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# **User Satisfaction with Shopee Chatbot:** An Extended TAM with Perceived Convenience as an Intervening Variable

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## Abstract

This study aims to analyze the effect of the Technology Acceptance Model (TAM) on user satisfaction, with perceived enjoyment serving as a mediating variable. The population of this study consists of all Shopee users in Indonesia who have interacted with the Shopee Chatbot. The sample includes Shopee users who have had experience interacting with the Shopee Chatbot. The research data were analyzed using SmartPLS. The results indicate that perceived usefulness (PU) has a positive and significant effect on user satisfaction, while perceived ease of use (PEOU) shows a positive effect but is not statistically significant. Perceived enjoyment (PE) also has a positive and significant influence on user satisfaction. In addition, perceived usefulness and perceived ease of use have positive and significant effects on perceived enjoyment. Furthermore, this study reveals that perceived enjoyment, as a mediating variable, successfully mediates the relationship between the Technology Acceptance Model and user satisfaction.

**Keywords:** Perceived enjoyment; Shopee Chatbot; Technology Acceptance Model (TAM); User satisfaction



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# INTRODUCTION

The rapid advancement of digital technology has profoundly transformed various aspects of human life, particularly in business activities. This technological evolution has compelled organizations to continuously innovate in delivering customer services that are faster, more efficient, and highly responsive to customer needs (Al Jupri & Fasa, 2025). One of the most prominent innovations arising from this development is Artificial Intelligence (AI), which enables machines to perform tasks traditionally executed by humans. The integration of AI is expected to significantly enhance organizational performance, especially in customer service operations (Suryatenggara & Dahlan, 2022).

AI technologies are increasingly reshaping how businesses interact with consumers by offering not only operational efficiency but also intelligent, real-time, and personalized service experiences (Silva et al., 2023; Ekechi et al., 2024). In the context of e-commerce, customer service plays a critical role in building customer satisfaction and fostering repeat purchase intentions. Effective customer support

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systems contribute directly to consumer trust, loyalty, and long-term business sustainability (Chau et al., 2025).

Shopee, as one of the largest e-commerce platforms in Indonesia, has implemented AI-based chatbots as part of its customer service strategy (Lestari, 2025). Through chatbot technology, users can interact with an automated system to obtain information, resolve issues, and receive assistance without direct human intervention (Sebela, 2025). Despite these advantages, the effectiveness of chatbot adoption is not solely determined by functional attributes such as usability and ease of use. Users' emotional and experiential perceptions, including comfort and enjoyment during interaction, also play a crucial role in shaping satisfaction and acceptance of the technology (Lubbe & Ngoma, 2021).

To better understand user acceptance of chatbot technology, this study adopts the Technology Acceptance Model (TAM) proposed by Davis (1989), which conceptualizes how perceived usefulness and perceived ease of use influence individuals' attitudes and behaviors toward new technologies. TAM has been widely applied in various technological contexts, including online banking, mobile applications, and e-commerce platforms (Alamsyah et al., 2023; Myin & Watchravesringkan, 2024). However, most prior studies have predominantly emphasized functional factors, leaving affective aspects such as perceived enjoyment relatively underexplored, particularly in the context of AI-based chatbots.

Perceived enjoyment reflects the degree to which the use of a system is perceived as pleasant and comfortable beyond its functional value. Recent studies suggest that affective responses can significantly enhance user satisfaction and strengthen technology acceptance (Venkatesh et al., 2012; Dwivedi et al., 2023). Nevertheless, empirical evidence examining the mediating role of perceived enjoyment in chatbot usage, especially within e-commerce platforms in developing countries, remains limited.

Addressing this gap, the present study extends the TAM framework by integrating perceived enjoyment as a mediating variable between perceived usefulness, perceived ease of use, and user satisfaction with Shopee chatbot usage in Indonesia. This study aims to (1) analyze the effects of perceived usefulness and perceived ease of use on user satisfaction, (2) examine the influence of these factors on perceived enjoyment, and (3) evaluate the mediating role of perceived enjoyment in the relationship between TAM constructs and user satisfaction. By doing so, this research contributes to the existing literature by offering a more comprehensive understanding of both functional and affective determinants of chatbot satisfaction in e-commerce settings.

# METHODOLOGY

This study uses a quantitative approach with a survey method, where the data collection instrument used is a questionnaire via Google Form. The population in this study are Shopee users located in various regions in Indonesia, and the sample in this study was taken with the characteristics of Shopee users in Indonesia, especially those

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who have used or interacted with the Shopee Chatbot. Sampling in this study uses a purposive sampling method, where this method is used with the aim of making the data obtained more representative (Sitanggang, 2022) . The number of respondents in this study is determined by the rules of Hair et al., (2021) , where Hair suggests that if the number of samples in the study is unknown the exact number of the population to be targeted, then it is 5 to 10 times the variables or question indicators. Therefore, with a total of 13 question indicators, the minimum number of respondents in this study is 65 respondents, the maximum number is 130 respondents. However, the target respondents in this study are 250 respondents, to avoid invalid data.

The data in this study were obtained through an online questionnaire using a six-point Likert scale.

Table 1. Definition of Likert Scale

| Symbol | Category | Weight |
|---|---|---|
| **SS** | Strongly agree | 6 |
| **S** | Agree | 5 |
| **AKS** | Somewhat Disagree | 4 |
| **KS** | Disagree Less | 3 |
| **TS** | Don't agree | 2 |
| **STS** | Strongly Disagree | 1 |

Data analysis in this study used SEM (Structural Equation Model) based on PLS (Partial Least Squares) with the help of SmartPLS software. SEM is a statistical method that can be used to analyze causal relationships between variables that are considered quite complex. SEM-PLS is a part of SEM, which is flexible and can be used to overcome unmet assumptions in covariance analysis (Akinremi, 2024). Tests conducted included an outer model evaluation test, namely validity and reliability tests, and an inner model, namely the coefficient of determination (R-square), effect size (F2 or f-square), significance tests, and Q-square.

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## RESULTS AND DISCUSSION

In this section, the researcher will discuss the analysis results of the research conducted on the TAM model for satisfaction with Shopee chatbot usage, intervening with perceived convenience. The following is a detailed explanation of the results of the outer and inner model evaluation tests using SmartPLS.

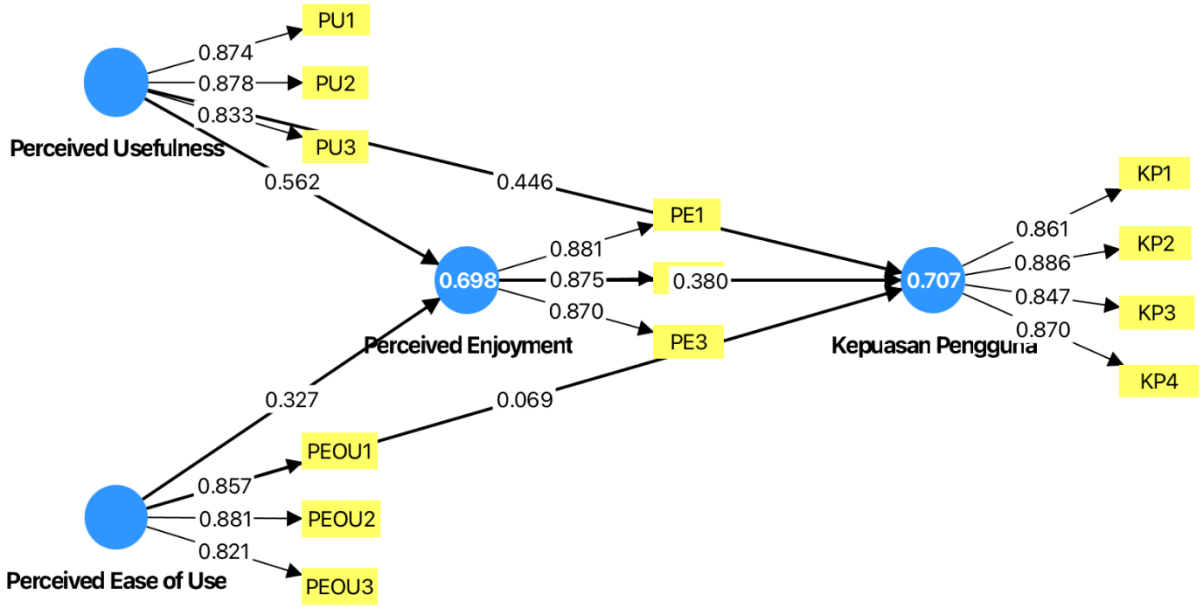


Figure 1. Path Diagram

Figure 1 shows the outer loading results with varying values for each indicator relative to its latent variable. Based on this data, it can be seen that all 13 indicators have outer loading values above 0.7, indicating that all indicators can be considered valid.

### Outer Model Evaluation (Measurement Model)

This outer model testing or evaluation is conducted to determine the validity and reliability of a study. This measurement model presents and demonstrates how each indicator represents the latent variable to be measured. This outer model evaluation has several stages: convergent validity, discriminant validity, and reliability testing.

1. Construct Validity Test

a. Covergent Validity

In this test, an indicator is considered valid if it has a *loading factor value* > 0.7, but it is still acceptable if *the loading factor value* is > 0.6. Furthermore, this test has another criterion, namely that each latent variable in the study must have an AVE value > 0.5 (Setiabudhi et al., 2025) . The following are the results of the outer model test in this study, which show the *loading factor value* of each indicator:

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Table 2. Convergent Validity Test with Loading Factor

| Variables | Indicator | Loading Factor | Information |
|---|---|---|---|
| **Perceived Usefulness** | PU1 | 0.874 | Valid |
| | PU2 | 0.878 | Valid |
| | PU3 | 0.833 | Valid |
| **Perceived Ease of Use** | PEOU1 | 0.857 | Valid |
| | PEOU2 | 0.881 | Valid |
| | PEOU3 | 0.821 | Valid |
| **Perceived Enjoyment** | PE1 | 0.881 | Valid |
| | PE2 | 0.875 | Valid |
| | PE3 | 0.870 | Valid |
| **User Satisfaction** | KP1 | 0.861 | Valid |
| | KP2 | 0.886 | Valid |
| | KP3 | 0.847 | Valid |
| | KP4 | 0.870 | Valid |

Source: Processed Primary Data, 2025

Meanwhile, the recommended AVE value is above 0.5. From the test results, it was found that the value of each variable was PU 0.743, PEOU 0.729, PE 0.767, and KP 0.750, which means that all variables were declared valid.

## Discriminant Validity

The assessment for this test itself is when the *cross loading value* for each existing latent variable must be greater than 0.7 Marzuki et al., (2025)

Table 4. Cross Loading Values between Indicators

| | Perceived Usefulness | Perceived Ease of Use | Perceived Enjoyment | User Satisfaction |
|---|---|---|---|---|
| **PU1** | 0.874 | 0.664 | 0.702 | 0.736 |
| **PU2** | 0.878 | 0.635 | 0.710 | 0.728 |
| **PU3** | 0.833 | 0.633 | 0.674 | 0.607 |

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| | | | | |
|---|---|---|---|---|
| **PEOU1** | 0.691 | 0.857 | 0.708 | 0.676 |
| **PEOU2** | 0.636 | 0.881 | 0.639 | 0.544 |
| **PEOU3** | 0.573 | 0.821 | 0.548 | 0.518 |
| **PE1** | 0.713 | 0.695 | 0.881 | 0.690 |
| **PE2** | 0.694 | 0.635 | 0.875 | 0.678 |
| **PE3** | 0.712 | 0.632 | 0.870 | 0.710 |
| **KP1** | 0.693 | 0.627 | 0.668 | 0.861 |
| **KP2** | 0.734 | 0.601 | 0.722 | 0.886 |
| **KP3** | 0.663 | 0.563 | 0.649 | 0.847 |
| **KP4** | 0.692 | 0.586 | 0.700 | 0.870 |

Source: Processed Primary Data, 2025

Furthermore, discriminant validity testing can be performed by comparing the *Fornell-Lacker Criterion* and the square root of the AVE. Discriminant validity is considered good if the value of each construct is greater than the correlation between constructs in the model.

Table 5. Discriminant Validity with Fornell-Larcker Criterion

| | **User Satisfaction** | **Perceived Ease of Use** | **Perceived Enjoyment** | **Perceived Usefulness** |
|---|---|---|---|---|
| **User Satisfaction** | **0.866** | | | |
| **Perceived Ease of Use** | 0.686 | **0.854** | | |
| **Perceived Enjoyment** | 0.791 | 0.747 | **0.876** | |
| **Perceived Usefulness** | 0.804 | 0.747 | 0.807 | **0.862** |

Source: Processed Primary Data, 2025

Table 6. Discriminant Validity Test with AVE root

| | **User Satisfaction** | **Perceived Ease of Use** | **Perceived Enjoyment** | **Perceived Usefulness** |
|---|---|---|---|---|
| **User Satisfaction** | **1,000** | 0.686 | 0.791 | 0.804 |

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| | | | | |
|---|---|---|---|---|
| **Perceived Ease of Use** | 0.686 | **1,000** | 0.747 | 0.747 |
| **Perceived Enjoyment** | 0.791 | 0.747 | **1,000** | 0.807 |
| **Perceived Usefulness** | 0.804 | 0.747 | 0.807 | **1,000** |

Source: Processed Primary Data, 2025

Based on tables 5 and 6 above, it can be seen that *the Fornell-Lacker Criterion value* and the square root value of AVE produced by the relationship or correlation of each construct are valid.

2. Reliability Test

In SMartPLS, this reliability test can be conducted or measured in two ways: *composite reliability* and *Cronbach's alpha* , both of which must be above 0.70 (Marzuki, 2024). The following are the results of *the composite reliability* and *Cronbach's alpha* :

Table 7. Cronbach's Alpha and Composite Reliability Values

| | **Cronbach's alpha** | **Composite reliability (rho_a)** | **Composite reliability (rho_c)** | **Average variance extracted (AVE)** |
|---|---|---|---|---|
| **Perceived Usefulness** | 0.827 | 0.831 | 0.896 | 0.743 |
| **Perceived Ease of Use** | 0.815 | 0.827 | 0.890 | 0.729 |
| **Perceived Enjoyment** | 0.848 | 0.848 | 0.908 | 0.767 |
| **User Satisfaction** | 0.889 | 0.890 | 0.923 | 0.750 |

Source: Processed Primary Data, 2025

Table 7 shows that all variables in the study have *composite reliability* and *Cronbach's alpha values* above 0.70. Therefore, it can be concluded that each construct in this study is reliable.

## Inner Model Evaluation (Structural Model)

An inner model, or structural model, is a model used to describe the relationships between latent variables (constructs) in a study. These relationships are based on theory, logic, and practical experience. This model contains mediator or intervening variables as well as moderator variables (Setiabudhi et al., 2025).

1. Coefficient of Determination (R-Square)

*The Coefficient of Determination* , or R-square, is commonly used to measure the ability of independent variables to explain the variance of the dependent variable in a study. Generally, the R-square value can be seen from its size, such as a strong value of 0.67, moderate value of 0.33, and weak value of 0.19 (Marzuki, 2024). The results of

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the tests showed user satisfaction with an R-square value of 0.707, and *perceived enjoyment* with an R-square value of 0.698.

2. Effect Size (f-Square)

*Effect size* (f-Square) is a measure of *effect size* in SmartPLS which is intended to evaluate how much influence a dependent variable has on the independent variable. There are 3 assessments in this test, namely an f-square value of 0.02 as small, a value of 0.15 as medium, and a value of 0.35 as large. If the f-square value <0.02 then the effect can be ignored or can be considered no effect. From the results of the test conducted through SmartPLS, it is known that several relationships between variables are at the PU value against KP 0.205 which is medium, PU against PE 0.463 which is large, PE against KP 0.149 which is medium, PEOU against KP 0.006 which is small and PEOU against PE 0.157 which is medium.

3. Path Coefficient and Significance Test

*The path coefficient* is a measure of the relationship or correlation between variables or latent constructs. This value reflects the strength of the relationship, with values ranging from -1 to 1. Significance testing is performed by examining the t-statistic and p-value. The relationship between variables is considered significant if the t-statistic is greater than 1.96 and the p-value is less than 0.05 (Marzuki, 2024). *The path coefficient* and significance test are as follows :

Table 10. Path Coefficient Values

| | **Path Coefficients** |
|---|---|
| **Perceived Usefulness -> User Satisfaction** | 0.446 |
| **Perceived Usefulness -> Perceived Enjoyment** | 0.562 |
| **Perceived Enjoyment -> User Satisfaction** | 0.380 |
| **Perceived Ease of Use-> User Satisfaction** | 0.069 |
| **Perceived Ease of Use-> Perceived Enjoyment** | 0.327 |
| **Perceived Usefulness -> Perceived Enjoyment -> User Satisfaction** | 0.214 |
| **Perceived Ease of Use -> Perceived Enjoyment -> User Satisfaction** | 0.124 |

Source: Processed Primary Data, 2025

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*path coefficient* data from Table 10, it is known that all variables have significant path coefficient values with values above zero (0). Then, the test results of the path coefficient significance test state that the results of the t-statistic calculation using the bootstrapping algorithm indicate that several relationships between variables have t-statistic values >1.96, which means that the relationship is significant. Meanwhile, there is one variable, namely the PEOU variable against KP, which has an insignificant value because it has a p-value <0.05.

4. Q2 Predictive Relevance

Q2, also known as Q-square, is intended to measure how well a research model or independent variable is able to predict the dependent variable. The assessment in this Q-square test is a Q-square value > 0, indicating that the model in the study has *predictive relevance value* , whereas if the Q-square value < 0, it indicates that the model has less *predictive relevance* (Marzuki, 2024). The results of the test conducted through SmartPLS are PE1 with a value of 0.561, PE2 with a value of 0.507, PE3 with a value of 0.523, KP1 with a value of 0.496, KP2 with a value of 0.536, KP3 with a value of 0.444, and KP4 with a value of 0.485.

H1: The Influence of Perceived Usefulness on User Satisfaction

In the hypothesis testing that has been carried out, it is known that the *perceived usefulness variable* has a positive influence on the user satisfaction variable as evidenced by the original sample value of 0.446. In addition, the relationship between *perceived usefulness* and user satisfaction is stated to be significant because it has a t-statistic value of 4.243 where the value is greater than the t-table of 1.96, and also a p-value of 0.000 which is smaller than 0.05. So H1 is concluded and stated that *perceived usefulness* has a positive and significant effect on user satisfaction.

The results of this study are consistent with previous research conducted by (Amelia et al., 2024; Maryanto & Kaihatu, 2021; Nuralam et al., 2024; Suryatenggara & Dahlan, 2022) , which found that *perceived usefulness* has a positive and significant effect on user satisfaction. The findings in this study, along with several previous studies, have strengthened the TAM theory, which explains that *perceived usefulness* is an important factor in individual acceptance of new technology. Mishra et al., (2023) argue that the influence of usefulness can decrease for long-time users of a technology, as these users have developed and gained sufficient knowledge about the technology. However, for new or short-term users, the perception of usefulness will remain and have a positive impact on user satisfaction levels.

H2: The Influence of Perceived Ease of Use on User Satisfaction

The results of the hypothesis test in this study indicate that *the perceived ease of use variable* has a positive but insignificant influence on user satisfaction. This is evidenced by the original sample value of 0.069. However, the relationship between *perceived ease of use* and user satisfaction is considered insignificant because it has a t-statistic value of 1.010 which is smaller than the t-table of 1.96) and a p-value of 0.313 which is greater than 0.05. Therefore, from the results of this study, it is concluded that H2 which states that *perceived ease of use* has a positive and significant effect on user satisfaction is rejected. Based on the results of the hypothesis test, it can be stated that the higher the

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perceived ease of use, the less it affects the satisfaction of using the Shopee Chatbot by individuals.

This study contrasts with previous studies conducted by Akdim (2022), Nuralam et al. (2024), and Amelia et al. (2024), which found that *perceived ease of use* had a positive and significant effect on user satisfaction. However, the study conducted by Akdim et al. (2022) stated that although *perceived ease of use* has a positive and significant effect on user satisfaction, the level of influence or relationship tends to be smaller compared to the influence of *perceived usefulness* on user satisfaction. This is considered because many users value or prefer chatbots more for their usefulness and the emotional connection they create.

H3: The Influence of Perceived Enjoyment on User Satisfaction

The third hypothesis test shows that the *perceived enjoyment variable* has a positive effect on user satisfaction, which is evidenced by the original sample value of 0.380. Then the relationship between the *perceived enjoyment variable* and user satisfaction is also declared significant because it has a t-statistic value > 1.96, which is 3.074, and a p-value of 0.000 which is smaller than 0.05. Based on these results, H3 which states that *perceived enjoyment* has a positive and significant effect on user satisfaction is accepted. This positive relationship indicates that the higher the perceived enjoyment or convenience of using the Shopee Chatbot, the higher the user satisfaction with using the Chatbot.

The results of this study also support the results of previous research by Putra et al., (2023) , which stated that *perceived enjoyment* has a significant influence on user satisfaction. Furthermore, this is also in line with research conducted by Orden-Mejía et al., (2025) , where the results of their research showed that the variable *of perceived enjoyment* has a positive influence on user satisfaction. Because Orden-Mejía et al. (2025) assessed that sometimes a technology is used for pleasure or convenience rather than productivity.

H4: Influence of Perceived Usefulness on Perceived Enjoyment

The results of the hypothesis test in this study indicate that the *perceived usefulness variable* has a positive influence on *perceived enjoyment* , which is evidenced by the original sample value of 0.562. In addition, the relationship between *perceived usefulness* and *perceived enjoyment* is proven to be significant with a t-statistic value greater than the t-table, namely 1.69, namely 9.038, and a p-value of 0.000 which is smaller than 0.05. So H4 which states that *perceived usefulness* has a positive and significant influence on *perceived enjoyment* is accepted.

The results of this study align with those conducted by Frita et al. (2024; Hasan et al., 2021) , which found that *perceived usefulness* has a positive and significant effect on *perceived enjoyment* . Furthermore, Akdim et al. (2022) also found that *perceived usefulness* significantly influences *perceived enjoyment* .

H5: Influence of Perceived Ease of Use on Perceived Enjoyment

The fifth hypothesis test shows that *the perceived ease of use variable* has a positive influence on *perceived enjoyment* as evidenced by its original sample value of 0.327. The relationship between *perceived ease of use* and *perceived enjoyment* is also stated to be significant, as evidenced by the t-statistic value of 5.866, which is greater than the t-

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table of 1.96, and the p-value of 0.000, which is smaller than 0.05. Thus, H5, which states that *perceived ease of use* has a positive and significant effect on *perceived enjoyment,* is accepted. This explains that the easier it is to use a new technology such as a Chatbot, the greater the perception of comfort in using the Chatbot.

The results of this study align with those of De Sa Siqueira et al. (2023) , which found that *perceived ease of use* positively impacts *perceived enjoyment* . Furthermore, studies by Hasan et al. (2021) and Frita et al. (2024) also found that *perceived ease of use* significantly impacts *perceived enjoyment* . This suggests that when people use technology like chatbots, they expect the technology to provide an easy and positive experience.

H6: The Influence of Perceived Usefulness on User Satisfaction through Perceived Enjoyment

The results of the hypothesis test in this study indicate that *the perceived usefulness variable* has a positive influence on user satisfaction through mediation from *perceived enjoyment* as evidenced by the original sample value of 0.214. In addition, the relationship between *perceived usefulness* and user satisfaction through mediation from *perceived enjoyment* is stated to be significant as evidenced by the t-statistic value which is greater than 1.69, namely 3.164 and p-value which is smaller than 0.05, namely 0.002. So H6 which states that *perceived usefulness* has a positive and significant influence on user satisfaction through mediation from *perceived enjoyment* is accepted by Silva et al., (2023) .

Essentially, there is still very little research discussing the relationship between *perceived usefulness* and user satisfaction through *perceived enjoyment.* Empirically, this research aligns with the results of research conducted by Jayanti et al. (2024) , which states that perceived usefulness influences user satisfaction through perceived enjoyment.

H7: The Influence of Perceived Ease of Use on User Satisfaction through Perceived Enjoyment

In the hypothesis testing that has been done, it is known that the variable *perceived ease of use* on user satisfaction through *perceived enjoyment* is proven by the original sample value of 0.124. Then, the relationship between *perceived ease of use* and user satisfaction through mediation of *perceived enjoyment* is also declared significant because it has a t-statistic value of 2.876 where the value is greater than the t-table of 1.96, and also a p-value of 0.004 which is smaller than 0.05. So H7 which states that *perceived ease of use has a* positive and significant effect on user satisfaction through perceived enjoyment is accepted.

To date, there is still very little research discussing the positive influence of *perceived ease of use on user satisfaction through the mediation of perceived enjoyment.* However, empirically, this research is in line with the results of research conducted by Orden-Mejía et al. (2025) and Jayanti et al. (2024), which stated that when individuals perceive the benefits and ease of use of a technology or system, this can create a positive, comfortable, and enjoyable experience, which then creates or increases user satisfaction with the technology.

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## CONCLUSION

Based on the analysis above, this study concludes that perceived usefulness and perceived enjoyment have a positive and significant influence on Shopee chatbot user satisfaction in Indonesia. Perceived ease of use has a positive but insignificant influence on user satisfaction, but this factor plays a role through perceived enjoyment as a mediating variable. Furthermore, perceived enjoyment has a positive and significant influence on satisfaction, and both TAM factors also have a positive and significant influence on perceived enjoyment.

Factors such as usability, ease of use, and convenience were considered important and played a role in increasing Shopee Chatbot user satisfaction. This study also found that perceived enjoyment was a significant mediating variable.

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