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A Nice and Friendly Chat with a Bot: User Perceptions of AI-Based Service Agents

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A Nice and Friendly Chat with a Bot: User Perceptions of AI-Based Service Agents

Short Paper

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Abstract

As more organizations establish artificial intelligence-based service agents to offer an automated customer dialogue it is crucial to understand how users perceive this new form of technology-mediated communication. AI-based service agents interact in a similar way as humans in human-to-human chat conversations, but instead of a live person on the other end, a chat bot steers the communication based on artificial intelligence and Natural Language Interaction. By combining qualitative and quantitative methods, we examine this context and explore the role of perceived authenticity and its impact on users' attitudinal and behavioral outcomes. Our results from the qualitative studies show that users infer the authenticity of the AI-based service agents based on two different categories of cues: (1) agent-related cues and (2) communication-related cues. We employ additional experimental studies to empirically test antecedents and consequences of authenticity perceptions in AI-based service encounters.

Keywords: AI-based service, service agents, chat bot, authenticity, cues, technology-mediated communication

Introduction

In today's world, technology-mediated communication is established as a key channel for organizations to interact, sell and communicate with their stakeholders (Yadav and Pavlou 2014). While organizations steer customers to automated channels due to their inexpensiveness and accessibility (Negash et al. 2003), most consumers believe that they are still interacting with a human person – however in a technology-mediated setting such as e-mail or live chat. This belief is challenged as firms increasingly use artificial intelligence (AI)-based service agents to offer support services such as text-based help to consumers. For example, Fukuoku Mutual Life Insurance just announced that they replace their customer service agents with artificial chat bots to increase the productivity and efficiency of their service support. AI-based service agents evaluate damage reports and e-mails from insured customers, recognize connections between inquiries, check the insurance requests for weak points, and even understand anger or irony in e-mails (Russon 2017). Also, Shell is amongst the first companies to use AI to establish an automated customer service dialogue. Customers type in product-related questions in a messenger and the service agents Emma and Ethan reply within a few seconds. At the moment the AI-based service agents handle over 100.000 data sheets for 3.000 products, know 16.500 physical characteristics of lubricants and are able to match 10.000 Shell products with competitor products (Shell 2015).

Building on AI firms might offer 24/7 support to their customers via live-chats with much less human resources involved, at much less costs and in shorter time compared to offering support services through traditional telephone-based call-centers. Firms can easily access the technology that enables automated live chats. For example, firms might use IBM's Watson to offer chat services, provide personalized recommendations to consumers while instantly reacting to their personality, tone, and emotions (IBM 2017). More and more organizations follow this trend and introduce AI-based chat bots or service agents that help customers to receive individual information. These examples motivate our research to examine in how far these AI-based service agents affect user perceptions and which consequences this might have for organizations and society at large.

Although new forms of interaction are typically designed to increase the quality of the information and to enhance user satisfaction as they usually lead to an adequate solution (Yoon et al. 2008), they do not always satisfy individuals' needs. For example, frustrated users report publicly about their negative experience with chat bots and attribute their discontent to a lack of authenticity of the technology-mediated encounter (Edwards 2013). Some even call the technology "dumb" (Smith 2017), mostly when the answer does not fit to the question asked or the user gets the wrong information. As a consequence, individuals might avoid AI-based communication. The organizational challenge is to find the right way to design an appealing and satisfying user experience when implementing AI-based service agents (Flynn-Ripley 2017). A recent study by Forrester highlights future developments: *"AI-based chatbots are like seeds. You plant them, but then you need to feed them with high volumes of consumer interaction so they grow. Chat developers and designers are the gardeners: they have to tend to the chat bots and coach their growth through continuous, yet gentle, correction."* (Ask et al. 2016)

In traditional service encounters, the human service representative is the key element which influences consumer's quality and relationship perceptions (Bitner 1990). An employee, who is not perceived as authentic in a face-to-face encounter, is typically evaluated as being dishonest or not true to himself (Hennig-Thurau et al. 2006). In the online context, where human cues are altered or completely absent, users cannot easily assess the nature of the service agent. As research on user's authenticity perceptions of AI-based communication is still lacking, it is not clear what determines the authenticity perception and how it impacts user behavior.

Against this background, our study tries to answer the following research questions:

- (1) How do users perceive AI-based service agents?
- (2) Do they care whether the service agent is human or artificial?
- (3) How do users form authenticity perceptions and how do these impact their behavior?

By answering these research questions, our study contributes to literature in the following way: (1) This study is amongst the first to empirically investigate the role of AI-based service agents. As these new type of service support will increase in the next few years, it is important for organizations to understand how users perceive artificial intelligence in a service context. (2) We show the importance of authenticity of AI

service agents from a user perspective and (3) we identify factors that constitute the authenticity perceptions of AI service agents. These factors are useful for the design of chat bots in order to increase acceptance and usage intentions.

Theoretical Background

To explore this phenomenon, we combine different streams of research from the fields of information systems, service management, marketing and psychology. Authenticity is a key construct that has been traditionally discussed in arts and history sciences (Reisinger and Steiner 2006) as it refers to “whether objects of art are what they appear to be or are claimed to be, and therefore worth being the price that is asked for them or ... worth the admiration they are being given” (Trilling 1972, p. 93). Although there is considerable debate on the meaning of authenticity across disciplines, researchers agree that the underlying understanding of authenticity refers to an object’s or experience’s genuineness, reality and/or truth (Beverland and Farrelly 2010). It is interesting to explore this construct in the context of AI-based service agents, since users might not even be aware that they are interacting with an artificial counterpart, for example, if they are dealing with an AI-based service agent that is capable of natural language processing.

As technology-mediated individual-organization interactions may happen between persons as human-to-human interactions (e.g., computer-mediated live chat) or between a human and a machine (e.g., customer uses information kiosk in museum), authenticity perceptions may depend on multiple cues pertaining to the employee behavior and/or the tangible objects involved in the encounter. We propose that beyond these factors specific characteristics of the technology-mediated interaction may also influence the authenticity perception. Lowry and colleagues (2009) introduce the computer-mediated communication interactivity model (CMCIM) and show that the communication quality in technology-mediated encounters is mainly determined by factors that simulate an interpersonal interaction: the level of interactivity (e.g., reciprocity, synchronicity, and control over the communication) and social presence. Next to social presence (i.e., the feeling of intimacy, the psychological distance), Ou, Pavlou, and Davison (2014) differentiate telepresence that describes a person’s perception of the physical distance or immediacy. As these factors have been shown to influence relationship variables and buying behavior, they may as well contribute to the fact whether an AI-based service encounter is perceived as authentic.

Research in the field of information systems has been paying attention to topics concerning computer-human interaction since many years. Various studies focus on the design elements (Hevner and Zang 2011) or implementation issues (Zhang et al. 2005). More recently, the topic of human-computer interaction is shaped by the influence of the digital era and researchers for example emphasized the role of atmospheric cues in the context of website usability (Sheng and Joginapelly 2012). The “virtual” world quickly became an interesting context to study (Wasko et al. 2011), where researcher examine the interplay between the virtual world, people and avatars (Davis et al. 2009). Another field that received attention was related to trust in computer-human interaction and the role of humanness for trust building (Lankton et al. 2015). In direct comparison, individuals showed higher arousal when interacting with a human counterpart than compared to a computer counterpart (Teubner et al. 2015).

Typically, organization-user interactions include the communication and interaction of an individual with a member of the organization. Research on authenticity of employee behavior often centers on the authenticity of emotional displays such as smiles and the emotional labor that are necessary to achieve authenticity perceptions (Henning-Thurau et al. 2006). Moreover, Turel, Connelly, and Fisk (2013) showed that the perception of an employee’s phoniness in web-based services leads to lesser satisfaction and usefulness. Research yet has to discover whether these features or other factors constitute a user’s authenticity perception in AI-based interactions in service contexts.

Research Design and Methodology

We have chosen an exploratory research design in which we combine qualitative and quantitative methods to examine users’ emotions, attitudes and perceptions and their consequences in AI-based

service encounters (Sarker et al. 2014; Venkatesh et al. 2013). We use a two-step approach to address our research questions. First, we employ a qualitative study to explore user perceptions in encounters with human and AI-based service agents. We establish the importance of authenticity perceptions and identify cues and boundary conditions that affect the users' response to service agents. Second, we conduct a series of experimental studies to quantify the effect of cues on authenticity perceptions and user behavior. We follow the recommendation of Sarker and colleagues (2014) by outlining our research design and process in detail.

Qualitative Study

In a first step, personal qualitative interviews seem to be suitable to deep-dive into users' feelings and to learn more about their experience with technology-mediated communication in professional contexts. We asked respondents about their experiences with chats through websites on computers, on phones or with personal assistants such as Siri since AI-based agents are still rare and users have not gathered much experience with this new technology (Miles and Huberman 1994). In addition to the exploratory qualitative interviews, in which respondents were asked to remember and describe their last chat bot experience, we conducted a think-aloud study. In this type of a qualitative study respondents were assigned to a predefined task and express their thoughts and feelings verbally while performing this task. The think-aloud technique is often used to test and evaluate new technologies (Kaikkonen et al. 2005; Yetim et al. 2012). We have chosen the think-aloud method because we were able to directly observe individual reactions and emotions when users interact with an AI-based or human service agent during a chat.

In order to capture a holistic picture of the novel research phenomena (Patton 2015), we used a purposive sampling method to generate a heterogeneous group of interview partners for both qualitative studies. Respondents were selected to represent varying degrees of experience with AI-based and human service agents in technology-mediated-communication. In sum, 41 personal in-depth interviews were conducted with a semi structured interview guideline to increase quality and ensure comparability of the findings (McCracken 1988). The interview guide consists of 23 open-ended questions, the interviews last up to 60 minutes and were recorded and transcribed. Furthermore, 15 think-aloud protocols were collected. Interview partner's age ranged from 21-55 and their experience with AI-based service agents stretched from low to medium.

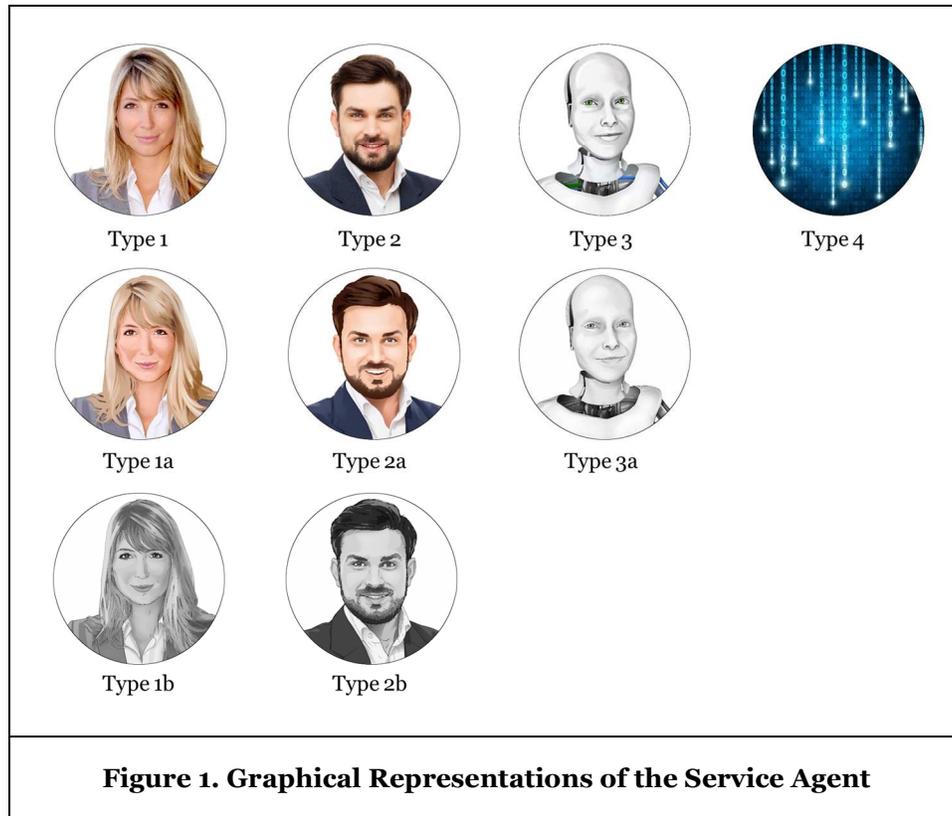
The interview material is analyzed with the software NVivo (Bazely and Richards 2000), which is widely used and accepted amongst IS-researchers (Abdul et al. 2016; Bandara et al. 2011; O'Flaherty and Whalley 2004). With the help of the software, we structured the data material and used content analysis to identify inductively emerging patterns, topics and themes in the data material (Miles et al. 2014).

Experimental Studies

In a next step, one pre-study and three experimental studies will be employed to triangulate the findings from the qualitative study. The objectives are to empirically test and quantify the effect of cues on users' authenticity perceptions, the behavioral responses to authenticity perceptions and the potential moderating effects that were identified in the qualitative study.

We conducted a pre-study to test the manipulations we will use in the experimental studies. We aimed to identify reliable and valid cues from the agent- and communication-related cue categories that clearly signal either the presence of an AI-based or a human service agent. We compared nine types of graphical representations of a service agent that vary in the degree of humaneness (human vs. robot vs. AI), gender (male vs. female) or in the level of abstractness (real picture vs. colored vs. monochromatic drawing). Figure 1 illustrates the ten graphical representations tested. Through a web-based survey participants were asked to evaluate a live-chat session based on a screenshot of a live-chat dialogue. We ask the participants to put themselves into the situation of the user, who – in the scenario - asked for delivery details on his order at an online retailer. The screenshots show the dialogue bubbles of both the user and the service agent. The dialogue text is constant throughout all conditions. Each participant was asked to

evaluate the authenticity of the service encounter based on one scenario with a randomly assigned graphical representation. The pre-test was conducted in July-August 2017 during a three weeks' period. The sample consisted of 169 participants. A second pre-study will be conducted in fall 2017 with the aim to compare the authenticity perceptions of communications styles with varying degrees of colloquial language.



Once we have established clear manipulations for signaling AI-based or human service agents based on visual representations and communication styles, we will run three experimental studies. The goal of the studies 1-3 is to provide insights into the effect of authenticity perceptions on usage intention and potential moderators of this effect that were identified in the qualitative study.

In study 1 a scenario-based experiment will be conducted where participants were asked to evaluate a screenshot of a fictive chat. We will manipulate the *indicated nature of the service agent* and level of credibility of this information that is perceived as transparency (*perceived transparency*). Participants will be randomly assigned to one of the four conditions in a 2 (indicated nature of service agent: human vs. AI-based agent) x 2 (perceived transparency: high vs. low) between-subjects design. We manipulate the indicated nature of the service agent with the best suitable cues based on the results of our pre-studies. Cue credibility will be manipulated with a provider-issued statement about the nature of the service agent.

In study 2 the scenario-based design of study 1 will be slightly modified. Instead of manipulating the perceived transparency we will manipulate the *problem-solving competence* of the service agent. We will offer two different chat dialogues, in which the service agent either sufficiently or insufficiently addresses the user's query. Participants will be randomly assigned to one of the four conditions in a 2 (indicated nature of service agent: human vs. AI-based agent) x 2 (problem-solving competence: high vs. low) between-subjects design. In study 3 a scenario-based experiment will be conducted where participants were asked to evaluate a dialogue with an AI-based service agent. Participants will be randomly assigned

to one of the two conditions in a single factor 1x2 between–subject design, where the *medium for AI-based service* is manipulated with either being a “echo”-like hardware or a web-based agent.

In all studies the participants will be asked to answer a survey that includes the depend variable measurements: authenticity perception, use intention, and alternative outcome measures such as service quality, attitude and WOM. All variables are measured with validated multi-item scales (e.g., Grayson and Martinec 2004; Venkatesh et al. 2003). We will analyze the data with multi-factor ANOVA using SPSS. The studies are scheduled to be conducted in September/October 2017.

Preliminary Results from the Qualitative Study

The following results are based on the analysis of 41 interviews and 10 think-aloud protocols from the data pool collected within the two qualitative studies.

Nature of the Service Agent

A recurring topic in the interviews was the respondents’ concerns regarding the nature of the service agent. It was remarkable to observe that users expressed high uncertainty when it comes to evaluating the nature of the service agent. Users admitted to constantly question whether the service agent is human or artificial.

“I am not sure if there is a real person behind it [the live chat]. I do not know. This uncertainty is extremely bothering me.” (I.8)

The uncertainty might be due to the fact that live chats represent a relatively new form of computer-mediated service encounters. The majority of our interview partners expressed the strong desire to know exactly with whom they are dealing with in this particular service situation. During the interviews, they told us that they pay close attention and challenge themselves to discover if their service agent is of human or artificial nature.

“It is kind of strange, because you do not know if there is really a person sitting there on the other side, or if it is all automated. But since my question was answered in full detail, I was quickly convinced that I was chatting with a real person.” (I.6).

Users wonder whether the service agent is human or artificial and build expectation about the nature of their interaction partners.

Authenticity Perception

Our results show that the users’ need to evaluate the nature of the service agent leads to the formation of authenticity evaluations. Users’ authenticity perceptions refer to service agent’s human nature. If they feel that they are interacting with an AI-based service agent they evaluate the encounter as less authentic, while they evaluate it as more authentic when they think they interact with a human agent. The authenticity perception is critical for a user’s evaluation of the service as valuable and satisfactory and for establishing trust as the following quotes illustrate:

“I think that the more authentic the encounter is the more I will use it” (I.12)

“If I image talking to a computer, I do not see the value for me because the responses are kind of standard and ... and can I trust a machine because... you never know what they are really up to and what they are doing on my computer” (I.3).

“Well, when I interact [with an agent] the whole situation should be authentic, you know... real and so on. I want to know that they care about my problem. But sometimes I do not know if somebody is really there” (I.19)

Our text data also indicate that users are more willing to use the service, increase their willingness to co-produce and recommend the service if it is delivered by a person compared to a chat bot. In sum, authenticity plays a critical role concerning the user acceptance of AI-based service agents. Therefore, we propose:

Proposition 1 (P1): The authenticity perception of the service agent has a positive impact on users’ behavioral and attitudinal outcomes.

Cues for Authenticity Evaluation

Our results show that users infer the authenticity of the AI-based service agent based on two different categories of cues: (1) agent-related cues and (2) communication-related cues.

Agent-Related Cues

Agent-related cues refer to the user’s evaluation of the service agent. If visual and audible cues are provided users use them to evaluate the authenticity of the service agent. For example, they expect authentic behavior and check on the appropriateness of the vocal inflections when they interact with voice-based agents. If these expectations are not matched during the interaction the users might feel betrayed and have low perceptions of authenticity as a respondent elaborates:

“I recently talk to the support on the phone and after a while, I was not sure if I was talking to a human or a machine. I was strange because the responses were ok but the voice sounds so weird and mechanical. To be honest, I did not dare to ask” (I. 14).

Furthermore, user prefer to get to know the service agent and are happy if they receive some additional information about their counterpart such as the name or a picture. This seems to help the user to establish a closer relationship with the agent and to evaluate their level of his or her competence. If a name is displayed during the chat, the users feel more comfortable as the service agents become more human, less abstract and the user can better imagine the service representative.

“You know, a name is definitely important and a picture is even better, so I can image who I am chatting with. This is the problem when you cannot hear the voice, you need other signals.” (I.27).

Overall, we summarize that the cues regarding the nature of the service agent are essential to form authenticity perceptions. Therefore, we propose:

Proposition 2 (P2): Agent-related cues have an impact on users’ authenticity perceptions.

Communication-Related Cues

Communication styles influence how users evaluate the quality of the communication. Users evaluate whether the communication fits their expectations on the sociability, interactivity and the degree of personalization of a service encounter. Deviations such as unfitting emotions, empty phrases or rude statements in a chat correspondence may be interpreted as not authentic as a user says:

“Well ...the responses do not make sense and do not fit to my question. Sometimes I get the feeling that the employee has no clue about what he just said, he just missed the point” (I.37).

“I want to be treated well. Sometimes, you only get this standard answers. Well this is not what I want.” (I.3).

Overall, users voice their wish for a smooth and natural interaction. They value colloquial language, for example, as it indicates a human service agent. They want to be treated as valuable customers and receive attention and immediate action from the service agents. Therefore, we propose:

Proposition 3 (P3): Communication-related cues have an impact on users’ authenticity perceptions.

Contextual Factors

Our results show that different contextual factors affect how authenticity perceptions are formed. For example, the impact of agent- and communication related cues on authenticity perception is dependent on characteristics of the user such as his self-efficacy and his need for personal contact as well as on different service contexts. Moreover, our data indicate that for services with high credence qualities (e.g., banking) the evaluation of agent-based cues is more important to form an overall authenticity perception than for services with search qualities (e.g., e-commerce).

Agent-related cues might have a stronger impact if they are directly communicated by the service provider, e.g., via announcement in chat stating that the provider guarantees that service agent is an actual employee named John Miller. One user indicated, that s/he thinks that raising the level of transparency would be helpful:

“I personally like it when I see the name of the agent, then I am dealing with someone, that really comforts me. I also start to image what kind of person that is.” (I.22).

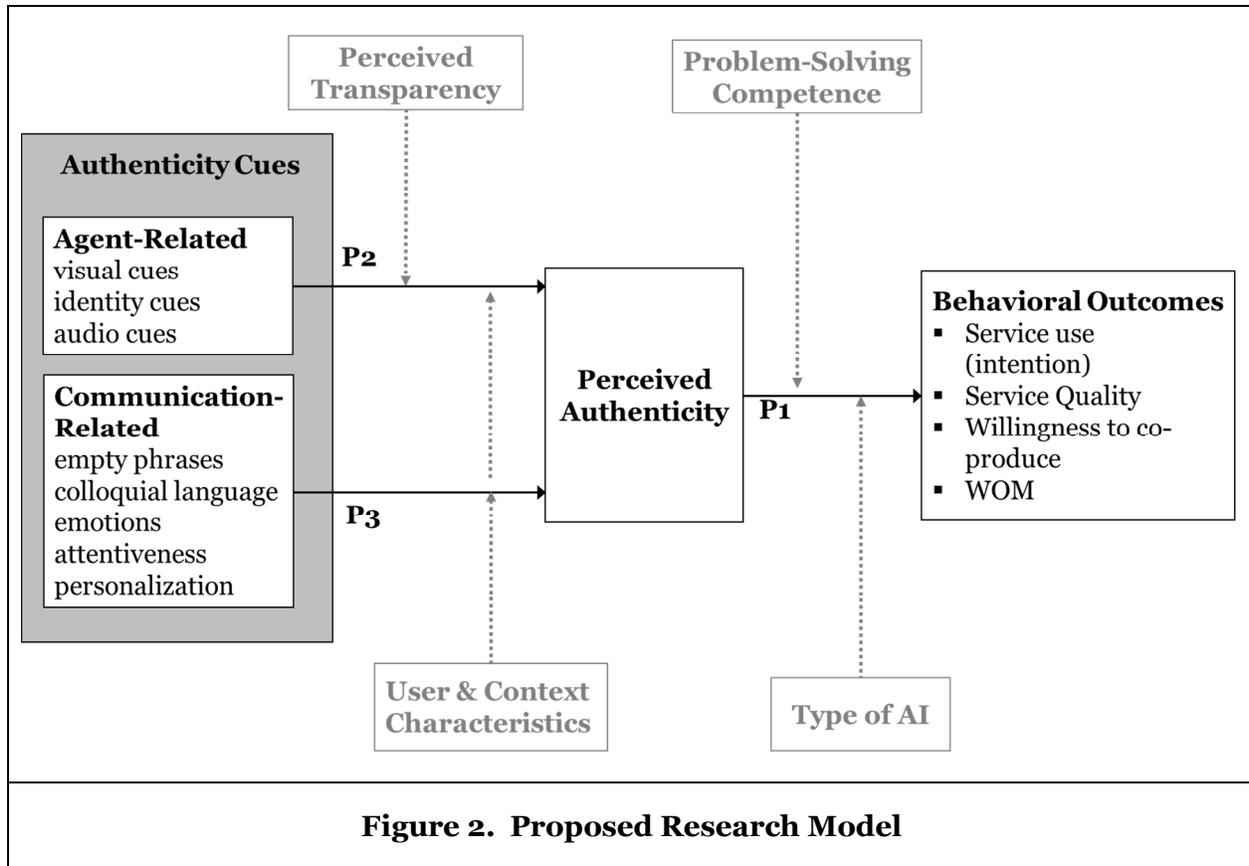
This confirms research on technology-mediated service encounters with a nonvisible service counterpart that identifies transparency in the service encounter as crucial for trust building and use intention (Wunderlich et al. 2013).

Our results indicate that context factors also affect how authenticity perceptions impact user behavior. Parasuraman and colleagues (2005), for example, show that a service employee’s responsiveness - the effective handling of problems - is one core driver of e-service quality. In line with literature on service evaluation that highlights the importance of the service outcome or the competence shown in delivering the service, our result indicate that authenticity perceptions seem to interact with the agent’s problem-solving competence as experienced by users during the service encounter. Some users indicated that in service context with low credence qualities the authenticity of the service agent is not as important as the service’ successful outcome or performance.

“My top priority is, that they help me with my problem.” (I.17).

We asked respondents about their experiences with chats through websites on computers, on phones or with personal assistants such as Siri. Based from our text data, we got the impression that users’ descriptions of voiced-based service experiences clearly differ from text-based service encounters. The type of AI or the medium (e.g. hardware- or software-based) seems to increase in importance as we see more and more AI-based personal assistants that do not have a website-based visual existence, but are linked to an object such as the voice-based assistants “Siri”, “Echo” or “Alexa”.

Figure 2 gives an overview of the proposed effects and potential moderatos we identified based on the qualitative interviews and think-aloud protocols.



Results of Pre-Study 1 and Next Steps of the Research Process

As this is research in progress, the analysis of the qualitative text data is still ongoing. We have analyzed 41 interviews and 10 (out of 15) think-aloud protocols and identified two cues categories that are central for our study: agent-related and communication-related cues. The data analysis will be finalized by the beginning of September. In addition, we have finalized our first pre-study and identified graphical representation Type 1 (see Figure 1) as the most appropriate stimulus to signal a human service agent. Both graphical representations Type 3a and Type 4 are equally suited to represent an AI-based service agent. In a next step, three experimental studies will be employed to triangulate the findings from the qualitative study. The objectives are to empirically test and quantify P1, P2, and P3.

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