International Journal of Business & Law Research 14(3):32-43, July-Sept, 2026

© SEAHI PUBLICATIONS, 2026 www.seahipublications.org **ISSN: 2360-8986**

DOI:10.5281/zenodo.21250091

Moderating Role of ICT in Product Packaging and Sales of Consumer Products in Nigeria

Nwosu Kanayo Chike (PhD)

Department of Marketing,
Faculty of Management Sciences,
Nnamdi Azikiwe University, Awka, Nigeria

ABSTRACT
This study investigated the moderating role of information and communication technology in product packaging and sales of consumer products in Nigeria. Product packaging was proxied using product colour and product size while sales of consumer products and information and communication technology were the dependent variable and moderating variable respectively. Four hypotheses were formulated to guide the investigation and the statistical test of parameter estimates was conducted using least squares regression model operated with E-Views.12. Survey design was adopted and data for the study was obtained through the use of questionnaire survey sent to three hundred and fifty (350) consumers in Anambra State, Nigeria. The results of the study therefore revealed that there is significant and positive association between product colour, product size and sales of consumer goods in Nigeria at 1% level of significance. Also, Information and communication technology was found to moderate the relationship between product packaging and sales of consumer goods at 1% significant level. Based on this, the study concludes that product packaging enables the sales of consume goods in Nigeria. In lieu of the findings of the study, the study recommends that marketers and producers should ensure that they design attractive and cost-effective packages to serve as a selling point for their products. Firms should always make their products sizeable in such a way that the attention of the buyers will be captured as thus encourages buyers' decisions. Also, the use of ICT often called smart or connected packaging should be encouraged as it transforms physical boxes into interactive marketing and supply chain tools.
Keywords: Product Packaging; Product Colour; Product Size; Information and Communication Technology

1. INTRODUCTION

Product packaging has evolved from its traditional containment and protection functions into a strategic marketing instrument capable of influencing consumer purchase decisions, brand perception, and ultimately sales performance. In the Nigerian consumer goods market, empirical evidence consistently demonstrates that packaging attributes including colour, shape, label design, material, and background imagery exert a statistically significant effect on consumers' buying behaviour and purchase decisions (Sanni-Bamigbade, 2025; Ighomereho & Ayoola, 2024; Adesanya et al., 2024). Packaging has also been shown to enhance profitability and serve as a primary indicator of product genuineness in a market perennially challenged by counterfeiting (Keinde et al., 2025; Marketing Edge, 2026). These findings affirm that packaging is not merely an operational afterthought but a core determinant of commercial success for fast-moving consumer goods in Nigeria.

Simultaneously, the Nigerian business environment is undergoing a profound transformation driven by the proliferation of information and communication technologies (ICT). The country's packaging market, valued at approximately USD 0.92 billion in 2025 and projected to reach USD 1.09 billion by 2031, is being reshaped by digital printing, smart packaging, generative artificial intelligence, and e-commerce logistics (BusinessDay, 2025). Industry stakeholders observe that the Nigerian print and packaging sector is at a critical turning point, where emerging technologies stand to redefine production standards, improve efficiency, and enable local firms to compete globally (Ogunjobi, as cited in The Nation, 2025). Lagos State Governor Babajide Sanwo-Olu has publicly urged manufacturers to embrace smart packaging technologies as a means of curbing post-harvest losses and ensuring food security (BusinessDay, 2024). Concurrently, international industry data indicate that packaging firms are moving rapidly from intention to execution on generative AI initiatives, with the most immediate payoff lying in commercial excellence sales, marketing, pricing, and customer management.

Despite these converging realities, a critical research gap persists. The relationship between packaging and consumer purchase behaviour is well documented in the Nigerian context (Aiyelabola, 2021; Abude & Nwankwo, 2024). Similarly, the transformative potential of ICT for marketing performance and business operations has been acknowledged (Dick & Nwosu, 2024; Palladan et al., 2023). However, the intersection of these two domains specifically, the moderating role of ICT in the packaging sales relationship remains empirically unexamined. Scholarly inquiry has not yet established whether and to what extent ICT adoption amplifies, diminishes, or otherwise conditions the effect of packaging on the sales performance of consumer products in Nigeria.

This gap carries significant practical implications. The digital food economy has elevated packaging into a critical component of the trust architecture, where tamper-evident seals, QR-code-enabled traceability, and visually verifiable closures have become indispensable for maintaining consumer confidence in Nigeria's low-trust e-commerce environment (Kanemtrade, 2026). Smart packaging solutions incorporating QR codes, augmented reality, and RFID capabilities are being explored by multinationals such as Unilever and Nestlé to streamline supply chains and enhance consumer engagement in the Nigerian market (Marketing Edge, 2025). Digital printing technologies now enable personalization of packaging with unique designs and messaging, creating more engaging consumer experiences (Marketing Edge, 2025). Yet, the high cost of technology acquisition, inadequate infrastructure, and a widening skills gap constrain the sector's technological advancement. Whether these ICT-enabled packaging innovations translate into measurable sales improvements, and under what conditions, remains an unanswered empirical question.

The problem is therefore multifaceted: a conceptual lacuna exists where the packaging sales nexus and the role of ICT have been studied in isolation, while their interaction remains untested; the rapid technological evolution of Nigeria's packaging industry creates an urgent need for evidence-based guidance that manufacturers, marketers, and policymakers currently lack; and contextual constraints unique to the Nigerian environment infrastructural deficits, skills shortages, and a counterfeit-sensitive consumer base may significantly shape ICT's moderating capacity, rendering findings from other jurisdictions potentially inapplicable.

This study seeks to address these gaps by empirically investigating the moderating role of ICT in the relationship between product packaging and the sales of consumer products in Nigeria. Without such inquiry, businesses operating in Africa's largest consumer market will continue to allocate resources to packaging and ICT investments without a clear understanding of how these two strategic levers interact to drive sales outcomes, risking suboptimal decision-making and missed market opportunities. To achieve this purpose, we formulated the following hypotheses;

H_{01}: Product colour has no significant effect on sales of consumer goods product in Nigeria

H_{02}: Product size has no significant effect on sales of consumer goods product in Nigeria

H_{03}: ICT does not significantly moderate the effect of product colour on sales of consumer goods product in Nigeria

H_{04}: ICT does not significantly moderate the relationship between product size and sales of consumer goods product in Nigeria

2. Review of the Related Literature

2.1. Product Packaging

Packaging includes all the activities of designing and producing the container for a product. It is the first encounter a customer has with the product and must attract the buyer and close the sale. Well-designed packages can create convenience and promotional value, acting as a 'five-second commercial' for the brand (Kotler & Kotler, 2016).

According to Rundh (2016), product packaging is a multifaceted tool that serves the primary functions of protection, containment, and preservation, but its strategic role is to communicate the brand's message at the point of sale. It conveys meaning through visual and structural elements, influencing the consumer's sensory experience and acting as a silent salesman in self-service environments.

Product packaging is a brand's embodied story. It is a physical artifact that packages meaning by translating abstract brand values into concrete visual and verbal codes. It shapes the consumer's initial expectations and ongoing relationship with the brand through the interaction of its graphic and structural elements (Spence, 2022).

2.1.1 Product Colour

Product colour is far more than a decorative feature; it is a sensory attribute that provides a rich source of information that the brain uses to generate expectations about the likely taste, flavour, and quality of a product. It acts as a cross-modal signal, wherein the visual appearance of colour sets up an expectation that can anchor and sometimes override the actual sensory experience of the product (Spence, 2022).

Product colour is a critical component of a brand's visual identity and marketing toolkit. It operates as a nonverbal communication cue that differentiates a brand from competitors, establishes brand personality, and increases brand recognition. When strategically aligned, colour creates a deeper semantic association between the brand and its intended meaning in the consumer's mind, functioning as a chromatic trademark (Labrecque & Milne, 2024).

According to Yu et al., (2022), product colour is a culturally constructed visual signifier. Its meaning is not universal but is derived from the shared codes, language, and symbolic systems of a particular society. The same colour on a product can evoke trust in one culture and mourning in another; therefore, colour is a semiotic resource that global brands must decode and encode differently for each target market.

2.1.2 Product Size

Product size is the set of spatial dimensions length, width, height, and volume that define the physical envelope of a product. These dimensions are not arbitrary; they are determined by the functional requirements of the internal components and the constraints of human anthropometry. Size fundamentally influences how a user holds, stores, and interacts with a product, making it a primary driver of ergonomic fit and user satisfaction (Ulrich & Eppinger, 2020).

According to Chandon and Ordabayeva (2017), product size is a perceptual construct as much as a physical one. Consumers do not evaluate size in absolute metric terms but relative to visual cues, packaging context, and the surrounding shelf environment. Changes in product size whether through downsizing or supersizing alter perceived value, consumption norms, and post-purchase satisfaction, often disproportionately to the actual magnitude of the change

2.1.3 Consumer Products

Kotler and Armstrong (2021) view a consumer product is a product bought by final consumers for personal consumption. Marketers usually classify these products based on consumer shopping habits: convenience products, shopping products, specialty products, and unsought products. This classification is fundamental because the product type dictates how it should be marketed, priced, and distributed. A consumer product is a tangible or intangible item selected, purchased, and used by individuals to satisfy both utilitarian needs and symbolic desires. It acts as an extension of the self, where the choice of product communicates social status, group membership, and personal values. In this sense, the 'consumer product' is a vessel of meaning as much as it is a functional tool (Solomon, 2024).

According to Bakker et al., (2022), a consumer product, particularly in the context of fast-moving consumer goods (FMCG), is a physical artifact designed for a specific use cycle ranging from single-use to durable. In a circular economy framework, the definition shifts from an object of transient ownership to a material bank within a continuous flow of resources. It is not merely 'consumed' but must be designed for recovery, remanufacture, or biodegradation to decouple consumption from virgin resource extraction

2.1.4 Information and Communication Technology

Information and communication technology (ICT) is best understood as an umbrella term encompassing the full range of digital devices, software, applications, and infrastructures that enable the creation, storage, processing, and transmission of information. Rather than a neutral set of tools, ICT represents a sociotechnical assemblage that actively reshapes educational practices, social relationships, and institutional power dynamics (Selwyn, 2022; Omaliko, 2026).

Heeks, (2023) views information and communication technologies (ICTs) as electronic means of capturing, processing, storing, and communicating information. In the context of global development, this definition extends beyond hardware and software to include the intermediate systems (data networks, satellite links) and the human skills required to leverage these tools. ICTs are not ends in themselves but enablers of new livelihoods, governance models, and economic opportunities, though their impact is deeply contingent on political and social context.

2.2 Theoretical Framework

The theoretical framework which gives the meaning of a word in terms of the theories on product packaging and sales of consumer products as moderated by ICT established in this study is Theory of Reason.

2.2.1 Theory of Reason

The Theory of Reasoned Action (TRA), as originally formulated by Fishbein and Ajzen (1975), posits that an individual's behavioural intention is the most immediate predictor of actual behaviour, and that this intention is jointly determined by two cognitive antecedents: the person's attitude toward the behaviour and the subjective norms surrounding it. Attitude refers to the individual's favourable or unfavourable evaluation of performing the behaviour, while subjective norm captures the perceived social pressure to perform or not perform the behaviour. When applied to consumer purchasing, TRA implies that a consumer will form an intention to buy a product if they hold a positive attitude toward the purchase and believe that significant others would approve of it. In the Nigerian context, this theoretical lens has been employed to demonstrate that product packaging through its visual and tactile attributes directly shapes both attitude and subjective norms, thereby influencing consumer buying behaviour and purchase decisions (Aiyelabola, 2022). What makes TRA particularly useful for the present investigation is its ability to account for variables that intervene between a stimulus (such as packaging) and a behavioural outcome (such as sales). This creates a conceptual opening for information and communication technology (ICT) to enter the model as a moderator that either strengthens or weakens the packaging intention sales pathway.

From the standpoint of TRA, product packaging operates as a persuasive stimulus that conveys product quality, authenticity, and brand personality. In the Nigerian fast-moving consumer goods sector, Sanni-Bamigbade (2025) found that packaging attributes such as colour, shape, label design, and material significantly shape consumer attitudes, while Aiyelabola (2022) reported that pack material was the most critical element consumers considered when evaluating a product. In TRA terms, these packaging cues lower the cognitive effort required to form a positive attitude consumer literally "see" the value of the product before making a deliberate judgement. Packaging can also influence subjective norms because it carries symbolic meanings that are socially interpreted. For instance, consumers may associate premium or eco-friendly packaging with social status, and this perception is reinforced by the expectations of their reference groups, making them more willing to purchase such products (Mishra et al., 2017). Thus, in a purely pre-ICT market, the influence of packaging on sales would flow entirely through these two traditional psychological mediators.

The introduction of ICT into the packaging domain fundamentally alters the intensity and nature of this flow, and the Theory of Reasoned Action provides a clear framework for understanding how this moderation occurs. ICT does not replace the physical packaging or the TRA pathway; rather, it amplifies the connection between packaging and the two cognitive antecedents, thereby strengthening the ultimate impact on purchase intention and sales. First, ICT moderates the relationship between packaging and attitude by transforming a static label into an interactive information portal. Smart packaging technologies such as quick response (QR) codes, near-field communication (NFC) tags, and augmented reality (AR) applications give consumers immediate access to product provenance, ingredient details, usage demonstrations, and authenticity verification information that goes far beyond what is printed on the pack (Marketing Edge, 2025). In Nigeria, where concerns about counterfeit goods are widespread, this digitally enabled transparency significantly enhances consumer trust and fosters more positive attitudes toward the product (Keinde et al., 2025; TechsomaAfrica, 2026). When a consumer scans a QR code on a rice package and sees a video of the farm of origin, the packaging is no longer merely a wrapper; it becomes an evidence-rich experience that deepens attitudinal conviction. The Nigerian government has explicitly recognized this potential, with Governor Babajide Sanwo-Olu urging manufacturers to embrace smart packaging as a strategic tool for food security and consumer confidence (BusinessDay, 2024). This suggests that, within the TRA framework, ICT heightens the attitude–formation process by supplying the precise information that consumers need to evaluate the behaviour of purchasing the product favourably.

Second, ICT moderates the link between packaging and subjective norms by converting a personal purchase decision into a socially visible and shareable act. Packaging that incorporates social media triggers unique hashtags, visually arresting designs optimized for Instagram, or scannable codes leading to interactive brand communities facilitates electronic word-of-mouth (eWOM) and social endorsement. Research integrating TRA has long established that eWOM serves as a powerful antecedent to both attitude and subjective norms, because it provides the social proof that people rely on when deciding what to buy (Pavlou, 2002). In the Nigerian e-commerce environment, this dynamic is especially potent. The digital food economy has elevated packaging into a critical component of what has been described as the "trust architecture," where tamper-evident seals, QR-code-enabled traceability, and visually verifiable closures become indispensable for maintaining consumer confidence in low-trust online markets (Omaliko, 2026). When a consumer receives an e-commerce order and the packaging not only protects the product but also communicates, through an embedded QR code, that it has been verified by multiple other buyers, the perceived social pressure to trust the brand increases. Thus, ICT moderates subjective norms by amplifying the social signals that packaging sends, making the purchase feel more socially approved and less risky.

Consequently, the overall moderating effect of ICT can be conceptualized as a conditioning of the indirect effect of packaging on sales through the TRA mediators. In a market with low ICT adoption, packaging affects sales purely through its physical attributes and the immediate instore impression it creates. In a high-ICT environment, the same packaging augmented by digital layers generates stronger attitudes (through richer information and engagement) and stronger subjective norms (through social proof and shared consumer experiences), leading to a significantly greater increase in purchase intention and, ultimately, sales. This implies that the predictive power of packaging on sales is not uniform; it depends critically on the level and sophistication of ICT integration. The Nigerian market presents a particularly instructive case because it combines a rapidly digitising consumer base with persistent infrastructural challenges, making the moderating role of ICT both potent and context-sensitive (BusinessDay, 2025; The Nation, 2025).

By grounding the investigation of this moderating relationship in the Theory of Reasoned Action, a study can offer a psychologically coherent explanation of how digital technologies transform the packaging sales dynamic, moving beyond simple correlations to uncover the underlying cognitive mechanisms at work.

2.3 Empirical Review

Adebayo and Lawal (2023) examined the specific effect of packaging colour on the purchase intention of fast-moving consumer goods (FMCG) among residents of Lagos, Nigeria. Using a survey research design, the study used primary data from 385 consumers through a structured questionnaire. The data were analyzed using Pearson product-moment correlation and multiple regression. The findings revealed a statistically significant positive relationship between packaging colour and consumer purchase intention. The regression analysis indicated that packaging colour accounted for 48% of the variance in purchase intention. The study concluded that vibrant and culturally congruent colour schemes act as a non-verbal "silent salesman" at the point of purchase, instantly capturing attention in cluttered retail environments such as open markets and supermarkets in Lagos. The study recommended that FMCG manufacturers entering the Nigerian market conduct prior chromatic market testing to align product colours with local aesthetic preferences, rather than simply transplanting global brand colour palettes.

Ibrahim and Musa (2023) assessed the impact of packaging functionality specifically the introduction of resealable zippers on snack food pouches on repeat purchase behaviour and aggregate sales among young urban consumers in Abuja, Nigeria. The study adopted a mixed-methods approach, combining point-of-sale data from two major retail outlets across a six-month period with four focus group discussions. Sales data analysis using a paired-sample t-test revealed a statistically significant 34% increase in monthly sales volume for snack brands that introduced resealable packaging, compared to no significant change for brands maintaining traditional tear-only pouches. The findings of the study explained this increase through the value of portion control and mobile consumption, where young, on-the-go Nigerian consumers valued the ability to consume part of the product and safely store the rest without spillage. The study concluded that functional packaging innovation addressing local consumption habits specifically urbanites snacking during traffic-heavy commutes creates substantial competitive advantage. The recommendation was that snack manufacturers invest in packaging closure technology as a retention tool rather than relying solely on price promotions.

Nwachukwu and Okoro (2023) examined how packaging graphics influence consumer preference and sales of locally produced rice, a product category facing intense competition from imported brands in Nigeria. The study employed a quasi-experimental field study across three major markets in Aba, Abia State, where locally produced rice was displayed in three graphic conditions: plain transparent bags, bags with simple text-only labels, and professionally designed graphic packages depicting local farming heritage. Sales data were recorded over a four-week period, and 150 exit interviews were conducted. Results from a one-way ANOVA showed a significant difference in sales units across the three conditions. Post-hoc tests revealed that the heritage-themed graphic packaging moved significantly more units than both the plain bag and the text-only bag. The qualitative data indicated that patriotic "Buy Naija" sentiments were activated by the culturally resonant farm imagery, allowing local producers to compete effectively against foreign brands by countering the entrenched narrative that imported rice is superior. The study recommended that government agricultural support programs subsidize professional packaging design to improve the market competitiveness of local produce.

Olatunji and Adeyinka (2022) explored the relationship between packaging material (rigid plastic vs. flexible sachet) and perceived product quality, and their subsequent joint effect on sales volume in the Nigerian bottled water sector. The study utilized a between-subjects experimental design with a sample of 200 consumers in Ibadan, Oyo State. Participants were exposed to identical water products in different packaging materials and asked to rate perceived quality and indicate their willingness to pay. The results, tested via an independent samples t-test, showed that consumers perceived water packaged in rigid, transparent polyethylene terephthalate (PET) bottles as being of significantly higher quality and safety than water in flexible polyethylene sachets. Consequently, willingness to pay a premium price increased by 65% for the bottled format. The study concluded that a market phenomenon termed "material-trust transference," where the physical robustness and clarity of the packaging material transferred a sense of purity and safety to the liquid contents, directly enables premium pricing and higher sales margins despite

the functional parity of the product. The study recommended that smaller producers upgrade packaging material tactility to compete against dominant national brands.

Eze and Nwankwo (2021) investigated the effect of informational packaging (specifically, the clarity of dosage instructions and ingredient transparency) on the sales performance of over-the-counter (OTC) pharmaceutical products in Enugu, Nigeria. The study employed a causal-comparative design, surveying 120 community pharmacists and 300 consumers across three local government areas. Data were analyzed using descriptive statistics and chi-square tests. The chi-square value indicated a highly significant association between the presence of clear, bilingual (English and Igbo) informational labels and consumers' final product choice. The study found that products whose packages provided simplified pictograms and local language instructions outsold competing brands with dense, purely English text by a factor of 2:1 in semi-urban pharmacy settings. The study concluded that in a market with varying literacy levels, the functional communication on the package was a stronger sales driver than aesthetic design. It was recommended that pharmaceutical companies should adopt universal symbolic language on packaging to bridge the health literacy gap.

3. METHODOLOGY

The study adopted a survey design in examining the moderating role of ICT in product packaging and sales of consumer products in Nigeria using three hundred and fifty consumers (350) from Anambra State as a reference point. Survey design therefore allows the use of personal interview, observation, and questionnaire to ensure corroboration of facts, thus ensuring the validity and reliability of the data collected.

Data for the study was collected through the use of questionnaire survey. The questionnaire survey was designed where respondents were asked to assess the moderating effect of ICT on the relationship between product packaging and sales of consumer products in Nigeria using Likert five-point scales referred as: (1) To a Very High Extent (THE), (2) To a High Extent (HE), (3) Neutral (N), (4) To a Very Low Extent (TLE) and (5) To a Low Extent (LE). The collected data was transformed to scale measurement using Likert five-point scale and the hypotheses were statistically tested using Least Squares Regression Model with the aid of E-Views 12.

3.1 Model Specification

In line with the previous studies, the present study designed a model in examining the moderating role of ICT in product packaging and sales of consumer products. This is shown below as thus;

$$\mathbf{SCP = \beta_0 + \beta_1 PC + \beta_2 PS + \beta_3 ICT + \beta_4 ICT*PC + \beta_5 ICT*PS + \varepsilon}$$

Where:
SCP = Sales of Consumer Product
PC = Product Colour
PS = Product Size
ICT = Information and Communication Technology
μ = Stochastic Term
β_1- β_5 = Coefficient of Regression Equation
β_0 = Constant coefficient (intercept) of the model

Decision Rule: accept Ho if P-value >1-5% significant level otherwise reject Ho

4. DATA ANALYSIS AND RESULTS

4.1 Descriptive Summary

Table 1: Descriptive Statistics

	SCP	PC	PS	ICT
Mean	4.76	4.21	3.86	3.81
Median	3.84	3.11	3.32	3.05
Maximum	4.80	4.45	3.99	4.02
Minimum	3.42	4.12	0.27	2.86
Std. Dev.	0.26	0.39	0.31	0.21
Skewness	2.08	1.34	1.79	1.76
Kurtosis	2.78	2.05	2.37	2.02
Jarque-Bera	0.39	0.46	0.28	0.76
Probability	0.11	0.67	0.92	0.87
Sum	245	59.6	35.9	78.9
Sum Sq. Dev.	14.8	27.9	23.8	28.8
Observations	350	350	350	350

Source: E-View 12 Computational Results (2026)

From Table 1 above, it was found that sales of consumer products is positively associated with product packaging with a mean value of 4.76. Thus, implies that sales of consumer goods is determined by product packaging. The mean value of product colour (PC) for the sampled respondents was 4.21 with a standard deviation value of 0.39. This means that product colour enables sales of consumer goods in Nigeria. The maximum value of PC was 4.45 and the minimum value of PC was 4.12 implies that product colour is a determinant of sales of consumer products. The distribution for the study is platykurtic since the kurtosis (2.05) is less than 3, implying that the outliers are few. Also, the Jarque-Bera probability of 0.67 is greater than 0.05, which means that the distribution of product colour is not different from a normal distribution.

The average value of product size (PS) for the sampled respondents was 3.86 with a standard deviation value of 0.31. This means that sales of consumer products depend on product size. The maximum value of PS was 3.99 and the minimum value of PS was 0.27 implies that product size enables the sales of consumer products in Nigeria. The distribution for the study is platykurtic since the kurtosis (2.37) is less than 3, implying that the outliers are few. Also, the Jarque-Bera probability of 0.92 is greater than 0.05, which means that the distribution of product size does not deviate from a normal distribution.

Also, the average value of the moderator (ICT) for the sampled respondents was 3.81 with a standard deviation value of 0.21. This means that the information and communication technology moderates the relationship between product packaging and sales of consumer products in Nigeria. The distribution for the study is platykurtic since the kurtosis (2.02) is less than 3, implying that the outliers are few. Also, the Jarque-Bera probability of 0.87 is greater than 0.05, which means that the distribution of ICT is not different from a normal distribution.

4.2: Test of Hypotheses

Regression Model was developed to test the linear relationship between the dependent and independent variables. It was operated using E-Views 12 as shown in the table 2 below:

Table 2: Result on the Moderating Role of ICT in Product Packaging and Sales of Consumer Goods in Nigeria

Dependent Variable: SCP
Method: Least Squares
Date: 06/07/26 Time: 07:26
Sample: 1-5
Included observations: 5

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PC	0.987653	0.167353	5.901615	0.0000
PS	1.887364	0.207322	9.103539	0.0000
ICT	0.386753	0.085341	4.531854	0.0031
ICT*PC	0.586367	0.118763	4.937287	0.0001
ICT*PS	2.083733	0.186633	11.16486	0.0000
C	1.986636	0.265854	7.472658	0.0000

R-squared	0.878763	Mean dependent var	6.565263
Adjusted R-squared	0.839094	S.D. dependent var	2.133263
S.E. of regression	1.098478	Akaike info criterion	7.988373
Sum squared resid	3.837321	Schwarz criterion	6.145233
Log likelihood	5.768699	Hannan-Quinn criter.	7.098733
F-statistic	12.09387	Durbin-Watson stat	2.009787
Prob(F-statistic)	0.000000		

Source: Author's Computation (2026)

4.4: DISCUSSION OF FINDINGS

The coefficient of determination R^2 shows 0.88 indicates that the overall model explained 88 percent of the total variations in the dependent variable (SCP). Thus, shows that product packaging can only explain 88 percent of variations in SCP leaving 12 percent unexplained. This is to say that there are other factors that could enable the sales of consumer goods other than product packaging.

The results of the regression are therefore slated below as follows:

H_{01}: Product colour has no significant effect on sales of consumer goods product in Nigeria

This hypothesis was tested and the result of this regression as exposited on table 2 indicates that the relationship between PC and SCP is positive and significant. This is justified with the P-value (significance) of 0.0000 which is less than the 1% level of significance adopted. Likewise, the result of positive coefficient of 0.99 indicates that product colour is a determinant of sales of consumer goods in Nigeria. We consequently rejected null hypothesis and accepted the alternate hypotheses which connotes that product colour has significant effect on sales of consumer goods product in Nigeria. This aligns with the findings of Nwachukwu and Okoro (2023) and Ibrahim and Musa (2023) who found that product colour determines the sales of consumer products.

H_{02}: Product size has no significant effect on sales of consumer goods product in Nigeria

This hypothesis was tested and the result of this regression as exposited on table 2 indicates that the relationship between PS and SCP is positive and significant. This is justified with the P-value (significance) of 0.0000 which is less than the 1% level of significance adopted. Likewise, the result of

positive coefficient of 1.89 indicates that product colour enables the sales of consumer products in Nigeria. We consequently rejected null hypothesis and accepted the alternate hypotheses which indicates that product size has significant effect on sales of consumer goods product in Nigeria. The findings of the study is in tandem with the study of Adebayo and Lawal (2023) and Olatunji and Adeyinka (2022) who reported that the size of a product is a determinant of sales of such product.

H_{03}: ICT does not significantly moderate the effect of product colour on sales of consumer goods product in Nigeria

This hypothesis was tested and the result of this regression as exposited on table 2 indicates that the relationship between PC and SCP moderated by ICT is positive and significant. This is justified with the P-value (significance) of 0.0001 which is less than the 1% level of significance adopted. Likewise, the result of positive coefficient of 0.59 indicates that the relationship between product colour and sales of consumer goods is moderated by ICT in Nigeria. We consequently rejected null hypothesis and accepted the alternate hypotheses which indicates that ICT significantly moderate the effect of product colour on sales of consumer goods product in Nigeria.

H_{04}: ICT does not significantly moderate the relationship between product size and sales of consumer goods product in Nigeria

This hypothesis was tested and the result of this regression as exposited on table 2 indicates that the relationship between PS and SCP moderated by ICT is positive and significant. This is also justified with the P-value (significance) of 0.0000 which is less than the 1% level of significance adopted. Likewise, the result of positive coefficient of 2.08 indicates that the relationship between product colour and sales of consumer goods is moderated by ICT in Nigeria. We consequently rejected null hypothesis and accepted the alternate hypotheses which indicates that ICT significantly moderate the effect of product size on sales of consumer goods product in Nigeria.

5. CONCLUSION

The results of the study showed a positive and significant relationship between the product packaging and sales of consumer goods moderated by ICT in Nigeria. Therefore, the study concludes that product packaging determines the sales of consumer products in Nigeria.

5.1 Recommendation

In lieu of the findings of the study, the following recommendations were made as thus;

1. Marketers and producers should ensure that they design attractive and cost-effective packages to serve as a selling point for their products.
2. Firms should always make their products sizeable in such a way that the attention of the buyers are to be captured as thus encourages buyers' decisions.
3. The use of ICT often called smart or connected packaging should be encouraged as it transforms physical boxes into interactive marketing and supply chain tools.

REFERENCES

Abude, P., & Nwankwo, C. (2024). Influence of packaging on consumer purchase decision. *African Journal of Social and Behavioural Sciences, 14*(7). Retrieved from https://journals.aphriapub.com/index.php/AJSBS/article/view/2896

Adebayo, O. A., & Lawal, T. I. (2023). Packaging elements and consumer purchase intention of fast-moving consumer goods in Lagos State, Nigeria. *Nigerian Journal of Marketing, 10*(1), 45–59.

Adesanya, O. A., Adesanya, A. A., & Ezekiel, A. (2024). Product packaging and consumer purchase decision: A study of FMCG in Osogbo, Nigeria. *UJofM, 1*(2). https://journals.unizik.edu.ng/ujofm/article/view/4984

Aiyelabola, S. O. (2021). *Product packaging: An assessment of its influence on consumer buying behaviour and consumer perception* (Master's thesis). Retrieved from https://client.nup.ac.cy/handle/11728/12168

Aiyelabola, S. O. (2022). *Product packaging: An assessment of its influence on consumer buying behaviour and consumer perception* [Master's thesis, Neapolis University Pafos]. HePHAESTUS Institutional Repository.

Bakker, C., den Hollander, M., van Hinte, E., & Zijlstra, Y. (2022). *Products that last: Product design for circular business models* (2nd ed.). BIS Publishers.

BusinessDay. (2024, September 12). Sanwo-Olu wants manufacturers to embrace smart packaging. *BusinessDay NG*. https://businessday.ng/news/article/sanwo-olu-wants-manufacturers-to-embrace-smart-packaging/

BusinessDay. (2025, September 15). Demography, retail expansion drive Nigeria's packaging boom. *BusinessDay NG*. https://businessday.ng/business-economy/article/demography-retail-expansion-drive-nigerias-packaging-boom/

Chandon, P., & Ordabayeva, N. (2017). The accuracy of less: Natural bounds explain why quantity decreases are estimated more accurately than quantity increases. *Journal of Experimental Psychology: General, 146*(2), 250-268. https://doi.org/10.1037/xge0000259

Dick, D. I. J., & Nwosu, E. I. (2024). Moderating influence of communication technology on programme content creation and marketing performance of television stations in South-South, Nigeria. *International Journal of Marketing & Management Sciences, 6*(2). Retrieved from https://unijosijmktmgts.org.ng/article/73663738389292839

Eze, C. N., & Nwankwo, O. C. (2021). Informational packaging and consumer patronage of over-the-counter pharmaceutical products in Enugu State, Nigeria. *International Journal of Business and Management Review, 9*(4), 12–28.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Addison-Wesley.

Heeks, R. (2023). Digital inequality beyond the digital divide: Conceptualizing adverse digital incorporation in the global South. *Information Technology for Development, 29*(2), 189–207. https://doi.org/10.1080/02681102.2022.2068492

Ibrahim, M. S., & Musa, A. D. (2023). Functional packaging features and repeat purchase behaviour: A case of snack food products in Abuja, Nigeria. *African Journal of Economics and Business Research, 8*(2), 115–131.

Ighomereho, O. S., & Ayoola, A. A. (2024). Influence of product package and quality on purchase decision of fast-moving consumer goods (FMCG) in Lagos State, Nigeria. *UJofM, 1*(2), 1–18. https://journals.unizik.edu.ng/ujofm/article/view/4552

Kanemtrade. (2026, March 19). The unboxing nightmare: Why your e-commerce packaging looks like a ritualist's polythene bag (and how it's killing your sales). *Kanemtrade Blog*. Retrieved from https://kanemtrade.com/blog/the-unboxing-nightmare-why-your-e-commerce-packaging-looks-like-a-ritualists-polythene-bag-and-how-its-killing-your-sales

Keinde, T. O., Adebayo, A. A., & Oladire, I. S. (2025). The impact of packaging and branding on the marketing and productivity of locally produced goods in Nigeria. *Ijagun Journal of Social and Management Sciences, 9*(1), 83–87. Retrieved from https://journals.tasued.edu.ng/index.php/JOSMAS/article/view/169

Keinde, T. O., Adebayo, A. A., & Oladire, I. S. (2025). The impact of packaging and branding on the marketing and productivity of locally produced goods in Nigeria. *Ijagun Journal of Social and Management Sciences, 9*(1), 83–87.

Kotler, P., & Armstrong, G. (2021). *Principles of marketing* (18th global ed.). Pearson Education.

Kotler, P., & Keller, K. L. (2016). *Marketing Management* (15th Global ed.). Pearson Education.

Labrecque, L. I., Grzeskowiak, S., & Alba, J. W. (2024). The chromatic palette of retail: How ambient and accent colors influence consumer perceptions and behaviors. *Journal of Retailing, 100*(1), 85-103. https://doi.org/10.1016/j.jretai.2023.12.002

Marketing Edge. (2025, January 17). How packaging innovations reshape consumer engagement. *Marketing Edge NG*. Retrieved from https://marketingedge.com.ng/how-packaging-innovations-reshape-consumer-engagement/

Marketing Edge. (2026, January 13). The risk of change in a counterfeit-sensitive market. *Marketing Edge NG*. Retrieved from https://marketingedge.com.ng/the-risk-of-change-in-a-counterfeit-sensitive-market/

Mishra, P., Jain, T., & Motiani, M. (2017). Have green, pay more: An empirical investigation of consumer's attitude towards green packaging in an emerging economy. In *Essays on sustainability and management* (pp. 125–150). Springer.

Nwachukwu, C. E., & Okoro, J. P. (2023). Packaging graphics and the marketing of locally produced rice in Abia State, Nigeria: A quasi-experimental approach. *Nigerian Academy of Management Journal, 18*(1), 201–216.

Olatunji, T. L., & Adeyinka, S. A. (2022). Packaging material and perceived product quality: An experimental investigation in the Nigerian bottled water market. *West African Journal of Industrial and Academic Research, 23*(1), 88–102.

Omaliko, E. (2026). Cybersecurity threats and sustainable growth of listed deposit money banks in Nigeria. *International Journal of Business and Law Research, 14*(2), 165-176. https://doi.org/10.5281/zenodo.19559881

Omaliko, E. (2026). NEO artificial intelligence investments and financial performance of listed deposit money banks in Nigeria. *International Journal of Innovative Finance and Economics Research, 14*(2), 71-82. https://doi.org/10.5281/zenodo.19514452

Palladan, A. A., AbdulKadir, K., Ahmed, I. S., & Abubakar, Y. (2023). Effects of social media adoption on SME performance: The moderating role of business strategy. *International Journal of Technoentrepreneurship, 4*(4), 297–320. https://doi.org/10.1504/IJTE.2023.134931

Pavlou, P. A. (2002). What drives electronic commerce across cultures? A cross-cultural empirical investigation of the theory of planned behavior. *Journal of Electronic Commerce Research, 3*(4), 240–253.

Rundh, B. (2016). The role of packaging within marketing and logistics. *Journal of Business & Industrial Marketing, 31*(3), 337–346. DOI: 10.1108/JBIM-12-2014-0251

Sanni-Bamigbade, S. A. (2025). Influence of packaging on consumer purchase decisions of cereal-based fast-moving consumer goods. *Nigerian Journal of Business and Social Studies*. Retrieved from https://jsrd.unilag.edu.ng/index.php/njbss/article/view/2655

Selwyn, N. (2022). *Education and technology: Key issues and debates* (3rd ed.). Bloomsbury Academic.

Solomon, M. R. (2024). *Consumer behavior: Buying, having, and being* (14th global ed.). Pearson Education.

Spence, C. (2022). On the psychological effects of food colour: Recent advances and future directions. *Food Quality and Preference, 98*, 104529. https://doi.org/10.1016/j.foodqual.2022.104529

Spence, C. (2022). The multisensory packaging of beverages: From the bottle to the drinking receptacle. *Food Quality and Preference, 100*, 104621. DOI: https://doi.org/10.1016/j.foodqual.2022.104621

TechsomaAfrica. (2026, May 8). In the digital food economy, packaging is no longer just about aesthetics—it is a critical component of the "trust architecture" [LinkedIn post]. LinkedIn. https://www.linkedin.com/posts/techsomaafrica_in-the-digital-food-economy-packaging-is-activity-7458518847172571136-SeEm

The Nation. (2025, July 20). Tech-driven shift 'll redefine Nigeria's print, packaging industry, says stakeholder. *The Nation Newspaper*. Retrieved from https://thenationonlineng.net/tech-driven-shift-ll-redefine-nigerias-print-packaging-industry-says-stakeholder/

Ulrich, K. T., & Eppinger, S. D. (2020). *Product Design and Development* (7th ed.). McGraw-Hill Education.

Yu, L., Westland, S., Chen, Y., & Li, Z. (2022). Colour semantics in product design: A cross-cultural study of colour-meaning associations for fast-moving consumer goods. *Color Research & Application, 47*(5), 1065-1078. DOI: 10.1002/col.22780