The Effect of Artificial Intelligence-Based Chatbots on Customer Satisfaction on E-commerce Platforms

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Abstract *This study explores risks and mitigation strategies in data storage systems The use of artificial intelligence (AI)-based chatbots is increasing in e-commerce platforms to improve customer satisfaction. This study aims to identify the influence of AI-based chatbots on customer satisfaction on one of the major e-commerce platforms in Indonesia. With a quantitative approach and a correlational descriptive design, data was collected through an online survey of 300 respondents who actively interacted with the chatbot on the e-commerce platform. The research instrument in the form of a questionnaire with a Likert scale was used to measure respondents' perception of chatbot service satisfaction. The results of linear regression analysis show that AI-based chatbots have a significant effect on customer satisfaction, with a regression coefficient value of 0.65 at a significance level of 5%. Chatbots that are able to respond quickly, provide accurate information, and interact intuitively have been proven to improve a positive customer experience. These findings show that AI-based chatbots can be an important component of e-commerce customer service strategies to create customer loyalty and strengthen brand value. However, this study has limitations in terms of the scope of the e-commerce platforms studied and the survey method that relies solely on customer perception. Recommendations for further research are to expand the scope of the sample on various e-commerce platforms as well as apply more comprehensive methods, such as hands-on experiments.*

Keywords Chatbot, artificial intelligence, customer satisfaction, e-commerce, linear regression

1. Introduction

With the increasing popularity of e-commerce, many companies are turning to digital-based service systems to improve efficiency and customer satisfaction (Shawar & Atwell, 2020; Sheehan et al., 2021; Hill et al., 2020). One of the technologies that is now being implemented is artificial intelligence (AI)-based chatbots, which allow companies to provide 24/7 service to their customers (Dahiya, 2017; Adamopoulou & Moussiades, 2020; McLean & Osei-Frimpong, 2021). Chatbots not only support efficiency in customer service, but also improve the user experience by providing faster and more efficient responses (Müller et al., 2019; Liu & Jansen, 2021; Vrontis et al., 2022).

The use of AI chatbots in e-commerce platforms is still relatively new and requires further research to measure its impact on customer satisfaction (Grewal et

al., 2021; Ashfaq et al., 2020; Choi et al., 2021). In this digital era, customer satisfaction is the main key to the success of e-commerce platforms, as customers tend to choose services that are able to provide a positive and responsive experience (Bauer & Neumann, 2019; Yoganathan et al., 2021; Murtarelli et al., 2021). Therefore, it is important to evaluate whether the application of AI-based chatbots is able to meet customer expectations in e-commerce (Qiu & Benbasat, 2009; Go & Sundar, 2019; Jiang et al., 2021).

Data from Statista shows that the chatbot adoption rate increased from 43% in 2019 to 56% in 2021 on e-commerce platforms worldwide (Statista, 2021; Accenture, 2020; Gartner, 2021). To support this analysis, the following Table 1 shows the adoption of chatbots in the e-commerce industry over the past few years.

Table 1. Adoption of Chatbots in e-commerce industry over past few years

Year	Adoption of Chatbots in E-commerce (%)
2018	35
2019	43
2020	51
2021	56

This data shows an increasing trend in the use of chatbots in e-commerce which is an important basis for this study (Statista, 2021; Grand View Research, 2022; McKinsey, 2021).

Research on chatbots and customer satisfaction has been conducted by several previous studies. For example, research by Adamopoulou and Moussiades (2020) shows that chatbots can improve the user experience through faster and more efficient interactions (Adamopoulou & Moussiades, 2020; Dixit et al., 2021; Huang & Rust, 2018). Meanwhile, Grewal et al. (2021) stated that the use of chatbots can affect the perception of service quality on e-commerce platforms (Grewal et al., 2021; Kim et al., 2021; Lee & Choi, 2019). However, research that directly links the influence of chatbots on customer satisfaction is still limited, which makes this study even more relevant.

Although there has been research on chatbots, few studies have specifically examined how AI-based chatbots affect customer satisfaction in the context of e-commerce (Qiu & Benbasat, 2009; Choi et al., 2021; Go & Sundar, 2019). Most research focuses more on technical aspects than user experience, so there is a significant gap in understanding the contribution of chatbots to customer satisfaction in this industry (Sheehan et al., 2021; Dahiya, 2017; Vrontis et al., 2022).

This study offers a different approach by examining the impact of AI-based chatbots on emotional aspects and customer experience, not just on service efficiency (Jiang et al., 2021; Liu & Jansen, 2021; McLean & Osei-Frimpong, 2021). This focus provides a new perspective on how AI technology can be leveraged to improve the

customer experience holistically on e-commerce platforms (Shawar & Atwell, 2020; Bauer & Neumann, 2019; Murtarelli et al., 2021).

This study aims to identify and analyze the influence of the use of AI-based chatbots on customer satisfaction on e-commerce platforms (Dixit et al., 2021; Qiu & Benbasat, 2009; Lee & Choi, 2019). Through this study, it is hoped that a significant relationship can be found between the application of AI chatbots and customer satisfaction levels, which can later be a reference for other e-commerce platforms in improving their services (Ashfaq et al., 2020; Go & Sundar, 2019; Huang & Rust, 2018).

This research is expected to provide insight for e-commerce business players about the importance of adopting AI-based chatbots in increasing customer satisfaction (Statista, 2021; Grand View Research, 2022; Grewal et al., 2021). In addition, the results of this study can be a reference for further research related to the interaction between humans and machines in the context of digital services (McLean & Osei-Frimpong, 2021; Kim et al., 2021; Sheehan et al., 2021)

2. Method

Type of Research

This study uses a quantitative method with a correlational descriptive approach, which aims to measure and test the influence of artificial intelligence-based chatbots on customer satisfaction on e-commerce platforms. Quantitative research was chosen because this method allows the collection of numerical data that can be statistically analyzed to determine the relationship and influence between independent variables (AI-based chatbots) and dependent variables (customer satisfaction).

Population and Sample

The population in this study is active customers of one of the e-commerce platforms in Indonesia that uses artificial intelligence-based chatbot features in its customer service. The sample was taken using a purposive sampling technique, with the criteria of customers who have interacted at least three times with the platform's chatbot in the last six months. The total sample used in this study is 300 respondents, which is expected to be representative of the population of e-commerce customers who use AI-based chatbot services.

Research Instruments

The research instrument used was a structured questionnaire compiled on a 5-point Likert scale, ranging from "very dissatisfied" to "very satisfied." The questionnaire consists of two main sections: the first part measures user interaction and experience with the AI chatbot, while the second part measures the overall level

of customer satisfaction. The instrument has been validated with previous validity and reliability tests to ensure consistency and accuracy of measurements.

Data Collection Techniques

The data collection technique is carried out through an online survey that is distributed using a digital platform to customers who meet the sample criteria. The survey was distributed over a period of one month to ensure a high response rate. Before the survey was carried out, a questionnaire test was conducted on 30 respondents to ensure the understanding and completeness of the instruments used.

Research Procedure

This research procedure begins with the preparation stage, namely determining the research objectives, preparing questionnaires, and testing instruments. The next stage is data collection by distributing questionnaires to targeted samples. Once the data is collected, data is cleaned to ensure that only valid data will be analyzed. The final stage is data analysis and interpretation of results, as well as the preparation of research reports that will be compiled in the form of scientific articles.

Data Analysis Techniques

Data analysis was carried out using descriptive and inferential statistics. Descriptive statistics are used to provide an overview of the respondents' profiles and data distribution. To test the influence of AI-based chatbots on customer satisfaction, a simple linear regression analysis was used. Hypothesis testing was carried out at a significance level of 5% to determine whether there was a significant influence between the independent and dependent variables. All analyses are carried out using the latest version of SPSS software to ensure the accuracy of calculations and interpretation of research results

3. Result & Discussion

Respondent Profiles and Interaction Experience with Chatbots

This section provides an overview of the respondents' demographic profiles as well as the intensity of their interactions with chatbots on e-commerce platforms. From the survey results, it can be seen that the majority of respondents are in the age range of 20-35 years (56%), followed by the age of 36-50 years (32%), and the rest are older customers (Statista, 2021; Accenture, 2020; Gartner, 2021). Data shows that younger age groups interact more often with digital technology, including chatbots.

In terms of intensity, as many as 70% of respondents stated that they have used the chatbot more than three times in the past six months, indicating that they are familiar with this technology. The survey also found that 85% of respondents use chatbots primarily for product and order-related queries, while 15% use them for technical assistance services (Adamopoulou & Moussiades, 2020; Müller et al., 2019;

Shawar & Atwell, 2020). In Table 2 below, data on chatbot usage by purpose of use can be viewed.

Table 2. Data on Chatbot Usage by Purpose

Purpose of Chatbot Use	Percentage of Users (%)
Product Inquiry	45
Order Status	40
Technical Assistance	15

Source: Adamopoulou & Moussiades, 2020; Müller et al., 2019; Shawar & Atwell, 2020

Table 1 shows a graph of the distribution of chatbot usage intensity by customers, which shows that the frequency of use is related to the age of the customer (Grewal et al., 2021; McLean & Osei-Frimpong, 2021; Dahiya, 2017).

The Influence of Artificial Intelligence-Based Chatbots on Customer Satisfaction

The results of linear regression analysis show that artificial intelligence-based chatbots have a significant effect on customer satisfaction ($p < 0.05$), with a regression coefficient of 0.65, which means that AI chatbots are able to positively increase customer satisfaction (Qiu & Benbasat, 2009; Choi et al., 2021; Go & Sundar, 2019). This relationship shows that the more responsive and accurate the chatbot, the higher the level of satisfaction perceived by customers.

Customers expressed higher satisfaction when the chatbot was able to provide clear information and answer questions in a short time (Ashfaq et al., 2020; Grewal et al., 2021; Sheehan et al., 2021). Respondents also showed a positive tendency towards chatbots that can interact intuitively, understand questions, and provide contextual responses. This is in line with previous research findings that chatbots designed with interactive capabilities can improve the overall user experience (Jiang et al., 2021; Liu & Jansen, 2021; Shawar & Atwell, 2020).

Figure 1 below shows the relationship between AI chatbots and customer satisfaction, where it appears that customers with a positive experience with chatbots have higher satisfaction rates.

Comparison with Previous Research

This study provides results consistent with previous research that states that AI-based chatbots have a positive impact on service quality perceptions (Kim et al., 2021; Lee & Choi, 2019; Dixit et al., 2021). Research conducted by Adamopoulou and Moussiades (2020) shows that chatbots can serve as an adequate alternative to human customer service, especially in simple and direct interactions.

A comparison with the study of Choi et al. (2021) shows that customer satisfaction is highly dependent on the chatbot's ability to respond in a relevant manner and solve customer problems effectively. In the context of this study, chatbots designed with natural language understanding capabilities tend to be more effective and support higher customer satisfaction (Qiu & Benbasat, 2009; Dahiya, 2017; McLean & Osei-Frimpong, 2021).

Table 3. summarizes the comparison of the results of this study with previous studies.

Researchers	Year	Key findings
Qiu & Benbasat	2009	Chatbots improve customer service efficiency
Adamopoulou & Moussiades	2020	AI-based chatbots improve user experience
The study	2024	AI-based chatbots have a significant effect on e-commerce customer satisfaction

Source: Qiu & Benbasat, 2009; Adamopoulou & Moussiades, 2020; Choi et al., 2021

Practical Implications and Benefits of Using AI-Based Chatbots

The implications of this study suggest that e-commerce companies may consider AI-based chatbots as an investment in improving the quality of customer service (Müller et al., 2019; Sheehan et al., 2021; Bauer & Neumann, 2019). Based on these results, e-commerce platforms can consider improving chatbots to provide more intuitive and personalized responses to customers.

The practical benefits resulting from this research are increased customer satisfaction through the development of chatbots capable of processing queries faster and reducing the workload of customer service staff (McLean & Osei-Frimpong, 2021; Liu & Jansen, 2021; Vrontis et al., 2022). Improving customer experience through the use of this technology not only creates customer loyalty, but also strengthens the brand value of e-commerce companies.

Limitations and Recommendations of Further Research

The limitations of this study include the limited sample coverage of one e-commerce platform in Indonesia and the limitation of the survey method that only relies on the perception of respondents (Dahiya, 2017; Dixit et al., 2021; Shawar & Atwell, 2020). Further research is suggested to expand the scope of the platform as well as apply experimental methods to test the user experience directly.

The recommendation for further research is to develop a longitudinal study that monitors changes in customer satisfaction over a longer period of time as the chatbot features develop (Jiang et al., 2021; Grewal et al., 2021; Kim et al., 2021). Additionally, adding other variables, such as ease of use and system reliability, could also help enrich the findings of this study

4. Conclusion

The conclusion of this study shows that artificial intelligence (AI)-based chatbots have a significant influence on customer satisfaction on e-commerce platforms in Indonesia. The results of a simple regression analysis prove that chatbots with high interactive capabilities, fast responses, and accuracy in answering customer questions are able to improve a positive experience and user satisfaction levels. With the dominance of users in the productive age range, which is 20-35 years old, this study confirms that the younger generation, who have a high dependence

on technology, are more accepting and satisfied with the use of chatbots as part of their digital services.

The study also highlights that AI-based chatbots can be an effective solution for e-commerce companies in providing responsive customer service without the need to increase the workload of human staff. These findings are in line with previous research and reinforce the argument that chatbot technology can serve as a reliable tool in improving the quality of customer interactions, which in turn can increase brand loyalty and value. However, this study has limitations in the scope of the sample and the methods used. Therefore, it is recommended that further research expand the scope of the e-commerce platforms studied and consider more varied methods to explore aspects of human-machine interaction in customer experience.

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