# Sustainable Procurement Practices: A Pathway to Green Supply Chains in Nigeria

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## Abstract

*This study explores how sustainable purchasing procedures influence the ecological efficiency of supply chains operated by Nigerian firms. Among other aims, it assesses whether the uptake of digital procurement platforms, the adoption of circular economy principles, adherence to environmental compliance rules, active engagement of stakeholders, and the use of technology-driven transparency each correlate with performance as gauged by conventional environmental sustainability indicators. Researchers gathered the requisite quantitative data through a structured questionnaire distributed across various industry sectors. Statistical analysis shows that the two practices-most strongly, the digital tools and circular economy strategies-are positively linked to improved green performance. By contrast, legal compliance checklists and ongoing stakeholder dialogues also exhibit meaningful positive correlations, whereas transparency fostered by advanced technologies fails to register a statistically significant effect. In light of these results, the study urges decision-makers to deepen the digitalization of procurement workflows and institutionalize circular economy concepts so that national firms can better meet Nigerias evolving sustainability targets.*

**Key Words:** Sustainable Procurement, Green Supply Chain, Digital Transformation, Circular Economy

## 1.0 Introduction

Organizations increasingly view sustainable procurement as a vital strategy for creating value while curbing the ecological toll of their supply chains (Ajayi *et al*. 2021; Agyabeng-Mensah *et al*. 2020). Heightened global awareness of climate change and biodiversity loss now compels firms to weave sustainability directly into purchasing routines if they hope to outpace competitors and stay on the right side of emerging regulations (Galdos-Urbizu *et al*. 2024). At its core, sustainable procurement aims to source goods and services that generate minimal environmental harm over their entire life span, yet remain economically viable and socially equitable (Walker & Jones 2017).

Nigeria-the largest economy and most populous country in Africa-faces a distinctive set of obstacles that make greening the supply chain an urgent priority (Inmpey 2017). Rapid industrial growth has, until recently, foregrounded output over ecological integrity, but mounting public concern is now nudging firms toward practices that enhance both environmental performance and profitability (Ezeudu *et al*. 2020). With the nation producing roughly 32 million tons of waste each year and battling widespread land and water degradation, embedding sustainable procurement into business as usual offers a concrete route for meeting the United Nations Sustainable Development Goals on Nigerian soil (Nigerian Federal Ministry of Environment 2023).

The modern green supply chain overlays traditional metrics of cost and quality with persistent scrutiny of environmental footprints, waste streams, and resource flows across every tier of the value network (Ngouapegne 2024). When firms shrink their carbon emissions, streamline material use, and insist on ethically sourced inputs, they move beyond compliance to build lasting adaptive advantage (Nwaulune *et al*. 2023). Published case studies indicate that organizations pledging to comprehensive, transparent procurement protocols continue to meet efficiency targets while outpacing rivals on nearly every climate benchmark (Gelagay 2024).

 In Nigeria, procurement practice is being reshaped by a wave of digital upgrades that promise sharper visibility, faster cycles, and tighter control over environmental

impacts (Mojaki *et al*. 2024). Merging artificial intelligence, blockchain, and IoT sensors inside a single workflow lets buyers rank suppliers on both cost and real-time emissions without sacrificial delay (Anozie *et al*. 2024). Cloud-based dashboards automate compliance alerts, track green credits as they accrue, and gradually turn aspirational sustainability goals into daily operational norms.

The circular economy framework adds a vital layer to Nigerias approach to sustainable purchasing, converting discarded materials into fresh inputs and fostering closed-loop supply chains (Idris & Bello, 2023). Organizations that embrace circular procurement can cut their ecological footprint, unlock new business avenues, and bolster the resilience of key resources (Desmond & Asamba, 2019). Recent government policies, backed by bilateral agreements and multilateral pledges, create a favorable regulatory backdrop for firms willing to experiment with these practices.

## 1.1 Objectives of the Study

i.  Determine the relationship between digital procurement adoption and green supply chain performance in Nigerian organizations.

ii.  Ascertain the relationship between circular economy integration and green supply chain performance in Nigerian organizations.

iii.  Investigate the relationship between environmental compliance frameworks and green supply chain performance in Nigerian organizations.

iv.  Investigate the relationship between stakeholder engagement mechanisms and green supply chain performance in Nigerian organizations.

v.  Investigate the relationship between technology-enabled transparency and green supply chain performance in Nigerian organizations.

## 1.2 Research Hypotheses

$H_{01}$ There is no significant connection between digital procurement adoption and green supply chain performance in Nigerian organizations.

**H$_{02}$** There is no significant relationship between circular economy integration and green supply chain performance in Nigerian organizations.

**H$_{03}$** There is no link between environmental compliance frameworks and green supply chain performance in Nigerian organizations.

**H$_{04}$** There is no significant relationship between stakeholder engagement mechanisms and green supply chain performance in Nigerian organizations.

**H$_{05}$** The relationship between technology-enabled transparency and green supply chain performance in Nigerian organizations is not significant.

The reach of this inquiry stretches beyond the academy, hinting at useful applications in corporate boardrooms and in the corridors where policy is crafted. Nigeria, with its twin ambitions of hitting bold sustainability benchmarks and remaking its economy through digital tools, presents a case where buyers must learn quickly how greener purchasing habits actually boost supply-chain ecology. Practitioners in sourcing, compliance officials waiting for clear rules, and civil servants drafting supportive legislation all stand to gain from the hands-on lessons the project places on the table.

Pinpointing the link between everyday buying choices and the cleaner air or water that Nigerians can count on is more than an academic drill; it is the backbone of workable, on-the-ground strategy. This study therefore drills into the question of how, precisely, responsible sourcing shapes the pulse of green-logistics performance in firms scattered across the national landscape. The analysis looks, in turn, at how digital platforms, circular-design thinking, and the pull of outraged customers are woven into purchase workflows and then tallies what that tapestry does for waste levels, emissions footprints, cost efficiency, and partner trust.

## 2.0 Literature Review

## 2.1 Theoretical Review

### 2.1.1 Stakeholder Theory

Stakeholder theory, first articulated by Freeman in 1984, has more recently been adapted to examine the underside of sustainable procurement, scrutinizing how supply-chain choices resonate up and down the logistical ladder (Jones, 2018). The core idea is straightforward: a firm cannot claim to be green while ignoring the hopes and troubles of suppliers, neighbors, customers, and even local wildlife. Doing so, quite literally, disrupts the balance Freeman insisted on.

In practice, every buying decision ripples outward, nudging manufacturers, regulators, communities, and environmental advocates to either gear up for change or push back (Chen, 2024). When companies open channels for conversation-plant-floor meetings, community forums, online dashboards-they often discover overlapping priorities that had seemed at odds on paper (Agyabeng-Mensah, 2023). That early dialogue does not always end in perfect harmony yet usually thickens the trust needed for ambitious greener initiatives to survive.

### 2.1.2 Resource-Based View Theory

The Resource-Based View (RBV) remains a prominent lens for scholars seeking to untangle the links between sustainable purchasing and hard-edged market success (Barney, 1991). Within that theoretical frame, the VRIO grid-valuable, rare, inimitable, organized-sets the bar for any resource claimed to boost profitability. E-procurement dashboards, circular-economy know-how, active stakeholder coalitions, and their ilk now qualify as strategic assets that can propel a green supply-chain agenda past competitors who still cling to routine sourcing routines.

### 2.2 Conceptual Review

### 2.2.1 Sustainable Procurement

Sustainable procurement flips the standard buying playbook upside down by weaving environmental, social, and economic criteria into every step from needs assessment to final payment (Dudić et al., 2024). Where conventional purchasing zeroes in on cost cutting and compliance, the sustainability lens pursues an overlapping target of people,

planet, and profit-a triangle familiar to triple-bottom-line advocates (Walker & Jones, 2017). That broader mindset pushes firms to rank suppliers not only on price and delivery, but also on carbon footprints, labor practices, and their genuine contributions to a more sustainable economy.

Growing concern about climate change, combined with fierce demands from shareholders and the threat of new regulation, has pushed many firms to overhaul their purchasing strategies (Galdos-Urbizu *et al*., 2024). Companies that embrace this so-called sustainable procurement often find that their reputation firms up, their legal exposure shrinks, and new customers suddenly appear (Fang & Zhang, 2018). Swollen volumes of digital information now rain down on buyers, and sharper tools let them sift that data, spot trends, and act before rivals do.

### 2.2.2 Digital Procurement Adoption

Digital procurement amounts to more than shiny dashboards-it is the sweep of algorithms, ledgers, and wirelessly linked sensors into the routine of daily buying (Mojaki *et al*., 2024). Machine-learning engines scour supplier records for hidden risk, blockchain tags shipments with immutable proof of origin, and IoT modules report temperature, emissions, or waste as shipments roll across the map (Anozie *et al*., 2024). Platforms studded with these artifacts trim paperwork, tame data errors, and keep buyers chatting in real time with vendors, regulators, and community groups.

Adopting digital procurement systems delivers more than just gains in speed and cost control; environmental benefits are also significant (Lodhi *et al*. 2024). Cloud-based dashboards let purchasing teams monitor carbon emissions and resource use in real time, flagging trouble spots before they grow. Built-in reporting tools churn out compliance documents at the push of a button, giving managers hard evidence when regulators come knocking.

Qualitative inquiry often uncovers the texture of real-world practice; interviews and case studies may tease out the everyday obstacles and quiet victories that color sustainable purchasing in emerging markets.

Close examination of discrete digital tools-blockchain ledgers, machine-learning algorithms-would illuminate how those innovations translate into measurable gains for organizations willing to invest. Quantitative research that traces cost offsets or revenue boosts tied to green procurement could furnish the hard numbers that sway executives and boards.

Agyabeng-Mensah, Adjei-Twum, and Frimpong (2020) measured how in-house green sourcing habits, eco-friendly human-resource policies, and cross-firm environmental cooperation affect overall corporate performance. Their fieldwork, which drew replies from 219 manufacturing and service firms, demonstrated that cloud-based purchasing tools act as a pivotal booster between the green initiatives and bottom-line results. The researchers concluded that technology sits at the centre of any serious attempt to turn rhetorical sustainability into measurable output.

Ajayi, Okolo, and Idu (2021) turned their attention to the Nigerian SME sector and probed how green warehousing and responsible buying influence both environmental footprint and day-to-day operations. A mix of questionnaire data from 455 small-business heads, analysed through ordinary least squares, revealed a strong upswing in ecological results when firms adopted formal procurement policies. Their findings reinforced the idea that streamlining logistics along green lines pays dividends in both planet terms and in profitably running the enterprise.

Nwaulune and colleagues (2023) probed the repercussions of green-logistics behavior on the social side of sustainability within fast-moving-consumer-goods firms based in Lagos State, Nigeria. Their data set produced a modest-but-still-meaningful Adj. $R^2$ of 0.066, with an F statistic of 8.036 on 496 degrees of freedom, each result landing below the conventional 0.05 threshold for statistical surprise. The researchers advised that managers weave eco-friendly sourcing into wider sustainable-strategy cloth rather than treating it as a separate patch.

Meanwhile, Gelagay (2024) surveyed 219 mid-sized and large enterprises, fishing for links between green-human-resource routines and the inner currents of green-supply-chain practice on plain-vanilla operational performance. The answer turned out to be yes-sustainable buying, undergirded by greening the HR function, did push

performance numbers upward. The author argued that personnel and supply-chain chiefs should sit at the same table when scheduling environmental upgrades.

Galdos-Urbizu and co-workers (2024) took a broader view, conducting a meta-analysis to measure how green-supply-chain tactics bounce back to corporate environmental health. They found the usual suspects-green purchasing, inventory trimming, waste recycling-yielding favorable eco-results no matter if the firm sold cars, cloth, or consulting hours. Moderation flags popped up, too: outfit size, sector quirks, and the length of regulations all had their say in deciding just how strong the relationships would be.

Ngouapegne (2024) analyzed how green-supply-chain practices affect the environmental bottom line for manufacturers. He found that when firms pair strategic environmental management with the right digital tools and policy back-stop, innovation ripples all the way down the chain. The data also showed a firm link between sustainable purchasing and broad green-economic gains, lending weight to managers who argue for deep-rooted environmental programs.

A quick look through the empirical literature, however, uncovers large blank spaces. Research on sustainable procurement in Nigeria remains surprisingly thin, even though global scholars have long studied green supply chains. Most of that prior work, furthermore, centers on manufacturers in wealthy nations and overlooks nigerias varied terrain- agriculture, services, extraction. There is also a shortage of studies that map how digital change fuels green buying in emerging-economy settings.

In Nigeria, the fusion of circular-economy principles with public and private purchasing processes is still a largely unexplored terrain, even though the nation has pledged allegiance to circularity via platforms like the Africa Circular Economy Alliance. Opening that inquiry now could reveal how locally tailored circular-procurement strategies would function against the backdrop of Nigerias sprawling informal economy.

Limited empirical work has yet scrutinized how stakeholder-engagement techniques fuel-or frustrate-sustainable-buying results in arenas where vendors, communities, and regulators each score differently on environmental literacy and technical know-how.

Figuring out which outreach methods genuinely rally those disparate groups around green procurement remains a pressing, unfinished research assignment.

## 3.0 Methodology

A descriptive survey research design guided this inquiry into how sustainable purchasing habits intersect with overall green-supply-chain performance within Nigerian firms. The descriptive lens facilitates an immediate, real-world snapshot of what organizations are actually doing, while also spotlighting clear patterns among the variables at play.

The target population totaled about 3,200 in-house decision-makers-sourcing heads, sustainability specialists, logistics managers, and compliance officers-drawn from manufacturing, services, farming, and extractive indus-tries alike. Data-collection sites were deliberately spread across economic hubs such as Lagos, Abuja, Port Harcourt, Kano, and Ibadan to keep geographic coverage balanced.

Applying a confidence level of 95 percent and a margin of error set at 5 percent, Taro Yamane's formula trimmed the ideal sample down to 356 active respondents. Stratified random sampling then ensured that each industry, firm size, and regional cluster was fairly mirrored in that eventual turnout.

A custom questionnaire, built around closed-ended items, served as the primary data-gathering instrument. Each point on the 5-point Likert scale from Strongly Agree (5) to Strongly Disagree (1) was chosen to capture the day-to-day perceptions and experiences of the people in the field.

A correlation matrix first mapped pairwise relationships among the measured variables. Multiple linear regression then evaluated each of the research hypotheses in turn. All calculations were performed in SPSS version 28 and reported at an alpha level of .05.

## 3.1 Model Specification

The following econometric model was formulated to test the relationships between sustainable procurement practices and green supply chain performance:

$$GSCP_i = \beta_0 + \beta_1 DPA_i + \beta_2 CEI_i + \beta_3 ECF_i + \beta_4 SEM_i + \beta_5 TET_i + U_i$$

Where:

- $GSCP_i$ = Green Supply Chain Performance
- $DPA_i$ = Digital Procurement Adoption
- $CEI_i$ = Circular Economy Integration
- $ECF_i$ = Environmental Compliance Frameworks
- $SEM_i$ = Stakeholder Engagement Mechanisms
- $TET_i$ = Technology-Enabled Transparency
- $\beta_0$ = Constant term
- $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Regression coefficients
- $U_i$ = Error term

## 4.0 Data Presentation and Analysis

## 4.1 Descriptive Statistics

### Table 4.1: Respondent Demographics

| Category | Variable | Frequency | Percent |
|----------|----------|-----------|---------|
| Gender | Male | 178 | 52.4 |
| | Female | 162 | 47.6 |
| | **Total** | **340** | **100** |
| Age | 25-35 years | 89 | 26.2 |
| | 36-45 years | 142 | 41.8 |
| | 46-55 years | 78 | 22.9 |
| | Above 55 years | 31 | 9.1 |
| | **Total** | **340** | **100** |
| Education | Bachelor's Degree | 76 | 22.4 |

|  |  |  |  |
|---|---|---|---|
| | Master's Degree | 189 | 55.6 |
| | PhD | 65 | 19.1 |
| | Professional Certification | 10 | 2.9 |
| | **Total** | **340** | **100** |
| **Experience** | 1-5 years | 67 | 19.7 |
| | 6-10 years | 134 | 39.4 |
| | 11-15 years | 96 | 28.2 |
| | Above 15 years | 43 | 12.6 |
| | **Total** | **340** | **100** |

The population sampled for this study presents a fairly even split between the sexes: men account for 52.4 percent, women for 47.6 percent. Such figures suggest that voices from both sides of the aisle have been heard. A plurality, 41.8 percent, fall into the thirty-six-to-forty-five bracket, an age range typically marked by practical know-how rather than early-on jitters. Three-quarters-plus of the cohort-75.6 percent, to be precise-carry a masters or doctoral credential, underscoring how deeply technical sustainable purchasing has become. On the experience front, two-thirds of the group (67.6 percent) boast six years or more on the job, meaning their observations about real-world hurdles-and openings-are far from speculative.

**4.2 Digital Procurement Adoption Analysis**

**Table 4.2: Digital Procurement Adoption**

| Statement | Response | Frequency | Percent |
|---|---|---|---|
| **Our organization has implemented digital procurement platforms** | Strongly Disagree | 23 | 6.8 |

| | | | |
|---|---|---|---|
| | Disagree | 34 | 10 |
| | Undecided | 67 | 19.7 |
| | Agree | 142 | 41.8 |
| | Strongly Agree | 74 | 21.8 |
| | **Total** | **340** | **100** |
| **Digital technologies enhance our procurement transparency** | Strongly Disagree | 18 | 5.3 |
| | Disagree | 29 | 8.5 |
| | Undecided | 48 | 14.1 |
| | Agree | 168 | 49.4 |
| | Strongly Agree | 77 | 22.6 |
| | **Total** | **340** | **100** |
| **We use AI and analytics for supplier selection** | Strongly Disagree | 41 | 12.1 |
| | Disagree | 58 | 17.1 |
| | Undecided | 73 | 21.5 |
| | Agree | 121 | 35.6 |
| | Strongly Agree | 47 | 13.8 |
| | **Total** | **340** | **100** |
| **Digital platforms improve environmental monitoring** | Strongly Disagree | 26 | 7.6 |
| | Disagree | 31 | 9.1 |
| | Undecided | 62 | 18.2 |
| | Agree | 151 | 44.4 |

| | | | |
|---|---|---|---|
| Strongly Agree | 70 | 20.6 | |
| **Total** | **340** | **100** | |

The survey data indicate that just over three-fifths (63.6 per cent) of Nigerian firms now rely on a digital procurement platform, a sign the sector is moving online at last. Transparency benefits are perhaps the loudest praise users offer; 72.0 per cent 'strongly agree' that the new tools let them see contracts and budgets with unusual clarity. Sophisticated add-ons such as machine-learning models or predictive analytics sit apart, earning a mixed 49.4 per cent endorsement that points to room for growth. Even so, respondents back environmental score-keeping through their dashboards at a respectable 65.0 per cent, suggesting many see tech as a partner in greening the supply chain.

**4.3 Circular Economy Integration Analysis**

**Table 4.3: Circular Economy Integration**

| Statement | Response | Frequency | Percent |
|---|---|---|---|
| We prioritize suppliers offering circular economy solutions | Strongly Disagree | 32 | 9.4 |
| | Disagree | 45 | 13.2 |
| | Undecided | 71 | 20.9 |
| | Agree | 138 | 40.6 |
| | Strongly Agree | 54 | 15.9 |
| | **Total** | **340** | **100** |
| Our procurement includes waste reduction criteria | Strongly Disagree | 21 | 6.2 |
| | Disagree | 38 | 11.2 |
| | Undecided | 59 | 17.4 |
| | Agree | 156 | 45.9 |
| | Strongly Agree | 66 | 19.4 |

| | | | |
|---|---|---|---|
| | **Total** | **340** | **100** |
| We implement reverse logistics for material recovery | Strongly Disagree | 47 | 13.8 |
| | Disagree | 62 | 18.2 |
| | Undecided | 84 | 24.7 |
| | Agree | 107 | 31.5 |
| | Strongly Agree | 40 | 11.8 |
| | **Total** | **340** | **100** |
| Circular procurement reduces our operational costs | Strongly Disagree | 28 | 8.2 |
| | Disagree | 41 | 12.1 |
| | Undecided | 73 | 21.5 |
| | Agree | 142 | 41.8 |
| | Strongly Agree | 56 | 16.5 |
| | **Total** | **340** | **100** |

A survey of corporate purchasing policies reveals that 56.5 percent of respondents now favor vendors who deliver circular-economy solutions. Such preference illustrates an increasing commitment to the principles of circular procurement. Environmental criteria rooted in waste reduction are woven into sourcing decisions; 65.3 percent of buyers formally endorse trash-minimization benchmarks. Adoption of reverse-logistics systems, by contrast, sits at a moderate 43.3 percent, signaling room to strengthen closed-loop supply chains. Nearly six in ten purchasers, or 58.3 percent, affirm that circular practices yield observable cost savings, a statistic that underlines the financial rationale for these models.

## 4.4 Environmental Compliance Frameworks Analysis

**Table 4.4: Environmental Compliance Frameworks**

| Statement | Response | Frequency | Percent |
|---|---|---|---|
| We have comprehensive environmental compliance procedures | Strongly Disagree | 19 | 5.6 |
| | Disagree | 32 | 9.4 |
| | Undecided | 54 | 15.9 |
| | Agree | 162 | 47.6 |
| | Strongly Agree | 73 | 21.5 |
| | **Total** | **340** | **100** |
| Our suppliers must meet environmental standards | Strongly Disagree | 16 | 4.7 |
| | Disagree | 27 | 7.9 |
| | Undecided | 43 | 12.6 |
| | Agree | 178 | 52.4 |
| | Strongly Agree | 76 | 22.4 |
| | **Total** | **340** | **100** |
| We regularly audit environmental compliance | Strongly Disagree | 24 | 7.1 |
| | Disagree | 39 | 11.5 |

| | | | |
|---|---|---|---|
| | Undecided | 68 | 20 |
| | Agree | 149 | 43.8 |
| | Strongly Agree | 60 | 17.6 |
| | **Total** | **340** | **100** |
| Environmental frameworks improve our performance | Strongly Disagree | 22 | 6.5 |
| | Disagree | 28 | 8.2 |
| | Undecided | 59 | 17.4 |
| | Agree | 156 | 45.9 |
| | Strongly Agree | 75 | 22.1 |
| | **Total** | **340** | **100** |

The survey data reveal that 69.1 percent of firms now maintain comprehensive procedures for environmental compliance, a notable increase over previous cycles. A slightly larger share-74.8 percent-affirm that supplier-selection criteria explicitly incorporate green standards, underscoring how quickly those priorities have been systematized. Routine audits of environmental practices occur in 61.4 percent of the sample, a statistic that hints at genuine commitment rather than intermittent window-dressing. Fully 68.0 percent of respondents report deriving measurable performance gains from the frameworks they enforce, a finding likely to encourage further investment in the near term.

## 4.5 Model Summary and Regression Analysis

**Table 4.5: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of Estimate |
|---|---|---|---|---|
| 1 | .687[a] | 0.472 | 0.464 | 0.789 |

*a. Predictors: (Constant), Digital Procurement Adoption, Circular Economy Integration, Environmental Compliance Frameworks, Stakeholder Engagement Mechanisms, Technology-Enabled Transparency*

**Table 4.6: ANOVA**

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 186.432 | 5 | 37.286 | 59.834 | .000[b] |
| Residual | 208.347 | 334 | 0.624 | | |
| Total | 394.779 | 339 | | | |

*a. Dependent Variable: Green Supply Chain Performanceb. Predictors: (Constant), Digital Procurement Adoption, Circular Economy Integration, Environmental Compliance Frameworks, Stakeholder Engagement Mechanisms, Technology-Enabled Transparency*

**Table 4.7: Coefficient Analysis**

| Model | Unstandardized Coefficients | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|
| | B | Std. Error | Beta | |
| (Constant) | 1.842 | 0.298 | | 6.181 |
| Digital Procurement Adoption | 0.267 | 0.058 | 0.273 | 4.603 |
| Circular Economy Integration | 0.319 | 0.062 | 0.312 | 5.145 |
| Environmental Compliance Frameworks | 0.198 | 0.054 | 0.221 | 3.667 |
| Stakeholder Engagement Mechanisms | 0.156 | 0.049 | 0.187 | 3.184 |
| Technology-Enabled Transparency | 0.089 | 0.056 | 0.095 | 1.589 |

*a. Dependent Variable: Green Supply Chain Performance*

**4.6 Hypothesis Testing Results**

**Hypothesis 1: Digital Procurement Adoption and Green Supply Chain Performance**

Digital procurement adoption registers a coefficient of 0.267, and the accompanying p-value-holding steady at 0.000-screams statistical significance. In plain terms, the data indicate that greater reliance on digital purchasing channels meshes positively with how well firms execute green supply-chain practices. The standardized beta of .273 reinforces this picture: even a single added unit of digital buying savviness should, on average, bump green-performance scores by around 0.267 units. We therefore set aside $H_{01}$ and conclude that leaning into digital procurement does, indeed, breathe new life into environmental performance metrics.

## Hypothesis 2: Circular Economy Integration and Green Supply Chain Performance

Regression analysis reveals that the inclusion of circular-economy metrics produces a correlation coefficient of 0.319, with a p-value squarely at 0.000; the relationship, in other words, is statistically rock-solid. Further scrutiny shows that the standardized weight-$\beta$ fixed at .312-measures larger than any other influence the model accommodates. Collectively, these numbers compel a rejection of the initial null hypothesis, $H_{02}$, and substantiate the claim that folding circular practices into operations reliably bolsters green-supply-chain outcomes.

## Hypothesis 3: Environmental Compliance Frameworks and Green Supply Chain Performance

A regression coefficient for the environmental-compliance variable registers at 0.198 and comes with a p-value fixed at 0.000, confirming that the rapport is not only positive but also statistically sturdy. When the same effect is standard-ized, a value of .221 emerges, pointing to a moderate yet non-trivial clout on green-supply-chain performance. Taken together, the evidence compels a researcher to set aside $H_{03}$ and concede that compliance frameworks furnish a substantial boost to eco-conscious logistics operations.

## Hypothesis 4: Stakeholder Engagement Mechanisms and Green Supply Chain Performance

For the variables in question, the stakeholder-engagement shock carries a coefficient of 0.156 and a p-value of 0.002, both figures pointing, cleanly and decisively, to statistical significance. Running the same numbers through the standardization process yields $\beta = 0.187$, a reading that sits comfortably inside the moderate-impact zone. Under these circumstances the null hypothesis-$H_{04}$, to be precise-falls by the wayside, leaving the positive clout of engagement on green-supply-chain performance standing solid and verified.

**Hypothesis 5: Technology-Enabled Transparency and Green Supply Chain Performance**

The latest regression printout shows that the transparency variable tied to digital technologies clocks in at a coefficient of 0.089 and a p-value of 0.113; neither figure breaches the usual 0.05 benchmark. Standardization places the effect size at $\beta = 0.095$, a weight that registers as practically trivial against indices of green-supply-chain effectiveness. Taken together, the evidence bolsters the decision to keep the null hypothesis, $H_{05}$, alive and well, implying that tech-fueled transparency, at least in this framework, bears little if any meaningful relationship to environmentally minded supply-chain performance.

**5.0 Discussion of Findings**

The recent surveys conducted in Nigerian manufacturing and logistics sectors yield a clear message: when firms embrace sustainable purchasing routines, their overall green supply-chain performance conspicuously improves. A robust, statistically significant coefficient attached to digital procurement- (.273, $p < .001$)- illustrates that technology and environmental stewardship now walk hand-in-hand. Anozie *et al.* (2024) and Mojaki *et al.* (2024) make the same point in their conference papers, describing e-platforms and cloud ledger systems as practical levers for turning abstract sustainability goals into daily operation.

Circular-economy thinking appears to move the needle even more decisively. The regression output lists its path coefficient at .312, $p < .001$, a figure that practically begs managers to design purchase contracts around reuse, remanufacture, and selling by return. Idris & Bello (2023) and Desmond & Asamba (2019) sketched this idea in

their joint articles, portraying circular models as Africas surest route to eco-friendly growth. Organizations that ring-fence waste streams, recover valuable inputs, and sketch closed-loop systems are likely to witness sizable environmental bonuses-and possibly a long-term cost advantage as well.

Robust environmental compliance frameworks exhibited a statistically significant and positive correlation with green supply-chain performance, as indicated by a standardized coefficient of .221 (p < .001). Such a finding reaffirms the predictive power of both mandatory regulations and voluntary standards in steering firms toward more sustainable operations. Ngubane (2024) reaches a similar conclusion, noting that well-structured compliance practices serve as veritable signposts for organizational decision-makers. The observed coefficient implies that businesses willing to invest time and resources in exhaustive environmental audits, reporting, and certifications tend to witness marked improvements in the greenness of their logistics and procurement activities. In short, the data supply fresh ammunition for managers who still debate whether proactive environmental stewardship pays off.

A separate analysis of stakeholder-engagement mechanisms produced a moderate yet statistically meaningful beta of .187 (p < .01) when linked to green supply-chain outcomes. This pattern lends empirical support to stakeholder theory by showing that firms which regularly consult suppliers, customers, local communities, and regulators often deliver superior environmental performance. Agyabeng-Mensah *et al*. (2023) document analogous patterns in their own field work, stressing that inclusive decision-making creates the collaboration needed to overcome the logistical hurdles of sustainable sourcing. Taken together, these results encourage practitioners to think of stakeholder interactions not merely as public-relations exercises, but as core components of operational strategy.

Technology-enabled transparency, measured in this study, emerged statistically inert: the coefficient stood at .095 with a p-value of .113. The figure hints that merely exposing information about inputs and emissions does little to move the needle unless those disclosures are bolstered by enforcement and practical follow-through. Several scholars working outside Nigeria have found the opposite, yet local hurdles-

inadequate broadband, skills shortages, and weak institutions-may blunt the promised gains of open data.

The regression model explained about 47.2 percent of green supply-chain performance, a respectable R-squared that signals the five sustainable procurement practices are not mere decoration in the framework. Even so, nearly half the story remains untold, with gaps likely filled by the tone set by organizational culture, the resolve of leadership, budget realities, and shifting market pressures.

A large F-statistic, clocking in at 59.834 with a p-value smaller than .001, reassures researchers that the assembled predictors work in concert rather than by accident. Such statistical muscle lines up neatly with the blended procurement strategies championed by Galdos-Urbizu *et al*. (2024) and Ngouapegne (2024), offering fresh evidence for their call to treat sustainability as an interlocking system rather than a checklist.

The discoveries reported here resonate deeply with core debates in management scholarship. They lend renewed credibility to stakeholder theory and the resource-based perspective when researchers attempt to explain sustainable purchasing behavior in emerging markets. In blunt terms, firms that deliberately build green-sourcing skills can outpace rivals on ecological metrics while preserving an edge in cost or reputation.

Stakeholders, especially those operating in Nigerias crowded supply chain space, face a different set of imperatives. The data urge them to funnel capital toward digital buying platforms and circular-loop projects if quick, visible progress is the goal. Layer on top of that a robust, well-documented internal compliance system, for the study hints that firms flirting with the legal floor will ultimately leave money-and goodwill-on the table.

## 6.0 Conclusion and Recommendations

## 6.1 Conclusion

This research explored how everyday purchasing decisions in Nigerian firms-line-item budgets, supplier contracts, and reliable record-keeping-line up with broader green-supply-chain goals. The data suggest that leaning on digital platforms, folding circular-economy logic into procurement playbooks, staying inside formal compliance fences, and keeping stakeholders vocal make a measurable difference, even though transparency driven by tech tools did not show a pronounced impact.

When organizations in Nigeria wire sustainability into the lifeblood of their buying processes, they routinely uncover fresh environmental gains. A bench of predictors pulled from the study-wide adoption of connected tech, circular principles, and frequent stakeholder check-ins-explains almost 47 percent of the variation in greener supply-chain performance, lending hard numbers to the case for sustainability spending.

On the theoretical side, the results let stakeholder theory and the resource-based view stretch beyond textbook cases and into the messy day-to-day of emerging markets. The data frame sustainable-procurement skill sets as rare, value-adding resources that enable firms to outpace rivals when it comes to low-impact operations.

## 6.2 Recommendations

Based on the empirical findings, several key recommendations emerge for Nigerian organizations seeking to enhance their green supply chain performance through sustainable procurement practices:

1. Embrace Digital Procurement Evolution:. A broad shift to digital buying platforms that combine artificial intelligence, advanced analytics, and habitually updated dashboards appears to have a sizeable payoff. Findings show that such technology deployments correlate with greener supply chains ($\beta$ = .273, p < .001), underscoring the idea that upfront capital in software usually pays back in emissions savings. Prudent managers will lean toward systems that automatically rate suppliers, log ecological performance, and flag compliance gaps in real time.

2. Apply Circular Economy Thinking: Out of all the variables tested, alignment with circular-economy concepts provides the strongest leverage for greening the supply

chain ($\beta$ = .312, p < .001). Consequently, procurement planners should craft selection criteria that reward closed-loop solutions, engineer reverse-logistics routes that coax material recovery, and forge alliances with vendors willing to rent or lease rather than sell outright. Routine training sessions on circular principles, paired with new metrics to quantify looped materials, will help staff keep pace with these shifts.

3. Strengthen Environmental Compliance Frameworks The sizeable correlation between rigorous compliance controls and the effectiveness of green supply chains ($\beta$ .221, p .001) indicates that firms can no longer settle for a bare-bones approach. Comprehensive management systems that chart environmental expectations for suppliers, embedded auditing routines, and continual refresh cycles for ecological performance may quickly become the new baseline in responsible sourcing.

4. Enhance Stakeholder Engagement Mechanisms: Engagement that is methodical rather than ad-hoc calms nerves and lifts performance. Colliding community voices, supply-chain partners, and regulatory watchers into shared procurement forums yields a measurable boost ($\beta$ .187, p .01) and dividends that are usually ecological in nature. Joint supplier training, neighborhood clean-up days, and cross-industry pledges crystallize that principle.

5. Focus on Implementation Rather Than Transparency Alone: The non-significant relationship between technology-enabled transparency and green supply chain performance suggests that organizations should focus on implementing substantive sustainability practices rather than merely reporting on environmental performance. While transparency remains important for stakeholder communication and regulatory compliance, organizations should ensure that transparency initiatives are accompanied by concrete actions to improve environmental performance.

6. Develop Integrated Sustainability Strategies: Evidence from the study shows that performance peaks when firms fuse discrete actions into a single, cohesive sustainability plan. In practice, this means harnessing digital tools, circular-economy logic, regulatory compliance, and ongoing dialogue with stakeholders, rather than treating each element as an isolated initiative.

7. Invest in Capacity Building: Durable progress relies on in-house expertise; purchasing teams need ongoing training and exposure to new technologies. Workshops that demystify e-procurement platforms or deepen understanding of life-cycle assessment can anchor those skills and encourage routine knowledge-sharing among colleagues.

8. Establish Performance Measurement Systems: Robust data is indispensable, so organizations must design dashboards that illuminate both procedural efficiency and environmental metrics. Target indicators should span every strategy adopted, and reports-redrawn quarterly or semi-annually-should narrate how well those benchmarks are met.

## 6.3 Implications for Policy and Practice

Regulators in Nigeria could spur momentum by crafting incentives- tax breaks, streamlined permitting- that reward buying public goods sustainably. Trade groups, for their part, are well positioned to compile playbooks and deliver hands-on clinics that demystify green sourcing for small and medium-sized enterprises. Development agencies may opt to pair financing with tailored technical assistance, thus bridging the gap between funding and real-world implementation.

Development agencies might promote the expansion of digital networks, invest in circular-economy projects, and strengthen local environmental-management skills if they hope to extend the reach of sustainable purchasing habits among Nigerian firms. These three levers could help embed green procurement in everyday practice.

## 6.4 Limitations and Future Research

This analysis is not without its caveats. Because the survey was confined to organizations based in Nigeria, the conclusions may not translate seamlessly to other emerging markets. Also, the cross-sectional snapshot we gathered prevents a definitive statement about cause and effect. Finally, the reliance on self-reported measures opens the door to social desirability distortions that could skew the data.

Future studies might address these shortcomings by drawing samples from multiple countries, using longitudinal designs to track change over time, and complementing survey instruments with objective performance records.

Qualitative inquiry often uncovers the texture of real-world practice; interviews and case studies may tease out the everyday obstacles and quiet victories that color sustainable purchasing in emerging markets.

Close examination of discrete digital tools-blockchain ledgers, machine-learning algorithms-would illuminate how those innovations translate into measurable gains for organizations willing to invest. Quantitative research that traces cost offsets or revenue boosts tied to green procurement could furnish the hard numbers that sway executives and boards.

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