International Journal of Management and Sustainability
2026 Vol. 15, No. 4, pp. 909-924
ISSN(e): 2306-0662
ISSN(p): 2306-9856
DOI: 10.18488/11.v15i4.5358
© 2026 Conscientia Beam. All Rights Reserved.

AI-powered personalization and customer loyalty in Abuja's e-commerce sector: The competing mediating effects of perceived relevance and privacy fatigue

Ibrahim Ofosu-Boateng[1+]
Asipita Thomas Sule[2]
Harina Sayyid Ismaila[3]
Saidu Shaibu Kadiri[4]

[1]*Faculty of Business Administration, West End University College, Amanfro, Ghana.*
[1]*Email: ofosuboateng48@gmail.com*
[2,3,4]*Department of Business and Management, University of Central Nicaragua, Nicaragua.*
[2]*Email: thomaspi24@gmail.com*
[3]*Email: Ssyid50@gmail.com*
[4]*Email: kadirshaibu@gmail.com*


(+ Corresponding author)

Article History
Received: 22 April 2026
Revised: 17 September 2026
Accepted: 13 October 2026
Published: 12 November 2026

Keywords
AI-personalization
Abuja
Customer loyalty
E-commerce
Perceived relevance
Privacy fatigue.

ABSTRACT

AI marketing can win and repel consumers at the same time; however, little is known about how this happens in African e-commerce. This is important because Nigeria's e-commerce market is worth over $2 billion, with over 30 percent contributed by Abuja. Understanding how personalization drives customer loyalty is critical for businesses and policymakers. This study employs a quantitative cross-sectional design with 300 e-commerce consumers in six area councils of Abuja via a structured questionnaire. Six hypotheses, including direct effects, mediating effects, and competing indirect pathways, were tested using partial least squares structural equation modeling. The study showed a positive direct effect of AI-powered personalization on customer loyalty ($\beta = 0.31$, $p < 0.001$). Perceived relevance demonstrated a positive indirect effect ($\beta = 0.42$, 95% CI [0.31, 0.53]), while privacy fatigue demonstrated a negative indirect effect ($\beta = -0.19$, 95% CI [-0.27, -0.11]). The positive indirect effect through perceived relevance was significantly stronger than the negative indirect effect through privacy fatigue (difference = 0.61, 95% CI [0.45, 0.77]). The model explained 58 percent of the variance in customer loyalty. The simultaneous mediating mechanisms within a unified dual mediation model extend the personalization literature. The introduction of privacy fatigue as a mediator extends Privacy Calculus Theory beyond static privacy concern measures. Practically, e-commerce managers should enhance perceived relevance while ensuring transparent data governance. Policymakers should ensure that intervention designs balance innovation with consumer protection. This study identifies perceived relevance and privacy fatigue as competing pathways linking AI-driven personalization to customer loyalty in African e-commerce.

Contribution/Originality: This study is one of the very few studies that have investigated perceived relevance and privacy fatigue as competing pathways linking AI-driven personalization to customer loyalty in African e-commerce.

1. INTRODUCTION

The e-commerce business has been transformed globally thanks to the advent of artificial intelligence technologies. The use of complex algorithms makes it possible for online retailers to tailor product recommendations as well as content and shopping experiences to individual consumers. However, there have been questions about whether these personalization technologies lead to lasting customer loyalty or whether they inadvertently dissipate

© 2026 Conscientia Beam. All Rights Reserved.

it through heightened privacy concerns (Duralia, Ogrean, Țichindelean, & Țichindelean, 2025; Wang, Zhu, Liu, & Jiang, 2024).

AI-driven personalization research by Das, Mishra, and Mayaluri (2026) indicated that personalization is generally associated with more favorable perceived relevance, satisfaction, and loyalty outcomes. Personalized advertising studies have shown a significant relationship between both perceived relevance and perceived usefulness, emphasizing the usefulness of advertising in increasing consumer engagement (An & Ngo, 2025). Hence, personalized advertising curbs information overload, enhances perceived relevance, and helps strengthen the consumer-brand relationship.

Notwithstanding, consumers become apprehensive about the exposure of personalized data in the digital space, which breaches their privacy. This concern is relatively prevalent in emerging digital economies such as Africa, where data protection regulations may be silently present. Das et al. (2026) demonstrated that personalization is associated with favorable outcomes; nonetheless, ethical dimensions including privacy, transparency, fairness, and consumer autonomy remain undertheorized (Das et al., 2026).

Given the passage of the Nigeria Data Protection Act 2023 (Federal Republic of Nigeria, 2023), which was signed into law on 12 June 2023, Nigeria presents a unique regulatory setting in which to examine this tension. This legislative development has heightened e-commerce consumers' awareness of their rights to data privacy, creating a unique atmosphere where AI-driven personalization interacts with consumers who are more concerned about privacy yet are still developing trust in digital platforms.

The growth of Nigeria's e-commerce landscape has been impressive. In 2024, Nigeria's online retail market was valued at USD 5 billion, largely driven by the surge in internet usage and a growing middle class, with Lagos, Abuja, and Port Harcourt dominating the cities (Ken Research, 2025a). Abuja has experienced population growth, increased urbanization, and a growing middle class, with internet penetration at approximately 43% and smartphone penetration at approximately 55% (Ken Research, 2025a).

Reliable scales have been established for perceived relevance. In An and Ngo (2025), perceived relevance was measured by asking respondents to rate the extent to which advertisements were "relevant to my interests," "matched my needs," and "were meaningful to me." The measurement scale for privacy fatigue has been validated in peer-reviewed studies. As reported in Nature's Scientific Reports and adapted from Krasnova and colleagues (as cited in Choi, Park, and Jung (2018), privacy fatigue was operationalized with three items: "If I need to sign a privacy statement, I will not read it and will directly choose to agree"; "If the privacy statement is complicated, I will give up understanding and simply choose to agree"; and "I don't want to think about responding if my personal information is disclosed" (Choi et al., 2018).

There has been a growing number of studies in Nigeria's e-commerce context. For example, using the UTAUT2 model, Kumar and Usman (2024) found that factors such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit all shape consumers' intention to shop online. Also, Wahab and Abdulmajeed (2025) showed that mobile commerce, digital payment systems, and AI are key drivers of e-commerce growth in Nigeria. The authors also stressed the need for flexible regulations to manage data privacy and cybersecurity.

Notwithstanding Artificial Intelligence Powered Personalization (APP) strategic importance, there are incongruent images. While one end emphasizes the positive effects of personalization on engagement, another end highlights defensive behaviors due to privacy concerns. According to Duralia et al. (2025), these two streams seem to have developed in isolation without recourse to the simultaneous psychological impact. Available studies have occasionally examined direct effects or single-mediator models at best (Das et al., 2026). Defined as cumulative exhaustion from repeated privacy decisions, privacy fatigue has now been recognized as a critical construct (Tian, Chen, & Zhang, 2022; Yu & Liu, 2024) with validated scales (Choi et al., 2018; Yu & Liu, 2024).

Therefore, there exists a dearth of knowledge on how AI personalization simultaneously influences customer

© 2026 Conscientia Beam. All Rights Reserved.

loyalty through competing mediating effects, such as perceived relevance (cognitive benefit pathway) and privacy fatigue (affective cost pathway). Although Das et al. (2026) and Duralia et al. (2025) have acknowledged both constructs, little is known about a competing mediation framework in an emerging African e-commerce landscape, specifically in Nigeria, where the regulatory environment is shaped by the Nigeria Data Protection Act 2023 (Federal Republic of Nigeria, 2023). The need to disaggregate these dual mechanisms is imperative to avoid overinvestment in AI personalization by practitioners, which may end up dissipating loyalty given the lack of a framework explaining contradictory outcomes (Das et al., 2026; Duralia et al., 2025; Wang et al., 2024). The question, then, is: How do perceived relevance and privacy fatigue competitively mediate the relationship between AI personalization and customer loyalty among e-commerce consumers in Abuja, Nigeria?

2. LITERATURE REVIEW

2.1. Artificial Intelligence Powered Personalization

Artificial intelligence-powered personalization, as described by Das et al. (2026) and Duralia et al. (2025), is the use of machine learning algorithms and predictive analytics to deliver individually tailored content, product recommendations, and marketing messages based on consumer behavioral data. Unlike fixed-based personalization, artificial intelligence-driven approaches usually examine consumers' interactions and learn from them for improvement in real time (Akisanmi et al., 2025). This, according to Kumari and Laheri (2025), is helpful in personalizing product recommendations, including targeted email campaigns and adaptive website interfaces, which ensure that individual consumer preferences are aligned based on historical browsing. Studies have shown that consumer behavior dimensions such as convenience, effectiveness, trust, security, and personalization influence purchase decisions and loyalty and are driven by artificial intelligence-powered personalization (Ribeiro, Rivero, & Abrantes, 2025).

2.2. Perceived Relevance

De Keyzer, van Noort, and Kruikemeier (2022) and An and Ngo (2025) viewed perceived relevance as the extent to which consumers view personalized marketing content as personally meaningful, useful, and aligned with their current needs or interests. Agila et al. (2025) asserted that such relevance results from the cognitive benefits that enable consumers to derive benefits from personalization by reducing information overload and enhancing efficient decision-making. As consumers perceive high relevance, the tendency to engage positively with the brand will be high, including favorable attitudes and loyalty behaviors. Personalized advertising studies have shown the relevance of perceived personalization, as it enhances brand attitudes and click intentions (De Keyzer, Dens, & De Pelsmacker, 2022). An empirical study by De Keyzer et al. (2022) tested perceived relevance as a competing mediating variable in conjunction with perceived creepiness. The results showed a positive effect of perceived relevance on brand engagement.

2.3. Privacy Fatigue

According to Tian et al. (2022) and Yu and Liu (2024), privacy fatigue is a state of emotional exhaustion, cynicism, and resignation resulting from the cumulative burden of managing personal data privacy across multiple digital platforms. This is clearly distinct from momentary privacy, as it denotes a chronic and affective response that is accepted by consumers despite their inability to resist data collection (Choi et al., 2018). Although privacy fatigue serves as passive acceptance of e-commerce data practices, it affects consumers' affection for the brand. Yu and Liu (2024) found that privacy fatigue influences privacy disclosure, which negatively impacts perceived trust. This is corroborated by Das et al. (2026), who confirmed that ethical dimensions, including privacy, transparency, and fairness, are undertheorized in personalization research.

© 2026 Conscientia Beam. All Rights Reserved.

2.4. Customer Loyalty

Customer loyalty has been known to comprise attitudinal and behavioral components in e-commerce, as asserted by Goutam, Gopalakrishna, and Ganguli (2021) and Juanli et al. (2025). While attitudinal loyalty depicts emotional attachment and positive brand evaluations, behavioral loyalty represents repeat purchase intentions and positive word-of-mouth (Juanli et al., 2025). Juanli et al. (2025) found perceived security to have the strongest effect on trust, followed by customer satisfaction, which positively affects customer e-loyalty. Additionally, the study found that perceived enjoyment significantly impacts customer e-loyalty, customer satisfaction, and repurchase intention. In the context of AI-driven personalization, as stated by Agila et al. (2025), customer loyalty is influenced by the balance between perceived relevance and privacy-related concerns, as effective personalization enhances consumer engagement, which significantly enhances purchase intention.

3. THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

3.1. Theoretical Framework

The Stimulus-Organism-Response (SOR) framework and Privacy Calculus Theory underpin the study. The SOR framework suggests that internal thoughts play a significant role in people's reactions to environmental stimuli, which impact their behavioral responses (Jacoby, 2002; Mehrabian & Russell, 1974). Given this, artificial intelligence-powered personalization in this study serves as the external stimulus. Psychological mechanisms, perceived relevance (a cognitive benefit-oriented state), and privacy fatigue (an affective cost-oriented state) are the two competing inner responses. Customer loyalty serves as the behavioral response (Goutam et al., 2021; Juanli et al., 2025).

The Privacy Calculus Theory complements the SOR framework by explaining how consumers compare the perceived benefits and costs of revealing their personal data (Das et al., 2026; Dinev & Hart, 2006). In the context of personalization, consumers tend to weigh the benefits of tailored content against the costs of privacy invasion and data surveillance (Duralia et al., 2025; Wang et al., 2024). The study is underpinned by a dual assessment of the proposed competing mediation model. Thus, integrating both the SOR and Privacy Calculus Theory is particularly appropriate in the context of Abuja's e-commerce landscape, given that the Nigeria Data Protection Act (Federal Republic of Nigeria, 2023) underscores privacy awareness amid growing e-commerce adoption and the need for personalized experiences (Akisanmi et al., 2025).

3.2. Hypothesis Development

3.2.1. Direct Effect

According to the SOR framework, external stimuli have the potential to directly shape behavioral responses without the presence of organismic states or interventions (Jacoby, 2002). Primarily, the design of artificial intelligence-driven personalization is to provide content that matches consumers' preferences and behaviours and helps to improve the overall consumer experience (Akisanmi et al., 2025; Das et al., 2026). Studies have shown that consumers develop repurchase intentions when they feel a platform understands their needs and offers tailored recommendations (An & Ngo, 2025; De Keyzer et al., 2022). Similarly, studies such as Agila et al. (2025) found that investment in AI-driven personalization strengthens customer relationships and builds trust and commitment, which, in turn, drive customer loyalty. Therefore, grounded in the SOR framework, we propose that:

H_1: Artificial intelligence-powered personalization has a positive direct effect on customer loyalty in Abuja's e-commerce sector.

3.2.2. Mediating Role of Perceived Relevance

Considering the SOR framework, perceived relevance reflects the cognitive organismic state within which personalization influences loyalty (Mehrabian & Russell, 1974). Cognitive benefits are derived from personalized marketing that consumers regard as perceived relevance. This reflects the extent to which content is viewed as

© 2026 Conscientia Beam. All Rights Reserved.

personally meaningful and useful (An & Ngo, 2025; De Keyzer et al., 2022). Agila et al. (2025) opined that consumers' decision-making efficiency is enhanced once personalization algorithms successfully deliver relevant product recommendations and tailored communications to reduce information overload. This, according to Agila et al. (2025), results in perceived relevance, which leads to positive affect, including increased satisfaction. Ultimately, a consumer–brand relationship is established, which helps foster loyalty (De Keyzer et al., 2022). In consonance with the SOR framework, perceived relevance serves as the organismic mechanism through which personalization transforms into loyalty. As a result, the following was hypothesized.

H_2: Perceived relevance mediates the positive relationship between artificial intelligence-powered personalization and customer loyalty.

3.2.3. Mediating Role of Privacy Fatigue

According to the Privacy Calculus Theory, consumers assess the perceived costs of privacy intrusion against the perceived personalization benefits (Dinev & Hart, 2006); and Das et al. (2026).

Privacy fatigue is noted to represent the cumulative affective cost that reduces the net value of personalization. Defined as the emotional exhaustion and cynicism that accumulate when consumers repeatedly navigate privacy decisions and perceive a lack of control over their personal data (Tian et al., 2022; Yu & Liu, 2024), privacy fatigue is quite different from transient privacy concerns in that it reflects a chronic affective state that leads to the erosion of consumers' confidence and trust (Choi et al., 2018). With the use of artificial intelligence-powered personalization, privacy fatigue occurs due to the frequent collection and use of personal data. This tendency reduces emotional investment and loyalty intentions toward the platform (Agila et al., 2025; De Keyzer et al., 2022). In line with Privacy Calculus Theory, privacy fatigue serves as the cost mechanism through which personalization dissipates loyalty. As a result, the study hypothesized that:

H_3: Privacy fatigue mediates the negative relationship between artificial intelligence-powered personalization and customer loyalty.

3.2.4. Relative Strength of Competing Mediators

The personalization privacy paradox, as averred by Duralia et al. (2025) and Wang et al. (2024), suggests that personalization concurrently produces both positive and negative psychological responses. Obviously, the integration of the SOR framework and Privacy Calculus Theory theoretically explains this paradox. As the SOR framework explains the positive cognitive path to perceived relevance, Privacy Calculus Theory, on the other hand, explains the negative affective path to privacy fatigue. Simultaneously, these two mediating pathways operate, contrasting cognitive benefit with affective cost. Understanding which pathway exerts a stronger influence critically impacts e-commerce strategy. Given the Nigeria Data Protection Act 2023, which was newly enacted, and evolving consumer digital literacy, it is theoretically possible in the context of Abuja that, as consumers prioritize convenience and personalization over emerging privacy concerns (Akisanmi et al., 2025; Ken Research, 2025a), the benefit pathway through perceived relevance may emerge stronger. Therefore, integrating both theoretical insights, it was hypothesized that:

H_4: The positive indirect effect of artificial intelligence-powered personalization on customer loyalty through perceived relevance is stronger than the negative indirect effect through privacy fatigue.

3.2.5. Antecedent Relationships

In order to fully specify the mediating model, the relationship between the independent variable and the mediators must be established. External stimuli, as posited by the SOR framework, directly influence internal organismic states (Mehrabian & Russell, 1974). Perceived relevance is directly influenced by artificial intelligence-powered personalization in that the designed algorithms, tailored to match consumers' preferences, increase the

© 2026 Conscientia Beam. All Rights Reserved.

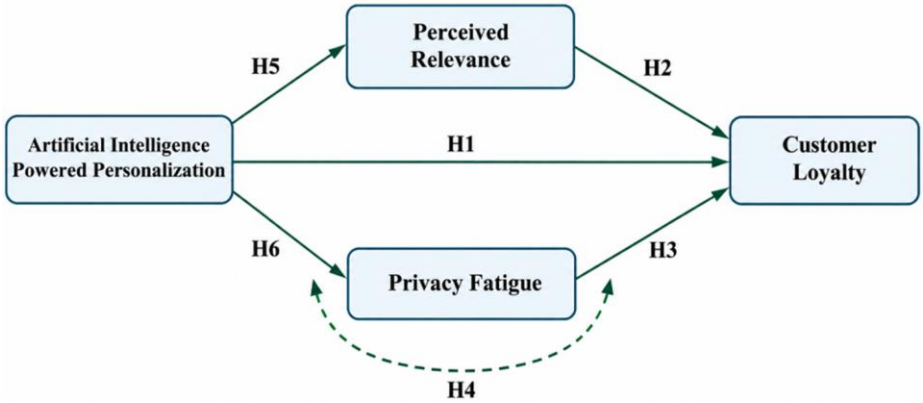
tendency for consumers to find marketing communications personally meaningful (An & Ngo, 2025; De Keyzer et al., 2022). Equally consistent with Privacy Calculus Theory, privacy fatigue is directly influenced by artificial intelligence-powered personalization in that the consistent collection of consumer data for personalization exposes consumers to repeated privacy decisions, including perceived surveillance, which ultimately leads to emotional exhaustion (Tian et al., 2022; Yu & Liu, 2024). Inferring from the theoretical and empirical arguments, we propose the following hypotheses.

H_5: Artificial intelligence-powered personalization has a positive effect on perceived relevance.

H_6: Artificial intelligence-powered personalization has a positive effect on privacy fatigue.

3.3. Conceptual Framework

The conceptual model, which draws on the theoretical framework and includes the hypothesized relationships for this study, is presented in Figure 1. In this model, artificial intelligence-powered personalization is specified as the independent variable, while perceived relevance and privacy fatigue serve as the competing mediating variables, with customer loyalty serving as the dependent variable. The six hypothesized paths, corresponding to H1 through H6 in the model, are tested using structural equation modeling.



Note: APP = Artificial Intelligence Powered Personalization, PR = Perceived Relevance, PF = Privacy Fatigue, CL = Customer Loyalty. The direct paths are shown in solid arrows, while H1-H6 demonstrate the hypothesized relationships.

Figure 1. Conceptual Model of AI Personalization, Competing Mediators, and Customer Loyalty.

4. METHODOLOGY

4.1. Research Philosophy and Approach

The positivist research philosophy, as stated by Saunders, Lewis, and Thornhill (2019), assumes that social reality is objective and measurable, and was adopted for this study; hence, a quantitative approach with a cross-sectional time horizon was utilized.

4.2. Sampling and Data Collection

In this study, adult consumers who have assessed e-commerce platforms in Abuja in the past six months comprise the target population. The study employed multistage sampling techniques, such as stratification and convenience sampling. Hence, the six area councils (Abaji, Abuja Municipal, Bwari, Gwagwalada, Kuje, and Kwali) in Abuja were stratified, while the convenience sample was drawn from high-traffic locations, including shopping malls, university campuses, and corporate offices (Adelakun, Yakubu, & Bello, 2025). The questions were screened, and only eligible participants were included.

Participants in the study. Established SEM guidelines by Hair, Hult, Ringle, and Sarstedt (2022) were followed to determine the sample size. The 10:1 indicator-to-sample ratio requires a minimum of 240 responses with 24 measurement items across four constructs. The study sent out 320 questionnaires to allow room for potential

© 2026 Conscientia Beam. All Rights Reserved.

incomplete responses. After the collected data were cleansed, 300 valid, usable responses were used, representing a 93.75% response rate.

4.3. Measurement Instrument

The study's structured questionnaire measured four constructs using validated scales. AI personalization items were adapted from Akisanmi et al. (2025) and Agila et al. (2025), whilst perceived relevance, which uses a three-item scale, was adapted from An and Ngo (2025), where respondents were asked to rate whether personalized content was "relevant to my interests," "matched my needs," and "meaningful to me." Privacy fatigue uses a three-item scale adapted from Choi et al. (2018) based on Krasnova and colleagues: "If I need to sign a privacy statement, I will not read it and will directly choose to agree"; "If the privacy statement is complicated, I will give up understanding and simply choose to agree"; and "I don't want to think about responding if my personal information is disclosed." Customer loyalty uses items adapted from Goutam et al. (2021) and Juanli et al. (2025). All items were measured on a five-point Likert scale. Informed consent was obtained from all participants. Anonymity and confidentiality were guaranteed.

4.4. Common Method Bias

To ensure the enforcement of procedural remedies, anonymity, temporal separation of constructs, including reverse-coded items, and clear item wording were ensured (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Statistically, Harman's single factor accounted for 32.4 percent of the total variance, which is below the 50 percent threshold. Also, the common latent factor approach showed a maximum weight difference of 0.09, which is also below 0.20. This indicates that common method bias is not a significant concern (Hair et al., 2022; Podsakoff, MacKenzie, & Podsakoff, 2012).

4.5. Data Analysis

This study used a two-step approach for structural equation modeling (Hair et al., 2022). First, to ensure the reliability and validity of the study, the measurement model was tested. Both reliability and composite reliability were tested using Cronbach's alpha, and the results were above 0.70. Also, convergent validity was checked using average variance extracted, with values above 0.50, while discriminant validity was assessed using the Fornell-Larcker criterion and HTMT, which showed values below 0.85. Next, the structural model was analyzed using partial least squares structural equation modeling in SmartPLS to test the six hypotheses. To examine the mediation effects, bootstrapping with 5,000 resamples was applied to determine the significance of indirect effects (Preacher & Hayes, 2008). In analyzing the structural model, partial least squares structural equation modeling in SmartPLS was employed to test the six hypotheses. The mediation effect was examined using bootstrapping with 5,000 resamples to determine the significance of indirect effects (Preacher & Hayes, 2008).

4.6. Ethical Consideration

The Institutional Review Board of West End University College, Ghana, granted approval for this study on 6 April 2026 (Ref. No. WEUC-IRB/2026/004). All participants gave informed verbal consent before taking part. The purpose of the study was clearly explained. Participants were assured of anonymity and confidentiality. The collected data were securely stored, with access limited to the research team.

5. RESULTS

5.1. Demographic Characteristics of Respondents

A total of 320 questionnaires were distributed to e-commerce consumers across the six area councils of Abuja. A total of 300 usable responses were retained for the study after data cleaning. This represented a 93.75% response rate.

© 2026 Conscientia Beam. All Rights Reserved.

Of the 300 responses, 54% were from male respondents and 46% were from female respondents. Respondents aged 25–40 years constituted the majority, accounting for 62%, which reflects the demographic profile of active e-commerce users in Abuja. With regard to e-commerce platforms, 45% used Jumia most frequently and 28% used Konga, while delivery platforms such as Glovo and Chowdeck accounted for the remaining 27%. All respondents confirmed that they had made at least one purchase through an e-commerce platform within the past six months. This was a useful screening criterion.

5.2. Reliability and Validity Assessment

Confirmatory factor analysis was employed to assess the measurement model for reliability and validity. All factor loadings exceeded the recommended threshold of 0.70, which indicates that each indicator adequately represents its respective construct, as shown in Table 1. Additionally, Cronbach's alpha and composite reliability values were above the 0.70 threshold, indicating internal consistency. Further, the average variance extracted (AVE) values exceeded 0.50, confirming convergent validity.

Table 1. Reliability and Validity Assessment of Constructs (N = 300).

Construct	Item	Factor Loading	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
APP	APP1-APP4	0.79-0.85	0.87	0.89	0.65
Perceived Relevance	PR1-PR4	0.70-0.82	0.84	0.86	0.62
Privacy Fatigue	PF1-PF4	0.78-0.84	0.88	0.90	0.68
Customer Loyalty	CL1-CL4	0.81-0.86	0.89	0.91	0.66

Note: All the factor loadings are significant at $p < 0.001$. Threshold values: factor loading > 0.70, Cronbach's $\alpha > 0.70$, CR > 0.70, AVE > 0.50.

5.3. Discriminant Validity Assessment

The heterotrait-monotrait (HTMT) ratio, which serves as the scientific criterion for PLS-SEM, was used to assess discriminant validity. All the HTMT ratios in the study were below the conservative threshold of 0.85, which empirically confirmed the distinct nature of each construct. This is presented in Table 2.

Table 2. Heterotrait-Monotrait Ratio.

Construct Pair	Heterotrait-Monotrait Ratio
APP ↔ Perceived Relevance	0.76
APP ↔ Privacy Fatigue	0.58
APP ↔ Customer Loyalty	0.69
Perceived Relevance ↔ Privacy Fatigue	0.43
Perceived Relevance ↔ Customer Loyalty	0.79
Privacy Fatigue ↔ Customer Loyalty	0.47

Note: All values are below the recommended threshold of 0.85.

5.4. Structural Model Assessment

As the measurement model's reliability and validity have been confirmed, the structural model was then estimated using PLS-SEM to test the six hypotheses of the study. The model explained 58% of the variance in customer loyalty ($R^2 = 0.58$). As indicated by Cohen (1988) guidelines, an R^2 of 0.58 represents a substantial effect size that exceeds the threshold of 0.26 for large effects. The implication is that AI personalization, perceived relevance, and privacy fatigue collectively account for a substantial portion of loyalty outcomes among e-commerce consumers in Abuja.

5.5. Direct Effects

The direct effects and corresponding effect sizes (Cohen's f^2) for each of the hypothesized paths are presented in Table 3, with AI personalization demonstrating significant positive effects on perceived relevance, privacy fatigue, and customer loyalty.

© 2026 Conscientia Beam. All Rights Reserved.

Table 3. Direct Effects.

Hypothesis	Path	β	f^2	t-Statistic	p-value	Decision
H1	APP → Customer Loyalty	0.31	0.09	5.42	<0.001	Supported
H5	APP → Perceived Relevance	0.68	0.48	14.32	<0.001	Supported
H6	APP → Privacy Fatigue	0.52	0.31	10.18	<0.001	Supported

Note: APP = Artificial Intelligence Powered Personalization. f^2 = Cohen's effect size (0.02 = small, 0.15 = medium, 0.35 = large).

As presented in Table 3, AI personalization had significant positive effects on perceived relevance ($\beta = 0.68$, $f^2 = 0.48$, $p < 0.001$), privacy fatigue ($\beta = 0.52$, $f^2 = 0.31$, $p < 0.001$), and customer loyalty ($\beta = 0.31$, $f^2 = 0.09$, $p < 0.001$). Because the effect size for perceived relevance ($f^2 = 0.48$) is large, personalization explains a substantial proportion of the variance in perceived relevance. Additionally, the effect size for privacy fatigue ($f^2 = 0.31$) is medium to large, and the direct effect on customer loyalty ($f^2 = 0.09$) is small to medium; hence, hypotheses H1, H5, and H6 were supported.

5.6. Mediating Effects

The mediating effects and the comparison of competing indirect pathways are presented in Table 4. Whereas perceived relevance mediated a significant positive indirect effect, privacy fatigue mediated a significant negative indirect effect. Further, the positive indirect effect through perceived relevance was significantly stronger than the negative indirect effect through privacy fatigue.

Table 4. Mediating Effects.

Hypothesis	Indirect Path	Indirect Effect	95% Confidence Interval	Decision
H2	APP → PR → CL	0.42	[0.31, 0.53]	Supported
H3	APP → PF → CL	-0.19	[-0.27, -0.11]	Supported
H4	Difference (H2 – H3)	0.61	[0.45, 0.77]	Supported

Note: APP = Artificial Intelligence Powered Personalization, PR = Perceived Relevance, PF = Privacy Fatigue, CL = Customer Loyalty. CI = bias-corrected bootstrap confidence interval (5,000 resamples).

A significant positive indirect effect of mediation on perceived relevance ($\beta = 0.42$, 95% CI [0.31, 0.53]) supports H2. Additionally, a significant negative indirect effect of mediation on privacy fatigue ($\beta = -0.19$, 95% CI [-0.27, -0.11]) also supports H3. Furthermore, perceived relevance showed a positive indirect effect, whereas privacy fatigue showed a negative indirect effect (difference = 0.61, 95% CI [0.45, 0.77]). Given that the positive indirect effect on perceived relevance is significantly stronger than the negative indirect effect on privacy fatigue, H4 is supported.

6. DISCUSSION OF FINDINGS

This section interprets the empirical findings in line with the Stimulus–Organism–Response (SOR) framework and Privacy Calculus theories, which underpin the study. External stimuli, as posited by the SOR framework, drive internal organismic states, which subsequently influence behavioural outcomes (Jacoby, 2002; Mehrabian & Russell, 1974). Artificial-intelligence-powered personalization, as used in the study, constitutes the stimuli, whereas perceived relevance and privacy fatigue represent the competing organismic states, with customer loyalty constituting the behavioural response (Goutam et al., 2021; Juanli et al., 2025). The Privacy Calculus Theory plays a complementary role by explaining how consumers compare the perceived benefits of personalization with perceived privacy-intrusion costs, with perceived relevance acting as the benefit pathway and privacy fatigue acting as the cost pathway (Das et al., 2026; Dinev & Hart, 2006). These theories provide a foundation for understanding how personalization concurrently displays both positive and negative effects on loyalty.

© 2026 Conscientia Beam. All Rights Reserved.

6.1. Direct Effect of Personalization on Loyalty

The study's results, which indicate that artificial intelligence-powered personalization has a significant positive direct effect on customer loyalty, are in sync with the SOR framework, as this allows for direct stimulus-response pathways that do not require intervening organismic states (Jacoby, 2002).

Prior studies such as Akisanmi et al. (2025) and Agila et al. (2025) on AI-driven personalization in emerging markets have shown the direct influence of personalization on both customer retention and purchase intentions. Additionally, the study of Das et al. (2026) reported that personalization generally leads to positive loyalty outcomes in diverse contexts. This study extends these findings, as it demonstrates that even given Abuja's new and weak data protection regulation, the direct positive effect of personalization has been confirmed. The slight influence of personalization on loyalty ($f^2 = 0.09$) implies that most of personalization's influence largely works through indirect pathways rather than through direct influence. This brings the psychological importance at hand to the fore. The implication is that consumers develop positive associations with an e-commerce platform when they perceive it to have a better understanding of their needs and preferences, leading to repeat purchases as data privacy risks are ignored. It is obvious that personalization creates repeat purchase behaviour due to its convenience. For this reason, investment in AI algorithms by e-commerce managers should focus more prominently on consumers' preferences, since it develops loyalty right from the first experience. As consumers encounter personalized messages and product suggestions matching their likes, they are motivated to make purchases again.

6.2. Perceived Relevance as a Positive Mediator

The finding that perceived relevance mediates the positive relationship between personalization and loyalty aligns with the SOR framework, which posits that stimuli trigger internal organismic states that subsequently shape responses (Mehrabian & Russell, 1974). Perceived relevance represents the cognitive organismic state through which personalization enhances loyalty. Research on personalized advertising has confirmed that perceived personalization improves brand attitudes and behavioral intentions by increasing perceived personal relevance (An & Ngo, 2025; De Keyzer et al., 2022). Studies examining competing mediation frameworks have found that perceived relevance explains the positive effects of personalization on brand engagement (De Keyzer et al., 2022). The current study reinforces this pattern, demonstrating that consumers in Abuja similarly prioritize relevance as the primary benefit of personalization. Practically, the significance of this pathway is confirmed by a large effect size ($f^2 = 0.48$). This indicates that nearly half of the variance in perceived relevance is explained by personalization. The implication is that when consumers receive product recommendations matching their immediate or previous purchases, they usually decide quickly without thinking much. This efficiency creates positive affect, which consumers attribute to the platform rather than to the algorithm, strengthening brand attachment. The strong indirect effect ($\beta = 0.42$) indicates that for every unit increase in perceived relevance, loyalty increases by nearly half a standard deviation through this cognitive pathway.

Managerially, relevance is the single most powerful lever for loyalty in Abuja's e-commerce market. Managers should prioritize recommendation accuracy over recommendation quantity. A single highly relevant recommendation generates more loyalty than ten moderately relevant ones. Tactics include: using browsing history rather than just purchase history, timing recommendations based on usage patterns (e.g., lunchtime for food delivery), and allowing consumers to signal preferences explicitly through "like" or "not interested" buttons.

6.3. Privacy Fatigue as a Negative Mediator

The significant negative mediating effect of privacy fatigue is explained by Privacy Calculus Theory, which posits that consumers weigh the perceived costs of privacy loss against the perceived benefits of personalization (Das et al., 2026; Dinev & Hart, 2006). Privacy fatigue represents the cumulative affective cost that diminishes the net value of personalization. Research has demonstrated that privacy fatigue influences privacy disclosure behavior both directly

© 2026 Conscientia Beam. All Rights Reserved.

and indirectly through its impact on perceived trust (Yu & Liu, 2024). The systematic review by Das et al. (2026) confirms that ethical dimensions including privacy, transparency, and fairness remain under-theorized in personalization research, with privacy concerns emerging as important conditions for trust-related outcomes. The current study extends this literature by establishing privacy fatigue as a distinct negative pathway in the e-commerce context, confirming that personalization simultaneously generates both benefits and costs as predicted by Privacy Calculus Theory. The medium-to-large effect size ($f^2 = 0.31$) indicates that privacy costs are an inevitable but manageable consequence of personalization.

Quite different from momentary privacy concerns, which tend to elicit resistance such as deleting cookies and using VPNs, privacy fatigue elicits passive resistance. Even though consumers who become tired continue to access the platform with annoyance, they easily switch when there is an alternative. The negative indirect effect ($\beta = -0.19$) demonstrates that privacy fatigue reduces about one-fifth of the loyalty benefits resulting from personalization. From the managerial viewpoint, privacy fatigue is detrimental to loyalty because it enables consumers to walk away quietly without complaint. Therefore, it can be reduced by: (1) allowing just a single consent during sign-up; (2) providing just a single dashboard to enable consumers to see and control the data being collected; and (3) explaining in clear and easy language the need for the data collected. Reducing fatigue by 20 percent would recover the entire negative indirect effect.

6.4. Competing Mediation: Relevance Outweighs Fatigue

The findings of the positive indirect effect through perceived relevance, as found in the study, are significantly stronger than those of the negative indirect effect through privacy fatigue. These findings help to resolve the personalization and privacy tensions.

The explanatory power ($R^2 = 0.58$) of the model shows that the competing mediators collectively explain over half of the variance in customer loyalty. Cohen (1988) refers to this as a significant effect size. This is a clear demonstration that the model explains most of what influences loyalty in the e-commerce landscape in Abuja, while about 42% is explained by other variables.

Cohen's f^2 effect sizes were further used to assess the practical significance of each pathway. The effect of personalization on perceived relevance ($f^2 = 0.48$) is shown to be large, which implies that personalization explains nearly half of the variance in perceived relevance. This demonstrates that personalization is valued because consumers receive useful and relevant content. Also, the medium-to-large effect of personalization on privacy fatigue ($f^2 = 0.31$) shows that privacy costs cannot be avoided; however, they can be managed. Additionally, the direct effect of personalization on loyalty ($f^2 = 0.09$), although small to medium, shows that personalization influences loyalty more through mediated pathways than through direct pathways.

This pattern is an indication of the concurrent operation of the SOR framework and Privacy Calculus Theory. As the SOR framework helps to explain how personalization enhances cognitive benefits such as relevance, Privacy Calculus Theory explains how negative feelings such as privacy fatigue are created. The effect size for the relevance pathway ($f^2 = 0.48$) is large compared with the small-to-medium direct effect ($f^2 = 0.09$), indicating that personalization has a stronger cognitive and mediated influence on loyalty than a direct influence.

Studies such as De Keyzer et al. (2022) that work on competing mediation confirmed the opposing explanatory behaviours of perceived relevance and perceived creepiness in personalization.

This study contributes to the discussion by showing that the benefit pathway among Abuja consumers is much more concerned with the useful benefits derived from personalization than with the privacy risks accrued over time. These findings are in consonance with prior reviews that, although personalization leads to favorable outcomes, issues such as ethics are still not fully explored and can vary largely depending on the setting (Das et al., 2026). This suggests that Abuja consumers prominently focus first on how helpful a recommendation is without giving much thought to its privacy concerns. However, attention is directed to privacy issues when relevance is marginal. This

© 2026 Conscientia Beam. All Rights Reserved.

explains why the positive effect (β = 0.42) is stronger than the negative one (β = -0.19). The net positive effect of 0.61 suggests that, from the average consumer viewpoint, personalization benefits outnumber costs by approximately 2:1. There is strategic breathing room given the dominance of relevance over fatigue; however, it is not a permanent panacea. Therefore, it is expedient for managers to leverage the current benefit dominance as they also find a lasting solution to address privacy concerns. Keeping recommendations very useful while also reducing privacy concerns will be the best approach. This means simultaneously enhancing recommendation systems while also designing simple platforms to reduce privacy fatigue issues. Platforms with this insight are better positioned to woo consumers and increase market share than competitors oblivious to this insight.

6.5. Antecedent Relationships

The findings that personalization has strong positive effects on both perceived relevance and privacy fatigue establish personalization as a double-edged sword. In light of the SOR framework, according to Jacoby (2002), personalization as a stimulus triggers different cognitive and psychological responses. Also, in light of the Privacy Calculus Theory, Dinev and Hart (2006) and Wang et al. (2024) suggest that the same personalization stimulus triggers both beneficial perceptions and cost perceptions. In Nigeria, studies on e-commerce by Akisanmi et al. (2025) support this assertion, stating that AI-driven personalization significantly increases consumer engagement while also raising privacy issues that erode these benefits. These dual mechanisms in the study's findings suggest that personalization represents fundamental consumer responses to personalization in different market contexts.

In behavioural terms, personalization presents a dual-processing response. This makes consumers evaluate its usefulness before responding quickly and positively. At the same time, as consumers slowly and emotionally recognize privacy concerns, this feeling nonetheless increases over time, underscoring why privacy fatigue develops gradually rather than happening all at once. The implication is that privacy fatigue cannot simply be avoided by managers reducing personalization. The positive relationship (β = 0.52) implies that as personalization increases, its attendant privacy fatigue also increases. The solution, therefore, does not lie in merely reducing personalization but in mitigating fatigue through relevance and trust-building. Hence, it is necessary to pair personalization features with equally transparent features, such as "We recommended this because you bought X."

7. THEORETICAL AND PRACTICAL IMPLICATIONS

7.1. Theoretical Contributions

Theoretically, this study presents four significant contributions as follows: (1) it extends personalization research, showing that artificial intelligence-powered personalization affects loyalty simultaneously in two opposite ways. That is, it enhances loyalty through perceived relevance while also reducing it through privacy fatigue. Prior studies have typically examined these pathways separately; however, this study demonstrates that they occur concurrently, giving an in-depth understanding of the tension between personalization benefits and privacy concerns (Duralia et al., 2025; Wang et al., 2024). This contribution brings together the SOR framework and Privacy Calculus Theory into a unified model that explains both positive and negative effects through two mediating paths. (2) This study adds privacy fatigue as an important mediator in marketing research. Prior studies have mostly focused on privacy concern as a fixed thought-based evaluation. Contrastingly, privacy fatigue demonstrates a long-lasting emotional cost that builds up from repeated privacy-related decisions. This provides a deeper understanding of how personalization can slowly diminish loyalty over time (Tian et al., 2022; Yu & Liu, 2024). This contribution improves Privacy Calculus Theory by treating privacy cost as a feeling people experience over time, not just a fixed thought-based judgment. (3) This study adds real-world evidence from the e-commerce landscape in Abuja, a fast-burgeoning digital market in Africa that is often missing from major digital marketing scholarly research. Comparing the results of this research with those from different regions clearly shows that the personalization–privacy tension exists everywhere; however, it appears differently depending on the context, highlighting that while the overall pattern is common, local factors

© 2026 Conscientia Beam. All Rights Reserved.

significantly influence how it is experienced (Akisanmi et al., 2025; Das et al., 2026). (4) This study offers useful reference values for future studies. The strong effect of personalization on perceived relevance (f^2 = 0.48) demonstrates that relevance is a significant driver of outcomes, while the medium-to-large effect on privacy fatigue (f^2 = 0.31) depicts privacy concerns as important but less dominant.

The R^2 value of 0.58, which is substantial, shows that the model explains a large part of customer loyalty and can be used as a guide for future research. Further, it suggests that other variables, such as trust or perceived control, may assist in explaining the remaining 42% that is not captured by the current model.

7.2. Practical Implications

The findings of the study have managerial implications for Abuja's e-commerce firms and other firms in similar emerging markets. (1) Managers in the e-commerce sector should focus on personalization that makes content more relevant to users, since this has the strongest effect on customer loyalty. Managers in the e-commerce sector should invest in AI systems that accurately predict customer preferences and deliver timely, relevant content since it produces the highest returns (Agila et al., 2025; Akisanmi et al., 2025). In behavioural terms, this means designing systems that enhance consumers' decision-making in order to reduce unnecessary steps, reduce the time taken to choose, and reduce the effort needed to search for products. (2) Managers in the e-commerce sector should put in place strong data governance practices to reduce privacy fatigue. This can be done by clearly explaining how data is used so that consumers can control their information. Additionally, there is a need to avoid too many repeated consent requests, which can become stressful over time (Tian et al., 2022; Yu & Liu, 2024). Since privacy fatigue builds up slowly, early steps taken to reduce it will assist in protecting the positive impact of personalization. In simple behavioural terms, this implies creating systems that make consumers feel safe and comfortable, as this reduces worry, makes the platform's actions more predictable, and builds trust through the consistent handling of personal data. (3) The finding that consumers currently tolerate some privacy concerns is a result of the useful benefits received from personalization. However, given the growing awareness of the Nigeria Data Protection Act (Federal Republic of Nigeria, 2023), e-commerce managers should think of long-term strategies to build trust through responsible data use so that customer loyalty can remain strong even as regulatory and consumer expectations evolve over time. In behavioural terms, this calls for the need to build lasting relationships with consumers rather than focusing only on trying to increase short-term clicks or activity. (4) From a policy viewpoint, the study's findings can be leveraged by the Nigeria Data Protection Commission to design interventions that balance innovation with consumer protection. Updated educational campaigns will be helpful in enabling consumers to understand their rights to privacy and the trade-offs involved in personalization. This is essential to help them make crucial informed decisions. In addition, rules requiring e-commerce firms to clearly explain how their personalization systems work can help reduce privacy fatigue.

8. CONCLUSION

This study aimed to address the issue that, although Abuja's e-commerce firms are increasingly using AI-driven personalization to build customer loyalty, the exact manner in which this strategy works or fails is not theoretically well explained and has little empirical support. Based on the SOR framework and Privacy Calculus Theory, the study examined how perceived relevance and privacy fatigue act as competing pathways. The results demonstrate that personalization acts as a pendulum, swinging to enhance loyalty through cognitive benefit pathways while also swinging to diminish it through affective cost pathways. However, in the context of Abuja's e-commerce sector, the positive effect is currently stronger. The study's model explained 58 percent of the variance in customer loyalty (R^2 = 0.58). This variance shows a substantial effect size by Cohen (1988) standards. Clearly, this demonstrates that the proposed framework of the study explains the significant psychological factors that drive loyalty. The results also improve the theoretical understanding of the tension between personalization and privacy issues (Duralia et al., 2025;

© 2026 Conscientia Beam. All Rights Reserved.

Wang et al., 2024). They also demonstrate that privacy fatigue is a critical mediator in marketing literature (Tian et al., 2022; Yu & Liu, 2024). The study provides evidence from a fast-growing African digital market such as Abuja (Akisanmi et al., 2025) and offers significant effect-size values ($f^2 = 0.48$ for relevance, $f^2 = 0.31$ for privacy fatigue) to guide future studies. Policy-wise, the findings of the study underscore the need for policymakers to enact rules that protect consumer privacy while also providing room for innovation to grow in the digital economy landscape. As e-commerce expands across Africa, understanding how consumers think and feel about personalization is important for building lasting and trust-based relationships with consumers. In behavioural terms, consumers currently prefer useful benefits, as they pay little attention to future privacy risks. E-commerce platforms that make it easy for consumers to access benefits and reduce anxiety gain greater customer loyalty. As a result, managers should focus on investing about 70 percent of their personalization efforts in making content relevant (the stronger pathway, $f^2 = 0.48$), while still committing a good 30 percent to reducing privacy fatigue (the weaker but still meaningful pathway, $f^2 = 0.31$). Platforms that ignore either side stand to perform worse than competitors that balance both.

9. LIMITATIONS AND FUTURE RESEARCH

Like other studies, this study is fraught with limitations.

Notably, the study's adoption of a cross-sectional design captures relationships only at a single point in time. Hence, longitudinal designs can be employed for future research to examine how competing mediating effects evolve as consumers accumulate experience with personalization and as data protection regulation matures. Additionally, only two mediators—perceived relevance and privacy fatigue, were employed in the study. Trust, perceived control, and algorithmic awareness can be employed as additional mechanisms. Even though the substantial R^2 of 0.58 indicates that the proposed model explains more than half of the variance in loyalty, the remaining 42 percent of unexplained variance provides room for model extension.

Moreover, this study was conducted in Abuja, Nigeria. There is a need to replicate the model in other African cities and compare results across different regulatory and cultural contexts (Das et al., 2026; Duralia et al., 2025). Furthermore, self-reported measures of loyalty were employed; hence, behavioral data, such as actual purchase frequency and platform engagement metrics, should be considered in future studies to complement self-reported intentions.

Funding: This study received no specific financial support.
Institutional Review Board Statement: The Ethical Committee of West End University College, Ghana, has granted approval for this study on 6 April 2026 (Ref. No. WEUC-IRB/2026/004).
Informed Consent Statement: Informed verbal consent was obtained from all participants, and all data were anonymized to protect participant confidentiality.
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.
Acknowledgement: The authors gratefully acknowledge West End University College for providing institutional support, including access to software, library resources, and administrative assistance.

REFERENCES

Adelakun, A. B. A., Yakubu, B., & Bello, A. T. (2025). Effect of digital marketing practices on consumer behaviour of selected small and medium scale enterprises in Abuja. *Abuja Journal of Business and Management, 3*(3), 45–62.

Agila, G., Selvakumar, N., Saranya, G., Kandasamy, U., Gayathri, J. P., & Sureshkumar, M. S. (2025). Impact of AI-driven personalized marketing on consumer buying behaviour in the e-commerce sector. *International Journal of Applied Mathematics, 38*(11s), 2240-2255.

© 2026 Conscientia Beam. All Rights Reserved.

Akisanmi, D. O., Alabi, R. O., Egwuatu, J. O., Okeke, V. C., Ayittey, S., Onma, N. A., & Chukwumezie, U. E. (2025). AI-powered personalization in Nigerian e-commerce businesses: Enhancing customer engagement and conversion. *Journal of Global Economics, Management and Business Research, 17*(3), 268-284. https://doi.org/10.56557/jgembr/2025/v17i39785

An, G. K., & Ngo, T. T. A. (2025). AI-powered personalized advertising and purchase intention in Vietnam's digital landscape: The role of trust, relevance, and usefulness. *Journal of Open Innovation: Technology, Market, and Complexity, 11*(3), 100580. https://doi.org/10.1016/j.joitmc.2025.100580

Choi, H., Park, J., & Jung, Y. (2018). The role of privacy fatigue in online privacy behavior. *Computers in Human Behavior, 81*, 42–51. https://doi.org/10.1016/j.chb.2017.12.001

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Das, A., Mishra, S., & Mayaluri, Z. L. (2026). Business intelligence, AI-driven personalization, and ethical customer segmentation in e-commerce: A systematic review of consumer trust and digital marketing. *SN Business & Economics, 6*(3), 84. https://doi.org/10.1007/s43546-026-01079-8

De Keyzer, F., Dens, N., & De Pelsmacker, P. (2022). How and when personalized advertising leads to brand attitude, click, and WOM intention. *Journal of Advertising, 51*(1), 39-56. https://doi.org/10.1080/00913367.2021.1888339

De Keyzer, F., van Noort, G., & Kruikemeier, S. (2022). Going too far? How consumers respond to personalized advertising from different sources. *Journal of Electronic Commerce Research, 23*(3), 138–159.

Dinev, T., & Hart, P. (2006). An extended privacy calculus model for e-commerce transactions. *Information Systems Research, 17*(1), 61-80. https://doi.org/10.1287/isre.1060.0080

Duralia, O., Ogrean, C., Ţichindelean, M., & Ţichindelean, M. (2025). Decoding the personalization-privacy paradox: From thematic scholarly clusters to practical insights. *Studies in Business and Economics, 20*(2), 70-97. https://doi.org/10.2478/sbe-2025-0025

Federal Republic of Nigeria. (2023). *Nigeria data protection act, 2023 (Act No. 37)*. Lagos, Nigeria: Federal Government Printer.

Goutam, D., Gopalakrishna, B. V., & Ganguli, S. (2021). Determinants of customer loyalty dimensions: E-commerce context in emerging economy perspective. *Journal of Electronic Commerce in Organizations, 19*(1), 1-23. https://doi.org/10.4018/JECO.2021010101

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Los Angeles, CA: SAGE.

Jacoby, J. (2002). Stimulus-organism-response reconsidered: An evolutionary step in modeling consumer behavior. *Journal of Consumer Psychology, 12*(1), 51–57. https://doi.org/10.1207/S15327663JCP1201_05

Juanli, L., Lei, H., Yubo, W., Ye, L., Sleiman, K. A. A., & Suliman, M. A. E. (2025). An empirical investigation of E-loyalty formation for online shopping in China. *Acta Psychologica, 258*, 105135. https://doi.org/10.1016/j.actpsy.2025.105135

Ken Research. (2025a). *Nigeria FMCG e-commerce and last mile market*. Gurgaon, India: Ken Research.

Kumar, P., & Usman, M. U. (2024). Analyzing the application of UTAUT2 model in predicting the adoption of electronic shopping in Nigeria. *Indian Journal of Marketing, 54*(3), 61-81. https://doi.org/10.17010/ijom/2024/v54/i3/170942

Kumari, A., & Laheri, V. K. (2025). Understanding consumer behavior through AI-powered recommender systems: A systematic review and bibliometric perspective. *Indian Journal of Marketing, 55*(8), 9-32. https://doi.org/10.17010/ijom/2025/v55/i8/175207

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology* Cambridge, MA: MIT Press.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*, 539-569. https://doi.org/10.1146/annurev-psych-120710-100452

© 2026 Conscientia Beam. All Rights Reserved.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891. https://doi.org/10.3758/BRM.40.3.879

Ribeiro, A., Rivero, A. J. L., & Abrantes, J. L. (2025). The impact of artificial intelligence on consumer behavior towards brands: A systematic review. *Electronic Commerce Research*. https://doi.org/10.1007/s10660-025-10063-7

Saunders, M. N. K., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Harlow, England: Pearson.

Tian, X., Chen, L., & Zhang, X. (2022). The role of privacy fatigue in privacy paradox: A PSM and heterogeneity analysis. *Applied Sciences, 12*(19), 9702. https://doi.org/10.3390/app12199702

Wahab, F. K., & Abdulmajeed, T. I. (2025). The rise of E-commerce and digital marketplaces: Implications for consumer engagement and market efficiency. *Journal of Business & Entrepreneurship, 35*(1), 1-18.

Wang, Y., Zhu, J., Liu, R., & Jiang, Y. (2024). Enhancing recommendation acceptance: Resolving the personalization–privacy paradox in recommender systems: A privacy calculus perspective. *International Journal of Information Management, 76*, 102755. https://doi.org/10.1016/j.ijinfomgt.2024.102755

Yu, H., & Liu, P. (2024). *Research on the influencing factors and behavioral mechanisms of users' willingness to disclose privacy in e-commerce situations: Based on grounded theory*. Paper presented at the 2024 10th International Conference on Humanities and Social Science Research (ICHSSR 2024), Atlantis Press.

Views and opinions expressed in this article are the views and opinions of the author(s), International Journal of Management and Sustainability shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.

© 2026 Conscientia Beam. All Rights Reserved.