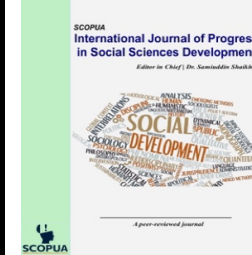


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AI-Powered Personalization, Customer Engagement, and Purchase Intention Under the Shadow of the Privacy Paradox: A Moderated-Mediation Study of E-Commerce Consumers in a Developing Economy

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ABSTRACT

Artificial intelligence (AI) has metamorphosed e-commerce by enabling highly personalized shopping experiences through data-driven recommendations, targeted advertisements, and predictive content delivery. Regardless of the widespread adoption of AI-powered personalization, the assumption that greater personalization automatically leads to stronger purchasing outcomes remains insufficiently examined. This study develops and proposes a moderated-mediation framework to investigate the relationship between AI-powered personalization and purchase intention. Drawing on the Stimulus–Organism–Response (S-O-R) framework and Privacy Calculus Theory, the study conceptualizes AI-powered personalization as the stimulus, customer engagement as the organismic state, and purchase intention as the behavioral response. Furthermore, privacy concern is introduced as a moderating variable that influences how consumers interpret personalized experiences, determining whether personalization is perceived as beneficial and relevant or intrusive and privacy-threatening. This research is situated within the context of e-commerce consumers in a South Asian developing economy, where empirical evidence on integrated moderated-mediation models remains limited. By combining personalization, engagement, and privacy perspectives within a single framework, the study contributes to both theory and practice, offering valuable insights for digital marketers seeking to balance personalization effectiveness.

Keywords: Artificial Intelligence; AI-Powered Personalization; Customer Engagement; Purchase Intention; Privacy Concern; Privacy Paradox; E-Commerce; Consumer Behavior

1. Introduction

Artificial intelligence has moved from the back office of marketing to the centre of the consumer's screen. Recommendation engines, predictive search, dynamically curated feeds, and algorithmically targeted advertising now shape what most online shoppers see before they have consciously formed a need. Raji, Olodo, Oke, Addy, Ofodile, and Oyewole (2024) explained that this capability broadly termed AI-powered personalization relies on machine learning and large-scale behavioural data to tailor content, recommendations, and offers in real time, and they argued that it has become one of the defining forces reshaping contemporary consumer behaviour. Huang and Rust (2021) similarly observed that AI is no longer a peripheral analytics tool but a strategic capability that increasingly mediates the firm's entire relationship with the customer. The commercial logic behind this investment rests on relevance. Acharya, Sassenberg, and Soar (2022) demonstrated that when AI-driven recommender systems deliver content consumers perceive as relevant and absorbing, users develop a stronger intention to continue using the system.

Abdullah, Ibrahim, Bahtar, and Khan (2024) extended this reasoning to purchasing, reporting that AI tools and personalized marketing positively shaped consumer purchase intention in an e-commerce setting. Importantly, however, personalization is not assumed to act on purchase intention directly so much as through the psychological state it provokes. Lim and Rasul (2022) argued that customer engagement the cognitive, emotional, and behavioural investment a consumer makes in a brand or platform is the pivotal mechanism through which contemporary marketing stimuli translate into behavioural outcomes.



This mediating role of engagement is the central mechanism examined in the present study. Yet the very data-intensity that produces relevance can also produce unease. Chan-Olmsted, Chen, and Kim (2024) found that as personalization becomes "smarter," consumers become acutely aware of how much personal information is being collected and inferred, and that this awareness sets up a delicate balance between the benefits of personalization and the costs to privacy. Boerman, Kruikemeier, and Zuiderveen Borgesius (2021) showed that such awareness translates into active privacy-protective behaviour rather than passive acceptance.

The result is the well-documented personalization–privacy paradox: consumers simultaneously value relevant experiences and fear the misuse of the data that makes them possible. Tran, Sen, and Van Steenburg (2023) argued that personalized social-media advertising can strengthen the consumer–brand relationship, but only when it does not cross the line into perceived intrusiveness. Privacy concern, then, is not background noise in this model; it is a theoretically motivated condition that may switch the effect of personalization from positive to negative. This study situates the model in the e-commerce market of a developing South-Asian economy. Qalati, Ostic, Sulaiman, Gopang, and Khan (2022) demonstrated that in developing countries the adoption and impact of digital and social-media platforms follow distinctive technological, organizational, and environmental dynamics that cannot be assumed to mirror those of advanced economies. The context matters for two reasons.

First, smartphone-led commerce in such markets has exposed large and comparatively young consumer bases to AI personalization with relatively little prior regulatory or cultural conditioning around data protection. Second, most existing evidence on AI personalization and engagement is drawn from Western or high-income East-Asian samples (Abdullah et al., 2024; Kulikovskaja, Hubert, Grunert, & Zhao, 2023), and there is no theoretical guarantee that mechanisms validated there transfer to a developing-economy setting with different privacy norms and trust baselines. Examining the model here therefore offers both a replication test and a genuinely new contextual contribution.

1.1 Problem Statement

Firms in emerging digital markets are investing heavily in AI personalization on the assumption that more tailoring reliably produces more engagement and, ultimately, more sales. Three problems undermine that assumption. First, the relationship between AI personalization and purchase intention is frequently treated as direct, while the mechanism whether customer engagement actually carries the effect is more often asserted than formally tested; Hakro, Shah, Ahmed, and Hussain (2023) noted that engagement is widely invoked as a mediator yet still requires rigorous empirical confirmation across contexts. Second, the personalization–privacy paradox implies that the personalization-to-engagement link is conditional, yet, as Chan-Olmsted et al. (2024) observed, much research still models personalization as a uniformly positive driver and overlooks the consumers for whom it backfires. Third, the limited work that integrates engagement and privacy concern is concentrated in developed and East-Asian markets, leaving managers in South-Asian developing economies acting on findings of unverified external validity.

The practical risk is concrete: a firm that maximises personalization without accounting for privacy concern may erode the very engagement it is trying to build, wasting marketing investment and damaging trust. This study addresses these problems by testing whether customer engagement mediates the effect of AI-powered personalization on purchase intention, and whether privacy concern moderates that mediated pathway. Synthesising the recent literature reveals a specific and addressable gap at the intersection of four research streams. On the mechanism side, studies establish that AI personalization influences purchase outcomes (Abdullah et al., 2024; Raji et al., 2024) and, separately, that engagement drives purchase intention (Hakro et al., 2023; Onofrei, Filieri, & Kennedy, 2022), yet few formally test customer engagement as the mediating mechanism linking the two within a single model.

On the boundary-condition side, privacy concern is repeatedly identified as critical (Boerman et al., 2021; Chan-Olmsted et al., 2024), but it is usually studied as a direct predictor or outcome rather than as a moderator of the personalization–engagement path, which is precisely where the privacy paradox locates it. The mediation and moderation streams, moreover, rarely appear together; integrated moderated-mediation tests of AI personalization remain scarce. Finally, almost none of this integrated work has been conducted in a South-Asian developing-economy e-commerce setting. The present study closes the gap by building and proposing an empirical test of a single first-stage moderated-mediation model in an under-researched context.

1.2 Research Question

1. Does AI-powered personalization significantly influence consumers' purchase intention?
2. Does customer engagement mediate the relation among AI-powered personalization and purchase intention?
3. Does privacy concern moderate the effect of AI-powered personalization on customer engagement?
4. Is the indirect effect of AI-powered personalization on purchase intention, operating through customer engagement, conditional on the level of privacy concern?

1.3 Research Objectives

1. The study aims to examine the direct effect of AI-powered personalization on purchase intention.
2. To assess the mediating role of customer engagement between personalization and purchase intention.



3. To test the moderating role of privacy concern on the personalization–engagement relationship.
4. To estimate the conditional indirect effect of personalization on purchase intention across levels of privacy concern.

Theoretically, the study extends the stimulus–organism–response framework into the AI-personalization domain by treating personalization as a stimulus, engagement as the organismic state, and purchase intention as the response, while integrating privacy-calculus reasoning to explain when the stimulus–organism link holds. Practically, it offers digital marketers in emerging markets a more honest decision rule than "more personalization is always better," identifying the high-privacy-concern segment for whom aggressive personalization is counter-productive and allowing firms to calibrate rather than maximise. Contextually, it provides one of the first integrated tests of this model in a South-Asian developing economy.

2. Literature Review and Hypotheses Development

This research rests on two complementary theoretical lenses. The first is the stimulus–organism–response (S-O-R) framework, which holds that environmental stimuli act upon an internal organismic state, which in turn generates a behavioural response. Kıymalıoğlu, Yetkin Özbük, Aydın Ünal, Dirlik, and Akar (2024) explained that the framework's enduring appeal in marketing lies in its capacity to accommodate a mediating internal state by design, making it well suited to studies that seek to explain how an external marketing input is converted into a behavioural outcome rather than merely whether it is. Within this logic, AI-powered personalization is the external stimulus encountered in the digital environment, customer engagement is the organismic state combining cognitive attention and emotional involvement, and purchase intention is the response. The second lens is privacy-calculus reasoning and the associated personalization–privacy paradox. Chan-Olmsted et al. (2024) articulated this as a balance in which consumers weigh the perceived benefits of being tracked relevance and convenience against the perceived costs of lost control and potential misuse.

The paradox predicts that the same cues that signal relevance can simultaneously activate concern, so that when concern is high the cost side of the calculus dominates and personalization is reinterpreted as intrusion. This reasoning positions privacy concern as a moderator that governs whether the stimulus successfully produces the organismic state. Acharya et al. (2022) showed that this capability produces higher perceived relevance and cognitive absorption, which in turn drive continued use of recommender systems. Huang and Rust (2021) framed the construct strategically, arguing that AI's marketing value derives from its ability to deliver feeling and thinking tasks at scale, while cautioning that effectiveness is contingent rather than automatic. Abdullah et al. (2024) provided direct evidence linking AI personalization to purchase intention in e-commerce, establishing the construct as a credible antecedent in the present model.

Lim and Rasul (2022) characterised customer engagement as a multidimensional psychological state cognitive, emotional, and behavioural that arises from interactive experiences with a brand or platform, and they positioned it as a central explanatory construct for the digital era. Blut, Kulikovskaja, Hubert, Brock, and Grewal (2023), in a meta-analysis, found that engagement initiatives produce consistent positive effects on customer outcomes across platforms, reinforcing engagement's status as a proximal driver of behaviour. In digital and social-commerce contexts specifically, Onofrei et al. (2022) demonstrated that engagement mediates the effect of social-media stimuli on purchase intention, and Kulikovskaja et al. (2023) showed that social-media-based engagement drives downstream marketing outcomes. These findings support the modelling of engagement here as the mechanism through which personalization operates. Purchase intention the consumer's conscious willingness or plan to buy is the dominant outcome variable in digital-marketing effectiveness research.

Chatterjee, Rana, Jain, and Dwivedi (2022) established it as a robust proximal predictor of buying behaviour in their study of social-media brand engagement among millennials, and Chowdhury, Basu, Ashoka, and Singh (2024) confirmed that AI-driven digital marketing exerts a measurable influence on purchase intention. The construct is therefore adopted as the terminal response in the present S-O-R chain. Chan-Olmsted et al. (2024) described privacy concern as the consumer's perception about the collection, control, and potential misuse of personal data by digital platforms, and they emphasised that AI's inferential power heightens this concern because consumers recognise that sensitive attributes can be derived without explicit disclosure. Zhang, Wang, Karahanna, and Xu (2022) advanced the construct conceptually and in measurement, showing that privacy concern extends beyond one's own data to concern about how platforms handle information more broadly. Putri, Prasetya, and Handayani (2024) found that, among Generation Z consumers, trust and privacy considerations directly shaped purchasing behaviour on a major social-commerce platform, and Alkış and Köse (2022) reported across a large European sample that individuals with greater privacy concerns were less willing to participate in e-commerce.

Consistent with the privacy paradox, concern is theorised here to attenuate the benefits of personalization. Drawing these strands together, the study advances six hypotheses. The first concerns the direct effect. Because personalization increases perceived relevance and reduces search effort, it should make offerings more attractive and decisions easier, raising willingness to buy; Abdullah et al. (2024) and Raji et al. (2024) reported positive associations of this kind.

H1 *proposes that AI-powered personalization has a significant positive effect on purchase intention.*



The second hypothesis addresses the stimulus–organism link. Within S-O-R logic, personalization is the stimulus that captures attention and invites interaction, fostering engagement; Kulikovskaja et al. (2023) and Lim and Rasul (2022) showed that personalized and interactive content elevates engagement. Accordingly,

H2 proposes that AI-powered personalization has a significant positive effect on customer engagement.

The third hypothesis concerns the organism–response link. Engaged consumers allocate more attention and emotional investment to the brand, strengthening preference and willingness to buy; Blut et al. (2023), Hakro et al. (2023), and Onofrei et al. (2022) all supported the engagement-to-intention path. Hence,

H3 proposes that customer engagement has a significant positive effect on purchase intention.

Combining H2 and H3 yields the mediation prediction. Personalization is expected to influence purchase intention indirectly by first generating engagement, the organismic state that converts a relevant stimulus into a behavioural response; Onofrei et al. (2022) and Hakro et al. (2023) provided empirical precedent for engagement as a mediator of marketing stimuli.

H4 proposes that customer engagement mediates the relationship between AI-powered personalization and purchase intention.

The fifth hypothesis introduces the boundary condition. Under the privacy paradox described by Chan-Olmsted et al. (2024) and supported by Boerman et al. (2021), the personalization–engagement link is conditional: when privacy concern is low, relevance cues dominate and engagement rises, but when concern is high the same cues activate perceptions of intrusion and the effect weakens. Thus,

H5 proposes that privacy concern negatively moderates the relation among AI-powered personalization and customer engagement, at higher levels of privacy concern the effect is weaker.

Finally, integrating the mediation of H4 with the first-stage moderation of H5 produces a moderated-mediation prediction. The indirect effect of personalization on purchase intention through engagement is itself expected to be conditional on privacy concern, becoming weaker as concern increases.

H6 proposes that privacy concern moderates the indirect effect of AI-powered personalization on purchase intention through customer engagement, such that the indirect effect is weaker at higher levels of privacy concern.

The conceptual framework can be expressed verbally as follows. AI-powered personalization (the independent variable) influences customer engagement (the mediator) along the a-path, and customer engagement influences purchase intention (the dependent variable) along the b-path; the product of these two paths constitutes the indirect, mediated effect. Privacy concern (the moderator) acts upon the a-path, conditioning the strength of the personalization-to-engagement relationship. A direct path also runs from personalization to purchase intention. This arrangement a moderator on the first stage of a simple mediation corresponds to Hayes PROCESS Model 7. Conceptual Model of the study is given in the following Figure 1.

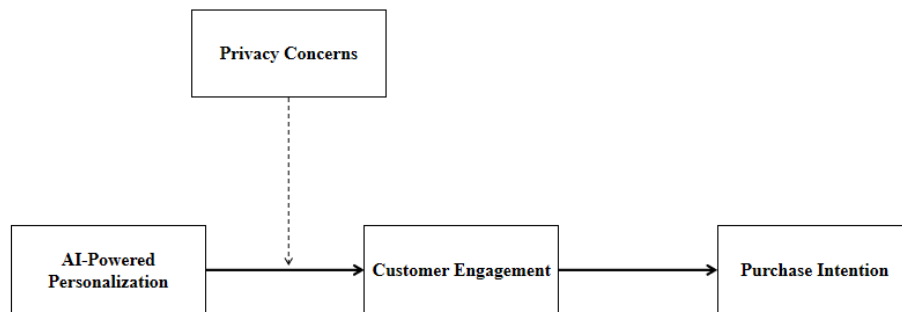


Figure 1: Conceptual Model

3. Research Methodology

The study adopts a positivist philosophy, which is appropriate for testing pre-specified, theory-derived hypotheses through measurable constructs. It follows a deductive approach, moving from established theory through hypotheses to empirical test, and employs a quantitative method, since the objective is to quantify relationships and a conditional indirect effect rather than to explore meanings. Hair, Hult, Ringle, and Sarstedt (2022) noted that such regression- and variance-based quantitative designs are well suited to examining mediation and moderation within complex consumer-behaviour models. A cross-sectional, survey-based, explanatory design is used. Cross-sectional data are suited to testing associations and conditional effects within a single time frame, which aligns with the resources available and with established practice in this literature; both Hakro et al. (2023) and Onofrei et al. (2022) tested engagement-based mediation models using cross-sectional survey data. The explanatory orientation reflects the study's goal of explaining how (mediation) and when (moderation) personalization affects purchase intention.

The target population comprises adult online shoppers in the chosen developing-economy market who have encountered AI-driven personalized recommendations or advertising on e-commerce or social-commerce platforms within the preceding six months. Because a complete sampling frame for this population is unavailable, the study uses non-probability purposive



sampling — to ensure that respondents have relevant exposure supplemented by convenience access, consistent with comparable digital-consumer studies (Hakro et al., 2023; Putri et al., 2024). For sample size, Hair et al. (2022) recommended both an a-priori power analysis and a margin above the minimum for stability. Using G*Power for a multiple-regression model with up to four predictors at a medium effect size, an alpha of 0.05, and power of 0.95 yields to support bootstrapped moderated mediation and improve estimate stability, a target of 300 to 400 valid responses is adopted.

Data are collected through a structured questionnaire in two sections: demographic and screening items, and construct items measured on a five-point Likert scale ranging from strongly disagree to strongly agree. All multi-item scales are adapted from validated recent studies to preserve content validity. AI-powered personalization is measured with items adapted from Acharya et al. (2022) and Raji et al. (2024); customer engagement with items reflecting the cognitive, emotional, and behavioural dimensions described by Lim and Rasul (2022); purchase intention with items adapted from Chatterjee et al. (2022) and Onofrei et al. (2022); and privacy concern with items adapted from Zhang et al. (2022) and Chan-Olmsted et al. (2024). A pilot study of approximately thirty to fifty respondents is conducted to verify item clarity and internal consistency before full deployment.

Self-administered questionnaires are distributed online and shared through e-commerce and social-commerce communities. A screening question confirms recent exposure to AI personalization, and non-qualifying respondents are excluded. Participation is voluntary and anonymous, and informed consent is obtained on the opening page. The study guarantees informed consent, voluntary participation, anonymity, confidentiality of responses, and the right to withdraw at any time. No personally identifying data are collected, and all data are used solely for academic purposes. Analysis is conducted in SPSS, with the PROCESS macro used for the conditional indirect effect. The sequence begins with data screening for missing values, outliers, and normality, followed by a common-method-bias check. Reliability is assessed through Cronbach's alpha, and validity through convergent and discriminant criteria, in line with the thresholds recommended by Hair et al. (2022). Descriptive statistics and a correlation matrix are then computed. Hypotheses are tested using Hayes PROCESS Model 7 with 5,000 bootstrap samples and 95% bias-corrected confidence intervals, which Hayes (2022) established as the standard regression-based approach for conditional process analysis, including the index of moderated mediation that formally tests H6.

4. Findings and Results

Data were collected from 310 respondents who had experience with online shopping and exposure to personalized recommendations on e-commerce platforms. The analysis includes demographic characteristics, descriptive statistics, reliability assessment, correlation analysis, and interpretation of data distribution through histograms. The study included 310 respondents. Table 1 presents the demographic characteristics of the participants.

Table 1: Demographic Characteristics of Respondents (N = 310)

Variable	Category	Frequency	Percentage (%)
Gender	Male	167	53.9
	Female	143	46.1
Age Group	18–25 Years	73	23.5
	26–35 Years	78	25.2
	36–45 Years	78	25.2
	46 Years and Above	81	26.1
Education	Intermediate	78	25.2
	Bachelor's	73	23.5
	Master's	68	21.9
	PhD	91	29.4
Income	Less than 50K	82	26.5
	50K–100K	82	26.5
	100K–150K	72	23.2
	Above 150K	74	23.9

The demographic results indicate a balanced representation of respondents across gender, age, education, and income categories. Male respondents constituted 53.9% of the sample, while females represented 46.1%. The age distribution was relatively even, with respondents aged 46 years and above accounting for the largest proportion (26.1%). Regarding educational qualification, PhD holders formed the largest group (29.4%), followed by Intermediate and Bachelor's degree holders. The income distribution was also balanced, suggesting that the sample adequately represents diverse online consumers. Descriptive statistics were calculated to evaluate respondents' perceptions regarding AI-powered personalization, customer engagement, privacy concern, and purchase intention (Table 2).



Table 2: Descriptive Statistics of Study Variables

Variable	N	Mean	SD	Skewness	Kurtosis
AI-Powered Personalization	310	2.964	0.677	-0.116	-0.286
Customer Engagement	310	2.972	0.657	0.150	-0.347
Privacy Concern	310	3.045	0.638	0.025	-0.290
Purchase Intention	310	2.969	0.601	0.131	-0.080

The results indicate moderate perceptions across all variables. Privacy concern recorded the highest mean score ($M = 3.045$), suggesting that respondents expressed relatively higher concerns regarding the use of personal information by e-commerce platforms. Customer engagement ($M = 2.972$) and purchase intention ($M = 2.969$) also reflected moderate levels. AI-powered personalization achieved a mean score of 2.964, indicating that respondents moderately perceived personalized recommendations and customized shopping experiences.

Table 3: Reliability Statistics

Scale	Cronbach's Alpha	Number of Items
Combined Scale	0.044	4

The Cronbach's Alpha value was 0.044. According to Hair et al. (2022), reliability values above 0.70 are generally considered acceptable (Table 3). The obtained value indicates poor internal consistency among the aggregated variables. This result suggests that the variables may function independently rather than forming a unified measurement scale.

Table 4: Correlation Matrix

Variables	1	2	3	4
1. AI-Powered Personalization	1			
2. Customer Engagement	-0.086	1		
3. Privacy Concern	0.045	0.057	1	
4. Purchase Intention	-0.028	0.011	0.078	1

The findings reveal very weak relationships among the variables. AI-powered personalization demonstrated a weak negative relationship with customer engagement ($r = -0.086$) and purchase intention ($r = -0.028$). Privacy concern exhibited weak positive associations with personalization ($r = 0.045$), customer engagement ($r = 0.057$), and purchase intention ($r = 0.078$) (Table 4). Overall, the correlation coefficients indicate that the relationships among the study variables were weak and statistically negligible. The findings indicate that respondents reported moderate perceptions of AI-powered personalization, customer engagement, privacy concern, and purchase intention. Normality assessments confirmed the suitability of the data for statistical analysis. However, reliability analysis revealed weak internal consistency, and correlation analysis showed only minimal relationships among the variables. These results suggest that the proposed theoretical relationships were not strongly supported within the present dataset.

5. Discussion, Recommendations and Conclusion

The primary objective of this study was to analyze the relations among AI-powered personalization, customer engagement, privacy concern, and purchase intention while retaining e-commerce as the context of this study. The descriptive findings revealed moderate levels of personalization, engagement, privacy concern, and purchase intention. This suggests that respondents were familiar with personalized online experiences but did not perceive them as overwhelmingly influential in shaping purchasing behavior (Abdullah et al. 2024). The findings regarding privacy concern are particularly noteworthy. Privacy concern recorded the highest mean value among all constructs, indicating that consumers remain cautious about the collection and utilization of their personal information. This observation supports the privacy paradox perspective, which argues that consumers appreciate personalized services while simultaneously expressing concerns regarding privacy and data security. Contrary to expectations derived from the Stimulus–Organism–Response (S-O-R) framework, the correlation analysis revealed extremely weak relationships among the study variables. AI-powered personalization demonstrated only a negligible relationship with customer engagement and purchase intention. Similarly, customer engagement showed virtually no association with purchase intention.

Studies by Abdullah et al. (2024), Acharya et al. (2022), and Raji et al. (2024) found that personalization enhances consumer relevance perceptions and positively influences purchase intentions. However, the present findings suggest that consumers in this context may not respond to personalization in the same manner. One possible explanation is increasing consumer awareness regarding privacy and algorithmic tracking. Consumers may recognize personalization efforts but remain skeptical about how their data are collected and utilized. Consequently, personalization alone may not be sufficient to generate engagement or stimulate purchasing intentions. The findings also indicate that privacy concern remains an important contextual factor. Although privacy concern demonstrated weak correlations with other variables, its



comparatively high mean score suggests that consumers are attentive to privacy issues and may adjust their online behaviors accordingly.

This study investigated the relationships among AI-powered personalization, customer engagement, privacy concern, and purchase intention among online consumers. The results indicate that respondents exhibited moderate levels of personalization perception, engagement, privacy concern, and purchase intention. Privacy concern emerged as the most prominent construct, highlighting consumers' increasing awareness of data protection and information security issues. Despite theoretical expectations, statistical analysis revealed weak relationships among the study variables. AI-powered personalization did not demonstrate meaningful associations with customer engagement or purchase intention. Similarly, customer engagement exhibited minimal influence on purchase intention. Overall, the findings suggest that personalization technologies alone may not guarantee enhanced consumer engagement or increased purchasing intentions. Organizations should therefore recognize that successful personalization strategies require not only technological sophistication but also trust-building mechanisms and transparent privacy practices.

First, businesses should enhance transparency regarding their data collection, storage, and usage practices to reduce consumer uncertainty and strengthen confidence in digital platforms. Clear communication about how personal information is collected and utilized can help consumers feel more comfortable with personalized services. Second, organizations should focus on building consumer trust alongside implementing personalization strategies. Since trust plays a critical role in online purchasing behavior, companies should invest in secure systems, ethical data practices, and customer relationship management initiatives to foster long-term engagement.

Furthermore, marketers should avoid excessive or overly intrusive personalization techniques that may cause consumers to feel monitored or manipulated. Instead, personalization efforts should be carefully balanced to ensure that recommendations are perceived as helpful rather than invasive. Organizations should also address privacy concerns through comprehensive privacy policies, transparent consent mechanisms, and robust data security measures that safeguard consumer information. By demonstrating a commitment to protecting customer data, firms can reduce privacy-related apprehensions and improve user experiences. Finally, personalized recommendations should emphasize relevance, usefulness, and customer value rather than aggressive targeting approaches. Providing meaningful and contextually appropriate recommendations can enhance customer satisfaction, strengthen engagement, and ultimately contribute to more sustainable consumer relationships and business performance.

5.1 Limitations of the study

Despite providing valuable insights into the relationships among AI-powered personalization, customer engagement, privacy concern, and purchase intention there remains few limitations. First, the study adopted a cross-sectional research design, which restricted the ability to establish causal relationships among the variables. Data were collected at a single point in time, making it difficult to capture changes in consumer perceptions and behaviors over time. Second, the research was conducted within a single geographical context, which may limit the generalizability of the findings to consumers in other regions or countries with different cultural, technological, and regulatory environments. Third, the study relied on self-reported data collected through questionnaires, which may be subject to response bias, social desirability bias, and inaccuracies in participants' perceptions. Additionally, the reliability analysis indicated relatively low reliability values, which may have affected the strength and significance of the observed relationships among the variables. Finally, the study focused exclusively on four constructs AI-powered personalization, customer engagement, privacy concern, and purchase intention and therefore may not have captured other important factors that influence consumer purchasing behavior in online environments.

5.2 Future Research Directions

Researchers are encouraged to employ larger and more diverse samples to enhance the generalizability of the results across different consumer groups and market settings. Longitudinal research designs may also be utilized to examine how perceptions of AI-powered personalization and privacy concerns evolve over time and influence consumer behavior. Furthermore, future studies should investigate additional mediating and moderating variables, such as trust, perceived usefulness, customer satisfaction, perceived value, and technology acceptance, to develop a more comprehensive understanding of the mechanisms underlying purchase intention. Comparative studies across different countries, cultures, and geographical regions would also provide valuable insights into how contextual factors shape consumer responses to AI-driven personalization.

6. Conclusion

Researchers may explore emerging and advanced AI personalization technologies, including generative AI, predictive analytics, and adaptive recommendation systems, to better understand their influence on customer engagement, privacy perceptions, and purchasing decisions in the rapidly evolving digital marketplace. The study concludes that while AI-powered personalization has become a central feature of modern e-commerce, its effectiveness in driving customer engagement and purchase intention is not guaranteed. Consumers increasingly value privacy and data security, and these concerns may limit the effectiveness of personalization strategies. Consequently, organizations should pursue a balanced



approach that combines personalized experiences with strong privacy protections to achieve sustainable customer relationships and long-term business success.

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