

The Relationship between AI Chatbot Attributes and Customer Experience in the E-Commerce Industry among Gen Y in Selangor

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Abstract

The increasing number of e-consumers and rapid changes in business dynamics have highlighted the importance of delivering a superior customer experience in e-commerce. The industry has seen remarkable growth recently, fueled by digital adoption, technological progress, and evolving customer expectations. This shift has also transformed the design and function of artificial intelligence (AI) within the e-commerce industry. One of the innovations in this industry is the AI chatbot, which is an essential tool for improving customer service and enhancing communication. The purpose of this research was to examine the relationship between AI chatbot attributes and customer experience in the e-commerce industry among Gen Y in Selangor. The study focuses on a population of 2,118,153 Gen Y from Selangor. To ensure a representative sample, the researcher employed the Krejcie and Morgan table, a representative sample size of 384 was selected. The research employed a quantitative approach, collect data by using an online survey through Google Forms. The data was analyzed using Statistical Package for the Social Sciences (SPSS). The findings showed that usability and responsiveness have a positive and significant relationship with customer experience. Based on the findings, practical recommendations are provided for businesses to effectively utilize AI chatbots to boost customer satisfaction.

1. Introduction

Malaysia's e-commerce industry is a key sector driving economic growth and digital transformation. It provides opportunities for businesses to broaden their customer base and stay competitive in the rapidly changing digital market. However, the industry faces challenges in ensuring customer service efficiency and satisfaction due to its limited human agents. One of the challenges occurs during shopping events such as the "Double Eleven" shopping festival, where human agents may feel overwhelmed with customer inquiries (Yang, Gao & Tong, 2015). During this busy period, they frequently find it challenging to handle the large volume of requests effectively, which results in longer wait times, slower response times, and decreased customer experience.

Next, another limitation of human agents is that they are always constrained by their work schedules. However, customers generally expect faster assistance and are often unsatisfied with any delay when seeking support. This limitation can restrict their availability, which can cause delays for customers seeking assistance outside of regular business hours (Redask, 2024). Additionally, human agents may also exhibit inconsistent performance or biases in their responses due to personal factors such as mood, burnout, or personal preferences (Expert, 2024). According to Söderlund (2017), service employees who experience mood exhaustion will impact their performance and increase mistakes when interacting with customers. Based on the limitations of human

agents, the e-commerce industry is increasingly shifting from human agents to AI. One of the AI in the e-commerce industry is the AI chatbot, which aims to improve the customer experience.

In the context of customer experience studies, most past studies focus on the customer experience of service quality, security, and social aspects of AI chatbots (Meyer-Waarden *et al.*, 2020). However, this study fills the gap by focusing on AI chatbot attributes: usability and responsiveness. In addition, based on the literature review, there is a limited study focusing on AI chatbot attributes in Malaysia, in the setting of countries. In the settings of countries, most past studies focus on other countries such as Taiwan (Chen, Le & Florence, 2021; Vu *et al.*, 2022; Truong & Chen, 2025), Saudi Arabia (Alsadoun & Alnasser, 2025; Zia & Alotaibi, 2024), Indonesia (Hamsar *et al.*, 2024; Oktavia & Arifin, 2024), Korea (Li *et al.*, 2021). Furthermore, according to Siow *et al.* (2025), in the context of industry, a previous study examined AI chatbot usability and responsiveness in e-retailing, but there remains a gap in research, specifically within the e-commerce industry. Therefore, this study will focus on e-commerce rather than e-retailing. In the context of respondents, Jyothsna, Venkata, and Kryvinska (2024) examined the users of AI chatbots among Gen Z. There is limited research focusing on Gen Y. Thus, this study will focus on users of AI chatbots among Gen Y.

Based on the limitations discussed above, there is a need to investigate the relationship between AI chatbot attributes and customer experience in the e-commerce industry among Gen Y. By identifying the most effective AI chatbot attributes, this research seeks to offer useful insights to e-commerce firms, technology developers, and researchers looking to enhance their digital customer service strategies.

2. Literature Review

2.1 Overview of Artificial Intelligence (AI) Chatbot

As Artificial Intelligence (AI) continues to grow, its role in various sectors of human activity and business has expanded significantly in recent years. AI technology, particularly AI chatbots, has transformed customer service interactions. These chatbots are seen as one of the most promising AI applications in e-commerce, marking a revolution in business communication by allowing companies to meet customer needs more efficiently and at scale (Paliwal, Bharti, & Mishra, 2019).

2.1.1 Definition of Artificial Intelligence (AI) Chatbot

AI enables computer programs, like chatbots, to imic human intelligence, decision-making, and problem-solving abilities (Stryker & Kavlakoglu, 2024). The word “bot” in chatbot refers to “robot”, reflecting that chatbots are intelligence systems that can robotically connect and interact with customers just like humans (Okuda & Shoda, 2018). In 1950, Alan Turing explored whether a computer could converse with humans without them realizing it was an AI (Adamopoulou & Moussiades, 2020). This concept, known as the Turing test, is widely regarded as the foundational idea behind chatbots (Turing, 1950).

2.1.2 Artificial Intelligence (AI) Chatbot on Customer Experience

AI chatbots are increasingly being integrated across various platforms, including e-commerce, to enable smooth communication, offer personalized support, and enhance the overall user experience (Ryan *et al.*, 2024). By increasing efficiency through quick answers, answering questions, and even assisting with transaction problem-solving, AI chatbots make an important contribution to customer service. They are a valuable resource for companies trying to enhance customer engagement and support services because of their capacity to learn and adapt, which guarantees that they change in response to user interaction (Ryan *et al.*, 2024).

2.2 Customer Experience

In general, customer experience can be explained as “the perceptions and reactions a person experiences when using or anticipating the use of a product, system, or service. Customers’ perceptions and reactions include customers’ feelings, opinions, preferences, perceptions, convenience, attitudes, and achievements before, during, and after use” (Nicolescu & Tudorache, 2022). Furthermore, customer experience is considered a crucial element influencing customers’ future online purchasing habits (Pappas *et al.*, 2014). It is a helpful idea for businesses to satisfy customer expectations, differentiate themselves, generate total customer value, and acquire a competitive edge (Jain, Aagja & Bagdare, 2017).

2.3 Artificial Intelligence (AI) Chatbot Attributes

According to Mimoun, Poncin, and Garnier (2017), chatbots can provide customer services and improve customer experiences by lowering the effort needed by customers and allowing them to better manage their time due to their knowledge of spoken language and capacity to participate in conversations. Based on past studies, the AI

chatbot attributes will influence customer experience. In this study, the AI chatbot attributes are divided into usability and responsiveness. These AI chatbot attributes will be discussed in detail in the next sub-section.

2.3.1 Usability

Usability refers to how easy a human-computer interface is to use and how well it allows users to complete specific tasks successfully, efficiently, and completely (Chen, Le & Florence, 2021). When consumers are satisfied with a product, they generally enjoy using it and have a positive overall experience. Moreover, enjoyment and fun are key components of the online customer experience because clear, smooth, and detailed interactions support better understanding and communication, fostering positive perceptions. Therefore, the usability can enhance the customer experience in the e-commerce industry.

2.3.2 Responsiveness

Responsiveness means being ready to provide quick assistance or convenient service at any time (Chen, Le & Florence, 2021). Customer perceptions of chatbots are enhanced by responsiveness features such as quick responses to their questions, ease of contact, and 24/7 availability (Chung *et al.*, 2020). This element is essential for maintaining customer experience and satisfaction. According to the research by Alsadoun & Alnasser (2025), customers seek fast replies, and a chatbot that is responsive can drastically reduce wait times, improving the overall experience. Therefore, the responsiveness can enhance customer experience in the e-commerce industry.

2.4 Previous Study on the Relationship Between Artificial Intelligence (AI) Chatbot Attributes and Customer Experience

A chatbot is a software that simulates human conversation using natural language. It frequently functions as an online virtual assistant (Fryer, Nakao & Thompson, 2019). The AI chatbots attributes such as usability and responsiveness may directly affect customer experience in the e-commerce industry.

2.4.1 Relationship Between Usability and Customer Experience

The businesses adopting AI chatbots in e-commerce are related to usability (Chen, Le & Florence, 2021; Siow *et al.*, 2025). This adoption allows greater AI chatbot use, supports operational effectiveness, and improves customer experience (Chen, Le & Florence, 2021). Additionally, fun plays a vital role in customer experience, as it can increase perceived value and motivate customers to engage with digital tools (Go & Sundar, 2019). According to Siow *et al.* (2025), when customers are happy with a product, they generally find it enjoyable and have a positive user experience. Customers will feel fun when chatting with chatbots. Many previous studies claimed that there is a relationship between usability and customer experience (Chen, Le & Florence, 2021; Siow *et al.*, 2025; Vu *et al.*, 2022; Alsadoun & Alnasser, 2025). For example, a study by Chen, Le, and Florence (2021) has shown a positive relationship between usability and customer experience. Thus, it is hypothesized:

H1: There is a positive relationship between usability and customer experience.

2.4.2 Relationship Between Usability and Customer Experience

The businesses adopting AI chatbots in e-commerce are related to responsiveness (Chen, Le & Florence, 2021; Siow *et al.*, 2025). Customers feel comfortable and appreciated because chatbots provide quick responses, are simple to communicate with, and are available when needed (Chung *et al.*, 2020). In addition, since chatbots offer 24/7 customer service, customers can submit requests without being restricted by standard business hours (Adamopoulou & Moussiades, 2020). Many previous studies have shown a significant relationship between responsiveness and customer experience (Chen, Le & Florence, 2021; Alsadoun & Alnasser, 2025). Based on the study by Alsadoun and Alnasser (2025), there is a positive relationship between responsiveness and customer experience. Therefore, it is hypothesized:

H2: There is a positive relationship between responsiveness and customer experience.

2.5 Conceptual Framework

Based on the empirical findings and hypotheses discussed in sub-section 2.4, the conceptual framework is derived as shown in Fig. 1, where the independent variables, usability and responsiveness, are posited to significantly influence the dependent variable, which is the customer experience in the e-commerce industry among Gen Y in Selangor.

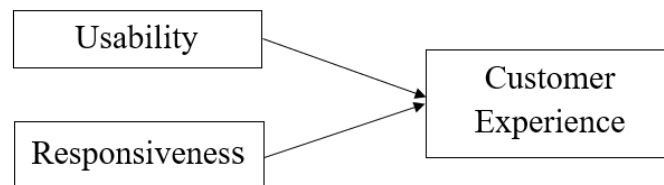


Fig. 1 *Conceptual Framework*

3. Research Methodology

3.1 Research Design

The research design outlines the framework for the selected methodology. This study adopts a quantitative approach to explore the relationship between dependent and independent variables. Data collection is conducted via an online survey. Purposive sampling, a non-probability sampling technique, is employed in this research. The collected data is analyzed using SPSS, involving reliability analysis, descriptive statistics, and correlation analysis to produce insightful findings.

3.2 Research Population and Sampling

3.2.1 Population

The target population for this study is Gen Y in Selangor, who are either participating in or selected for the research. According to the Department of Statistics Malaysia (DOSM) 2023, there are 2,118,153 individuals in this group within Selangor.

3.2.2 Sampling

The number of observations or participants in a study is known as the sample size. According to Krejcie and Morgan (1970), the sample size of this research was 384 based on the population size.

3.2.3 Sampling Technique

This study employed non-probability sampling, specifically purposive sampling. The respondents of this research were Gen Y from Selangor, who were selected through purposive sampling. Purposive sampling is choosing specific units for the sample based on their relevance to the research question (Tajik, Golzar & Noor, 2024).

3.3 Research Instrument

3.3.1 Survey Design

Table 1 examines the relationship between AI chatbot attributes and customer experience in the e-commerce industry among Gen Y in Selangor. The survey is structured into three sections such as Section A, Section B, and Section C. The demographic respondents are covered in Section A. Furthermore, the AI chatbot attributes are covered in Section B. In addition, customer experience is covered in Section C. The instrument was designed in Likert scale style, with a five-scale range from "Strongly Disagree" to "Strongly Agree".

Table 1 *Survey Design*

Section	Interpretation	Scale
A	Demographic respondents	Nominal scale
B	Artificial Intelligence (AI) chatbot attributes	Five-point Likert scale: (Strongly disagree to Strongly agree)
	Usability	
	Responsiveness	
C	Customer experience	

3.3.2 Item Measurement

Table 2 shows the measurement development of the survey for usability, responsiveness, and customer experience, which were adapted from established sources for content validity. The instrument was designed in Likert scale style, with a five-point range from "Strongly Disagree" to "Strongly Agree".

Table 2 Item Measurement of AI Chatbot Attributes

Section	Variables	Scale	References
B	Usability	Five-point Likert scale: (Strongly disagree to Strongly agree)	(Finstad, 2010; Rose <i>et al.</i> , 2012; Roy <i>et al.</i> , 2018; Chung <i>et al.</i> , 2020)
B	Responsiveness		
C	Customer experience	Five-point Likert scale: (Strongly disagree to Strongly agree)	(Rose <i>et al.</i> , 2012; Pappas <i>et al.</i> , 2014)

3.4 Pilot Study

In this study, the online survey is used as a pilot test to assess the findings and determine whether the variable was understood correctly and whether the online survey was acceptable. Furthermore, the researcher corrected and addressed errors in the online survey, conducting subsequent pilot tests until there were no mistakes and no further changes were needed. As part of the pilot test, both the dependent and independent variables were tested for Cronbach's alpha reliability. SPSS software was used to process the data and verify the preliminary results. According to Whitehead *et al.* (2015), a sample size of 20 to 40 is recommended for pilot testing to assess the survey's validity. Thus, the pilot test of this study was conducted among 20 Gen Y in Selangor.

3.5 Data Collection

Data collection involves systematically gathering observations or measurements. This study uses two data sources such as primary data and secondary data. This study conducts an online survey to collect primary data by distributing Google Forms to 384 Gen Y in Selangor. The researcher collects secondary data by reading relevant written materials, such as academic journals, reference articles, newspapers, and books.

3.6 Data Analysis

SPSS will be used to determine descriptive, reliability, normality and correlation analysis. In addition, these three analysis techniques were used as data analysis techniques. According to Villegas (2024), descriptive analysis involves examining data to describe, demonstrate, or summarize data points effectively, enabling the identification of patterns that meet *all* the conditions of the data. Descriptive analysis is used to analyze demographic respondents.

4. Results and Discussion

This section employs the Statistical Package for the Social Sciences (SPSS) to examine the questionnaire survey data. The analysis includes demographic, reliability, descriptive, normality, and correlation analysis.

4.1 Response Rate

A total of 384 questionnaires were distributed among Gen Y, but the researcher received only 324 responses, yielding a response rate of 84.38% as presented in Table 3. Sataloff and Vontela (2021) consider a response rate of at least 60% is acceptable. Therefore, this rate was accepted.

Table 3 Response Rate

Sample size	Questionnaire Distributed	Returned Questionnaire	Percentage
384	384	324	84.38%

4.2 Reliability Analysis

As mentioned by Admin (2024), reliability analysis involves assessing how stable and consistent a measurement tool is over time. This method is used to ensure that instruments consistently produce reliable results under stable conditions. Cronbach's alpha is commonly employed to measure internal consistency, reflecting how well a group of items measures a single continuous variable.

4.2.1 Pilot Study

According to Table 4, 20 questionnaires were used for the pilot test, randomly selected from the research sample. Cronbach's Alpha for customer experience is 0.951, indicating excellent. Usability (0.935) and responsiveness (0.931) are also considered excellent.

Table 4 *Reliability for Pilot Study Result*

Variables	No items	Cronbach's Alpha value for the pilot study (20 respondents)	Interpretation
Independent Variable:			
Usability	8	0.935	Excellent
Responsiveness	4	0.931	Excellent
Dependent Variable:			
Customer Experience	9	0.951	Excellent

4.2.2 Actual Study

The study followed a pilot study that confirmed the online survey's reliability and validity. As shown in Table 5, Cronbach's Alpha for customer experience is 0.921 (excellent), usability is 0.905 (excellent), and responsiveness is 0.739 (good).

Table 5 *Reliability for Actual Study Result*

Variables	No items	Cronbach's Alpha value for the actual study (324 respondents)	Interpretation
Independent Variable:			
Usability	8	0.905	Excellent
Responsiveness	4	0.739	Good
Dependent Variable:			
Customer Experience	9	0.921	Excellent

4.3 Demographic Analysis

Table 6 shows the demographic details of 324 respondents. The number of female respondents is 235 (72.50%, exceeding the number of male respondents at 89 (27.50%). Most respondents are aged between 34 and 38 years, with 143 respondents (44.10%), while the fewest are aged 39 to 44 years, totaling 43 (13.30%). Among the race groups, 119 respondents are Malay, 133 respondents are Chinese, and 68 respondents are Indian. Bachelor's Degree holders comprise the majority, with 119 respondents (36.70%), while respondents with a PhD level of education are the lowest at 3.10% (10 respondents). Regarding income, the largest segment earns RM4001-RM5000 monthly, with 96 respondents (29.60%), while the smallest group earns more than RM5000 per month with 64 respondents (19.80%). Next, for the frequency of online shopping, the highest number of respondents who often shop online are 171 respondents (52.80%), while those who rarely shop online are the lowest number with 6 respondents (1.90%). Most respondents have used a chatbot more than 2 times, with 286 respondents (88.30%), while only 38 respondents (11.70%) have used a chatbot once. Lastly, the Shopee platform had the most users, with 189 respondents (58.30%), while the Taobao had the fewest with 37 respondents (11.40%).

Table 6 *Demographic information of respondents*

Demographic	Detail	Frequency	Percentage (%)
Gender	Male	89	27.50
	Female	235	72.50
Age	Between 29-33 years old	138	42.60
	Between 34-38 years old	143	44.10
	Between 39-44 years old	43	13.30
Race	Malay	119	36.70
	Chinese	133	41.00
	Indian	68	21.00
	Others	0	0
Highest Qualification	Primary/Secondary	86	26.50
	Diploma	89	27.50
	Bachelor	119	36.70
	Master	20	6.20

	PhD	10	3.10
	Others	0	0
Income	<RM2500 per month	74	22.80
	RM2501-RM4000/month	90	27.80
	RM4001-RM5000/month	96	29.60
	More than RM5000/month	64	19.80
Frequency of Online Shopping	Rarely	6	1.90
	Sometimes	58	17.90
	Often	171	52.80
	Always	89	27.50
Experience in Using Chatbot	Once	38	11.70
	More than 2 times	286	88.30
Platform of Chatbot Mostly Used	Taobao	37	11.40
	Lazada	98	30.20
	Shopee	189	58.30
	Others	0	0

4.4 Descriptive Analysis

The researcher analysed the data and calculated the mean and standard deviation for all variables, including usability, responsiveness and customer experience.

4.4.1 Usability

The AI chatbot's usability scores are high, with an average mean of 4.10 and a standard deviation of 0.85. Most of the respondents agree that the chatbot provides a complete and useful solution to their problems during online shopping. Table 7 presents descriptive analysis for usability.

Table 7 *Descriptive Analysis for Usability*

Statement	Mean	Std. Deviation	Interpretation
1. Learning to navigate through e-commerce websites is simple with assistance from the chatbot.	4.14	0.758	High
2. Searching with assistance from the chatbot saves my time.	4.11	0.725	High
3. The chatbot makes e-commerce websites easy to use.	4.35	0.880	High
4. The chatbot has the ability to start conversation for further discussion.	4.05	0.842	High
5. The chatbot provides specific and preferred information to customers.	4.11	0.853	High
6. The information provided by chatbot is clear and easy-to-read.	4.11	0.864	High
7. The chatbot provides a complete and useful solution to my problems.	4.13	0.872	High
8. The chatbot is aware of the context (order tracking or refund) during a conversation.	3.83	1.006	High
Total average score	4.10	0.85	High

4.4.2 Responsiveness

The average responsiveness score of the AI chatbot is high, with a mean of 4.15 and a standard deviation of 0.82. Most of the respondents agree that the chatbot is always available when needed. Table 8 provides descriptive analysis for responsiveness,

Table 8 *Descriptive Analysis for Responsiveness*

Statement	Mean	Std. Deviation	Interpretation
1. The chatbot replies quickly.	4.39	0.665	High
2. Getting in contact with the chatbot is easy.	4.10	0.799	High

3. The chatbot is always available when needed.	4.30	0.821	High
4. The chatbot provides credible advice.	3.81	0.997	High
Total average score	4.15	0.82	High

4.4.3 Customer Experience

The overall average mean score and standard deviation for customer experience are high ($\mu=4.01$, $\sigma=0.91$). This shows the level of agreement is high. Most respondents agree that the chatbot helps resolve user needs without creating additional problems. Table 9 presents a descriptive analysis for customer experience.

Table 9 Descriptive Analysis for Customer Experience

Statement	Mean	Std. Deviation	Interpretation
1. The chatbot makes me feel that someone is talking to me personally as a customer.	4.11	0.871	High
2. The chatbot helps resolve my needs without creating other problems.	3.96	0.891	High
3. The chatbot makes me feel more comfortable talking compare to human.	4.12	0.979	High
4. The chatbot makes me feel valued as a customer.	4.05	0.880	High
5. I think that a company is innovative if it uses a chatbot.	4.07	0.807	High
6. The chatbot helps me gather additional information on goods and services.	4.06	0.855	High
7. I like it when the chatbot helps me customise my e-commerce experience to my own preferences.	4.05	0.932	High
8. I enjoy getting the benefits from using the chatbot with little effort.	4.05	0.908	High
9. The chatbot is fun to chat with.	3.62	1.062	Moderate
Total average score	4.01	0.91	High

4.5 Normality Analysis

The data analysis covers 324 respondents. Since the number of respondents exceeds 50, this study will employ the Kolmogorov-Smirnov test. Based on Table 10, the analysis results indicate that the data follow a non-normal distribution. The study proceeded with the Spearman correlation analysis.

Table 10 Kolmogorov-Smirnov Test of Normality

Kolmogorov-Smirnov ^a			
Independent Variables	Statistic	df	Sig.
Usability	0.300	324	<.001
Responsiveness	0.322	324	<.001
Dependent Variable			
Customer Experience	0.278	324	<.001

4.6 Correlation Analysis and Hypothesis Testing

Table 11 indicates that the correlation between the usability and customer experience is strong and positive ($r = 0.634$, $p < 0.001$). Similarly, responsiveness shows a strong and positive correlation with customer experience ($r = 0.629$, $p < 0.001$).

Table 11 Result of Spearman's Correlation

Correlation Analysis	Customer Experience		Hypothesis
Spearman's rho			Result
Usability	Correlation Coefficient	0.634**	Accepted
	Sig. (2-tailed)	<.001	
	N	324	
	Correlation Coefficient	0.629**	

Responsiveness	Sig. (2-tailed)	<.001	Accepted
	N	324	
Customer Experience	Correlation Coefficient	1.000	
	Sig. (2-tailed)	.	
	N	324	

5. Conclusion

In conclusion, this study successfully achieved all its research objectives. It demonstrates a strong positive relationship between usability, responsiveness, and customer experience. The results can guide technology developers in improving AI chatbot design and functionality. By focusing on increasing usability and responsiveness, businesses can improve customer satisfaction, make support processes more efficient, and elevate the overall customer experience. Importantly, the insights gained provide valuable guidance for e-commerce companies aiming to create more effective AI chatbots that align with Gen Y customers.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Chang Xin Qiau and Nor Kamariah Kamaruddin; **data collection:** Chang Xin Qiau and Nor Kamariah Kamaruddin; **analysis and interpretation of results:** Chang Xin Qiau and Nor Kamariah Kamaruddin; **draft manuscript preparation:** Chang Xin Qiau and Nor Kamariah Kamaruddin. All authors reviewed the results and approved the final version of the manuscript.

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