ProBisnis : Jurnal Manajemen, 16 (5) (2025) pp. 962-970

Published by: Lembaga Riset, Publikasi, dan Konsultasi Jonhariono

ProBisnis : Jurnal Manajemen

Journal homepage: www.jonhariono.org/index.php/ProBisnis

The Impact of Using Chatbots in Improving Customer Service in the E-commerce Industry

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ARTICLE INFO

Article history:

Received Aug 4, 2025
Revised Aug 23, 2025
Accepted Sep 8, 2025

Keywords:

Chatbot
Customer service
E-commerce
Customer satisfaction
Artificial intelligence
Service efficiency

ABSTRACT

The advancement of digital technology has encouraged e-commerce industry players to adopt artificial intelligence-based innovations, one of which is chatbots, as a strategy to improve the quality of customer service. This study aims to analyze the impact of using chatbots on customer satisfaction, service effectiveness, and user loyalty in the e-commerce sector. The method used is quantitative with a survey approach to 120 respondents who are active users of e-commerce platforms in Indonesia. The results of the study show that the use of chatbots significantly increases the speed of response, 24/7 service availability, and ease of access to information which has a positive impact on customer satisfaction. In addition, chatbots also contribute to increasing operational efficiency and reducing the workload of conventional customer service. However, the limitations of chatbots in handling complex problems are still an obstacle that affects user perceptions of service personalization. These findings provide important implications for e-commerce managers to continue to develop more adaptive, responsive, and humane chatbot features in order to improve the quality of interactions with customers in a sustainable manner.

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1. INTRODUCTION

The development of digital technology has driven massive transformations in various industrial sectors, including the e-commerce industry. In today's digital economy era, customer service is one of the key factors in maintaining consumer loyalty and increasing business competitiveness (Solikhah et al., 2024). Changes in consumer behavior that increasingly demand speed, convenience, and efficiency in interacting with service providers encourage e-commerce players to continue to innovate in providing adaptive customer service solutions (Fauzia et al., n.d.; Solikhah et al., 2023). One of the innovations that has stood out in recent years is the use of chatbots, which are artificial intelligence programs designed to communicate automatically with users through a conversational interface (Adam et al., 2021). Chatbots offer the ability to respond to customer questions instantly, 24 hours a day, without the need for direct involvement from human staff. The existence of chatbots allows companies to automate basic communication processes such as answering frequently asked questions (FAQs), providing product information, and assisting with the purchase and return process (Bakkouri et al., 2022). Amid the massive growth of e-commerce transactions, this efficiency is very important. Chatbots not only provide benefits from the operational side of the company, but are also able to improve the user experience by providing fast, consistent, and personalized services (Wibowo et al., 2020). However, the adoption of chatbots in customer service is not without challenges and debates. On the one hand, chatbots are considered capable of effectively replacing traditional customer service functions. On the other hand, concerns have arisen regarding the limitations of

chatbots' ability to understand complex conversational contexts, provide empathetic solutions, and establish emotional connections with customers (Solikhah, 2024). Several studies have shown that although chatbots provide speed and efficiency, customers still tend to prefer human interaction in situations that require high flexibility and empathy (Vebrianti et al., 2025). Therefore, it is important to examine in more depth the extent to which chatbots actually impact the quality of customer service, both from the perspective of the company and the consumer. In the context of Indonesia, the growth of the e-commerce industry has increased significantly, especially since the COVID-19 pandemic which accelerated the digitalization of economic activities (Tamara et al., 2023). E-commerce players such as Tokopedia, Shopee, Bukalapak, and others are competing to improve the quality of their services through the integration of the latest technology, including the use of chatbots (Solikhah et al., n.d.; Song et al., 2021). However, there is still variation in the quality and effectiveness of the chatbots used. Some users are satisfied because they get answers quickly, while others are frustrated because the answers given are less relevant or do not solve the problems they face (Song et al., 2021). This shows that the use of chatbots still has room for evaluation and development, especially related to understanding customer needs, interactivity, and the level of service personalization. Previous studies have examined the benefits of using chatbots in the context of customer service. For example, a study by (Singh & Singh, 2024) states that chatbots can reduce the workload of customer service and increase communication efficiency. Meanwhile, (Oktavia & Arifin, n.d.) highlights the importance of user perceptions of the reliability and credibility of chatbots in influencing customer satisfaction. In practice, chatbots that are not optimally designed can actually cause frustration and worsen the company's image. Therefore, a comprehensive understanding of the factors that influence the effectiveness of chatbots in improving customer service quality is needed (Mubasher Rasheed et al., 2025). In addition, chatbot technology continues to develop, from rule-based chatbots that are only able to provide responses based on certain scripts, to AI-based chatbots that use machine learning and natural language processing (Natural Language Processing/NLP) to understand context and learn from previous interactions (Ngai et al., 2021). This development opens up great opportunities for e-commerce companies to create a more sophisticated and humane service experience. However, the adoption of this new technology also requires resource readiness, adequate digital infrastructure, and good management strategies so that its implementation does not cause new problems.

Chatbot is an artificial intelligence (AI)-based system designed to automatically imitate human conversation through text or voice media. In the context of the e-commerce industry, chatbots function as customer service agents who are able to answer questions, provide product information, assist in the ordering process, and handle customer complaints in real-time (Misischia et al., 2022). Chatbots are here to increase efficiency, reduce response time, and provide a more personalized service experience to customers. According to (Kvale et al., 2021), chatbots in e-commerce have a crucial role in accelerating interactions and bridging the limitations of human services that have limited operating hours. With chatbots, customers can access 24/7 assistance without having to wait in the customer service queue (Kurniawan et al., 2024). In addition, this technology can be used to improve the operational efficiency of companies because it is able to handle many customers simultaneously. Chatbots can also be integrated with customer data to provide relevant and contextual responses (Følstad & Skjuve, 2019). Customer service is one of the strategic elements that determine customer loyalty in the e-commerce industry. In the digital era, service quality is not only measured by human response ability, but also includes automated systems such as chatbots (Vebrianti et al., 2025). According to (Mubasher Rasheed et al., 2025), the quality of electronic services has several main dimensions, namely efficiency, reliability, ease of access, and security. Chatbots are considered capable of meeting several of these dimensions, especially efficiency and speed of service. However, challenges arise when chatbots are unable to understand the emotional context of customers or complex requests, resulting in frustration and decreased satisfaction (Kvale et al., 2021). Therefore, chatbot development must consider natural, empathetic, and personalized conversational design in order to improve customer perceptions of service quality. Customer satisfaction is an important factor in determining the long-term success of an e-commerce business. Effective use of chatbots can increase customer satisfaction through easy access to information, fast response, and consistent interaction (Yi & Nataraajan, 2018). Research conducted by (Kvale et al.,

2021) states that responsive chatbots that provide appropriate solutions have a positive impact on customer experience, which further strengthens loyalty and the possibility of repeat purchases. In addition, chatbots designed with an anthropomorphic touch can build emotional closeness with users. This supports the findings of (Song et al., 2021) that personalizing chatbot interactions can create a perception of interpersonal relationships similar to human service. In the long run, this contributes to the creation of brand trust and positive word-of-mouth among consumers.

H_1: The use of chatbots has a positive effect on e-commerce customer satisfaction.

H_2: Customer satisfaction has a positive effect on customer loyalty in e-commerce.

The effectiveness of chatbots in providing customer service is influenced by several important factors, including the quality of conversation design, natural language processing technology, and the level of integration with the Company's information systems (Han, 2021). Research by (Ernestivita et al., 2024) shows that chatbots that are able to understand context accurately and provide adaptive responses have a higher success rate in creating a satisfying service experience. In addition, the type of question or problem being handled also affects the effectiveness of the chatbot. Standard information requests and simple transactions can generally be handled well by chatbots. However, for complex or emotional questions, customers tend to prefer human assistance (Ngai et al., 2021). Therefore, it is important to provide a hybrid system where chatbots and human agents can collaborate in providing solutions.

Figure 1. Mechanism of the Relationship between Chatbot to Customer Satifaction on customer Loyalty

The adoption of chatbots in customer service strategies reflects a paradigm shift from human interaction to technology-based automation. This requires companies to review their service approaches, including staff training, backend system development, and brand communication strategies. According to (Cordero et al., 2022), strategic use of chatbots can increase operational efficiency by up to 30% and reduce the workload of human customer service. However, the success of chatbot implementation is not only determined by technology, but also by user acceptance. Customers with high digital literacy are more adaptable and tend to be satisfied with chatbot services. Conversely, customers with conventional service preferences may feel less comfortable. Therefore, customer education and user-friendly design are integral parts of the chatbot development strategy.

Based on the description, it can be concluded that the use of chatbots in the e-commerce industry is not just a technology trend, but part of a business strategy that must be understood comprehensively. There needs to be an in-depth study to assess whether chatbots are truly able to improve the quality of customer service in terms of efficiency, satisfaction, and user loyalty. This research is important to answer these questions, while also contributing to the development of a more innovative customer service system that is oriented towards consumer needs in the digital era. Thus, this study aims to analyze the impact of using chatbots on customer service in the e-commerce industry, covering aspects of satisfaction, communication effectiveness, and the potential for increasing customer loyalty.

2. RESEARCH METHOD

This study uses a quantitative approach with a survey method to test the effect of chatbot usage on customer service quality on e-commerce platforms in Indonesia. Data were collected through an online questionnaire distributed to e-commerce users who had interacted with chatbots in the last 6

months. The research instrument was compiled using a 5-point Likert scale (Muri, 2016) and developed based on indicators from relevant literature, such as service quality according to (Cordero et al., 2022) and chatbot indicators from (Kumar & Mishra, 2025). The population in this study were active e-commerce users, with a purposive sampling technique and a minimum number of respondents of 120 people. The variables used in this study include chatbot usage, service quality, and customer satisfaction, each of which is described through several operational indicators. The data analysis technique was carried out using SmartPLS, starting with the validity and reliability test of the instrument, followed by path analysis to see the direct and indirect effects between variables. If using SEM-PLS, the analysis is carried out by testing outer loading, composite reliability, AVE, and R-square value (Haryono, 2017).

Table 1. Variable Definition

Variable	Definition	Indicator
Chatbot	An artificial intelligence-based system in e-commerce that provides automated responses to customers in service.	Responsiveness of chatbot in answering customer questions Accuracy of information provided Ease of use of chatbot Impression of personalization from chatbot
Customer Service Quality	The level of service excellence perceived by customers based on the interactions they experience, both directly and via chatbots.	Reliability Responsiveness Assurance Empathy Tangibles
Customer satisfaction	User satisfaction level after interacting with chatbot	Satisfaction with overall experience Conformity of service to expectations Likelihood of reuse Recommendation to others

3. RESULTS AND DISCUSSIONS

Prior to the analysis, validity and reliability tests were conducted on the distributed questionnaire. Using the SmartPLS 4.0 software, the factor loading values of each indicator were examined to evaluate the validity of the data in this study. According to (Haryono, 2017), indicators with factor loading values below 0.4 may be excluded from the research model, while values above 0.7 indicate strong validity. The results of the validity test showed that all items were valid, as they had loading factor values above 0.5, and therefore no indicators were removed from the analyzed model.

Table 2. Final Validity Test Results

Variable	Item	Loading Factor	Information
Chatbot	CB1	0.874	Valid
	CB2	0.820	Valid
	CB3	0.867	Valid
	CB4	0.790	Valid
Customer Service Quality	LP1	0.852	Valid
	LP2	0.857	Valid
	LP3	0.870	Valid
	LP4	0.827	Valid
	LP5	0.729	Valid
Customer satisfaction	KP1	0.712	Valid
	KP2	0.879	Valid
	KP3	0.889	Valid
	KP4	0.794	Valid
Acceptable Limits		**> 0.5**	**Accepted**

The validation test yielded satisfactory results, as all variable indicators demonstrated loading factor values greater than 0.5, indicating that the data is acceptable and all items are eligible to proceed to the next stage of analysis. Reliability was assessed through the measurement of composite reliability

using the output from SmartPLS 4.0. According to (Ghozali, 2008a), a variable is considered highly reliable if the composite reliability exceeds 0.7 and the Cronbach's alpha value is above 0.6.

Table 3. Reliability Test Results

Variable	Item	Construct Reliability	AVE
Chatbot	CB1	0.904	0.703
	CB2		
	CB3		
	CB4		
Customer Service Quality	LP1	0.916	0.687
	LP2		
	LP3		
	LP4		
	LP5		
Customer satisfaction	KP1	0.892	0.675
	KP2		
	KP3		
	KP4		

The reliability test results of the research questionnaire indicate that the construct reliability values for all items are equal to or greater than 0.70. Additionally, the Average Variance Extracted (AVE) for each item is also ≥ 0.50. These findings confirm that the questionnaire meets the reliability criteria, allowing the collected data to be used for further model analysis.

Testing Research Model Path Analysis

In Partial Least Squares (PLS), the estimation of weights for latent variable score components is derived from both the inner model and the outer model, where the outer model represents the relationship between indicators and their respective constructs. Structural model assessment is conducted to examine the relationships among constructs. The evaluation results of the structural model in this study are presented as follows.

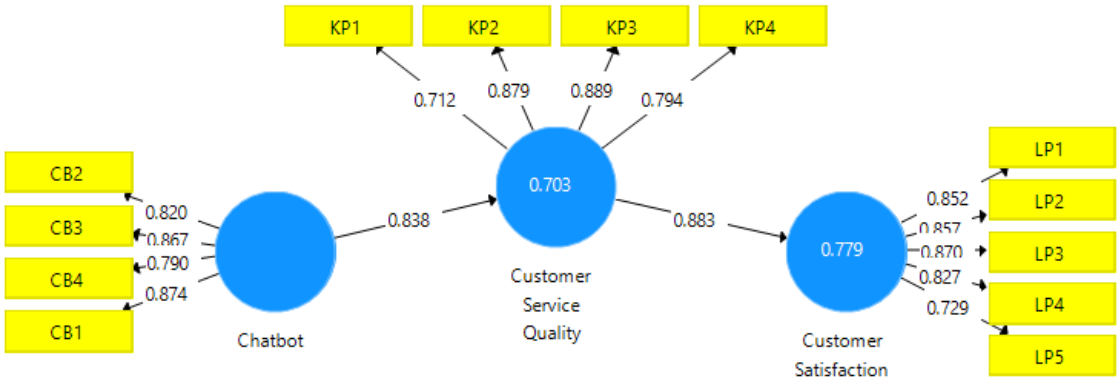

Figure 2. SmartPLS 4.0 Structural Model

Furthermore, decision making to determine whether to accept or reject the hypothesis is based on the resulting significance probability, the value of the significance level is α = 5% (0.05) (Ghozali, 2008b). The research results are presented in the following table.

Table 4. Path Model Significance Test Results

Variable	Original Sample (O)	Sample average (M)	Standard Deviation (STDEV)	T-Statistic (|O/STDEV)	P	Information
CB → KP	0.838	0.838	0.041	20.492	0.000	Accepted
KP → LP	0.883	0.881	0.027	32.794	0.000	Accepted

Based on the results of the structural model test, it was found that the use of chatbots (CB) had a positive and significant effect on customer satisfaction (KP), with an original sample value of 0.838, a t-statistic of 20.492, and a p-value of 0.000. In addition, customer satisfaction (KP) was also proven to have a significant positive effect on customer loyalty (LP), indicated by an original sample value of 0.883, a t-statistic of 32.794, and a p-value of 0.000. All t-statistic values exceeded the critical limit of 1.96 and the p-value was below 0.05, so both hypotheses were accepted. These results confirm that in the context of the e-commerce industry, effective use of chatbots can increase customer satisfaction, which ultimately encourages the creation of customer loyalty to the services provided.

Discussion

This study aims to analyze the impact of using chatbots in improving customer service in the e-commerce industry, specifically through two main relationships: the effect of using chatbots on customer satisfaction, and the effect of customer satisfaction on customer loyalty. The results of the study show that both hypotheses proposed are significantly proven, namely the use of chatbots has a positive effect on customer satisfaction, and customer satisfaction has a positive effect on customer loyalty. These findings confirm that the adoption of artificial intelligence-based technologies, such as chatbots, makes a real contribution to shaping a better customer experience and has a long-term impact on customer relationships with e-commerce platforms. First, the results of the analysis show that the use of chatbots significantly increases customer satisfaction. A well-designed chatbot can provide a fast response, is available 24 hours a day, and is able to handle various types of questions or complaints efficiently (Cordero et al., 2022). In the context of e-commerce, where customers expect responsive and informative services, chatbots are an effective solution to overcome the limitations of human services, especially in handling high volumes of requests (Mubasher Rasheed et al., 2025). This is in line with the theory of service quality which states that reliability, speed, and convenience of service are the main factors in shaping customer satisfaction.

Chatbot features such as the ability to answer product questions, track orders, provide recommendations, and resolve complaints automatically, provide added value to users. Customers feel more valued when their problems are responded to quickly and accurately, without having to wait long as in conventional services (Song et al., 2021). Thus, chatbots not only act as technical aids, but also as an important component in strategies to improve customer service quality. This finding is reinforced by the results of previous studies, such as those conducted by (Ngai et al., 2021), which showed that chatbots can increase perceptions of service efficiency and customer convenience. Likewise, a study by (Følstad & Skjuve, 2019) emphasized that user-friendly chatbots can increase customer engagement and satisfaction in digital interactions. In the local context, more and more e-commerce companies are integrating chatbots into their applications and websites to speed up services, reduce the burden on customer service teams, and increase operational scale. Furthermore, this study also found that customer satisfaction has a significant positive effect on customer loyalty in e-commerce (Vebrianti et al., 2025). Customer loyalty is a strategic asset in digital business because loyal customers not only make repeat purchases, but also tend to recommend the platform to others, provide positive reviews, and are more tolerant of minor service errors (Farhan et al., 2020). In other words, consistent satisfaction can create a long-term, mutually beneficial relationship between customers and service providers. Within the framework of consumer behavior theory, customer satisfaction is the main determinant of loyalty. When customers feel that the service received meets or even exceeds their expectations, they will have an emotional and cognitive commitment to continue using the service (Schirmer et al., 2018). In the context of e-commerce,

aspects such as ease of transaction, clarity of information, responsiveness of service, and reliability of the system greatly determine the level of satisfaction felt.

The use of chatbots contributes to the creation of this positive experience. Chatbots help create a smoother customer journey, reduce frustration when searching for information, and provide instant solutions (Mubasher Rasheed et al., 2025). Therefore, chatbots not only function in the initial stages of the transaction such as product search, but also in the post-purchase phase such as tracking and complaints, which are very important in shaping the overall service perception (Tamara et al., 2023). When these experiences are repeated and consistent, customers are more likely to remain loyal to the platform. The practical implications of these findings are very relevant for e-commerce industry players. First, the development and implementation of chatbots should be an integral part of the customer service strategy (Kvale et al., 2021). Investment in chatbots equipped with natural language processing and artificial intelligence can improve the quality of interactions and expand the scope of automated services. Second, companies need to continuously evaluate and update the performance of chatbots based on customer feedback, to ensure that the system remains relevant and responsive to user needs (Misischia et al., 2022). Third, although chatbots can replace some human service functions, the existence of human support is still important in handling complex cases that cannot be resolved by automated systems (Vebrianti et al., 2025). Therefore, the integration between chatbots and human agents must be carried out in a balanced manner to ensure maximum satisfaction. Customers need to feel that even though they are served by machines, quality and empathy are maintained. Overall, this study confirms that chatbots have a strategic role in increasing customer satisfaction, which in turn drives customer loyalty in e-commerce. This technology is not just a supporting tool, but is an important part of building a superior customer experience. Therefore, e-commerce companies that want to compete sustainably need to make chatbot optimization a priority in developing digital-based customer services.

4. CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that the use of chatbots in e-commerce services has a positive effect on customer satisfaction. This shows that chatbot technology that is able to provide fast, accurate responses, and is available 24 hours a day can significantly improve the customer shopping experience. The satisfaction felt by customers from these interactions creates a feeling of being appreciated and facilitated in the transaction process. Furthermore, this study also proves that customer satisfaction has a positive effect on customer loyalty in e-commerce. Customers who feel satisfied tend to make repeat purchases, recommend the platform to others, and have a long-term relationship with the service. Therefore, improving the quality of chatbot services is an important strategy in increasing satisfaction and building customer loyalty sustainably in the increasingly competitive e-commerce industry. This research has several limitations, such as limited samples and focus on a single e-commerce platform. Therefore, future research can enhance the generalizability of the results by using broader samples and comparing different e-commerce platforms. Additionally, future research can also investigate other factors influencing customer satisfaction and loyalty and develop a more comprehensive model to understand the relationship between chatbots, customer satisfaction, and loyalty. By doing so, this research can become more comprehensive and contribute significantly to the field of e-commerce and marketing.

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