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Customization Depth and Customer Engagement of E-Commerce Consumers in Ota, Ogun State

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Abstract

The increasing adoption of artificial intelligence (AI) in e-commerce has intensified the use of personalization strategies, particularly customization depth, to enhance customer experiences. However, existing studies have largely focused on the positive outcomes of personalization, with limited attention to its dual effects, especially perceived intrusiveness, and insufficient evidence from emerging economies such as Nigeria. This study addresses this gap by examining the effect of customization depth on perceived usefulness and perceived intrusiveness, and how these perceptions influence customer engagement among e-commerce consumers in Ota, Ogun State. A quantitative survey design was employed, using structured questionnaires administered to 164 respondents selected through purposive and convenience sampling. Data were analyzed using frequency statistics and linear regression analysis. The findings reveal that customization depth significantly increases both perceived usefulness and perceived intrusiveness. Perceived usefulness strongly enhances customer engagement, whereas perceived intrusiveness has no significant effect on engagement. The study recommends that firms adopt value-driven and customer-centric personalization strategies that prioritize relevance and usability while maintaining transparency. Policymakers should establish data protection regulations to address privacy concerns. The study contributes to theory by extending the S-O-R framework and offers practical insights for businesses, consumers, and regulators in emerging digital markets.

Keywords: Customization Depth, Customer Engagement, E-Commerce Consumers, Ota, Ogun State.

Introduction

In the era of technological advancement, the use of artificial intelligence (AI) to understand and respond to consumer needs and preferences is essential. AI has changed the pattern in which companies and industries interact with its consumers. From mass marketing approaches to highly personalized data-driven methods. The use of personalization has become a vocal strategy by organisations. Organisations now engages in the use of individualized marketing strategies to predict consumer insights, reshaping the dynamics of engagement. Personalization which was once a manual or intuition-based approach is now driven by machine learning algorithms capable of analyzing large volumes of consumer data and behavioural pattern to deliver tailored services, recommendations and promotions that matches individual preferences and needs (Raji et al., 2024). The growing importance of personalization in shaping consumer decision making processes and digital shopping experiences cannot be overemphasized. Wasilewski, Chawla & Pralat (2025) study indicated that two-thirds of consumers prefer purchasing from brands that provide personalized experiences such as touch points, product recommendations, interactive service systems, search results and targeted advertisement.

The use of AI now serves as a key driver to personalization capabilities. One of the dimensions of personalization is customization depth. Customization depth reflects the degree or intensity to which organisations uses digital platforms to provide tailored contents, services, website layouts, advertisement, recommendations and messages based on browsing history, purchase behaviour, preferences and demographic information (Panya, Sa-nga-ngam & Leelasantitham, 2025). In other words, it is how deep or sophisticated personalization becomes and this level of customization, can be perceived to be useful or intrusive. Deeper levels of customization influences the perception of consumers (perceived usefulness or perceived intrusiveness). Perceived usefulness refers to the extent to which a consumer believes that a digital system improves their shopping experience, performance, or efficiency. When consumers view their shopping process as easy, fast and seamless, and little effort is required to search through large number of options, they develop a positive evaluation of the platform. Perceived usefulness also makes consumers feel understood and valued, which encourages more interaction with digital platforms. Therefore, perceived usefulness is often associated with improved engagement, satisfaction and stronger relationship because consumers are more willing to interact with systems that make their task easier and more efficient (Madane & Azeroual, 2025).

While personalization has many benefits, on the other hand, it can create negative reactions when consumers feel that marketing practices invade their privacy. Perceived intrusiveness is therefore the extent to which consumers feel that marketing communications interfere with their personal space or privacy. Consumers appreciate personalized marketing but when it becomes excessive or overly targeted, they feel monitored. When consumers perceive

marketing messages as intrusive, several negative reactions such as loss of trust and irritation arises building negative attitude towards the platform even when the recommendations themselves are accurate (Panya, Sa-nga-ngam & Leelasantitham, 2025; Madane & Azeroual, 2025).

The behavioural outcomes of customization depth are more likely reflected as engagement, satisfaction or dissatisfaction and loyalty. Customer engagement refers to the cognitive, emotional, and behavioural interactions between consumers and brands across digital platforms and it represents one of the most important outcomes of personalization strategies in digital marketing. Etuk, Akpan & Awah (2025) study showed that highly engaged customers are more likely to interact with tailored content, share brand experiences with others, and develop long-term relationships with firms.

AI personalization has become an essential tool for e-commerce platforms seeking to maintain competitive advantage. The two sides of customization depth should be considered when designing tailored recommendations to consumers of E- Commerce platforms. To deliver useful marketing messages that drives engagement, there must be a balance between perceived usefulness and intrusiveness.

The use of AI personalization is dominating the business world and organisations that do not adopt the customization of its marketing messages, recommendations and offerings tends to experience decline and loses its competitive advantage. In adopting personalization, the dual effect of customization depth- enhancing perceived usefulness while simultaneously increasing perceptions of intrusiveness must be considered. Despite the increased adoption of AI personalization in e-commerce platforms, the effect of customization depth on consumer responses have received little attention.

Research on AI personalization tends to focus primarily on the positive outcomes of personalization, such as perceived usefulness, engagement, and satisfaction. However, fewer studies incorporated the negative perceptions such as perceived intrusiveness, which may arise from excessive personalization practices. Additionally, the majority of empirical studies on AI-driven personalization have been conducted in developed economies, including North America, Europe, and East Asia. Limited research has examined these phenomena within emerging digital markets particularly in Africa. Nigeria represents one of the fastest- growing digital economies in Africa, with rapidly expanding internet penetration and increasing adoption of online shopping platforms. Its cultural, technological, and economic contexts may also influence consumer responses to personalization technologies. Therefore, to address these research gaps, the study will examine the effect of customization depth on perceived usefulness and perceived intrusiveness and how these perceptions influence customer engagement among consumers of e-commerce platforms in Ota, Ogun State.

The specific objectives are:

i. To examine the effect of customization depth on perceived usefulness among consumers of e-commerce platforms in Ota, Ogun State.

ii. To examine the effect of customization depth on perceived intrusiveness among consumers of e-commerce platforms in Ota, Ogun State.
iii. To determine the effect of perceived usefulness on customer engagement among consumers of e-commerce platforms in Ota, Ogun State.
iv. To determine the effect of perceived intrusiveness on customer engagement among consumers of e-commerce platforms in Ota, Ogun State.

Customization Depth in AI-Driven E-Commerce

In e-commerce environment, customization depth manifest through the use of digital platforms to provide tailored contents, services, website layouts, advertisement, recommendations and messages based on browsing history, purchase behaviour, preferences and demographic information. AI- powered personalization technologies extend beyond product recommendations to include intelligent chatbots, personalized search results, and dynamic pricing mechanisms that adapts to individual consumer profiles (Ali & Zeebaree, 2025; Panya, Sa-nga-ngam & Leelasantitham, 2025; Raji et al., 2024).

The impact of AI personalisation on consumer behaviour is gaining attention in recent studies. Akisanmi et al., (2025) found that AI-powered personalization significantly enhances customer engagement and conversion rates in Nigerian e-commerce businesses. The study revealed that personalized product recommendations increase consumer interaction with digital platforms and improve the likelihood of purchase decisions.

Similarly, research examining Nigerian online retail platforms indicates that AI-driven personalization improves customer satisfaction by delivering relevant and time-efficient shopping experiences (Etuk, Akpan, & Awah, 2025).

However, Nigerian consumers also express concerns regarding intrusiveness, privacy and data security in AI-driven marketing environment. Akisanmi et al., (2025) noted that over-personalization may lead to consumer fatigue, mistrust, and perceived invasion of privacy. These perceptions may negatively affect customer loyalty and brand trust.

Most studies in AI personalization focus on developed economies while in Nigeria, despite the growing importance, empirical research on customization depth in Nigerian e-commerce platforms remains limited, thus leaving a contextual research gap in emerging digital markets.

Customization Depth and Perceived Usefulness

Perceived usefulness refers to the degree to which consumers believe that a technology improves their performance or enhances the efficiency of their tasks. This concept originated from the Technology Acceptance Model (TAM) and has been widely applied in examining consumer adoption of digital technologies. Perceived usefulness has also been seen as a key cognitive mechanism through which personalization influences consumer behaviour.

Studies shows that strong relationships exists between personalization and perceived usefulness in e-commerce environments. Research on AI-driven personalization in online shopping contexts indicates that personalization improves the efficiency of product search and

simplifies consumer decision making processes. These benefits increase the perceived usefulness of digital platforms and enhance consumer satisfaction with online shopping experiences (Ameen, Tarhini, Reppel, & Anand, 2023; (Teepapal, Suksakulchai & Kittikowit, 2025). However, the effectiveness of customization depth depends on how well personalization algorithms aligns with consumer preferences.

Available studies focus on personalization in general rather than examining the depth or intensity, others that examine the concept of perceived usefulness evaluated it as a predictor of technology adoption and limited studies examined the relationships of both construct in developed economies. Consequently, the following hypothesis was proposed:

Ho_1: There is no significant relationship between customization depth and perceived usefulness among consumers of e-commerce platforms in Ota, Ogun State.

Customization Depth and Perceived Intrusiveness

Perceived intrusiveness refers to the extent to which consumers feel that marketing practices invade their privacy or interfere with their personal space. In e-commerce platforms, perceived intrusiveness may occur when personalized advertisements appear excessively tailored or when consumers believe that firms possess more personal information than they are comfortable sharing (Madane & Azeroual, 2025).

Empirical studies have shown that hyper-personalized advertising can generate discomfort among consumers when the level of personalization exceeds what they perceive as appropriate (Madane & Azeroual, 2025). It also reveals that deeper customization can intensify consumer awareness of data collection practices. When consumers recognize that personalization relies on extensive tracking of their online activities, they may perceive such practices as intrusive or when consumer personal information is being used without sufficient transparency or consent.

In emerging digital markets such as Nigeria, where e-commerce adoption continues to expand rapidly, understanding the relationship between customization depth and perceived intrusiveness is particularly important. Nigerian consumers increasingly interact with AI-driven personalization systems through online platforms, yet their perceptions of privacy and data usage remain underexplored in academic research. Investigating how deeper customization influences perceived intrusiveness can therefore provide valuable insights into consumer responses in developing digital economies. Consequently, the following hypothesis was proposed:

Ho_2: There is no significant relationship between customization depth and perceived intrusiveness among consumers of e-commerce platforms in Ota, Ogun State.

Perceived Usefulness and Customer Engagement

Perceived usefulness plays a crucial role in influencing customer engagement because consumers are more likely to interact with platforms that provide valuable and helpful services. Recent studies emphasize that perceived usefulness significantly influences

customer engagement in e-commerce platforms.it shows that consumers who perceives digital systems as useful are more likely to engage with e-commerce platforms because these system simplify the purchase process and improve decision-making efficiency (Mittameedi, Dogra & Sayal, 2025; Panya, Sa-nga-ngam & Leelasantitham, 2025).

Perceived usefulness also plays an important role in shaping customer satisfaction. According to Wasilewski, Chawla & Pralat (2025), perceived usefulness significantly influences customer satisfaction in digital marketing environments because consumers appreciate systems that simplify complex decision making processes they develop positive evaluations of those platforms. These positive experiences contribute to higher levels of satisfaction and encouraged continued use of the platforms.

Perceived usefulness of e-commerce platforms leads to customer engagement resulting in satisfaction. Engaged consumers are more likely to develop emotional connections with brands and derive greater value from their interactions with digital platforms. Engagement activities such as exploring personalized recommendations, interacting with digital contents, and participating in brand communities enhance the overall customer experience. Thus, the hypothesis:

Ho_3: There is no significant relationship between perceived usefulness and customer engagement of consumers of e-commerce platforms in Ota, Ogun State.

Perceived Intrusiveness and Customer Engagement

The use of personalized services can improve satisfaction by delivering relevant experiences, perceived intrusiveness may undermine this positive effect. When consumers perceive marketing practices as intrusive, they may develop negative attitudes towards digital platforms. Intrusive marketing practices can generate feelings of discomfort, distrust, and loss of control over personal information. These negative emotional responses may reduce satisfaction with digital services. Therefore, perceived intrusiveness is most likely to negatively influence customer engagement. Thus, the hypothesis:

Ho_4: There is no significant relationship between perceived intrusiveness and customer engagement of consumers of e-commerce platforms in Ota, Ogun State.

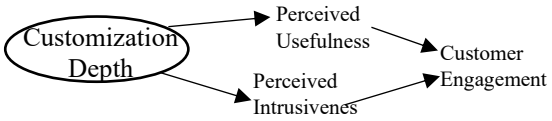


Figure 2.1 Conceptual Diagram Showing the Relationship between the Constructs

Theoretical Review

This study integrates two major theories: the Stimulus-Organism-Response (S-O-R) Theory and the Technology Acceptance Model (TAM) to explain how external digital marketing stimuli influence consumers' internal evaluations and behavioural outcomes in technology mediated environment.

Stimulus-Organism-Response (S-O-R) Theory

The Stimulus-Organism-Response (S-O-R) theory was originally developed by Mehrabian & Russell, (1974) in environmental psychology. The theory posits that environmental stimuli trigger internal psychological states within individuals, which subsequently influence their behavioural responses. Stimulus (S) = external environmental factors that influence individuals; Organism (O) = the internal psychological or emotional states that arises from exposure to these stimuli; and Response (R) = the behavioural reactions that result from these internal states.

Stimulus = customization depth

Organism = perceived usefulness; and perceived intrusiveness

Response = customer engagement; and customer satisfaction

Customization depth represents the external marketing stimuli that influences consumers' psychological evaluations (usefulness and intrusiveness) which subsequently affects behavioural responses.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed by Davis (1989) to explain how individuals adopt and use new technologies. The model proposes that two key factors determine users' acceptance of technology:

Perceived Usefulness = the degree to which individuals believe that using a technology improves their performance or tasks efficiency.

Perceived Ease of Use = the extent to which individuals believe that using a technology requires minimal effort.

In the study, TAM was used as a supporting theory for perceived usefulness. Perceived usefulness represents the cognitive evaluation through which consumers assess the benefits of personalization technologies.

Research Design

The survey research design was utilized for the study since it assist researchers to collect standardized responses from a large number of respondents and analyze relationships among variables.

Population of the Study

The population of interest consists of consumers of e-commerce platforms in Ota, who have used e-commerce platforms within the last six months. Ota was selected because it is a major commercial urban center in Ogun State with high levels of internet penetration and significant adoption of digital platforms. This location also host a large population of technology-savvy consumers who frequently engage in online shopping activities.

Sample Size

In determining the sample size since the population is infinite that is e-commerce users in Ota and Lagos cannot be precisely determined, the Cochran (1977) formula was used.

The sample size for this study was determined using Cochran's formula for large populations. A 95% confidence level (Z = 1.96), a proportion estimate of 0.5, and a margin of error of 0.08. The choice of a relatively higher error margin (8%) was informed by constraints such as limited time and restricted access to respondents in the e-commerce environment. This approach is consistent with quantitative research practices where moderate precision is acceptable, particularly in behavioural and perception-based studies.

$$n = \frac{Z^2pq}{e^2}$$

where:

n= required sample size;

Z = value corresponding to confidence level (1.96 for 95%);

p = estimated proportion with the attribute (0.5);

q = 1-p; and

e = margin of error (0.08)

therefore,

$$n = \frac{(1.96)^2(0.5)\ (0.5)}{(0.08)^2}$$

n = 150.06 thus, a minimum of 150 respondents was sampled.

Sampling Technique

The study employed the purposive and convenience sampling. Purposive sampling was used to ensure that respondents met the specific criteria required for the study: only individuals who resides in Ota and had used e-commerce platforms within the last six months. Convenience sampling was used to select participants who were readily accessible within the study locations: Universities and social media groups.

Instrumentation

Data for the study were collected using a structured questionnaire designed to measure the constructs of interest and it consisted of two sections: Section A, the demographic data of the respondents and Section B, measurement of study variables (customization depth, perceived usefulness, perceived intrusiveness and customer engagement) on a five point Likert scale (using google forms and paper-based).

The study utilized the frequency distribution statistics and linear regression analysis to show the relationship each independent variable has on the dependent variable.

All measurement items were adapted from previously validated scales in existing literatures and modified to suit the context of e-commerce personalization.

A pilot study was conducted to test the clarity, reliability and validity of the scale before administering the main questionnaire. Following the recommendation of a 10% of the sample size, 15 respondents in Abeokuta who had used e-commerce platforms within the last six months took part in the pilot study.

The data collected from the pilot study were analyzed using SPSS to assess the reliability of the measurement scales through Cronbach's alpha and the result as presented below: customization depth 0.812, perceived usefulness 0.758, perceived intrusiveness 0.913, customer engagement 0.649. The items for customer engagement were reworded for ease of understanding.

Table 1 Frequency Distribution showing the Demographic Data of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	58	35.4
	Female	106	64.6
Age	18–25	51	31.1
	26–35	93	56.7
	36–45	15	9.1
	46–55	5	3.0
Education	SSCE	4	2.4
	BSc	116	70.7
	Others	44	26.8
Employment Status	Student	23	14.0
	Employed	105	64.0
	Self-employed	26	15.9
	Unemployed	10	6.1
Rate of Use	Very Frequently	14	8.5
	Frequently	58	35.4
	Occasionally	73	44.5
	Rarely	15	9.1
	Others	4	2.4

From table 1, a total of 164 valid responses were analyzed, with no missing data, indicating a complete dataset suitable for inferential analysis. The sample is dominated by female respondents (64.6%), while males account for 35.4%. In terms of age distribution, the majority of respondents fall within the 26–35 age group (56.7%), followed by 18–25 (31.1%), suggesting a predominantly young and digitally active population.

Educationally, most respondents possess a bachelor's degree (70.7%), reflecting a relatively educated sample capable of interacting with advanced digital systems. Employment status

shows that 64% are employed, indicating purchasing power and practical exposure to e-commerce platforms. Usage patterns reveal that 44.5% of respondents use e-commerce platforms occasionally, while 35.4% use them frequently, confirming familiarity with digital retail environments.

These characteristics suggest that the sample is appropriate for examining AI-driven personalization, as respondents are both technologically aware and actively engaged in online consumption.

Table 2 Summary of Regression Results

Hypothesis Path	β (Beta)	t-value	Sig.	R^2	Decision
CD and PU	0.667	11.386	0.000	0.445	Supported
CD on PI	0.343	4.652	0.000	0.118	Supported
PU on CE	0.630	10.292	0.000	0.400	Supported
PI on CE	-0.120	-1.958	0.052	0.400	Not Supported

Effect of Customization Depth on Perceived Usefulness

The regression analysis reveals that customization depth has a strong and statistically significant positive effect on perceived usefulness ($\beta = 0.667$, $t = 11.386$, $p < 0.001$). The model explains 44.5% of the variance in perceived usefulness ($R^2 = 0.445$), indicating substantial explanatory power.

This finding demonstrates that deeper levels of AI-driven customization enhance users' perception of system utility. In line with the Technology Acceptance Model (TAM), perceived usefulness emerges as a critical determinant of user evaluation of digital systems. Within the Stimulus–Organism–Response (S-O-R) framework, customization depth acts as a stimulus that positively influences internal cognitive evaluation (perceived usefulness).

The result is consistent with recent empirical studies. Bhojwani et al. (2025) found that AI-enabled personalization significantly enhances perceived usefulness by improving relevance and user experience. Similarly, Park et al. (2022) demonstrated that personalized recommendation systems increase users' perception of utility and facilitate decision-making efficiency in digital environments. Furthermore, Teepapal (2024) reported that personalization positively influences perceived usefulness, which subsequently drives user engagement.

These findings collectively reinforce the argument that **the effectiveness of AI-driven systems is largely determined by their ability to deliver meaningful and useful personalized experiences**, thereby improving user satisfaction and decision efficiency in e-commerce platforms.

Effect of Customization Depth on Perceived Intrusiveness

Customization depth also exhibits a significant positive effect on perceived intrusiveness ($\beta = 0.343$, $t = 4.652$, $p < 0.001$), although the explanatory power of the model is relatively weak ($R^2 = 0.118$).

This suggests that while increased personalization enhances user experience, it simultaneously raises concerns related to privacy and perceived overreach. This dual effect supports the notion of the **personalization–privacy paradox,** where users benefit from tailored services but remain cautious about how their personal data is collected and utilized.

This finding is consistent with prior studies: **Bhojwani et al. (2025)** found that increased personalization depth significantly enhances perceived usefulness while also elevating perceived intrusiveness, reinforcing the existence of the personalization–privacy paradox in AI-powered systems. Similarly, **Teepapal (2024)** reported that personalization influences user perceptions through both positive (usefulness) and negative (intrusiveness) cognitive pathways, although the negative effects are often weaker. Huang & Rust (2021) found that AI-enabled personalization enhances customer experience but may lead to discomfort when users perceive excessive data usage. **Verhoef et al. (2021)** emphasized that while digital personalization improves customer journeys, it can also create tension due to privacy concerns.

However, the relatively low R^2 indicates that customization depth explains only a small portion of intrusiveness perceptions, implying that other factors such as trust, transparency, and data governance may play a more dominant role.

Effects of Perceived Usefulness on Customer Engagement

The results indicate that perceived usefulness has a strong and statistically significant positive effect on customer engagement ($\beta = 0.630$, $t = 10.292$, $p < 0.001$). The model explains 40.0% of the variance in customer engagement ($R^2 = 0.400$). These findings highlight that customer engagement is primarily driven by **perceived value rather than privacy concerns**.

This result is consistent with prior empirical studies. For instance, Bhojwani et al**. (2025)** reported that perceived usefulness is a key driver of behavioural engagement in AI-enabled platforms, outweighing potential privacy concerns. Similarly, Park et al**. (2022)** found that users are more likely to engage with digital platforms when personalized systems enhance decision efficiency and functional value.

Effects of Perceived Intrusiveness on Customer Engagement

The results indicate that perceived intrusiveness has a negative and statistically insignificant effect ($\beta = -0.120$, $t = -1.958$, $p = 0.052$). The model explains 40.0% of the variance in customer engagement ($R^2 = 0.400$). Although perceived intrusiveness showed a negative relationship, its lack of statistical significance suggests that users may tolerate certain levels of intrusion when the system delivers meaningful and relevant benefits. Teepapal **(2024) study** showed that perceived usefulness significantly influences engagement, while negative perceptions such as intrusiveness exert limited or indirect effects.

The findings also reinforce the **Stimulus–Organism–Response (S-O-R) framework,** where cognitive evaluations (perceived usefulness) act as dominant internal states that drive behavioural responses (customer engagement). In contrast, negative perceptions such as

intrusiveness may not necessarily translate into reduced engagement, particularly when the perceived benefits of personalization are high.

Theoretical and Practical Implications

This study extends the S-O-R framework by empirically demonstrating that not all organism variables exert equal influence on behavioural responses. Specifically, perceived usefulness acts as a dominant mediator, while perceived intrusiveness plays a limited role. This refines existing models by highlighting the primacy of value-based cognition in digital interactions.

For e-commerce operators, the findings suggest that firms should prioritize enhancing the functional value of AI systems and investments in personalization should focus on accuracy and relevance. Thus, organizations should balance personalization with transparency but focus primarily on delivering meaningful user benefits.

Further Research

First, the study adopted a cross-sectional survey design, which limits the ability to establish causal relationships among the variables. Future studies should employ longitudinal designs to examine how consumer perceptions of customization depth, usefulness, and intrusiveness evolve over time, particularly as users become more familiar with AI-driven systems.

Secondly, the findings revealed that perceived intrusiveness does not significantly influence engagement, suggesting the presence of potential mediating or moderating variables. Future research should explore mediating mechanisms such as trust and perceived value, as well as moderating variables such as digital literacy, and personality traits to better understand this relationship.

Conclusion

This study examined the effect of customization depth on customer engagement and satisfaction within the context of e-commerce consumers in Ota, Ogun State, integrating the Stimulus–Organism–Response (S-O-R) theory and the Technology Acceptance Model (TAM). The findings provide strong empirical evidence that AI-driven customization depth plays a critical role in shaping consumer perceptions and behavioural outcomes.

The results revealed that customization depth significantly enhances perceived usefulness, confirming that deeper levels of personalization improves the efficiency, relevance, and overall utility of digital platforms. At the same time, customization depth also increases perceived intrusiveness, highlighting the dual nature of personalization strategies. This supports the personalization–privacy paradox, where consumers simultaneously value personalization benefits while expressing concerns about privacy and data usage.

From the study, perceived usefulness emerged as the most influential determinant of customer engagement, indicating that consumers prioritize functional value and convenience over privacy concerns. In contrast, perceived intrusiveness does not significantly affect

engagement, suggesting that users may tolerate certain levels of perceived intrusion when personalization delivers clear benefits.

Theoretically, this study extends the S-O-R framework by demonstrating that perceived usefulness acts as a dominant mediating variable, while perceived intrusiveness has a limited effect on behavioural outcomes. It also contributes to the literature by incorporating cultural influence as a boundary condition in personalization research.

From a practical perspective, e-commerce firms should prioritize enhancing the usefulness and relevance of personalized systems while ensuring transparency and user control to mitigate privacy concerns. Policymakers should develop and enforce robust data protection and privacy regulations to safeguard consumer interests in the increasingly data-driven environment.

Finally, while AI-driven customization depth is a powerful tool for enhancing engagement and satisfaction, its effectiveness depends on balancing personalization benefits with ethical considerations and cultural sensitivity.

References

Akisanmi, T., Adeyemi, O., & Bello, R. (2025). AI-powered personalization and consumer engagement in Nigerian e-commerce. *African Journal of Economic and Management Studies*, 16(2), 210–225.

Ali, O., & Zeebaree, S. (2025). AI personalization technologies in digital commerce systems. *International Journal of Advanced Computer Science and Applications*, 16(1), 55–63.

Ameen, N., Tarhini, A., Reppel, A., & Anand, A. (2023). Customer experiences in the age of artificial intelligence. *Computers in Human Behavior*, 114, 106548. https://doi.org/10.1016/j.chb.2020.106548

Bhojwani, R., Sharma, A., & Gupta, S. (2025). AI-enabled personalization and customer engagement in digital commerce. *Journal of Retailing and Consumer Services*, 78, 103456.

Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). New York, NY: John Wiley & Sons.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. https://doi.org/10.2307/249008

Etuk, E., Akpan, I., & Awah, F. (2025). AI personalization and customer engagement in emerging markets. *Journal of Business Research*, 175, 114890.

Huang, M.-H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, 49(1), 30–50. https://doi.org/10.1007/s11747-020-00749-9

Jain, V. (2025). Cross-cultural perspectives on AI-driven personalization. *International Journal of Information Management*, 72, 102456.

Li, X., Zhang, Y., & Wang, Z. (2025). Cultural values and AI personalization acceptance. *Information & Management*, 62(3), 103789.

Madane, S., & Azeroual, O. (2025). Perceived intrusiveness and consumer responses in AI-driven marketing. *Information Systems Frontiers*, 27(2), 345–360.

Madlenak, R., Madlenakova, L., & Kolarovszki, P. (2025). Cultural factors in digital marketing and AI personalization. *Sustainability*, 17(4), 2100.

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

Mittameedi, R., Dogra, N., & Sayal, R. (2025). Perceived usefulness and engagement in AI-enabled digital systems. *Technological Forecasting and Social Change*, 198, 123456.

Onibokun, A. (2023). Customer satisfaction in digital service environments. *Nigerian Journal of Marketing*, 8(2), 112–125.

Panya, N., Sa-nga-ngam, C., & Leelasantitham, A. (2025). Customization depth and consumer perception in AI-driven platforms. *Journal of Retailing and Consumer Services*, 79, 103512.

Park, B., Kim, J., & Lee, H. (2022). AI-based recommendation systems and behavioral engagement. *Computers in Human Behavior*, 128, 107123. https://doi.org/10.1016/j.chb.2021.107123

Raji, I., Olodo, O., Oke, A., Addy, T., Ofodile, C., & Oyewole, A. (2024). AI-driven personalization and consumer behavior in Nigerian e-commerce. *Nigerian Journal of Business and Technology*, 10(1), 45–60.

Teepapal, T. (2024). AI personalization and customer engagement: A stimulus–organism–response perspective. *Journal of Business Research*, 172, 114456.

Teepapal, T., Suksakulchai, S., & Kittikowit, S. (2025). AI personalization, perceived usefulness, and engagement in digital platforms. *Journal of Interactive Marketing*, 65, 102345.

Verhoef, P. C., Kooge, E., & Walk, N. (2021). Creating value with data analytics and artificial intelligence. *Journal of Retailing*, 97(1), 1–15. https://doi.org/10.1016/j.jretai.2020.10.005

Wasilewski, M., Chawla, N., & Pralat, K. (2025). AI-driven personalization and consumer decision efficiency in e-commerce. *Electronic Commerce Research and Applications*, 62, 101245.