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The Impact of AI Chatbots, Service Personalization, and Response Speed on Customer Satisfaction in E-Commerce in Indonesia

Rini Hadiyati[1], Feba Dinova Dex Tovtora S[2]
[1] Universitas Muhammadiyah Luwuk and hadiyati.rini84@gmail.com
[2] Universitas Muhammadiyah Tangerang and febadinova@gmail.com

ABSTRACT

This study investigates the impact of AI chatbots, service personalization, and response speed on customer satisfaction in the e-commerce sector in Indonesia. As e-commerce platforms continue to grow, customer satisfaction has become a critical factor in maintaining competitiveness. A quantitative approach was employed, utilizing a structured questionnaire to gather data from 175 respondents. The data were analyzed using multiple regression analysis through SPSS version 25. The results indicated that AI chatbots, service personalization, and response speed all have a significant positive impact on customer satisfaction, with response speed having the strongest influence. These findings suggest that optimizing AI chatbot functionalities, enhancing personalized experiences, and improving response speed are essential strategies for e-commerce businesses aiming to enhance customer satisfaction. This study provides valuable insights for e-commerce practitioners in Indonesia and contributes to the literature on customer service in digital platforms.

Keywords: *AI Chatbots, Service Personalization, Response Speed, Customer Satisfaction, E-Commerce.*

1. INTRODUCTION

The rapid development of digital technology has transformed the landscape of global commerce, with e-commerce emerging as one of the most dynamic sectors in the digital economy. In Indonesia, e-commerce growth has been particularly significant, driven by increasing internet penetration, widespread smartphone adoption, and the expansion of digital payment systems [1]. As a result, Indonesia has become one of the largest e-commerce markets in Southeast Asia, with millions of consumers relying on online platforms for purchasing goods and services. This growth has intensified competition among e-commerce firms, forcing them to continuously improve service quality and customer experience to maintain satisfaction and loyalty [2]. In such a highly competitive environment, customer satisfaction has become a critical determinant of business success. Unlike traditional retail, e-commerce transactions are characterized by limited face-to-face interaction, high information asymmetry, and greater uncertainty regarding service outcomes. As a result, customers rely heavily on digital service attributes—such as system responsiveness, personalization, and automated assistance—when evaluating their satisfaction. Failing to meet customer expectations in these areas can lead to dissatisfaction, negative word-of-mouth, and customer switching behavior [3], [4]. Therefore, e-commerce companies are increasingly adopting advanced digital technologies, especially artificial intelligence (AI), to improve service delivery and customer engagement.

One of the most prominent applications of AI in e-commerce is the use of AI-powered chatbots, which are automated conversational agents designed to simulate human-like interactions and provide real-time assistance to customers. These chatbots are widely used to handle customer inquiries, provide product recommendations, track orders, resolve complaints, and support post-purchase services [5], [6]. The adoption of AI chatbots offers several advantages for e-commerce firms, including cost efficiency, scalability, and the ability to provide 24/7 customer support. From the customer's perspective, chatbots can reduce waiting times, improve access to information, and

enhance the overall service experience. However, the effectiveness of AI chatbots in improving customer satisfaction largely depends on their accuracy, usability, and perceived intelligence. In addition to AI chatbots, service personalization has become a key strategy in modern e-commerce platforms. Service personalization refers to the ability of an e-commerce system to tailor content, recommendations, and services based on individual customer preferences, behavior, and purchase history. Personalized services can include customized product recommendations, personalized promotions, adaptive user interfaces, and targeted communication. Prior studies suggest that personalization can enhance perceived relevance, reduce search effort, and strengthen emotional connections between customers and platforms. In the Indonesian e-commerce context, where consumers are increasingly diverse in terms of demographics, preferences, and purchasing power, personalization plays an important role in meeting heterogeneous customer needs and improving satisfaction levels.

Another crucial factor influencing customer satisfaction in e-commerce is response speed, which refers to how quickly an e-commerce platform or its customer service system responds to customer inquiries, complaints, or requests. In digital environments, customers tend to have high expectations for immediate responses due to the real-time nature of online interactions, and delays in response time may lead to frustration, reduced trust, and negative evaluations of service quality. With the increasing use of AI chatbots and automated systems, response speed has become an important indicator of technological effectiveness and service efficiency. Fast response times not only improve functional service quality but also signal professionalism and reliability, which can positively influence customer satisfaction. Despite the growing importance of AI chatbots, service personalization, and response speed in e-commerce, empirical research examining their combined impact on customer satisfaction in the Indonesian context remains limited. Many previous studies have focused on traditional service quality dimensions or have examined AI adoption in developed economies. Indonesia presents a unique research context due to its rapidly growing digital market, diverse consumer base, and varying levels of technological literacy. Understanding how Indonesian consumers perceive AI-based services and how these perceptions influence customer satisfaction is essential for both academic and managerial purposes.

Furthermore, existing studies often examine these factors in isolation, without considering their simultaneous effects on customer satisfaction. In practice, AI chatbots, personalization features, and response speed are interrelated components of an integrated digital service system noted in the service quality literature. For example, AI chatbots are often deployed to enhance response speed and deliver personalized interactions. Therefore, analyzing these variables together provides a more comprehensive understanding of how AI-driven service attributes shape customer satisfaction in e-commerce environments. Based on these considerations, this study aims to investigate the impact of AI chatbots, service personalization, and response speed on customer satisfaction in e-commerce in Indonesia. Using a quantitative research approach, this study collects data from e-commerce users through a structured questionnaire measured using a Likert scale. The data are analyzed using Statistical Package for the Social Sciences (SPSS) version 25 to test the proposed relationships. By focusing on the Indonesian e-commerce context, this study seeks to provide empirical evidence that reflects local consumer perceptions and behaviors toward AI-enabled services. The findings of this research are expected to contribute to the literature on e-commerce, digital service quality, and AI adoption by extending empirical insights into emerging markets. From a practical perspective, the results can assist e-commerce practitioners and managers in designing more effective AI-based

customer service strategies, optimizing personalization mechanisms, and improving response speed to enhance customer satisfaction. Ultimately, this study highlights the strategic role of AI-driven service innovations in sustaining competitiveness and delivering superior customer experiences in Indonesia's rapidly evolving e-commerce industry

2. LITERATURE REVIEW

2.1 E-Commerce and Customer Satisfaction

E-commerce refers to commercial transactions conducted electronically through online platforms, enabling consumers to purchase goods and services without physical interaction. The growth of e-commerce has significantly altered consumer behavior and expectations, particularly in terms of service quality and convenience [7], [8]. In digital environments, customer satisfaction is defined as a customer's overall evaluation of their online shopping experience based on the comparison between expectations and perceived performance. High levels of customer satisfaction are associated with positive outcomes such as repeat purchases, customer loyalty, and favorable word-of-mouth, making it a key performance indicator for e-commerce firms [9], [10]. In the context of e-commerce, customer satisfaction is influenced by multiple factors, including website usability, information quality, security, responsiveness, and customer service quality. Unlike traditional retail settings, customers interact primarily with technological interfaces rather than human service providers. As a result, the quality of technology-mediated services plays a crucial role in shaping customer perceptions and satisfaction. Previous studies suggest that efficient, reliable, and user-friendly digital services can reduce perceived risk and increase trust, thereby enhancing overall customer satisfaction.

2.2 Artificial Intelligence Chatbots in E-Commerce

Artificial intelligence (AI) chatbots are computer-based systems designed to interact with users through natural language processing and machine learning techniques. In e-commerce, AI chatbots are widely used to automate customer service functions such as answering frequently asked questions, providing product information, assisting with order tracking, and resolving basic complaints [1]. The increasing adoption of AI chatbots reflects the need for e-commerce platforms to provide continuous, scalable, and cost-effective customer support. From a theoretical perspective, AI chatbots can be explained through the lens of technology acceptance and service automation theories, which suggest that perceived usefulness and ease of use influence user satisfaction. When chatbots are perceived as helpful, accurate, and easy to interact with, customers are more likely to develop positive attitudes toward the service. Empirical studies have found that AI chatbots can improve service efficiency and customer experience by reducing waiting time and offering immediate assistance [11], [12]. However, limitations such as lack of emotional intelligence or inability to handle complex queries may negatively affect customer perceptions if not properly managed. In the e-commerce context, customer satisfaction with AI chatbots depends on factors such as response accuracy, conversational quality, and system reliability. Well-designed chatbots can simulate human-like interactions and create a sense of engagement, thereby enhancing satisfaction, whereas poorly designed chatbots may cause

frustration and reduce service quality perceptions. Therefore, understanding the role of AI chatbots in shaping customer satisfaction is essential for evaluating their effectiveness in digital commerce.

2.3 Service Personalization in E-Commerce

Service personalization refers to the customization of products, services, and communication based on individual customer characteristics, preferences, and behavioral data. In e-commerce, personalization is enabled by data analytics and AI technologies that process large volumes of customer data to deliver tailored recommendations, targeted promotions, and personalized user experiences. Personalization aims to increase the relevance of offerings and reduce information overload, thereby improving the efficiency and enjoyment of the shopping process [13]. Theoretically, personalization is grounded in relationship marketing and customer-centric perspectives, which emphasize the importance of understanding and responding to individual customer needs. Personalized services can enhance perceived value and emotional attachment by making customers feel recognized and understood [14], [15]. Prior research indicates that personalization positively influences customer satisfaction by improving perceived fit between customer needs and service offerings. Personalized recommendations, for instance, can simplify decision-making and increase confidence in purchase choices. In the Indonesian e-commerce market, service personalization is particularly relevant due to the diversity of consumer preferences and shopping behaviors. Effective personalization strategies can help platforms differentiate themselves and build stronger customer relationships. However, excessive or poorly executed personalization may raise privacy concerns or be perceived as intrusive, potentially reducing customer satisfaction. Therefore, the impact of service personalization on customer satisfaction depends on the balance between relevance and respect for customer privacy.

2.4 Response Speed in E-Commerce Services

Response speed refers to the time taken by an e-commerce platform or its customer service system to respond to customer inquiries, requests, or complaints. In online environments, response speed is a critical dimension of service quality, as customers often expect immediate or near-instant feedback. Fast response times can signal efficiency, reliability, and professionalism, which positively influence customer perceptions of service quality. From the perspective of service quality theory, responsiveness is one of the key dimensions that determine customer satisfaction [1], [16]. In e-commerce, responsiveness is closely linked to technological capabilities such as system performance, automation, and AI integration. AI chatbots, for example, are commonly implemented to improve response speed by providing instant replies without human intervention. Empirical studies have shown that quicker response times can reduce customer frustration, enhance trust, and increase satisfaction. In contrast, slow or delayed responses may lead to dissatisfaction and perceptions of poor service quality. Customers may interpret delays as a lack of concern or competence, especially when alternative platforms offer faster service. In highly competitive e-commerce markets, response speed can therefore serve as a key differentiating factor.

Understanding its influence on customer satisfaction is essential for evaluating the effectiveness of digital customer service systems [13], [17].

3. METHODS

3.1 Research Design

This study adopts a quantitative research design to examine the impact of AI chatbots, service personalization, and response speed on customer satisfaction in e-commerce in Indonesia. A quantitative approach is appropriate because it enables the measurement of relationships between variables using numerical data and statistical analysis. The study employs a cross-sectional survey design, in which data are collected from respondents at a single point in time to capture their perceptions and experiences related to e-commerce services.

3.2 Population and Sample

The population of this study consists of individuals in Indonesia who have experience using e-commerce platforms and interacting with online customer service features, including AI chatbots. Given the broad and diverse nature of the e-commerce user population in Indonesia, a non-probability sampling technique was applied. Specifically, purposive sampling was used to select respondents who met the following criteria: (1) have used e-commerce platforms in Indonesia, (2) have made at least one online purchase in the past six months, and (3) have interacted with customer service features such as chatbots or online support. A total of 175 valid responses were collected and used for data analysis. This sample size is considered adequate for quantitative analysis using multiple regression techniques and meets the minimum requirements for statistical testing using SPSS.

3.3 Data Collection Method

Primary data were collected using a structured questionnaire distributed online. The questionnaire was designed to capture respondents' perceptions of AI chatbots, service personalization, response speed, and overall customer satisfaction when using e-commerce platforms in Indonesia. Online distribution was chosen due to its efficiency, accessibility, and suitability for reaching active e-commerce users. Before data collection, the questionnaire items were adapted from relevant prior studies and modified to fit the context of Indonesian e-commerce. To ensure clarity and relevance, the questionnaire was written in simple and understandable language. A brief explanation of the study's purpose was provided to respondents, and participation was voluntary and anonymous.

3.4 Measurement of Variables

All variables in this study were measured using a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The operational definitions of the variables are as follows: AI Chatbots (X1) measures respondents' perceptions of the usefulness, accuracy, ease of use, and effectiveness of AI chatbots in e-commerce platforms, with indicators such as the chatbot's ability to provide clear information, solve problems, and assist customers efficiently. Service Personalization (X2) reflects the extent to which e-commerce platforms provide customized services based on individual preferences and behavior, with indicators including personalized product recommendations, tailored promotions, and relevance of content displayed to users. Response Speed (X3) measures respondents' perceptions of how quickly e-commerce platforms or customer service systems respond to inquiries, complaints, or requests, with indicators including waiting time, promptness of replies, and perceived efficiency of service responses. Customer Satisfaction (Y) represents the overall level of satisfaction experienced by customers when using e-commerce platforms, with indicators including satisfaction with the service experience, fulfillment of expectations, and willingness to continue using the platform.

3.5 Data Analysis Technique

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Data analysis was conducted in several stages. First, descriptive statistics were used to summarize respondent characteristics and provide an overview of the data distribution. Second, validity and reliability tests were performed to ensure that the measurement instruments were appropriate and consistent. Item validity was assessed using correlation analysis, while reliability was evaluated using Cronbach's alpha coefficient. Next, classical assumption tests were conducted to ensure that the data met the requirements for regression analysis, including normality, multicollinearity, and heteroscedasticity tests. After confirming that the assumptions were satisfied, multiple linear regression analysis was employed to examine the effect of AI chatbots, service personalization, and response speed on customer satisfaction. Hypothesis testing was carried out using t-tests to assess the significance of each independent variable and an F-test to evaluate the overall model significance. The coefficient of determination (R^2) was also calculated to determine the extent to which the independent variables explain variations in customer satisfaction.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Descriptive statistics were computed for the four key variables in this study: AI Chatbots, Service Personalization, Response Speed, and Customer Satisfaction. The data was gathered using a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Below is a summary of the mean, standard deviation, minimum, and maximum values for each variable, which provides an overview of respondents' perceptions of these e-commerce service attributes.

Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation	Min	Max	N
AI Chatbots	3.85	0.80	1	5	175
Service Personalization	4.00	0.75	2	5	175
Response Speed	4.10	0.70	2	5	175
Customer Satisfaction	4.05	0.72	2	5	175

Table 1 presents the descriptive statistics for AI Chatbots, Service Personalization, Response Speed, and Customer Satisfaction. The mean score for AI Chatbots was 3.85, indicating a generally positive view of their effectiveness, with a standard deviation of 0.80 suggesting moderate variability in responses. The minimum and maximum values of 1 and 5 show that while most respondents had positive perceptions, some strongly disagreed or agreed. Service personalization scored a mean of 4.00, reflecting agreement on the value of personalized services in e-commerce, with a standard deviation of 0.75 indicating fairly consistent responses. The minimum score of 2 and maximum score of 5 suggest some variability, with a few respondents feeling neutral or less positive about personalization. Response Speed had the highest mean of 4.10, demonstrating high appreciation for fast response times, with a standard deviation of 0.70 showing alignment in respondents' expectations. The minimum value of 2 and maximum value of 5 indicate that most respondents favored quick responses, though some rated it less favorably. Finally, Customer Satisfaction had a mean score of 4.05, signaling general satisfaction with e-commerce experiences, with a standard deviation of 0.72 suggesting some variation in satisfaction levels. The minimum and maximum values of 2 and 5 indicate that while most were satisfied, a few were neutral or dissatisfied.

4.2 Validity and Reliability Test Results

In order to ensure the robustness of the measurement instruments used in this study, validity and reliability tests were conducted. These tests assess the accuracy and consistency of the

survey items used to measure the key constructs, namely AI Chatbots, Service Personalization, Response Speed, and Customer Satisfaction. Below are the results of the validity and reliability tests.

Validity refers to the degree to which an instrument measures what it is supposed to measure. In this study, validity was assessed using item-total correlation and construct validity. The item-total correlation for all questionnaire items was calculated to determine the extent to which each item correlates with the total score for its respective variable. According to Hair et al. (2010), a correlation of 0.30 or higher is considered acceptable. In this study, all items had correlation values above 0.30, indicating that the items were valid and meaningfully related to their respective constructs. Construct validity was assessed using exploratory factor analysis (EFA). Factor loadings for all items were examined to determine whether each item loaded highly on the intended factor and did not cross-load on other factors. The results indicated that all items loaded strongly on their respective constructs with factor loadings exceeding 0.50, suggesting good construct validity. Furthermore, the Kaiser-Meyer-Olkin (KMO) measure was 0.85, which is considered excellent, and the Bartlett's Test of Sphericity yielded a significant value ($p < 0.01$), further confirming the suitability of the data for factor analysis.

Reliability refers to the consistency of the measurement instrument. In this study, reliability was evaluated using Cronbach's alpha, which is a measure of internal consistency. A Cronbach's alpha value above 0.70 is considered acceptable for reliability in social science research (Nunnally, 1978). Cronbach's alpha for the AI Chatbots scale was 0.87, indicating excellent reliability. This suggests that the items used to measure AI chatbots were consistent in assessing respondents' perceptions of AI chatbot effectiveness. The Cronbach's alpha for Service Personalization was 0.82, well above the threshold of 0.70, indicating that the items measuring service personalization were reliable. The Cronbach's alpha for the Response Speed scale was 0.79, which falls within the acceptable range, suggesting that the items consistently measured the respondents' perceptions of the speed of responses from e-commerce platforms. The Cronbach's alpha for Customer Satisfaction was 0.80, indicating good reliability, confirming that the items measuring customer satisfaction were consistently evaluating respondents' overall satisfaction with their e-commerce experiences.

4.3 Classical Assumption Test Results

Before proceeding with the multiple regression analysis, several classical assumption tests were conducted to ensure the validity of the regression model. These tests included normality, multicollinearity, and heteroscedasticity. Meeting these assumptions is essential for ensuring that the regression results are reliable and interpretable.

Table 2. Classical Assumption Test Results

Test	Test Statistic	Value	Decision
Normality (Shapiro-Wilk)	p-value	0.112	Residuals are normally distributed
Skewness	Value	-0.19	Acceptable range (-1 to +1)
Kurtosis	Value	0.342	Acceptable range (-3 to +3)
Multicollinearity (VIF)	AI Chatbots	1.853	No multicollinearity (VIF < 10)
	Service Personalization	1.744	No multicollinearity (VIF < 10)
	Response Speed	1.627	No multicollinearity (VIF < 10)
Tolerance	AI Chatbots	0.542	No multicollinearity (Tolerance > 0.10)
	Service Personalization	0.573	No multicollinearity (Tolerance > 0.10)
	Response Speed	0.625	No multicollinearity (Tolerance > 0.10)
Heteroscedasticity (Breusch-Pagan)	p-value	0.178	No heteroscedasticity (p > 0.05)

Table 2 summarizes the results of the classical assumption tests for normality, multicollinearity, and heteroscedasticity. The Shapiro-Wilk test for normality yielded a p-value of 0.112, indicating that the residuals are normally distributed, as the p-value is greater than 0.05. Additionally, the skewness and kurtosis values were within the acceptable ranges, with skewness at -0.19 and kurtosis at 0.342, further confirming normality. For multicollinearity, the Variance Inflation Factor (VIF) values for AI Chatbots (1.853), Service Personalization (1.744), and Response Speed (1.627) were all below 10, and the tolerance values for these variables (0.542, 0.573, and 0.625, respectively) were all above 0.10, indicating no multicollinearity. The Breusch-Pagan test for heteroscedasticity returned a p-value of 0.178, suggesting no heteroscedasticity as the p-value is greater than 0.05. These results confirm that the assumptions of normality, no multicollinearity, and homoscedasticity are satisfied for the regression model.

4.4 Multiple Regression Analysis Results

To examine the relationships between AI Chatbots, Service Personalization, Response Speed, and Customer Satisfaction, a multiple regression analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 25. The aim was to assess the significance and strength of the independent variables in predicting customer satisfaction. The results of the analysis are presented in the following sections. The Model Summary revealed that the coefficient of determination (R^2) was 0.72, meaning that approximately 72% of the variance in customer satisfaction can be explained by AI Chatbots, Service Personalization, and Response Speed. The adjusted R^2 of 0.70 indicates a good fit, as it explains 70% of the variation in customer satisfaction when adjusting for the number of predictors in the model.

The ANOVA table tests the overall significance of the regression model, comparing it to a model with no predictors. The F-statistic of 148.22 and the p-value of < 0.001 indicate that the regression model is highly significant, suggesting that the combination of AI Chatbots, Service Personalization, and Response Speed significantly explains variations in customer satisfaction. Finally, the Coefficients table presents the individual impact of each independent variable on customer satisfaction, showing the magnitude and direction of the relationship between each predictor and the dependent variable.

Variable	Unstandardized Coefficients (B)	Standardized Coefficients (β)	t-value	p-value
AI Chatbots	0.280	0.225	4.35	< 0.001
Service Personalization	0.310	0.241	4.86	< 0.001
Response Speed	0.430	0.368	6.01	< 0.001
Constant	1.250			

The interpretation of the results reveals the individual impact of AI Chatbots, Service Personalization, and Response Speed on customer satisfaction. For AI Chatbots, the unstandardized coefficient of 0.280 indicates that for every one-unit increase in the perception of AI chatbots' effectiveness, customer satisfaction increases by 0.280 units, with a moderate positive relationship ($\beta = 0.225$). The t-value of 4.35 and p-value of < 0.001 confirm that this relationship is statistically significant. Service Personalization has an unstandardized coefficient of 0.310, suggesting that for every one-unit increase in service personalization, customer satisfaction increases by 0.310 units, with a standardized coefficient (β) of 0.241 indicating a moderate positive relationship. The t-value of 4.86 and p-value of < 0.001 show that this relationship is also statistically significant. Response Speed, with an unstandardized coefficient of 0.430, shows that for every one-unit increase in perceived response speed, customer satisfaction increases by 0.430 units. The standardized coefficient (β) of 0.368 indicates that response speed has the strongest positive relationship with

customer satisfaction among the three predictors, and the t-value of 6.01 and p-value of < 0.001 confirm the statistical significance of this relationship.

Discussion

The results of this study provide valuable insights into the relationships between AI chatbots, service personalization, response speed, and customer satisfaction in e-commerce in Indonesia. The analysis revealed that all three independent variables—AI chatbots, service personalization, and response speed—have significant positive effects on customer satisfaction. These findings are consistent with previous research on e-commerce service quality and technology adoption but also offer new insights specific to the Indonesian market, which is characterized by its rapidly growing digital economy [18], [19].

The significant positive relationship between AI chatbots and customer satisfaction underscores the importance of AI-driven customer service solutions in the e-commerce sector. AI chatbots, which provide fast and accurate responses to customer inquiries, can significantly enhance the customer experience by reducing waiting times and improving accessibility. [18], [20] However, while AI chatbots received a relatively strong positive rating, some respondents noted their limitations in handling more complex or nuanced inquiries. E-commerce platforms should focus on continuously improving chatbot algorithms and integrating advanced AI capabilities to handle a wider range of customer queries, thereby enhancing customer satisfaction.

Service personalization emerged as another important predictor of customer satisfaction, reinforcing the value of tailored experiences in digital platforms. Personalized services, such as customized product recommendations and targeted promotions, were found to enhance the emotional connection between customers and e-commerce platforms. In the Indonesian context, where consumer preferences vary due to cultural and regional differences, e-commerce firms should invest in data-driven personalization strategies. However, e-commerce platforms must also balance personalization with privacy concerns, ensuring transparent data usage policies to maintain customer trust. The strongest impact on customer satisfaction was found in response speed, highlighting the importance of quick responses in e-commerce environments. E-commerce platforms should prioritize response time optimization, particularly through AI chatbots and other automated technologies, to meet customers' growing expectations for fast service across various touchpoints.

Implications for E-Commerce Businesses in Indonesia

The findings of this study offer important implications for e-commerce businesses in Indonesia. To enhance customer satisfaction, businesses should prioritize strategies such as enhancing AI chatbot capabilities, focusing on personalized experiences, optimizing response speed, and maintaining a balance with privacy. E-commerce platforms should invest in improving AI chatbot systems to provide faster, more accurate, and personalized responses by upgrading natural language processing (NLP) and integrating AI with customer data to handle a wider range of queries. Personalization should be central to the customer experience, with businesses leveraging data analytics to offer customized product recommendations, promotions, and tailored content, which can significantly boost customer satisfaction. Additionally, fast response times are crucial, and businesses must ensure their customer service systems provide quick, real-time assistance by optimizing chatbot responses, live chat support, and automating responses to common inquiries. Lastly, businesses should balance personalization with privacy by being transparent about data usage and respecting customer privacy concerns, allowing them control over the level of personalization they receive.

Limitations of the Study and Future Research Directions

Although this study provides valuable insights into the impact of AI chatbots, service personalization, and response speed on customer satisfaction in e-commerce, there are several limitations to consider. First, the study used a cross-sectional design, capturing customer perceptions

at a single point in time, which limits the ability to observe how these relationships evolve over time or in response to changes in technology and customer behavior. Future research could employ a longitudinal design to examine these dynamics over a longer period. Second, the study focused solely on the Indonesian e-commerce market, which may limit the generalizability of the findings to other countries with different cultural contexts and levels of technological adoption. Future studies could expand the scope to include multiple countries or regions, allowing for comparisons of the effectiveness of AI-driven service attributes in various cultural and market contexts. Finally, the study relied on self-reported data, which could be subject to biases such as social desirability or recall bias. Incorporating behavioral data, such as actual purchase behavior or usage patterns, in future research could provide a more objective measure of customer satisfaction and the impact of service attributes.

CONCLUSION

This study explored the roles of AI chatbots, service personalization, and response speed in shaping customer satisfaction within the e-commerce sector in Indonesia. The findings clearly demonstrate that all three factors have a significant and positive effect on customer satisfaction, with response speed being the most influential. The results highlight the increasing importance of AI-driven services in enhancing the customer experience, particularly in fast-paced online shopping environments where timely and personalized service is paramount. E-commerce businesses in Indonesia are encouraged to invest in improving their AI chatbots, ensuring fast response times, and delivering personalized experiences to maintain high levels of customer satisfaction. Additionally, the study underscores the need for a balanced approach to service personalization that respects customer privacy concerns. Future research could expand the scope of this study to examine these relationships across different cultural and market contexts, as well as over extended periods of time to assess the long-term impact of these service attributes on customer loyalty and business performance.

REFERENCES

[1] N. Samala, B. S. Katkam, R. S. Bellamkonda, and R. V. Rodriguez, "Impact of AI and robotics in the tourism sector: a critical insight," *J. Tour. Futur.*, vol. 8, no. 1, pp. 73–87, 2022, doi: 10.1108/JTF-07-2019-0065.

[2] M. Adam, M. Wessel, and A. Benlian, "AI-based chatbots in customer service and their effects on user compliance," *Electron. Mark.*, vol. 31, no. 2, pp. 427–445, 2021.

[3] D. Astria and M. Santi, "Pemanfaatan Aplikasi Whatsapp Bisnis Dalam Strategi Pemasaran Online Untuk Meningkatkan Jumlah Penjualan," *… Ekon. Syari'ah &Bisnis Islam …*, 2021.

[4] K. S. Kyaw, P. Tepsongkroh, C. Thongkamkaew, and F. Sasha, "Business Intelligent Framework Using Sentiment Analysis for Smart Digital Marketing in the E-Commerce Era," *Asia Soc. Issues*, vol. 16, no. 3, pp. e252965–e252965, 2023.

[5] Y. Li and Y. Wang, "Influence and strategy of 5G technology on E-commerce marketing and operation mode," *… Cogn. based Inf. Process. …*, 2022, doi: 10.1007/978-981-16-5854-9_85.

[6] Apprilisda Ranica Putri, Devi Maria Saadah, Iis Nurkamillah, Silven Yonathan, Sucya Sri Yuliana, and Ricky Firmansyah, "Peran E-commerce Sebagai Media Komunikasi Bisnis Dalam Peningkatan Penjualan UMKM Salaut Di Universitas Teknologi Digital," *J. Kaji. dan Penelit. Umum*, vol. 1, no. 3 SE-Articles, pp. 1–16, May 2023, doi: 10.47861/jkpu-nalanda.v1i3.181.

[7] Q. Yang, "Research on e-commerce customer satisfaction evaluation method based on pso-lstm and text mining," *3c Empres. Investig. y Pensam. crítico*, vol. 12, no. 1, pp. 51–66, 2023.

[8] R. Ramdani and S. Saad, "Service Quality and Customer Satisfaction on E-commerce Platform Towards Apparel Products in Indonesia," *J. Inf. Syst. Technol. Manag.*, vol. 8, no. 31, pp. 20–34, 2023.

[9] V. Kumar, V. Kumar, S. Singh, N. Singh, and M. Banoth, "The Impact of User Experience Design on Customer Satisfaction in E-commerce Websites," *Int. J. Res. Appl. Sci. Eng. Technol.*, vol. 11, pp. 4571–4575, May 2023, doi: 10.22214/ijraset.2023.52580.

[10] C. P. Nursalim, T. Tannia, and A. Robert, "Service Quality And Perceived Value Toward Customer Satisfaction In E-Commerce Delivery: The Role Of Trust," *Int. J. Appl. Bus. Int. Manag.*, vol. 10, no. 1, pp. 136–153, 2025, doi: 10.32535/ijabim.v10i1.3741.

[11] A. J. Wójcik-Czerniawska, "The Role of Artificial Intelligence in Modern Finance and Sustainable Marketing," in *Handbook of Research on Achieving Sustainable Development Goals With Sustainable Marketing*, IGI Global, 2023, pp. 355–

371.
[12] H. Wang, B. Kang, L. Peng, and Y. Shi, "Analysis and Research on the Marketing Strategy of Agricultural Products Based on Artificial Intelligence," *Math. Probl. Eng.*, vol. 2022, 2022.
[13] P. Sahu and P. Mandal, "Unleashing the Power of Customer Personalization in the Digital Age With Artificial Intelligence," in *Improving Service Quality and Customer Engagement With Marketing Intelligence*, IGI Global, 2024, pp. 97–113.
[14] E. M. Olson, K. M. Olson, A. J. Czaplewski, and T. M. Key, "Business strategy and the management of digital marketing," *Bus. Horiz.*, 2021.
[15] Y. Gao and H. Liu, "Artificial intelligence-enabled personalization in interactive marketing: a customer journey perspective," *J. Res. Interact. Mark.*, vol. 17, no. 5, pp. 663–680, 2023.
[16] G. Priyanga, "The Effects of Artificial Intelligence on Digital Marketing.," *ShodhKosh J. Vis. Perform. Arts*, vol. 4, pp. 158–167, 2023.
[17] A. Haleem, M. Javaid, M. A. Qadri, R. P. Singh, and R. Suman, "Artificial intelligence (AI) applications for marketing: A literature-based study," *Int. J. Intell. Networks*, vol. 3, pp. 119–132, 2022.
[18] D. Chong and H. Ali, "LITERATURE REVIEW: COMPETITIVE STRATEGY, COMPETITIVE ADVANTAGES, AND MARKETING PERFORMANCE ON E-COMMERCE SHOPEE INDONESIA," *Dinasti Int. J. Digit. Bus. Manag.*, vol. 3, no. 2, pp. 299–309, 2022.
[19] S. Mujiatun, B. Trianto, E. F. Cahyono, and Rahmayati, "The Impact of Marketing Communication and Islamic Financial Literacy on Islamic Financial Inclusion and MSMEs Performance: Evidence from Halal Tourism in Indonesia," *Sustainability*, vol. 15, no. 13, p. 9868, 2023.
[20] R. Bhinekawati, "ALKO Cooperatives' Social Initiatives: Empowering Coffee Farmers to Preserve Kerinci Seblat National Park, Indonesia," in *Sustainability and Social Marketing Issues in Asia*, Emerald Publishing Limited, 2023, pp. 183–206.