Development and Validation Measures for Green Entrepreneurship and Environmental Sustainability of SMEs in Nigeria

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Abstract: The global emphasis on environmental sustainability has placed pressure on Small and Medium Enterprises (SMEs) to embrace green entrepreneurial practices. Despite increasing global emphasis on sustainable business practices, empirical tools tailored to the Nigerian SME context remain scarce. This research aimed to develop and validate measurement scales that incorporated five proxies of green entrepreneurship (environmental entrepreneurship, green institutional entrepreneurship, and green market appropriating entrepreneurship, green producer-focused and green customer-focused informational entrepreneurship) as well as ecological entrepreneurship of SMEs in Nigerian context. A total of 313 entrepreneurs took part in this research. Data were analyzed through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), by the use of partial least square – structural equation modeling (PLS-SEM) approach. The reliability was achieved through the composite reliability (rho_a and rho_c), outer loading constructs, and cronbach's alpha. The validity was performed through convergent validity which was obtained by measuring the average variance extracted (AVE), while the discriminant validity of the instrument was confirmed through heterotrait-monotrait (HTMT). CR and AVE values showed a satisfactory level to establish measurement model and all values assed to prove discriminant validity achieved the HTMT criterion. Model fit assessment was performed through SRMR and NFI criteria, which confirmed the study's model fit as sufficiently robust to support further analysis. Fundamentally, the development and validation of measurement scale through PLS-SEM has showed that the scales developed in this research are valid and statistically reliable.

Keywords: Green Environmental Entrepreneurship, Green Institutional Entrepreneurship, Green Market Appropriating Entrepreneurship, Green Producer-focused Informational Entrepreneurship, Green Customer-focused Informational Entrepreneurship, Ecological Entrepreneurship, Scale Reliability

1. Introduction

The global shift towards environmental sustainability has led to increased attention on green entrepreneurship, particularly in emerging economies. SMEs play crucial roles in economic development, job creation, and innovation, yet their environmental footprint remains an issue. Green entrepreneurship integrates environmentally sustainable practices into business models, has emerged as vital strategy to address ecological challenges while fostering economic growth. Green entrepreneurship refers to business initiatives that prioritize sustainable practices, resource efficiency, and environmental responsibility (Gupta and Dharwal, 2021). Green refers generally to ideas, practices, or initiatives that prioritize environmental sustainability and aim to reduce negative impacts on the planet (Adeola et al, 2021). Green idea is centred on promoting eco-friendly practices, conserving natural resources, and minimizing pollution and waste generation (Sarkar, at al, 2020).

The environment is the source of all the resources needed by an organization to accomplish its objectives (Xushi Wei et al, 2023). But its negligence has triggered environmental degradation caused by oil spills, erosions and host of other factors that is peculiar to Nigeria environment (Adeola et al, 2021). Sustainability exists as three-legged table consisting of the environment, the economy, and society, or as a dualistic relationship between human-beings and the ecosystem they inhabitate (Chen et al, 2022; Xushi Wei et al, 2023). Environmental sustainability is the rate of renewable resource harvest (Makhulo, 2017), and involves practices that ensure economic activities do not compromise ecological balance (Kaur et al, 2025).

A common blueprint and global call to action, the United Nation in 2015 defined 17 SDGs, which are the cornerstone for SDG agenda. The fact that innovation and entrepreneurship are explicitly mentioned in four of these SDGs highlights their relevance to sustainable development (Adeola et al, 2021). This green agenda aims to transform economic idea generation to involve environmental well-being and social-equity in accordance with SDGs agenda and to achieve the sustainable management and efficient use of natural resources (OECD, 2015; Gyimah et al, 2020; Adeola et al, 2021). SMEs play a critical role in economic development in Nigeria, contributing to employment and local economic growth. However, their activities often have adverse environmental impacts, including pollution, resource depletion, and inefficient waste management (Adedoyin

et al, 2021). While green entrepreneurship presents an opportunity to address these challenges by promoting eco-friendly innovation and sustainability practices, the adoption of such practices among SMEs remain low.

For SMEs to understand how to synchronise the environmental sustainability objectives with their business strategy, green entrepreneurship practices are critical. Example, lack of focus on environmental entrepreneurship, inability to understand the application of green institutional entrepreneurship, unalignment of green market-appropriating entrepreneurship to firm's strategy and environmental objectives, and conversion of producer-focused and customer-focused informational entrepreneurship to green entrepreneurship practices are some problems and challenges faced by SMEs. This empirical research has developed a measurement scale to examine green entrepreneurship and environmental sustainability among SMEs. Addressing these challenges is essential for developing effective policies and support mechanisms to facilitate transition of SMEs from traditional entrepreneurship to a more eco-friendly businesses embedded in green entrepreneurship and environmental sustainability in an emerging economy.

2. Research Objectives

The study broad aim is to develop and validate measurement constructs to assess green entrepreneurship and environmental sustainability of SMEs. The specific objectives are subdivided into the following:

- To develop measure of green entrepreneurship and environmental sustainability (GEES).
- Review current literature in the area of GEES.
- Assessment of unidimensionality, construct reliability and validity, discriminant validity, and model fit.
- Interpretation, final assessment of findings, and contribution to knowledge.

3. Literature Review

3.1 Conceptual Review GEES Constructs.

3.1.1 Environmental Entrepreneurship (GEE)

They are business ventures that incorporate environmental sustainability into their core processes, products, and services (Jiang *et al.,* 2020; Anghel and Anghel, 2022). This involves adopting eco-friendly practices such as waste reduction, renewable energy use, sustainable supply chains, and pollution control. GEE focuses on minimizing the negative impact of business activities on the environment while promoting long-term ecological sustainability (Smaliukienė, and Monni, 2019; Shabbir, 2023; Leal Filho et al, 2025).

3.1.2 Green Institutional Entrepreneurship (GIE)

Involve efforts by businesses or organizations to influence regulatory, social, and institutional frameworks in favour of sustainable practices. Entrepreneurs in this category engage in policy advocacy, industry collaborations, and institutional reforms that encourage green business initiatives (Colwell and Joshi, 2013; Atiase et al., 2018; Herrerera, 2021). GIE plays a crucial role in shaping environmental governance and driving systemic change toward sustainability (Kalyar et al*,* 2020; Zhao et al, 2021; Liu et al*,* 2022).

3.1.3 Green Market-Appropriating Entrepreneurship (GMAE)

Refer to business strategies that capitalize on the growing consumer demand for sustainable products and services (Dean and McMullen, 2007; Cohen and Winn, 2007). Entrepreneurs in this category align their business models with market trends in eco-conscious consumerism, leveraging green branding, certification (e.g., organic or carbon-neutral labels), and sustainability-driven product innovations to gain a competitive advantage (Nordin and Hassan, 2019; Aljuwaiber, 2021).

3.1.4 Green Producer-Focused Informational Entrepreneurship (GPFIE)

Involve disseminating sustainability knowledge and best practices among producers, suppliers, and industry stakeholders (Dean and McMullen, 2007; Cohen and Winn, 2007; Zhao et al, 2021). This includes training programs, workshops, and advisory services aimed at helping producers adopt green technologies, eco-friendly production processes, and sustainable resource management techniques (Zhao et al, 2021; Liu et al*,* 2022).

3.1.5 Green Customer-Focused Informational Entrepreneurship (GCFIE)

It is centred on educating and influencing consumers to adopt environmentally friendly behaviours and make sustainable purchasing decisions (Dean and McMullen, 2007; Cohen and Winn, 2007). This includes green marketing campaigns, eco-labelling, consumer awareness programs, and initiatives that inform customers about the environmental impact of their consumption choices. Businesses using C_FIE leverage consumer engagement to drive demand for eco-friendly products and services (Liu et al*,* 2022).

3.1.6 Ecological Entrepreneurship (ECO_ENT)

Refer to business activities that are inherently designed to promote environmental sustainability by addressing ecological challenges (Clifford and Dixon, 2006). Unlike conventional businesses that integrate sustainability as a secondary goal, ecological entrepreneurship businesses prioritize ecological conservation, restoration, and sustainable resource use as their core mission (Mieszajkina, 2016). Examples include renewable energy ventures, circular economy start-ups, and businesses focused on biodiversity conservation.

The six scales: EE (Jiang et al, 2020; Anghel and Anghel, 2022); GIE (Colwell and Joshi, 2013; Kalyar et al, 2020; Liu et al, 2022); GMAE; GPFIE; GCFIE (Dean and McMullen, 2007; Cohen and Winn, 2007; Nordin and Hassan, 2019); and ECON_ENT (Clifford and Dixon, 2006; Mieszajkina, 2016) were all assessed and extensively developed by the researcher after thorough review of literature.

3.2 Theoretical Framework

This research is anchored on triple bottom line (TBL) theory. A sustainable framework that measures a business success on three core dimensions: economic, social, and environment (Elkington, 2013). TBL has been recognized because it encourages firms to go past traditional financial accounting to take account of ecological and societal considerations in their decision-making practices. Xushi Wei et al, (2023), notes the combination of the three dimensions of TBL theory can help explain the way organizations could go green, partake in eco-friendly activities and understand the incentives available when organizations cultivate green entrepreneurship practices. TBL theory has confirmed both the short and long term incentives of the association between entrepreneurship and the three essentials of an organization's sustainable development (Dhahri and Omri, 2018). TBL theory provides a comprehensive justification for evaluating how SMEs can balance economic viability, social responsibility, and environmental values (Sun et al., 2020). The TBL theory provides a theoretical foundation for categorizing, validating, and operationalization of constructs used to assess green entrepreneurship and environmental sustainability. The researchers used the TBL theory to suggest that enhancing economic viability (i.e. market appropriating entrepreneurship) of organizations is not enough, rather entrepreneurs should increase focus on organization's social responsibility (i.e. green producer-focused and customer-focused entrepreneurship) and environmental values (i.e. environmental, ecological, green institutional entrepreneurship). In this context, the TBL theory is instrumental to provide a balanced-integrative framework that justifies the importance of developing measures to validate green entrepreneurship and environmental sustainability (Usman et al, 2021; Chen et al, 2022). It underscores the need to promote eco-friendly and socially responsible business practice amongst SMEs in Nigeria, at the same time not to lose focus on their financial sustainability. As such, TBL theory enriches both the theoretical grounding and practical significance of this study (Sun et al, 2020; Xushi Wei et al, 2023).

4. Methodology

The researchers adopted a quantitative research design with emphasis on development and validation of survey instrument. The main objective was to develop, test, and validate measurement scales for assessing green entrepreneurship practices and environmental sustainability of SMEs. The study design was arranged in two main parts: development and validation, which includes both exploratory and confirmatory approaches. The researchers made use of a deductive research approach, grounded in theoretical exposition from existing literature on green entrepreneurship, environmental sustainability, and SMEs management and followed a structured step of: item generation, scale development, empirical testing, statistical validation and model fit assessment. In addition, this study adopted a multistage sampling method and was conducted in South-East, Nigeria. Five innovation districts were selected through a random sampling method. The researchers selected few SMEs that promote green entrepreneurship from the innovation districts for the pilot study. Finally, purposive sampling was adopted to select SMEs that promotes green entrepreneurship to meet the requirement of the study. These SMEs have similar characteristics and maintain international standards required by Climate

Action for Africa. The most desirable sample size determination method for PLS-SEM research should be based on power analysis to ensure guaranteed results and a model that can be generalized (Hair, Hult, et al, 2017). The minimum sample of this study was calculated using Krejcie-Morgan formula based on specific features and sample size recommendation in PLS-SEM for a statistical power of 80%. Based on calculations, a total of 212 minimum sample numbers in reference to PLS-SEM were proposed for this study (Hair, Hult, et al, 2017). Previous research recommended that 100 to 200 samples are adequate to serve as starting point for research related to path estimation, particularly PLS-SEM (Mohd Dzin et al, 2021). To meet the requirement, the researchers collected data from 313 samples. Theses samples were measured to be homogenous as they operate within the innovation district clusters within South-East, Nigeria and they use the same standard of operation required by Climate Change for Africa.

4.1 Method of Analysis

The researchers adopted Partial Least Square-Structural Equation Modelling (PLS-SEM) as appropriate software for predictive research and can sufficiently handle both reflective and formative measurement models (Yildiz, 2023). The choice of confirmatory factor analysis (CFA) is deeply intertwined with the choice of PLS-SEM because of the following: when the statistical objective of the research is predictive, measurement validation and model confirmation, PLS-SEM is the preferred method (Hair, Mathews, et al, 2017; Shmueli et al, 2019). Secondly, PLS-SEM is mostly associated with exploratory and development of theory (Hair, Howard, et al., 2020) and provides more accurate estimates with small sample size (Hair and Sarstedt, 2019). Finally, PLS-SEM easily assess endogeneity and measurement invariance test to address the issues of biased estimates and constructs are measured for valid comparison (Hair, Howard, et al, 2020).

The six scales were assessed using the approach of Anderson and Gerbing and Gerbing and Anderson. Individual construct's unidimensionality, reliability, and validity are estimated by the measurement model (Green et al, 2006). The measurement model described how efficiently the observed indicators measured the latent variables.

CFA method was adopted, another refined method, together with EFA was used to specify the measurement model. Assigning indicators (such as survey items) to a latent construct or variable constitutes determining the measurement model (Garver and Mentzer, 1999). Following the instruction of Cohen and Winn, (2007) distinctive measurement models were estimated for each construct within the STGEES. Once the scales' unidimensionality has been proven, additional validation studies must wait until the statistical reliability has been evaluated (Mohammed Yashik and Mathew, 2023).

The dependability of the indicator and scale were both estimated. The squared factor loadings for an indication are communities or indicator reliability. Every single indicator is measured. According to Nunnally and Bernstein (1994), internal consistency or the degree of intercorrelation among the scale items is how scale dependability is operationalized. It illustrates the scale's capacity to provide the same results throughout time. Scale reliability was evaluated using Cronbach's alpha, construct reliability, and variance-extracted measures. Convergent and discriminant validity were among the various types that were evaluated.

4.2 Pilot Test and Gathering of Data

SMEs were asked to fill the survey instrument and feedbacks were requested from them on the structure, instrument and items in addition to their personal answer. The respondents were allowed to criticize the questionnaire and their inputs were duly noted.

Before the conduct of pilot test, few of the items were rearticulated, improved, or modified to be more symptomatic of the target structure, thereby, enhancing the content validity of the instrument. Final administration was personally collected by the researcher in partnership with Climate Action for Africa. Previous scholars have adopted this methodology, including (Thabane et al, 2010; Hashim, 2012; Mohammed Yashik and Mathew, 2023).

4.3 Unidimensionality: Exploratory Factor Analysis

Exploratory Factor Analysis was adopted to measure the unidimensionality. The degree in which an item on a scale is utilized to estimate a single concept is referred to as unidimensionality. Unidimensionality is a must for validation and reliability to be assumed (Mohammed Yashik and Mathew, 2023). The survey instrument was subjected to EFA to ascertain if all items loaded onto their individual variables. Without putting limitations on

the components number that would be derived, all the elements in the study were subjected to a principal component actor analysis employing VARIMAX rotation. Before subjecting the elements to EFA, the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's Test of Sphericity were conducted to ascertain the degree in which the data is well-suited for factor asymptomatic. KMO ascertains the strength or weakness of correlation among variables. The survey instrument showed a middling KMO value = 0.756, an indication the data is moderately suitable and appropriate for factor analysis. The Bartlett's Test of Sphericity ascertained if the correlation between variables under investigation are adequately strong for factor analysis. Consequently, to be able to achieve factor analysis, Bartlett's Test of Sphericity is needed to be significant (Malhotra, 2005). From the analysis conducted, it was observed that all scales has p = 0.000 less than 0.05; which means that the variables are correlated and appropriate for factor analysis.

Table 1: KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.756
Bartlett's Test of Sphericity	Approx. Chi-Square	666.203
	df	15
	Sig.	.000

4.4 Confirmatory Factor Analysis

The scales were caused to undergo CFA procedure through the use of consistent PLS-SEM to perform a correction of reflective construct correlations to ensure that the outputs are consistent with a factor model (Dijkstra and Henseler, 2015; Ringle et al, 2024). The first step is to define constructs and their associated indicators to establish measurement model; by specifically showing the relationship between latent constructs and between latent constructs as well as their indicators. The second step is the outer factor loading assessment which is the estimation process used to check the indicator reliability, construct reliability and validity for suggested values fit indices and their description.

Hair et al (2022) opines that reflective indicators and observed variables should be excluded from the measurement model if they have an outer standard loadings value of less than 0.4. The reason is that they do not contribute meaningfully to measuring the construct and may reduce validity and reliability of the model. It means that indicators that is 0.40≤ outer loading <0.70 is acceptable and should be retained if the construct's CR and AVE remain above standard (Hair et al, 2022).

4.5 Reliability Analysis

Assessing reliability criteria, we adopted composite reliability to assess internal consistency of constructs (Hair et al, 2018). Values ≥0.7 indicate high level of reliability (Hair, Hult et al, 2022; Hair, Sarstadt et al, 2024). The rho_a and rho_c ranged from 0.726 to 0.869; are considered "acceptable in exploratory research" "satisfactory to good" (Hair et al, 2022). Another criterion for assessing reliability is Cronbach's alpha; according to tradition, reliability criteria should be ≥0.7 (Hair, Hult et al, 2022; Hair, Sarstedt et al, 2024). It is pertinent to note that all the constructs ranged from 0.727 to 0.854, which indicates no individual construct measures the same concepts, and no signs of redundancy (Hair, Risher et al, 2019; Hair et al, 2020, Hair, Howard et al, 2022).

4.6 Validity Analysis

Validity ensures that the measurement model accurately reflects the construct it aims to measure and includes assessment of convergent and discriminant validity (Kaplan and Sacuzzo, 1993). Convergent validity is obtained by measuring the AVE of the indicator reliabilities of a construct (Hair, Howard et al, 2020). For validity check to be satisfied the estimates should be positive and the criterion measures for AVE value should be ≥0.5 (Hair, Howard et al, 2020). Findings showed that moderate convergent validity existed; meaning that constructs already share a moderate proportion of variance, a positively correlation with each other and established good internal consistency.

Table 2: Construct Reliability and Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
GEE	0.728	0.879	0.751	0.530
GIE	0.778	0.836	0.869	0.786
GMAE	0.727	0.761	0.726	0.579
GPFIE	0.851	0.877	0.854	0.599
GCFIE	0.785	0.795	0.786	0.533
ECO_ENT	0.854	0.854	0.852	0.591

4.7 Discriminant Validity

Discriminant validity measures the unique correlation between variables within same construct (monotrait) and distinctive correlation between variables of different constructs (heterotrait) (Henseler et al, 2015; Mohd Dzin and Lay, 2021). When the shared variance in a construct (AVE) is above the shared variance among the constructs, discriminant validity is demonstrated (Hair, Howard et al., 2020). The method used to assess the discriminant validity is HTMT ratio of correlation. HTMT has become the main assessment criteria over cross-loading and the Fornell-Larcker method. The cut-off value should be ≤0.90 (Henseler, Ringle et al, 2015) to demonstrate discriminant validity has been established among reflective measured constructs (Hair, Hult et al, 2022; Henseler, Ringle, Sarstedt et al, 2023). Evidence of discriminant validity has been established; meaning that the individual constructs in this model are truly distinct and not measuring the same underlying concept.

Table 3: Showing Discriminant Validity

Heterotrait-monotrait ratio (HTMT) - Matrix						
	CFIE	ECO_ENT	EE	GIE	MAE	PFIE
CFIE						
ECO_ENT	0.852					
EE	0.537	0.491				
GIE	0.309	0.555	0.243			
MAE	0.682	0.667	0.671	0.386		
PFIE	0.818	0.673	0.537	0.307	0.843	

4.8 Model Fit Assessment

Henseler et al (2014) operationalized the use of SRMR as a goodness of fit measure that should be applied to avoid model misspecification in PLS-SEM. In a more conservative interpretation, a value of SRMR that is ≤0.08 (Hu and Bentler, 1999) or a liberal interpretation of SRMR value ≤0.1 (Henseler et al, 2014) alike were deemed good fit measure.

Table 4: Model Fit Indices

Fit Summary		
	Saturated Model	Estimated Model
SRMR	0.085	0.085
d_ULS	1.371	1.371
d_G	0.870	0.870
Chi-square	1563.852	1563.852
NFI	0.889	0.889

This study's model showed SRMR of 0.085 indicates that the model is considered moderate fit; it is acceptable especially in this early stage. The NFI values ranges from 0 to 1, with values closer to 1 indicating better fit. A commonly accepted threshold for perfect fit is ≥0.90. With an NFI value 0.889 the model is close to, but slightly below the conventional cut-off. This suggests a moderate to acceptable fit, especially when viewed alongside the acceptable SRMR and discrepancy measures. While the model fit is not perfect, it is sufficiently robust to support further analysis, because the theoretical justification of the model structure is strong.

5. Discussion, Conclusion and Recommendation

The assessment of construct validity and reliability, unidimensionality and model fit through PLS-SEM indicate that the constructs developed and scale used in this study is statistically valid and reliable. The approach adopted to measure the six scales, showed that the nature of the scales were not one-dimensional. However, with the help of CFA, scale refinements were carried out to arrive at better scales that were fit. The EFA established that the scales were one-dimensional and have good fit indices. The reliability of the scales were evaluated and established through the construct composite reliability and Cronbach's alpha reliability coefficient to measure reliability which indicated tolerable level of scale dependability. The evidence from the assessment model demonstrated that a moderate convergent validity was established and a fundamental proof of internal consistency.

The researchers focused on validating the STGEES based on six dimensions (EE, GIE, GMAE, GPFIE, GCFIE and ECO_ENT). Findings showed consistency in terms of psychometric features across the different kinds of validation methods used by the researchers. This proof that the measurement scales can be adopted in diverse scales, depending on the context of the study. The validation of these six constructs showed that the items are statistically valid and reliable. The findings provides new additional information of a validated framework for measuring green entrepreneurship in Nigeria SMEs, as these scales are suitable for use in semantic differential scales.

The contributions to knowledge to academics and professionals need were considered. The paper explored current theoretical research whose purpose is to enhance the scope of green entrepreneurship and environmental sustainability research. The development of the STGEES is the major contributions to knowledge of this study. This study contributes to the research discipline by using Nigeria as its sampling country, and with the use of PLS-SEM, for measurement model confirmation and developing or adapting multi-item measures, this study makes a methodological contributions. The findings can be trusted because PLS-SEM can be adopted to enhance individual item and scale reliability, the development, adaptation, and confirmation of measurement scales (Petter, 2018; Hair, Howard et al, 2020). The reliability and validity assurance provides a solid premise for both managerial and theoretical knowledge. This is due to the strict methodology adopted and the good internal validity which would boost practitioners' confidence in the study's conclusion. The final refined and retained items scale developed are below:

Table 5: Retained items in the STGEES

Items	Statements	Outer Loadings
EE_2	I frequently identify ideas that can be converted into new products or services in environmental protection industries.	0.802
EE_3	I frequently identify opportunities to start up new businesses in the environmental protection industries	0.571
EE_4	I enjoy thinking about new ways of doing green businesses	0.471
GIE_7	I expect all the firms in the industry to be environmentally responsible	0.811
GIE_8	Being environmentally responsible is a requirement for firms to be a part of this industry	0.571
GMAE_13	There is a high demand for green production and services.	0.825
GMAE_14	There are wide opportunities for green procurement.	0.488
GMAE_17	Changes occurring in the natural environment redefine the institutional and natural environment of firms and their market	0.720
GPFIE_18	Producer implementation of clean technologies leads to cost savings	0.726
GPFIE_19	Producer renewable choice leads to discovery of new knowledge	0.962

Items	Statements	Outer Loadings
GPFIE_20	Knowledge of renewable choice enhances market for superior environmentally products and services.	0.639
GPFIE_21	Green focused knowledge of imperfect market information presents unknown conditions for potential economic actors	0.731
GCFIE_23	Customer imperfect information can contribute to environmental degradation	0.685
GCFIE_24	Environmental entrepreneurs can capture opportunities by informing customers regarding the environmental attributes of products and services.	0.699
GCFIE_25	Customer imperfect information regarding product or service attributes presents opportunities for entrepreneurial action.	0.838
ECO_ENT_28	I see waste as an opportunity to save valuable resources.	0.795
ECO_ENT_29	I am conscious of environmental components and resources	0.787
ECO_ENT_30	I am conscious of level of pollution and environmental devastation	0.714
ECO_ENT_31	I advance quality of the natural environment in my products and services	0.775

There some limitations of the study that must to be looked into by researchers to shed more light on the state of the research. The objective of this study was to develop a dependable and valid instrument that could be used to measure STGEES. However, this instrument has only been tested among SMEs within the innovation district that operates in South-East, Nigeria. To attain the hallmark of scientific research, this empirical scales need to be adjusted and cross-validated on diverse samples. For future research, it is pertinent to subject these scales to a different study context, to show rigor, reliability, validity, generalizability, confirmation of measurement scale and dependability. Future research can use these scales in semantic differentiation scale on sample study that possesses same characteristics, especially SMEs in manufacturing and agriculture sectors; as this study did not differentiate the influence of sector-specific dynamics on green entrepreneurship and sustainability.

Ethics and AI Declaration

This research did not include sensitive data/information that needs approval from any institutional review board (IRB). The authors affirm that AI tool, which include ChatGPT from OpenAI, were used specifically to edit language and enhance the manuscript clarity of expression.

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