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Bridging AI and human interaction: How trust and social presence affects chatbot acceptance

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Abstract

This study examines the factors driving chatbot adoption among customers. Integrating the Technology Acceptance Model with social presence, perceived performance, and trust, the research investigates how these variables influence customers' attitudes and intentions to use chatbots. The findings confirm the importance of conversational commerce, particularly for millennials, and support the Social Presence Theory, highlighting the positive impact of human-like interactions on trust and attitudes towards chatbots. Key constructs such as trust, perceived usefulness, ease of use, and behavioral intention are validated as influential factors in consumer decisions regarding chatbot technology. The study offers practical implications for businesses seeking to enhance chatbot experiences by focusing on usability, usefulness, and performance. Future research should consider a broader population, explore additional variables like ethical considerations, cross-cultural differences, and personalization, and investigate potential moderating factors such as personality traits and prior technology experience.

Keywords: Chatbots, Trust, Social presence, TAM.

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1. Introduction

Undoubtedly, the development of the internet hasn't only shaped the way people conduct business at a lightning-fast rate; it has also introduced a new channel for e-commerce and endless opportunities for businesses, including better information flow, improved product and customer service, greater availability, and greater market transparency [1]. Most specifically, thanks to Artificial Intelligence (AI) technologies, businesses and marketers are now more able to handle enormous amounts of data, carry out personalized sales, and satisfy customer prospects [2]. For instance, chatbots, also

known as AI conversational agents, are a good starting point for companies seeking to improve their responsiveness, productivity, and capability to provide consumers with appropriate and customized experiences and services. In fact, chatbots serve as the ideal example of how to design and use customer-focused artificial intelligence that mimics human behavior. This technology has a broad variety of applications in diverse industries, including e-commerce, financial services, and healthcare [3].

The usage of chatbots in modern phones and online platforms has grown significantly. By 2025, the market for chatbots is anticipated to grow to $1.25 billion [4]. Users, on average, will converse with chatbots more frequently than with humans on a daily basis, and 85% of client-brand engagements in the years to come won't include human interaction [5]. Additionally, over 50% of firms will adopt chatbot-based methods, which will help the industry reach $1.23 billion in value [6]. The use of chatbot technology has been prevalent in communicating with customers and accomplishing diverse tasks related to customer service, such as resolving complaints, identifying items for purchase, and suggesting purchase recommendations [7, 8].

Chatbots can be especially integral in enhancing customer service along the entire customer journey [9, 10]. Nevertheless, the use of chatbot technology presents both opportunities and challenges to firms and customers simultaneously. For instance, according to Van Doorn, et al. [11], chatbots are able to establish connections with customers through their robotic social presence, which in turn is expected to boost customer satisfaction. However, Ho and MacDorman [12] claim that there is an irregular correlation between the automated social presence of chatbots and favorable user judgments. In other words, at a certain stage of the customer online journey, the connection might change, and consumers may start to feel uncomfortable with the absence of human-like interaction.

In this regard, earlier studies have looked at how the absence of physical interaction and the diminished presence of human factors in online settings might create interactions that are less personal and more robotic, resulting in a lack of comfort and friendliness and a decrease in customer trust [13]. Recent research has shown that a personal touch has been considered an aspect that can lead businesses to establish genuine closeness by producing favorable psychological responses [14]. Most importantly, earlier studies have shown that people are more likely to disclose personal information when they believe that they have a connection with the brand rather than if there are only infrequent interactions [15]. This is because people are less likely to share personal information when they feel they are regarded only as customers to be profiled. Additional research has shown the positive effects of trust on their willingness to disclose details in digital interactions. For instance, chatbots may communicate with clients via a variety of venues, including business web pages or even social media sites [16].

Albeit a trending topic in the past few years, there is still a need for further research on the use of AI chatbots in customer service in major sectors such as education [17]. Moreover, it is imperative to explore the possible drivers of users' acceptance of utilizing and adopting chatbots in various fields, such as the educational context [18], given that one of the major challenges to the adoption of chatbots is students' attitudes and acceptance [19]. In this regard, a few gaps in the previously conducted research can be pointed out. Existing research has mostly examined the use of chatbots in marketing businesses [20-22] and the implications of chatbot adoption on enterprise effectiveness [23, 24].

Furthermore, according to El Bakkouri, et al. [25], in the context of the use of AI chatbots in customer experiences between the years 2019 and 2022, publications have primarily focused on industries such as B2B [26], service contexts [27], and retail [28]. There exist very few studies conducted in the higher education sector [29-31]. The research aim is threefold: 1) explore the factors that affect consumers' attitudes and intention to use chatbots, in terms of TAM variables such as perceived performance, perceived usefulness, and perceived ease of use; 2) examine the role of social presence in impacting these attitudes; and 3) explore the mediating role of trust between attitudes and social presence.

The rest of the paper is designed as follows. The literature review discusses existing theoretical models and research related to chatbots in higher education. Then, the research methodology and research design are described, followed by the findings of our empirical study. Finally, the key findings and contributions of this research, along with limitations, in addition to the implications and recommendations for future research.

2. Literature Review

A chatbot, in its most basic definition, is a computer programme that simulates human interaction in response to the consumer's speech or written instructions. Businesses employ them in domains including dealing with clients, client service, order processing, and individual consulting to actively involve and entertain consumers. Chatbots are available in a variety of IM programmes and are often programmed to seem human-like in conversation [32]. There are several names for conversational systems like chatbots [33]. Chatbots are also referred to as virtual assistants and conversational bots. Customer care chatbots are primarily text-based, however, voice-based chatbots are also commercially accessible.

2.1. Chatbots use in Customer Service

In recent years, virtual assistants have emerged as both, one of the trendiest keywords in digital marketing a marketing need for enhanced customer experience [34]. Chatbots have gained their popularity among consumers for its ability to provide continuous interaction [35] prompt responsiveness to customer issues and problems [24, 36] real-time communication [37] and as a cost effective tool [38]. This AI enabled tool can be especially beneficial in industries including customer service, marketing, sales, training, and technical support [39]. Additionally, chatbots may aid in managing website traffic and ensuring that customers receive the proper information and support, increasing purchases and lowering load time. This is crucial for companies whose major source of revenue is internet marketing. Furthermore, chatbots may be used to develop long term relationships with customers. For instance, a chatbot might be programmed to wish a client a happy birthday and give discounts to attract a return. By making such efforts, firms can promote while improving the customer experience [40].

Furthermore, since it produces a valued answer by incorporating a personalized experience to the communication between AI and customers, particularly without engaging human employees, chatbots emerge as an efficient and affordable means of delivering customer service. Further benefits of chatbots include a) the elimination of client waiting time, in a convenient manner in addition to b) personalization of customer service based on customers' current requirements and previous conversations [40].

Nevertheless, the litruture shows that customers tend to respond more favourably to chatbots that are more human-like [41] when interacting with a chatbot, users often specifically ask for a human operator's assistance [42]. In this regard, different theoretical perspectives must be consulted as to our present understanding nor alternative theoretical frameworks for describing the link between humans and chatbots exist [43]. Despite the expansion of this phenomena in the service sector, little study has been done on how human-to-machine communicate. Several theories, including human performance [44] and activity theories [45] have been linked to how human-to-machine interactions operate. According to research by Agarwal and Prasad [46] the acceptance of novel applications is significantly negatively correlated with the level of difficulty of the invention. Thus, it may be assumed that the consumer's usage of virtual assistants would be harmed by its intricacy or sophistication.

2.2. Theoretical Background

2.2.1. Social Presence and AI

Research has shown that the more effectively AI can simulate social cues and relational warmth, the more likely it is that customers will develop favorable attitudes towards it and integrate it into their routine interactions. This assumption is referred to as social presence. The theory of "social presence," originally introduced by Short, Williams, and Christie in 1976, refers to the degree to which a person perceives another individual as being "real" or "present" in a mediated communication environment. Most previous e-commerce studies have taken this social presence view, emphasizing the importance of a site's capacity to come across as friendly and personable [47].

In the context of AI and customer service, social presence theory plays a significant role in shaping customers' attitudes towards AI-based interactions. A higher social presence can make AI systems appear more personable and engaging, which, in turn, can enhance customer satisfaction and trust. When AI systems, such as chatbots, are designed to mimic human-like behaviors, such as empathy, responsiveness, and personalized interaction, they can evoke a greater sense of social presence. This perception can positively influence customers' attitudes, leading to higher acceptance and a stronger intention to use AI for customer service [48, 49].

Research has also shown that the perceived social presence in AI-driven interactions can mitigate the impersonal nature of digital communication and foster a more positive user experience. The more effectively AI can simulate social cues and relational warmth, the more likely it is that customers will develop favorable attitudes towards it and integrate it into their routine interactions. For example, Gefen and Straub [50] found that social presence is crucial in online interactions, as it enhances the perceived trustworthiness and enjoyment of the experience, which are key factors in the acceptance and use of technology. Similarly, studies on AI and chatbots have indicated that when customers perceive a "higher level of social presence, they are more likely to engage positively with the technology and view it as a viable substitute for human agents" [51-53].

H_1: The social presence has a positive effect on trust towards the chatbots.

2.2.2. Trust in Technology

Humans tend to reject or distrust technologies they don't fully understand, often viewing them as "black boxes"—complex systems whose inner workings are not transparent [54]. This perception is particularly common with AI, where users may find the technology fascinating but also obscure and ambiguous, leading to skepticism [55]. The lack of clarity about how AI processes decisions can contribute to low trust, influencing users' willingness to engage with AI systems, such as chatbots.

De Cicco, et al. [56] assert that trust's effect on customers' attitudes has been shown true in several industries, and e-commerce is no exception. Since AI is complex and difficult to comprehend, it goes against human beings to put trust in it, thus customers will have a more difficult time putting trust in it [57]. Research shows that trust plays a crucial role in shaping customers' attitudes toward AI-based interactions. When AI systems are perceived as opaque or incomprehensible, users are more likely to experience discomfort and reject the technology [58-62]. This distrust is particularly evident in human-chatbot interactions, where the "black box" nature of AI can lead to uncertainty about the chatbot's decision-making processes, prompting users to approach such interactions with caution [63].

H_2: Trust in technology has positive effect on customers' attitude towards chatbots.

2.2.3. Technology Acceptance Model (TAM)

The "Technology Acceptance Model (TAM)", initially concepted by Davis [64] is one of the most used models used to study drivers' behind consumers' adoption of new technologies [65]. This model proposes that the perceived usefulness (PU) and the perceived ease of use (PEU) are significant determinants of the adoption of Information Technology (IT). Whilst PU is the extent to which an individual anticipates that employing that system would lead to enhanced efficiency, PEU is the degree to which someone observes a certain application to be simple to use is known as perceived ease of use [66]. According to earlier studies Al-Hujran, et al. [67] consumers' opinions of the usefulness of personal devices were positively impacted by perceived simplicity of use. Furthermore, Kim, et al. [68] state that perceived simplicity of use was an important variable

in the widespread use of AI. Thus, we anticipate that if the chatbot is perceived by consumers as simple to use and has high utility, then their attitudes toward chatbots use would be positive. Therefore, we propose the following hypotheses:

H_3: "There is a positive relation between perceived usefulness and customers' attitude towards chatbots".

H_4: "There is a positive relation between perceived ease of use and customers' attitude towards chatbots".

2.2.4. Perceived Performance

Performance is a collection of characteristics or advantages of a product or service [69]. Both objective performance and perceived performance may be used to analyse it. The latter comprises individual evaluations, whereas the other represents the real performance degree of the product or service [70]. After buying a product or service, customers' perceptions of its value and quality are referred to as "perceived performance" [71]. Customers' desires to use, recommend, and use a chatbot are determined by how they feel about them [21]. Therefore, the perceived performance of a chahtbot might be a great tool for marketing professionals to improve customer experience [56]. In this regard, when chatbot agent engagement is more fluent, effective, and productive than in-person contacts with regular agents, customers favourably evaluate the competency of the chatbots [28]. Researchers have suggested that customers observe trustworthiness and knowledge in how that interaction is done when a brand's chatbots remain immersive, promptly offer information available, are well-informed about the most recent market trends, and can inform the consumers about the trends [72-79]. Thus, we suggest the below hypothesis:

H_5: "There is a positive relation between perceived performance and consumers' attitude towards chatbots".

2.2.5. Attitudes and Intention to Use Chatbots

Theory of planned behavior (TPB) by Ajzen [80] suggest that "behaviors are influenced by intentions, which are determined by three factors: attitudes, subjective norms, and perceived behavioral control" [81]. In the context of our research, positive attitudes, driven by perceptions of chatbot usefulness, ease of use, and enjoyment, are key predictors of user acceptance as per [82]. Chatbots that are perceived as helpful, efficient, and user-friendly tend to foster stronger intentions to use, particularly when users feel that the technology adds value to their experience. Additionally, the integration of human-like features, such as empathy and personalization, can enhance social presence, which in turn positively impacts attitudes and increases intention to use chatbots in case they trust it Chattaraman, et al. [83]. However, negative attitudes, often stemming from concerns about the chatbot's capabilities or trustworthiness, can hinder usage intentions, highlighting the importance of trust in mediating the relationship between social presence and attitudes towards the utilization of chatbots and ultimately, shaping user behavior [84]. Therefore we propose the following hypotheses:

H_6: "there is a postive relation between attitudes towards chatbots and the intention to use chatbots"

H_7: "Trust mediates the relationship between social presence and attitudes towards chatbots utilization".

Based on th above review of literature, we propose the following research model:

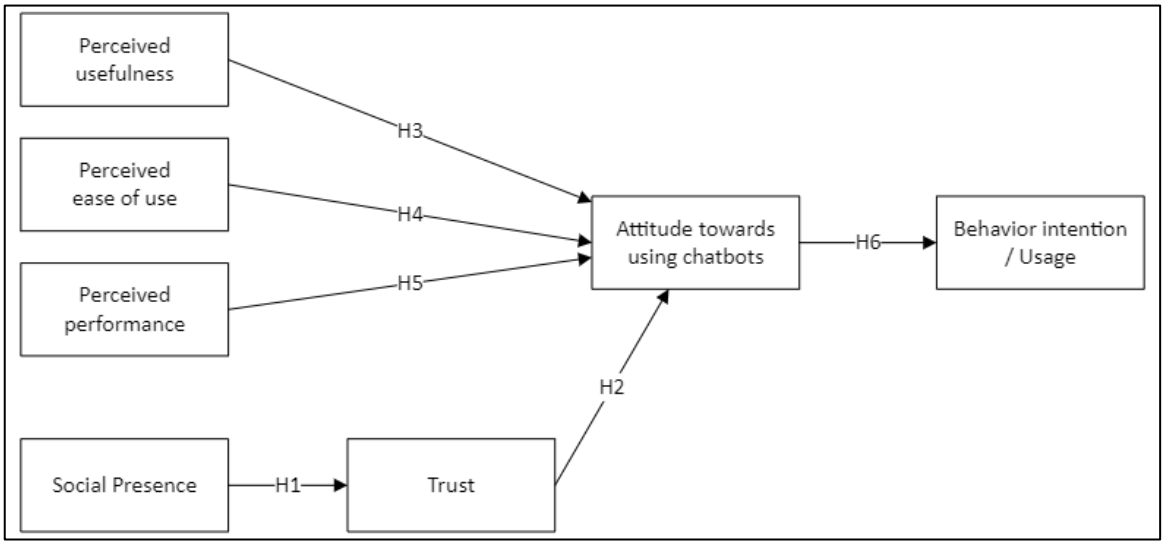

Figure 1.
Conceptual Model.

3. Methods

This research aims to explore the drivers of consumers' attitudes and intentions to use chatbots in customer service. Furthermore, the study examines the possible relationships between TAM model variables, perceived performance, social presence, trust, and attitudes towards the use of chatbots. Therefore, a quantitative survey research strategy is pursued, and a deductive approach is adopted. Smart PLS version 4 was utilized to analyze the data.

3.1. Data collection, Research Instrument, Scales and Measurement

As aforementioned, a quantitative research methodology has been pursued in this study, where a questionnaire has been disseminated to a sample of university students via social networks and email between April 2023 and June 2023. The

questionnaire, designed using Microsoft Forms, consists of a socio-demographic section including gender, age, educational level, employment status, frequency of using online shopping, and frequency of using chatbots. The second part of the questionnaire includes items that measure the following variables: social presence, trust in technology, "perceived usefulness," "perceived ease of use," "perceived performance," "attitude towards using" chatbots, and behavioral intention. To ensure the collection of responses of utmost validity, Section Two will be presented to participants exclusively if they confirm their prior engagement in online shopping and specifically if they indicate usage of chatbots in online shopping within the preceding Section One (See Appendix A). Furthermore, the main research participants' anonymity and confidentiality were respected. Participation was completely voluntary.

The measurement scales that are used in this study are derived from different empirical studies as described in the table below. The items were adapted and translated for the use of this study. To measure attitudes, five items were adapted from the study of Eeuwen [85]. Social presence was "measured using five items adapted from" [86]. Five items constructed by Cheriyan, et al. [87] were used to measure trust in technology. To measure perceived usefulness, items were adapted from Eeuwen [85]. As for perceived ease of use, "items were adapted from Cheriyan, et al. [87]. The perceived performance of chatbots was measured by using six items from Chan and Leung [88]. All items were measured using a "5-point Likert scale", where 1 is ("Strongly Disagree") and 5 is ("Strongly Agree").

3.2. Study Population and Sample Size

A purposive sampling method followed by a snowball technique was employed to select the participants of our study. Specifically, university students were chosen as the primary target group due to their familiarity with technology [89]. After initially selecting university students, participants were encouraged to refer individuals from their social networks who may similarly meet the criteria for participation. In total, 225 responses were collected. Table 1 summarizes the characteristics of the sample.

Table 1.
Sample characteristics.

Variable	Category	n	%
Respondent Gender	Male	148	66
	Female	77	34
	Less than 20	158	70
Respondent Age	20-35	58	26
	More than 35	9	4
	High school or lower	55	24
Level of education	Bachelors	72	32
	Diploma	53	24
	Higher education	45	20
	Full-time employed	46	20
	Part-time employed	11	5
Employment Status	Self-employed	21	9
	Unemployed	15	7
	Student	132	59

In terms of gender, 66% of the participants are male, while 34% are female. Notably, 70% of the participants belong to the 'Generation Z' category (born between 1997 and 2012), followed by 26% in the 'Millennials' or 'Generation Y' group (born from 1981 to 1996), and only 4% in the 'Generation X' category (born between 1965 and 1980). Regarding the educational level of the respondents, 24% of the participants have completed high school education or lower, 32% hold bachelor's degrees, 24% possess diplomas from higher education institutions, and 20% have pursued higher education. Furthermore, 20% are employed full-time, 5% work part-time, 9% are self-employed, 7% are currently unemployed, and a substantial 59% identify as students.

4. Analysiss

4.1. Common Method Bias

Using the same tools for measuring both independent and dependent variables can lead to systematic bias and distort the relationships between them [90]. To evaluate our model, we employed "partial least squares structural equation modeling (PLS-SEM)" and calculated variance inflation factors (VIF) to address potential common method bias and ensure reliable results. The VIF values obtained from the PLS-SEM algorithm were all below 3, indicating that common method bias does not significantly impact our model [91], as shown in Table 2.

4.2.Measurement Model

Table 2 presents the measurement loadings and reliability, illustrating the strength of the correlation between the observed variables and their corresponding measurement. Several items from the constructs A, SP, PEOU, PP, PU, and SP were removed due to low loadings. The remaining 24 items all have outer loadings above the recommended threshold of

0.708 [92], demonstrating a strong relation. Cronbach's alpha values exceed 0.6 for all constructs, meeting Nunnally's criteria for reliability. Furthermore, all average variance extracted (AVE) values are above 0.5, confirming convergent validity [92].

Table 2.
Outer loading and internal reliability.

Items	Loadings	Cronbach's alpha	CR	AVE
A1	0.871	0.843	0.847	0.761
A2	0.892			
A3	0.854			
BI1	0.911	0.824	0.854	0.739
BI2	0.781			
BI3	0.881			
PEOU1	0.766	0.732	0.741	0.651
PEOU3	0.845			
PEOU4	0.808			
PP3	0.791	0.827	0.827	0.659
PP4	0.852			
PP5	0.806			
PP6	0.798			
PT1	0.798	0.745	0.794	0.660
PT4	0.742			
PT5	0.890			
PU2	0.801	0.824	0.827	0.654
PU3	0.794			
PU4	0.817			
PU5	0.823			
SP1	0.764	0.763	0.769	0.583
SP2	0.808			
SP3	0.737			
SP4	0.753			

Discriminant validity, assessed using Fornell and Larcker's criterion [93], is listed in Table 3. The square root of each construct's AVE (the diagonal elements) exceeds its correlations with other constructs (the off-diagonal elements), demonstrating strong discriminant validity. This, along with the strong convergent validity, further supports the robustness of the measurement model [92].

Table 3.
Correlation matrix and discriminant validity.

	A	BI	PEOU	PP	PT	PU
BI	0.643					
PEOU	0.803	0.697				
PP	0.919	0.571	0.613			
PT	0.610	0.481	0.647	0.568		
PU	0.887	0.608	0.825	0.778	0.674	
SP	0.597	0.341	0.522	0.536	0.599	0.720

4.3. Structural Model

Figure 2 illustrates the R-squared values, which indicate the amount of variance in the dependent variables that can be explained by the independent variables.

The model accounts for approximately 72.2% of the variance in attitudes toward using chatbots. In contrast, the behavioral intention variable has a lower R-squared value of 0.30, suggesting that the model explains around 30% of its variance.

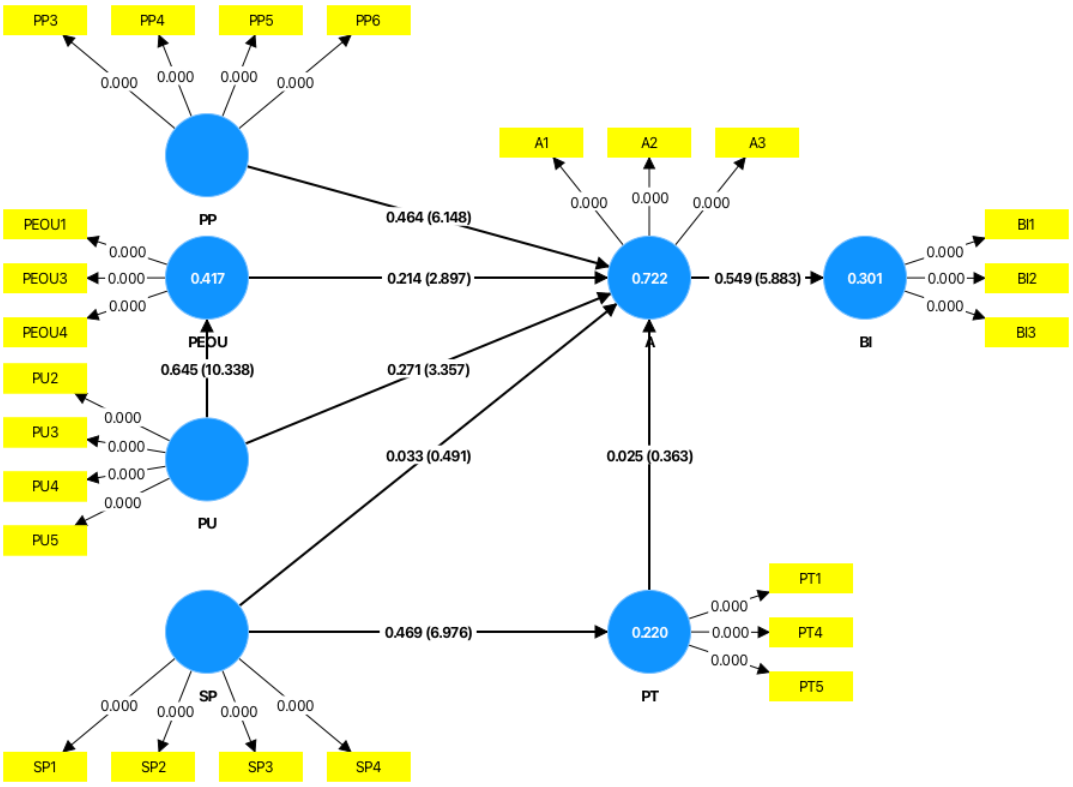

Figure 2.
PLS-SEM model.

PU explains 42% of the variance in Perceived Ease of Use (PEOU), while Social Presence (SP) accounts for 22% of the variance in Perceived Trust (PT). Table 4 and Figure 2 illustrate the relationships between the model constructs and their effects on attitudes toward chatbots. The significance of these relationships was determined using 5,000 bootstrap resamples and is indicated by the t-statistics and p-values. Low p-values (e.g., < 0.050) suggest statistically significant paths.

Table 4.
Direct and indirect paths hypotheses testing

		Based sample	Mean	St. Dev.	T	P
	Direct effect					
H1	SP -> A	0.033	0.027	0.066	0.491	*0.624*
H2	PT -> A	0.025	0.035	0.068	0.363	*0.716*
H3	PU -> A	0.271	0.269	0.081	3.357	0.001
H4	PEOU -> A	0.214	0.217	0.074	2.897	0.004
H5	PP -> A	0.464	0.464	0.076	6.148	0.000
H6	A -> BI	0.548	0.552	0.093	5.883	0.000
	Indirect effect					
H7	SP -> PT -> A	0.012	0.018	0.034	0.339	0.734

4.4. Direct Effect

Analyzing the research hypotheses presented in Table 4 offers valuable insights into the relationships between the variables. Most of the hypotheses were supported by the data, showing statistically significant relationships. However, hypotheses H1 and H2 were not supported. Specifically, the analysis revealed a strong and statistically significant positive association between the perceived usefulness of chatbots and attitudes towards chatbots ($\beta = 0.271$; $t = 3.357$; $p < 0.050$). This suggests that users who find chatbots useful tend to have a more positive attitude towards them. Similarly, perceived ease of use also showed a noteworthy positive association with attitude ($\beta = 0.214$; $t = 2.897$; $p < 0.050$), indicating that users who find chatbots easy to use also have a more positive attitude. Furthermore, perceived performance exhibited a significant and positive association with attitude ($\beta = 0.464$; $t = 6.148$; $p < 0.050$). This highlights the importance of chatbot performance in shaping user attitudes. A positive attitude towards chatbots, in turn, was found to be significantly and positively associated with behavioral intention ($\beta = 0.548$; $t = 5.883$; $p < 0.050$), suggesting that positive attitudes translate into stronger intentions to use chatbots.

Contrary to expectations, the analysis revealed no significant association between social presence and attitude towards chatbots in the context of social media marketing and brand equity ($\beta = 0.033$; $t = 0.491$; $p > 0.050$). This suggests that social presence may not be a strong driver of attitudes towards chatbots in this specific context. Similarly, the association between perceived trust and attitude towards chatbots was also not significant ($\beta = 0.025$; $t = 0.363$; $p > 0.050$), indicating that

perceived trust may not play a significant role in shaping attitudes. These findings led to the rejection of hypotheses H1 and H2.

Table 5 presents the variance inflation factor and f-square values, which provide insights into the quality of the relationships between the different factors in the model. High VIF values can indicate multicollinearity, which can affect the stability of regression estimates. In this study, all VIF values were below 3, suggesting that multicollinearity is not a significant issue. This reinforces the stability and reliability of the regression estimates [94]. The low VIF values indicate that the independent variables are not highly correlated, which strengthens the validity of the findings.

Table 5.
Effect size.

	VIF	f-square	Effect size
A -> BI	1.000	0.430	Large
PEOU -> A	1.819	0.091	Small
PP -> A	1.789	0.431	Large
PT -> A	1.605	0.001	Small
PU -> A	2.707	0.099	Small
SP -> A	1.582	0.002	Small
SP -> PT	1.000	0.281	Medium

The effect sizes of the relationships between variables were assessed using Cohen's f^2 measure [95]. The results indicate that only hypotheses H5 and H6 demonstrate a large effect size ($f^2 \geq 0.35$). This suggests that these relationships have a substantial impact and practical significance. The relationships between the proposed concepts and users' attitudes towards chatbots (H1, H2, H3, and H4) were found to have small effect sizes ($f^2 < 0.15$). This indicates that while these relationships are statistically significant, their practical impact may be less pronounced compared to H5 and H6. The remaining associations in the model exhibited medium effect sizes, suggesting a moderate practical impact. Overall, the study demonstrates a strong positive influence of behavioral intention on the attitude toward using chatbots. This implies that a user's intention to use a chatbot is a significant predictor of their attitude towards using it. The large effect sizes observed for H5 and H6 further underscore the importance of these relationships in understanding user attitudes and behaviors related to chatbots.

4.5. Indirect effect

One of the objectives of the study was to examine the mediating role of social presence within the conceptual model. Table 4 displays the total effects, direct effects, indirect (mediation) effects, and confidence intervals for these effects. The results related to hypothesis H7, which suggested that social presence mediates the relationship between perceived trust and attitude, indicate that this hypothesis was not supported. Specifically, the indirect effect of social presence on attitude through perceived trust was found to be non-significant ($\beta = 0.012$; $t = 0.339$; $p > 0.050$). This implies that social presence does not significantly mediate the relationship between perceived trust and attitudes toward chatbots. In other words, the influence of perceived trust on attitude remains largely unchanged by the presence of social elements.

5. Discussions

The current study aimed to explore the relationships between various factors that influence the attitudes and intentions of consumers regarding the utilization of chatbots in online transactions. The identified significant correlations between social presence, trust in technology, perceived usefulness, perceived ease of use, perceived performance, attitude, and behavioral intent offer valuable perspectives on the complex landscape of consumer perceptions and behaviors. One of our focal points was examining the connection between social presence and trust in chatbots. Through linear regression analyses, we confirmed our first hypothesis that the presence of a social touch positively influences the trust consumers place in chatbots. The result aligns with recent research [3, 96] and could be related to the importance that consumers attribute to human-like connections in enhancing the credibility of chatbot interactions. Interestingly, trust in technology, in disagreement with Kasilingam [97], was found to be influential in the attitudes towards chatbot use, thereby confirming our second hypothesis. Our results also show that the TAM variables influence the intention to use chatbots indirectly through developing attitudes, in agreement with Kasilingam [97]; Chocarro, et al. [98]; and Davis [64]; and others e.g. [72, 99, 100].

In this regard, chatbots need to demonstrate greater perceived usefulness compared to alternatives to encourage adoption. Additionally, enhancing consumers' attitudes toward the perceived usefulness of chatbots can increase their likelihood of adopting and approving them. Furthermore, trust mediated the relationship between social presence and attitudes. In other words, consumers would be willing to use chatbots only if they trust that it would serve them in a human-like way. The notion that AI's positive outcomes lead to consumer favorability [101] resonates with our finding that when consumers' perception of chatbots' performance is higher, their dispositions towards using it would be more positive. Therefore, our fifth hypothesis is also confirmed. Finally, the assertive relationship between attitudes and behavioral intent is once more confirmed in line with past research [46, 102, 103].

6. Conclusions, Implications, Limitations and Recommendations

By integrating the TAM model with variables including social presence, perceived performance, and trust, our research unveiled some of the drivers of attitudes and intentions to use chatbots among university students. Our research has asserted, once again, that AI presents new opportunities for conversational commerce, which involves initiating and completing transactions via chat interfaces like chatbots. This is especially relevant for millennials, as chatbots serve as an effective tool for interacting with online service providers [56, 104-106].

This study contributes to both academic research and business practice by validating existing theories related to technology adoption and consumer behavior, particularly in the context of chatbots. The findings support the Social Presence Theory, demonstrating that human-like interactions foster trust and shape consumer attitudes toward chatbot technology. Key constructs such as trust, perceived usefulness, ease of use, and behavioral intent are confirmed as critical in influencing consumer decisions. From a practical perspective, the study provides businesses with strategies to enhance chatbot experiences by improving usefulness, usability, and performance.

Nevertheless, this study does not come without limitations. Our sample consisted of students from one university in KRG, which most likely cannot be generalized to the whole university student population in KRG or in Iraq. Although our study has explored various variables' effects on attitudes and intentions to use chatbots, other variables such as ethical considerations, cross-cultural differences, and personalization can be explored in future research. Furthermore, future research can explore potential moderating factors, such as individual personality traits or prior technology adoption experiences, that may influence the relationships examined in this study.

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APPENDIX

Appendix A.
Study measures.

Variables	Items	References
Social Presence (SP)	SP1 There is a sense of human contact when interacting with chatbots.	Gefen and Straub [86]
	SP2 There is a sense of personalness in contacting with chatbots.	
	SP3 There is a sense of sociability in chatbots.	
	SP4 There is a sense of human warmth in chatbots.	
	SP5 There is a sense of human sensitivity in chatbots.	
Trust in Technology (TT)	TT1 I find chatbots in customer service credible.	Cheriyan, et al. [87]
	TT2 I do not think chatbots in customer service will act in a way that is disadvantageous to me.	
	TT3 I am sceptical of chatbots in customer service.	
	TT4 Chatbots appear to be misleading.	
	TT5 I feel confident in chatbots in customer service.	
Perceived usefulness (PU)	PU1 I think using chatbots would make it easier for me as a customer.	Eeuwen [85]
	PU2 I think using chatbots would make it easier for me to follow up on my orders.	
	PU3 I think using chatbots enables me to shop for products online more quickly.	
	PU4 I think using chatbots enables me to shop for products online more effectively.	
	PU5 I find chatbots very useful in customer service.	
Perceived ease of use (PEOU)	PEOU1 Chatbots of online shopping appear to be knowledgeable.	Cheriyan, et al. [87]
	PEOU2 The content of chatbots of online shopping is according to my expectation.	
	PEOU3 It is easy for me to learn how to use chatbots of online shopping.	
	PEOU4 My dialogue with chatbots of online shopping is clear and understandable.	
	PEUO5 Chatbots of online shopping are flexible to interact with.	
Perceived performance (PP)	PP1 Chatbots of online shopping respond rapidly.	Chan and Leung [88]
	PP2 Chatbots of online shopping respond accurately.	
	PP3 Chatbots of online shopping respond clearly.	
	PP4 Chatbots of online shopping respond naturally.	
	PP5 Chatbots of online shopping provide friendly responses.	
	PP6 Chatbots of online shopping respond humorously.	
Attitude towards using chatbots (A)	A1 Using chatbots for online shopping seems a good idea.	Eeuwen [85]
	A2 Chatbots make online shopping more interesting.	
	A3 Using a chatbot for online shopping seems fun.	
	A4 I would like online shopping with chatbots.	
Behaviour Intent (BI)	BI1 I intent to use chatbots for online shopping in the near future.	Eeuwen [85]
	BI2 I believe my interest in chatbots for online shopping will increase in the future.	
	BI3 I recommend others to use chatbots for online shopping.	