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Should a Chatbot Disclose Itself? Implications for an Online Conversational Retailer

Roberta De Cicco[12*], Susana Cristina Lima da Costa e Silva[3] and Riccardo Palumbo[12]

[1] Department of Neuroscience, Imaging and Clinical Sciences, University of Chieti-Pescara, Chieti, Italy
[2] CAST, Center for Advanced Studies and Technology, University of Chieti-Pescara, Chieti, Italy
[3] Católica Porto Business School – Universidade Católica Portuguesa, Porto, Portugal

Abstract. Today many consumers prefer interactions with companies via chat and instant messaging, however, although in most cases it is now a virtual agent to handle the interactions, many of them feel it would be eerie if a chatbot pretended to be human. The present study aims at disentangling this sort of ambivalence people have for chatbots through an investigation on how the explicit disclosure of the chatbot identity, before the interaction, influences consumers' perceptions. Specifically, this study compares the effects that the explicit disclosure of the chatbot identity has on social presence trust and users' attitudes toward the online retailer. Findings from an online experiment with 160 participants show that interacting with the chatbot whose identity has been primed through a disclosure leads to less perceived social presence, trust, and attitude toward the online retailer, compared to interacting with the chatbot whose identity has not been disclosed before the interaction. The study further analyses a causal chain among the variables, proving that social presence and trust mediate the relationship between the chatbot identity disclosure and the attitude toward the online retailer.

Keywords: Chatbot, Disclosure, Social Presence, Trust, Attitude toward the online retailer.

1 Introduction

The spread of digital services and digital marketing channels offer companies new opportunities to satisfy customers [4]. Among these channels, considerable interest has been addressed to conversational touchpoints. Today conversational systems in the form of chatbots have become a reality on social media and messaging apps [2]. Chatbots are programs that simulate human conversations through voice commands or text chats and serve as virtual assistants to users [25]. These systems are designed to carry out tasks as simple as sending airline tickets or as complex as giving health, financial, or shopping advice [2] depending on the resources invested in terms of artificial intelligence. Human-chatbot interactions usually take place within the context of the so-called "conversational marketing" that, among its multiple facets, in-

volves conversational commerce, which is messaging with consumers and allowing them to make purchases [41] over platforms like Facebook Messenger.

According to Hubspot, the main reasons for the spread of chatbots lies in the fact that they help consumers find solutions anywhere, anytime and with any device, and that with chatbots, users do not need to fill bottomless forms, cluttered inboxes and waste time searching and scrolling through content. Chatbots raise interest because they seem to express the future of user-provider interactions [22]. On a firm-level, they are increasingly applied for marketing purposes such as customer relationship management (CRM), pre and post-purchase support [33] and customer service [14], as they represent a potentially cost-effective solution offering between 15 – 90% cost reduction opportunity depending upon the characteristics of the functions selected for the automation [7]. Many market research companies that provide advice on the existing and potential impact of technology are ahead in expressing optimism toward the future of this technology. As reported by Gartner, over the next ten years, AI will be infused in most technologies. The main factors that will contribute to this trend will be the augmentation in computational power, big data, and the development of deep neural networks. It is expected that in the next years, Messenger users will be more often talking to chatbots than to a partner every day, and 25% of interactions between a client and a brand will not be based on direct contact with a human [12]. These expectations are supported by the quick projected growth of the chatbot market size from $250 million in 2017 to over $1.34 billion in 2024 [25].

More than 21% of U.S adults and over 80% of Generation Z use voice/text bots for information search and shopping [27]. Many brands such as American Eagle Outfitters and Domino's Pizza have turned to chatbots to take orders or recommend products, and major platforms such as Amazon, eBay, Facebook, and WeChat are starting to adopt chatbots for conversational commerce. Despite the potential benefits offered by chatbots, a key challenge this technology has to face is the potential customers' pushback. In fact, many people still feel uncomfortable talking and chatting with computer programs to reveal personal needs or purchase decisions [25]. Many companies adopting chatbots face the dilemma of whether disclosing the artificial nature of this channel to customers as, if doing so, companies might go through negative effects due to the perception of the bot as a less knowledgeable and empathetic entity [25]. In the future, however, disclosing the artificial identity of the bot may not be an option anymore. The California Consumer Protection Act (CCPA) has started inviting all companies using machine/AI bot in customer services to disclose the bot identity in the conversation.

In light of the above, a few questions arise: what are the implications for explicitly disclosing the artificial identity of the chatbot at the beginning of the interaction? Is transparency helpful or does users' resistance queen it over?

As suggested in a very recent work by Luo et al. [25], disclosing the artificial identity of the conversational agent can have a strong influence on consumers' overall perceptions. According to the authors, to be successful companies must understand whether, when, and how to best introduce the identity of the artificial agents to consumers. On this premise, our research sheds light on a promising topic in Human-Computer Interaction (HCI) and media psychology, that is the disclosure of the artifi-

cial nature in human-chatbot interaction. In so doing, the present work extends earlier research by analyzing the effects of disclosing the chatbot's identity on three crucial variables in online transactions that are social presence, trust, and attitude toward the online retailer. The study further disentangles the relationships among these variables by explicating a causal chain that identifies social presence and trust as serial mediators between the effect of chatbot identity disclosure on attitude toward the online retailer.

2 Theoretical Framework and Hypotheses Development

2.1 The Effect of Chatbot Disclosure on Social Presence, Trust and Attitude toward the Online Retailer

Humans and chatbots have different capabilities [37], consequently, humans differ in how they perceive the interaction and how they interact with a chatbot compared to another human [19]. This makes transparency in the nature and limitations of this technology somehow an important issue for academics and practitioners studying human-chatbot interactions. Some scholars argue that chatbots should be upfront about their machine status [28] because this is beneficial to limit users' expectations in the system and avoid negative implications from users failing to realize the limitations in chatbots. According to a recent study, however, there are some negative effects in disclosing artificial agents that seem to be driven by a subjective human perception against machines [25]. Studies show that people prefer replacement of human employees by other humans as opposed to by machines/robots/new technologies, which negatively influences their overall attitude towards AI [15] that can be defined as an evaluative response, including both cognitive and affective components [30]. Moreover, compared to trust towards humans, prior research has argued that people tend to have less trust towards AI by default, so, according to the definition of trust, less belief in the competence, dependability, and security of the system, under the condition of risk [21], which may partly be explained by the high media attention on instances in which AI went wrong [36].

A prejudice many people have is that chatbots lack personal feelings and empathy and are less trustworthy [10] and less pleasant [37] compared to humans. So, on the one hand, if companies decide to explicitly disclose the artificial agent identity, they might not gain the full business value of AI chatbots due to customer resistance [25]. On the other hand, however, customers should have the right to know whether it is a bot or a human that handles their communications because of moral and ethical concerns, especially if such differentiation leads to disagreeing perceptions and outcomes.

A recent study tested the causal impact of a voice-based bot disclosure on customer purchases and call length [25]. The results of the study show that when customers know the conversational partner is not a human, they are brusque, short the conversation length, and purchase less. Kim and Sundar [20] were among the first to argue that

if an agent is presumed to be operated by an artificial agent, users are more likely to evaluate the quality of the agent's performance based on their pre-existing perceptions, regardless of the agent's actual performance quality. In the years, other studies investigated the different perceptions users have when they chat – or believe they are chatting – with a human or rather with an artificial agent. These studies confirmed the preference for humans, even when the other (believed to be a human) is a bot [6, 31]. More specifically, Murgia et al. [31] found that a bot that answered users' questions on a social website was regarded more positively when posing as a human than when explicitly revealing its bot identity. In Corti and Gillespie [6], users were more likely to expend effort in making themselves understood when the agent's chat content was conveyed through a human than through an artificial text-based interface. Similarly, Sundar et al. [39] showed that participants were more willing to recommend a website to others when it provided a human chat agent compared to a chatbot agent, despite in both conditions the chatting protocol to communicate with all the participants was the same.

According to some authors [e.g. 2], perceptions about the conversational agent may be influenced by how the agent is introduced before the conversation.
Making users believe that they are engaging with a fully-autonomous agent when, in reality, the agent is human-controlled, or priming users to believe that they are engaging a real person when they are in reality interacting with an agent are common practices in experimental studies in HCI [6]. This priming effect was found to considerably influence subsequent general perceptions about the agent and, particularly, social presence, a construct at the heart of the HCI literature (Human-Computer Interaction) representing the "*degree of salience of the other person in the interaction*" [35 p. 65]. According to Etemad-Sajadi and Ghachem [8], social presence is particularly relevant in online business contexts because it creates the feeling of the employees' presence and improves the customer experience in a retail interaction.

From these premises, in line with past studies where the explicit disclosure of the artificial agent identity was shown to negatively affect users' perceptions of the interaction and the system, we expect that participants will perceive lower levels of social presence, trust and attitude toward the online retailer in the disclosed chatbot condition than in the undisclosed chatbot condition.

H1. *Users perceive lower levels of social presence in the online retailer when the chatbot identity is disclosed compared to when the chatbot identity is undisclosed.*

H2. *Users perceive lower levels of trust in the online retailer when the chatbot identity is disclosed compared to when the chatbot identity is undisclosed.*

H3. *Users perceive a less positive attitude toward the online retailer when the chatbot identity is disclosed compared to when the chatbot identity is undisclosed.*

2.2 Social Presence and Trust Mediate the Relation between Disclosure of Chatbot Identity and Attitude toward the Online Retailer

Social presence represents the feeling of being with another in a mediated environment [3]. This construct is of great value for the human-chatbot interaction, especially

in the business domain where it is found to be a positive predictor of trust and attitude not only when considering overall evaluations of the artificial agent [44] but also when evaluating outcomes related to e-service interactions [e.g. satisfaction with the service, 42] or the emotional connection with the company [**2**].

In the online environment, social presence is one of the most influential predictors of trust [32], which represents a crucial construct in online interactions because it influences a customer's willingness to accept the information provided and to follow suggestions [16]. Trust is often based on familiarity [24], hence, in order to reduce the social uncertainty in a new environment like that of conversational commerce, people may naturally seek peripheral cues that enhance their sense of familiarity. A higher perception of social presence in the interaction should help the user to experience more familiar elements compared to when the social presence perceived is low. In keeping with this, we believe that priming users with the notion of acting with artificial intelligence should increase eeriness and resistance due to pre-existing negative perceptions toward the artificial agent [20], thus enhancing the perceived ambiguity and decreasing the familiarity regarding the expected behaviours of the medium and the online retailer. The more are the uncertainty and ambiguity related to the conversational vendor system, the more trust should be hindered, while the opposite should occur when the chatbot identity is not explicitly disclosed.

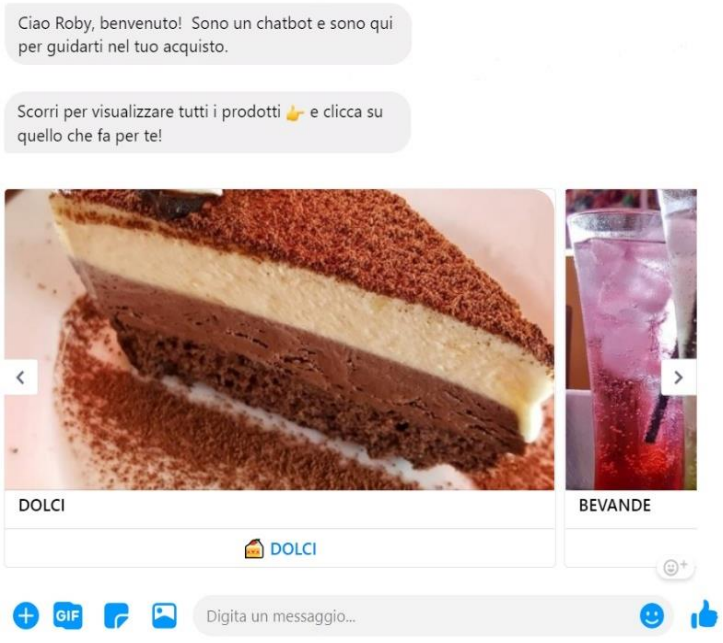
Previous research offered consistent and strong support for the effect of trust on the overall consumers' responses in terms of attitudinal experience with a system [40]. The attitude represents a valuable construct to be assessed in new forms of transactions (i.e conversational commerce) as it explains a significant amount of variation in consumers' patronage intention (i.e., the likelihood to use and recommend the service) [45]. Past studies relying on the Theory of Reasoned Action (TRA) [9] and Theory of Planned Behavior (TPB) [1] agree in defining trust as salient beliefs capable of influencing consumer attitudes [23]. This effect was confirmed in many studies investigating different technologies or business elements. In a study on Internet banking users, Suh and Han [38] found that trust positively affects customers' attitudes toward using e-commerce for trade transactions. Macintosh and Lockshin [26] showed that customers' trust in a store is positively related to their attitude toward the store, concluding that attitude is also a major component of loyalty. So, based on the evidence from past studies, we expect social presence to positively predict trust and, in turn, attitude to be positively influenced by trust. In few words we expect social presence and trust to serially mediate the relation between the chatbot identity disclosure and the attitude toward the online retailer.

H4. *Social presence and trust serially mediate the relation between the disclosure of the chatbot identity and attitude toward the online retailer.*

3 Research Method

3.1 Design, Experimental Procedure, and Measures

A single factor experimental design was adopted for the study. Participants were randomly assigned either to the group interacting with the chatbot whose identity was introduced by the disclosure "*you are going to try a conversational service provided by an artificial agent*" and explicitly reinforced with the bot itself ("*I am a chatbot*") or the group interacting with the chatbot whose artificial identity was not primed neither by the disclosure nor by the chatbot itself. The interaction in this case directly starts with the phrase "*Hi [Name], welcome! I am here to guide you through your purchase*". Aside from the first block of text where the chatbot presents itself as such (in the disclosure condition), the rest of the conversations (or rather the scripts) are exactly the same for both conditions. The interaction with the chatbot was designed to guide users through a set of products from which they had to choose. An example of chatbot interaction is displayed in Figure 1.



Translation: Hi Roby, welcome! I'm a chatbot and I am here to guide you through your purchase. Swipe left to view all the products and choose the one that better suits you!

Fig. 1. Example of human-chatbot interaction (identity disclosure condition)

An a priori analysis was conducted for sample size estimation (using GPower 3.1). With an alpha = .05 and power = .80, the projected minimum sample size needed to detect a medium effect size of 0.5 is n = 128 for a between-groups comparison (T-test: difference between two independent means).

We recruited participants through a snowball sampling by sharing the link on Facebook and inviting users to do the same with their contacts. The recruitment text briefly informed participants about the data collection and how it would be conducted, in addition to listing requirements for participation. The participants had to be at least 18 years and possess a Facebook account to interact with the chatbot. Participants' task was to look for food products and virtually buying the desired ones. Participation in the study was voluntary. According to the ethical standards of the 1964 Declaration of Helsinki, participants were informed about all relevant aspects of the study, e.g., institutional affiliations of the researcher, data protection and privacy (GDPR) before they became involved in the experiment. They were apprised of their right to refuse to participate in the study or to withdraw their consent to participate at any time during the study without fear of reprisal.

A total of 160 participants of Italian nationality took part in the study. Participants ranged from 18 to 45 years in age (M = 22.1, SD = 3.38), 59.4% of participants were women.

The questionnaire consisted of a first part designed to acquire demographic insights on the use of messaging apps and online purchases experience and a second part consisting of statements regarding the constructs.

As expected, respondents reported a daily use of messaging apps, as only 3.1% indicated to have no or very little use of messaging apps. The survey recorded the online purchasing behaviour of the respondents. Only 1.9% of them indicated they have never made online purchases. More specifically 88.1% declared to make online purchases between one and four times per month. At the end of the questionnaire, participants were asked if they had ever interacted with a chatbot to interact with companies and to make purchases. Overall, 89.4% have experienced interactions with chatbots, while only 24.4% of participants declared to have experienced an AI conversational chat-based retailer.

Previous research was reviewed to ensure that a comprehensive list of measures was included. The responses were recorded on a seven-point Likert scale (1 = "s*trongly disagree*"; 7 = "s*trongly agree*").

The measures for social presence was taken from Gefen and Straub [13] (five items, M = 3.86; SD = 1.53; Cronbach's alpha = .93), trust was assessed accordingly to Pengnate and Sarathy's [34] (four items, M = 5.00; SD = 1.24; Cronbach's alpha = .89), attitude toward the online retailer (four items, M = 4.82; SD = 1.42; Cronbach's alpha = .87) was measured accordingly to Moon and Kim [29]. The items are displayed in Table 1.

Table 1. Constructs' Items and Correlations

Constructs	**1**	**2**	**3**
1 Social presence			
There is a sense of human contact in the online retailer			
There is a sense of personalness in the online retailer			
There is a sense of sociability in the online retailer			
There is a sense of human warmth in the online retailer			
There is a sense of human sensitivity in the online retailer			
2 Trust	.50***		
I believe that the online retailer keeps its promises and commitments			
I trust the online retailer keeps customers' best interests in mind			
The online retailer is trustworthy			
The online retailer will not do anything to take advantage of its customers			
3 Attitude	.54***	.68***	
The online retailer is good			
The online retailer is wise			
The online retailer is pleasant			
The online retailer is positive			

Note: *** p < .001

4 Results

First of all, we run a bivariate Pearson correlation analysis to examine the relationship between the key variables (Table 1). As expected, results show that social presence was positively associated with trust (b = .50 $p < .001$) and attitude toward the online retailer (b = .54 $p < .001$). Trust was also positively related to attitude toward the online retailer (b = .68 $p < .001$). To test for H1, H2, and H3 we relied on a normal-model based ANOVA. Specifically, we performed three ANCOVAs controlling for age, gender, past experience with chatbot and awareness of the artificial nature of the system (these two questions were asked at the very end of the questionnaire as not to interfere with the overall responses) adjusting the p-values for Bonferroni significance tests for pairwise comparisons. In line with H1, the analysis revealed a significant main effect of chatbot identity disclosure on social presence ($F(1, 156) = 7.836$, $p < .01$, partial $\eta 2 = .05$), indicating that participants reported lower social presence in the disclosed chatbot identity condition than in the undisclosed chatbot identity condition. In line with H2, the analysis showed a significant effect of chatbot identity disclosure

on trust ($F(1, 156) = 5.720$, $p < .05$, partial $\eta 2 = .04$), indicating that participants reported lower trust in the disclosed chatbot identity condition than in the undisclosed chatbot identity condition. Finally, in line with H3, the analysis revealed a significant main effect of chatbot identity disclosure on attitude toward the online retailer ($F(1,156) = 23.181$, $p < .001$, partial $\eta 2 = .13$), indicating that participants reported lower attitude toward the online retailer in the disclosed chatbot identity condition than in the undisclosed chatbot identity condition. Means and Standard Deviations for the disclosure conditions are reported in Table 2.

Table 2. Means and Standard Deviations for the chatbot disclosure conditions

Construct	Chatbot identity disclosed	Chatbot identity undisclosed	p-value
Social presence	3.57 (1.46)	4.18 (1.59)	$p < .01$
Trust	4.82 (1.31)	5.26 (1.16)	$p < .05$
Attitude twd the online retailer	4.35 (1.29)	5.34 (1.39)	$p < .001$

4.1 Mediation Analysis

We expected that social presence and trust would mediate the relationship between chatbot identity disclosure and attitude toward the online retailer (H4). To examine this hypothesis, we relied on PROCESS, the SPSS macro developed by Hayes and Preacher [17], a method that employs observed variable OLS regression path analysis and allows for the estimation of direct and indirect effects of multiple mediators. We used model 6 with 5000 bootstrapping resamples to compute 95% confidence intervals, knowing that confidence intervals that do not contain zero denote statistically significant indirect effects. We examined the mediation model with chatbot identity disclosure (-1 = disclosed; 1 undisclosed) as predictor. The overall equation was significant ($R^2 = .55$, $F(3, 156) = 63.49$, $p < .001$), confirming that social presence and trust are serial mediators between chatbot identity disclosure and attitude toward the online retailer. In line with H4, the results show the hypothesized causal chain is significant ($b = .07$, confidence interval [95% CI] = [.0135, .1459]). As displayed in Figure 2, when the chatbot identity is undisclosed, social presence increases ($\beta = .30$, $p < .05$) and has a positive influence on trust ($\beta = .49$, $p < .001$), which in turn, positively predicts attitude toward using the online retailer ($\beta = .57$, $p < .001$). We found that the remaining direct effect of chatbot identity disclosure on attitude toward the online retailer was still significant ($\beta = .23$, $p < .001$) thus, suggesting a partially mediated effect. Table 3 reports direct and indirect effects of chatbot identity disclosure.

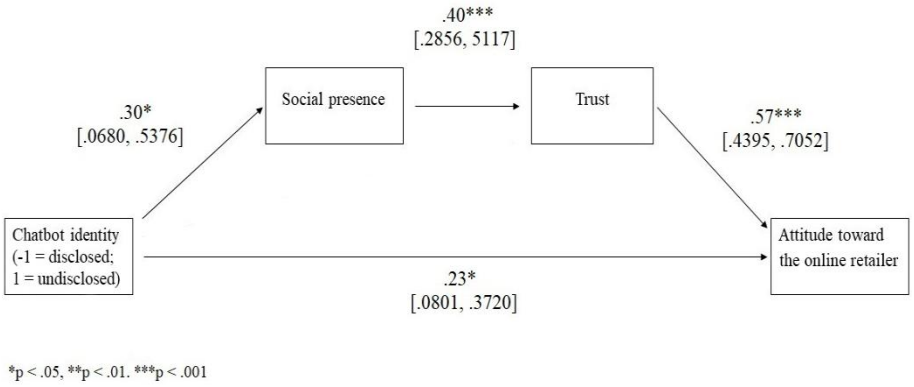


Fig. 2. Mediation model with values indicating unstandardized path coefficients.

Table 3. Other direct and indirect effects

Chatbot Identity (CI): disclosed vs. undisclosed

N = 160

	b (SE)	Lower 95% BCBCI	Upper 95% BCBCI
Direct effects			
SP → Trust	.40 (.06)	.2856	.5117
SP → Attitude	.26 (.06)	.1442	.3753
Trust → Attitude	.54 (.07)	.4006	.6823
Indirect effects			
CI → SP → Trust	-.12 (.05)	-.2350	-.0265
CI → SP → Attitude	-.08 (.04)	-.1555	-.0156
CI → Trust → Attitude	-.06^{ns} (.05)	-.1540	.0375
SP → Trust → Attitude	.23 (.05)	.1398	.3491
CI → SP → Trust → Attitude	.06 (.03)	.1395	.0119

Note. Unstandardized *b* coefficients (with *boot SE* between parentheses). BCBCI = bias corrected 5,000 bootstrap confidence intervals.
^{ns} = not significant.

5 Discussions, Implications and Future Studies

Many customers in the world retain that chatbots can offer great value for their quickness, personalization, and entertainment, but despite this, still few academic studies confirmed the possibility of using chatbots as a means of securing new customers and launching new services such as conversational commerce [18].

Although few studies show important insights on users' behavior and experiences with chatbots, little is known about how online retailers leveraged by artificial agents are perceived and what variables determine chatbots' effectiveness [45]. In this perspective, the present study enriches literature in HCI and more specifically in human-chatbot interaction for business purposes. The main caveat of the study concerns the disclosure of artificial agents' identity, a timely and managerially relevant topic since regulators are increasingly concerned about customer privacy protection and transparency and that the Federal Trade Commission (FTC) itself has already started encouraging companies to be transparent on chatbot applications during customer communications [11]. This study aimed to provide useful implications on the effects of such transparency on chatbots applied for conversational commerce to give a substantial contribution to the literature investigating chatbots for business purposes. This objective has been pursued through an experimental study testing the effects that the disclosure of the chatbot identity has on social presence, trust, and attitude toward the online retailer. In so doing, this study provides a basis for understanding the implications that priming users with an explicit disclosure of the chatbot identity has for the business.

This study extends early research on HCI and more specifically on the effect of priming participants with a disclosure indicating the artificial nature of the system. The first key result of the study suggests that, in line with Araujo [2], priming consumers with a specific frame introducing the conversational online retailer has a significant impact on users' perceptions. Keeping with Luo et al. [25], where disclosing the chatbot identity at the beginning of the call causes worse results when it comes to perceiving the system as being sociable and warm, our results show that priming participants with the notion of interacting with a company's artificial agent reduces their perceptions of social presence, trust and overall attitude toward using the online retailer. The most reasonable explanation for these findings is probably due to the prejudice people have developed toward chatbots in terms of expectations, lack of personal feeling, and empathy [25], which is recalled after priming users of the artificial nature of the system.

In line with earlier research on artificial agents [31, 6], this study confirms the preference for a non-artificial interface, further translating this preference in terms of social presence, trust, and attitude. The study also addresses the role of social presence and trust as serial mediators in the relation between the chatbot identity disclosure and the attitude toward the online retailer. The mediation hypothesis was supported, thus confirming the centrality of social presence and trust, for assessing the users' overall feelings toward the online retailer. The causal chain underlines that when users interact with a chatbot whose identity is explicitly disclosed (compared to

when it is not disclosed), they perceive a lower degree of social presence, which induces less trust and less positive attitude toward the online retailer.

In light of the results of this study, we expect that practitioners should be aware of the consequences of disclosing artificial agents' identity and start focusing on how to best disclose chatbots.

Due to the increasing ability of chatbots to be humanized to such an extent that customers may not realize the machine identity in the conversation, major concerns about customer privacy protection and business ethics are rising. In view of this, it cannot be excluded that in near-future new government policy regarding the machine identity disclosure in chat conversations may become the norm. In this perspective, our results represent interesting insights that highlight the necessity to find ways to mitigate the negative effect of chatbot identity disclosure. With this in mind, practitioners will need to identify new cues that could positively affect social outcomes [5]. In the same way, we believe just as important that the chatbot identity disclosure was not to represent a limit but rather to act as a lever. As an example, a clear communication aligned to the user in terms of conversational cues (e.g. tone of voice) could help in strengthening the users' experience and limit skepticism and mistrust. Similarly, a clear communication on the actual capability on what the chatbot can do or cannot do for the user could help meeting the consumers' expectations and increase the level of social presence and trust in the interaction.

The present research may undergo possible improvements that call for future studies. The majority of participants (93.8%), regardless of the condition they were exposed to (disclosure vs not disclosure), declared to be aware of the artificial nature of the online retailer. Such insight is very important because it highlights that the simple priming effect derived by the explicit disclosure of the artificial agent's identity can activate different and not always positive associations among various consumers [43]. In this perspective, future works may consider proving how different text disclosures - for example in terms of communication style or timing (before, during, and after the interaction) -, impact consumers' attitudes. Future research may look for effects within different framings in the introduction of the chatbot. For instance, in order to limit users' mistrust, future studies might consider chatbots that introduce themselves by briefly illustrating the technological benefits they offer, such as reducing customer costs in terms of less time to waste waiting for the answers. Moreover, new relevant constructs could be examined in a more detailed model using real company data, or rather it would be interesting for future research to extend similar data collections to markets where the levels of digital technology uptake are different.

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