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# Anthropomorphic service recovery: the panacea following service failure of automated CSAs

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**Orientation:** Automated customer service agents (CSAs) are not mere tools but social interaction entities with anthropomorphic traits capable of predicting consumer responses following unique online service failures scenarios.

**Research purpose:** The study advances the discourse in how automated CSAs can seem more human, with acute understanding of shopper experiences. Thus, anthropomorphism remains an ineluctable ingredient preceding the alteration of shoppers' trustworthiness perceptions via forgiveness.

**Motivation for the study:** Selected anthropomorphic traits of automated CSAs could make shoppers personify these agents as endowed with human qualities such as humour and response empathy, thereby enhancing the trustworthiness of non-human computer social actors.

**Research design, approach and method:** A scenario-based quantitative survey was distributed as a hyperlink, yielding 287 valid participants.

**Main findings:** The SEM-PLS analysis demonstrated good model fit. The findings showed a significant effect between empathy and anthropomorphism with perceived trustworthiness. In addition, anthropomorphic CSAs provide a trust shield effect, reducing the loss of trust following a service failure. Consequently, shoppers are more willing to forgive the online retailer.

**Practical/managerial implications:** The findings of this study could shape customers' response mechanisms during failed interactions with automated CSAs, offering salient insights to adequately address service failures while tapping into the judicious utilisation of human-robot collaboration opportunities.

**Contribution/value-add:** The study provides initial lenses for considering the social acting nature of automated CSAs. The positionality in this paper is that during a online service failure, humans pardon and are more trusting of a technological service agent that demonstrates anthropomorphic and humanist attributes.

**Keywords:** anthropomorphism; automated customer service agent; empathy; humour; service failure; perceived trustworthiness.



## Introduction

### Background

Thorbjørnsen et al. (2002:19) define interactive marketing as 'an iterative dialogue where individual consumers' needs and desires are uncovered, modified and satisfied to the highest degree possible'. In this respect, digital conversational assistants have tremendous potential to boost customer engagement, an essential metric in marketing responsible for raised conversions and revenue (Kaczorowska-Spychalska 2019). According to Lekaviciute, Auruskeviciene and Reardon (2023), the inherent conversational nature of chatbots lends them to be consistently acknowledged as an effective marketing instrument for developing and nurturing business–customer relationships. While automated customer service agents (CSAs) excel in handling simple routine requests from customers (Chaves & Gerosa 2018), they are somewhat limited when attempting to handle complex and nuanced scenarios, often yielding instances of online service failure.

### Problem statement

Imbuing conversational CSAs with anthropomorphic traits enhances communication and assists in cultivating social and emotional bonds with customers (Araujo 2018; Chaves & Gerosa 2018).

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Such interactions with a human-like CSA are likely to foster favourable perceptions towards both the conversational agent and the brand that it represents (Araujo 2018). Be that as it may, conversational agents are not human, they are not even pretending to be human; save for the fact that they only behave human-like rather than as humans (Lutz 2023). However, the customers through interaction tend to perceive them as social actors, which somewhat yields unsettling sensations and higher expectations. In this respect, the literature is awash with studies that seek to focus on improving the design of automated CSAs to enhance their functional precision (e.g. Touré-Tillery & McGill 2015). While this is so, Jain et al. (2023) as well as Njeguš (2021) concede that conversational CSAs such chatbots should incorporate social capabilities. Furthermore, Neururer et al. (2018) highlight the fact that the process of enhancing the likeability of a conversational agent is a social issue, not fundamentally a social matter, rather than a technological one. Thus, the problem remains in determining which of those social qualities are essential for enhancing the communication and social abilities of conversational CSAs. The aforementioned problem is prominent when the use of automated conversational agents by shoppers is low, in a case of service failure, where an even darker side (potential negative effect) of conversational agents is portrayed that could result in customer aggression (Huang & Dootson 2022).

Scholars such as Frank and Otterbring (2023) and Adam, Wessel and Benlian (2021) have identified the necessary qualities an Artificial Intelligence (AI)-based front-line employee requires to serve customers at the same level as human employees. Be that as it may, service failure research documents that the recovery programmes used to recoup a failed service experience involving online shoppers and automated CSAs have an influential effect on the psychological perceptions of bot users (e.g. Song et al. 2023).

This study seeks to advance the discourse on how automated CSAs can seem more human, while demonstrating anthropomorphic characteristics. Such an understanding affects shopper experiences and yet remains an ineluctable ingredient to deliver an alteration in shoppers' trustworthiness perceptions via forgiveness.

### Research objectives

This study comes in response to urges made by service scholars such as Song et al. (2023) to address the knowledge deficiency in the literature by investigating the role of conversational agents in service failure and recovery. The study has two objectives: Firstly, to explore the anthropomorphised traits of automated CSAs (empathy and humour). Secondly, to explore the mediating role of trustworthiness and anthropomorphism on customer forgiveness, of which the latter is considered a calculated response to the marketer's efforts in service recovery.

This article is structured such that it commences with a concise background section, which introduces the study context, whereas the article proceeds to outline the research gaps via problematisation and identification of clear lines of inquiry with which to pursue the study objectives. Thereafter, a comprehensive review of the literature is presented to elucidate the study suppositions. In the review, the computers as social actors (CASA) theory is explained, followed by the supporting literature for the formulated hypotheses. This is followed by research design and methodology, methods and sampling procedures, data analysis and presentation of results. Finally, the conclusions drawn from the study are outlined, whereas the limitations yielding avenues for future research are discussed.

## Literature review

While they may be attributed with human-like names (Boldi et al. 2023) automated CSAs are not infallible. Scenarios of interactive service failure might include the limited ability to understand the customer's tone of voice, accent and other emotional nuances during communication. For example, when a customer attempts to address a credit card billing query to finalise a purchase order, hurriedly they might encounter generic replies from the automated CSA, which might yield feelings of excessive irritation and discontent. Another usual problem is the absence of empathy and politeness in the reply. For example, upon attempting to report a possible fraudulent encounter on their mobile banking application, the programmed response from the automated CSA might seem to lack co-operation and sympathy. The documented failures of CSAs underscore the constraints of using automated CSAs, where the absence of personalisation and profound understanding of the customer's tone can deepen dissatisfaction.

### Outcomes of service failure

Casidy and Shin (2015) allude to the adverse reactions to a service failure, which comprise overt behaviours such as taking revenge against brands and/or disseminating negative word-of-mouth (nWOM). The scholars notice that such responses harm a firm's brand image. It is thus vital to understand these post-failure reactions of consumers in the technology context, where chatbots are responsible for service recovery. While it could be a significant gain for marketers if consumers forgive a brand for service failure and diminish their propensity to spread nWOM, research is silent on the chatbot traits that render them effective in managing online service failure recovery.

### Computers as social actors theory

The idea put forward by Nass and Moon (2000:93) denotes Computers as Social Actors (CASA), implying their anthropomorphistic nature. This implies that users are able to reflect on the human-like attributes of the automated agent during a social interaction, thereby inferring a more mindful psychological process (Adolphs 2010; Boldi et al. 2023). It is this latter school of thought that is adopted in this study, further drawing from the central tenets of the theory of reasoned action.

## The computers as social actors theory and anthropomorphic traits of automated customer service agents

If automated CSAs could resemble humans and reflect empathy in their wording of text, they, as per CASA, are more likely to be viewed as social actors (Pelau, Dabija & Ene 2021). Consequently, anthropomorphic conversational agents with an empathic and amusing communication style are likely to enhance consumers' favourable reactions towards the retailer following a service failure. Nonetheless, while chatbots may be regarded as social entities because of their conversation and normative appearance, consumers still acknowledge that they are, in fact, machines. Consequently, they remain apprehensive about declaring their personal information during interactions with automated CSAs. Thus, it is found that the three attributes comprising empathy, anthropomorphism and privacy concerns predict users' perceived trustworthiness of automated CSAs. More so, perceived trustworthiness is likely to be conceived in instances where the consumer believes that an automated CSA has full clarity about the service failure and has taken sufficient service recovery steps, to a point, which serves to alleviate any prevailing negative emotions.

### Empathy

Customers are somewhat reluctant to interact with automated CSAs as the personal touch could be lacking. Furthermore, the inevitable risks of economic loss, time loss as well as the inconvenience encountered during a service failure together propagates the innate desire to interact with an empathetic automated CSA who understands the extent of the loss, of which such expression would be easily projected by a human agent (Nguyen et al. 2023).

**$H_1$:** The positive effect of empathy on trustworthiness of automated CSAs is mediated by perceived anthropomorphism.

### Humour

In human-to-human interactions, humour can be spontaneous yet instrumental in regulating a conversation and more so, in negotiating a service recovery process. Humour allows criticism to be smoothened and also acts as a stress-reliever. Humour can also help with reducing consumer frustration. According to Lekaviciute et al. (2023), in commercial settings, humour can be useful in inducing customer trust. Chaves and Gerosa (2018) uphold that by integrating humour into the design of automated CSAs, retailers could deliver engaging and memorable experiences for customers. Therefore, it is conceivable that humour, an exceptionally humanistic trait, could enhance users' connections to and the ultimate trustworthiness of the automated. Thus:

**$H_2$:** The positive effect of humour on trustworthiness of automated CSAs is mediated by perceived anthropomorphism.

### Anthropomorphism

Nass and Moon (2000:93) contrast mindlessness, which is 'considered an automatic, involuntary and spontaneous psychological process' with anthropomorphism, which is perceived as the 'thoughtful, sincere beliefs that the object has human characteristics'. In other words, whereas mindlessness is driven by reflexive and habitual behaviours, anthropomorphism requires carefully engaged thought. As per Adolphs (2010), anthropomorphism implies a more deliberate psychological process that involves iterative reflection on actions taken. Likewise, Epley, Waytz and Cacioppo (2007) (as cited in Van Pinxteren et al. 2020:206) define anthropomorphism as 'the process whereby individuals attribute humans' mental or emotional activities to non-human agents to interpret their actions'. In this vein, previous research has attempted to determine whether mindlessness or anthropomorphism drive users' social responses to technologies (Kim & Sundar 2012; Lee & Oh 2021), yielding inconclusive findings, which steered the course of the study.

## Trustworthiness following an anthropomorphised service recovery effort

McKnight, Choudhury and Kacmar (2002) provided an influential model of interpersonal trust, which was based on three dimensions. According to this conceptualisation, perceptions about competence, integrity and benevolence determine the initial trust level. In the case of examining the trustworthiness of technology, Lankton, McKnight and Tripp (2015) assert that technology must fulfil three criteria; namely, perceived ability (competence), benevolence and integrity. Perceived ability suggests that a client evaluates whether technology delivers the promised performance (McKnight et al. 2002). This dimension denotes a trustor's assessment of a trustee's specialised knowledge and capability to effectively achieve the intended functional result (Mayer, Davis & Schoorman 1995). For instance, the capability of an automated CSA to address an online shopping inquiry would be regarded as fulfilling the initial commitment made. On the other hand, the benevolent aspect of trustworthiness indicates the degree to which the trustee is viewed as consistently prioritising the trustor's interests (Bhattacherjee 2002). This aligns with individuals' expectations that the automated CSA is sufficiently attentive to assist with the accomplishment of the shopping task. More precisely, users anticipate that a technology's assistance feature will provide the requisite information to resolve their shopping queries (McKnight et al. 2002). Finally, the integrity dimension embodies the ethical component of trustworthiness reflected in the way the automated CSA maintains performance consistency. Of note, ensuring predictability (with evidence of executing commands in response to user inputs) in instances of service breakdowns could shape customers' perceptions of the integrity of automated CSAs.

Drawing from the CASA theory, adding human-like characteristics and appearance during service failure encounters could enhance customer impressions of automated CSAs, portraying these agents as empathetic problem solvers rather than merely programmed entities

(Polakow et al. 2022). Consequently, humanistic design will lead consumers to perceive automated CSAs as equally trustworthy and capable (or better) of addressing service faults, much akin to human agents. Thus:

**$H_3$:** An anthropomorphised service recovery effort by an automated CSA yields perceptions of trustworthiness by shoppers.

### Forgiveness following an anthropomorphised service recovery effort

Once consumers encounter service failure, their emotional state changes. In this instance, a myriad of factors come into play in influencing how they manage disappointment. On the one hand, researchers have pointed to reliance on religiosity and spirituality, when determining the propensity to pardon and acquit a retailer for their service failures (Tsarenko & Tojib 2011). On the other hand, reciprocated firm-level strategies such as seeking forgiveness, amplifying consumer voices and providing compensation during a service failure increase consumers' likelihood of forgiving the firm (Harrison-Walker 2019). Casidy and Shin (2015) also point to the role of perceived justice in explaining consumers' readiness to forgive a company following service failures, including efforts by the organisation to offer apologies and compensation.

The significance of forgiveness is moot in the case of a minor service failure, where customer anger and the desire for retribution are initially minimal or where a weak customer relationship exists. Likewise, the forgiveness attribute remains immaterial where an organisation has proactively established an acceptable recovery strategy. However, in cases where the service failure has a significant bearing on the personal comfort of the customer, a forgiving disposition becomes more salient. Fetscherin and Sampedro (2019) describe forgiveness as 'letting negative emotions waive off, resulting from the wrongdoing of oneself, others, or situations'. In moments of service failures, forgiving aids customers in restoring psychological equilibrium, enabling them to participate in constructive interactions with the retailer, through the automated CSA (Tsarenko & Tojib 2011). Consequently, forgiveness can serve as a basis for restoring broken relationships with the offending brand or organisation (Xie & Peng 2009). For example, acts of apologising, accepting blame, providing a candid explanation and providing an alternative recovery action plan are all tactics for promoting positive assessments of interactional justice (Jung & Seock 2017). Consequently, retailers are expected to continue to identify anthropomorphised cues and responses by automated CSAs, which promote customer forgiveness following a service failure.

**$H_4$:** An anthropomorphised service recovery effort by an automated CSA yields acts of forgiveness by shoppers.

### The relationship between perceived trustworthiness and forgiveness

Customers' willingness to forgive a brand for service failure is critical. The customers' propensity to forgive a brand for service failures is a significant matter. This is because customers may occasionally overlook a company's service failures because of perceived trustworthiness, even when the service recovery does not meet expectations. Customers have a propensity to forgive a service failure when they believe that the service provider has made genuine steps to rectify the issue, perceiving the agent as compassionate and committed in their resolution attempts (Polakow et al. 2022). Consequently, a consumer may be more inclined to forgive the retailer for service deficiencies. On the other hand, if an automated CSA fails to meet expectations in resolving a service issue, trust is likely to be broken.

**$H_5$:** The positive effect of anthropomorphism on forgiveness is mediated by shopper's perceptions of trustworthiness of automated CSAs.

## Research methodology

The study applied a scenario-based approach, which is popular among studies related to service failure and recovery inspired by the exceptional works of Park and Ha (2016) as well as Singh and Crisafulli (2015). A scenario-based approach was deemed superior when compared to recall-based or retrospective-reporting approaches because of their inherent robustness and lack of sensitivity to memory lapses and rationalisation tendency. Furthermore, a scenario-based approach is less time-consuming and also less prone to ethical and managerial challenges, when juxtaposed with enacting a service failure scenario that is linked with an existing organisation. Initially, exploratory research with 47 advanced diploma students (19 male; 28 female) was conducted to test the content validity of the measuring instrument. The test assisted in determining the sector where service failure by automated CSAs is prevalent, namely online retail shopping for fashion (hedonic) merchandise. An online survey (Figure 1) was administered using Google Docs. In the scenario, a shopper was experiencing a service failure as their ordered item [low-end sneakers] was not delivered as per the stipulated delivery date by Rai.com, a fictitious e-retailer. Thabo, the automated CSA of Rai.com, initially sought to comprehend the failing issue encountered by the consumer. Thabo expressed regret for the inconvenience that had been caused by the failed delivery by exclaiming 'Oopsie Daisy' and immediately stating that there was an inventory miscount on the online store. Rai.com tracked a store with inventory and offered an alternate store for a collection of the same item that had been purchased online, including free delivery with a free shoe polish gift. The customer consented to a revised delivery date and time that was now proposed by Thabo.

### Target population

The target population was restricted to participants between the ages of 18 and 60 years old, with access to the survey link using WhatsApp and other social media distribution pages. Because of time constraints and budgetary considerations, a sample size of 300 respondents was

**NB: You are requested to answer all the remaining questions in this survey based on the scenario described here.**

**Survey Scenario: Thabo the Chatbot Assists Shopper Z**

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**Scenario Description:**

Shopper Z ordered a pair of low-end sneakers from Rai.com, a well-known e-retailer. The sneakers were supposed to be delivered by a certain date, but unfortunately, the delivery was delayed. Shopper Z decided to reach out to Rai.com's customer service and was greeted by Thabo, the friendly chatbot.

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**Shopper Z interacts with Thabo the Chatbot**

**Shopper Z:** Hi, I ordered a pair of sneakers, but they haven't been delivered yet.

**Thabo:** Hello! I'm Thabo. Let me help you with that. Could you please provide your order number?

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**Thabo the Chatbot identifies the issue**

.....Thabo reviewing the order details on a virtual screen

**Thabo the Chatbot:** Oopsie Daisy! It looks like there was an inventory miscount on our online store, and your sneakers are out of stock. I am really sorry for the inconvenience.

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**Thabo offers a solution**

**Thabo the Chatbot:** We have tracked down a store that has your sneakers in stock. Would you prefer to pick them up from the store or have them delivered to your address? We can offer free delivery and include a complimentary shoe polish gift for the trouble.

**Shopper Z:** I would prefer home delivery, please.

**Thabo the Chatbot:** Great! We'll arrange for the sneakers to be delivered to your address at no extra charge. Can you please confirm an alternate delivery date and time that works for you?

**Shopper Z:** Tomorrow at 4 PM would be perfect.

**Thabo the Chatbot:** Your delivery is scheduled for tomorrow at 4 PM. Thank you for your understanding. Have a great day!

**FIGURE 1:** Survey scenario for automated CSA Thabo at Rai.com.

deemed adequate for the study. Furthermore, Malhotra, Nunan and Birks (2017) advise that a minimum sample size of 300 respondents be considered if multivariate statistical analysis will be applied. Purposive sampling was applied by targeting those individuals with previous experience and understanding of interacting with an automated CSA. Of the 300 responses received only 287 were usable. A total of 13 submissions were discarded owing to straight-lining effects.

## Measures

The constructs for this research were operationalised using multi-item scales adapted from earlier published works, as shown in Table 1. The language used in the measuring instrument underwent additional modifications to align with the context of the study.

A five-item scale used in a study by Croes and Antheunis (2021) was adopted to measure perceived empathy whereas the three-item humour scale was adapted from Cline, Altsech and Kellaris (2003). These two constructs were anchored along seven-point Likert scales, with the lowest anchor (1) denoting the strongly disagree response, whereas the highest anchor (7) denotes the strongly agree response. On the other hand, the perceived anthropomorphism of automated CSAs was assessed by requesting participants to evaluate four adjectives: likeable, sociable, friendly and personal, using a seven-point scale from '1' (describes very poorly) to '7' (describes very well), following the guidelines by Araujo (2018) as well as Kim and Sundar (2012).

Perceived trustworthiness was measured using a six-item scale by McKnight et al. (2002). The consumer forgiveness scale is composed of two subscales, with one that measures the absence of negative responses, featuring six items and another subscale that assesses the presence of positive responses, also consisting of six items. The current investigation revealed a positive and significant relationship (0.442; $p < 0.001$) between both subscales, aligning with existing literature on forgiveness (Harrison-Walker 2019). Interestingly, the scholar clearly states that the two sub-components of forgiveness are 'intertwined and therefore inseparable' (p. 382), suggesting that future studies should be undertaken to enable a more comprehensive analysis using the scale in its entirety rather than treating it as two separate constructs. A seven-point Likert scale with '1' representing strong disagreement and '7' indicating strong

**TABLE 1:** Confirmatory factor analysis (CFA) results.

| Descriptors | | Descriptive statistics | | | | Reliability statistics | | Convergent validity statistics | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Construct** | **Item wording** | **Mean** | ***SD*** | **Skewness** | **Kurtosis** | **Outer loadings** | **Cronbach's alpha coefficient ($\alpha$)** | **Composite reliability (RHO _c)** | **Dillion-Goldstein's (RHO _a)** | **AVE** | **The square root of AVE** |
| Empathy<br>Croes and Antheunis (2021) | Said the right things to make me feel better | 4.81 | 1.03 | 0.90 | 0.24 | 0.82 | 0.68 | 0.77 | 0.79 | 0.57 | 0.75 |
| | Responded appropriately to my feelings and emotions | - | - | - | - | 0.86 | - | - | - | - | - |
| | Came across empathetic | - | - | - | - | 0.83 | - | - | - | - | - |
| | Said the right thing at the right time | - | - | - | - | 0.71 | - | - | - | - | - |
| | Good at understanding my problem | - | - | - | - | 0.79 | - | - | - | - | - |
| Humour<br>Cline et al. (2003) | I prefer a service recovery situation where the automated CSA is free to express their sense of humour | 3.50 | 0.62 | -0.18 | -0.64 | 0.77 | 0.71 | 0.72 | 0.87 | 0.60 | 0.77 |
| | I enjoy a service recovery conversation that includes jokes from an automated CSA | - | - | - | - | 0.70 | - | - | - | - | - |
| | I often read written jokes by automated CSAs | - | - | - | - | 0.77 | - | - | - | - | - |
| Anthropomorphic<br>Araujo (2018), Kim and Sundar (2012) | This automated CSA is likeable | 4.50 | 0.92 | 0.88 | 0.64 | 0.81 | 0.81 | 0.82 | 0.84 | 0.78 | 0.88 |
| | This automated CSA is sociable | - | - | - | - | 0.71 | - | - | - | - | - |
| | This automated CSA is friendly | - | - | - | - | 0.81 | - | - | - | - | - |
| | This automated CSA is personal | - | - | - | - | 0.86 | - | - | - | - | - |
| Trustworthiness<br>McKnight et al. (2002) | I believe that the agent would act in my best interest | 4.07 | 0.71 | 0.60 | 0.34 | 0.75 | 0.80 | 0.82 | 0.84 | 0.72 | 0.85 |
| | If I required help, the agent would do its best to help me | - | - | - | - | 0.73 | - | - | - | - | - |
| | The agent is interested in my well-being, not just its own | - | - | - | - | 0.82 | - | - | - | - | - |
| | The agent is truthful in its dealings with me | - | - | - | - | 0.77 | - | - | - | - | - |
| | I would characterise the agent as honest | - | - | - | - | 0.77 | - | - | - | - | - |
| | The agent would keep its commitments | - | - | - | - | 0.87 | - | - | - | - | - |
| Shopper forgiveness<br>Harrison-Walker (2019) | I will not stop thinking about how I was wronged by the e-Retailer | 4.23 | 1.93 | 1.04 | 0.11 | 0.67 | 0.90 | 0.90 | 0.94 | 0.79 | 0.89 |
| | I will spend time thinking about how to get back at the e-Retailer for the service failure | - | - | - | - | 0.80 | - | - | - | - | - |
| | I will avoid certain websites because they will remind me of the e-retailer who wronged me. (R) | - | - | - | - | 0.80 | - | - | - | - | - |
| | This e-retailer's wrongful actions will keep me from enjoying life. | - | - | - | - | 0.71 | - | - | - | - | - |
| | (R) I think that many of the emotional wounds related to the e-retailer's wrongful actions will heal. | - | - | - | - | 0.83 | - | - | - | - | - |
| | I think my life will be ruined because of the e-retailer's wrongful actions. (R) | - | - | - | - | 0.74 | - | - | - | - | - |
| | I wish for good things to happen to the e-retailer who wronged me. | - | - | - | - | 0.82 | - | - | - | - | - |
| | If I encounter the e-retailer who wronged me, I will feel at peace. | - | - | - | - | 0.82 | - | - | - | - | - |
| | I have compassion for the e-retailer who wronged me. | - | - | - | - | 0.70 | - | - | - | - | - |
| | I hope the e-retailer who wronged me is treated fairly by others in the future. | - | - | - | - | 0.69 | - | - | - | - | - |
| | I forgive the e-retailer for what they did to me. | - | - | | - | 0.90 | -- | - | - | - | - |
| | Even though the e-retailer's actions hurt me, I have goodwill for the e-retailer. | - | - | - | - | 0.75 | - | - | - | - | - |
| Thresholds | | - | - | - | - | 0.71 | 0.70 | 0.70 | 0.70 | 0.50 | Higher than the correlation coefficients |

AVE, average of variance extracted.

agreement, was employed in measuring the forgiveness scale items.

The consumer forgiveness scale consists of two subscales, depicting the absence of negative responses (six items) and the presence of positive responses (six items). In this study, both the subscales were found to be positively (0.442) and significantly related ($p < 0.001$), which is consistent with extant literature on forgiveness (Harrison-Walker 2019). Forgiveness literature also explicitly mentions that both the sub-components of forgiveness are 'intertwined and therefore inseparable' (Harrison-Walker 2019:382) and studies should be conducted to allow further analysis using the scale in its completeness and not as two sub-constructs. Seven-point Likert scales ranging from '1' (strongly disagree) to '7' (strongly agree) were used to measure the scale items.

### Common methods bias

Podsakoff et al. (2003) highlight the fact that common method bias poses a significant challenge in research that utilises a single-survey methodology. Therefore, by following the procedures outlined by Podsakoff et al. (2003) and Lindell and Whitney (2001), this study employed both statistical and procedural remedial approaches to mitigate common method bias. Firstly, as a prevention measure, the scale items used in this study were adapted from pre-validated measures. Secondly, the survey was self-administered (online), whereas respondent anonymity was upheld and participants were provided with written assurance regarding the matter of confidentiality of their responses. Thirdly, the questionnaire administration made room for the randomisation of questions. Finally, a single-factor confirmatory factor analysis (CFA) approach was conducted as a statistical measure. The CFA procedure indicated a very poor fit (Chi-square/df = 13.26; root mean square error of approximation [RMSEA] = 0.418; comparative fit index [CFI] = 0.577; Tucker-Lewis index [TLI] = 0.512), suggesting minimal impact from common method bias.

### Ethical considerations

Ethical clearance to conduct this study was obtained from the Vaal University of Technology Faculty Research Ethics Committee (FREC) (No. FRECMS-26042024-394). Respondents granted consent for participation by way of clicking the 'consent' button displayed at the online survey page.

## Results

### Sample description

An analysis of the respondent's profile in this research indicates a higher number of male participants (54.6%; $n = 157$) compared to female participants (45.4%; $n = 130$). The sample was largely youthful, with most of the participants (52.6%; $n = 151$) indicating that they were between 20 and 39 years old and also holders of a post-high school certificate (58%; $n = 166$).

### Model fit

The PLS-SEM algorithm was employed in the analysis. In the initial model assessment, the value of Standardised Root Mean Square Residual Value (SRMR) was assessed to establish model fit. Moreover, the d_G and d_ULS values were below the 95% bootstrapped quantile. Therefore, these values indicate a good model fit. The initial assessment involved evaluating the SRMR to determine the fit of the model. Moreover, the d_G and d_ULS values were below the 95% bootstrapped quantile, denoting good model fit.

### Measure validation using confirmatory factor analysis

It is important to evaluate a reflective measurement model by examining the indicator loadings. Outer loadings exceeding 0.50 suggest significant observed variables for each latent variable, while those loadings below 0.50 are candidates for deletion. Be that as it may, Hair et al. (2018:675–676) recommend that only loadings exceeding 0.708 be considered, as they demonstrate that the construct accounts for over 50% of the indicator's variance, thereby ensuring acceptable item reliability. According to Table 1, the outer loadings in this research ranged between 0.674 and 0.903, which is above 0.50 at the minimum. Be that as it may, the items "I enjoy a service recovery conversation that includes jokes from an automated CSA" (0.699) and "I will not stop thinking about how I was wronged by the online retailer" (0.674) were slightly below 0.708 but a decision was taken to retain the items as it was observed that both items would not compromise the purity of the model since they did not cross-load (indicator loading highly on more than one factor). Moreover, the manifest variables loaded in the same direction hypothesised by the theory, signalling no need for deletion.

### Reliability assessment

The Cronbach's alpha values presented in Table 1 confirm that each construct met the minimum cut-off value of 0.70 (Malhotra et al. 2017), except for empathy, which yielded a Cronbach's alpha coefficient of 0.683. Be that as it may, Sarstedt, Ringle and Hair (2021) acknowledge that while Cronbach's alpha coefficient assumes the same thresholds as composite reliability, it generally yields lower values. The study proceeded to note this together with the submission by Cohen, Manion and Morrison (2018), who pointed out that values between 0.60 and 0.69 can be interpreted as evidence of marginal reliability. Other statistics that were computed and proved the study to be reliable include the composite reliability statistic (ranging between 0.718 and 0.901) as well as Dillion–Goldstein's *rho* statistic (ranging between 0.789 to 0.937), which were above 0.70.

### Convergent and discriminant validity

According to Table 1, the AVE values extracted in this study exceeded 0.50. The model is deemed satisfactory regarding its convergent validity.

Table 2 shows the discriminant validity assessment for this research.

A three-fold assessment of discriminant validity was carried out, comprising an evaluation of the correlation coefficients, applying the Fornell–Larcker heuristic as well as the hetrotrait-monotrait (HTMT) correlation estimation. The highest correlation coefficient in the Pearson correlation matrix is 0.686 ($p < 0.01$), which is below 0.70 thereby depicting the theoretic uniqueness and separability of each construct in the study. In Table 2, the highest correlation coefficient is 0.686, which is lower than all the square roots of the AVE values for each construct (ranging between 0.753 and 0.887). Furthermore, the HTMT values range between 0.139 and 0.841, which is below the 0.85 cut-off (Henseler, Ringle & Sarstedt 2015). The study met the recommended criteria across the three measures and demonstrated satisfactory discriminant validity.

## Structural model assessment

The results of the structural model assessment are illustrated in Table 3.

From Table 3, all the latent variables had variance inflation factor (VIF) values below 5.0, whereas the tolerance values ranged between 0.298 and 0.678, which is above 0.10. These results assisted in diminishing any deep malaise about multicollinearity risk in this research. In addition, a review of the inter-factor correlations (all were below 0.80) presented in Table 2 indicates that collinearity issues were not present, as recommended by Henseler et al. (2015). Furthermore, a rigorous bootstrapping procedure utilising 5000 subsamples was implemented. This enabled the researcher to calculate the path estimates and t-values for the structural model. All relationships yielded a fully significant outcome, except for the impact of humour on shoppers' perceptions of anthropomorphism ($p = 0.498$). In the study, at least 59.6% of the variance in anthropomorphism is explained by humour and empathy, whereas 54.1% of the variance in forgiveness is explained by both anthropomorphism and trustworthiness perceptions.

## Theoretical and managerial implications

This article is a first step towards re-considering automated CSAs as social actors in a service failure scenario by acknowledging the transferability of human principles and/or the essence of anthropomorphism (demonstrated by incidents of chatbot empathy and humour) in triggering high perceptions of trustworthiness and ultimately, forgiveness inclinations among online shoppers. As a theoretical contribution, the findings of this study are crucial in as far as they exposed gaps in the service recovery strategies that relate to technology-based frontline employees. The study provides a fruitful opportunity to consider more developed research in neuroscience and how conversational agents can be harnessed to alter consumer perceptions and emotions during shopping encounters. This study pinpointed the significance for information system developers and marketing managers to collaborate in exploring the inclusion of key traits and features in the design of automated CSAs to mitigate customers' negative reactions in the event of a service failure.

## Conclusions, limitations and future research

While scholars such as Ge and Gretzel (2017) found positive effects of humour on customer engagement in social media, this has been difficult to prove in a more consequential task-based scenario such as in online shopping; hence the diminishing indirect effect between humour and anthropomorphism. While it seems natural to assume that if humour improves human–human connection, comparable impacts can be expected on interactions between humans and conversational agents,

**TABLE 2:** Discriminant validity results.

| Latent variable | Empathy | Humour | Anthro | Trustworthiness | Forgiveness | HTMT |
|---|---|---|---|---|---|---|
| Empathy | **0.75** | - | - | - | - | 0.24 |
| Humour | 0.25** | **0.77** | - | - | - | 0.84 |
| Anthro | 0.33** | 0.49** | **0.88** | - | - | 0.13 |
| Trustworthiness | 0.23** | 0.69** | 0.39** | **0.85** | - | 0.58 |
| Forgiveness | 0.33* | 0.32** | 0.24** | 0.51** | **0.89** | 0.66 |

Note: *, $p < 0.05$; **, $p < 0.01$.

AVE, average of variance extracted; HTMT, hetrotrait-monotrait.

The AVE values extracted for each formative indicator are not applicable. The square roots of all AVE values extracted for each construct are positioned along the diagonal (Bold). The correlation coefficients of all construct associations are beneath the diagonal.

**TABLE 3:** Structural model and hypotheses testing results.

| Path | | | Hypotheses | Path coefficients ($\beta$) | T- statistic | Significance level | Decision |
|---|---|---|---|---|---|---|---|
| Perceived empathy | ← | Anthropomorphism | $H_1$ | 0.34 (+) | 2.89 | *** | $H_1$ is supported |
| Humour | ← | Anthropomorphism | $H_2$ | 0.15 (+) | 4.47 | * | $H_2$ is partially supported |
| Anthropomorphism | ← | Trustworthiness | $H_3$ | 0.44 (+) | 5.86 | *** | $H_3$ is supported |
| Anthropomorphism | ← | Shoppers' forgiveness | $H_4$ | 0.23 (+) | 3.95 | *** | $H_4$ is supported |
| Perceived trustworthiness | ← | Shoppers' forgiveness | $H_5$ | 0.27 (+) | 3.80 | *** | $H_5$ is supported |
| **Thresholds** | | | | **≥ +0.20** | **> 2.58** | **$p < 0.01$** | **Hypotheses are supported by the sample data** |

this study could only partially prove the clinical validity of this indirect effect between humour and shoppers' perceptions of the trustworthiness of automated CSAs. The reason could be because the economic and non-economic losses suffered by customers when they engage in online shopping and fail to complete a shopping task seem to far outweigh any form of probable reparation that could be delivered through humour and jokes.

The scope of this study was restricted to a single-cross sectional survey, hence the generalisability of the findings can be challenged. This study could be expanded to a larger sample and cross-country locations in view of enhancing the cultural validity of the findings. Again, the study adopted a mono-quantitative research methodology, which left no opportunity for triangulation of the study findings. Despite these shortcomings, this study may be used as the springboard by future researchers who may want to explore further the nexus between anthropomorphic traits in various service failure scenarios.

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## Author's contributions

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## Data availability

The author confirms that the data supporting the findings of this study are available within the article.

## Disclaimer

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