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Chatbots and Customer Satisfaction in E-Commerce: An Exploratory Study

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ABSTRACT

Objective – This study tries to analyze how the implementation of chatbots, with their capabilities for fast responsiveness and personalized service, influences customer satisfaction in the e-commerce context.
Methodology – Given the nature of the research question, the study could potentially employ a quantitative **methodology** to measure and analyze the relationship between chatbot features (like responsiveness and personalization) and customer satisfaction levels. This might involve surveys – Collecting data from e-commerce customers about their experiences with chatbots and their overall satisfaction.
Findings – The study's findings indicate a significant positive correlation between chatbot usage and key e-commerce outcomes, revealing that chatbots enhance customer satisfaction through fast, responsive, user-friendly, and personalized services, which in turn drives increased site revisits, repurchase intentions, and positive word-of-mouth. Therefore, the effective implementation of chatbots is crucial for boosting customer satisfaction and fostering positive consumer behavior in the e-commerce sector.
Novelty – Based on the provided findings and the suggestion for future research, the novelty of this study appears to lie in empirically demonstrating the multifaceted positive impact of chatbot implementation on crucial e-commerce metrics – specifically customer satisfaction, repurchase intentions, site revisits, and word-of-mouth – by highlighting the mediating role of enhanced service qualities like speed, responsiveness, ease of use, and personalization.
Keywords: *chatbot, e-commerce, customer satisfaction*

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I. INTRODUCTION

In the era of ever-evolving technology, technological transformation has become a common sight in various aspects of human life, including in the business world. One of the most significant impacts of this digital revolution is the paradigm shift in the interaction between companies and customers. This phenomenon not only changes the way companies operate but also influences consumer expectations and behavior. In the context of the e-commerce industry, the presence of chatbots is one of the most striking manifestations of this change. Chatbots, as computer programs designed to automatically respond to customer questions and requests, have become an integral element in customer service strategies across e-commerce platforms. Their ability to provide instant, consistent, and personalized responses has made them a key pillar in companies' efforts to improve customer experience (Aldoseri et al., 2024). One of the main advantages of chatbots is their fast and consistent responsiveness. In a competitive business environment, the ability to respond quickly to customer requests can be a determining factor in maintaining customer loyalty (Vilkaite-Vaitone & Skackauskiene, 2020).

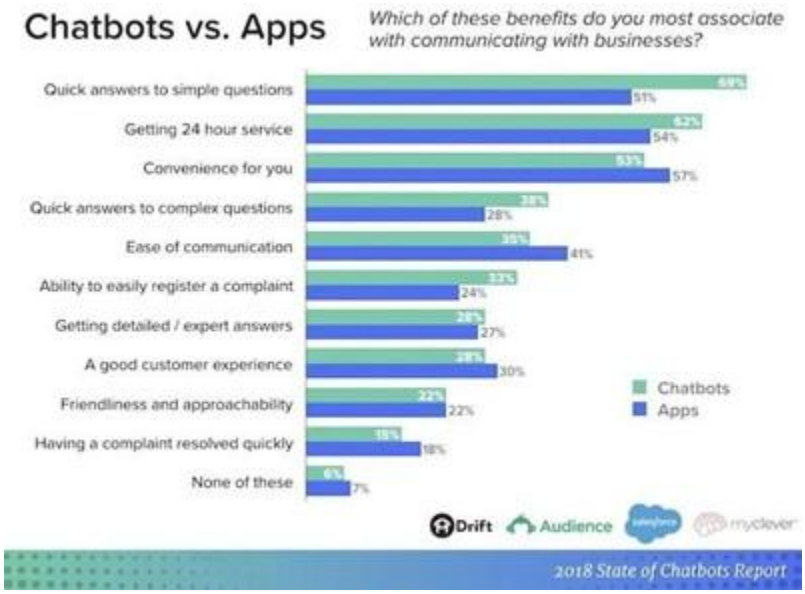

Figure 1 Chatbots vs. Apps

Figure 1 shows a comparison of chatbot usage with applications according to consumers, one of which is a faster chatbot response with 24/7 non-stop operation, chatbots allow customers to access help or information whenever needed, without time or location restrictions (Brn.Ai, 2018). This not only increases customer convenience, but also creates a positive perception of the company's commitment to superior customer service.

In addition to responsiveness, chatbots also have the ability to provide personalized services that enrich the customer experience (Cheng & Jiang, 2020). Through customer data analysis, chatbots can understand individual preferences and needs, so they can provide product or service recommendations that are relevant and in accordance with customer desires. Thus, chatbots are not only a tool to answer customer questions, but also a personal assistant that helps customers find the solution that best suits their needs.

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However, although chatbots offer great potential in increasing customer satisfaction, there are still several challenges that need to be overcome. One of them is the development of chatbot technology that is more sophisticated and relevant to current customer needs. Although existing chatbots are capable of providing fast responses and good personalization, there is still room for improvement in the ability of chatbots to understand context and respond better to requests.

There is also a need to better understand how chatbot usage impacts customer perceptions of service quality and their overall satisfaction (Shweta, 2022). By understanding the factors that influence the effectiveness of chatbots in improving customer satisfaction, companies can optimize their customer service strategies to achieve sustainable success in the increasingly competitive and dynamic e-commerce market. Therefore, further research on the impact of chatbot usage on customer satisfaction in the e-commerce industry is highly relevant and necessary.

II. LITERATURE REVIEW

Chatbots

Chatbots have become an important part of today's digital technology. With the ability to interact with users automatically and efficiently, chatbots can help various sectors ranging from customer service, banking, to health. With fast and accurate responses, Chatbots can provide timely solutions and help users solve their various problems or questions. In addition, chatbots also operate 24/7, so they can provide non-stop service to users. Chatbot is defined as a Computer Program that can imitate human conversation by applying 2 Artificial Intelligence methods and algorithms, namely Natural Language Processing and Machine Learning (Anindyati, 2023).

Chatbot is a computer program that interacts with users using natural language. The first chatbot technology began in the 1960s (Benedictus et al., 2017). Chatbot is one of the audio and text-based artificial intelligence technologies that is able to simulate how to behave and speak like humans as conversation partners (Oktavia, 2020). In the context of the COVID-19 pandemic, Chatbots have an important role in building society 5.0. Chatbots allow their users to get information. Based on various findings that have been presented, the use of chatbot technology in the COVID-19 Pandemic is considered an important aspect in the formation of society 5.0, when society can utilize industrial revolution 4.0 technology in solving various problems (Sugiono, 2021).

Customer Satisfaction

Customer Satisfaction is the level of achievement of a product/service performance received by consumers that is the same as consumer expectations (Mai & Chuong, 2021). Customer Satisfaction measures the extent to which customers are satisfied with the products or services they purchase or use. The level of customer satisfaction can be influenced by various factors, such as product quality, speed of service, responsiveness of customer service, appropriate price, and the overall experience provided.

Hypothesis Development

Because chatbots respond quickly, they are easy to contact and are available when needed, making customers feel comfortable. In addition to feeling comfortable, consumers also feel appreciated (Nugraha et al., 2022). The main characteristics of chatbots such as convenience, customization and time efficiency can have a positive effect on consumer satisfaction. Time efficiency in interacting with companies is a part that satisfies consumers because it is consumer expectations. A fast and reliable system is consumer expectations (Nugraha et al., 2022). Hence, hypothesis one of this study is:

H1: There is a positive relationship between the use of Chatbots and Customer Satisfaction.

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According to Chiu et al. (2012), online repurchase intention is subjective probability that experienced shoppers will make purchase again from the same online retailer. In addition, according to Hellier, Geursen, Carr and Rickard (2003), "Online repurchase intention is the individual's decision about buying again a designated service from the same company, taking into accounts his or her present situation and likely circumstances". Based on the definition above, it can be concluded that repurchase intention is the customer's intention to repurchase a product offered by an online store after the customer is satisfied with the product received (Aurelia et al., 2021). Hence, hypothesis two of this study is:
H2: There is a positive relationship between Satisfaction and Repurchase Intention.

The convenience of a service to consumers makes consumers tell other consumers about their positive experiences (Roy et al., 2020). According to Joesyana (2018), word of mouth is known as the most effective marketing activity. In order to form the dissemination of information or experiences related to products or services that are utilized through word of mouth, it can be done by creating customer satisfaction and loyalty. According to Rahmawati (2014), customer satisfaction and loyalty are one of the main bases that form the spread of word of mouth. This statement is supported by research conducted by Titing (2020) with results stating that there is a positive and significant influence on customer satisfaction and loyalty to word of mouth (Endrawan, +17+Luh+Ade+Pratiwi+Oke, n.d.). Hence, hypothesis three of this study is:
H3: There is a positive relationship between Satisfaction and Word-of-Mouth.

Wulanjani and Derriawan (2017) explained that Revisit Intention is a behavior (behavioral intention) or customers want to make repeat visits, provide positive word of mouth, spend more than expected and stay longer than expected. Andriani and Fatimah (2018) explained that revisit intention is a tourist's likelihood of visiting an activity or making a repeat visit to a destination. It can be concluded that Revisit Intention is a condition where customers revisit a place that has been visited before based on the experience they have gained from that place. Hence, hypothesis four of this study is:
H4: There is a positive relationship between Satisfaction and Intention to Revisit Site.

Figure 2 explains that there is a relationship between Chatbot and Customer Satisfaction. High Customer Satisfaction can influence Repurchase Intention, Word Of Mouth, and Site Revisit.

Figure 2 Proposed Conceptual Model

III. METHODOLOGY

In a study aimed at exploring the effect of chatbot usage on customer satisfaction in the e-commerce industry, the subjects of the study involved a number of customers from various backgrounds and preferences in online shopping. The object of this study is the use of chatbots as one of the communication

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and customer assistance tools implemented by certain e-commerce platforms. The use of chatbots is the main focus of the study to understand the extent of its role in influencing customer satisfaction levels.

This study includes customers who have interacted with chatbots in various contexts, including but not limited to product inquiries, navigation assistance, transaction problems, and after-sales service. The subjects of the study are treated as individuals who have direct experience with chatbots in the online shopping process, while the object of the study is the chatbot itself and its impact on overall customer satisfaction.

By considering the interaction between the subject (customer) and the object (chatbot), this study aims to understand the extent to which the use of chatbots can influence customer perceptions of e-commerce service quality, transaction satisfaction, and overall satisfaction. Analysis will be conducted to identify correlations between chatbot usage and relevant customer satisfaction indicators, such as response speed, information availability, ease of use, and problem resolution. Thus, this study aims to provide deeper insights into the role of chatbots in improving customer experience in ecommerce.

In this study, primary data was used and the method used in data collection was through a questionnaire. According to (Sujarweni, 2020:94), a questionnaire is a data collection instrument that is carried out by providing several written statements or questions to respondents for them to answer. In this study, the questionnaire was measured using a Likert scale, a scale used to measure the attitudes, opinions, and perceptions of a person or group of people about social phenomena. The variables measured will be the variable indicators, then the indicators are used as benchmarks for compiling question items (Sujarweni, 2020).

In this study, there are two types of scales used, namely Likert and nominal scales. The Likert scale is a measurement method used to assess the opinions and perceptions of a person or group towards a social phenomenon (Sugiyono, 2019:146). This scale describes a range of values from very negative to very positive, with respondents asked to indicate the extent to which they agree or disagree with the statement given. The answers to the scale are represented by numbers 1-4.

IV. DISCUSSION

Based on the data above, it can be seen that the majority of chatbot users are female. This is indicated by more than half of the sample population, namely 82.5% or 85 people are female. While the male gender is 17.5% or 18 people.

Based on the data, the majority of respondents are 18-35 years old. This is indicated by more than half of the sample population, namely 1.9% or 2 people under 18 years old, then 61.5% or 64 people aged 18-24 years, 25-35 years old by 34.6% or 36 people, and over 35 years old by 1.9% or 2 people. Respondents are dominated by the 18-25 year age range because the 18-25 age range is included in the digital native generation. Digital natives are people who grew up in an era where digital technology such as the internet, computers, and smartphones are commonplace. They have been familiar with this technology since childhood and have used this technology since childhood and use digital technology for almost all of their activities, from searching for information, communicating, to shopping online (Friederich et al., 2022).

Based on the data, the majority of respondents are domiciled in Jakarta and Outside Jakarta, consisting of 84.6% or 88 people domiciled in Jakarta. While 15.4% or 16 people are domiciled from outside Jakarta. Therefore, it can be concluded that most chatbot users in e-commerce involved in this study come from the Jakarta area.

Based on the data, the use of chatbots in e-commerce shows 6.7% or 7 people answered no, and 93.3% or 97 people answered yes. The pattern of answering no to e-commerce chatbots can have a negative impact

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on customer satisfaction and sales conversion. Chatbots have become a popular tool in e-commerce to improve customer satisfaction and shopping experience.

Outer Loadings

To determine the validity and reliability of the model, an evaluation of the measurement model is carried out. The validity test is carried out in two stages. First, convergent validity in the form of outer loadings (loading factors) and Average Variance Extracted (AVE). Second, discriminant validity in the form of cross loading, Fornell-Larcker criterion, and Heterotrait-Monotrait Ratio (HTMT). Furthermore, a reliability test is carried out through two stages, namely the evaluation of Cronbach's alpha and Composite Reliability values (see Table 1).

Table 1 Outer Loadings

	CHATBOT	CS	Ri	Sr	WOM
CB2	0.961				
CB3	0.956				
CB4	0.974				
CB5	0.954				
Cs1		0.983			
Cs2		0.966			
Cs3		0.990			
Ri1			0.971		
Ri2			0.964		
Ri3			0.972		
Sr1				0.990	
Sr2				0.986	
Sr3				0.985	
WOM1					0.979
WOM2					0.982
WOM3					0.983
CB1	0.930				

Discriminant Validity

Discriminant validity in this study went through several stages of testing, namely cross loading, Fornell-Larcker criterion, and Heterotrait-Monotrait Ratio (HTMT). The cross loading test is carried out by looking at the outer loading of the indicator against the variable itself must have a greater value than against other variables. The standard set is> 0.70 for each variable (see Table 2).

Table 3 shows that the outer loading value of each indicator on its variable is higher than its 172 relationships with other variables. In addition, the outer loading value of each indicator has also exceeded 0.70 so that it can be continued to the next test, namely the Fornell-Larcker criterion. The Fornell-Larcker criterion is carried out by comparing the square root value of AVE of one variable with its variable. A variable is considered to have passed the Fornell-Larcker criterion evaluation if the square value of the AVE of its own variable is greater than the construct of other variables. The Fornell-Larcker criterion can be seen in the diagonal and vertical directions of each variable column. The Fornell-Larcker criterion evaluation can be seen in Table 3.

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Table 2 Cross Loadings of Discriminant Validity

Discriminant validity - Cross loadings					
	CHATBOT	CS	Ri	Sr	WOM
CB2	0.961	0.828	0.796	0.800	0.806
CB3	0.956	0.857	0.833	0.842	0.850
CB4	0.974	0.891	0.841	0.841	0.868
CB5	0.954	0.879	0.839	0.829	0.845
Cs1	0.891	0.983	0.850	0.851	0.919
Cs2	0.836	0.966	0.796	0.743	0.845
Cs3	0.887	0.990	0.846	0.839	0.900
Ri1	0.835	0.812	0.971	0.817	0.800
Ri2	0.841	0.841	0.964	0.810	0.809
Ri3	0.831	0.812	0.972	0.846	0.831
Sr1	0.850	0.823	0.837	0.990	0.837
Sr2	0.847	0.833	0.850	0.986	0.841
Sr3	0.849	0.800	0.832	0.985	0.815
WOM1	0.868	0.909	0.828	0.797	0.979
WOM2	0.837	0.879	0.835	0.858	0.982
WOM3	0.849	0.883	0.807	0.823	0.983
CB1	0.930	0.789	0.807	0.789	0.767

Reliability and Validity

The AVE of the Chatbot variable is 0.955. This shows that the square root value of the AVE Chatbot against itself is greater than other variables. This also applies to the square root values of the AVE Customer Satisfaction of 0.980, the square root value of the AVE Repurchase Intention of 0.969, the square root value of the AVE Site Revisit of 0.987, and the square root value of the AVE Word Of Mouth of 0.981. The square root values of the AVE of all variables against themselves are greater than other variables.

Table 3 Fornell-Larcker Criterion

Discriminant validity - Fornell-Larcker criterion					
	CHATBOT	CS	Ri	Sr	WOM
CHATBOT	0.955				
CS	0.890	0.980			
Ri	0.862	0.848	0.969		
Sr	0.860	0.829	0.851	0.987	
WOM	0.868	0.908	0.839	0.842	0.981

It can be seen that all variables passed the Cronbach's alpha evaluation because each variable has a Cronbach's alpha value > 0.70. Then from the composite reliability evaluation, it can also be seen that each variable passed the composite reliability evaluation test because all of them have a composite reliability value greater than the standard, namely 0.70. As shown by the previous validity and reliability value evaluation, the data collection instruments used in this study are valid and reliable. so it can be concluded that the measuring instrument or instrument used in this study has a consistency that can be accounted for.

The first stage validity test is the convergent validity test. The convergent validity test is divided into two stages, namely outer loadings and AVE. In the results of the convergent validity test, there are outer loading values that do not meet the standard value above 0.70.

Table 4 shows the AVE value of all variables where the five research variables have met the set AVE standard, namely > 0.50. This shows that the convergent validity test can be accepted and continued by conducting a discriminant validity test.

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Table 4 Reliability and Validity

Construct reliability and validity - Overview

	ach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
CHATBOT	0.976	0.977	0.981	0.912
CS	0.979	0.981	0.986	0.960
Ri	0.968	0.968	0.979	0.939
Sr	0.987	0.987	0.991	0.975
WOM	0.981	0.981	0.987	0.963

Hypothesis Testing (Direct Paths)

Path coefficient is carried out to test the direct influence between exogenous variables on endogenous. To test this hypothesis can be done in two ways, namely by looking at the T-statistic and p-value

Table 5 Direct Paths

Path coefficients - Mean, STDEV, T values, p values

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
CHATBOT -> CS	0.890	0.882	0.050	17.917	0.000
CS -> Ri	0.848	0.837	0.065	13.085	0.000
CS -> Sr	0.829	0.819	0.066	12.584	0.000
CS -> WOM	0.908	0.902	0.042	21.717	0.000

This study uses a 1-tailed hypothesis, for a significance of 0.05 it can be seen that the hypothesis is accepted if the T-statistic value is above 1.65 or the p-value is below 0.05. Based on these standards, it can be seen that the hypothesis on the relationship of variables is accepted.

Hypothesis Testing (Indirect Paths)

At the evaluation stage of the mediation effect, the bootstrapping method is used to sample the distribution of indirect relationships. The mediation relationship can be seen from the specific indirect effects table. The following is the specific indirect effects in Table 6.

Table 6 Indirect Paths

Total indirect effects - Mean, STDEV, T values, p values

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
CHATBOT -> Ri	0.755	0.740	0.090	8.420	0.000
CHATBOT -> Sr	0.738	0.724	0.089	8.272	0.000
CHATBOT -> WOM	0.808	0.797	0.071	11.308	0.000

Chatbot → Ri: There is a significant indirect effect (p-value = 0.000) from the Chatbot variable to the Ri variable with an average value of 0.755. This shows that the Chatbot variable has a positive effect on the Ri variable, where the use of Chatbot will increase repurchase intention.

Chatbot → Sr: There is a significant indirect effect (p-value = 0.000) from the Chatbot variable to the site revisit variable with an average value of 0.738. This shows that the Chatbot variable has a positive effect on the Sr variable, where the use of Chatbot will increase Site revisit.

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Chatbot → WOM: There is a significant indirect effect (p-value = 0.000) from the Chatbot variable to the WOM variable with an average value of 0.808. This shows that the Chatbot variable has a positive effect on the WOM variable.

The results of the analysis show that the chatbot variable has a significant positive effect on the repurchase intention, site revisit, and word of mouth variables. This means that the use of chatbots can increase repurchase intention, site revisit, and word of mouth of chatbot usage on customer satisfaction in e-commerce.

In today's digital era, e-commerce has become one of the shopping platforms favored by many people. The ease and speed of transactions are the main attractions of e-commerce. However, on the other hand, e-commerce also presents challenges in terms of customer service. This is because the interaction between sellers and buyers is not done directly, but through an online platform. Chatbots are present as a solution to improve customer service in e-commerce. Chatbots are computer programs that are able to simulate conversations with humans through text or voice. Chatbots can be integrated into e-commerce platforms to provide automatic customer service. The use of chatbots in e-commerce has many benefits, one of which is increasing customer satisfaction.

Chatbots can provide answers to customer questions quickly and responsively, 24 hours a day, 7 days a week. This is certainly very helpful for customers who need information or assistance quickly. Chatbots are easy to use and do not require special technical skills. Customers can interact with chatbots through simple conversations. This certainly makes it very easy for customers to get the information they need. Customers who are satisfied with chatbot services tend to be more loyal to the company and are more likely to make repeat purchases. This is certainly very beneficial for the company because it can increase sales and profits. This study can prove the influence of using chatbots on customer satisfaction which can increase repurchase intention, site revisit and also word of mouth.

V. CONCLUSION

Based on the results of the study showing a positive relationship between the use of chatbots with customer satisfaction, repurchase intentions, and site revisits in e-commerce, it can be concluded that: (1) Chatbots Increase Customer Satisfaction because chatbots can provide fast, responsive, easy-to-use and learn, and more personal services. This can increase customer satisfaction with e-commerce services, (2) Customer Satisfaction Increases Site Revisit, Customers who are satisfied with e-commerce services tend to visit the site more often, (3) Customer Satisfaction Increases Repurchase Intention because Chatbots can increase customer satisfaction, which ultimately increases repurchase intentions and site revisits, and (4) Customer Satisfaction Increases Word-of-Mouth, Customers who are satisfied with e-commerce services tend to recommend the site to others.

The use of chatbot can be reconsidered because in our opinion it is quite important where with the presence of chatbot can provide fast, responsive, easy to use and more personal services so that it can increase customer satisfaction. With customer satisfaction and increasing repurchase intentions so that customers will visit the website. And also with increasing customer satisfaction there will be an increase in word of mouth where they will recommend the site to others.

For further researchers, we suggest looking for other variables related to the use of chatbots compared to customer satisfaction in this study so that the research becomes more interesting and can create more varied results related to the use of chatbots.

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REFERENCES

Aldoseri, A., Al-Khalifa, K. N., & Hamouda, A. M. (2024). AI-Powered Innovation in Digital Transformation: Key Pillars and Industry Impact. Sustainability, 16(5), 1790.

Aurelia, F., Muhammad, D., & Nawawi, T. (2021). Pengaruh Customer Satisfaction, Perceived Value. Jurnal Manajerial dan Kewirausahaan, 3(1), 117-126.

Anindyati, L. (2023). Analisis Dan Perancangan Aplikasi Chatbot Menggunakan Framework Rasa Dan Sistem Informasi Pemeliharaan Aplikasi (Studi Kasus: Chatbot Penerimaan Mahasiswa Baru Politeknik Astra). Jurnal Teknologi Informasi dan Ilmu Komputer 10(2), 291–300.

Benedictus, R. R., Wowor, H. F., & Sambul, A. (2017). Rancang Bangun Chatbot Helpdesk Untuk Sistem Informasi Terpadu Universitas Sam Ratulangi. Jurnal Teknik Informatika 11(1).

Mai, D. S., & Chuong, D. T. (2021). Relationship between service quality, brand image, customer satisfaction, and customer loyalty. Journal of Asian Finance Economics and Business, 8(3), 585-593.

Nugraha, Y., Masnita,Y., & Kurniawati, K. (2022). Peran Responsiveness Chatbot Artificial Intelligence Dalam Membentuk Customer Satisfaction. Jurnal Manajemen dan Bisnis Sriwijaya 20(3), 143–58.

Oktavia, C. A. (2020). Implementasi Chatbot Menggunakan Dialogflow Dan Messenger Untuk Layanan Customer Service Pada E- Commerce. Jurnal Informatika Merdeka Pasuruan 4(3), 36–40.

Sugiono, S. (2021). Pemanfaatan Chatbot Pada Masa Pandemi Covid- 19: Kajian Fenomena Society 5.0 Chatbot Utilization During the Covid-19 Pandemic: Revisiting the Concept of Society 5.0. Jurnal PIKOM (Penelitian Komunikasi dan Pembangunan) 22(2), 133–148.

Vilkaite-Vaitone, N., & Skackauskiene, I. (2020). Service Customer Loyalty: An Evaluation Based on Loyalty Factors. Sustainability, 12(6), 2260.