eco-system stability	.405
ENVS5	Reduced air pollution	.582
ENVS6	Reduced noise pollution	.622
ENVS7	Re-provision of habitat (re-green/tree planting	.617
ENVS10	Safe management of other wastes	.479
ENVS11	Extent of encroachment at dump site	.570
GTP1	Use of renewable and recyclable resources	.552
GTP2	Minimization of resource consumption	.601
GTP3	Protect and promote human health through a healthy and safe habitat, infrastructure, and environment	.637
GTP5	Sustainable supply chain management	.571
GTP7	Prudent use of the four generic construction resources (water, energy, material, and land)	.460
GTP8	Improvement in an indoor environment (air, thermal, visual, and acoustic quality) and optimization of operation and maintenance	.377
GTP9	Minimization of energy consumption	.694
GTP10	Project identification and fulfillment of needs, requirement, and aspiration of communities and stakeholders while involving them in critical decisions	.028

4.4. Empirical Relationship between Green Technology Principles and Sustainability of Infrastructure Development

Data in Tables 1 to 3 demonstrate a good model fit because all output values fall within allowable bounds. The assessment of the statistical significance of parameter estimates shows that all p-values are less than 0.05. This suggests that all estimates are significant at a 95% level of confidence. These model fit indices' values indicated a good model fit. In line with Schumacher and Lomax (2004), Zulu (2007), Hair *et al*. (2010), and Byrne (2010), this study also used a variety of model fit indices to assess the overall model fitness.

The sustainability of infrastructure development in Nigeria is directly and favourably impacted by green technology principles, as shown in Figure 2 (r = 0.82). The degree to which green technology principles are applied determines how environmentally and socially sustainable infrastructure construction is. It shows that the use of recyclable and renewable resources, reducing resource consumption, protecting and promoting human health through a safe and healthy environment, infrastructure, and habitat, managing a sustainable supply chain, and wise use of the four general resources of construction (water, energy, material, and land) all contributed to the development of sustainable infrastructure. The improvement of indoor environments (air, thermal, visual, and acoustic quality), as well as the optimisation of operation and maintenance, lowering energy consumption, and project management, are further green technology principles that have had a significant impact on the development of sustainable infrastructure.

Empirically, green technology accounts for 67 % of the changes or variability of the sustainability in infrastructure development. The remaining 33% can be attributed to other factors that were not considered in this study. Specifically, green technology principles account for 58.2 %, 62.2 %, 61.7 %, 48 %, and 57 % of the variability in air pollution, noise pollution, re-provision of habitat (re-green/tree planting), Safe management of wastes, and extent of encroachment at dump site. This study supports the contention made by Ogunbode *et al*. (2017) that in order to create a built environment that is more sustainable, construction professionals need to embrace and promote sustainable construction techniques through their job.

Furthermore, applying green technology concepts to infrastructure delivery boosts project implementation success by 4.1%. Additionally, the proper application of green technology concepts in infrastructure development can raise the standard of living by 32.7%. The degree of adoption of green technologies accounts for sixty two percent (62%) of the variation in public and private sector investment in infrastructure development. Green technology implementation boosts corporate value and interest among stakeholders in making investments in infrastructure development. According to this study, the adoption of green technologies is responsible for 40.1% of the variation in biodiversity and eco-system stability. This research supports the claim made by Russ *et al.* (2018) that the construction of infrastructure can benefit from green technology principles in terms of the environment, economy, and society. This study concurs with Elizabeth (2019), who asserted that practical sustainable features in building design and construction can reduce environmental impact, save money, and produce excellent value that endures over the course of the project.

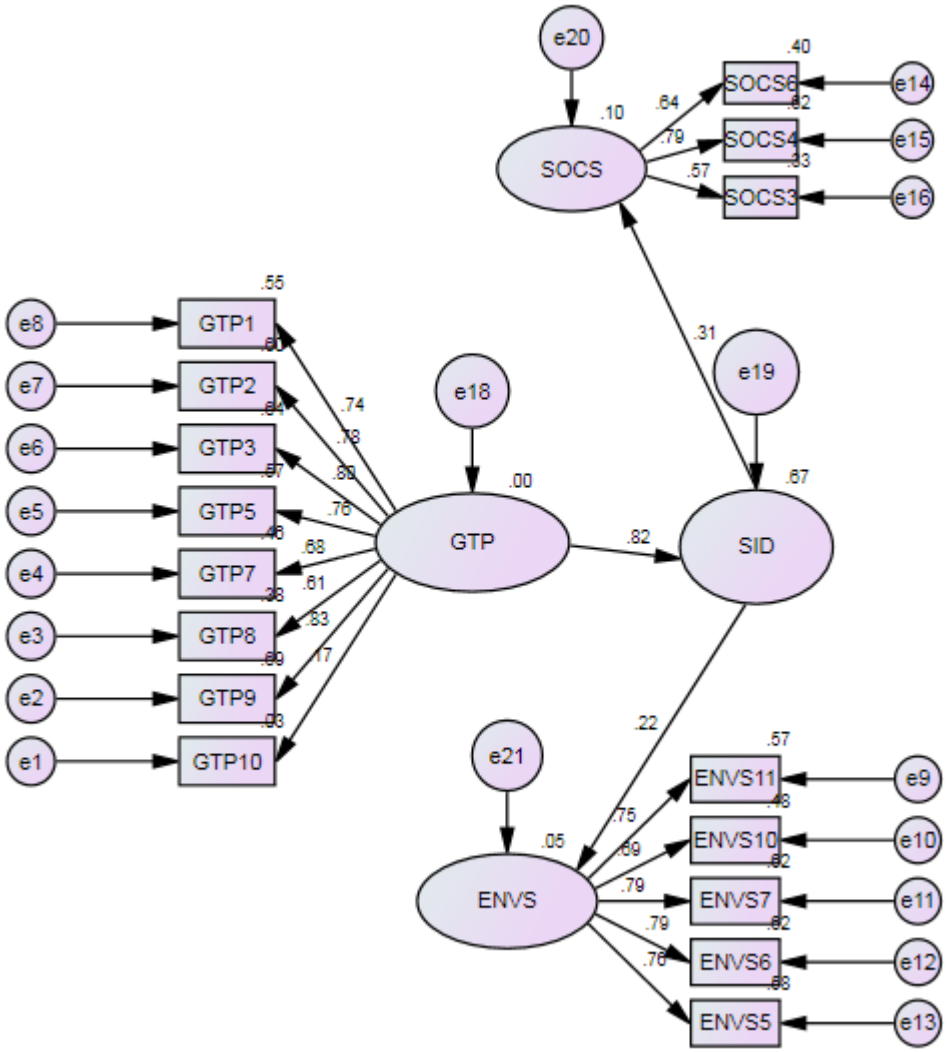

Figure 6: Structural Equation Model Establishing the Relationship between Green Technology Principles and Sustainability of Infrastructure Development

5. CONCLUSIONS AND RECOMMENDATIONS

To ascertain the impact of green technology principles on the sustainability of infrastructure development in Nigeria, a structural equation model was developed. The estimation, modification, verification, and validation of the model were completed. Chi-square/degree of freedom, goodness of fit, root mean square approximation error, Tucker-Lewis index, normed fit index, incremental fit index, and relative index had values of: 1.976, 0.983, 0.062, 0.966, 0.971, 0.963, 0.959, and 0.974, respectively. These model fit indices' values indicated a good model fit. According to the findings, green technology principles directly and favourably affect Nigeria's infrastructure development's sustainability (r = 0.82). The degree to which green technology concepts are implemented has a proportional impact on the environmental and social sustainability of infrastructure development. According to empirical data, 67% of the variations or changes in the sustainability of infrastructure development may be attributed to green technology. With regard to air pollution, noise pollution, re-provision of habitat (tree planting), safe management of wastes, and level of encroachment at dump sites, green technology principles specifically account for 58.2%, 62.2%, 61.7%, 48%, and 57% of the variability, respectively. This study also comes to the conclusion that by properly applying green technology concepts to infrastructure construction, the standard of living can be raised by 32.7%. The degree of adoption of green technologies accounts for sixty two percent (62.1%) of the variation in public and private sector investment in infrastructure development. Green technology implementation

boosts corporate value and interest among stakeholders in making investments in infrastructure development. The study's findings suggest that the degree to which green technology concepts were applied by construction experts had a favourable impact on the sustainability of infrastructure development. It is advised that green technology principles be applied by construction experts and other key players in the built environment in order to produce infrastructure that is environmentally sound, socially responsible, and commercially successful.

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