
Issues and Perspectives in Business and Social Sciences

The impact of AI chatbot adoption on customer experience in e-retailing

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Abstract

Due to the outbreak of the COVID-19 pandemic, the changes in shopping norms from offline to online and rapid development in the field of artificial intelligence (AI) have redefined customer experience. This change has brought lucrative opportunities for organisations to provide better customer service by interacting with customers using chatbots. Thus, this research was conducted to examine the attributes of AI chatbots that affect online customer experience in the e-retailing market. This paper applied the Technology Acceptance Model (TAM) to design a research model to investigate the relationship between chatbot usability, responsiveness, and online customer experience. A quantitative method was employed to test the research model, and data were collected from an online survey. A total of 101 usable responses were received and examined using SPSS software. The results show a positive relationship between chatbot usability and online customer experience, while no significant relationship is observed between chatbot responsiveness and online customer experience. The findings of this study offer insights for academics, industry practitioners, and policymakers aiming to utilise the potential of AI chatbots to enhance online customer experience and elevate overall customer satisfaction in the e-retail sector.

Keywords:

AI Chatbot;
Customer experience;
E-retailing;
Usability;
Responsiveness.

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1. Introduction

Following the COVID-19 aftermath, retailers were forced to transform their operations by adopting online business modes and new marketing and selling strategies (Roggeveen & Sethuraman, 2020; Sabanoglu, 2021; Tighe, 2021). One of the vastly adopted technologies is artificial intelligence (AI) chatbots, the adoption of which has increased significantly, particularly in the e-retailing sector. Chatbots assist online customers with real-time, customised assistance, mitigating risks and solving problems during online shopping and purchases (Chen et al., 2021).

In online markets, companies improved customer service to differentiate themselves and attract online customers, leading to changes in the roles of AI chatbots (Davenport et al., 2020). A study found that 41% of firms highly used AI chatbots to increase sales, leading to a 67% improvement

in sales with chatbot assistance. Furthermore, 67% of customers interacted with chatbots for customer support, with 87.2% providing positive or neutral feedback (Moran, 2022). Customers, especially females, are increasingly interested in using chatbots, with nearly 50% of female customers liking and frequently using chatbots for online shopping, compared to 36.81% of men (Jovic, 2022).

As firms adopted chatbots to support online operations, the potential to increase operational efficiency was recognised (Chen et al., 2021). Nonetheless, past studies on customer experience are more focussed on service quality, security, and social aspects (Lars et al., 2020; Hasal et al., 2021). While a study indicated different degrees of liking for chatbots between male and female shoppers in the United States (Rajnerowicz, 2022), there was a lack of research on this topic in Malaysia. Additionally, a study on chatbot usability or responsiveness and the perceived value of chatbots on customer experience in e-retailing was lacking (Chen et al., 2021), creating a gap in the literature. According to Chopra (2019), understanding the motivations behind AI usage is vital to AI adoption and growth. The following key research questions were formulated:

RQ1: What is the relationship between AI chatbot usability and online customer experience in e-retailing?

RQ2: What is the relationship between AI chatbot responsiveness and online customer experience in e-retailing?

RQ3: Which factor of AI chatbot (usability or responsiveness) has more impact on online customer experience in e-retailing?

2. Literature review

2.1 Underpinning theory

The Technology Acceptance Model (TAM) is a framework developed by Fred David in 1989 (Kock, 2014), who explained user motivation by focusing on three variables: perceived usefulness, perceived ease of use, and attitude toward using specific technology. Among the variables, user attitude was considered the main variable determining user acceptance of technology, while the other two variables are factors influencing the attitude. This study used TAM as a supportive framework for exploring the perceived value delivered to customers by AI chatbots and AI chatbot adoption.

2.2 Online customer experience

Customer experience describes customers' feelings upon interacting with an organisation's goods, services, or atmosphere (Jain et al., 2017). It has been recognised as a key factor affecting customers' future online purchasing behavior (Pappas et al., 2014). In the e-commerce sector, customer experience is defined as a subjective response from customers resulting from direct or indirect interactions with an organisation (Jain et al., 2017; Rose et al., 2011). As an impression formed internally, it is a psychological sensation distinct to each customer (Zhang et al., 2017). It is a useful concept for businesses to create overall customer value, achieve differentiation, meet customer expectations, and gain competitive advantage (Jain et al., 2017). Chang et al. (2016) suggested evaluating online customer experience in e-retailing based on intrinsic and extrinsic value. The intrinsic aspect focuses on joyfulness, enjoyment, and fun, with key attributes including confidence, playfulness, novelty, and enjoyment. The extrinsic aspect emphasises economic results such as economic value and performance, with a timesaving and convenient service recognised as practicable outcomes (Chen et al., 2021; Wei et al., 2016).

2.3 Chatbot usability

Usability means the ease of using a product or human-computer interface to complete a task reliably, effectively, and efficiently (Chen et al., 2021). Usability metrics to understand user experience include efficiency, error rate, ease of use, and user satisfaction (Chen et al., 2015; Ren et al., 2022). When customers are satisfied with a product, they usually enjoy using it and have a great overall user experience. In e-retailing, chatbots provide customised assistance to customers through direct chat systems (Chung et al., 2020). This personalisation improves online customer experience by meeting expectations for highly personalised digital assistants (Kraus et al., 2019). Chatbots can meet customer expectations and improve their experience by providing personalised service through credible advice (Prentice et al., 2019).

Enjoyment and fun are significant to online customer experience, as positive perceptions can be generated if interactions are accurate, smooth, and complete for understanding and communication. Clear and specific information from chatbots makes reading easy and increases the probability of customers feeling comfortable and valued (Chen et al., 2021; Go & Sundar, 2019). The following hypothesis was developed:

H1: There is a relationship between chatbot usability and online customer experience in e-retailing.

2.4 Chatbot responsiveness

Responsiveness is the readiness to provide customers with quick assistance or accessible service (Chen et al., 2021). Quick responses to customer queries, ease of contact, and 24/7 availability are responsiveness qualities that improve customer impressions towards chatbots (Chung et al., 2020). Customers tend to perceive an e-retailing business as more innovative if the chatbot adopted is responsive (Chen et al., 2021).

According to statistics from Userlike (Leah, 2021), 68% of respondents appreciate high chatbot responsiveness, as they can get answers within a short period and appreciate 24-hour accessibility even outside business hours. Issues related to AI chatbot responsiveness that have been reported include lack of response, and late or no reply, causing decreased customer engagement and resulting in dissatisfaction and unfavourable customer experiences (Mogaji et al., 2021). The relevant hypothesis is stated as follows:

H2: There is a relationship between chatbot responsiveness and online customer experience in e-retailing.

2.5 Research model

The research model, developed based on TAM and the information system success model proposed by DeLone and McLean (2004), explains the influence of chatbot usability and responsiveness. According to TAM, perceived ease of use and perceived usefulness influence users' behavioural intentions to adopt and utilise a technology. Flavian et al. (2006) established that perceived usefulness and perceived ease of use generally contribute to usability, reflecting users' expectations of technology-based applications. Thus, in this study, usability is deemed as reflecting ease of use and perceived usefulness. Moreover, in the IS success model, usability is perceived as a valuable, desired characteristic of the quality of an information system, and responsiveness predominates as the key role of customer service (Jeyaraj, 2020). By integrating these two theories, two variables, namely, usability and responsiveness, are identified as significant attributes of chatbots in e-retailing (Chen et al., 2021).

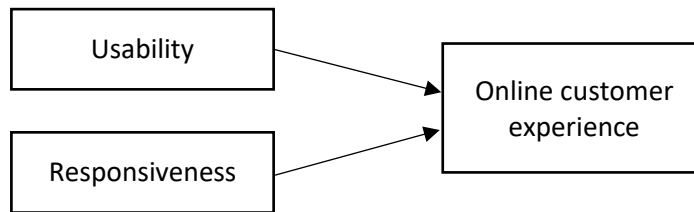


Figure 1: Research model

3. Methods

3.1 Data, sample, and analysis

This study employed a quantitative approach to investigate the relationship between the dependent variables (usability and responsiveness) and the independent variable (online customer experience). A survey questionnaire was developed as the main research instrument, and the measures used were adopted from Chen et al. (2021). Table 1 shows the measurement items for the three variables tested in this study. All items were measured using a 5-point Likert scale, with 1 indicating strongly disagree and 5 indicating strongly agree.

Table 1: Measurement

Variable	Questionnaire items
Usability	U1: Learning to navigate through e-commerce websites is simple with assistance from the chatbot U2: Searching with assistance from the chatbot saves my time U3: The chatbot makes e-commerce websites easy to use U4: The chatbot has the ability to start conversation for further discussion U5: The chatbot provides specific and preferred information to customers U6: The information provided by chatbot is clear and easy-to-read U7: The chatbot provides a complete and useful solution to my problems U8: The chatbot is aware of the context during a conversation
Responsiveness	R1: The chatbot replies quickly R2: Getting in contact with the chatbot is easy R3: The chatbot is always available when needed
Online customer experience	OCE1: The chatbot makes me feel that it is talking to me personally as a customer OCE2: The chatbot helps resolve my needs without creating other problems OCE3: The chatbot makes me feel more comfortable talking with it than human OCE4: The chatbot makes me feel valued as a customer OCE5: I think that a company is innovative if it uses a chatbot OCE6: The chatbot helps me gather additional information on goods and services OCE7: I like it when the chatbot helps me customise my e-commerce experience to my own liking OCE8: I enjoy getting the benefits from using the chatbot with little effort OCE9: The chatbot is fun to chat with

This study used judgment sampling, a non-probabilistic sampling method because the target participants were online customers with experience of using AI chatbots. This group provides a limited population that can provide useful information for this study (Sekaran & Bougie, 2016). Survey questionnaires were distributed to 150 selected participants, out of which, responses from 101 participants were used in this study. The balance was discarded as the participants lacked online shopping experience and/or chatbot use experience. The demographic profiles of the participants are shown in Table 2. The total sample size is deemed adequate based on the results generated by G*Power software.

Table 2: Demographic profile of the participants (N =101)

Demographic variable	Categories	Frequency	Percentage (%)
Gender	Male	39	38.6
	Female	62	61.4
Age	20 and below	16	15.8
	21-30	64	63.4
	31-40	10	9.9
	41 and above	11	10.9
Highest / current educational level	SPM	10	9.9
	Foundation or Pre-U	8	7.9
	Diploma	21	20.8
	Bachelor's Degree	58	57.4
	Master's Degree	3	3.0
Income	No income	42	41.6
	< RM2,500 per month	25	24.8
	RM2,501 – RM4,000 / month	20	19.8
	RM4,001 – RM5,000 / month	7	6.9
	More than RM5,000 / month	7	6.9
Frequency of online shopping*	Rarely	8	7.9
	Sometimes	46	45.5
	Often	32	31.7
	Always	15	14.9
Experience in using chatbot	Once	15	14.9
	Twice	15	14.9
	Thrice	4	4.0
	More than 3 times	67	66.3
Platform of chatbot used	Facebook / Messenger	23	22.8
	WhatsApp	11	10.9
	Taobao	17	16.8
	Lazada	11	10.9
	Shopee	37	36.6
	Grab	1	1.0
	Educational website	1	1.0

* Rarely – 1-2 times per year, Sometimes – 1-2 times per month, Often – 1-3 times per week, Always – more than 3 times per week

3.2 Descriptive analysis

Table 3 presents the descriptive statistics of the data. The standard deviations for all items were between 0.806 and 1.172. The small range reflects low variability in the data set (Bhandari, 2020). It also indicates the consistency of the mean values.

Table 3: Descriptives

Items	Minimum	Maximum	Mean	Std. Deviation
U1	1	5	3.85	0.865
U2	2	5	3.94	0.846
U3	2	5	4.01	0.806
U4	1	5	3.79	1.098
U5	1	5	3.80	0.990
U6	1	5	4.03	0.877
U7	1	5	3.50	0.945
U8	1	5	3.42	0.962
R1	1	5	4.48	0.795
R2	2	5	4.22	0.820
R3	2	5	4.27	0.811
OCE1	1	5	3.15	1.126
OCE2	1	5	3.50	0.855
OCE3	1	5	2.92	1.172
OCE4	1	5	3.42	1.013
OCE5	1	5	3.86	0.980
OCE6	1	5	3.70	0.933
OCE7	1	5	3.75	0.994
OCE8	1	5	3.77	0.915
OCE9	1	5	3.28	1.087

3.3 Reliability

We have examined the internal consistency of the data using Cronbach's alpha statistics. Measures for the three variables were found to be within the acceptable values of above 0.70 (Taber, 2018). Usability, responsiveness, and online user experience show Cronbach's alpha statistics of 0.899, 0.872, and 0.792, respectively, as shown in Table 4. Therefore, it can be concluded that all the items in this study are reliable and consistent.

Table 4. Reliability analysis

Variables	Number of items	Cronbach's alpha
Usability	8	0.872
Responsiveness	3	0.792
Online Customer Experience	9	0.899

3.4 Factor analysis

A factor analysis was performed to examine the underlying dimensions of the data and to confirm that the measurement items load significantly on the theorised dimensions. The Kaiser-Meyer-Olkin (KMO) value is 0.888, which falls between the acceptance range of 0.8 to 1.0 (Stephanie, 2016). The Bartlett's Test of Sphericity is significant (Chi-Square = 1037.058, $p < 0.01$) as it is below 0.05 (Sekaran & Bougie, 2016).

The results also showed all three components of eigenvalues exceed 1, and components 1, 2, and 3 explained 24.549%, 22.425%, and 12.537% of the variance, respectively. Table 5 summarises rotated factors and factor loadings for all variables. The rotated solution showed that all measurement items load significantly on three dimensions, each representing usability, responsiveness, and online customer experience. The results indicate that the underlying dimensions of the data fit with the theorised variables.

Table 5. Rotated factors and factor loadings for all variables

Items	Components		
	1	2	3
U1		0.604	
U2		0.778	
U3		0.705	
U4		0.731	
U5		0.809	
U6		0.665	
U7		0.548	
U8		0.506	
R1			0.840
R2			0.760
R3			0.824
OCE1	0.750		
OCE2	0.512		
OCE3	0.762		
OCE4	0.831		
OCE5	0.675		
OCE6	0.702		
OCE7	0.639		
OCE8	0.527		
OCE9	0.723		
Eigenvalues	8.077	2.073	1.752
Total variance explained	24.549	22.425	12.537
KMO	0.888		
Bartlett's Test of Sphericity*	1037.058		

* $p < 0.01$.

3.5 Inferential analysis

Two inferential analyses were conducted: correlation analysis and multiple linear regression analysis. The correlation analysis showed significant associations between the tested independent and dependent variables (Table 6). Usability is positively correlated with online customer experience, with $r = 0.655$. The relationship between responsiveness and online customer experience is also significant and positive, albeit at a lower degree ($r = 0.300$).

Table 6: Correlation analysis

	Usability	Responsiveness
Usability	1	
Responsiveness	0.320**	1
Online Customer Experience	0.655**	0.300**

** $p < 0.01$ (one-tailed)

Next, a multiple linear regression analysis was applied to investigate whether online customer experience is affected by chatbot usability and responsiveness, as depicted in Table 7. The results show that usability significantly influences online customer experience ($\beta = 0.623$, $p < 0.001$) and responsiveness does not ($\beta = 0.100$, $p = 0.107$). These results provide support for H1 and no support for H2.

Table 7. Regression for online customer experience

Hypotheses	Standardised beta	t value	p value	Decision
H1: U → OCE	0.623	7.789	0.000	Supported
H2: R → OCE	0.100	1.252	0.107	Not supported

4. Conclusions, practical implications, and future research

This study investigates two attributes of AI chatbots, specifically usability and responsiveness, on online customer experience. The first objective was to explore whether there is a relationship between chatbot usability and online customer experience in e-retailing. H1 was developed to address this research objective, and the statistical results support the hypothesis. This finding aligns with those found in Chen et al. (2021).

Meerschman and Verkeyn (2019) have determined that two elements of chatbot usability, i.e., dependable knowledge and ease of use, significantly impact online customer experience. Usability also provides for the value perceived by online customers (Rajaobeline et al., 2021). Usability makes customers feel valued and enhances the feeling of customisation. Adopting AI chatbots with high usability is thus significant for online merchants. Moreover, online customers view retail businesses with chatbot adoption as innovative (Cicco et al., 2020).

The second objective of this study is to examine the relationship between chatbot responsiveness and online customer experience in e-retailing. H2 was developed accordingly. Unexpectedly, the statistical analysis showed that responsiveness does not influence online customer experience. This finding is inconsistent with those of Chen et al. (2021) and Meerschman and Verkeyn (2019). The lack of significance could be attributed to the availability of live online agents to assist customers. Whenever chatbots are slow to respond or unresponsive, online customers can quickly get assistance from online live agents. The accessibility of online live agents could mediate the relationship between responsiveness and online customer experience. Moreover, another study has shown that only 20% of Malaysian customers believed that AI chatbots are sufficient to solve their problems without requiring additional assistance from human customer service (Iriani, 2021). In other studies, it was argued that the high responsiveness of chatbot services causes users to be unable to feel variations in the responsiveness, resulting in the lack of significance of the variable in relation to online customer experience (Li et al., 2021; Lars et al., 2020).

The third objective is to determine whether usability or responsiveness has a greater influence on online customer experience. Results show that usability is the only influencing factor, where the *p*-value obtained from the regression analysis is well below 0.05 (Schmidt & Osebold, 2017).

The findings of this research provide a deeper understanding of the two attributes of AI chatbots towards customer experience in e-retailing. The findings provide both theoretical and practical implications. The results also implied that online merchants could not eliminate human intervention in customer service and rely solely on AI chatbots. E-retailers should adopt a hybrid approach involving chatbots and live human agents to assist customers. By doing so, customers can gain a better experience. Developers need to ensure chatbots' usability and responsiveness. Usability, on the other hand, requires a synergistic collaboration between the developers and the e-retailing merchants.

Three limitations are present in this study. Firstly, apart from usability and responsiveness, other attributes of AI chatbots are believed to affect online customer experience, including security level, friendliness, and service quality (Cheng et al., 2022; Hasal et al., 2021; Moon & Armstrong, 2020). These attributes are not investigated in this study. Secondly, the study results could be biased towards online customers aged between 21 and 30 years old, who formed the largest age group in the sample. The lack of participants of different age groups in the current study might affect the generalisability of the findings.

Future research can be conducted to study chatbot capabilities, benefits, and impacts in different industries, such as healthcare and banking, to expand the field of research. Since many e-retailers adopted AI chatbots without considering their effectiveness (Agnihotri & Bhattacharya, 2024), it is imperative that future studies also examine expectation gaps between the e-retailers and online customers.

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