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The Role of Attachment in Improving Consumer-AI Interactions

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Abstract. *A successful implementation of artificial intelligence and robots in the service industry requires the acceptance and trust of consumers. In order to be able to provide similar services as human employees, AI devices and robots have to have the ability to interact and relate to the human consumer and, at the same time, to provide the expected information. Researches in the field of consumer services have shown that empathy and emotions can improve the relation between service employees and consumers, by providing more enjoyable interactions and a better exchange of information. In our research we investigate if the attachment between the consumer and AI devices can facilitate a higher quality of information exchange, a better and more pleasant interaction and if it determines a higher self-disclosing behavior from the consumer. Our results confirm that attachment has a positive impact on consumer-AI interactions, improving the perceived enjoyment of the conversation, a better quality of the exchanged information and determining a higher self-disclosing behavior. These results have important implications on the design of the future consumer-AI-interactions.*

Keywords: artificial intelligence, consumer-AI interactions, attachment, interaction, self-disclosing behavior, information

Introduction

Social AI devices and robots have become a common presence in recent years and nowadays they are regularly active in the business and commercial environment, as well as at home (Gursoy et al., 2019; Huang & Rust, 2018). In the business environment, social artificial intelligence (AI) devices are used for customer support and service, while at home, they are used to complete tasks, such as controlling smart homes, assisting people with household activities and providing entertainment. The adoption of social AI devices and robots is a result of technology's advancements and the increasing demand for more convenient ways to interact with technology. AI's advancements drive interest in information sharing among academic researchers and retailers (Lu et al., 2020; Pillai et al., 2020) and they have begun testing the use of AI-empowered robots to improve marketing and operations by capturing consumer reactions and offering customized solutions for e-commerce, customer service and logistics (Anica-Popa et al., 2021; Chuah & Yu, 2021; Kotouza et al., 2020).

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In this context, it is important to identify which role the attachment plays in improving the interaction between AI devices and consumers, as until now most of research has focused on analyzing and understanding what are the main factors that influence consumers' acceptance towards AI devices in their everyday life.

Literature review

2.1 Attachment to AI

Attachment refers to the emotional bond that is formed between consumers and specific AI devices and robots (Malär et al., 2011, Thomson et al., 2005) Attachment toward AI devices requires connective and affective feelings (Aron & Westbay, 1996; Fehr & Russell, 1991). Furthermore, the stronger the attachment to an entity is, the more likely an individual is to maintain a close relationship with it (Thomson et al., 2005).

Individuals differ in how they assess, perceive and respond to brands or service providers (Clark & Mills, 1993). Attachment can play a critical role in improving their interaction with AI devices because when they feel emotionally attached to it, they may be more likely to interact with it and even recommend it to others (Martelaro et al., 2016). Additionally, an emotionally attached consumer may be more forgiving to errors and more likely to provide constructive feedback to improve the AI's performance. Therefore, the role of attachment in improving consumer-AI interactions is to create a sense of trust and connection between the user and the AI, leading to a more enjoyable and effective experience.

Attachment security leads to receptive and trustworthy interactions (Gillath & Karantzas, 2019) while attachment insecurity is formed when an individual experiences anxiety about the possibility to be rejected and leads to the avoidance of closeness (Bartholomew & Horowitz, 1991; Brennan et al., 1998). In this context, attachment insecurity leads to unresponsive and untrustworthy interactions, consumers experiencing an anxious attachment and they will not be open to interact or to engage in relationships (Kim et al., 2022). Therefore, attachment security is connected to a higher responsive interaction (Gillath et al., 2021).

2.2 Information quality

Determining various predictors of willingness to share personal data with robots will deepen the understanding of what actions companies should take when they incorporate intelligent and robotic technology into their operations (Song & Kim, 2021). In their experimental study using a chatterbot phone application, Schroeder and Schroeder (2018), found that users' perceived trust influences positively their willingness to share personal information. In addition to this, Martelaro et al. (2016) found that enhancing users' sense of trust, feeling of companionship and the social expressivity of robots can strengthen the relationship between people and robots.

As mentioned above, trust represents a key element in both human-to-human and human-to-machine interactions and the accuracy of personal and financial information shared by consumers to robots is directly influenced by the level of trust in AI devices. In case that a robot doesn't meet consumers' needs, they may lose confidence in it (Pillai et al., 2020; Rese et al., 2020; Wirtz et al., 2018) and in consequence, they will not be willing to share their personal information with it. Anthropomorphism is another important characteristic of AI devices, which might strengthen the relationship between humans and machines. This characteristic improves trust, enjoyment and positively influences consumers' intention to interact further and to buy AI devices or robots (Chang & Kim, 2022; Pop et al., 2023).

2.3 Interaction quality

Interpersonal interaction and communication represent important characteristics of the social existence of our society and they are considered distinctively human traits (Pelau et al., 2021). Perceived interactivity is crucial to understand the role of interactive AI speakers in facilitating the organization of tasks between humans and robots (Kim et al., 2022). Anthropomorphism plays an important role in increasing the perceived interaction quality, which drives to elevated acceptance and trust (Pelau et al., 2021). This characteristic increases the consumer's willingness to interact and the development of affective relations with robots and AI devices (Gonzalez-Jiminez, 2018; van Doorn et al., 2017).

According to Kim et al. (2022), interactivity can be divided in two categories: human-to-human interaction and human-to-machine interaction. The first category, human-to human interaction is referring to an interpersonal and relational interactivity (Carey, 1989; Massey & Levy, 1999) while the second category, human-to-machine interaction is identified as user-to-computer interaction and user-to-system interaction (Liu & Shrum, 2002; McMillan, 2005).

Research shows that users are willing to interact with AI devices but their messages during these interactions are shorter (Hill et al., 2015) and less extroverted or self-disclosing (Mou & Xu, 2017). Nevertheless, consumers tend to engage in longer interactions with human-like chatbots or AI devices (Ciechanowski et al., 2019). In engineering and computer science fields, anthropomorphism has played a crucial role in shaping human-to-machine interactions as they seem to enhance social behaviour (Wang, 2017). In terms of consumers' expectations regarding AI devices, they expect AI to be empathetic, but due to the lack of personal touch and the difficulty in dealing with complex situations, users are reluctant to use AI devices in certain circumstances (Nguyen, 2019).

2.4 Enjoyment of interaction

Enjoyment refers to a consumers' feelings of happiness and pleasure in the use of a robot or AI device (Chuah & Yu, 2021; Lu et al., 2019). Research on Internet of Things (IoT) shows that enjoyment of having an agreeable conversation with robots plays a strong role in positively impacting the usage of technology-based services, user satisfaction and information exchange through the platform (Hoyer et al., 2020; Lee et al., 2019).

Research has shown that satisfied consumers find their interaction with robots intrinsically enjoyable, they tend to spread positive word-of-mouth and have a higher willingness to share information and interact with them (Gursoy et al., 2019; Lu et al., 2019; Rese et al., 2020; Song and Kim, 2020). Also, when people perceive the conversation with an AI agent similar to one with a human, they enjoy it and they are encouraged to use the technology more often (Heerink et al., 2008).

2.5 Self-disclosing behavior

Pearce & Sharp (1973) define the term of self-disclosure as the process of revealing thoughts, opinions, emotions or personal information to others. Self-disclosure is crucial for building and maintaining relationships, as well as for expressing feelings of liking an individual (Collins & Miller, 1994). According to Lee & Choi (2017), self-disclosure behavior enhances the possibility of intimacy, trust and the joy of interacting with someone.

Self-disclosure facilitates the reciprocal exchange of information between two parties and reduces uncertainty between them (Lee & Choi, 2017). If one of the involved parties doesn't reciprocate, then there is a little chance to develop a relationship between them (Sprecher et al.,

2013). There are three significant effects of self-disclosure in relationships: the first one refers to people who are making intimate disclosures and tend to like more a person than just by taking part in non-intimate disclosures, the second one is about the initial positive feeling towards a person which leads to increased disclosure and the last one, humans who are disclosing each other, make the former like the latter (Collins & Miller,1994).

In the context of the willingness to share personal information to AI-empowered devices and the self-disclosing consumers' behaviours, it is important to mention that users have the possibility to select different privacy options. However, disclosing personal information can sometimes put individuals' privacy at risk and this may lead to financial fraud and identity theft (Song & Kim, 2021). Regardless of the risks mentioned above, there are still some users who choose to disclose their personal data, especially when they realize they receive tangible benefits such as information exchange, building social connections, trust in companies and ease of communication (Niculescu et al., 2022; Pillai et al., 2020; Rese et al., 2020; Schroeder and Schroeder, 2018; Zaheer and Trkman, 2017). These factors are vital in both human-to-human and human-to-machine interaction and shape consumers' behaviour towards people and companies (van Pinxteren et al., 2019).

Methodology

The objective of our research is to determine the role of the consumers' attachment towards the AI in determining the communication characteristics between them. More precisely, we aim to investigate if a closer attachment to the AI improves the information quality transmitted in the communication, the overall evaluation of the interaction, the pleasure of interacting with each other and the availability to disclose personal information. In order to determine empirically these relations, we have developed an online survey containing the following constructs. Attachment has been measured based on 15 items including 8 items related to identity, dependence and social attachment, all adapted after Horakova et al (2022) and 4 items defining emotional attachment adapted after Apaolaza et al. (2022). Information quality was measured based on 7 items and interactivity was assessed based on 8 items, both adapted after Ashfaq et al. (2020) and Kim & Baek, 2018. The perceived enjoyment of the interaction was measured based on 5 items adapted after Ashfaq et al. (2020) and Lee & Choi (2017), while the self-disclosing behavior was measured based on 4 items adapted after Song & Kim (2021).

The sample consisted out of 252 respondents and was carried out in SmartPLS 4.0 (Ringle et al. 2022), by using structural equation models based on bootstrapping with 5000 distinct samples at a confidence interval of 95%. The reliability of the variables in the proposed model was assessed in order to ensure the quality of the data analysis. Results indicate that all Cronbach's Alphas (Tabele 1) for all constructs are greater than the suggested cut-off value of 0.70 (Hair et al., 2011), proving that all tested dimensions are internally consistent. Moreover, the Composite Reliability (CR) also provides strong evidence of reliability, showing results greater than the threshold of 0.70 (Hair et al., 2014). The Average Variance Extracted (AVE) values (Table 1) for all constructs are also above the cut-off value of 0.50, thus confirming strong internal consistency (Fornell & Larcker, 1981).

Table 1. Reliability of variables in the proposed model

Constructs	Cronbach α	CR	AVE
AI attachment (15 items adapted after Horakova et al., 2022; Apaolaza et al., 2022)	0.916	0.930	0.598
Information quality (7 items adapted after Ashfaq et al., 2020; Kim & Baek, 2018)	0.956	0.963	0.790
Interaction quality (8 items adapted after Ashfaq et al., 2020; Kim & Baek, 2018)	0.936	0.947	0.692
Enjoyment of interaction (5 items adapted after Ashfaq et al., 2020; Lee & Choi, 2017)	0.928	0.946	0.780
Self-disclosing behavior (4 items adapted after Song & Kim 2021)	0.894	0.927	0.760

Source: Authors' own research.

The convergent validity is given by the outer loadings of the items, for which all $p<0.001$ and all loadings are higher than 0.650. The divergent validity was measured with the heterotrait-monotrait ratio (HTMT), which had values <0.900 for all given relations.

Results and discussions

With the model measurement proving strong evidence of validity and reliability, the relationships between the constructs were examined by using Structural Equation Modeling (SEM). As proposed in Figure 1, we tested the model where AI attachment is the independent (predictor) variable and information quality, interaction quality, enjoyment of interaction and self-disclosing behavior are all dependent (response) variables.

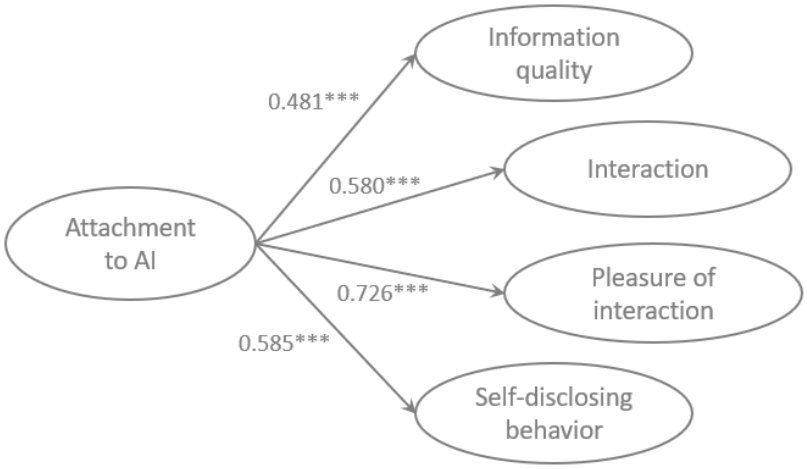


Figure 1. Graphical representation of the proposed model

Results of the SME indicate that all proposed relationships and tested hypotheses are supported, as shown in Figure 1. AI attachment has a significant positive effect on all four dependent variables. More specifically, our study found that AI attachment has a positive influence on information quality ($\beta = 0.481$, $p < 0.001$) and on interaction quality ($\beta = 0.580$, $p < 0.001$). The model also discloses that AI attachment is positively related to enjoyment of interaction ($\beta = 0.726$, $p < 0.001$) and to consumers self-disclosing behavior ($\beta = 0.585$, $p < 0.001$). No non-significant or negative relations are observed in the proposed model.

The proposed structural model explains a significant proportion of variances in each construct, through the coefficients of determination of R^2 (Table 2). More explicitly, the model explains 23% ($p < 0.001$) of the variance in information quality, 34% ($p < 0.001$) of the variance in interaction quality, 53% ($p < 0.001$) of the variance in enjoyment of interaction, 34% ($p < 0.001$) of the variance in self-disclosing behavior.

Table 2. The role of attachment in consumer-AI interactions

Relation	β-coefficient	t-value	p	R^2
AI attachment☮Information quality	0.481	10.23	0.000	0.231
AI attachment ☮Interaction quality	0.580	13.99	0.000	0.337
AI attachment ☮Enjoyment of interaction	0.726	24.05	0.000	0.527
AI attachment ☮Self-disclosing behavior	0.585	12.83	0.000	0.342

Source: Authors' own research.

Given the significant relations between the dimensions of our scale, we concluded that our model has demonstrated sufficient evidence of nomological evidence. These results emphasize that the AI attachment impacts in a positive significant way, all four dependent variables in our model: information quality, interaction quality, enjoyment of interaction and self-disclosing behavior. Our hypotheses are therefore all confirmed.

Discussion

Findings of this research contribute to existing literature on several fronts. The results of the SME point out that the level of a consumer's attachment to AI will influence the perceived information one receives from AI, the interaction quality and pleasure with the AI and will also reveal a more or less self-closing behavior, thus influencing the level of revealed thoughts, opinions, emotions and personal information.

When interested in building and improving consumer-AI interactions, researchers must assess the level of the consumer's attachment to AI. The level of AI attachment is one of the main components for maintaining a close relationship and has the main role of improving customer-AI interactions. Perceived as an emotional bond, the higher the consumer's attachment to AI, the better the perceived interactivity with the AI and also the more enjoyable the interaction. As all relationships and interactions, including the ones with AI, are defined by an emotional component, our model also emphasizes the fact that being attached to an AI, leads to a more self-disclosing behavior. Attachment and thus trusting AI, will lead to more enjoyable interactions and eventually to revealing personal information and preferences in order to properly establish relationships between consumers and different forms of AI.

All things considered, attachment to AI is demonstrated to have an important role in improving consumer-AI interactions, significantly influencing the researched constructs related to interaction in a positive way.

Conclusion

Consumer-AI interactions have recently seen significant developments, becoming more and more regular. Yet, research in this area is still in its infancy and needs more attention, in order to define conceptual and functional frameworks that can correctly assess different aspects of these kind of interactions.

We acknowledge several limitations of our research. Considering the background of the respondents, findings may vary from a culture to another, as for e.g. Asian consumers are more used to the interaction with AI on a daily basis and in multiple various situations, whereas European consumers have fewer such interaction occasions (Lu et al., 2019). Also, our research did not consider individual differences such as age and gender when assessing the model. Future studies may investigate how individual traits disclose different behavioral patterns in the relation between consumers and AI. Additionally, our research focused mainly on attachment towards AI in determining the communication characteristic between AI and consumer. Our main goal was to find out if a closer attachment to AI improves the information quality transmitted in the consumer-AI interaction, the overall interaction, and the pleasure of interacting and also the availability to disclose personal information to the AI. As this represents only a small number of factors that can be influenced by one's attachment to AI, further constructs can be added to the current model. This might be especially useful if future research identifies new constructs to explain more of the total variance of the model.

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