

AI ANTHROPOMORPHISM, CUSTOMER EXPERIENCE, AND TRUST: PATHWAYS TO IMPROVE CUSTOMER PERFORMANCE IN E-COMMERCE

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Abstract: The growth of online shopping platforms in Indonesia, particularly Shopee, has intensified digital interactions between businesses and customers. Beyond transaction volume, e-commerce success is reflected in Customer Performance (CP), including loyalty, reviews, repeat purchases, and digital advocacy. This study examines the effects of Customer Experience (CX), AI anthropomorphism (AI), and Trust on Customer Performance (CP) among Shopee users in Denpasar. Using a quantitative approach, data were collected from 100 university students with prior interaction with AI-based chatbots. Responses were measured on a five-point Likert scale and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS. Findings indicate that CX significantly improves perceptions of AI anthropomorphism, which subsequently enhances CP. Trust has a direct positive impact on CP and strengthens the influence of AI on CP. Mediation analysis further shows that AI mediates the link between CX and CP. The model demonstrates satisfactory explanatory power and predictive relevance. Practically, e-commerce platforms should improve CX through personalization, responsiveness, and ease of use while embedding anthropomorphic features into chatbot design. Building trust through transparency, security, and consistent service is also crucial to maximizing customer engagement and performance outcomes.

Keywords: Customer Experience, AI Anthropomorphism, Trust, Customer Performance, E-commerce.

1. Introduction

The rapid growth of e-commerce in Indonesia has transformed the way consumers shop and interact with companies. According to the eEconomy SEA 2024 report by Google, Temasek, and Bain & Company, Indonesia's e-commerce transaction value is projected to reach US\$65 billion in 2024, an increase of 11% from the previous year (Vebrianti et al., 2025). This highlights the significant potential of e-commerce in Indonesia's digital economy. However, such rapid development also raises challenges, particularly regarding active customer involvement measured through Customer Performance (CP), including loyalty, repeat purchases, reviews, and digital promotions (Ho et al., 2020).

One of the key factors influencing CP is Customer Experience (CX), which covers aspects such as navigation convenience, service speed, and communication quality. Positive CX has been proven to enhance satisfaction, loyalty, and repurchase intention (Hariguna & Ruangkanjanes, 2024). In the digital context, CX is further strengthened by the use of Artificial Intelligence (AI), especially when designed with anthropomorphic features. Human-like AI can increase emotional closeness and comfort for customers (Bunea et al., 2024). Nevertheless, prior studies have rarely positioned AI anthropomorphism explicitly as a mediator between CX and CP (Klein & Martinez, 2023; Yanxia et al., 2023).

Another critical factor is trust. Without a sense of security and confidence in the system, customers are reluctant to rely on AI-based services (Shahzad et al., 2024). Previous

research emphasizes that trust serves as an antecedent that reduces risk and strengthens purchase intentions (Sulistyowati & Husda, 2023). In this regard, trust may moderate the relationship between CX, AI anthropomorphism, and CP, making it a key element for e-commerce sustainability.

Shopee, as one of the largest e-commerce platforms in Indonesia, has introduced various innovations such as multiple payment methods, flexible shipping options, and interactive features like live streaming. However, despite more than 70% of initial interactions being handled by chatbots, customer complaints against Shopee's chatbot service increased by 17% in 2023 (Cahaya Ilmu Bangsa Institute, 2024). This indicates that AI integration, particularly with anthropomorphic design, remains suboptimal. The issue is especially evident among university students in Denpasar, a key consumer segment with high online shopping intensity and critical digital expectations.

Based on this background, the objectives of this study are as follows: (1) to analyze the influence of CX on AI anthropomorphism among Shopee student users in Denpasar, (2) to examine the effect of AI anthropomorphism on CP, (3) to analyze the role of trust in shaping CP, and (4) to test the moderating role of trust in the relationship between AI anthropomorphism and CP.

2. Literature Review

Customer Performance

Customer performance refers to the ability of customers to achieve their shopping objectives through interactions with digital platforms (Sanny et al., 2020). In the e-commerce context, it reflects how efficiently and satisfactorily customers can complete their shopping processes (Shahzad et al., 2024). Customer performance can be observed from several aspects, including trust and understanding of chatbot responses, willingness to rely on chatbots when shopping, comfort in using chatbot services, and openness to future chatbot interactions (Sanny et al., 2020; Ho et al., 2020; Shahzad et al., 2024).

Several factors such as customer experience, the level of AI anthropomorphism, and customer trust play crucial roles in enhancing customer performance. When customers have satisfying experiences, perceive AI interactions as more human-like, and trust the platform, they are more likely to enjoy effective, efficient, and reliable shopping experiences, which in turn foster satisfaction and loyalty (Lemon & Verhoef, 2016; Gnewuch et al., 2017; Gefen et al., 2003).

Customer Experience

Customer experience (CX) refers to the overall perceptions, emotions, and evaluations of customers when interacting with products, services, and digital technologies. CX involves both functional perceptions (e.g., navigation convenience, service speed, personalization) and emotional aspects (e.g., comfort, satisfaction, feeling valued) (Lemon & Verhoef, 2016; Meyer & Schwager, 2007; Verhoef et al., 2009). In e-commerce, CX is shaped by quick, relevant, and personalized interactions that lead to greater engagement and satisfaction (Wamba, 2022; Sidaoui et al., 2020).

Indicators of CX include social experience, service experience, intellectual experience, exploitation of features, and classification ability (Cheng et al., 2022; Hariguna & Ruangkanjanases, 2024; Shahzad et al., 2024). Positive experiences make customers more open to human-like technologies such as chatbots. Natural, personalized, and empathetic chatbot interactions are more likely to be perceived as anthropomorphic (Epley et al., 2007; Gnewuch et al., 2017).

H1: Customer experience has a positive influence on AI anthropomorphism.

AI Anthropomorphism

AI anthropomorphism refers to the perception of AI systems as having human-like features, behaviors, or personalities (Epley et al., 2017). Customers may perceive chatbots as anthropomorphic when they use natural language, express empathy, or display interpersonal communication styles. Such anthropomorphic features enhance psychological closeness, create more personal and convincing interactions, and improve customer effectiveness and satisfaction (Gnewuch et al., 2017).

Indicators of AI anthropomorphism include visual design, behavioral imitation, cognitive reasoning, emotional empathy, and cognitive trust in the chatbot's responses (Yanxia et al., 2023; Bunea et al., 2024). High anthropomorphism makes interactions feel more human, which strengthens trust, satisfaction, and ultimately customer performance (Klein & Martinez, 2023).

H2: AI anthropomorphism has a positive influence on customer performance.

Furthermore, customer experience may also shape AI anthropomorphism perceptions, which in turn influence customer performance. A positive CX not only directly increases satisfaction but also indirectly enhances performance through stronger anthropomorphic perceptions of AI (Wamba, 2022; Gnewuch et al., 2017).

H3: Customer experience has a positive influence on customer performance through the mediation of AI anthropomorphism.

Trust

Trust refers to customers' belief in the reliability, security, and consistency of digital platforms (Gefen et al., 2003; Shahzad et al., 2024). In e-commerce, trust is essential, as customers who feel secure are more motivated to use AI-based services confidently. Trust indicators include perceived security, platform preference, product quality assurance, risk reduction, loyalty, and overall belief in the platform (Sulistyowati & Husda, 2023; Al-Oraini, 2025; Blömker & Albrecht, 2025).

High trust enhances the positive impact of AI anthropomorphism on customer performance. When customers trust chatbots, anthropomorphic behaviors such as empathy, reasoning, and human-like interaction are more readily accepted and translated into performance outcomes. Conversely, low trust can weaken these effects (Gefen et al., 2003).

H4: Trust moderates the relationship between AI anthropomorphism and customer performance.

Theoretical Model

In summary, customer experience shapes perceptions of AI anthropomorphism, which then influence customer performance. Trust acts as a moderator, strengthening the positive influence of AI anthropomorphism on performance. This framework highlights the interplay of CX, AI anthropomorphism, and trust in driving sustainable customer performance in e-commerce.

Customer Performance

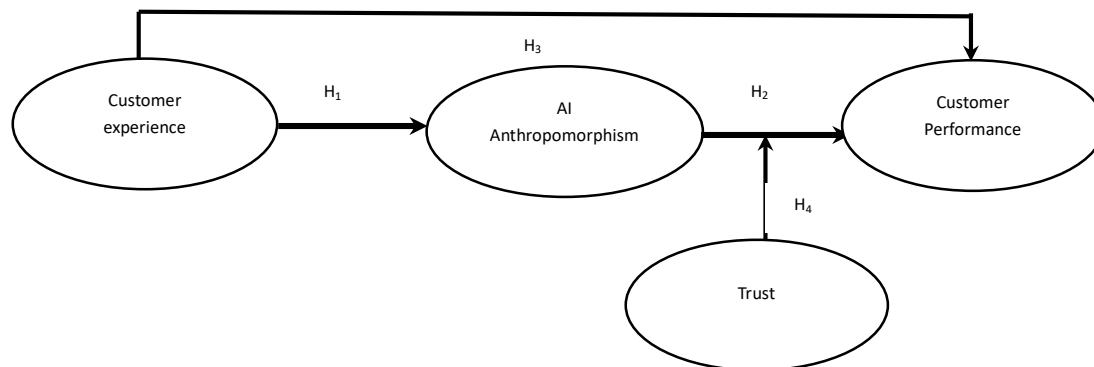


Figure 1. Research Model

3. Method

This research uses a quantitative explanatory approach** to test the relationship between variables. The population in this study is active Shopee e-commerce users in Denpasar City who have interacted with AI-based chatbots in the last six months. Sampling was carried out purposively with criteria that met the research conditions. Based on the PLS-SEM guideline (Hair et al., 2017), with 20 indicators the minimum sample size ranges from 100–200 respondents.

The research instrument used a questionnaire with a 5-point Likert scale. Indicators of Customer Experience were adapted from Hariguna & Ruangkanjanes (2024); AI Anthropomorphism from Bunea et al. (2024); Trust from Shahzad et al. (2024); and Customer Performance from Ho et al. (2020). Validity and reliability testing as well as hypothesis testing were carried out using the SmartPLS 4.0 application.

4. Results and Discussion

Respondent Characteristics

A total of 100 Shopee users in Denpasar participated, dominated by the 35–44 age group (26%), male (52%), and bachelor's degree holders (60%). Most respondents earn IDR 2–5 million/month (30%), are married (48%), and have moderate digital literacy (56%).

Measurement Model

All indicators showed outer loadings >0.70, AVE >0.50, and Composite Reliability >0.70, confirming convergent validity and reliability

Table 1. Construct Reliability and Validity

Construct	Cronbach's Alpha	CR	AVE
Trust	0.897	0.924	0.709
AI Anthropomorphism	0.928	0.944	0.770
Customer Experience	0.833	0.882	0.601
Customer Performance	0.824	0.874	0.581

Structural Model

The R^2 values were 0.291 for AI Anthropomorphism and 0.662 for Customer Performance, indicating moderate explanatory power. Predictive relevance was confirmed with Q^2 values of 0.195 and 0.323, respectively.

Hypothesis Testing

Table 2. Hypothesis Testing Result

Path	Coefficient	t-value	p-value	Result
CX → AI	0.539	7.377	0.000	Supported
AI → CP	0.437	4.837	0.000	Supported
Trust → CP	0.532	6.914	0.000	Supported
AI × Trust → CP	0.171	3.094	0.002	Supported
CX → AI → CP	0.236	4.962	0.000	Supported

1. Customer Experience → AI Anthropomorphism

The path coefficient of 0.539 with a t-value of 7.377 ($p < 0.001$) indicates that Customer Experience has a strong and significant positive effect on AI Anthropomorphism. This suggests that when customers perceive better experiences—such as ease of navigation, responsiveness, and overall service quality—they are more likely to view AI systems as human-like.

2. AI Anthropomorphism → Customer Performance

The coefficient of 0.437 with a t-value of 4.837 ($p < 0.001$) confirms that AI Anthropomorphism significantly enhances Customer Performance. This means that when AI is perceived as more human-like in behavior, appearance, or cognition, customers interact more effectively, comfortably, and productively with the system.

3. Trust → Customer Performance

The path coefficient of 0.532 with a t-value of 6.914 ($p < 0.001$) demonstrates that Trust has a direct and significant influence on Customer Performance. Customers who trust AI technology are more confident and willing to engage, which leads to improved outcomes in their online shopping activities.

4. AI Anthropomorphism × Trust → Customer Performance (Moderation)

The interaction effect of 0.171 with a t-value of 3.094 ($p = 0.002$) shows that Trust moderates the relationship between AI Anthropomorphism and Customer Performance. Specifically, when customers have higher trust, the positive influence of AI Anthropomorphism on performance becomes stronger.

5. Customer Experience → AI Anthropomorphism → Customer Performance (Mediation)

The indirect effect of 0.236 with a t-value of 4.962 ($p < 0.001$) confirms that AI Anthropomorphism mediates the relationship between Customer Experience and Customer Performance. This indicates that positive experiences not only directly enhance performance but also indirectly do so by increasing anthropomorphic perceptions of AI.

Discussion

The Influence of Customer Experience on AI Anthropomorphism

The results of the study show that Customer Experience (CX) has a significant positive effect on AI Anthropomorphism ($\beta = 0.539$; $t = 7.377$; $p < 0.001$). This finding suggests that the better the experience perceived by customers—including ease of navigation, speed of service, and quality of digital interactions—the higher their tendency to perceive the AI system as a human-like entity. In other words, a positive customer experience not

only increases satisfaction but also shapes their perspective on interactions with technology.

These findings align with the anthropomorphism theory proposed by Epley et al. (2007), which states that individuals tend to attribute human traits to non-human objects when they feel comfortable and engaged in the interaction. Furthermore, Lemon & Verhoef (2016) and Wamba (2022) emphasized that positive customer experiences in digital ecosystems strengthen the acceptance of AI-based technologies. Therefore, this study emphasizes the importance of building a strong CX to foster anthropomorphic perceptions of AI.

The Impact of AI Anthropomorphism on Customer Performance

The study results demonstrated that AI anthropomorphism had a significant positive effect on customer performance ($\beta = 0.437$; $t = 4.837$; $p < 0.001$). This means that the higher customers' perceptions of human-like AI, the better their performance in using digital services. More natural, empathetic, and communicative interactions from chatbots or AI systems have been shown to increase customer convenience, effectiveness, and loyalty.

These results are consistent with research by Klein & Martinez (2023) and Yanxia et al. (2023), which found that anthropomorphism in chatbots increases customer satisfaction and engagement. According to the theory of anthropomorphic technology, the perception of "human-likeness" in AI strengthens emotional bonds, making customers more proactive in interactions. Thus, the results of this study extend the literature by confirming that AI anthropomorphism impacts not only emotional perceptions but also functional outcomes in the form of customer performance.

The Influence of Customer Experience on Customer Performance through AI Anthropomorphism

Mediation path analysis shows that Customer Experience has a significant positive effect on Customer Performance through AI Anthropomorphism ($\beta = 0.236$; $t = 4.962$; $p < 0.001$). These results confirm that positive customer experience not only has a direct impact on performance but also indirectly through increased anthropomorphic perceptions of AI. Thus, AI Anthropomorphism is proven to be a partial mediator that strengthens the relationship between CX and CP.

These findings align with Gnewuch et al. (2017), who stated that enjoyable digital interactions increase customers' tendency to perceive chatbots as human, resulting in more effective interactions. Furthermore, Wamba (2022) demonstrated that positive experiences open up opportunities for deeper engagement with AI-based technology. Therefore, these research findings reinforce the view that CX is a key factor influencing CP, both directly and through the mediation of AI anthropomorphism.

Moderating Effect of Trust in AI Anthropomorphism on Customer Performance)

The results of the study showed that trust significantly moderated the relationship between AI anthropomorphism and customer performance ($\beta = 0.171$; $t = 3.094$; $p = 0.002$). This means that the level of customer trust can strengthen the influence of anthropomorphic perceptions on their performance. When trust is high, customers are more confident and comfortable interacting with AI, resulting in improved performance. Conversely, when trust is low, anthropomorphic perceptions are insufficient to drive improved customer performance.

These findings support the theory proposed by Gefen et al. (2003), which states that trust is the primary foundation for digital technology acceptance. These results are also consistent with a study by Blömker & Albrecht (2025), which asserted that trust strengthens the effectiveness of interactions with AI systems. Thus, this study confirms that the successful implementation of AI anthropomorphism in e-commerce depends not only on technological design but also on efforts to build customer trust through guarantees of security, transparency, and service consistency.

5. Conclusion

Based on the analysis using SmartPLS, this study concluded several important points. First, customer experience has a positive and significant effect on AI anthropomorphism. This indicates that the better the customer experience, the more likely they are to perceive AI as having human characteristics. Second, AI anthropomorphism has a positive effect on customer performance, meaning that customer acceptance of AI technology can improve their effectiveness and performance in interacting with digital services. Furthermore, trust was shown to play a significant role, positively influencing customer performance while moderating the relationship between AI anthropomorphism and customer performance. This means that the higher customer trust, the stronger the influence of AI anthropomorphism on customer performance. Furthermore, customer experience also indirectly influences customer performance through the mediation of AI anthropomorphism. These findings underscore the importance of building a quality customer experience while ensuring trust in technology-based interactions.

Implications

Theoretical Implications

Theoretically, this study strengthens the Technology Acceptance Model (TAM) and Social Response Theory, where customers tend to treat technology (in this case AI) like humans when it possesses strong anthropomorphism features. Furthermore, these results also broaden understanding of the role of trust as a moderating variable that strengthens the relationship between AI perceptions and customer performance. Thus, this study contributes to enriching the literature on customer experience, AI anthropomorphism, and trust in the context of digital customer behavior.

Practical Implications

From a practical perspective, the findings of this study offer several recommendations. First, companies need to improve the quality of the customer experience through responsive service, personalization, and ease of navigation to foster positive perceptions of AI. Second, when developing AI-based systems, elements of anthropomorphism, such as the use of natural language, visual expressions, or human-like interactions, should be incorporated to enhance customer experience. Third, companies must build trust through data transparency, information security, and consistent service, as trust has been shown to strengthen the relationship between AI and customer performance.

Suggestion

For further research, it is recommended that:

1. Adding other variables such as satisfaction, loyalty, or digital literacy to expand the research model.
2. Using larger and more diverse samples, so that research results can be more generalized to different populations.

3. Combining quantitative with qualitative research methods (e.g., in-depth interviews) to capture customer perceptions more comprehensively.
4. Compare the results with other analysis models such as SEM-AMOS or machine learning-based approaches to test the robustness of the model.

Limitations Study

This study has several limitations. First, the number and diversity of respondents were relatively limited, so the results may not be widely generalizable. Second, the variables were measured solely using a questionnaire, thus relying on respondents' subjective perceptions and being prone to bias. Third, the research model only included customer experience, AI anthropomorphism, trust, and customer performance, thus failing to consider other potentially influential external factors. Finally, the SmartPLS analysis method did not compare the results with other models, so further research is needed to test the consistency of the findings.

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