

# THE ROLE OF EMPATHY AND PERCEIVED USEFULNESS IN SHAPING EMOTIONAL ENGAGEMENT AND DIGITAL TRUST IN CHATBOT CUSTOMER SERVICE WITHIN E- COMMERCE

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## ABSTRACT

Artificial intelligence in chatbots is growing in use as an alternative to human-customer services, specifically in e-commerce. This paper explores how two key attributes of chatbots, empathy and perceived usefulness, enhance the overall customer experience by fostering trust and emotional engagement. The paper is based on previous theoretical foundations. A pilot study was conducted with 50 participants who had experienced chatbots in e-commerce before. Responses were gathered through an online survey using a Google Form, which was spread via social media platforms, to test the reliability and validity. A multiple regression-based structural equation modeling was used to analyze the relationships. The results indicate that perceived usefulness significantly enhances digital trust, while its effect on emotional engagement is positive but marginal. Empathy did not significantly influence either outcome. These findings suggest that the functional benefits of chatbots may be more influential than emotional cues in shaping customer perceptions in e-commerce. The paper provides some suggestions for businesses, by which they should design a chatbot with human-like characteristics and gain an advantage from using a system, especially in complex inquiries, to enhance empathy and perceive usefulness. Consequently, consumers' digital trust and emotional engagement towards systems will increase, addressing positive perception in the E-commerce context. This paper extends the Technology Acceptance Model (TAM) and Social Response theory to chatbot communication and support dimensions into how psychological barriers, such as digital trust and emotional engagement, can enhance overall customer perception. Also, it offers a theoretically grounded and empirically tested measurement foundation for future research.

## 1 INTRODUCTION

In our modern digital atmosphere, artificial intelligence (AI) has established itself as a vital element in redesigning customer-business relationships. Chatbots have become a crucial component of customer service strategies across sectors, enabling organisations to deliver real-time, personalised, and efficient assistance. By introducing novel levels of

trust and emotional engagement, the application of chatbots in customer service not only increases operational efficiency but also enriches the customer experience as a whole.

Among several technological innovation strategies implemented across various sectors, the paper examines the application of Chatbots in customer service. To comprehend the key attributes that simplify the application of chatbots as an interaction channel for service organisations, prior research has identified several effective factors that enhance chatbot efficiency and warrant analysis. In this paper, Empathy and perceived usefulness will be discussed in the context of previous literature and how their comprehension influences customer attitudes and behaviours regarding digital trust and emotional engagement.

Individuals are aided by plenty of empathic AI tools nowadays, which include conversational chatbots, voice assistants, and service robots; however, people still lack the understanding of the complexity of humans. People have always been captivated by the idea of imparting AI with human-like features [1]. Second, perceived usefulness is an external motivator that influences individuals' perceptions of how technology adoption improves job performance. Perceived usefulness improves customers' experience with chatbots [2].

The business's ability to enhance customer perceptions through technological advancements became crucial to its survival in an increasingly unstable, uncertain organizational environment [3]. In this context, integrating a digital trust approach, previous research on AI chatbots has found that a chatbot's ability to answer users' inquiries and give valuable information appropriately plays an essential role in making recommendations and building trust in chatbots [4]. However, [5] warned that placing excessive trust in AI can lead to complacency and reduced human control. Second, [6] have shown that cognitive intelligence develops in a chatbot's ability to handle complicated inquiries by integrating reliable information with emotional intelligence to enhance engagement. By doing this, the user perception is strengthened by this customized, emotionally sensitive approach.

However, less attention has been given to the emotional engagement and digital trust that determine customers' experience and satisfaction during chatbot interactions. This gap highlights the need for a better understanding of how AI chatbot attributes, such as empathy and perceived usefulness, can affect customers. The purpose of this study is to understand the relationships and explore how the empathy and perceived usefulness of AI chatbots influence customers in digital trust and emotional engagement. The outcomes of this study should benefit research as well as management.

## 2 LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### 2.1 Chatbot Customer Service in E-commerce

Chatbots that utilize Artificial Intelligence technology have become more widely used in e-commerce customer service, providing several advantages, which include being cost-effective, highly efficient, and available 24/7 to respond to customers' questions and inquiries. In relation to this, their market size will reach \$454.8 million in 2027, and transactions made through chatbots will reach \$112 billion in 2023, which shows the importance of these tools in this field [7]. In addition, Chatbots can be utilized to reply to frequently asked questions, provide product recommendations, produce leads, and provide immediate responses, thus resulting in a seamless experience for customers [8].

Generally, Chatbots for e-commerce are characterized as text-based software robots that can mimic conversations between people by virtue of natural language processing. Moreover, they may be displayed as avatars and exchange messages with consumers in text forms with the intention of delivering fast and reliable customer service [9]. Thus, it

has been evident that research has demonstrated the effectiveness of chatbots in increasing customer satisfaction and loyalty by being responsive and offering high-quality information, as well as perceived usefulness and ease of use by consumers [10], [11]. Moreover, the underlying factors for satisfaction would involve aspects like: "Trust, empathy and engagement"[12], [13].

Despite all the advantages, chatbots still experience some challenges. For example, chatbots are unable to show their potential in empathy, thus reducing customer satisfaction, particularly while dealing with complex inquiries[13]. Moreover, it was proven that if chatbots do not effectively resolve issues, customers would prefer human assistance for service recovery, specifically in non-functional failure, thereby impacting their trust [14]

Chatbot customer service technology used in e-commerce has numerous benefits, but challenges persist on the empathetic and trusting side, or, more specifically, customer acceptance. Addressing such challenges through design, personalization, or deployment could serve as the key to optimizing the use of the technology by helping the customers build a long-term relationship with the e-commerce platform, which can further increase its customer base [15].

## **2.2 Perceived Usefulness in Chatbot Customer Services**

Perceived usefulness is a belief in the decision-making process. If the information system offers benefits, someone will use it; if you feel it is less valuable, it will not be used. Building on this definition, research suggests that perceived ease of use plays a significant role in shaping perceived usefulness. Studies have shown that a well-designed interface is the primary factor in a strong relationship between customers and service providers [40]. When customers find product information helpful and adequate, they are more likely to use it. Empirical research has consistently shown that attitudes concerning the execution of chatbots are strongly influenced by perceived usefulness [41], [42]. Therefore, perceiving usefulness enhances customers' experience when using chatbots [43]. Furthermore, research on the use of chatbots in hospitality and tourism [44], retail [45], Amazon's Mechanical Turk [46], and bank services [47] has found that perceived usefulness increases the likelihood of repeated use.

## **2.3 Theoretical Foundation**

### **2.3.1 Technology Acceptance Model**

The study appeals to the relevance of E-commerce; when embraced, it has the ability to facilitate an efficient marketing of the traders' grains. The study, therefore, focuses on the Technology Acceptance Model (TAM). The Technology Acceptance Model (TAM) was developed by [16]. The Technology Acceptance Model (TAM) was an extension or an adjusted form of the Theory of Planned Behavior [17]. The fundamental concept of the Technology Acceptance Model (TAM) postulated that people's behavior and intention towards accepting information technology is dependent upon their perceptions towards the significance of the two factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) [18]. The Technology Acceptance Model (TAM) has been widely acclaimed for its significance in the study of individuals accepting information technology, and most researchers have acknowledged the significance and importance of this model [19], [20]. This extension of the Technology Acceptance Model (TAM), which includes the elements of other concepts or theories, maintains the simplicity of the Technology Acceptance Model (TAM), and at the same time, it increases the ability to predict and explain the acceptance and usage of the information system (IS). Empirical evidence has been a determinant of the Technology Acceptance Model (TAM), as seen by the study by [21], [22].

### **2.2.2 Social Response Theory**

Social response theory was proposed by [23], showing that people will treat computers as if they were social actors, even though people realize that a machine will not have any feelings, intentions, or motivation and will never be conscious. Similarly, through SRT, many have explained why people exhibit social and emotional behaviors toward technology as if it were a social actor and not a tool [24], [25]. This context can be further elaborated from what was envisaged by [24] himself in *The Role of Empathy and Perceived Usefulness in Shaping Emotional Engagement and Digital Trust in Chatbot Customer Service within E-Commerce*.

Prior research has thus used social response theory as a theoretical foundation to compare the outcomes of interactions with either humans or technology, as well as comparing social responses to variously designed technological interaction partners [26], [27]. Moreover, this theory has been tested across many contexts, such as AI, chatbots, robots, websites, and social media; these tests have shown over and over that social cues elicit social behaviors, improve engagement, and impact attitudes and intentions toward technology [28], [29].

Furthermore, SRT incorporates the explanations that perceived social presence (feeling that one is interacting with a social entity) arises from human-like and empathic cues and is associated with positive attitudes and behaviors toward the technology [30]. Hence, we argue that SRT is a suitable theoretical basis for jointly comparing the responses to help given by humans, a VA, and conventional technology.

### **2.4 Artificial Empathy in Chatbot Customer Services**

Artificial empathy within chatbot customer service systems refers to the development of AI-powered chatbots that are capable of detecting, processing, and reacting to customers' emotions, ideas, and feelings in a manner that simulates human empathy [31]. Similarly, authors such as [32] perceive that artificial empathy within the framework of customer services provided by chatbots refers to the development of AI-powered chatbots that are capable of detecting, processing, and reacting to customers' emotions, ideas, and feelings in a manner that mimics human empathy. Based on these conceptualizations, companies are urged to develop chatbots that emulate human-like behaviors and reactive capabilities in order to provide customers with elements that are able to increase the effectiveness of empathy and the rate of customer acceptance [33]. Moreover, personalizing the dialogue of the chatbot by simulating the way people talk while embedding AI capabilities may further increase the effects of empathy and customer acceptance [34].

In this regard, multiple authors provide empirical evidence to illustrate the significant influence of empathy on customers' emotional experiences within customer-chatbot relationship settings. For instance, [35] in their study within the framework of examining the effects of AI-powered consumer service robots, indicate that customer robot empathy is able to provide significant averages in the development of consumer robot acceptance. Furthermore, studies provide evidence to engender the idea that artificial empathy within the retail environment has a potentially significant role in the development of customer engagement [36].

Conversely, the lack of empathy within these situations would inevitably trigger adverse effects such as misunderstanding, aggression, and disapproval [37]. Moreover, the lack of empathy within customer-chatbot service encounters indicates that customers are not satisfied with the lack of empathy of the conversation partners, who are the chatbots of the companies, and that customer-chatbot service encounters appear monotonous and lack emotions compared to employees' customer service encounters that seem glamorous and refreshing [38].

Overall, customers tend to prefer chatbots that offer high performance through responsiveness and warm, friendly conversations, which enhances trust and their willingness to use the technology [39]. Building on these theoretical arguments, the genuine level of artificial empathy directly influences perceptions of customers' digital trust and emotional engagement.

### **2.5 Digital Trust Towards Chatbot in E-Commerce**

Trust is an important part of communication between people and machines. As AI utilizes advanced technologies, it is crucial to understand the role of trust in systems. In the information systems and information technology (IS/IT) domain, the trustor is the individual, while the trustee is the technology. This construct indicates that perceived value, not just personalized efforts, is necessary to build trust [48]. Trust originates from the quality of information provided by AI digital agents, which is evaluated based on accuracy, format, and completeness [46]. Trust is essential for consumer acceptance, particularly when AI technologies autonomously recommend products or services [49]. When customers trust an AI Chatbot to protect their data, resolve issues, and deliver accurate information, their overall perception of the brand increases.

From a cognitive trust perspective, research on AI chatbots indicates that a chatbot's ability to accurately respond to customer queries and provide helpful information is critical for building trust. However, [50] found that problems with trust measurements have been identified in other research domains as well. Similarly, according to [51], more than 60% of consumers are unwilling to buy from the same brand again after an unpleasant experience, thereby reducing electronic trust. Furthermore, chatbots have the ability to detect bias and inaccurate data, which can negatively affect investing in inappropriate trust in them [52]. Over-trust in AI can also lead to over-reliance and reduced human oversight [48].

### **2.6 Emotional Engagement Towards Chatbot in E-Commerce**

Emotional engagement has been felt to have significant importance in connection to the customer service offered by e-commerce chatbots, as it influences customer satisfaction and engagement levels with the platform [12]. Furthermore, emotional engagement has been felt to be a form of reinforcement behavior that increases the customer relations experience rather than the functionality offered by the chatbots [53]. Thus, emotional engagement is imperative to enhance overall customer engagement across time in e-commerce chatbot customer service. But for effective emotional engagement, empathetic and enjoyable interactions are a must, which must be balanced proficiently with the facts of technical reliability and authenticity for the best results and to avoid worst ones as well [53], [54]

In spite of all these advantages, difficulties in mental ability, emotional management, and performance abilities can affect customer experience negatively with advanced services [55]. Therefore, eliminating negative consumer emotions toward chatbots is crucial for e-retailers, not only improving the accuracy of algorithms. Even though various studies are available with in-depth insights, this field of research is in its initial stages, with comparatively limited samples and findings valid only for specific contexts. Therefore, chatbots should be used more for the objective tasks in E-commerce, and human or human and AI collaboration should be used for subjective tasks by E-retailers [54].

## **3 HYPOTHESIS DEVELOPMENT**

This paper examines the relationships among chatbot empathy, perceived usefulness, and customer experience, and develops four hypotheses grounded in the conceptual framework. Hypothesis 1 (H1), Empathy of chatbot customer services has a positive effect on digital trust. Findings by [56] proved that empathic AI agents are associated

with a strong impact on trust, indicating a positive relationship between empathy and digital trust.. According to this study, Hypothesis 2 (H2) states that empathy in chatbot customer service has a positive effect on emotional engagement. [57] asserted that Empathy allows receivers to connect with their peers and senders on an emotional level, which can facilitate emotional engagement in the communication area. Moreover, this study's Hypothesis 3 (H3) claims that the perceived usefulness of chatbot customer services has a positive effect on digital trust. The relation is based on research by [58], who found that usefulness jointly predicts trust in chatbot-mediated services. Lastly, for effective chatbot customer service, this study includes Hypothesis 4 (H4), which posits that the perceived usefulness of chatbot customer service has a positive effect on emotional engagement. According to [59], Emotional engagement, especially the perception of care, exerts a greater influence on the perceived usefulness of personalized customer services.

#### 4 RESEARCH GAP

Although research on the increasing usage of AI-driven chatbots in the area of customer service in e-commerce has been growing steadily, existing research has been mostly centered on the technological efficiency and optimization of these applications. Although research rooted in the Technology Acceptance Model has thoroughly considered the constructs of perceived usefulness in the acceptance of chatbots, little research has adequately considered the pivotal roles that attributes such as empathy play in the determination of customer experience outcomes.

In addition, existing studies on chatbots tend to focus on trust and emotional engagement separately, without testing the joint impact of these two constructs in terms of the crucial outcomes of customer experience in the context of AI-supported services. The fragmented study of various constructs prevents a unified understanding of the joint impact of the functional attribute of the chatbot (usefulness) and the social attribute of the chatbot (empathy) on the emotional and social responses of users. Further, despite the theoretical foundation of the Social Response Theory, wherein human-like and empathy-building features of technology can lead users to experience a social response, existing empirical studies on the related constructs based on TAM in the context of e-commerce and chatbots remain scarce.

Moreover, previous research studies, being empirical in nature, are more grounded on full-scale data, as opposed to pilot data, using developed chatbot platforms, without giving much emphasis on pilot research on measurement mode validation that deals with empathy, usage, emotional engagement, as well as digital trust simultaneously. This creates a gap in the measurement framework that can measure these aspects using chatbot platforms in an ecommerce setting.

In order to fill the existing gaps, the current study employs a quantitative pilot study research approach to explore the combined impacts of empathy and perceived usefulness on emotional engagement and trust with the digital chatbot customer services. By blending the existing Technology Acceptance Model and Social Response Theory, this study helps pave the path forward for more extensive research to be conducted within the context of e-commerce.

## 5 CONCEPTUAL FRAMEWORK

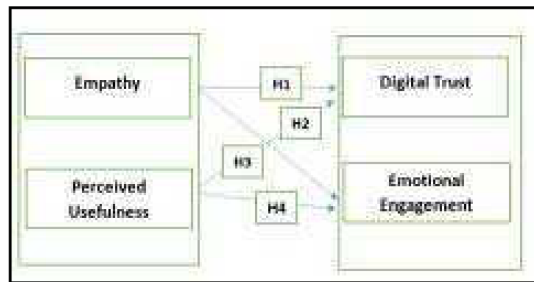


Figure 1: Conceptual Framework - Developed by Authors

This paper's approach is to explore the role of empathy and perceived usefulness in shaping emotional engagement and digital trust in chatbot customer service within e-commerce. Illustrating two key features of effective AI chatbots: empathy and perceived usefulness. Empathy refers to the technology enabling AI systems to simulate human emotional states using multimodal, whereas perceived usefulness concerns the benefits, assistance, and ease of use of AI chatbot customer service when responding. These constructs are posited to argue the improvement of digital trust and emotional engagement. Digital trust is the confidence users have in the Chatbot's reliability, as long as emotional engagement indicates that the user feels the Chatbot understands and creates a sense of emotional support and connection. The framework provides a structured method to analyze the relationship among all constructs by incorporating insights from prior literature.

## 6 METHODOLOGY

The study applied a deductive approach to validate and test the conceptual model, which involved delivering a survey to collect data to investigate the hypotheses developed by the literature review. Validated scales from previous literature were suited to the present situation to form the questionnaire, and the study was conducted via an online survey utilizing Google Forms. A total of 30 questions divided into three main parts: the first is the online shopping habits and use of chatbots of the participant [50], [60], and the second is the demographic characteristics. The last part concentrated on the question items associated with the construct proposed in the model, which was used in prior studies, to measure empathy and perceived usefulness [61], [62]. To measure trust and emotional engagement, the questions are extracted from [63], [64], and [65]. All items were measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), which helped to quantify the participants' responses. 53 responses were collected, but only 50 responses were valid. The proposed framework was the subject of a systematic analysis of the literature to identify relevant theories and constructs. This approach fits with basic literature review practices, synthesizing findings from different prior studies to develop an integrated understanding of how empathy and perceived usefulness affect users' digital trust and emotional engagement.

### 6.1 Pilot Study

A preliminary test has been conducted to assess the proposed framework of theory that examines the role of empathy and perceived usefulness in emotional engagement and digital trust in the chatbot customer service of the online shopping environment. The main aims of the preliminary test or study include determining the validity and reliability of the proposed framework of theory. A survey study was conducted with the aid of a pool of 50 volunteers that yielded useful information and results that played an important role in improving the framework of the proposed study of the online shopping environment.

## 6.2 Sample

A total of 50 participants (n = 50) took the survey. The study used purposive sampling to select participants, targeting those with previous experience in the use of e-commerce chatbots. The demographic information of the study participants was determined based on the study, which was conducted on the population of 50 participants. The study participants were 46% male and 54% female, resulting in 100% of the population. Also, the age structure of the participants was determined based on the age of the participants, which was segmented into five brackets, namely those below 20 years (16%), between 20 and 29 years (14%), between 30 and 39 years (28%), between 40 and 49 years (34%), and between 50 and 59 years (8%), resulting in 100% of the population. Finally, the study was also conducted based on the level of the participants' academic history, which was segmented into five categories, namely those having completed high school (8%), bachelor's degree (22%), professional degree (22%), master's degree (32%), and doctoral degree (14%), resulting in 100%.

## 6.3 Analysis Results

Table 6.3.1: Exploratory Factor Analysis and Assessment of Validity and Reliability

Construct	MEAN	Variance	Std. deviation	Cronbach's alpha	No. of items	KMO Measure of Sampling Adequacy	Bartlett's Chi-Square	df	Sig.
Empathy	15.02	14.347	3.788	.711	5	.710	49.346	10	<.001
PU	19.00	15.918	3.990	.769	6	.692	85.725	15	<.001
Emotional Engagement	13.42	5.024	2.241	.447	4	.589	21.248	6	.002
Trust	13.80	6.327	2.515	.714	4	.575	70.722	6	<.001

SPSS was used to check reliability and validity of the measurement scales. For internal consistency, Cronbach's alpha is used. Construct validity is then determined through the use of exploratory factor analysis. The KMO value is above the recommended threshold of 0.60, while Bartlett's Test of Sphericity registered a p-value below 0.05, signifying that data is adequate to undergo factor analysis. All retained items should load above 0.50 on their respective factors. The analyses for reliability yielded that all constructs other than Emotional Engagement showed acceptable internal consistencies ( $\alpha \geq 0.70$ ). Emotional Engagement performed badly, with  $\alpha$  of 0.447, indicating that its items may measure multiple dimensions. The KMO value was greater than the recommended threshold of 0.60, while Bartlett's Test of Sphericity is significant for all constructs ( $p < 0.05$ ), indicating that the data are adequate to undergo factor analysis, implying that the items could capture different facets of emotional engagement. The study being a pilot one means the construct was retained for exploratory analysis, while the findings related to this construct are considered cautiously.

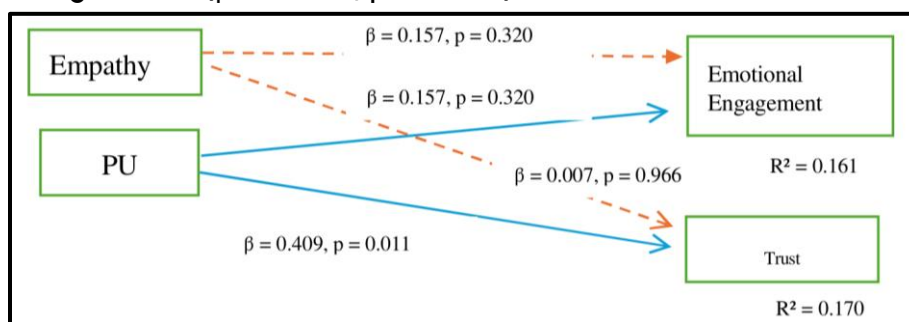
## Regression Analysis and Hypotheses Testing

Multiple regression analyses were carried out to investigate the impact of empathy and perceived usefulness on emotional engagement and digital trust. Before conducting regressions, assumptions were checked, including Linearity: Scatterplots showed somewhat linear relationships between independent and dependent variables. Independence of errors: The Durbin-Watson statistics ranged between 1.5 and 2.5. Homoscedasticity: Plots of standardized residuals against predicted values showed no pattern. Normality of residuals: Normal P-P plots showed the residuals were approximately normally distributed. Multicollinearity: VIFs below 5 and tolerance values above 0.2 signified no potential multicollinearity issues.

**Table 6.3.2: Regression Results**

Dependent Variable	Independent Variable	Unstandardized Coefficients	Standardized Coefficients (β)	t-value	Sig.	R <sup>2</sup>	Adjusted R <sup>2</sup>	F-value	Sig. (F)
Emotional Engagement	Empathy	.134	.157	1.005	.320	.161	.125	4.496	<.016
Emotional Engagement	Perceived Usefulness	.291	.297	1.909	.062	.161	.125	4.496	<.016
Digital Trust	Empathy	.006	.007	.043	.966	.170	.135	4.829	<.012
Digital Trust	Perceived Usefulness	.387	.409	2.645	.011	.170	.135	4.829	<.012

The regression model for emotional engagement was significant ( $R^2 = 0.161$ ,  $F = 4.496$ ,  $p = 0.016$ ), but only perceived usefulness showed a positive effect with a marginal trend ( $\beta = 0.297$ ,  $p = 0.062$ ), while empathy had no significant effect ( $\beta = 0.157$ ,  $p = 0.320$ ). For digital trust, the model was significant ( $R^2 = 0.170$ ,  $F = 4.829$ ,  $p = 0.012$ ). Perceived usefulness had a significant positive effect ( $\beta = 0.409$ ,  $p = 0.011$ ), whereas empathy did not influence digital trust ( $\beta = 0.007$ ,  $p = 0.966$ ).



Note:  $p < .10$  (marginal);  $p < .50$  (significant)

**Figure 6.3.1: Results of The Research Model**

**Table 6.3.3: Hypothesis Decision**

Hypothesis	Result
Empathy → Emotional Engagement	Not supported
PU → Emotional Engagement	Not supported at 0.05, marginal trend ( $p = 0.062$ )
Empathy → Digital Trust	Not supported
PU → Digital Trust	Supported

The findings indicate that perceived usefulness significantly influences digital trust, while empathy does not have a direct significant effect on either emotional engagement or digital trust. The marginal effect of perceived usefulness on emotional engagement suggests a potential trend that may reach significance with a larger sample. Results are aligned with [66] who showed that perceived ease of use has a significant and positive impact on trust. Similarly to [67], who found that the relation between PU and emotional engagement depended on how the data was interpreted, suggesting that increased usability may decrease engagement, as [68] mentioned before. On the contrary, it has seen that results are contradicted with [69], who also found that it raises ethical issues, such as leading people to believe they are engaging with each other and leaking private information.

## 8 POTENTIAL CONTRIBUTION

This study makes its contribution to the literature because it presents a conceptual framework that explains the interrelationship between empathy and perceived usefulness of chatbot customer service and their impact on the end result of emotional engagement and digital trust in the e-commerce arena. Through this, this study draws attention to how the service offered through the chatbot service affects the overall experience of the clients in both functional and emotional ways. Specifically, this study explores the significance of perceived usefulness, in collaboration with empathy, as a social factor that could facilitate emotional engagement and digital trust.

The importance of the study cannot be overemphasized as it seeks to fulfill a void in previous studies that have concentrated on the perception of usefulness as well as digital trust, with little focus on emotional engagement as a separate result of chatbot usage. Contrary to previous studies that focused on the study of trust in a separate manner, the study seeks to put the concepts of emotional engagement and digital trust together in one conceptual framework to provide a better understanding of the customer experience in the context of artificial intelligence in customer service support offered in the online marketplace by e-commerce companies.

This would be helpful for the organization. Pragmatically and economically, the implications of the model are significant for any business enterprise involving the service sector, including e-commerce and logistics companies. Consequently, it allows enterprises to foster digital trust and emotional engagement, and eventually improve customer experience. This will create opportunities for increased efficiency, lower service costs, and boosted customer retention for any enterprise. By automating common queries, enterprises will be able to utilize human resources more efficiently, resulting in increased productivity and additional service offerings. Eventually, enterprises that are able to foster customer trust and emotional engagement will be able to create strong customer loyalty and achieve sustained competitiveness in the marketplace. Intelligent customer services by chatbots will thereby lead to the enhancement of digital service ecosystems and the progress of the digital economy.

## 9 CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH

In conclusion, this study has laid out a conceptual framework for analyzing the role of empathy and perceived usefulness in influencing emotional engagement and digital trust in customer service in e-commerce through chatbots. Secondly, it has emphasized that for these services to function at their best, they must offer their users not only functionalities in terms of perceived usefulness, but they must also engage in empathetic conversations. Thirdly, it has verified through regression that perceived usefulness has played a significant role in determining digital trust, yet it has played a positive, yet marginal, role in emotional engagement. Finally, it has verified through regression that empathy played no significant role in determining emotional engagement or digital trust.

This proposed framework provides a base platform that e-commerce businesses can use to try to maximize the impact of their chatbots on the customer service aspect. However, despite the many contributions that this research provides, the research stands to be a conceptual study that uses a small data set, which may not fully translate to the real-life scenario on different e-commerce platforms. This is because the marginal effect that the study provided on the data can be read as a call to further study the conditions that surround the impact that emotions can have on this aspect.

For sure, this framework needs to be further validated across various contexts, including different types of products and consumers. A useful long-term study or experiment might provide information on how design variables of chatbots such as responsiveness, personalization, and empathic communication influence customer outcomes. The

framework can be applied through the design of chatbots by organizations that are both usable and empathic, while taking up new technologies including AI-driven personalization and predictive analytics in order to work toward an improvement in the customer experience through loops incorporated for enhancement. In short, the current research sends important light on the key role played by perceived usefulness—and, to a certain extent, empathy—as antecedents in digital trust and emotional engagement, therefore drawing some valuable lessons for companies that want to improve the functioning of e-commerce chatbots.

### **DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES:**

Alaa Saleh declares that no generative AI or AI-assisted tools were used during the preparation of this work.

### **10 REFERENCES**

- [1] M. Haenlein and A. Kaplan, "A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence," *California Management Review*, vol. 61, no. 4, pp. 5–14, Aug. 2019, doi: 10.1177/0008125619864925.
- [2] S. Khan and M. R. Rabbani, "Artificial Intelligence and NLP -Based Chatbot for Islamic Banking and Finance," *IJRR*, vol. 11, no. 3, pp. 65–77, July 2021, doi: 10.4018/IJRR.2021070105.
- [3] M. E. A. González, L. R. Comesaña, and J. A. F. Brea, "Assessing tourist behavioral intentions through perceived service quality and customer satisfaction," *Journal of Business Research*, vol. 60, no. 2, pp. 153– 160, Feb. 2007, doi: 10.1016/j.jbusres.2006.10.014.
- [4] J. Mou, D.-H. Shin, and J. Cohen, "Understanding trust and perceived usefulness in the consumer acceptance of an e-service: a longitudinal investigation," *Behaviour & Information Technology*, vol. 36, no. 2, pp. 125– 139, Feb. 2017, doi: 10.1080/0144929X.2016.1203024.
- [5] T. A. Bach, A. Khan, H. Hallock, G. Beltrão, and S. Sousa, "A Systematic Literature Review of User Trust in AI-Enabled Systems: An HCI Perspective," *International Journal of Human-Computer Interaction*, vol. 40, no. 5, pp. 1251–1266, Mar. 2024, doi: 10.1080/10447318.2022.2138826.
- [6] N. Ma, R. Khynevysh, Y. Hao, and Y. Wang, "Effect of anthropomorphism and perceived intelligence in chatbot avatars of visual design on user experience: accounting for perceived empathy and trust," *Front. Comput. Sci.*, vol. 7, May 2025, doi: 10.3389/fcomp.2025.1531976.
- [7] M. Li and R. Wang, "Chatbots in e-commerce: The effect of chatbot language style on customers' continuance usage intention and attitude toward brand," *Journal of Retailing and Consumer Services*, vol. 71, p. 103209, Mar. 2023, doi: 10.1016/j.jretconser.2022.103209.
- [8] L. Cui, S. Huang, F. Wei, C. Tan, C. Duan, and M. Zhou, "SuperAgent: A Customer Service Chatbot for E-commerce Websites," in *Proceedings of ACL 2017, System Demonstrations*, M. Bansal and H. Ji, Eds., Vancouver, Canada: Association for Computational Linguistics, July 2017, pp. 97–102. Accessed: Dec. 19, 2025. [Online]. Available: <https://aclanthology.org/P17-4017/>
- [9] C. V. Mischia, F. Poetze, and C. Strauss, "Chatbots in customer service: Their relevance and impact on service quality," *Procedia Computer Science*, vol. 201, pp. 421–428, Jan. 2022, doi: 10.1016/j.procs.2022.03.055.
- [10] J. Gao, A. P. Opute, C. Jawad, and M. Zhan, "The influence of artificial intelligence chatbot problem solving on customers' continued usage intention in e-commerce

- platforms: an expectation–confirmation model approach," *Journal of Business Research*, vol. 200, p. 115661, Nov. 2025, doi: 10.1016/j.jbusres.2025.115661.
- [11] R. Vebrianti, M. Aras, M. S. S. Putri, and I. A. Swandewi, "AI Chatbots in E-Commerce: Enhancing Customer Engagement, Satisfaction and Loyalty," *PaperASIA*, vol. 41, no. 2b, pp. 248–260, May 2025, doi: 10.59953/paperasia.v41i2b.445.
- [12] C. Wang, Y. Li, W. Fu, and J. Jin, "Whether to trust chatbots: Applying the event-related approach to understand consumers' emotional experiences in interactions with chatbots in e-commerce," *Journal of Retailing and Consumer Services*, vol. 73, p. 103325, July 2023, doi: 10.1016/j.jretconser.2023.103325.
- [13] Y. Zhu, J. Zhang, and J. Liang, "Concrete or abstract: How chatbot response styles influence customer satisfaction," *Electronic Commerce Research and Applications*, vol. 62, p. 101317, Nov. 2023, doi: 10.1016/j.elerap.2023.101317.
- [14] X. Xing, M. Song, Y. Duan, and J. Mou, "Effects of different service failure types and recovery strategies on the consumer response mechanism of chatbots," *Technology in Society*, vol. 70, p. 102049, Aug. 2022, doi: 10.1016/j.techsoc.2022.102049.
- [15] T. T. A. Ngo, T. Y. N. Phan, T. K. Nguyen, N. B. T. Le, N. T. A. Nguyen, and T. T. D. Le, "Understanding continuance intention toward the use of AI chatbots in customer service among generation Z in Vietnam," *Acta Psychologica*, vol. 259, p. 105468, Sept. 2025, doi: 10.1016/j.actpsy.2025.105468.
- [16] F. D. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319–340, 1989, doi: 10.2307/249008.
- [17] M. Fishbein and I. Ajzen, "Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research," *Philosophy and Rhetoric*, vol. 10, no. 2, pp. 130–132, 1977.
- [18] J. B. W. Kabo-Bah and R. K. Bannor, "E-commerce among grain traders and its impact on marketing," *Sustainable Technology and Entrepreneurship*, vol. 4, no. 1, p. 100090, Jan. 2025, doi: 10.1016/j.stae.2024.100090.
- [19] N. Marangunić and A. Granić, "Technology acceptance model: a literature review from 1986 to 2013," *Univ Access Inf Soc*, vol. 14, no. 1, pp. 81–95, Mar. 2015, doi: 10.1007/s10209-014-0348-1.
- [20] B. Wu and X. Chen, "Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model," *Computers in Human Behavior*, vol. 67, pp. 221–232, Feb. 2017, doi: 10.1016/j.chb.2016.10.028.
- [21] D. Cho, H. J. Kwon, and H. Lee, "Analysis of Trust in Internet and Mobile Commerce Adoption," in *2007 40th Annual Hawaii International Conference on System Sciences (HICSS'07)*, Jan. 2007, pp. 50–50. doi: 10.1109/HICSS.2007.76.
- [22] C. C. Wong and P. L. Hiew, "Diffusion of Mobile Entertainment in Malaysia: Drivers and Barriers," *International Journal of Economics and Management Engineering*, vol. 1, no. 11, 2007.
- [23] C. Nass, Y. Moon, B. J. Fogg, B. Reeves, and D. C. Dryer, "Can computer personalities be human personalities?," *International Journal of Human-Computer Studies*, vol. 43, no. 2, pp. 223–239, Aug. 1995, doi: 10.1006/ijhc.1995.1042.
- [24] T.-H. Liao, "Online shopping post-payment dissonance: Dissonance reduction strategy using online consumer social experiences," *International Journal of Information Management*, vol. 37, no. 6, pp. 520–538, Dec. 2017, doi: 10.1016/j.ijinfomgt.2017.03.006.
- [25] J. Ossadnik, K. Muehlfeld, and L. Goerke, "Man or machine – or something in between? Social responses to voice assistants at work and their effects on job

satisfaction," *Computers in Human Behavior*, vol. 149, p. 107919, Dec. 2023, doi: 10.1016/j.chb.2023.107919.

[26] X. Li and Y. Sung, "Anthropomorphism brings us closer: The mediating role of psychological distance in User-AI assistant interactions," *Computers in Human Behavior*, vol. 118, p. 106680, May 2021, doi: 10.1016/j.chb.2021.106680.

[27] J. Munnukka, K. Talvitie-Lamberg, and D. Maity, "Anthropomorphism and social presence in Human-Virtual service assistant interactions: The role of dialog length and attitudes," *Computers in Human Behavior*, vol. 135, p. 107343, Oct. 2022, doi: 10.1016/j.chb.2022.107343.

[28] P. Kautish, W. M. Lim, and N. Joshi, "Awe-inspired experience in the metaverse: A multi-study investigation," *Journal of Retailing and Consumer Services*, vol. 87, p. 104390, Oct. 2025, doi: 10.1016/j.jretconser.2025.104390.

[29] J. Park, J. Yun, and W. Chang, "Intention to adopt services by AI avatar: A protection motivation theory perspective," *Journal of Retailing and Consumer Services*, vol. 80, p. 103929, Sept. 2024, doi: 10.1016/j.jretconser.2024.103929.

[30] L. Xie, C. Liu, and D. Li, "Proactivity or passivity? An investigation of the effect of service robots' proactive behaviour on customer co-creation intention," *International Journal of Hospitality Management*, vol. 106, p. 103271, Sept. 2022, doi: 10.1016/j.ijhm.2022.103271.

[31] D. Nanos and G. Lappas, "ChatGPT and Pi AI under the Microscope: Artificial Empathy for Enhancing Digital Customer Service," in *Proceedings of the 3rd International Conference of the ACM Greek SIGCHI Chapter, in CHIGreece '25*. New York, NY, USA: Association for Computing Machinery, Sept. 2025, pp. 250-254. doi: 10.1145/3749012.3749075.

[32] Y. Xiao and S. Yu, "Can ChatGPT replace humans in crisis communication? The effects of AI-mediated crisis communication on stakeholder satisfaction and responsibility attribution," *International Journal of Information Management*, vol. 80, p. 102835, Feb. 2025, doi: 10.1016/j.ijinfomgt.2024.102835.

[33] T. T. H. Truong and J. S. Chen, "When empathy is enhanced by human-AI interaction: an investigation of anthropomorphism and responsiveness on customer experience with AI chatbots," *Asia Pacific Journal of Marketing and Logistics*, vol. 37, no. 12, pp. 3908-3925, May 2025, doi: 10.1108/APJML-10-2024-1464.

[34] T. Zhu, L. Xie, and C. Liu, "Driving human-robot value co-creation in hospitality: The role of artificial empathy," *International Journal of Hospitality Management*, vol. 126, p. 104075, Apr. 2025, doi: 10.1016/j.ijhm.2024.104075.

[35] C. Pelau, D.-C. Dabija, and I. Ene, "What makes an AI device human-like? The role of interaction quality, empathy and perceived psychological anthropomorphic characteristics in the acceptance of artificial intelligence in the service industry," *Computers in Human Behavior*, vol. 122, p. 106855, Sept. 2021, doi: 10.1016/j.chb.2021.106855.

[36] T. Zhu, L. Xie, and C. Liu, "Driving human-robot value co-creation in hospitality: The role of artificial empathy," *International Journal of Hospitality Management*, vol. 126, p. 104075, Apr. 2025, doi: 10.1016/j.ijhm.2024.104075.

[37] M.-H. Huang and R. T. Rust, "The Caring Machine: Feeling AI for Customer Care," *Journal of Marketing*, vol. 88, no. 5, pp. 1-23, Sept. 2024, doi: 10.1177/00222429231224748.

[38] M. Subramony, M. Groth, X. 'Judy' Hu, and Y. Wu, "Four Decades of Frontline Service Employee Research: An Integrative Bibliometric Review," *Journal of Service Research*, vol. 24, no. 2, pp. 230-248, May 2021, doi: 10.1177/1094670521999721.

- [39] J.-L. Richet, "AI companionship or digital entrapment? investigating the impact of anthropomorphic AI- based chatbots," *Journal of Innovation & Knowledge*, vol. 10, no. 6, p. 100835, Nov. 2025, doi: 10.1016/j.jik.2025.100835.
- [40] W.-T. Wang, W.-M. Ou, and W.-Y. Chen, "The impact of inertia and user satisfaction on the continuance intentions to use mobile communication applications: A mobile service quality perspective," *International Journal of Information Management*, vol. 44, pp. 178–193, Feb. 2019, doi: 10.1016/j.ijinfomgt.2018.10.011.
- [41] N. Gümüş and Ö. Çark, "The Effect of Customers' Attitudes Towards Chatbots on their Experience and Behavioural Intention in Turkey," *Interdisciplinary Description of Complex Systems*, vol. 19, pp. 420–436, Sept. 2021, doi: 10.7906/indecs.19.3.6.
- [42] G. Murtarelli, C. Collina, and R. Stefania, "'Hi! How can I help you today?': investigating the quality of chatbots–millennials relationship within the fashion industry," *The TQM Journal*, vol. 35, Apr. 2022, doi: 10.1108/TQM-01-2022-0010.
- [43] S. Khan and M. R. Rabbani, "Artificial Intelligence and NLP -Based Chatbot for Islamic Banking and Finance," *IJRR*, vol. 11, no. 3, pp. 65–77, July 2021, doi: 10.4018/IJRR.2021070105.
- [44] R. Pillai and B. Sivathanu, "Adoption of AI-based chatbots for hospitality and tourism," *International Journal of Contemporary Hospitality Management*, vol. 32, no. 10, pp. 3199–3226, Sept. 2020, doi: 10.1108/IJCHM-04-2020-0259.
- [45] A. Rese, L. Ganster, and D. Baier, "Chatbots in retailers' customer communication: How to measure their acceptance?," *Journal of Retailing and Consumer Services*, vol. 56, p. 102176, Sept. 2020, doi: 10.1016/j.jretconser.2020.102176.
- [46] M. Ashfaq, J. Yun, S. Yu, and S. M. C. Loureiro, "I, Chatbot: Modeling the determinants of users' satisfaction and continuance intention of AI-powered service agents," *Telematics and Informatics*, vol. 54, p. 101473, Nov. 2020, doi: 10.1016/j.tele.2020.101473.
- [47] D. M. Nguyen, Y.-T. H. Chiu, and H. D. Le, "Determinants of Continuance Intention towards Banks' Chatbot Services in Vietnam: A Necessity for Sustainable Development," *Sustainability*, vol. 13, no. 14, p. 7625, Jan. 2021, doi: 10.3390/su13147625.
- [48] G. K. An and T. T. A. Ngo, "AI-powered personalized advertising and purchase intention in Vietnam's digital landscape: The role of trust, relevance, and usefulness," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 11, no. 3, p. 100580, Sept. 2025, doi: 10.1016/j.joitmc.2025.100580.
- [49] Y. Lu and J. Zhang, "Balancing identity diversity and product contexts: Understanding consumer trust in AI-enhanced chatbot services," *Journal of Retailing and Consumer Services*, vol. 84, p. 104205, May 2025, doi: 10.1016/j.jretconser.2024.104205.
- [50] S. Martínez Puertas, M. D. Illescas Manzano, C. Segovia López, and P. Ribeiro-Cardoso, "Purchase intentions in a chatbot environment: An examination of the effects of customer experience," *oc*, vol. 15, no. 1, pp. 145–194, Mar. 2024, doi: 10.24136/oc.2914.
- [51] M. Salem, "Use of Chatbots and its Role in Enhancing Customer Experience: A Study of the Banking Industry," in *Digital Technology and Changing Roles in Managerial and Financial Accounting: Theoretical Knowledge and Practical Application*, vol. 36, A. Hamdan, B. Alareeni, and R. Khamis, Eds., Emerald Publishing Limited, 2024, p. 0. doi: 10.1108/S1479-351220240000036010.
- [52] W. D. Hoyer, M. Kroschke, B. Schmitt, K. Kraume, and V. Shankar, "Transforming the Customer Experience Through New Technologies," *Journal of Interactive Marketing*, vol. 51, pp. 57–71, Aug. 2020, doi: 10.1016/j.intmar.2020.04.001.

- [53] T. T. A. Ngo, T. Y. N. Phan, T. K. Nguyen, N. B. T. Le, N. T. A. Nguyen, and T. T. D. Le, "Understanding continuance intention toward the use of AI chatbots in customer service among generation Z in Vietnam," *Acta Psychologica*, vol. 259, p. 105468, Sept. 2025, doi: 10.1016/j.actpsy.2025.105468.
- [54] X. Lv, Y. Yang, D. Qin, X. Cao, and H. Xu, "Artificial intelligence service recovery: The role of empathic response in hospitality customers' continuous usage intention," *Computers in Human Behavior*, vol. 126, p. 106993, Jan. 2022, doi: 10.1016/j.chb.2021.106993.
- [55] C. Crolic, F. Thomaz, R. Hadi, and A. T. Stephen, "Blame the Bot: Anthropomorphism and Anger in Customer-Chatbot Interactions," *Journal of Marketing*, vol. 86, no. 1, pp. 132-148, Jan. 2022, doi: 10.1177/00222429211045687.
- [56] T. Tsumura and S. Yamada, "The role of individual recognition in shaping empathy and trust toward an agent," *PLOS ONE*, vol. 20, no. 7, p. e0327329, July 2025, doi: 10.1371/journal.pone.0327329.
- [57] C. S. Abacioglu, M. Zee, F. Hanna, I. M. Soeterik, A. H. Fischer, and M. Volman, "Practice what you preach: The moderating role of teacher attitudes on the relationship between prejudice reduction and student engagement," *Teaching and Teacher Education*, vol. 86, p. 102887, Nov. 2019, doi: 10.1016/j.tate.2019.102887.
- [58] A. Aziziyah, "Peranan Persepsi Manfaat sebagai Mediasi dalam Pengaruh Kemudahan Penggunaan dan Kepercayaan terhadap Penggunaan E-Commerce pada Aplikasi Traveloka," *JIM*, vol. 9, no. 1, p. 205, Mar. 2021, doi: 10.26740/jim.v9n1.p205-216.
- [59] T.-P. Liang, H.-Y. Chen, and E. Turban, "Effect of personalization on the perceived usefulness of online customer services: a dual-core theory," in *Proceedings of the 11th International Conference on Electronic Commerce*, Taipei Taiwan: ACM, Aug. 2009, pp. 279-288. doi: 10.1145/1593254.1593296.
- [60] A. Ranieri, I. Di Bernardo, and C. Mele, "Serving customers through chatbots: positive and negative effects on customer experience," *JSTP*, vol. 34, no. 2, pp. 191-215, Mar. 2024, doi: 10.1108/JSTP-01-2023-0015.
- [61] C. Schwenck, A. Ciaramidaro, M. Selivanova, J. Tournay, C. M. Freitag, and M. Siniatchkin, "Neural correlates of affective empathy and reinforcement learning in boys with conduct problems: fMRI evidence from a gambling task," *Behavioural Brain Research*, vol. 320, pp. 75-84, Mar. 2017, doi: 10.1016/j.bbr.2016.11.037.
- [62] S. Dassouli, H. Satt, and N. Senhaji, "Attitude and behavior towards chatbots: case of the beauty care industry," *IJPHM*, vol. 19, no. 1, pp. 51-74, Feb. 2025, doi: 10.1108/IJPHM-09-2023-0086.
- [63] D. Gefen and D. W. Straub, "Consumer trust in B2C e-Commerce and the importance of social presence: experiments in e-Products and e-Services," *Omega*, vol. 32, no. 6, pp. 407-424, Dec. 2004, doi: 10.1016/j.omega.2004.01.006.
- [64] K.-L. Hsiao and C.-C. Chen, "What drives continuance intention to use a food-ordering chatbot? An examination of trust and satisfaction," *Library Hi Tech*, vol. 40, no. 4, pp. 929-946, Dec. 2021, doi: 10.1108/LHT-08-2021-0274.
- [65] K. Park and H. Y. Yoon, "Beyond the code: The impact of AI algorithm transparency signaling on user trust and relational satisfaction," *Public Relations Review*, vol. 50, no. 5, p. 102507, Dec. 2024, doi: 10.1016/j.pubrev.2024.102507.
- [66] M. A. Nangin, I. R. G. Barus, and S. Wahyoedi, "The Effects of Perceived Ease of Use, Security, and Promotion on Trust and Its Implications on Fintech Adoption," *JCS*, vol. 5, no. 2, pp. 124-138, Aug. 2020, doi: 10.29244/jcs.5.2.124-138. [67] R. M. Mayordomo, A. Espasa, T. Guasch, and M. Martínez-Melo, "Perception of online feedback and its impact on cognitive and emotional engagement with feedback," *Educ*



Inf Technol, vol. 27, no. 6, pp. 7947– 7971, July 2022, doi: 10.1007/s10639-022-10948-2.

[68] K.-K. Seo, S. Lee, B. D. Chung, and C. Park, "Users' Emotional Valence, Arousal, and Engagement Based on Perceived Usability and Aesthetics for Web Sites," International Journal of Human-Computer Interaction, vol. 31, no. 1, pp. 72–87, Jan. 2015, doi: 10.1080/10447318.2014.959103.

[69] T. Maeda and A. Quan-Haase, "When Human-AI Interactions Become Parasocial: Agency and Anthropomorphism in Affective Design," in The 2024 ACM Conference on Fairness, Accountability, and Transparency, Rio de Janeiro Brazil: ACM, June 2024, pp. 1068–1077. doi: 10.1145/3630106.3658956.