

Environmental awareness and perceived corporate social responsibility: Evidence from employees in Nigerian manufacturing firms

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Abstract

Purpose: This study explores how environmental knowledge, sensitivity, and practices influence employees perceived corporate social responsibility (PCSR) in selected consumer manufacturing firms in Lagos, Nigeria.

Design/methodology/approach: The study used a cross-sectional survey, collecting data from 320 employees in Lagos's consumer goods firms via stratified random sampling. Data analysis employed PLS-SEM with SmartPLS 4 to test three hypotheses.

Findings: Findings indicate environmental knowledge, practice adoption, and sensitivity positively influence employee PCSR in Lagos State's consumer manufacturing. Knowledge is the top predictor; sensitivity is significant but less impactful, challenging identity-based CSR views. PLS-predict confirms strong out-of-sample relevance, outperforming benchmarks.

Limitations and Research implications: This cross-sectional study limits causal inference; the relationships are associational, not directional. The sample from Lagos-based consumer goods firms restricts generalisation to other sectors and regions in Nigeria and beyond.

Practical Implications: The study offers a nuanced view of PCSR antecedents, impacting sustainability training, organizational policy, and future theory development by including dispositional, cognitive, and institutional factors.

Originality/value: This study contributes to the existing body of empirical research by utilising PLS-SEM analysis.

Keywords: Environmental Awareness, Employee Perceived Corporate Social Responsibility, Environmental Knowledge Capability, Environmental Sensitivity, Environmental Practice Adoption

Received: 06 May 2026
Revised: 06 May 2026
24 June 2026
Accepted: 25 June 2026
Published: 30 June 2026

Introduction

The assumption that organisations which become more environmentally aware will naturally translate this awareness into employee perceived corporate social responsibility (PCSR) practice is theoretically appealing but empirically fragile. In developed economies, where regulatory frameworks are mature, sustainability norms are well established around professional culture, and consumer pressure on firms is high, the awareness of PCSR pathway appears plausible (Dzage et al., 2024; Rehman et al., 2022; Wang & Li, 2024). In emerging economies, however, the institutional infrastructure required to convert environmental cognition into operational change is frequently absent or unevenly enforced, creating

conditions under which firms may communicate environmental concern without substantively embedding it in their practices (Powell & DiMaggio 2023; Alhamdi & Al-Kahtani 2026; Abdelnour, et al. 2017). This is not merely a governance gap; it reflects a fundamental disconnect between awareness and action that has been documented in the corporate governance literature as well. Putra (2016) found that institutional ownership structures and board composition significantly shaped firm-level accountability and value creation in emerging market contexts, which aligns with the view that governance arrangements mediate whether environmental cognition actually produces observable CSR conduct. It is precisely this question that the present study pursues: whether environmental awareness, disaggregated into knowledge capability, sensitivity, and practice adoption, generates measurable PCSR outcomes.

Nigeria presents a compelling context to test this relationship. The country's manufacturing sector concentrated in Lagos State operates amidst growing environmental challenges, including industrial waste, air and water pollution, and greenhouse gas emissions, all of which have attracted increasing scrutiny from the National Environmental Standards and Regulations Enforcement Agency (NESREA, 2021). At the same time, regulatory enforcement remains inconsistent, consumer environmental consciousness is uneven, and many firms face resource constraints that limit their capability to act on sustainability commitments (Adelekan, 2016; Alhamdi & Al-Kahtani, 2026). What makes this context particularly instructive is that it reproduces, in a West African setting, a set of institutional conditions familiar to researchers working in Asia and other developing regions. Nursida (2017), in a study of Indonesian manufacturing companies listed on the Indonesia Stock Exchange, found that CSR activity and financial leverage interacted with governance variables to shape profitability across different time horizons. The implication is that CSR-governance interactions are context-sensitive rather than uniform in their effects, a lesson that translates directly to the present inquiry.

The empirical literature on this relationship is surprisingly thin in African contexts. Most studies examining environmental awareness and PCSR have been conducted in Europe, North America, and East Asia, where the institutional environment is considerably more supportive of green business behaviour. What limited research exists in sub-Saharan Africa suggests that firms frequently engage in decoupling, adopting the language of environmental responsibility whilst failing to make substantive operational changes (Abedin et al., 2024; Alzu'bi et al., 2025; Obafemi & Ihunwo, 2022; Nassani et al., 2023). This pattern is consistent with the institutional theory prediction that in the absence of coercive or normative pressure, firms default to symbolic rather than substantive PCSR.

Comparatively little empirical attention has been devoted to the environmental awareness and PCSR nexus within African contexts. The bulk of research on this relationship has been conducted in Europe, North America, and East Asia, where institutional environments are considerably more favourable to green business conduct. The sparse sub-Saharan evidence that does exist points to widespread decoupling: firms adopt the language of environmental responsibility whilst the underlying operational realities change very little (Abedin et al., 2024; Alzu'bi et al., 2025; Obafemi & Ihunwo, 2022; Nassani et al., 2023). Institutional theory anticipates exactly this outcome when coercive and normative pressures are weak. Similar dynamics have been traced in Asian emerging economy contexts, where the interaction between governance quality and CSR reporting has been linked to long-run firm value outcomes. Alkhairani et al. (2020), in a study of Indonesian mining sector firms, established that good corporate governance shaped both CSR activity and firm value, with profitability functioning as an intervening variable, a finding that speaks to how governance arrangements can either channel or suppress the translation of environmental values into visible CSR performance.



Against this backdrop, this study investigates the impact of environmental awareness and employee PCSR of selected consumer goods manufacturing firms in Lagos State, Nigeria. The central research question is: Does environmental knowledge capability, environmental sensitivity, and environmental practice adoption significantly influence PCSR outcomes among employees of selected consumer manufacturing firms in Lagos State, Nigeria? The study's objective is to determine the influence of environmental knowledge capability, environmental sensitivity, and environmental practice adoption on PCSR among employees of selected consumer manufacturing firms in Lagos State, Nigeria. Three hypotheses were tested. Hence, producing rigorous, context-specific evidence, this work contributes to ongoing calls for more empirical research on environmental awareness and PCSR in institutional settings that differ substantially from the Western contexts in which most prior work has been done. The findings are not, however, confined to their relevance to sub-Saharan Africa. Across several Asian economies, firms are navigating comparable tensions between rapid industrial expansion, variable regulatory enforcement, and the rising expectations of international stakeholders concerning PCSR conduct. The theoretical and practical lessons produced by this study are therefore intended to travel, and the discussion that follows makes this cross-regional relevance explicit.

Literature Review

Conceptual Review

Environmental Awareness

Environmental awareness describes the degree to which individuals and organisations recognise and internalise the causes, consequences, and potential mitigation strategies associated with ecological degradation (Martínez-Falcó et al., 2024). White et al. (2019) proposed the SHIFT framework, identifying social influence, habit formation, individual self-relevance, feelings and cognition, and tangibility as the five mechanisms through which environmental awareness converts into sustainable behaviour. Critically, the framework makes clear that awareness is a necessary but insufficient condition for behavioural change: the pathway from knowledge to action is mediated by psychological, social, and contextual factors that can strengthen or block the translation of awareness into practice (Khaleeli 2021; Martínez-Falcó et al., 2024).

At the organisational level, environmental awareness operates across strategic, operational, and marketing dimensions. Strategically, it determines whether environmental considerations are embedded in corporate planning and governance (Bhat et al., 2024; Fleck-Baustian et al., 2025; Wang & L, 2024). Operationally, it shapes whether environmental management systems, waste reduction programmes, and energy efficiency investments are implemented (Nassani et al., 2023; Rehman et al., 2022; Rodríguez-Fernández et al., 2024). In marketing, it influences how environmental values are communicated and whether those communications generate stakeholder credibility (He et al., 2020; Huang et al., 2021; Lui et al., 2022; Jiang & Fu 2019). Jain et al. (2025) and Kotha et al. (2025) noted that the drivers of environmental awareness include education, media exposure, and direct personal experience with ecological harm, all of which vary significantly across societal and institutional contexts.

In Nigerian manufacturing contexts, Khaleeli (2021) established that environmental marketing awareness significantly raises consumer purchase intentions in the food and beverage sector, suggesting that awareness does filter through to market behaviour. Adelekan (2016) documented rising public concern about environmental conditions in Lagos State. Yet the firm-level evidence is less encouraging. Abedin et al. (2024), Alzu'bi et al. (2025), and Obafemi and Ihunwo (2022) found that environmental awareness at the corporate level does not consistently produce substantive PCSR action, an outcome predicted by the institutional decoupling hypothesis. However, in this study environmental awareness is conceptualised

using three main constructs environmental knowledge capability, environmental sensitivity, and environmental practice adoption.

Employee Perceived Corporate Social Responsibility (PCSR)

Employee PCSR, as understood within the green marketing literature, refers to the employee's voluntary commitment to run business in ways that are ethically sound, socially beneficial, and environmentally responsible, beyond what law requires (Kurawa & Shuaibu, 2022; Olalekan & Glory 2025). What makes PCSR empirically complex is that firms can perform differently across these layers: a firm may fully comply with environmental regulations (legal PCSR) whilst investing little in community development (philanthropic PCSR), or may communicate robust environmental values (normative PCSR) whilst failing to embed them in production processes (operational PCSR) (Nassani et al., 2023; Fosu et al., 2024; Shah et al., 2023).

For manufacturing firms, the environmental dimension of PCSR is particularly consequential, given the sector's direct exposure to ecological harm through production, waste, energy consumption, and logistics. Research by Tan et al. (2020), Lui et al. (2022), and Jiang and Fu (2019) demonstrated that firms genuinely embedding environmental responsibility into their operations, rather than limiting themselves to disclosure statements, achieve better stakeholder outcomes and stronger competitive legitimacy. Kurawa and Shuaibu (2022) and Olalekan and Glory (2025) confirmed this pattern in the Nigerian context, reporting a positive relationship between PCSR quality and firm legitimacy. The question, however, is what drives firms to move from symbolic to substantive PCSR, and whether environmental awareness alone is sufficient.

He et al. (2020) and Huang et al. (2021) argued that PCSR-active firms tend to be those where sustainability values are embedded in organisational culture and reinforced by external stakeholder pressure. Bhattacharya et al. (2020) showed that sustainability-oriented strategies improve long-term legitimacy and competitiveness when they are operationalised rather than merely communicated (Lindgreen et al., 2012). These findings collectively suggest that the pathway from awareness to PCSR is moderated by organisational commitment, resource availability, and institutional pressure, variables that vary considerably between developed and emerging economies.

Theoretical Framework

Institutional Theory and Theory of Planned Behaviour

Two theoretical frameworks anchor this study. Institutional theory, originally developed by Meyer and Rowan (1977) and refined by Powell and DiMaggio (2023), holds that organisations adapt their strategies and structures in response to three forms of institutional pressure: coercive pressure from regulations and powerful stakeholders, normative pressure from professional standards and industry norms, and mimetic pressure from imitating successful industry peers (Ebisi et al., 2025; Harrison et al., 2015; Lui et al., 2022; Pfajfar et al., 2022; Jiang & Fu 2019). In contexts where coercive pressure is strong and consistently enforced, firms are more likely to move from symbolic to substantive environmental compliance. Where enforcement is weak, however, firms may engage in decoupling, publicly adopting green language whilst maintaining conventional operational practices (Abdelnour, et al. 2017; Filatotchev & Wright 2011).

The Theory of Planned Behaviour (Ajzen, 1991, 2020) predicts that awareness (environmental knowledge capability, environmental sensitivity, environmental practice adoption), as an attitude-forming input, should lead to intentions, which in turn predict behaviour (Song et al., 2024; Wild & Schulze Heuling 2024; Tan et al., 2020). Applied to the organisational context, this



would suggest that environmental awareness (environmental knowledge capability, environmental sensitivity, environmental practice adoption) should produce PCSR intentions and, ultimately, PCSR actions (Shah et al., 2023; Rehman, et al., 2022; Fosu et al., 2024). The theory's construct of perceived behavioural control, however, introduces an important qualification: intentions are more likely to translate into behaviour when the actor perceives that the resources, capabilities, and enabling conditions required to act are available (Conner & Armitage, 2006). The joint explanatory force of these two frameworks, applied to the Nigerian manufacturing context, is examined empirically in the sections that follow.

Empirical Review

The empirical evidence on the relationship between environmental awareness and PCSR is mixed and context-dependent. In developed economies, Aguinis and Glavas (2012) demonstrated that firms integrating stakeholder interests, particularly on sustainability, achieve long-term competitive advantages, whilst Xie et al. (2025) confirmed that companies engaging proactively with environmental stakeholders are better positioned to sustain environmental legitimacy (Pfajfar et al. 2022). Harrison et al. (2015) showed that organisations successfully managing stakeholder relationships with a sustainability orientation achieve dual benefits: meeting consumer demand and addressing ecological challenges simultaneously.

In emerging-economy settings, the picture is less consistent. Akude et al. (2025) found that regulatory pressure, stakeholder influence, and top management commitment, rather than environmental awareness per se, were the primary drivers of green marketing adoption and enhanced performance in Nigerian manufacturing firms. Abedin et al. (2024) and Alzu'bi et al. (2025) found that symbolic green initiatives in Nigeria's oil and gas sector frequently failed to generate performance benefits, a finding consistent with the institutional decoupling hypothesis (He et al., 2021). Eco-friendly labelling and promotion improved organisational performance only when embedded in a coherent long-term corporate strategy, not when deployed as isolated awareness campaigns (Lindgreen et al., 2012; Pfajfar, et al., 2022). Across both contexts, a recurring finding is that the conversion of environmental awareness into substantive PCSR depends on institutional enablers that are often underdeveloped in emerging markets. This review, therefore, supports the expectation that the awareness of PCSR relationship in Nigerian manufacturing will be statistically weak or non-significant, a prediction this present study tests empirically.

Hypotheses Development

Firms cannot act appropriately on what they do not comprehend. Where employee can detect production-related environmental concerns, stay current with legal requirements, and communicate that knowledge internally, the conditions for purposeful PCSR action are more likely to develop (He et al., 2021). Research on green intellectual capital reveals that organisations focusing on environmental knowledge and capabilities obtain greater sustainability performance outcomes than knowledge-deficient rivals (Martínez-Falcó et al. 2024). In the manufacturing sector specifically, environmental strategies that induce forward-thinking ecological responses enable enterprises to develop and apply environmentally friendly practices. Owusu et al. (2024) show that road depends significantly on past knowledge capability. Evidence from manufacturing organisations reveals that employee PCSR, including information sharing on environmental issues, favourably improves environmental performance. Rehman et al. (2023) show that knowledge diffusion within firms is itself a PCSR-enabling process. More broadly, employee-centred PCSR programmes, which involve growing internal environmental awareness, are significantly and favourably associated with the adoption of sustainable environmental practices in manufacturing organisations (Liu et al., 2022; Ruiz-López et al., 2026). Dzage et al. (2024) pointed out that Nigerian manufacturing

enterprises work under substantial ecological pressure; knowledge of environmental issues is a critical precondition for the kind of PCSR conduct our study explores. On this premise, the following hypothesis is proposed:

H1: Environmental knowledge capability has a significant effect on employee PCSR performance.

A corporation can possess environmental knowledge and still choose not to act on it. What translates awareness into responsiveness is sensitivity: the degree to which management and workers actually care about the natural circumstances around their operations and feel accountable to affected populations. In contexts such as Nigeria, community perceptions and lived experiences have become crucial markers for measuring the authenticity and success of PCSR activities at (Ebisi et al., 2025), and enterprises that are responsive to those experiences are better positioned to respond through meaningful PCSR programmes. Employee PCSR is increasingly accepted as a vital component of sustainable environmental performance (Dzage et al., 2024; Liu et al., 2022), but the route from PCSR goal to outcome depends largely on how seriously corporations take stakeholder environmental concerns at the managerial level (Ruiz-López et al., 2026). Stakeholder pressure urging corporations to prioritise environmentally sustainable practices has driven firms to integrate environmental considerations into their organisational frameworks (Owusu et al., 2024), and this integration is, by definition, a product of organisational sensitivity to those concerns. PCSR activities geared towards the community can contribute to increased environmental performance, as enterprises engaging in community-focused PCSR initiatives tend to be more ecologically responsive (Colombo et al., 2023). Rehman et al. (2023) mentioned that the Nigerian manufacturing sector, where communities around industrial sites usually incur the environmental costs of production, sensitivity to such conditions is theoretically supposed to translate into greater PCSR performance. The study consequently proposes the following hypothesis:

H2: Environmental sensitivity has a significant effect on employee PCSR performance.

Knowledge and sensitivity create the circumstances for PCSR; practice adoption is what makes it real. Firms that have codified their environmental commitment through documented policies, measurable targets, management evaluations, and cleaner manufacturing methods are not only aware of environmental challenges; they have institutionalised a response to them (Ebisi et al., 2025). Adopting sustainable environmental practices is crucial to boosting green innovation and PCSR outcomes in manufacturing organisations, with environmentally sustainable business practices having a strong positive association with performance (Dzage et al., 2024). The deployment of green practices, supported by suitable leadership, delivers superior organisational outcomes, with empirical evidence proving that innovation favourably improves sustainable practices and environmental performance (Gazi et al., 2025). In emerging economy contexts, participating in responsible environmental behaviours increases a firm's likelihood of adopting and implementing measures that enhance its contribution to the environment, as evaluated by sustainable environmental performance (Rodríguez-Fernández et al., 2024). At the sectoral level, there is a positive association between the implementation of PCSR and environmental management techniques and operational performance, with environmental management performing a mediating function that magnifies the PCSR impact on performance outcomes (Colombo, et al., 2023; Ruiz-López, 2026; Nassani, et al., 2023). Since practice adoption reflects the behavioural translation of environmental awareness into measurable organisational action, it is expected to bear the most direct and observable relationship with PCSR success amongst the three factors explored here. Accordingly, the study proposes the following hypothesis:

H3: Environmental practice adoption has a significant effect on employee PCSR performance.



Methodology

The study adopted a quantitative, cross-sectional survey research approach, consistent with the positivist epistemological tradition and appropriate for testing a priori hypotheses about relationships between latent constructs (Eastwood et al., 2014). The study population comprises employees of selected consumer goods manufacturing firms in Lagos State, Nigeria: Unilever Nigeria Plc, Nestlé Nigeria Plc, PZ Cussons Nigeria Plc, Flour Mills of Nigeria Plc, Cadbury Nigeria Plc, Vitafoam Nigeria Plc, Dangote Sugar Refineries Plc, Guinness Nigeria Plc, DN Tyre and Rubber Plc, Nigerian Enamelware Plc, Nascon Allied Industries Plc, and Union Dicon Salt Plc. Lagos State was selected because it hosts approximately 70% of Nigeria's FMCG manufacturing capability and provides direct access to the institutional pressures, environmental challenges, and regulatory dynamics relevant to the research question (NBS, 2022; NESREA, 2021).

The stratified random sampling technique was applied, with the employee population of each firm constituting a separate stratum. The final employee sample was 320 respondents, determined using the Krejcie and Morgan (1970) formula to ensure statistical adequacy at the 95% confidence level. Structured questionnaires were distributed using Google Forms via mobile phone between July 2025 and January 2026. Respondent anonymity was preserved throughout.

Environmental awareness was measured using three constructs (environmental knowledge capability, environmental sensitivity, environmental practice adoption) five validated Likert-scale items (rated 1-5, Strongly Disagree to Strongly Agree), adapted from prior green marketing research. PCSR was assessed using employee PCSR performance using five validated Likert-scale response type items. Items were adapted to the Nigerian manufacturing context following expert review by five academics in marketing and management. The pilot study with 30 respondents confirmed item clarity and face validity. All items in the final instrument were retained or refined based on pilot feedback.

The study adopted Partial Least Squares Structural Equation Modelling (PLS-SEM) executed through SmartPLS 4. PLS-SEM was selected because it is well suited to variance-based modelling with latent constructs, accommodates non-normal data distributions, and is appropriate for exploratory and confirmatory research contexts (Hair et al., 2019). The measurement model for the four reflecting constructs was evaluated on four criteria. Indicator reliability was examined by assessing outer loadings, with a minimum threshold of 0.70 needed for each item (Hair et al., 2022). Internal consistency reliability was examined using Cronbach's alpha (α) and composite reliability (CR), both of which were required to surpass 0.70. Convergent validity was examined by the Average Variance Extracted (AVE), with a minimum threshold of 0.50 defined by Fornell and Larcker (1981) to confirm that each construct explains more variance in its indicators than measurement error does.

Discriminant validity was examined using two criteria. The Heterotrait-Monotrait (HTMT) ratio of correlations, advocated by Henseler et al. (2015) as a superior discriminant validity criterion for PLS-SEM, was required to fall below 0.85 for all construct pairs. Additionally, the Fornell-Larcker criterion was employed, requiring the square root of each construct's AVE to exceed all of its inter-construct correlations. Common method bias was tested using Harman's single-factor test (Podsakoff et al., 2003), with a threshold of less than 50% variance explained by a single factor used to indicate that common method variance did not constitute a substantial danger to the validity of the findings. Following confirmation of sufficient measurement model features, the structural model was estimated to evaluate the three study hypotheses. Statistical significance of the three direct path coefficients EKC to PCSR (H_{01}), ESC to PCSR (H_{02}), and EPA to PCSR (H_{03}) was determined through bootstrapping with 5,000 subsamples, applying a two-tailed test at a significance level of $\alpha = .05$, consistent with the recommendations of Hair et al. (2022). Bootstrapping is a non-parametric resampling technique that provides empirical sampling distributions without assuming normality in the

data, making it the preferred method for significance testing in PLS-SEM (Henseler et al., 2016). The study was conducted in adherence to established ethical standards. Participants participation in the survey was voluntary and were informed of this prior to the questionnaire administration.

Results and Discussion

Demographic Profile of Respondents

Table 1 present the result of the demographic profile of respondents, the demographic mix of the respondents provides a solid contextual framework for interpreting the study’s empirical conclusions, particularly in relation to representativeness, depth of experience, and cognitive maturity within the sample.

From a gender standpoint, the distribution reveals a minor male majority (54.7%) relative to female respondents (45.3%). While not excessively skewed, this mismatch reflects a slightly male-dominated respondent pool, which may mirror the structural reality of the industry under inquiry. Importantly, the near parity strengthens the analytical credibility of the dataset by limiting excessive gender bias and allowing for generally equal inferential conclusions.

Table 1. *Demographic Profile of Respondents*

Feature		Number	Percentage
Gender	Male	175	54.7
	Female	145	45.3
Age	18-20 Years	7	2.2
	21-30 Years	27	8.4
	31-40 Years	71	22.2
	41-50 Years	137	42.8
	50+	78	24.4
Highest Educational Qualification	No formal Education/FLSC	0	0.0
	SSCE/NECO/NABTEB/GCE/Artisan	10	3.1
	ND/NCE/A Levels	14	4.4
	HND/B.Sc	95	29.7
	Post Graduate Certificate/Professional Certification	201	62.8
Years of Experience	0 – 5 Years	40	12.5
	6 – 10 Years	95	29.7
	11 – 15 Years	12	3.8
	16 – 20 Years	61	19.1
	20+ Years	112	35.0
Total		320	100.0

The age structure of the respondents is noticeably concentrated among the mid-to-late career categories. The largest cohort comes within the 41–50 years category (42.8%), followed by those aged 50 years and above (24.4%). Collectively, approximately 67% of the responders are over 40 years old, indicating a mature and experienced population. This age distribution is particularly relevant, since it shows that the replies are likely guided by lengthy professional exposure, institutional memory, and strategic-level understanding rather than entry-level perceptions. The comparatively low proportion of younger respondents (below 30 years, around 13%) further emphasises the seniority profile of the sample.



In terms of educational attainment, the data reflect a highly educated respondent base. A considerable majority (62.8%) possess postgraduate or professional qualifications, while an additional 29.7% hold HND or Bachelor's degrees. The low fraction of respondents with only secondary school (3.1%) and the entire absence of persons without formal education underline the intellectual complexity of the sample. This high degree of educational attainment enhances the dependability of the responses, as participants are likely to possess the analytical capability and domain knowledge necessary for informed judgment.

The distribution of years of experience further corroborates the maturity of the group. A large fraction of responders fall within the 6–10 years (29.7%) and 20+ years (35.0%) groups, demonstrating a bimodal concentration of mid-career and highly seasoned workers. Additionally, 19.1% of respondents have 16–20 years of experience, indicating the breadth of expertise within the sample. Only 12.5% of respondents have fewer than five years of experience, showing inadequate representation of early-career workers. This experience profile strengthens the study's validity, as it gathers ideas from individuals with extensive practical engagement and longitudinal exposure to the phenomena under examination. Hence, the demographic profile is defined by a highly educated, professionally experienced, and mature respondent pool with a reasonably balanced gender distribution. This design greatly increases the internal validity and interpretive depth of the study, since the findings are founded in the viewpoints of individuals who are not just competent but also deeply embedded in the operational and strategic dimensions of their respective domains.

Table 2 displays the descriptive and normalcy statistics for all 20 measurement items across the four components. Responses across all items spanned the entire scale range (1–5), with construct means clustering between 3.35 and 3.67, indicating moderate-to-high perceptions across EKC, ESC, EPA, and PCSR. Standard deviations varied roughly from 0.743 to 0.891, showing rather uniform response variability. PCSR items showed the highest means (3.594–3.669), whereas EPA items were marginally lower (3.350–3.422), suggesting respondents regarded corporate social responsibility participation somewhat more favourably than their personal pro-environmental initiatives.

Skewness values for all items came within the ± 1.0 range, and excess kurtosis values stayed well below ± 1.0 , indicating essentially symmetric, platykurtic distributions. Whilst the Cramér-von Mises test flagged statistical non-normality for all items, an expected outcome in large samples where even trivial deviations from normality attain significance, the observed skewness and kurtosis indices do not raise substantive concerns for PLS-SEM analysis, which operates distribution-free and remains robust under such conditions (Hair et al., 2019).

Table 2. Descriptive and Normality Statistics

Construct	Item Code	Item	Min	Max	Mean	Standard deviation	Excess kurtosis	Skewness
EKC	EKC1	Employees can identify environmental risks linked to production	1	5	3.438	0.808	-0.333	-0.064
	EKC2	Organisation is aware of Nigerian environmental laws and norms	1	5	3.456	0.817	-0.321	0.090
	EKC3	Management shares environmental sustainability knowledge with staff	1	5	3.413	0.854	-0.467	0.093
	EKC4	Firm understands how production activities affect the natural environment	1	5	3.406	0.831	-0.260	0.005
	EKC5	Organisation actively seeks updated cleaner production information	1	5	3.509	0.825	-0.369	0.020
ESC	ESC1	Company genuinely cares about environmental impact on communities	1	5	3.472	0.851	-0.211	-0.248
	ESC2	Managers are personally concerned about environmental degradation	2	5	3.487	0.891	-0.736	-0.002
	ESC3	Organisation attends seriously to community environmental complaints	1	5	3.484	0.869	-0.538	-0.023
	ESC4	Operations are modified when environmental impact is reported	1	5	3.503	0.887	-0.601	-0.063
	ESC5	Stakeholder environmental concerns reach decision-making levels	1	5	3.481	0.818	-0.357	-0.198



Construct	Item Code	Item	Min	Max	Mean	Standard deviation	Excess kurtosis	Skewness
EPA	EPA1	A defined environmental policy guides daily operational decision	1	5	3.359	0.847	-0.195	-0.173
	EPA2	Measurable targets exist for reducing waste, energy, and emissions	1	5	3.359	0.855	-0.394	0.021
	EPA3	Environmental performance is reviewed through management processes	1	5	3.422	0.814	-0.242	-0.183
	EPA4	Cleaner production technologies have been adopted to reduce harm	1	5	3.359	0.809	-0.119	-0.142
	EPA5	Senior management is committed to environmental sustainability	1	5	3.350	0.815	-0.189	-0.169
PCSR	PCSR 1	Organisation invests in community development where it operates	1	5	3.641	0.798	-0.272	-0.078
	PCSR 2	Environmental and social performance is disclosed to stakeholders	1	5	3.669	0.792	-0.320	-0.017
	PCSR 3	Tangible steps are taken to reduce pollution from operations	2	5	3.606	0.787	-0.441	-0.026
	PCSR 4	Employee welfare is given priority by management	2	5	3.628	0.743	-0.310	-0.056
	PCSR 5	PCSR operations are governed by clear policy, not ad hoc decisions	2	5	3.594	0.785	-0.421	-0.040

Figure 1 shows the PLS-SEM path diagram from model estimates. All indicator loadings ranged from 0.834 to 0.910, exceeding the 0.70 threshold, indicating each item shares substantial variance with its concept. The PCSR endogenous construct had an R^2 of 0.388, meaning environmental knowledge, practice adoption, and sensitivity together explain about 39% of its variance, a meaningful share for a simple three-predictor model in a complex institutional context.

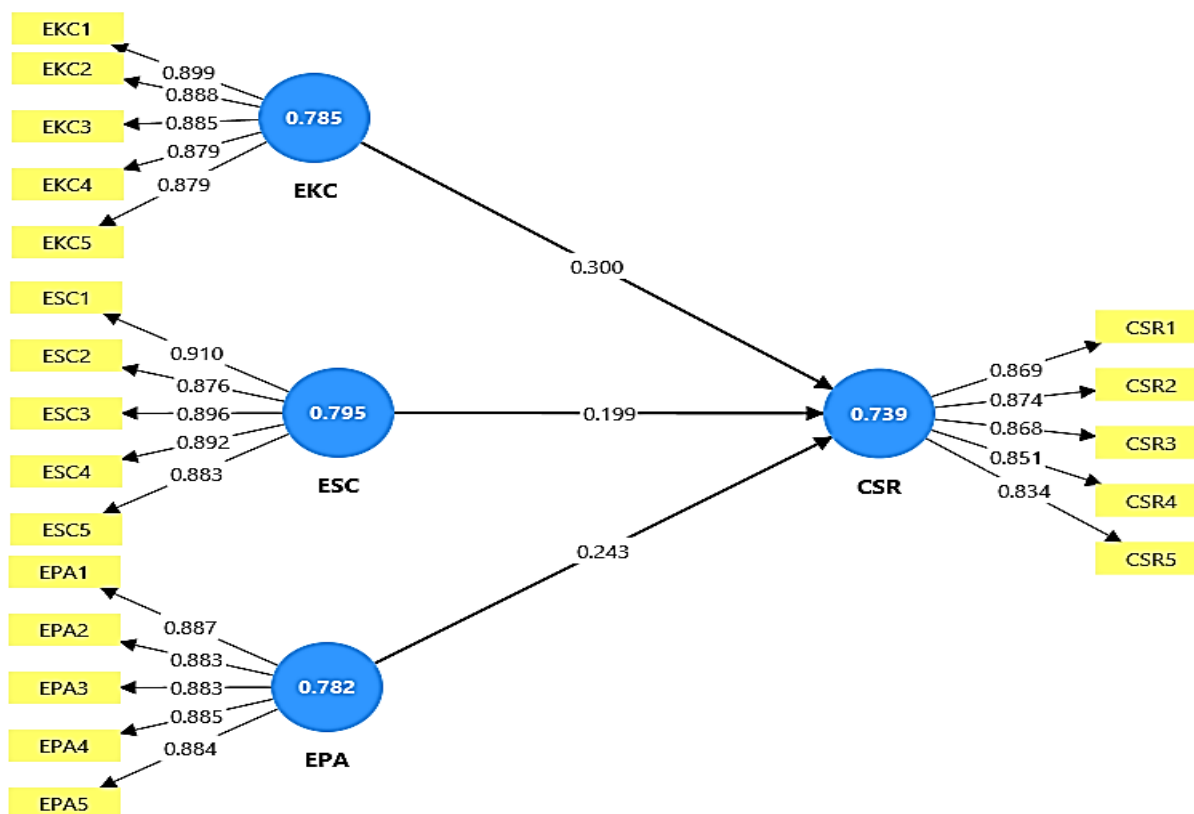


Figure 1. Modified PLS-Path Model

All three paths were positive and supported PCSR, with EKC ($\beta=0.300$) having the strongest influence, followed by EPA ($\beta=0.243$) and ESC ($\beta=0.199$). Bootstrapped BCa intervals excluding zero confirm these effects' robustness.

Table 3 shows the result of the convergent validity and internal consistency reliability, the measurement model was examined utilising the two-step approach provided by Anderson and Gerbing (1988). As indicated in Table 3, all outer loadings above the 0.70 criterion (range: 0.834-0.910), with ESC1 recording the highest loading (0.910), demonstrating that each indicator shares substantial variance with its respective construct. Average variance extracted (AVE) values surpassed the 0.50 standard for all constructs: EKC (0.785), ESC (0.795), EPA (0.782), and PCSR (0.739), proving convergent validity (Fornell & Larcker, 1981).



Table 3. Convergent Validity and Internal Consistency Reliability

Construct	Item Code	Item	Outer Loading	AVE	Cronbach's alpha	Rho_a	Rho_c
EKC	EKC1	Employees can identify environmental risks linked to production	0.899	0.785	0.932	0.933	0.948
	EKC2	Organisation is aware of Nigerian environmental laws and norms	0.888				
	EKC3	Management shares environmental sustainability knowledge with staff	0.885				
	EKC4	Firm understands how production activities affect the natural environment	0.879				
	EKC5	Organisation actively seeks updated cleaner production information	0.879				
ESC	ESC1	Company genuinely cares about environmental impact on communities	0.910	0.795	0.935	0.936	0.951
	ESC2	Managers are personally concerned about environmental degradation	0.876				
	ESC3	Organisation attends seriously to community environmental complaints	0.896				
	ESC4	Operations are modified when environmental impact is reported	0.892				
	ESC5	Stakeholder environmental concerns reach decision-making levels	0.883				

Construct	Item Code	Item	Outer Loading	AVE	Cronbach's alpha	Rho_a	Rho_c
EPA	EPA1	A defined environmental policy guides daily operational decision	0.887	0.782	0.930	0.931	0.947
	EPA2	Measurable targets exist for reducing waste, energy, and emissions	0.883				
	EPA3	Environmental performance is reviewed through management processes	0.883				
	EPA4	Cleaner production technologies have been adopted to reduce harm	0.885				
	EPA5	Senior management is committed to environmental sustainability	0.884				
PCSR	PCSR1	Organisation invests in community development where it operates	0.869	0.739	0.911	0.912	0.934
	PCSR2	Environmental and social performance is disclosed to stakeholders	0.874				
	PCSR3	Tangible steps are taken to reduce pollution from operations	0.868				
	PCSR4	Employee welfare is given priority by management	0.851				
	PCSR5	PCSR operations are governed by clear policy, not ad hoc decisions	0.834				



Internal consistency reliability was tested via three complementary metrics. Cronbach's alpha values ranged from 0.911 to 0.935, but composite reliability estimates, both rho_a (0.912-0.936) and rho_c (0.934-0.951), were above the 0.70 criterion across all constructs. The tight agreement between alpha and rho_a values takes out worries about tau-equivalence breaches that might unduly inflate or deflate alpha-based reliability estimations (Dijkstra & Henseler, 2015). Collectively, the measuring model displays good convergent validity reliability.

Discriminant validity was tested by two complementary criteria. The Fornell-Larcker criterion (Table 5) was satisfied for all construct pairs: the square root of each construct's AVE PCSR (0.859), EKC (0.886), EPA (0.884), and ESC (0.891) exceeded its highest inter-construct correlation in every instance, with the largest off-diagonal value observed between ESC and EKC ($r = 0.643$). The more conservative heterotrait-monotrait ratio of correlations (HTMT), Henseler et al., (2015) is provided in Table 4, with bootstrapped 95% BCa confidence intervals calculated from 5,000 subsamples. All six HTMT ratios came comfortably below the 0.85 threshold, ranging from 0.536 (EPA↔EKC) to 0.688 (ESC↔EKC), and no confidence interval upper bound approached the criterion value. The ESC-EKC pair returned the highest ratio, which is theoretically plausible given the conceptual connection between environmental sensitivity and environmental knowledge; however, empirical distinctiveness between the two constructs is definitely established. However, both criteria affirm that the four categories are empirically distinguishable, adding credence to subsequent structural path interpretation.

Table 4. Discriminant Validity: Heterotrait-Monotrait Ratio Statistics (HTMT)

	PCSR	EKC	EPA	ESC
PCSR				
EKC	0.595			
EPA	0.537	0.536		
ESC	0.560	0.688	0.558	

Table 5 presents the result of the structural model and hypotheses testing, before analyzing the structural routes, collinearity among the predictor constructs was investigated using inner model variance inflation factors (VIF). All VIF values fell considerably below the 3.3 threshold: EKC (1.820), EPA (1.465), and ESC (1.875), ruling out collinearity as a confound in path estimates (Hair et al., 2019).

Table 5. Discriminant Validity: Fornell-Larcker Criterion

	PCSR	EKC	EPA	ESC
PCSR	0.859			
EKC	0.549	0.886		
EPA	0.496	0.500	0.884	
ESC	0.518	0.642	0.521	0.891

Note: Diagonal values are the square root of AVE, off-diagonals are correlation coefficients.

Figure 3 shows the results of a Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis, including the measurement (outer) and structural (inner) models. All indicators have

strong outer loadings from 0.834 to 0.910, surpassing the 0.70 threshold, confirming convergent validity. Each construct EKC, ESC, EPA, and CSR is reliably represented by its indicators, indicating the measurement model is valid and reliable.

From the structural model, the coefficient of determination (R^2) for CSR is 0.739, implying that 73.9% of the variance in CSR is explained by EKC, ESC, and EPA, which reflects substantial explanatory power. Furthermore, all hypothesized relationships are positive and statistically significant: EKC has the strongest effect on CSR ($\beta = 0.300$, $p = 0.000$), followed by EPA ($\beta = 0.243$, $p = 0.000$) and ESC ($\beta = 0.199$, $p = 0.002$). These findings indicate that all three exogenous variables significantly influence CSR, with EKC emerging as the most dominant predictor, thus supporting the proposed model and demonstrating strong predictive capability.

Figure 3. Hypothesized PLS-Path Model

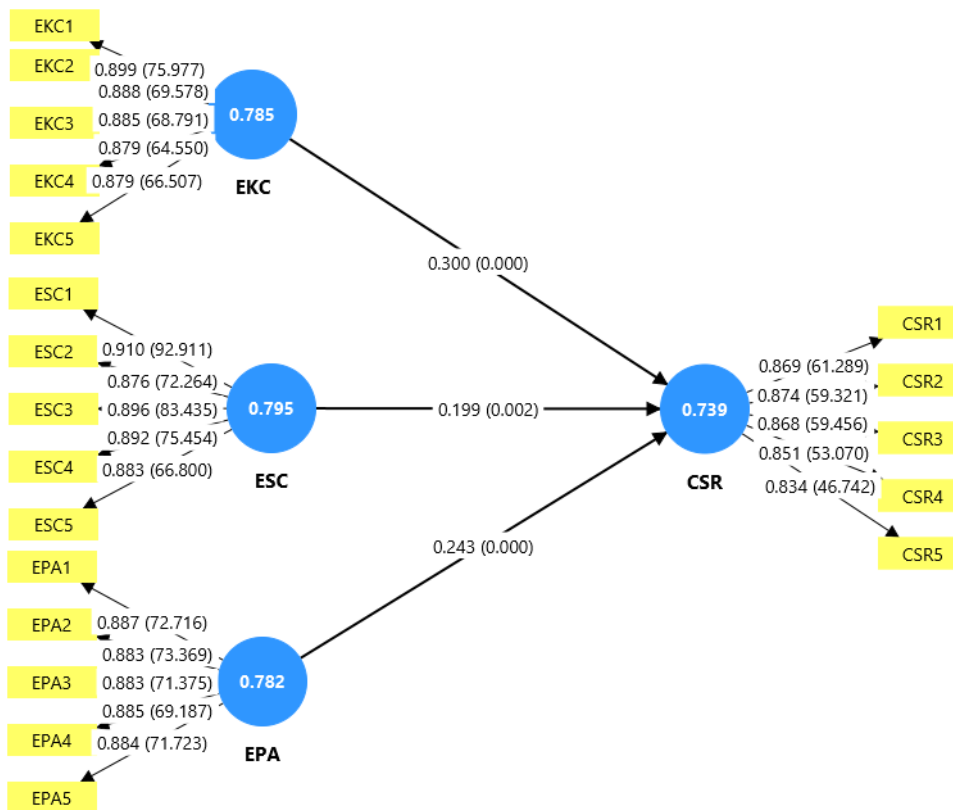


Table 6 summarises the bootstrapped structural path results (5,000 subsamples, two-tailed, BCa confidence intervals). The model explained 38.8% of the variance in PCSR ($R^2 = 0.388$; adjusted $R^2 = 0.383$), a moderate impact in accordance with other three-predictor models in the PCSR literature. All three hypothesised pathways gained statistical significance. EKC exhibited the biggest direct influence on PCSR ($\beta = 0.300$, $t = 5.006$, $p < .001$, 95% CI [0.182, 0.417]), supporting H1, and its effect size was the most practically important ($f^2 = 0.081$). EPA followed with a substantial favourable effect ($\beta = 0.243$, $t = 4.847$, $p < .001$, 95% CI [0.144, 0.341]), supporting the hypothesis H2, but with a small effect size ($f^2 = 0.066$). ESC, albeit statistically significant ($\beta = 0.199$, $t = 3.047$, $p = 0.002$, 95% CI [0.067, 0.323]), revealed a small effect size ($f^2 = 0.035$), showing that its practical contribution to PCSR variation, beyond the common influence of EKC and EPA, is limited. The non-significance of ESC's bootstrapped f^2 ($p = .157$) strengthens this interpretation and demands attention in theoretical debates of ESC's position as a PCSR antecedent. No confidence interval straddled zero, providing independent validation of path importance across all three hypotheses. Hence, all three hypotheses were accepted.



Table 6. Summary of Hypotheses Testing

Hypotheses	Path	Std. Beta	Std. Error	t-values	p-values	Bias	Confidence Interval 5.00%	Confidence Interval 95.00%	VIF	f-square	Decision
H ₀₁	EKC→P CSR	0.300	0.060	5.006	<.001	0.002	0.182	0.417	1.820	0.081	Supported
H ₀₂	EPA→P CSR	0.243	0.050	4.847	<.001	-0.001	0.144	0.341	1.465	0.066	Supported
H ₀₃	ESC→P CSR	0.199	0.065	3.047	.002	0.000	0.067	0.323	1.875	0.035	Supported

Note: Alpha ≤ 0.05 (1-tailed test)

The model's out-of-sample predictive power was examined using PLSpredict with ten-fold cross-validation (Shmueli et al., 2019), as shown in Table 7. All five PCSR indicators produced positive Q^2 predict values (range: 0.249–0.292), and the latent variable-level Q^2 predict was 0.373, demonstrating that the model possesses considerable predictive relevance beyond a naive baseline. Crucially, PLS-SEM RMSE values were consistently lower than both the linear model (LM) benchmark and the ignorance-based average (IA) benchmark across all indicators; for instance, PCSR1: PLS-SEM RMSE = 0.674 vs LM RMSE = 0.697 vs IA RMSE = 0.801. This pattern, replicated across all five items, confirms that the PLS-SEM model generates genuinely superior predictions relative to both a linear regression alternative and a naïve mean-based forecast, satisfying the criterion for predictive power as distinct from merely predictive relevance (Hair et al., 2022).

Table 7. Summary of PLS-Predicts

Endogenous Items	Q^2 predict	PLS-SEM_RMSE	LM_RMSE	IA_RMSE
PCSR1	0.292	0.674	0.697	0.801
PCSR2	0.286	0.672	0.687	0.795
PCSR3	0.254	0.682	0.693	0.790
PCSR4	0.292	0.627	0.642	0.745
PCSR5	0.249	0.683	0.703	0.788

Discussion of Findings

The Effect of Environmental Knowledge Capability on Employee PCSR Performance

The findings of the first hypothesis showed that environmental knowledge capability (EKC) positively promotes employee PCSR. The hypothesis that EKC exerts substantial influence on PCSR is now accepted. The results indicated a positive and statistically significant link ($\beta = 0.300$, $t = 5.006$, $p < .001$, 95% BCa CI [0.182, 0.417]), with EKC appearing as the strongest predictor in the model ($f^2 = 0.081$), consistent with Cohen's (1988) convention placing $f^2 = 0.02$ as the lower threshold for small effects in regression contexts. This research shows that when individuals or organisational actors possess a well-developed cognitive grasp of environmental challenges, they are more willing to translate that awareness into PCSR activity. Knowledge, in this reading, works not just as an informational resource but as a motivating forerunner that narrows the intention–behaviour gap in the sustainability domain.

This result accords with the theory of planned behaviour, which proposes that factual and conceptual environmental understanding is a core driver of pro-social and pro-environmental activity. Cui et al. (2024) found that cognitive involvement with environmental issues among managers substantively affected the extent and depth of PCSR efforts performed by their firms, a trend consistent with the finding of Fosu et al. (2024). Similarly, Sarfraz et al. (2023) found that employees with greater environmental awareness scores were considerably more likely to engage in green organisational behaviours that, in aggregate, influenced firm-level employee PCSR positioning. More recently, Alhamdi and Al-Kahtani (2026) found that environmental knowledge increased the link between green consciousness and corporate sustainability pledges, particularly in scenarios where enterprises faced external stakeholder scrutiny.



Notwithstanding these congruent findings, the link is not without academic contestation. Rehman et al. (2023) argued that the empirical association between environmental knowledge and actual behaviour is frequently weak and mediated by deeply entrenched psychological and structural barriers that knowledge alone cannot overcome. In the same vein, Fleck-Baustian et al. (2025) emphasised that knowledge-based treatments tend to overstate the rational-actor assumption, highlighting that emotive, habitual, and contextual factors often overwhelm cognitive determinants in predicting sustainability-oriented behaviour. These dissenting perspectives invite a more nuanced reading of the present finding: whilst EKC is the strongest structural predictor in this model, its effect size remains in the small-to-medium range ($f^2 = 0.081$), suggesting that knowledge operates as a necessary but not sufficient condition for employee PCSR engagement and that its influence is likely moderated or mediated by organisational culture, leadership orientation, and institutional pressures not captured in the present framework. Relevant here is the finding of Saka et al. (2024) that transparency and stakeholder engagement, both of which depend heavily on knowledge-sharing capability, were among the most heavily weighted governance dimensions in their multi-criteria evaluation study. This reinforces the view that knowledge-based factors matter structurally but require complementary institutional conditions to produce durable organisational change.

The Effect of Environmental Sensitivity on Employee PCSR Performance

The findings of the third hypothesis showed that environmental sensitivity (ESC) positively promotes employee PCSR. The hypothesis that ESC exerts substantial effect on employee PCSR is now accepted. The route was positive and statistically significant ($\beta = 0.199$, $t = 3.047$, $p = .002$, 95% BCa CI [0.067, 0.323]). This divergence between a statistically significant path coefficient and a non-significant effect size is not a contradiction but a reflection of what each index measures. The bootstrapped path coefficient ($p = .002$) confirms that ESC's association with PCSR is unlikely to be a product of sampling error; the relationship is real in a probabilistic sense. The effect size index f^2 , by contrast, quantifies the incremental variance that ESC contributes to R^2 once EKC and EPA are already in the model. An f^2 of 0.035 indicates that ESC adds very little explanatory power beyond what the other two predictors already account for. In practical terms, this means that organisations which have already invested in knowledge capability and structured practice adoption derive negligible additional PCSR benefit from cultivating environmental sensitivity as a standalone driver. Sensitivity may still matter as a background condition or motivational precursor, but its independent structural contribution within this model is marginal. Future research should examine whether ESC functions more appropriately as a moderator or mediator rather than as a direct predictor of PCSR outcomes.

This result finds partial support in the available literature. Song et al, (2024) established that environmental self-identity, a construct closely aligned with ESC, significantly predicted a range of pro-environmental behaviours at the individual level, including willingness to engage in voluntary carbon reduction and sustainable consumption, suggesting that sensitivity functions as an important motivational substrate for sustainability conduct. Wild and Schulze Heuling (2024) further demonstrated that environmental self-identity exerted consistent effects on both past and intended environmental behaviour across multiple studies, operating through a self-consistency motive whereby individuals act in accordance with how they perceive themselves environmentally. Shah et al. (2023) showed that stronger environmental identity was associated with greater participation in pro-environmental collective action, with the relationship partially mediated by intrinsic motivation, a pathway that could, in organisational settings, translate into PCSR championing behaviours.

Nevertheless, the small practical impact size observed in the present study finds parallels in scholarship that doubts the sufficiency of identity-based categories at the organisational level of analysis. Gazi et al. (2025) were among the first to note that self-identity effects on

environmental behaviour diminish substantially when behavioural habits and situational constraints are introduced as covariates, a finding that anticipates the present result, where ESC's effect shrinks in the presence of knowledge and practice adoption. More pointedly, Bhat et al. (2024) demonstrated that identity-based environmental interventions produced smaller and less durable behavioural changes compared to informational and skill-building interventions, suggesting that sensitivity, whilst a meaningful antecedent in attitudinal models, may lack the traction needed to produce sustained employee PCSR-relevant behaviour change at scale. However, these threads suggest that ESC occupies a conditional position in the PCSR antecedent hierarchy: it is statistically present, but its independent explanatory power is bounded. Its theoretical contribution may be more accurately captured through interaction effects with knowledge capability and institutional context than through additive main effects. This finding carries particular relevance for Asian and other emerging economy contexts in which PCSR frameworks remain in transition. Nursida (2017), examining Indonesian manufacturing firms, found that PCSR's influence on long-term performance operated through mechanisms that were more structural and governance-related than individually dispositional, which aligns closely with the subordinate role of ESC observed here. These findings, considered collectively, advance a sharper understanding of the cognitive, dispositional, and identity-based origins of PCSR. Environmental knowledge and practice adoption emerge as the more consequential drivers, consistent with action-oriented frameworks that prioritise cognitive capability and behavioural readiness over self-perceptual components. Environmental sensitivity, whilst statistically detectable, operates at the margins of practical significance within this tripartite framework. The moderate R^2 of 0.388 reinforces the point that PCSR is an overdetermined outcome: institutional constraints, regulatory conditions, board structures, and stakeholder dynamics occupy a large explanatory space that individual-level constructs cannot fully cover on their own.

The Effect of Environmental Practice Adoption on Employee PCSR Performance

The result of the second hypothesis showed that environmental practice adoption (EPA) positively promotes employee PCSR. The hypothesis that EPA exerts has substantial effect on PCSR is now accepted. The path coefficient was positive and significant ($\beta = 0.243$, $t = 4.847$, $p < .001$, 95% BCa CI [0.144, 0.341]), establishing EPA as the second-highest predictor of PCSR in the model. The related effect size, albeit small ($f^2 = 0.066$), is nonetheless relevant in a domain where employee PCSR results are shaped by a multitude of competing organisational, institutional, and individual-level pressures. This finding shows that an inclination toward anticipatory, initiative-driven environmental action rather than reactive compliance constitutes a genuine structural driver of employee PCSR outcomes. Actors that proactively strive to identify and manage environmental hazards before regulatory or reputational constraints materialise appear to cement this approach into their broader employee PCSR action, providing empirical support to the natural-resource-based perspective of the enterprise (Hart, 1995).

The finding resonates with a growing body of scholarship on proactive environmental strategy. Bhat et al. (2024) empirically demonstrated that proactive environmental strategies characterised by voluntary, beyond-compliance environmental investments are associated with superior PCSR performance, particularly under conditions of environmental dynamism and stakeholder complexity. Wang and Li (2024) found that firms exhibiting proactive environmental orientations driven by competitiveness, legitimacy-seeking, and ecological responsibility consistently outperformed reactive counterparts on employee PCSR disclosure and community engagement metrics. More recently, Fleck-Baustian et al. (2025) offered large-sample panel evidence that enterprises investing in intangible environmental capacities, a primary manifestation of practice adoption, generated greater employee PCSR effects over time, mediated by reputational and relational resources.



Contrasting perspectives, Čater et al. (2023), argue that much of what is labelled 'environmental practice adoption' in organisational research is, in practice, a strategic performance calibrated to institutional expectations rather than a genuine commitment to ecological or social responsibility. Similarly, Rehman et al. (2022) demonstrated, using a large cross-national sample, that the gap between internal environmental actions and external PCSR communications frequently undermines the substantive link between pro-environmental disposition and employee PCSR outcomes. Firms that talk more than they act exhibit weaker actual employee PCSR performance regardless of their stated proactive orientation. These objections do not contradict the present conclusion but highlight the necessity of studying whether the EPA-PCSR association remains when social desirability biases and strategic signalling incentives are controlled, a direction that future research would do well to follow. This concern is amplified by the findings of Alkhairani et al. (2020) in Indonesian corporate settings, where employee PCSR activity interacted with profitability in ways that were difficult to disentangle from strategic image management, adding a further layer of interpretive complexity to cross-regional comparisons of environmental practice and employee PCSR performance.

Contribution to Knowledge

This study provides numerous contributions to the environmental awareness and PCSR literature. Theoretically, it advances understanding of the cognitive and dispositional antecedents of PCSR by empirically distinguishing the relative explanatory power of environmental knowledge, practice adoption, and sensitivity within a unified structural model, a tripartite configuration that has not been previously tested in the literature. The finding that environmental sensitivity, despite its theoretical prominence in identity-based sustainability frameworks, exerts a statistically significant yet practically negligible effect on PCSR when knowledge and practice adoption are simultaneously modelled represents a meaningful refinement of existing theory. Methodologically, the study contributes a rigorously validated PLS-SEM measurement model with strong convergent and discriminant validity, confirmed through both Fornell-Larcker and bootstrapped HTMT criteria, offering a replicable instrument for future PCSR antecedent research across diverse cultural and sectoral contexts.

Implications of the Study

Theoretical implications

The results provide empirical weight to action-oriented frameworks, specifically the theory of planned behaviour and institutional theory, but also undermine identity-centric interpretations of PCSR motivation. The restricted effect of ESC shows that sensitivity may work as a distal rather than proximal antecedent of PCSR, operating through its influence on information acquisition and proactive disposition rather than exerting independent structural consequences. Future theory development should address the conditional and intervening processes by which identity notions gain or lose traction in PCSR antecedent chains.

Practical implications

For organisational practitioners and policymakers, the dominance of EKC and EPA as PCSR drivers carries actionable consequences. Organisations seeking to embed PCSR more deeply into their operational fabric should prioritise structured environmental knowledge development through training, sustainability literacy programmes, and knowledge-sharing platforms alongside institutional mechanisms that reward anticipatory environmental action rather than reactive compliance. The comparatively smaller contribution of ESC shows that identity-based communication efforts, albeit helpful for attitude development, are insufficient

as independent PCSR enablement techniques and should be integrated within broader capability-building frameworks.

Conclusion

This study evaluated the structural links between environmental knowledge, environmental sensitivity, environmental practice adoption, and PCSR, drawing on PLS-SEM analysis of a twenty-item, four-construct measuring model. The findings reveal that all three dimensions positively and significantly predict PCSR, with environmental knowledge appearing as the most consequential antecedent, followed by environmental practice adoption and environmental sensitivity accordingly. The model displays good explanatory power ($R^2 = 0.388$) and strong predictive relevance ($Q^2_{\text{predict}} = 0.373$), with PLS-SEM beating both the linear model and naïve benchmarks across all PCSR measures. The findings of this study are not restricted to the Nigerian context. The patterns identified here, particularly the primacy of knowledge capability and practice adoption over identity-based sensitivity, are broadly transferable to other emerging economies confronting similar institutional challenges. Across several Asian economies, firms are working within rapidly evolving PCSR frameworks whilst facing pressure from international investors and the demands of regional regulatory convergence. The action-oriented pathways documented in this study offer a concrete basis for CSR strategy in these settings. Policymakers may also find value in the findings when designing environmental compliance programmes: interventions that build genuine knowledge capability are likely to produce more substantive PCSR outcomes than those that operate primarily through identity or attitudinal messaging.

This study is cross-sectional in design, which constrains causal inference; the relationships identified are associational rather than directional in a temporal sense. The sample is drawn exclusively from Lagos-based consumer goods manufacturing firms, which limits generalisation to other sectors and regions within Nigeria and beyond. Self-reported measures introduce a degree of social desirability bias, particularly on items relating to organisational environmental conduct. Future research should test whether environmental practice adoption (EPA) mediates the relationship between environmental knowledge capability (EKC) and PCSR, and whether institutional pressures, such as regulatory stringency and stakeholder coercive force, moderate any of the three antecedent paths to PCSR. Longitudinal designs would further clarify whether the weak practical contribution of environmental sensitivity (ESC) persists over time or strengthens as organisational sustainability culture matures.

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