Journal of Business and Information Systems
Vol. 7, No. 2, December (2025)
www.thejbis.upy.ac.id
DOI: https://doi.org/10.31316/jbis.v7i2.326
ISSN:2685-2543

Accepted, October 2025
Revised, November 2025
Published, December 2025

AI-Driven Customer Engagement in Tokopedia: Satisfaction Mediation on Chatbot and Recommendation System Based on UTAUT

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Abstract: *Artificial intelligence (AI) technologies, including chatbots and recommendation engines, are reshaping customer interaction in digital marketplaces, yet their ability to directly enhance engagement remains uncertain. This research examines the impact of Tokopedia's AI-driven features, including the TANYA chatbot and automated product recommendations, on customer engagement, with satisfaction serving as an intermediary construct. Employing a quantitative explanatory design, data from 204 Tokopedia users in Jabodetabek were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. The results reveal that chatbot interaction and recommendation systems do not directly strengthen engagement, but both significantly improve satisfaction, which in turn enhances engagement. Satisfaction also mediates the effects of the chatbot and recommendation system on engagement. The findings confirm that AI influences engagement indirectly through user satisfaction, extending the UTAUT model by emphasizing satisfaction as a crucial psychological link in AI-driven e-commerce behavior.*

Keywords: *Chatbot; Customer engagement; Customer satisfaction; Product recommendation system*

1. Introduction

Artificial intelligence (AI) has increasingly emerged as a key driver of global digital innovation and transformation. AI extends beyond process automation to become a transformative force that enhances analytical intelligence, informs decision-making, and illuminates human behavior, ultimately driving innovation and value creation across the digital economy (Bawack et al., 2022). In e-commerce, the adoption of AI-based tools, particularly chatbots and recommendation systems, has fundamentally changed how businesses interact with consumers. These technologies create personalized, interactive, and real-time experiences that redefine customer engagement, transforming it from a transactional process into an adaptive and relational relationship framework (Møller et al., 2025; Zhang et al., 2024). Such advancements underscore AI's strategic role in improving customer engagement and fostering loyalty in an increasingly competitive marketplace.

This technological transformation is particularly evident in Indonesia's rapidly expanding e-commerce sector. The intensifying competition among leading platforms compels companies to innovate through digital technologies to retain their customer base. Tokopedia, one of Indonesia's largest e-commerce platforms, is experiencing a decline in digital engagement amid shifts in consumer behavior and market competition. Data from Semrush (April 2025) show that Tokopedia recorded 64.9 million visits, while Shopee

reached 132 million in the same period. Furthermore, Tokopedia's online popularity declined by approximately 43% during the 2020–2023 period, following a noticeable decrease in search traffic on Google (Hasri & Barus, 2024). A similar pattern was observed in Google Trends, indicating a sustained decline in public interest in Tokopedia from 2020 to 2025. These indicators highlight an urgent need for Tokopedia to strengthen its customer engagement strategy through digital innovation, particularly by optimizing AI-based features that enhance user satisfaction and loyalty.

In response to this challenge, Tokopedia has implemented AI-driven features, primarily the "TANYA" chatbot and the personalized product recommendation system. The "TANYA" chatbot serves as an automated conversational assistant that guides users, resolves inquiries, and addresses transactional issues efficiently. At the same time, the recommendation system curates product suggestions based on users' purchase history and behavioral patterns. Previous research suggests that users' attitudes toward chatbots are largely influenced by their perceived usefulness and ease of use, influencing their satisfaction and purchase intention (Rizkillah et al., 2024). Similarly, interactivity and responsiveness in digital environments are key determinants of customer engagement, as they allow users to form both cognitive and emotional connections with a brand (Utami et al., 2022). These results indicate that the success of AI implementation in e-commerce depends not only on technological performance but also on the emotional quality of user experiences.

Despite the expanding study into AI in e-commerce, existing studies primarily emphasize technical factors such as algorithmic accuracy, system reliability, and data processing efficiency (Aulia & Abidin, 2023; Desai, 2024). Less attention has been given to psychological mechanisms, particularly how user interactions with AI-based systems influence satisfaction and engagement. Trust in AI recommendations is built upon perceived accuracy and reliability, which shape users' willingness to rely on automated decisions (Zhang et al., 2024). However, in Indonesia, AI-based personalization remains underdeveloped, often emphasizing functionality while neglecting emotional and experiential aspects (Poa et al., 2025). Addressing this research gap, the study examines customer satisfaction as a mediating mechanism linking AI-driven features to customer engagement, thereby explaining how AI enhances engagement indirectly through user satisfaction.

To provide a robust theoretical foundation, this study adopts the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). The model incorporates performance expectancy, effort expectancy, and facilitating conditions as key determinants of technology adoption and user behavior (Gao et al., 2023). Because social influence is often less relevant in contexts involving individual and voluntary technology use, this study modifies the UTAUT framework by integrating customer satisfaction as a mediating variable. Satisfaction is expected to bridge users' perceptions of usefulness and ease of use with their engagement behaviors on the platform (Chau et al., 2025; Joshi, 2025). This integration aligns with recent research emphasizing that satisfaction is a vital

psychological mechanism connecting users' perceptions of technology with their emotional and behavioral engagement (Berliana et al., 2025; Taheri et al., 2024).

Accordingly, this research intends to assess the influence of Tokopedia's AI-driven features, notably the "TANYA" chatbot and personalized product recommendation system, on consumer engagement, with customer satisfaction serving as a mediating variable. Theoretically, this research enhances the UTAUT framework by integrating satisfaction to elucidate the indirect mechanisms by which AI influences user engagement. In practice, the study contributes to understanding how e-commerce platforms can leverage AI not only as a functional tool but also as an experiential medium that enhances emotional connection and sustained user engagement. Through this dual focus, the research seeks to offer both theoretical and managerial insights into how AI-based technologies can strengthen customer relationships and long-term competitiveness in Indonesia's e-commerce landscape.

2. Literature Review & Hypotheses Development

2.1. Chatbot

Chatbots are artificial intelligence-powered conversational agents that enable automatic two-way communication between people and systems in real time. In e-commerce, chatbots enhance customer engagement by delivering personalized support, rapid problem resolution, and immediate responses to user requests. These AI tools simulate human conversation, increasing service convenience and accessibility, which consequently improves customer satisfaction (Rizkillah et al., 2024). The existing literature indicates that perceived utility and simplicity of engagement have a substantial influence on users' perceptions regarding chatbots (Jeong-Kim, 2024). The effectiveness of chatbots lies not only in their technical accuracy but also in their capacity to exhibit empathy and contextual understanding (Møller et al., 2025). Within the UTAUT model, chatbot performance aligns with performance expectancy, while ease of use reflects effort expectancy. Thus, chatbots represent a critical technological factor that facilitates customer satisfaction and fosters engagement in digital commerce (Utami et al., 2022).

2.2. System Recommendation

Recommendation systems are algorithmic tools that analyze consumer data to provide personalized product suggestions tailored to user preferences and purchase history. In e-commerce, they are central to shaping customer experience by minimizing search effort and presenting relevant product alternatives (Aulia & Abidin, 2023). Studies show that perceived accuracy and transparency in recommendation systems build user trust and satisfaction (He et al., 2024). Within the UTAUT framework, recommendation systems strengthen performance expectancy through relevance and facilitating conditions through consistent system functionality (Zhang et al., 2024). Personalized recommendations can increase user loyalty by fostering a perceived connection between consumers and the platform (Poa et al., 2025). Therefore, AI-based recommendation systems act as engagement drivers by enhancing efficiency, satisfaction, and emotional attachment toward the platform (Shafiquzzaman, 2024).

2.3. Customer Satisfaction

Customer satisfaction reflects a user's cognitive and emotional evaluation of whether a product or service meets expectations. In digital commerce, satisfaction derives from perceptions of convenience, accuracy, and interactive quality of AI-based systems (Hassan et al., 2025). It functions as a key determinant of loyalty and engagement, reflecting the user's overall assessment of system experience. According to UTAUT, satisfaction can be understood as an outcome of performance expectancy and effort expectancy that shapes behavioral intention (Gao et al., 2023). Satisfied customers exhibit a positive emotional response, which in turn leads to greater platform involvement. Prior research demonstrates that satisfaction mediates the relationship between technology features and engagement outcomes (Berliana et al., 2025). Hence, satisfaction serves as a bridge connecting technological usefulness to sustained customer engagement (Taheri et al., 2024).

2.4. Customer Engagement

Customer engagement is a multidimensional construct involving users' cognitive, emotional, and behavioral participation in interactions with a platform. It extends beyond mere transactions, encompassing affective connection, trust, and enthusiasm toward the brand (Hollebeek et al., 2014). Engagement develops when customers perceive the platform as responsive, reliable, and personally relevant (Vivek et al., 2012). Within the UTAUT context, engagement emerges as a behavioral manifestation of satisfaction, driven by user perceptions of usefulness and enjoyment (Taheri et al., 2024). Emotionally satisfied users are more likely to engage through repeat purchases, referrals, and advocacy (Oliver, 2014). Thus, engagement functions as both an outcome of satisfaction and a reinforcing mechanism for customer loyalty in AI-based e-commerce ecosystems (Poa et al., 2025).

2.5. Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) integrates eight prior technology acceptance models into a unified framework (Venkatesh et al., 2003). It identifies four primary constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions as determinants of user behavioral intention and technology usage. In e-commerce contexts, these constructs explain users' responses to AI-driven systems, including chatbots and recommendation engines (Gao et al., 2023). However, social influence is often less relevant for individual decision-making in online shopping. Therefore, this study adapts UTAUT by introducing customer satisfaction as a mediating variable that links performance and effort expectancy to engagement. This adaptation aligns with recent findings suggesting that satisfaction is a psychological bridge connecting technology adoption and user behavior (Chau et al., 2025; Joshi, 2025). The UTAUT framework thus provides a comprehensive theoretical foundation for understanding how AI-based features enhance satisfaction and engagement in Tokopedia.

2.6. Hypotheses

Chatbots are among the most interactive AI technologies, enabling real-time communication between customers and digital platforms. Their role extends beyond providing automated responses; they act as relational agents that foster trust and continuous interaction. Effective chatbots strengthen engagement by providing human-like communication characterized by empathy, immediacy, and contextual relevance (Jeong-Kim, 2024). Prior studies have shown that perceived responsiveness and emotional presence in chatbot interactions increase customer involvement and positive affective experiences (Møller et al., 2025). Within the UTAUT framework, such engagement arises from performance expectancy, as users perceive chatbots to enhance the value of their interaction, and effort expectancy, reflecting their ease of use (Venkatesh et al., 2003). Chatbots that reduce uncertainty and offer satisfying experiences trigger both cognitive and emotional engagement. Hence, chatbots are expected to strengthen customer participation, trust, and sustained interaction on digital platforms.

*H_1: Chatbot has a positive effect on customer engagement***.**

Recommendation systems enhance engagement by offering personalized content that aligns with users' preferences, shopping histories, and browsing patterns. These mechanisms enhance users' sense of relevance and perceived control, which in turn drives continuous engagement and interaction on the platform (He et al., 2024). Studies reveal that when recommendation systems deliver accurate, timely, and fair product suggestions, customers perceive the experience as valuable and reliable (Aulia & Abidin, 2023). The UTAUT model explains this phenomenon through performance expectancy, users believe AI recommendations improve their shopping efficiency, and facilitating conditions, where system reliability supports ongoing use (Gao et al., 2023). Emotional responses such as enjoyment and trust emerge when users feel understood by the system (Zhang et al., 2024). In Tokopedia's context, the AI recommendation feature acts as a strategic tool to promote user engagement by personalizing the online experience and strengthening users' emotional connection with the platform (Poa et al., 2025).

H_2: The recommendation system has a positive effect on customer engagement

Chatbots influence satisfaction by delivering efficient, personalized, and context-aware assistance, thereby enhancing the overall user experience. The immediacy of chatbot responses creates a perception of attentiveness and reliability that fosters trust (Rizkillah et al., 2024). Users tend to feel more satisfied when the chatbot not only solves problems but also provides empathetic communication that mirrors human interaction (Utami et al., 2022). According to UTAUT, satisfaction develops when perceived usefulness (performance expectancy) and ease of interaction (effort expectancy) are high (Venkatesh et al., 2003). In AI-mediated environments, satisfaction is also linked to affective experiences derived from comfort, enjoyment, and confidence (Berliana et al., 2025). For Tokopedia users, the "TANYA" chatbot functions as both a transactional and relational interface, increasing satisfaction by simplifying complex queries and enhancing service accessibility.

Consequently, chatbots play a pivotal role in forming positive user evaluations of AI-driven service quality.

H_3: An AI-based chatbot has a positive effect on customer satisfaction

AI-driven recommendation systems enhance customer satisfaction by optimizing information delivery and reducing cognitive effort during decision-making. Personalized recommendations help customers feel recognized and understood, resulting in higher perceived value (He et al., 2024). When users receive accurate, relevant, and unbiased suggestions, they are more inclined to trust the system and feel confident in their choices (Poa et al., 2025). The UTAUT framework supports this relationship, explaining that satisfaction arises when technology consistently meets expectations of usefulness and performance (Venkatesh et al., 2003). Empirical findings also suggest that recommendation quality correlates strongly with enjoyment and emotional fulfillment in online shopping (Hassan et al., 2025). In the context of Tokopedia, a well-designed recommendation system improves satisfaction not only through functionality but also through perceived personalization, which makes users feel valued. Thus, effective recommendation systems cultivate satisfaction and reinforce positive user attitudes toward the platform.

H_4: AI-based product recommendations have a positive effect on customer satisfaction

Customer satisfaction is a crucial antecedent of engagement, transforming positive evaluations into sustained behavioral involvement. Satisfied users experience emotional attachment that motivates repeat purchases, advocacy, and long-term loyalty (Oliver, 2014). In the context of digital commerce, satisfaction triggers cognitive and affective commitment, reinforcing users' trust and connection to the platform (Taheri et al., 2024). According to the UTAUT model, satisfaction mediates the pathway between performance expectancy and behavioral intention (Venkatesh et al., 2003). Prior studies have found that satisfaction encourages active participation in online communities and interactive features, enhancing engagement intensity (Gao et al., 2023). For Tokopedia, customer satisfaction derived from the quality of the chatbot and recommendation system translates into deeper emotional engagement and sustained interaction. Hence, satisfaction functions as both a psychological and behavioral driver of customer engagement.

H_5: Customer satisfaction has a positive effect on customer engagement

Customer satisfaction serves as a mediating mechanism linking AI-driven features to engagement outcomes. When users perceive chatbots and recommendation systems as practical, easy to use, and personalized, they develop positive affective responses that increase satisfaction and engagement (Berliana et al., 2025). Satisfaction transforms functional interactions into meaningful experiences that foster emotional loyalty and repeated usage (Gao et al., 2023). Within the UTAUT framework, this mediation aligns with the notion that satisfaction amplifies the effects of performance and effort expectancy on behavioral outcomes (Venkatesh et al., 2003). Empirical research demonstrates that satisfied customers are more inclined to keep platform ties and promote the company (Joshi, 2025). Thus, in Tokopedia's AI-driven environment, satisfaction is expected to serve as the key

mechanism linking technological innovation to emotional and behavioral engagement (Chau et al., 2025).

H_6: Customer satisfaction mediates the effect of an AI-based chatbot on customer engagement

H_7: Customer satisfaction mediates the effect of AI-based product recommendations on customer engagement.

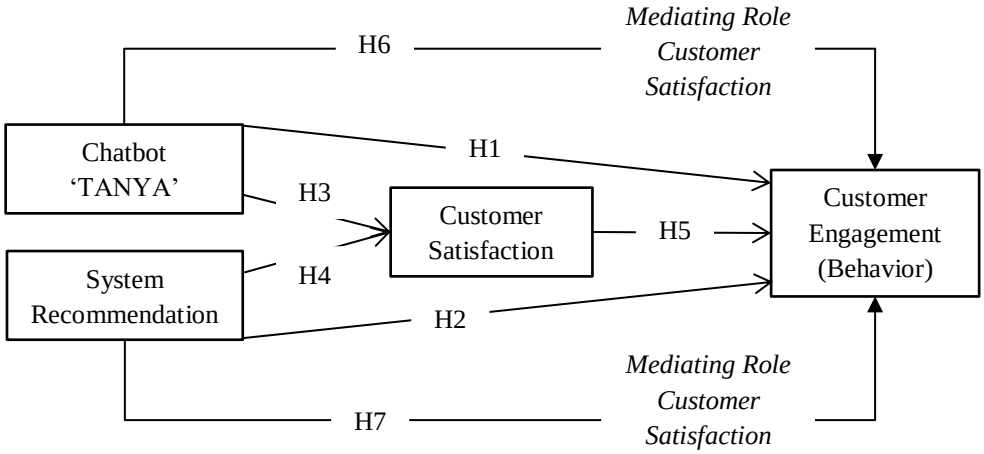

Figure 1. Research Model

Chatbot "TANYA" and the AI-based Recommendation System influence Customer Engagement (Behavior) both directly (H1, H2) and indirectly through Customer Satisfaction (H3, H4 → H5). The dashed lines (H6, H7) illustrate the mediating role of Customer Satisfaction in the relationship between AI characteristics and customer engagement. This model is theoretically grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT) and empirically supported by prior studies, which emphasize that customer satisfaction serves as a central psychological mechanism bridging users' experiences with AI-driven features and their engagement behaviors on digital platforms.

3. Method

This study examines the impact of implementing artificial intelligence (AI) features on the Tokopedia platform, particularly the TANYA chatbot and product recommendation system, on customer engagement, with customer satisfaction as a mediating variable. The research design employs an explanatory causal quantitative approach based on the modified Unified Theory of Acceptance and Use of Technology (UTAUT) model, with customer satisfaction added as a mediating variable to evaluate the cause-and-effect link between variables (John & David, 2018; Sugiyono, 2013; Venkatesh et al., 2003). This approach is used because it is well-suited to explaining causal relationships between latent variables and to testing complex mediation effects in the context of digital technology. The research flow depicted in Figure 2 consists of 4 stages.

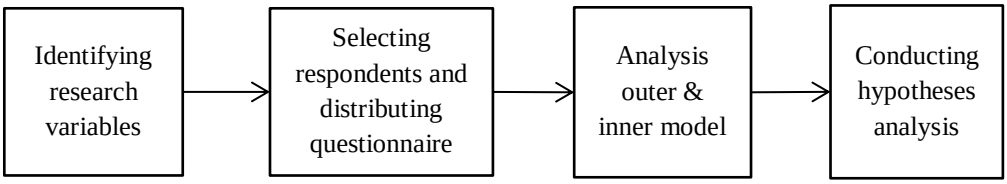

Figure 2. Research Methodology

The three main UTAUT constructs used in this study include performance expectancy, effort expectancy, and facilitating conditions, which represent user perceptions of the benefits, ease, and support of using AI technology. These constructs are operationalized through two main variables, namely Chatbot (CB) and System Recommendation (SR), which describe the application of AI features in Tokopedia. These two variables are assumed to affect Customer satisfaction (CS), which in turn affects Customer engagement (CE), the dependent variable. The data were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach with SmartPLS 4.0. This technique is appropriate for models that include mediating variables, non-normal data distribution, and medium sample sizes (Hair et al., 2019).

Table 1. Research Instrument

Variables	Instrument
Chatbot 'TANYA' (Berliana et al., 2025; Jeong-Kim, 2024; Venkatesh et al., 2003)	1. The TANYA chatbot helps me quickly find solutions to problems on Tokopedia. 2. Tokopedia's chatbot can provide accurate solutions to my problems. 3. I find TANYA chatbot feature easy to use. 4. TANYA Chatbot interface is easy to understand. 5. TANYA chatbot feature is always available when I need it.
Recommendation System (Aulia & Abidin, 2023; Berliana et al., 2025; He et al., 2024; Venkatesh et al., 2003)	1. Product recommendations on Tokopedia help me make shopping decisions faster. 2. The product recommendations provided are very accurate to my interests. 3. I find the product recommendation feature on Tokopedia easy to use. 4. The product recommendation system makes it easy for me to find relevant items. 5. Tokopedia's recommendation system consistently displays products that are relevant to me every time I use the platform. 6. The product recommendation feature on Tokopedia works smoothly without any problems.
Customer Satisfaction (Chau et al., 2025; Poa et al., 2025)	1. I am pleased to use this AI Chatbot/Recommendation service system. 2. I am satisfied with my experience interacting with Tokopedia's AI Chatbot/Recommendation feature. 3. My overall shopping experience at Tokopedia was satisfying thanks to the AI Chatbot/Recommendation feature. 4. My experience with Tokopedia's AI Chatbot/Recommendation service was better than I expected.
Customer Engagement (Cuesta-Valiño et al., 2023; Utami et al., 2022)	1. I actively provide feedback to Tokopedia for the development of its services. 2. I recommend this Tokopedia app to others. 3. I often upload photos of products or purchases from Tokopedia on social media. 4. I enjoy spending time on Tokopedia. 5. I am willing to help other users if they need assistance.

The research population comprises all active users of Tokopedia in the Jabodetabek area (Jakarta, Bogor, Depok, Tangerang, Bekasi). A purposive sampling strategy was adopted because the study required respondents to have experience with both AI-based features (the "TANYA" chatbot and the recommendation system). This method ensures that only relevant and informed users are included, thereby increasing the validity of responses (Hair et al., 2019). The sampling criteria were: (1) active Tokopedia users for at least six months, and (2) users who had interacted with both AI features. According to guidelines for PLS-SEM modeling, an adequate sample size for 24 indicators ranges from 120 to 240 respondents; therefore, 200 participants were targeted, yielding 204 valid responses (Hair et al., 2019).

A five-point Likert scale (1 = strongly disagree, 5 = strongly agree) was employed to assess each construct. Data collection was conducted online via Google Forms, distributed via social media and Tokopedia user communities. This method follows the analytical approach commonly applied in technology-based user behavior research, emphasizing the assessment of measurement accuracy and model robustness through reliability and validity testing. Reliability and validity were evaluated using composite reliability, Cronbach's alpha, and average variance extracted (AVE), while multicollinearity and standard method bias were examined using the HTMT criterion. This procedure aligns with the methodological recommendations (Hair et al., 2019; Henseler et al., 2015; Kock, 2015)

4. Results & Discussion

In this study, 204 questionnaires were collected from active Tokopedia users residing in the Jabodetabek area. Table 2 shows the demographic distribution of research respondents, including variables such as gender, age, domicile, and frequency of Tokopedia usage.

Table 2. Respondent Characteristic

Measurement Items	Total	Percentage (%)
Gender:		
1. Male	90	44.1
2. Female	114	55.9
Age:		
1. 18 or below	11	5.4
2. >18 to <25	136	66.7
3. >26 to<35	38	18.6
4. 35 or above	19	9.3
Domicile		
1. Jakarta	36	17.6
2. Bogor	28	13.7
3. Depok	63	30.9
4. Tangerang	46	22.5
5. Bekasi	31	15.2
Frequency of Use		
1. Every day		
2. Several times a week	6	2.9
3. Several times a month	84	41.2
4. Rarely (once a month	80	39.2
or less)	34	16.7

A total of 204 respondents, 56% were female, and 44% were male, demonstrating fair representation of genders. By age, most respondents were 18–25 (67%), reflecting the dominance of young users as Tokopedia's primary segment. The respondents' locations indicate a concentration of users in the urban areas of Jakarta, Bogor, Depok, Tangerang, and Bekasi. The frequency-of-use data indicate that the majority of users access Tokopedia several times per week (41%). This distribution illustrates that the respondents are an active user group, predominantly young people in urban areas.

The convergent validity test results indicate that all outer loading values exceed the minimum threshold of 0.70, so that each indicator is adequate in representing the measured construct (Budiarto et al., 2020; Aulia & Abidin, 2023; Hair et al., 2019). As shown in Table 3, all constructs have strong internal consistency with Cronbach's Alpha (CA) values ranging from 0.838 to 0.940 and Composite Reliability (CR) between 0.884 and 0.950, all of which exceed the 0.70 threshold as recommended through the PLS-SEM approach (Gao et al., 2023; Hair et al., 2019). The convergent validity criterion is satisfied, as the Average Variance Extracted (AVE) values for all latent constructs range from 0.605 to 0.706, indicating that its corresponding construct explains more than 60% of each indicator's variance (Joshi, 2025; Lin et al., 2022).

Table 3. Convergent Validity and Reliability Test

Variables	Item Code	Outer Loadings	CA	CR	AVE
Chatbot (CB)	CB1	0.800	0.863	0.900	0.644
	CB2	0.798			
	CB3	0.780			
	CB4	0.839			
	CB5	0.794			
System Recommendation (SR)	SR1	0.727	0.885	0.913	0.636
	SR2	0.819			
	SR3	0.799			
	SR4	0.806			
	SR5	0.790			
	SR6	0.840			
Customer Satisfaction (CS)	CS1	0.826	0.94	0.950	0.706
	CS2	0.865			
	CS3	0.830			
	CS4	0.842			
	CS5	0.839			
	CS6	0.867			
	CS7	0.813			
	CS8	0.835			
Customer Engagement (CE)	CE1	0.752	0.838	0.884	0.605
	CE2	0.772			
	CE3	0.795			
	CE4	0.845			
	CE5	0.719			

Discriminant validity is tested using the Heterotrait-Monotrait Ratio (HTMT). This method is more sensitive in detecting differences between constructs and is recommended as a more reliable approach in PLS-SEM models (Henseler et al., 2015). HTMT values below 0.90 in Table 4 indicate good discriminant validity, consistent with the findings and

guidelines (Chau et al., 2025; Gold et al., 2001; Joshi, 2025; Utami et al., 2022). Based on these results, the external model has met all the suggested reliability and validity criteria. Thus, the research instrument is deemed valid and reliable and can be applied appropriately in the next stage of structural model analysis (Deng et al., 2024).

Table 4. Heteroit Monorait Ratio (HTMT)

Variable	CB	CE	CS
CB			
CE	0.661		
CS	0.871	0.772	
SR	0.895	0.681	0.868

Table 5. Path Coefficients

Hypotheses	Original sample	T-statistics	P-values	Status
CB => CE	0.078	0.838	0.402	H_1: Rejected
SR => CE	0.136	1.413	0.158	H_2: Rejected
CB => CS	0.445	5.942	0.000**	H_3: Accepted
SR => CS	0.450	6.245	0.000**	H_4: Accepted
CS => CE	0.525	4.568	0.000**	H_5: Accepted
CB => CS => CE	0.234	3.490	0.000**	H_6: Accepted
SR => CS => CE	0.237	3.647	0.000**	H_7: Accepted

** Sig < 1%

The insignificant relationship between chatbot use and customer engagement indicates that interactions with Tokopedia's "TANYA" chatbot are still perceived as functional rather than participative. Most users rely on the chatbot to resolve practical issues or obtain information, rather than to initiate ongoing interaction with the platform. In the UTAUT framework, this suggests that while *performance expectancy* and *effort expectancy* are satisfied, they do not independently stimulate *behavioral engagement* without satisfaction as an intermediary (Venkatesh et al., 2003). Engagement generally requires more immersive interaction and consistent experiential feedback. The limited frequency of chatbot use among respondents reduces opportunities for familiarity and attachment to develop. Empirically, user engagement occurs when technology systems are viewed as dependable, responsive, and contextually relevant to individual requirements (Møller et al., 2025). Similarly, adaptive interaction quality, rather than repetitive automated responses, strengthens engagement through perceived usefulness and efficiency (Gao et al., 2023).

The lack of a significant association between recommendation systems and engagement indicates that personalization alone does not guarantee user participation. While Tokopedia's recommendation feature improves search efficiency, users perceive it as an automatic function rather than an interactive experience. In UTAUT terms, *performance expectancy*, the perceived usefulness of AI, may be achieved, but *facilitating conditions* and emotional relevance are not sufficiently developed to sustain *behavioral intention* (Venkatesh et al., 2003). Engagement requires users to perceive active involvement and reciprocal interaction with the system. The moderate platform usage pattern observed among respondents further limits the frequency of exposure to recommendation outputs, reducing

the potential for perceived connection. Recommendation reliability enhances perceived value but does not necessarily lead to engagement without prior satisfaction or trust (Zhang et al., 2024). Similarly, in Indonesia's e-commerce context, recommendation personalization remains primarily focused on efficiency rather than experiential or emotional connection (Poa et al., 2025).

The significant effect of chatbot interaction on satisfaction confirms that the "TANYA" feature successfully fulfills users' expectations of efficiency, accessibility, and informational accuracy. Users perceive the chatbot as an effective support mechanism that simplifies problem-solving and accelerates response time. Within the UTAUT framework, effort expectancy and facilitating conditions play a central role, as ease of use and responsive infrastructure shape satisfaction through perceived convenience (Venkatesh et al., 2003). Satisfaction also increases when users consider the system as trustworthy and capable of providing appropriate responses. The contribution of performance expectancy is evident, as users perceive the chatbot as instrumental in achieving their goals efficiently. Empirical studies indicate that responsiveness, contextual relevance, and informational clarity are critical determinants of satisfaction in AI service environments (Møller et al., 2025). Perceived usefulness, combined with emotional comfort in digital interaction, enhances user satisfaction and reinforces continued platform use (Rizkillah et al., 2024).

The significant influence of recommendation systems on satisfaction demonstrates that Tokopedia's AI-based personalization effectively increases perceived value and convenience in online shopping. Users appreciate the system's ability to deliver relevant product suggestions quickly, reducing search time and cognitive effort. In the UTAUT framework, this outcome reflects the role of *performance expectancy*, where users' trust in the technology's ability to give accurate and efficient outcomes promotes satisfaction (Venkatesh et al., 2003). The relevance and transparency of the recommendation results strengthen users' trust in the platform, thereby enhancing satisfaction. Recommendation accuracy positively affects satisfaction by increasing perceived usefulness (Aulia & Abidin, 2023). Confidence in AI system reliability also improves user evaluations of convenience and satisfaction (Zhang et al., 2024). Thus, Tokopedia's recommendation system contributes to satisfaction by combining functional precision, perceived value, and efficiency in user decision-making.

The positive and significant impact of satisfaction on engagement indicates that users who evaluate their experiences positively are more likely to exhibit continued behavioral involvement. Satisfaction strengthens users' motivation to interact repeatedly with the platform, provide feedback, and engage in word-of-mouth advocacy. Within UTAUT, satisfaction functions as a psychological manifestation of *performance expectancy* and *effort expectancy*, influencing behavioral intention through perceived fulfillment and ease of interaction (Venkatesh et al., 2003). Satisfied users develop greater affective commitment and a greater willingness to engage in digital communities and transactional activities. Satisfaction is identified as the key variable linking perceived usefulness to engagement in e-commerce systems (Berliana et al., 2025). Satisfaction also transforms favorable perceptions into sustained digital loyalty and active user participation (Taheri et al., 2024).

In Tokopedia's context, satisfaction derived from AI-driven efficiency acts as a catalyst for long-term engagement and platform retention.

The mediating effect of satisfaction in the relationship between chatbot interaction and engagement indicates that user involvement arises from cognitive and affective evaluations of the service experience. The chatbot's capacity to deliver accurate, timely, and contextually relevant responses generates satisfaction, which subsequently fosters behavioral engagement. In the UTAUT framework, this relationship illustrates how *effort expectancy* and *facilitating conditions* contribute to satisfaction, which then translates into *behavioral intention* (Venkatesh et al., 2003). Engagement is therefore a consequence of positive user evaluation of interaction quality and perceived system responsiveness. Satisfaction functions as an evaluative mechanism bridging technology experience and behavioral loyalty (Møller et al., 2025). Satisfaction also converts cognitive appreciation of technological performance into affective attachment and continued participation (Gao et al., 2023). Hence, Tokopedia's chatbot indirectly enhances engagement by fostering user satisfaction rooted in efficiency and interaction reliability.

The mediating role of satisfaction in the relationship between AI-based recommendation systems and engagement underscores that emotional and evaluative processes shape behavioral responses. Users satisfied with the system's relevance and accuracy exhibit greater engagement, as evidenced by repeat purchases and active participation. Within the UTAUT model, *performance expectancy* drives satisfaction when technology consistently meets user expectations, while *behavioral intention* emerges from this satisfaction (Venkatesh et al., 2003). Perceived trust and value further reinforce this path, as users interpret accurate recommendations as indicators of platform credibility and efficiency. Satisfaction resulting from reliable recommendations enhances users' commitment to the platform (Zhang et al., 2024). Perceived personalization and trust derived from system performance also increase user engagement through satisfaction (Aulia & Abidin, 2023). Therefore, Tokopedia's recommendation system indirectly contributes to engagement, with satisfaction serving as the psychological bridge between system effectiveness and behavioral participation.

5. Conclusion, Limitation, & Suggestion for the Future

This research concludes that the effectiveness of artificial intelligence (AI) features on e-commerce platforms is determined not only by the sophistication of the technology but also by their ability to shape a satisfying user interaction experience. Customer satisfaction plays an important role in bridging the relationship between the use of AI-based technology and sustainable customer engagement. The results of this study imply that AI development strategies should be geared towards enhancing the emotional rather than functional dimensions of user experience. Theoretically, this study strengthens and extends the Unified Theory of Acceptance and Use of Technology (UTAUT) model by integrating customer satisfaction as an explanatory mechanism between perceptions of technology and user engagement behavior. The findings yield practical insights for focusing AI innovations on improving interaction quality, recommendation relevance, and service personalization,

as these factors have been shown to enhance satisfaction, thereby increasing user loyalty and engagement.

Overall, this research emphasizes the relevance of customer satisfaction as a key link between technological sophistication and customer behavior in a digital context. Future research is encouraged to empirically explore how variables such as trust, personalization quality, and continuance intention interact with satisfaction and engagement within the Indonesian e-commerce context, as prior empirical studies have highlighted their importance but have not comprehensively examined their roles in AI-driven customer behavior (Hassan et al., 2025; Poa et al., 2025; Zhang et al., 2024). This method is expected to yield a more comprehensive understanding of how AI technology shapes and sustains long-term customer engagement in the e-commerce ecosystem in Indonesia.

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