

The Effect of Chatbot Usage on Customer Satisfaction: A Quantitative Study of Shopee, Tokopedia, and Lazada Using SmartPLS

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Abstract— With the increasing growth of e-commerce, it is important to identify the features available in e-commerce applications that can provide customer satisfaction. One of the features in e-commerce is the chatbot. Chatbots in e-commerce can provide various services to users, such as assistance in product search, ordering, product information, payment processing, customer support, and more. This research aims to analyze and understand how the response quality of each chatbot in e-commerce platforms such as Shopee, Tokopedia, and Lazada affects e-commerce user satisfaction. This study employs a quantitative methodology, integrating data analysis conducted through the SmartPLS 4.1 software. The research results show that the chatbot in Shopee platform has a impact on customer satisfaction. The same goes for chatbot in Tokopedia platform, but there are two variables that do not have a direct impact, there are information quality and waiting time. Meanwhile, chatbot in Lazada platform does not affect customer satisfaction. The findings of this research should reveal new strategies for leveraging chatbot technology to better satisfy customers in e-commerce environments, as well as lay the groundwork for further research on how artificial intelligence can shape customer experiences in the future.

Keywords— Chatbot, E-Commerce, User Satisfaction, Customer Service, SmartPLS

I. INTRODUCTION

The increasing utilization of communication technology and online platforms in economic activities has become an indicator of the development of the digital economy in Indonesia at present. The movement of the digitalization era began with the Industrial Revolution 3.0, where the role of humans was replaced by the advent of computers. And now the world has just entered the Industrial Revolution 4.0. This era is marked by the ability to retrieve or exchange data in real time with an internet connection [1]. The digital economy is capable of transforming the economic activities of society and businesses from initially manual processes to fully automated ones.

The growth of e-commerce is rapidly advancing, marked by the growth of online transaction volumes, market expansion into various product types, enhanced user experiences through personalization and technology, increased popularity of shopping via mobile devices, data analytics, emphasis on data

security and privacy, and a focus on sustainable business practices [2]. Based on data compiled by Databoks, the Shopee and Tokopedia platforms still lead the e-commerce market in Indonesia, followed by Lazada in third place. Based on the average number of visitors per month, Shopee reaches 195.8 million visitors each month, followed by Tokopedia with 104.2 million visitors, and Lazada with a total of 63.5 million visitors per month.

Chatbots have ability to handle multiple user issues simultaneously and save on customer service costs [3]. Chatbots are no longer just considered assistants, their interaction approach has brought them closer to users as friendly companions [4][5]. Chatbots can be a digital era solution to address the issue of improving customer service [7].

The research conducted focuses on analyzing how the use of chatbots from each e-commerce platform, such as Shopee, Tokopedia, and Lazada affects e-commerce user satisfaction.

Although there have been several previous studies discussing the use of chatbots, research comparing their impact across major e-commerce platforms in Indonesia remains limited. For instance, studies by Dey *et al.* (2020) and Wibowo *et al.* (2020) focus solely on the design and implementation of chatbots, particularly regarding the quality of information provided to customers [8][10].

II. THEORETICAL FOUNDATION

A. Customer Service

In order to have loyal customers, the service industry, especially e-commerce, must meet the service quality expected by customers, so that customers can feel satisfied and have trust in the services provided [23]. With the large number of customers shopping on e-commerce platforms, it is necessary to support it with good service quality so that customers feel satisfied after making online transactions through the e-commerce platform [34]. In the development of the business world, service quality is one way to achieve excellence by consistently applying the right service quality and product quality, which can later influence customer satisfaction and create customer loyalty [10].

The research by Rita *et al.* (2019), when consumers are

satisfied with the products or services provided by an online store, they are likely to revisit the store and purchase products from the same store again. This study also proves that consumers will spread information about their satisfaction through word of mouth to relatives or close friends. [12].

B. E-Commerce

The use of the internet is not only limited to the exchange of information but has also expanded into economic activities such as buying and selling. Currently, the buying and selling process can be conducted through electronic devices such as smartphones, utilizing the electronic network known as E-Commerce [13]. Currently, e-commerce has entered and developed significantly in Indonesia and is used by the public, such as Shopee, Tokopedia, and Lazada.

1. Shopee

Shopee is one of the e-commerce platforms that has successfully established dominance in the Indonesian market. Shopee is a marketplace founded by Forrest Li, which was first launched to the public in 2015. Shopee could only be used and accessed in Indonesia since December 2015 [14]. Shopee is a mobile marketplace application with a Consumer-to-Consumer (C2C) model, which ensures a secure and convenient way to buy and sell. It features a wide range of products that cater to everyday needs, including clothing, electronics, beauty products, home appliances, and shopping vouchers. Furthermore, Shopee frequently offers substantial promotions to entice customers, with one of the most favored being free shipping [12].

2. Tokopedia

Tokopedia is an online marketplace that was officially introduced to the public in 2009, under the management of PT Tokopedia. To attract more consumers, Tokopedia employs diverse marketing strategies, one of which is collaborating with several public figures as their brand ambassadors. Among the various online marketplaces available, Tokopedia is an Indonesian-made marketplace that is highly favored by the Indonesian public [15].

3. Lazada

Lazada Group was founded in 2012 by Rocket Internet, a global investment and technology startup development company. Lazada is a platform that acts as an intermediary between sellers and buyers using an internet connection. This provides an opportunity for sellers to transition from traditional sales to digital sales. Meanwhile, it also offers an online shopping experience for buyers instead of traditional shopping [16].

C. Information Quality

High-quality information is more valuable to consumers, while information is considered low-quality if it does not provide benefits to consumers [26]. The quality of information displayed on e-commerce platforms helps predict product quality and availability, provides accurate information, clear and detailed transactions, as well as reliable information that meets user expectation [27].

D. User Experience

User experience emerges as a promising element in the

analysis of consumption related to technology, especially in connection with the development of digital products [28]. User experience is also an important part of buying and selling transactions in e-commerce, which will influence consumer purchasing interest [29]. User experience is defined as an individual's perception and response from using a particular product, system, or service [30]. Purchasing behavior will be heavily influenced by the user experience in the future. As consumers evaluate online shopping experiences, they will take into account their perception of product information, payment methods, delivery, services available, features, risks involved, and privacy and security concerns [32]. This emphasizes that satisfied users are likely to become loyal customers. In other words, improving comfort and user experience on e-commerce platforms is a strategic tool to extend business relationships with customers and encourage more frequent purchases [31].

E. Waiting Time

Waiting time encompasses the total period customers must wait from the point of ordering until they obtain their desired product or service [32]. The implementation of chatbots can usually resolve customer issues without wasting the customer's time. One of the benefits of using chatbots is that they can provide instant and automatic responses to user inquiries. With this capability, they can help reduce user wait times and expedite problem resolution, making them a highly useful feature in customer service on an online platform such as e-commerce [33]. Research by Ramadhani *et al.* (2024) indicates that the waiting time of chatbots can affect customer satisfaction. This can be caused by the time gap between when consumers request information and when they receive the desired information, which is a crucial period in the considering stage [26].

F. User Satisfaction

Consumer interest in using e-commerce can be influenced by satisfaction in conducting online transactions, which is a primary indicator for consumers to prefer one marketplace over another [17]. Setyaningsih explains that satisfaction is the feeling experienced when the outcome of evaluating what has been received aligns with expectations, encompassing both the purchase decision and the needs and desires associated with the purchase [17].

The level of satisfaction can vary between one customer and another. Customer expectations can be influenced by previous purchase experiences, opinions from close acquaintances, and the information provided [38]. As written by marketing experts Kotler and Keller in their book, successful sellers are those who carefully reinforce customer satisfaction [18].

G. Chatbot

Chatbots are built using AI and Machine Learning technologies, enabling them to behave like humans. With the availability of data possessed by the chatbot, it is capable of providing the best recommendations to customers and can answer follow-up questions that encourage further explanations [19][20]. According to Følstad *et al.* (2021), customers are able to interact with chatbots to access information and services utilizing everyday language, which has been applied across various sectors, including customer service, e-commerce,

healthcare, and education [21].

Chatbots, often referred to as conversational interfaces, offer an innovative approach to interacting with computer systems. In the past, finding answers to questions from software typically required the use of search engines. However, it is possible for users to communicate with chatbots in the same manner as they would with a human. In addition to voice chatbots, chatbots are now also being used with computer chat platforms at an increasing rate [22].

H. SmartPLS

One of the latest and easiest applications for processing statistical data is SmartPLS [32]. SmartPLS, or Smart Partial Least Square, is one of the tools for processing statistical data. One of the uses of SmartPLS is to test the relationships between variables, namely between latent variables, latent variables with indicators, or latent variables with manifests. This software is recommended for a limited sample size [23].

III. METHODOLOGY

1. Research Type

This research uses a quantitative approach that will specifically contribute by analyzing the impact of chatbot usage in e-commerce (Shopee, Tokopedia, and Lazada) on customer satisfaction using the parametric procedure of PLS-MGA. PLS-MGA is considered more appropriate for exploring and comparing differences between two or more variables [27]. The proposed research framework follows these steps:

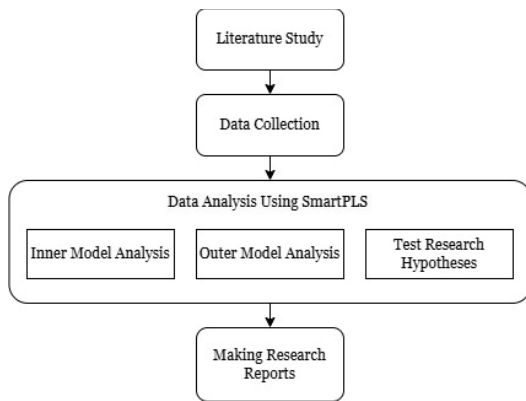


Fig. 1. Research Framework.

The first step is to gather information relevant to the research topic from various sources, such as books, articles, journals, and previous studies. The next step involves collecting data by distributing questionnaires to the research respondents. Once the data distribution results are gathered, the next step is to analyze the data using the SmartPLS 4.0.9.5 application. The final step is to create a research report by compiling all the data and information obtained throughout the research process.

2. Population and Sample

A population generally refers to a group of objects or subjects possessing specific qualities and characteristics identified by the researcher for analysis and conclusion drawing [36]. In this study, the research population included all students

from the Faculty of Computer Science at Sriwijaya University.

Whereas a sample is a part of a population [36]. In the framework of this research, the sample includes users of the e-commerce platforms Shopee, Tokopedia, and Lazada who meet the necessary criteria for the study such as having an e-commerce account (Shopee, Tokopedia, Lazada), actively using e-commerce for at least the last 1 month, actively interacting with chatbots. The total sample required is 100 respondents, determined using the Slovin's formula as follows:

$$n = \frac{N}{1+Ne^2} \tag{1}$$

3. Research Instruments

The research instruments used in this study are information quality, user experience, wait time, customer service, and customer satisfaction.

TABLE I. RESEARCH VARIABLES

Variable	Code	Questions
Information Quality	KI.1	How important is the accuracy of the information and answers provided by chatbot for your satisfaction?
	KI.2	How easy is it for you to find the information you need through chatbot?
	KI.3	How relevant is the information provided by chatbot to your needs?
	KI.4	Is the information provided by chatbot easy to understand?
	KI.5	How do you assess the consistency of the answers provided by chatbot in various conversations or questions?
User Experience	PP.1	How often do you use chatbots when shopping online?
	PP.2	How was your experience using chatbot?
	PP.3	Did chatbot help you resolve the problems or questions you raised?
	PP.4	Does chatbot provide good service during the interaction?
	PP.5	How do you assess the ease of use of chatbot?
Waiting Time	WT.1	How important is the response speed of chatbot for your satisfaction in online shopping?
	WT.2	How quickly does chatbot respond to your questions?
	WT.3	Is chatbot available at all times when you need it?
	WT.4	Do you feel that the response time of chatbot is adequate?
	WT.5	How do you rate the response speed of chatbot compared to human-based customer service in responding to your questions?
Customer Service	LP.1	How well does chatbot understand your questions or requests?
	LP.2	How easy is it for you to find chatbot feature on the e-commerce platform?
	LP.3	Is chatbot interface easy for you to understand?
	LP.4	Does your interaction with chatbot make you feel satisfied with the customer service of this platform?
	LP.5	Does chatbot use clear and easy-to-understand language?
Customer Satisfaction	KP.1	How satisfied are you with chatbot's ability to provide information and answer your questions?
	KP.2	To what extent do you feel chatbot influences your purchasing decisions?
	KP.3	Can chatbot enhance your shopping experience?
	KP.4	Does chatbot help you resolve the issues you encounter while shopping?

KP.5	How would you assess your overall satisfaction with the service offered by the chatbot?
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IV. RESULT

A. Outer Model

1) Outer Loadings and Convergent Validity (AVE)

An outer loading score exceeding 0.70 (>0.70) indicates that the validity indicator is acceptable. To meet the minimum criteria, AVE must be greater than 0.50 (>0.50). If the outer loading value is below 0.70 but remains above the minimum threshold of 0.40 (>0.40), and the AVE value exceeds 0.50 (>0.50), the indicator can still be considered valid. If less than 0.40, it must be removed [25].

TABLE III. OUTER LOADINGS AND AVE

Latent Variable	Construct Variable	Loading (>0.70)	AVE (>0.5)
Information Quality	KI.1	0.742	0.567
	KI.2	0.823	
	KI.3	0.720	
	KI.4	0.702	
	KI.5	0.772	
User Experience	PP.1	0.794	0.584
	PP.2	0.778	
	PP.3	0.746	
	PP.4	0.757	
	PP.5	0.742	
Waiting Time	WT.1	0.783	0.609
	WT.2	0.803	
	WT.3	0.817	
	WT.4	0.735	
	WT.5	0.762	
Customer Service	LP.1	0.790	0.586
	LP.2	0.761	
	LP.3	0.729	
	LP.4	0.791	
	LP.5	0.755	
Customer Satisfaction	KP.1	0.752	0.577
	KP.2	0.746	
	KP.3	0.756	
	KP.4	0.791	
	KP.5	0.753	

Construct loading values are higher than 0.70, and AVE values all exceed 0.50. Therefore, the factor loading values and AVE of all variables and indicators meets the validity criteria.

2) Construct Reliability

To ensure the reliability of constructs, both composite reliability and Cronbach's alpha should exceed 0.70. A construct variable is considered reliable if both above this threshold [25].

TABLE IIIII. CONTRUCT RELIABILITY

Latent Variable	Cronbach's Alpha	Composite Reliability (rho_c)	Information
Information Quality	0.810	0.867	Reliable
User Experience	0.823	0.875	Reliable
Waiting Time	0.840	0.886	Reliable
Customer Service	0.825	0.876	Reliable
Customer Satisfaction	0.817	0.872	Reliable

According to the test results, leads to these conclusions that

both values for all variables exceed 0.70. Based on this assessment, the research model is suitable for further analysis.

3) Discriminant Validity Heterotrait Monotrait (HTMT)

HTMT is the ratio of the inter-construct correlation to the intra-construct correlation. According to the HTMT method, the disattenuated correlation between two constructs can be calculated if both are perfectly measured. A construct variable is considered a latent variable if its value is less than 0.90, and each construct variable can form a latent variable if its value is less than 0.90 [25].

TABLE IVV. HETEROTRAIT MONOTRAIT

Path Coefficient	HTMT Ratio
Information Quality <-> Customer Satisfaction	0.242
Customer Service <-> Customer Satisfaction	0.412
Customer Service <-> Information Quality	0.066
User Experience <-> Customer Satisfaction	0.387
User Experience <-> Information Quality	0.133
User Experience <-> Customer Service	0.101
Waiting Time <-> Customer Satisfaction	0.343
Waiting Time <-> Information Quality	0.139
Waiting Time <-> Customer Service	0.163
Waiting Time <-> User Experience	0.144

HTMT calculation value is less than 0.90. This value indicates that each construct variable is capable of forming its own latent variable and satisfies the HTMT criteria.

B. Inner Model

1) Collinearity Assessment

In order to test a model further, the VIF value should be below 5.0, which indicates that the model is free from multicollinearity issues among all predictors and responses [25].

TABLE V. COLLINEARITY ASSESSMENT VIF

Patch Coefficient	VIF	Multikoleniaritas
Information Quality -> Customer Satisfaction	1.019	No
Customer Service -> Customer Satisfaction	1.022	No
User Experience -> Customer Satisfaction	1.024	No
Waiting Time -> Customer Satisfaction	1.041	No

From the table above, it is evident that the VIF values for each construct variable are below 5.0 (<5.0). Therefore, all variables do not show any indications of multicollinearity and are suitable for use in further analysis.

2) Coefficient of Determination (R²)

The R² is used to evaluate the precision of predictions. Generally, an R² value of 0.75 signifies high predictive accuracy, 0.50 indicates moderate, and 0.25 implies low [25].

TABLE VI. COEFFICIENT OF DETERMINATION

Latent Variable	R ²	R ² Adjusted	Information
Customer Satisfaction	0.277	0.268	Moderate

According to the test results, leads to these conclusions that

the accuracy of the User Satisfaction model estimation is 0.277. Based on this value, it has a Moderate estimation accuracy. Predictive Relevance (Q^2).

The blindfolding procedure is applied. Q^2 value of 0.02 (small), 0.15 (moderate), and 0.35 (high) predictive relevance [25].

TABLE VII. PREDICTIVE RELEVANCE

Latent Variable	SSO	SSE	$Q^2 (=1 - SSE/SSO)$
Customer Satisfaction	1500	1272.721	0.152
Information Quality	1500	1500	0
Customer Service	1500	1500	0
User Experience	1500	1500	0
Waiting Time	1500	1500	0

According to the test results, leads to these conclusions that the predictive relevance Q^2 value for the User Satisfaction construct model is influenced by Information Quality, User Experience, Wait Time, and Customer Service at a rate of 0.152, which is classified as having moderate predictive relevance.

3) Effect Size (f^2)

In contrast to R^2 , f^2 is specifically concerned with each exogenous variable. Generally, a value of 0.02 (small), 0.15 (medium), 0.35 (large) effect size. Here is f^2 value table [25].

TABLE VIII. EFFECT SIZE

Path Coefficient	f-square	Information
Information Quality -> Customer Satisfaction	0.031	Small
Customer Service -> Customer Satisfaction	0.119	Small
User Experience -> Customer Satisfaction	0.094	Small
Waiting Time -> Customer Satisfaction	0.054	Small

- According to the test results, leads to these conclusions:
- *Information Quality -> Customer Satisfaction has a constructive model value with an affect size f^2 of 0.031, which is classified as having a small estimated value.*
 - *Customer Service -> Customer Satisfaction has a constructive model affect size f^2 value of 0.119 and is categorized as having a small estimated value.*
 - *User Experience -> Customer Satisfaction has a constructive model affect size f^2 value of 0.094 and is classified as having a small estimated value.*
 - *Waiting Time -> Customer Satisfaction has a constructive model affect size f^2 value of 0.054 and is classified as having a small estimated value.*

C. Hypothesis Testing of the Research Model

The analysis of structural model coefficients is conducted to test hypotheses by identifying which relationships have a significant impact. If p-value is less than the significance level (0.05), the relationship is considered significant. Conversely, a relationship is considered not significant when the p-value exceeds 0.05 [25].

TABLE IX. HYPOTHESIS TESTING

Hypothesis	Path Coefficient	Original Sample (O)	T Stat	P Values	Information
H1	Information Quality -> Customer Satisfaction	0.150	2.518	0.012	Accepted
H2	User Experience -> Customer Satisfaction	0.264	4.435	0.000	Accepted
H3	Waiting Time -> Customer Satisfaction	0.201	3.240	0.001	Accepted
H4	Customer Service -> Customer Satisfaction	0.296	5.480	0.000	Accepted

From the test results in the table above, leads to these conclusions:

- *Information Quality significant positive impact on Customer Satisfaction. Therefore, H1 is accepted and H0 is rejected.*
- *Experience has a significant impact on Customer Satisfaction. Therefore, H2 is accepted and H0 is rejected.*
- *Waiting Time has a significant positive effect on Customer Satisfaction. Therefore, H3 is accepted and H0 is rejected.*
- *Customer Service has a significant positive impact on Customer Satisfaction. Therefore, H4 is accepted and H0 is rejected.*

D. Multigroup Analysis (PLS-MGA)

Multigroup Analysis (MGA) in the context of PLS-SEM is a technique used to evaluate differences in structural relationships between sample groups. The goal is to determine whether there are significant differences in the influence between latent variables across different groups, such as based on age, gender, geographic region, or other characteristics. PLS-MGA allows researchers to compare PLS-SEM models across different groups and test parameter differences, such as path coefficient values, to determine whether these differences are statistically significant. The testing criterion is that there is a significant difference if the p-value < a (0.05) [25]. The results of MGA-PLS can be seen as follows:

TABLE X. MULTIGROUP ANALYSIS

Path Coefficient	2-tailed (Lazada v Shopee) p value	2-tailed (Lazada v Tokopedia) p value	2-tailed (Shopee v Tokopedia) p value
Information Quality -> Customer Satisfaction	0.318	0.829	0.135
User Experience -> Customer Satisfaction	0.787	0.251	0.251
Waiting Time -> Customer Satisfaction	0.092	0.345	0.001
Customer Service -> Customer Satisfaction	0.634	0.013	0.057

According to the test results, leads to these conclusions: **Lazada v Shopee**

- *There is no significant differences in the Direct Influence Path Coefficient between Information Quality and Customer Satisfaction, with p-value 0.318, greater than 0.05.*

- There is no significant differences in the Direct Influence Path Coefficient between User Experience and Customer Satisfaction, with p-value 0.787, greater than 0.05.
- There is no significant differences in the Direct Influence Path Coefficient between Waiting Time and Customer Satisfaction, with p-value 0.787, greater than 0.05.
- There is no significant differences in the Direct Influence Path Coefficient between Customer Service and Customer Satisfaction, with p-value 0.787, greater than 0.05.

Lazada v Tokopedia

- There is no significant differences in the Direct Influence Path Coefficient between Information Quality and Customer Satisfaction, with p-value 0.829, greater than 0.05.
- There is no significant differences in the Direct Influence Path Coefficient between User Experience and Customer Satisfaction, with p-value 0.251, greater than 0.05.
- There is no significant differences in the Direct Influence Path Coefficient between Waiting Time and Customer Satisfaction, with p-value 0.345, greater than 0.05.
- There is a significant differences in the Direct Influence Path Coefficient between Customer Service and Customer Satisfaction, with p-value 0.013, less than 0.05.

Shopee v Tokopedia

- There is no significant differences in the Direct Influence Path Coefficient between Information Quality and Customer Satisfaction, with p-value 0.135, greater than 0.05.
- There is no significant differences in the Direct Influence Path Coefficient between User Experience and Customer Satisfaction, with p-value 0.251, greater than 0.05.
- There is a significant differences in the Direct Influence Path Coefficient between Waiting Time and Customer Satisfaction, with p-value 0.001, less than 0.05.
- There is no significant differences in the Direct Influence Path Coefficient between Customer Service and Customer Satisfaction, with p-value 0.057, greater than 0.05.

E. Multigroup Analysis Hypothesis Testing

1) Shopee

TABLE XI. MULTIGROUP SHOPEE

Hypothesis	Path Coefficient	Original Sample (O)	T Stat	P Values	Information
H1	Information Quality -> Customer Satisfaction	0.295	2.850	0.004	Accepted
H2	User Experience -> Customer Satisfaction	0.296	4.223	0.000	Accepted
H3	Waiting Time -> Customer Satisfaction	0.400	4.344	0.000	Accepted
H4	Customer Service -> Customer Satisfaction	0.265	3.034	0.002	Accepted

From the test results in the table above, leads to these conclusions:

- There is a significant positive influence of Information

Quality on Customer Satisfaction. **H1 is accepted** and H0 is rejected.

- There is a significant positive influence of User Experience on Customer Satisfaction. Therefore, **H2 is accepted** and H0 is rejected.
- There is a significant positive influence of Waiting Time on Customer Satisfaction. Therefore, **H3 is accepted** and H0 is rejected.
- Customer Service has a significant positive impact on Customer Satisfaction. Consequently, **H4 is accepted** while H0 is rejected.

2) Tokopedia

TABLE XII. MULTIGROUP ANALYSIS TOKOPEDIA

Hypothesis	Path Coefficient	Original Sample (O)	T Stat	P Values	Information
H1	Information Quality -> Customer Satisfaction	0.083	0.761	0.447	Rejected
H2	User Experience -> Customer Satisfaction	0.439	4.354	0.000	Accepted
H3	Waiting Time -> Customer Satisfaction	0.009	0.099	0.921	Rejected
H4	Customer Service -> Customer Satisfaction	0.502	5.818	0.000	Accepted

According to the test results, leads to these conclusions:

- There is a positive but insignificant of Information Quality on Customer Satisfaction. Therefore, **H1 is rejected** and H0 is accepted.
- There is a significant positive influence of User Experience on Customer Satisfaction. Therefore, **H2 is accepted** and H0 is rejected.
- There is a positive but insignificant effect of Waiting Time on Customer Satisfaction. Therefore, **H3 is rejected** and H0 is accepted.
- There is a significant positive influence of Customer Service on Customer Satisfaction. Therefore, **H4 is accepted** and H0 is rejected.

3) Lazada

TABLE XIII. MULTIGROUP ANALYSIS LAZADA

Hypothesis	Path Coefficient	Original Sample (O)	T Stat	P Values	Information
H1	Information Quality -> Customer Satisfaction	0.096	0.557	0.578	Rejected
H2	User Experience -> Customer Satisfaction	0.167	0.753	0.451	Rejected
H3	Waiting Time -> Customer Satisfaction	0.150	0.989	0.323	Rejected
H4	Customer Service -> Customer	0.197	1.728	0.084	Rejected

Satisfaction				
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According to the test results, leads to these conclusions:

- *There is a positive but insignificant effect of Information Quality on Customer Satisfaction. Therefore, H1 is rejected and H0 is accepted.*
- *There is a positive but insignificant effect of User Experience on Customer Satisfaction. Therefore, H2 is rejected and H0 is accepted.*
- *There is a positive but insignificant effect of Waiting Time on Customer Satisfaction. Therefore, H3 is rejected and H0 is accepted.*
- *There is a positive but insignificant effect of Customer Service on Customer Satisfaction. Therefore, H4 is rejected and H0 is accepted.*

According to the test results, leads to these conclusions that Shopee chatbot service has an impact on user satisfaction. This indicates that the service provided by the Shopee chatbot is already running effectively, starting from the quality of information provided, user experience, relatively faster response time, and the features offered are quite complex and easy to use.

On the other hand, Tokopedia chatbot shows the same thing. However, there are still shortcomings in the quality of the information provided, as well as a relatively long wait time for responses.

Meanwhile, chatbot on Lazada does not affect user satisfaction, which could be due to the quality of the information provided not matching user complaints, the user experience not being very good while using the chatbot service, the relatively longer wait time for responses, and the features provided still having shortcomings. Additionally, this could also be due to the lack of user interest in using the Lazada platform, especially the chatbot service.

V. DISCUSSIONS

This study is expected to make a significant contribution to the fields of digital marketing and customer service, particularly in the context of chatbot usage on e-commerce platforms. While many previous studies have examined chatbot usage in general, this research delves deeper into understanding how the effectiveness of chatbots can vary across leading e-commerce platforms in Indonesia, such as Shopee, Tokopedia, and Lazada.

This study highlights that chatbots can play a significant role in enhancing customer satisfaction on e-commerce platforms, especially on Shopee and Tokopedia. The findings reveal that Shopee's chatbot consistently has a positive impact on customer satisfaction.

Meanwhile, Tokopedia demonstrates a more limited positive impact, with two variables that are waiting time and information quality that showing no significant positive influence. In the context of e-commerce, waiting time is often associated with customer service response speed. With respect to waiting time, e-commerce platforms like Tokopedia have largely automated their customer service processes using chatbot features. According to Song et al. (2019), an artificial

intelligence assistant (chatbot) primarily functions to automatically respond to customer inquiries [35]. Based on this, customers may have become accustomed to minimal waiting times in e-commerce transactions, making this factor less influential in shaping their satisfaction.

Additionally, information quality in e-commerce encompasses the accuracy, completeness, and relevance of the product information provided. The insignificance of information quality in Tokopedia's chatbot could be attributed to customers prioritizing other features. Customers may rely more on reviews and ratings from other buyers as their primary source of information rather than the product descriptions provided by sellers. As research by Sudirjo et al. (2023), consumers often seek information in various ways, including through previous customer reviews of purchased products [36]. This reliance on social proof may diminish the importance of information quality as a determinant of satisfaction. Therefore, Tokopedia should consider optimizing its chatbot, both in terms of its ability to answer inquiries and its response speed, to maximize customer satisfaction.

For Lazada, this study found no significant impact of chatbot usage on customer satisfaction. User expectations play a critical role in shaping perceptions of chatbot effectiveness. Modern e-commerce users often expect chatbots to efficiently resolve complex issues, yet many chatbots are limited to providing predefined responses or handling basic queries. As Reinkemeier and Gnewuch (2022) emphasize, users value chatbots more when they exhibit a high degree of interactivity and adaptability [37], attributes that may not be consistently present in Lazada's chatbot.

Therefore, Lazada should evaluate and potentially revise its strategy for utilizing chatbots. One possible approach is to enhance the quality of chatbot interactions, improve the quality of information provided, and ensure faster and more accurate responses.

Thus, it is expected that e-commerce companies can utilize these findings to design more effective customer service strategies, focusing on enhancing digital interactions to boost customer loyalty and satisfaction.

VI. CONCLUSION

After conducting tests, analysis, and discussions to determine the impact of chatbot usage on e-commerce users (Shopee, Tokopedia, and Lazada), it can be concluded that Chatbot service on Shopee platform for all its variables significantly shows a positive impact on user satisfaction. This is consistent with the test results showing P Values for the information quality variable at 0.004, user experience at 0.000, wait time at 0.000, and customer service at 0.002. The values of each of these variables are less than 0.05. Besides that, chatbot service on Tokopedia platform also significantly shows a positive influence on user satisfaction for the user experience and customer service variables. This is evidenced by the P values of the user experience variable being 0.000 and the customer service variable being 0.000. The values of both variables are less than 0.05. Meanwhile, the information quality and waiting time variables show no significant influence on user satisfaction. However, chatbot service on Lazada platform

for all its variables shows an not significant effect on user satisfaction. This is indicated by the P values of each variable being greater than 0.05.

This study focuses only on three major e-commerce platforms in Indonesia (Tokopedia, Shopee, and Lazada), which means the results may not be generalizable to other e-commerce platforms with different characteristics. Additionally, the variables examined include information quality, user experience, waiting time, and customer service in relation to customer satisfaction. However, other factors such as price, promotions, user reviews, and additional elements that may also influence customer satisfaction have not been explored in this study. This study should reveal new strategies by connecting the variables of waiting time, user experience, information quality, and customer service with customer satisfaction in the context of e-commerce chatbots. Future research could further examine the implementation of chatbots as a critical element in customer experience management. Furthermore, future research are expected to evaluate additional variables that were not included in this research.

REFERENCES

- [1] Handayani, N. L. P. (2022). E-Commerce Sebagai Penunjang Ekonomi Digital di Jawa Tengah. *Jurnal Ilmiah Manajemen, Bisnis Dan Kewirausahaan*, 2(1), 9–14. <https://doi.org/10.55606/jurimbik.v2i1.103>.
- [2] Bawack, R. E., Wamba, S. F., Carillo, K. D. A., & Akter, S. (2022). Artificial intelligence in E-Commerce: a bibliometric study and literature review. In *Electronic Markets* (Vol. 32, Issue 1). Springer Berlin Heidelberg. <https://doi.org/10.1007/s12525-022-00537-z>.
- [3] Madasamy, S. and Aquilanz, L. L. C. (2023) 'The Evolution of Chatbots: Cloud and Ai Synergy in Banking Customer Interactions', *Journal of Emerging Technologies and Innovative Research*, 10(October 2023), pp. 127–137.
- [4] Adamopoulou, E., & Moussiades, L. (2020). An Overview of Chatbot Technology. In *IFIP Advances in Information and Communication Technology: Vol. 584 IFIP*. Springer International Publishing. https://doi.org/10.1007/978-3-030-49186-4_31.
- [5] Zumstein, D. and Hundertmark, S. (2020) 'Chatbots – An Interactive Technology for Personalized Communication', *Chatbots – An Interactive Technology For Personalized Communication*, IADIS International Journal, 15(February 2018), pp. 96–109.
- [6] Trivedi, A., Gor, V., & Thakkar, Z. (2019). Chatbot generation and integration: A review. *International Journal of Advance Research*, 5(2), 1308–1311. www.IJARIIT.com
- [7] Sabila, A. R. and Kusumaningrum, L. (2020). Analisis Kualitas Layanan E-Commerce Shopee Dalam Meningkatkan Kepercayaan Dan Kepuasan Pelanggan (Studi Kasus: Pelanggan Shopee Di Kota Tangerang 2020). *Jurnal Ilmiah Sekolah Tinggi Teknologi Informasi NIIT*, 16(2), pp. 72–80.
- [8] Dey, N., Mahelle, P., Mohd Shafi, P., Kimabahune, V. and Hassanien, A. E. (2020) *Internet of Things, Smart Computing and Technology: A Roadmap Ahead*, Studies in Systems, Decision and Control.
- [9] Indah Yani, M. and Sugiyanto, S. (2022). Pengaruh Kualitas Layanan, Kepercayaan, Citra Merek Dan Kepuasan Pelanggan Terhadap Loyalitas Pelanggan Edwin Jeans Indonesia Pada E-Commerce Shopee. *SINOMIKA Journal: Publikasi Ilmiah Bidang Ekonomi dan Akuntansi*, 1(3), pp. 443–472.
- [10] Wibowo, B., Clarissa, H. and Suhartono, D. (2020) 'The Application of Chatbot for Customer Service in E-Commerce', *Engineering, Mathematics and Computer Science (EMACS) Journal*, 2(3), pp. 91–95.
- [11] Rita, P., Oliveira, T. and Farisa, A. (2019). The impact of e-service quality and customer satisfaction on customer behavior in online shopping. *Heliyon*. Elsevier Ltd, 5(10), p. e02690.
- [12] Sim, L. S., Christopher, M., Nafitra, H. D., Panjaitan, J. S. V., & Rakhmawati, N. A. (2023). Pemilihan Platform E-Commerce Pada Kalangan Mahasiswa Its Dengan Menggunakan Metode Weighted Product. *Jurnal Teknoinfo*, 17(1), 36. <https://doi.org/10.33365/jti.v17i1.2252>.
- [13] Chong, D., & Ali, H. (2022). Competitive Strategy, Competitive Advantages, dan Marketing Performance pada E-Commerce Shopee Indonesia. *Jurnal Kewirausahaan Dan Multi Talenta*, 1(1), 1–13. <https://doi.org/10.38035/jkmt.v1i1.7>.
- [14] Sasmita, A., Ambarita, Y. M., & Putri, A. M. (2021). Strategi Pemasaran Tokopedia dalam Persaingan Antar E-Commerce dengan Analisis SWOT. *Jptam*, 5(2), 3397–3404. <https://jptam.org/index.php/jptam/article/view/1403>
- [15] Edeh, F. O., Quttainah, M. A., Syed Badruzaman, S. N., Kee, D. M. H., Mohd Zamri, S., Tariq Mahmud, T., Izni Shafiee, S. S., & Awoke, V. C. (2021). Factors Contributing to Online Purchase Intention amongst Malaysian Consumers: A Case of Lazada. *International Journal of Accounting & Finance in Asia Pasific*, 4(2), 33–45. <https://doi.org/10.32535/ijafap.v4i2.1113>.
- [16] Nurdiansyah, A., Pratiwi, A., & Kaunaini, B. (2022). Literature Review Pengaruh Kepercayaan, Kemudahan dan Kepuasan. *Jurnal Ilmu Multidisiplin*, 1(1), 297–303.
- [17] Masyhuri, M. (2022). Key Drivers of Customer Satisfaction on the E-Commerce Business. *East Asian Journal of Multidisciplinary Research*, 1(4), 657–670. <https://doi.org/10.55927/eajmr.v1i4.405>.
- [18] Pallathadka, H., Ramirez-Asis, E. H., Loli-Poma, T. P., Kaliyaperumal, K., Ventayen, R. J. M., & Naved, M. (2023). Applications of artificial intelligence in business management, e-commerce and finance. *Materials Today: Proceedings*, 80(xxxx), 2610–2613. <https://doi.org/10.1016/j.matpr.2021.06.419>.
- [19] Talanquer, V. (2023) 'Interview with the Chatbot: How Does It Reason?', *Journal of Chemical Education*, 100(8), pp. 2821–2824.
- [20] Følstad, A., Araujo, T., Law, E. L. C., Brandtzaeg, P. B., Papadopoulos, S., Reis, L., Baez, M., Laban, G., McAllister, P., Ischen, C., Wald, R., Catania, F., Meyer von Wolff, R., Hobert, S., & Luger, E. (2021). Future directions for chatbot research: an interdisciplinary research agenda. *Computing*, 103(12), 2915–2942. <https://doi.org/10.1007/s00607-021-01016-7>.
- [21] Ansari, M., & Parbulkar, M. S. (2021). Intelligent Chatbot. 9(4), 79–82.
- [22] Permata, R. A., Syaيداتussalihah and Abdurahim (2023). Analisis Data Penelitian Kesehatan: Perbandingan Hasil antara SmartPLS, R dan IBM SPSS untuk Jumlah Sampel Kecil. *JSN : Jurnal Sains Natural*, 1(1), pp. 17–22.
- [23] Gajewska, T., Zimon, D., Kaczor, G. and Madzik, P. (2020) 'The impact of the level of customer satisfaction on the quality of e-commerce services', *International Journal of Productivity and Performance Management*, 69(4), pp. 666–684.
- [24] Hair, J.F., Hult, G.T.M., Ringle, C.M. & Sarstedt, M. 2022. *Partial Least Squares Structural Equation Modeling (Pls-Sem) Third Edition*. Third Edit ed. *Angewandte Chemie International Edition*, 6(11), 951–952., Los Angeles: SAGE Publications, Inc.
- [25] Ismawati, A. (2020). Pengaruh Kualitas Informasi Terhadap Keputusan Pembelian Produk Online Pada Shopee. *Prisma (Platform Riset Mahasiswa Akuntansi)*, 01(06), 51–62. <https://ojs.stiesia.ac.id/index.php/prisma/article/view/692>.
- [26] Yolandita, C., Nursanta, E., Widiyarsih, W., & Masitoh, S. (2022). Analisis Pengaruh Daya Tarik Iklan, Kualitas Informasi, Kemudahan dan Kepercayaan Terhadap Keputusan Pembelian Marketplace Shopee. *Jurnal Sosial Teknologi*, 2(6), 479–486. <https://doi.org/10.59188/jurnalsostech.v2i6.343>.
- [27] Maulida, N., & Jaya, U. A. (2024). Pengaruh Personalisasi dan Kecerdasan Buatan (AI) Terhadap Loyalitas Pelanggan Dalam Industri 6.0 Pada Platform E-Commerce di Sukabumi. *Jurnal Ekonomi, Manajemen Dan Akuntansi*, 1192, 304–317.
- [28] Zuhdi, D. A., & Yasya, W. (2023). Pengaruh Kepercayaan dan Pengalaman Pembelian Online terhadap Minat Beli di E-Commerce Shopee. *Jurnal Interaksi: Jurnal Ilmu Komunikasi*, 7(2), 261–277. <https://doi.org/10.30596/ji.v7i2.14761>.

- [29] Maulidiyah, N. F. A., Singasatia, D., & Sunandar, M. A. (2022). Analisis Pengaruh User Experience Terhadap Kepuasan Pengguna Mobile Application VLive Menggunakan Model SCS. MALCOM: Indonesian Journal of Machine Learning and Computer Science, 2(2), 28–34. <https://doi.org/10.57152/malcom.v2i2.398>.
- [30] Susiyanto, D., & Naningsih. (2024). Pengaruh Artificial Intelligence Terhadap E Business Dan E Commerce. Jurnal Ekonomi, Manajemen Dan Akuntansi, 2(1), 482–486. <http://jurnal.kolibi.org/index.php/neraca>.
- [31] Kapojos, A. L. N., Saerang, D. P. E., & Gunawan, E. M. (2023). the Effect of E-Service Quality and Waiting Time Towards Customer Satisfaction At Pizza Hut Restaurant in Manado Town Square. Jurnal EMBA : Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi, 11(4), 439–449. <https://doi.org/10.35794/emba.v11i4.51230>.
- [32] Fauzan, M., Wicaksana, M. P., & Rahardandi, P. G. (2024). Literatur Review Penggunaan Chatbot Untuk Layanan Informasi. Journal Of Social Science Research, 4(4), 8316–8323.
- [33] Ramadhani, D. R., Birawa, M. S., Sholikah, D. S., & Prabandanu, R. M. A. A. H. (2024). Analisis Pengaruh Kualitas Pelayanan Berbasis Chatbot Terhadap Kepuasan Pelanggan Dalam Transaksi Online Dengan Objek Aplikasi Shopee. Journal of Exploratory Dynamic Problems, 1, 104–115.
- [34] Pasaribu, F., Sari, W. P., Ni Bulan, T. R. and Astuty, W. (2022) ‘The effect of e-commerce service quality on customer satisfaction, trust and loyalty’, International Journal of Data and Network Science, 6(4), pp. 1077–1084.
- [35] Song, X., Yang, S., Huang, Z. and Huang, T. (2019) ‘The Application of Artificial Intelligence in Electronic Commerce’, Journal of Physics: Conference Series, 1302(3).
- [36] Sudirjo, F., Ratnawati, Hadiyati, R., Sutaguna, I. N. T. and Yusuf, M. (2023) ‘The Influence Of Online Customer Reviews And E-Service Quality On Buying Decisions In Electronic Commerce Ratnawati 2 Politeknik Pertanian Negeri Pangkep 2’, Journal of Management and Creative Business (JMCBUS), 1(2), pp. 156–181.
- [37] Reinkemeier, F. and Gnewuch, U. (2022) ‘Designing effective conversational repair strategies for chatbots’, 30th European Conference on Information Systems (ECIS), (June), pp. 1–17.
- [38] Ingaldi, M. and Ulewicz, R. (2019) ‘How to make e-commerce more successful by use of Kano’s model to assess customer satisfaction in terms of sustainable development’, Sustainability (Switzerland), 11(18), pp. 1–22.