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AI-chatbots on the service frontline

Addressing challenges and opportunities of agency

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Abstract

AI-chatbots as frontline agents promise innovative opportunities for shaping service offerings that benefit customers and retailers. Examining current practice through the lens of agency, as defined by Social Cognitive Theory, we present a 3-level classification of AI-chatbot design (anthropomorphic role, appearance and interactivity) and examine how the combination of these three aspects of chatbot design impacts on the complementarities of agency. Recognizing current implementation challenges, we advance that the complementarities of agency at each level are the lynchpin mechanism that translates AI-chatbot design into service relevant outcomes. We develop a research agenda focused on the emotion interface, resolution of the proxy agency dilemma and development of collective agency to support the implementation of AI-chatbots as frontline service agents.

Keywords: AI-chatbots, agency, proxy agent, services frontline

AI-Chatbots on the services frontline

Addressing the challenges and opportunities of agency

1. Introduction

AI-chatbots, as a new form of frontline service agent, are noticeably multiplying in use within retailing and consumer services (Dilmegani, 2021). It is predicted that, by 2025, 95% of consumer online service interactions will be chatbot-powered (Clark, 2020), contributing $112 billion to retail sales (Williams, 2019). AI-chatbots can already answer at least 80% of standard customer enquiries (Suthar, 2020), in addition to being available 24/7. Yet, AI-chatbots are more than enquiry agents. They are able to assist with multiple tasks along a customer's journey. For example, the Tommy Hilfiger chatbot assists customers to select complete outfits, places these selections into the virtual shopping cart and redirects customers to the website for checkout (Moghis, 2020). Chatbots can also fulfil more complex service demands. For example, retail client trading has increased more than 50% in the last year and retail banks are turning to the use of AI-chatbots as financial advisors in order to meet growing demand. At the same time, initial evidence suggests that working with AI-chatbots is more cost-effective for firms than working with human equivalents, whilst still maintaining value for customers. For example, retailers are expected to cut costs by $439 billion a year by 2023 through automating many of the customer interactions currently handled by human customer service representatives (Williams, 2019). As such, AI-chatbots promise large returns on investment for minimal effort (Srinivasan et al., 2018), freeing up time to allow human employees to focus on higher-value customer engagements (Devaney, 2018; Guzman and Pathania, 2016).

There is evidence that AI-chatbots are gaining traction as part of customers' everyday lives. For example, around 35% of customers regularly use chatbot services to buy groceries,

homecare products, and clothes (Mauze et al., 2018). Despite this promising trend, a majority of consumers still remain skeptical about AI-chatbots ability to deliver retail services. With 43% of consumers indicating that they prefer to deal with a human instead of an AI-chatbot (Devaney, 2018). Further, 64% of companies are not planning to implement AI-chatbots, citing user's reluctance to engage with a chatbot as the top reason (Srinivasan et al., 2018). A particular challenge for the widespread implementation of chatbot services is managing service quality alongside productivity. AI-chatbots have to a large extent been used to replace human frontline employees to boost productivity, but they also inherit service quality challenges. That is, AI-chatbots need to convince customers that they are competent to deal with customers' enquiries, provide credible information and deliver reliable services (Gélinas-Chebat et al., 1996; Lapierre et al., 1999). Furthermore, with large and diverse online consumer cohorts, AI-chatbots need to deal with customers from different cultural backgrounds and diverse service expectations and preferences (Chebat and Morrin, 2007; Michon and Chebat, 2004). To date, advances in AI-chatbots as service agents has largely focused on efficiency and functional benefits, especially developing interaction capabilities (Zamora, 2017). AI-Chatbot failure to deliver quality service is still a major impediment to widespread customer usage (Adam et al., 2020). Yet there is a lack of sufficient guidelines on how to better utilize AI-chatbots to deliver value and high-quality services to consumers.

To provide insight into realizing the promise of AI-chatbots as service agents we turn to Social Cognitive Theory (SCT; Bandura, 2018) and the phenomenon of agency. In SCT, agency refers to people's capability to control their life through their actions (Bandura, 2006). To be an agent, "is to intentionally produce certain effects by one's actions" (Bandura, 2018, p. 103). Reflecting the 'triadic co-determination theory of causation' of the interdependencies between personal, environmental and behavioral influences, agency is conceived of at three levels: self; socially-mediated proxy, and; collective (Bandura, 2018). That is, self-agency is

not always sufficient for a person to function well. Sometimes, input from another who has the ability to act on one's behalf (i.e., proxy agency) may be required. Or, input from group or team effort might be needed (i.e., collective agency). We contend that, given the advances in AI-chatbot abilities, as service agents they are well-placed to offer input to complement consumers' capability to manage their needs. Using the 3 levels of agency as a framework, we argue that AI-chatbots can not only act as an assistant in customers' retail shopping, e.g., taking orders. In complex services, AI-chatbots can act as coaches providing guidance, for example, on financial matters. They can also act as co-workers along with human frontline service staff, to form a working team with customers to co-produce the service journey.

In this paper we question how AI-chatbots can be embedded as service agents in order to bring about the promised benefits in retailing and consumer services, highlighting the challenges that need to be addressed. As such, we offer three substantive contributions. First, contributing to current SCT theorizing, we expand the concept of agency to include non-human actors, that is, AI-chatbots. We do so by examining the impact of three aspects of chatbot design (anthropomorphic role, appearance and interactivity) through the lens of agency to establish a comprehensive understanding of the juxtaposition of human and non-human in a service team. Second, looking beyond AI-chatbot functionality, we examine how challenges inherent in the adoption of AI-chatbots as new forms of service agents can be resolved. We develop a framework and supporting propositions regarding how the mechanism of agency translates AI-chatbot design into delivery of relevant service outcomes, taking into account service and customer characteristics. Third, we propose a comprehensive research agenda aimed at the appropriate development of AI-chatbot agency and the integration of AI-chatbots as part of core retailing and consumer service offerings. We also focus specifically on the evolving nature of the intricacies of human-chatbot agency complementarities.

2. AI-Chatbots and Social Cognitive Theory

Our study responds to the call from Blut et al. (2021)'s work that is based on a meta-analytic review of service robot anthropomorphism. They have identified imperative research areas that require attention. In particular, they raise the need to further explore the impact of anthropomorphism in the service delivery process under different conditions. They also highlight the need to reveal the process of such impact (i.e., through meaningful mediators). This is in line with Wirtz et al. (2018) who suggest more research is needed to understand how service robot design dimensions relate to customer responses. Our proposed framework and propositions aim to address these research gaps. We identify the potential factors that may have an impact on agency from various aspects. Specifically, these factors are different manifestations of AI-chatbot design elements which work together to affect customer thinking and behavior. Drawn from SCT, we reveal that such impact may be explained by agency (e.g., a customer's sense of personal control).

As AI-chatbots serve many of the same functions as human actors in frontline service and people tend to anthropomorphize non-human agents, we contend that it is important to understand people's social cognition of non-human agents such as AI-chatbots (Epley et al., 2008; Kwan and Fiske, 2008). Furthermore, in retailing and consumer services, people are increasingly interacting with a frontline service team consisting of AI-chatbots and human staff. Thus, customer confidence in the integrated team is also the key to successful service delivery. We examine current applications of AI-chatbots in practice and apply the lens of agency, as conceived in SCT, to develop a classification of AI-chatbot design and its impact on the complementarities of agency. SCT explains how people's thinking and behavior can be influenced by the other social actors that they interact with and depend on in their daily life,

identifying three modes of human agency (Bandura, 2001; 2018). These agency modes refer to the capability and control of different actors in dealing with tasks in everyday situations.

First, people can rely on their own self-agency, that is, the extent of their capabilities to match the demands of achieving their personal goals (Bandura, 1997; 2006). People's own self-agency can be extended when they become skillful in using technological tools such as smart speaker assistants to complete daily tasks more effectively (Hoffman and Novak, 2018). For example, Amazon enables consumers to issue voice commands to make purchases through the virtual personal assistant Alexa (reporting a 300% increase in voice-based shopping orders during the 2018 holiday season compared with 2017; Reisinger, 2018). As another example, consumers can use Google's human-sounding Duplex chatbot to make restaurant or salon reservations (see Table 1). Since the explosion of AI-chatbot applications in 2016, the implementation of AI-chatbots undertaking such tasks has been where we have seen most experimentation, but not necessarily the most successful in their development (Brandtzaeg and Følstad, 2018).

[Insert Table 1 about here]

Second, people may need to rely on another agent's capabilities to achieve their goals, as they may not possess sufficient capability or control. A necessary condition is that a person has confidence in the agent's abilities to help them to achieve their personal goals, that is, socially-mediated proxy agency (Bandura, 2018; Shields and Brawley, 2007). For example, when AI-chatbots are used in the delivery of an online professional service, it is important to understand people's confidence in AI-chatbot's ability to delivery that service as it has implications for compliance with the advice given (Adam et al., 2020; Vodrahalli, 2021). Using AI-chatbots to augment consumer abilities to achieve personal goals (e.g., providing advice to customers to influence and guide their decision making) is, in practice, one of the largest growing and more successful areas of developments for AI-chatbots, as evidenced in

Table 1. Typical examples of AI-chatbots fulfilling such functions are AI-chatbot financial advisors such as Cleo, Trim, Plum, and Chip (Table 1).

Third, people may need to work together with other agents in a team in order to achieve desired goals, that is, combining the collective agency of capabilities and control (Bandura, 2000; 2018). As machine learning technology continues to advance, so an emerging class of AI-chatbots with the ability to contribute to the collective agency of a team has begun to be implemented in practice to serve customers. For example, Fatema of Bank ABC has been launched as a core member of the customer service team. Based on her ability to learn from interactions with humans, Fatema is employed to provide a personalized customer experience through specified digital channels. She will also post information and updates through social media. Nola is employed by Noel Leeming within its physical retail stores to enhance the in-store experience for customers. This growing area of chatbot application is, perhaps, the most innovative and promising for the future, whilst at the same time being the most challenging to effectively implement. Yet, early evidence suggests that in practice applications demonstrate to customers that AI-chatbots can contribute to collective efficacy (Cui et al., 2021, Wilson and Daugherty, 2018).

We propose that the different modes of customer capabilities and exercising of different controls determine what combination of AI-chatbot design aspects is optimal in supporting the achievement of service goals. That is, the main premise of this paper is that when AI-chatbots are anthropomorphized as service agents, their anthropomorphic design elements will have impact on customer perceptions of agency. Taking account of existing AI-chatbots in daily service, we conceive of three design aspects that reflect the progressive sophistication of AI-chatbot agency in supporting consumers and service delivery. These three AI-chatbot design aspects are: anthropomorphic role, appearance and interactivity, which we discuss in the following section.

Further, we note that as agency sophistication increases so do the managerial implications. These extend from technical limitations through to customer and employee relational issues with AI-chatbots. Our research highlights that firms need to design the AI-chatbot differently, depending on the desired impact on customer agency, echoing Chattaraman et al.'s (2019) observation that AI-chatbots cannot be designed using a one-size-fits-all approach. This is an area that we return to when considering the complementarities of agency later in section 4.

3. AI-chatbot design: challenges and opportunities for agency

Service providers adopt AI-chatbots to facilitate service delivery in various ways (Blut et al., 2016; van Doorn et al., 2017). The challenge of implementing AI-chatbots as a fundamental part of the frontline service team lies in understanding the nature of an AI-chatbot ability to perform various tasks. As AI-chatbots vary in their level of intelligence and autonomy, they can take different roles in the communication and interaction with customer and employees (Xiao and Kumar, 2021). The perceived abilities of AI-chatbots are also shaped by the look of the AI-chatbot service agent and its interface, which can vary with respect to voice- and/or text-based formats, and scripted (responding to specific commands) or machine-learning dialogue (with the ability to understand natural language) (Kirilov, 2016). We examine these three key AI-chatbot design aspects (anthropomorphic role, appearance and interactivity) and the challenges and opportunities for agency.

3.1 AI-chatbot's anthropomorphic role

Wirtz et al. (2018) have proposed that the acceptance of service robots depends on how well robot acts in accord with socially defined roles. AI-chatbot service providers have increasingly anthropomorphized chatbots (i.e., design chatbots with humanlike appearance and interactivity) to convince consumers to perceive these chatbots as frontline agents

capable of performing service roles traditionally performed by human agents (Blut et al., 2021). However, Shank et al. (2021) found that people have different perceptions of AI-agents vis-à-vis human agents inhabiting identical service roles. It is therefore important to understand the impact of different anthropomorphic roles performed by AI-chatbots. We extend current conceptualizations of role anthropomorphism, which has focused on anthropomorphizing a brand to be partner vs. servant role (Kim and Kramer, 2015), by classifying AI-chatbots into three different anthropomorphic roles (assistants, coaches, and co-workers) based on the service roles performed by AI-chatbots.

AI-chatbot assistants AI-chatbot assistants play a supplementary role that facilitates customers in performing tasks and decision making. However, this is a passive role in which customers give orders to AI-chatbot assistants, and the AI-chatbots have little influence on customers' decision making. As such, AI-chatbot assistants enhance a customer's own capability and control in a service interaction. For instance, an AI-chatbot assistant may help a customer to more quickly search for and find products, or provide essential information services, such as, about stock levels and delivery times. This enhances the customer's self-agency, that is, the customer's ability to make decisions during a shopping journey (Thakur, 2018).

However, chatbot assistants are designed for relatively simple tasks, which are also limited in both service scope and the technology underpinning them, meaning there is less flexibility in the AI-chatbots ability to take commands. This can negatively impact on customer use of AI-chatbot assistants (Følstad et al., 2018). A key managerial challenge, therefore, is to improve the flexibility of order taking of chatbot assistants (Dickson, 2018).

AI-chatbot coaches AI-chatbot coaches can effectively support customers with parts of their decision making, so that customers can spend their time and efforts on other things (cf. Bandura, 1997). Perceptions of an AI-chatbot coach's capability may influence

customers' own confidence to tackle a complex task. In this case, customers rely on an AI-chatbot coach's ability to provide guidance, which entails that a customer voluntarily gives some level of control to an AI-chatbot coach, i.e., proxy agency (Bray et al., 2006). This implies a more active role than seen with AI-chatbot assistants. Indeed, such conversational AI-chatbots can engender trust in their human users (Hildebrand and Bergner, 2020). Furthermore, we argue that AI-chatbot coaches may act as a guide to customers, and their guiding style may impact on customers' perceptions of their own abilities in the same manner as human coaches can influence others (e.g., Mittal and Dhar, 2015; Salanova et al., 2011).

However, customers may still be cautious with respect to following the advice of AI-chatbots (Adam et al., 2020). Alongside security and privacy issues, customers may be fearful of the loss of human-to-human services, which they perceive as superior to human-to-chatbot services (Følstad et al., 2018). This is particularly so for complex services that require a comprehensive understanding of the consumer before an AI-chatbot can provide appropriate advice. The challenge here is threefold, one relates to technological advancement (e.g., advanced abilities to learn), one to AI-chatbot design features (e.g., professionalism) and the other relates to customer expectations and acceptance of AI-chatbots delivering more complex services (e.g., Adam et al., 2020; Følstad et al., 2018; Hildebrand and Bergner, 2020). With respect to the latter, the ability for AI-chatbots to not only detect but also respond to emotional states is needed if customers are to more fully accept AI-chatbots in complex services (e.g., health, Fadhil and Schiavo, 2019). A less recognized challenge with respect to the use of AI-chatbot coaches is the proxy dilemma whereby a coach enables people to focus on self-development, yet dependence on proxy agency could also impede self-development (Bandura, 2001), an issue that we return to later.

AI-chatbot co-workers While some users are aware that chatbots are not human, they still interact with chatbots as if they were interacting with real people. Some

users find it comforting chatting with chatbots as if chatbots were their friends. They perceive chatbots as a real service team member rather than just the technology performing basic, routine, and standardized functions (Brandtzaeg and Følstad 2018). Drawn from SCT, we argue that customers' perceptions of this integrated working team will have an impact on their confidence in the service team's (i.e., collective) ability. For example, sales AI-chatbot Conversica augments the capabilities of existing sales teams (Davenport et al., 2020) by seamlessly transferring sales-ready leads to human sales staff in order to close a sale, which may be perceived by customers as being more effective service delivery. SCT documents how a team of human agents achieves collective agency to achieve goals (Bandura, 2000). The emerging class of AI-chatbots are digital co-workers that team up with human counterparts, and take a share in the interdependent relationships within the team. To date, the full opportunity of AI-chatbots as co-workers has not been fully realized. In most cases the AI-chatbot co-worker takes on important but more routine tasks, while human agents focus on the more sophisticated tasks (Clark, 2020). However, the co-worker role differs significantly from the chatbot assistant role in that the chatbot co-worker's role forms a fundamental working part of the service team, rather than as an add-on peripheral service to be used at the customer's discretion. That is, removal of the AI-chatbot from the team would mean that the service would be significantly reduced or impaired. In addition, customers perceive the AI-chatbot-worker as an equal counterpart in the service team, whereas the AI-chatbot coach is seen as an independent advisory agent. Whilst there are currently only a few examples, those that have launched are embedded as part of a deliberate strategy creating a specific role for the AI-chatbot co-worker within a team and relying heavily on more advanced machine learning capabilities. Such AI-chatbot co-workers are envisaged as being able to undertake work that entails complex, ambiguous and uncertain interactions with

customers (Androutsopoulou et al., 2019). As such, the implication of an AI-chatbot failing to deliver service can be as impactful as through a human failure.

While AI-chatbots can work alongside human service agents, raising productivity and enhancing service quality for the service team (Vishnoi, 2020), this may create challenges for both human agents and customers (Robinson et al., 2020). At the least, the transition from interacting with an AI-chatbot co-worker to a human agent needs to be seamless. Further, the boundaries of role that scope between AI-chatbots and human agents may not be obvious to customers, who perceive one service, rather than the component parts. More fundamentally, similar to perceptions of robots (e.g., Barnett et al., 2014), AI-chatbots may be perceived as a threat to human frontline service staff, and human agents may be reluctant to work with a chatbot co-worker in a team (as seen in the introduction of robot workers; Figueiredo and Pinto, 2020). Indeed, where frontline service staff have feared AI-chatbots taking over their jobs, sabotage of AI-chatbot co-workers has resulted (Buyniski, 2019). As these internal operations link to external performance (e.g., customer satisfaction; Kadic-Maglajlic et al., 2018), the integration of AI-chatbots within a human team requires a clearly defined strategy (such as with Fatema or Nola). A further as yet unexplored potential is the role of the chatbot as a co-worker within consumer teams. For consumers there are already fuzzy boundaries between digital and physical voices (e.g., in health, Keeling et al., 2018), indicating the important latent potential for co-creation across varied teams of customers and human and digital employees.

Assemblage theory contends that the characteristics of AI chatbots can expand or restrict users' abilities. For example, when customers use Siri to control their electrical devices remotely, they feel that their capabilities have been expanded (Hoffman and Novak, 2018). It clearly illustrates the assistant role that Siri performs has an impact on user's self-efficacy. On the other hand, when we delegate our financial decision making to the AI-

chatbot coach, we voluntarily transfer our agency to a proxy agent (i.e., proxy agency) (Puntoni et al., 2020). When the AI-chatbot works alongside users, the user sees themselves working with AI-chatbots and others (such as human service staff) that are involved in the production of service, as a team; and that this will impact on user's confidence in this service team (Brandtzaeg and Følstad, 2018).

3.2 AI-chatbot's appearance

As AI-chatbots are replacing human agents in a number of online retailing and consumer service domains, considerable effort has been dedicated to study the optimal design of AI-chatbot's appearance (Go and Sundar, 2019). Appearance can manifest through design of profile pictures (realistic, dynamic and 3D human avatar vs. static and 2D cartoon avatar) and chatbot names (overtly human name vs. non-human name) (Araujo, 2018; Go and Sundar, 2019). In addition, signals of gender, race and age can be used to enhance perception of humanness of the chatbot (Miao et al., 2021). There are two main types of AI-chatbot's appearance that have been investigated in the literature so far: humanlike and robotlike.

Humanlike appearance is proposed to increase perception of social presence, credibility and competence (Nass and Moon, 2000; Westerman et al., 2015). A humanlike appearance may boost perceptions of competence in a chatbot (Schurink, 2019; Araujo, 2018; Kowatsch et al., 2018), and perceived humanness of AI-chatbots support enhanced perceptions of self-agency through chatbot assistance (cf. Gibbons and McCoy, 1991). However, Ciechanowski et al. (2019) found that animated and humanlike chatbots triggered higher uncanny valley effects (i.e., participants considered the chatbot as 'weird') and was viewed less positively compared to a simple chatbot design. Indeed, robotlike appearance is useful in certain situations to lower customer expectations of chatbot behavioral competence and avoid the uncanny valley effect (Mende et al., 2019; Miao et al., 2021).

However, such effects may not be as straightforward, as the findings with respect to the advantages of humanlike over robotlike appearance and interaction style have been equivocal. For example, the failure of Ikea's chatbot Anna was partly due to her being perceived as too human in look and style, which led to raised customers' expectations that could not be met and in turn led to disappointment (Brandtzaeg and Følstad, 2018).

3.3 AI-chatbot's interactivity

Interactivity refers to the chatbot's ability to engage in two-way interaction (Miao et al., 2021), manifested through modes of interaction (verbal vs. nonverbal), and interaction content (style). Prior research suggests that AI-chatbots should adopt characteristics of human-human communication and thus be designed anthropomorphically (i.e., humanlike) in their verbal design cues and non-verbal design cues (Adam et al., 2020).Verbal design cues refer to the use of human-like language (e.g., first person singular pronouns, responsive message exchange) and have been found to impact perception of anthropomorphism and social presence and subsequently on behavioural intention, advice compliance and satisfaction (Adam et al., 2020; Araujo, 2018; Go and Sundar, 2019). Nonverbal design cues refer to AI-chatbot facial cues (Gobron et al., 2013) and the use of emoji (Beattie et al., 2020).

For interaction style, AI-chatbots can adopt a goal-oriented, purposeful and formal task-oriented style or a casual social-oriented style characterized by the exchange of social-emotional and affective information (Chattaraman et al., 2019; Keeling et al., 2010). These two styles have been found to have a differential impact on social (e.g., trust), functional (e.g., self-efficacy, perceived usefulness), and behavioural intent outcomes (e.g., website patronage intention).

One particular problem is with the use of scripted AI-chatbots, and the need to use specialized commands so that chatbot assistants can understand requests. If a chatbot

assistant does not correctly recognize a command it can fail to fulfil a request or act erratically. Concurrently, it is difficult for customers to memorise the complete list of commands that the AI-chatbot assistant can understand (Dickson, 2018). Another problem specific to the use of voice AI-chatbot assistants is that without a display and a graphical user interface they are not suited to assist with complex, multistep tasks (Dickson, 2018).

A particularly important development in the realm of AI-chatbot advisors, especially in financial services, has been the advance from non-conversational to (natural language) conversational interfaces (Hildebrand and Bergner, 2020). This has important implications for the development of chatbot agency, both in terms of a chatbot's ability to deal with more complex tasks and a customer's perception of the chatbot's capabilities. It signifies AI-chatbot has acquired a certain level of autonomy and can take a more active role in advising customer rather than passively taking order from customer (Xiao and Kumar, 2021).

4. Optimizing the value of AI-chatbots as agents in service

Reviewing the current state of knowledge with respect to AI-chatbots, we identify and explore the relationship between anthropomorphic design, agency and service outcomes, to determine the opportunities for successfully embedding AI-chatbots as service agents (see Figure 1). We argue that chatbot functionality is no longer sufficient as a focus. Instead, taking on board the challenges that we identify above we argue for the centrality of the agency mechanism in translating chatbot design into the delivery of relevant service outcomes. The agency mechanism, we argue, rests on the complementarities of agency between human and non-human agents (see Table 2). That is, the extent to which each agent's (human or non-human) capabilities and levels of control synchronizes with and enhances those of the other interacting agents to achieve individual or joint goals.

[Insert Table 2 about here]

[Insert Figure 1 about here]

4.1 AI-chatbot design and complementarities of agency

Much research has focused on the appearance and interface qualities of AI-chatbots, yet research on the anthropomorphic role that AI-chatbot performs (as we advance above) is only just emerging. Depending on the anthropomorphic role performed by of the AI-chatbot agent, enhanced by its appearance and interface qualities, we argue for different complementarities of agency (see Table 2). That is, that different AI-chatbot designs may elicit different agency outcomes (cf. Bloch, 1995).

In the first instance of AI-chatbot assistants, as customers treat chatbot assistants' capabilities similar to their own capabilities (Hoffman and Novak, 2018), they may have experienced a sense of expansion in their own capabilities, leading to an increase in perceptions of self-agency. However, the limitations of AI-chatbot design may restrict this potential to enhance a customer's capability of performing tasks (Hoffman and Novak, 2018), such that there may be a negative impact on perceptions of self-agency (Puntoni et al., 2020). Appearance and interface qualities are two important design aspects. Further, a more natural conversational interface or, at least, the use of turn-taking dialogue, may also support such perceptions of capability (Jain et al., 2018) and hence heightened perceptions of agency. However, such affects may not be as straightforward, as the findings with respect to the advantages of humanlike over robotlike appearance and interaction style have been equivocal.

In the case of AI-chatbots coaches, customers who have confidence in the competence of such AI-chatbots will likely willingly transfer partial or all control to the chatbot, as is seen in studies of human coaches (Bray and Cowan, 2004; Elias and MacDonald, 2007; Jackson et al., 2012). As such, the chatbot's proxy agency works alongside the customer's own agency. However, over reliance on proxy agency may lead a customer to experience a reduced sense

of their own agency (Bandura, 2001). Given the importance of conveying leadership qualities as a coach (Kao and Tsai, 2016), nuances of appearance become more important in the context of a chatbot coach. For example, facilitating a professional appearance or an appearance fitting the context of coaching (Følstad et al., 2018) may increase a sense of social connection and, in turn, increase their perceived capability and thus agency of the AI-chatbot. Further, where a chatbot has a coaching role, the lack of conversational ability to answer complex queries, especially where the chatbot cannot access personal information, could be an impediment to the perceptions of a chatbot's proxy agency (Følstad et al., 2018). A further complexity is that customers may have different needs with respect to interactions with AI-chatbot coaches, where the value of a non-judgmental interaction with a non-human actor enables more self-disclosure and connectedness that subsequently boosts self-agency (Brandtzaeg and Følstad, 2018).

Recent research on robot roles in teams, demonstrates that robots can operate effectively in a team, encouraging desired behaviors in human co-workers (Haring et al., 2019). Consistent with research on service co-creation between customers and human employees (e.g., Yau, 2014; Yim et al., 2012), when an AI-chatbot is perceived as an effective co-worker with the human staff, we propose that it will have a positive impact on customers' perception of the service teams' ability to deliver the services. A defined role for the AI-chatbot co-worker is thus required (as with robot co-workers, Figueiredo and Pinto, 2020), especially as a shared understanding is required to enable teams to collaborate (Davis et al., 2009). Complementarities of agency is complicated within triadic chatbot-human-customer teams. In the best case, collective efficacy will boost self-agency perceptions for customers, and for AI-chatbots, perceptions of their proxy efficacy will be heightened. There is sparse research that examines the appearance and interfaces of AI-chatbots as employees.

Avatar-to-avatar team working supports the importance of appearance and interactions on team's developing a shared understanding (Davis et al., 2009).

Proposition 1: AI-chatbot's anthropomorphic role interacts with appearance and interactivity to impact customers' perceptions of (a) their self-agency, (b) an AI-chatbot's proxy agency, and (c) a service team's collective efficacy.

4.2 The impact of the complementarities of agency on service outcomes

There is evidence that not only does self-agency impact on consumer behaviors, but also that in combination with a proxy's agency such outcomes can be boosted. For example, proxy agency can boost self-agency perceptions to improve educational performance (Elias and MacDonald, 2007), the volume, frequency and enjoyment of exercise (Bray et al., 2013; Jackson et al., 2012), following a coach's advice (Bray and Cowan, 2004) and satisfaction with the service (Kao and Tsai, 2016). In the context of retail banking, customer's perceptions of self-agency and employee (proxy) agency impact on customer service use and customer enjoyment and vice versa for employees (Yim et al., 2012), underpinning the importance of the complementarities of agency. Indeed, when consumers are more dependent on the proxy's efficacy, they perceive, for example, exercise to be more difficult to manage (Shields and Brawley, 2007). Finally, there is evidence that self-agency and collective agency can impact on customers' willingness to pay, e.g., for environmental protection in the tourism and hospitability industry (Doran et al., 2015).

In more complex team situations, a team's service-sales ambidexterity can be boosted through perceptions of proxy efficacy (Yu et al., 2015). Further, there is evidence that self-agency, proxy agency and collective agency together are significant determinants of participation in teamwork, for example in the context of multi-owned housing management teams (Yau, 2014). Despite a lack of research evidence in the AI-chatbot realm, it is likely

that agency perceptions in the context of AI-chatbots as service agents will bring about similar outcomes.

Prior research has established that perception of self-efficacy has direct impact on usage intention (Joo et al., 2018), advice compliance (Scherer and Bruce, 2001), satisfaction (Zhao et al., 2008) and willingness to pay (Doran et al., 2015). Literature examining the use of a proxy agent has found that proxy-efficacy perception leads to enjoyment (Bray et al., 2013; Jackson et al., 2012), advice compliance (Bray and Cowan, 2004) and satisfaction (Kao and Tsai, 2016). A group's collective efficacy has been found to predict group performance (Watson et al., 2001) and individual job satisfaction (Klassen et al., 2010).

Proposition 2: Self agency, proxy agency, and collective agency will impact on service relevant outcomes (such as customers' intention to use AI-chatbots and to follow an AI-chatbots' advice, as well as customer enjoyment and satisfaction, and willingness to pay).

4.3 Moderating role of customer characteristics

Epley et al. (2007) argues that the more humanlike a chatbot is in appearance the more likely a person will be to anthropomorphize the non-human agent. However, customers vary in their tendency to anthropomorphize non-human entities (Aggarwal and McGill, 2007; Waytz et al., 2010a). This tendency can be conscious or non-conscious (Kim and Sundar, 2012). When consumers see AI-chatbots as similar to human agents, they view the chatbot as a social actor. The chatbot may, thus, be perceived as capable of judgement, intention and feeling. In turn, the chatbot is perceived as capable of social influence as individuals believe the agent could direct the judgement, intention and feeling toward the individuals (Waytz et al., 2010b). Thus, a person's tendency to anthropomorphize a chatbot as a service agent will likely moderate their perceptions of proxy agency.

Consumers also differ in their desire for control, that is, the "extent to which people generally are motivated to see themselves in control of the events in their lives" (Burger, 1992, p. 6). A customer with a high desire for control may experience a perceived loss of control when they rely on an AI-chatbot agent to undertake a task for them. In contrast, those who have a low desire for control may experience a perceived gain in control as the AI-chatbot helps them to achieve more. We thus argue that the desire for control may also moderate a customer's perceptions of self-agency.

Proposition 3: The relationship of AI-chatbot design with agency will be moderated by consumer characteristics (tendency to anthropomorphize AI-chatbots and desire for control).

4.4 Moderating role of the nature of service

The nature of the service may impact on the relationship between agency and customer outcomes due to the differing demands of complementarities of agency. For transactional services, the main goal is task completion, most likely undertaken by an AI-chatbot assistant. In this instance, the relationship between agency and customer outcomes is likely to rely on self-agency being boosted by perceived proxy agency. For relational services, it is important to build agent-customer relationships to engage customers on an ongoing basis (Huang and Rust, 2017), most likely undertaken by an AI-chatbot coach or, for more complex relationships, chatbot co-worker with a human counterpart. In this instance, the relationship between agency and customer outcomes is likely to rely on a more complex interaction between self, proxy and collective agency.

Perceived risk refers to the uncertainty that a customer experiences during their service interactions with AI-chatbots, for example functional risk, financial risk and privacy risk (Miao et al., 2021; Moriuchi, 2021). When customers feel greater uncertainty (i.e., higher perceived risk), they may rely more on the chatbot's ability to provide personalized advice to

reduce the risks (Miao et al., 2021). Thus, the relationship agency and customer outcomes are likely to be moderated by perceptions of risk.

Proposition 4: The relationship between agency and outcomes will be moderated by the nature of service (transactional vs relational services) and perceived risks.

4.5 Implications for developing AI-chatbot services

Practitioners need to be aware not only what kind of designs would impact on service outcomes but also the rationale of such impact. This is a useful insight in deciding the positioning strategy for an AI-chatbot service offering. That is, to achieve desirable customer outcomes, AI-chatbots need to be designed appropriately (Huang et al., 2019; Miao et al., 2021). Our paper advances the process of how the design of AI-chatbots influences customer outcomes via its impact on the complementarity of agencies. For example, AI-chatbot's anthropomorphic role as an assistant would enhance customers' capabilities to complete the tasks by performing simple routine tasks on behalf of the customers. This creates a sense of capability enhancement via AI-chatbots, which may positively impact self-agency. On the other hand, AI-chatbot's anthropomorphic role as a coach enables the customers to achieve their goals via a different mechanism. In this case, customers voluntarily give up control to AI-chatbots to think or analyze for them and subsequently follow AI-chatbots' advice. In the creation of service value, AI-chatbots working as co-workers side-by-side with the customers creates a sense of a team, which impacts on collective agency. Customers are no longer just by themselves; they are partnered with AI-chatbots and human service staff in this service creation journey. It is clearly illustrated that the different anthropomorphic roles performed by AI-chatbots would have impact on how customers see themselves, AI-chatbots, which then lead to different customer outcomes.

Practitioners also need to be aware that different combinations of design elements may yield different impact on customers' perceptions, thus they need to carefully select the optimal combination of different design aspects for delivering certain type of service for a certain group of customers. We argue that a more comprehensive approach when designing AI-chatbots should be taken rather than just focusing on one or two aspects of the AI-chatbots. For instance, when designing an AI-chatbot to perform an assistant role, it needs to match with a suitable appearance (e.g., robotlike appearance to lower expectation of the AI-chatbot) and interactivity (e.g., appropriate verbal or non-verbal communication style). This will maximize the intended impact of AI-chatbots on the various types of agencies. Thus, anthropomorphic role, appearance, and interactivity need to be taken into consideration simultaneously, especially how the combined design elements impact on agency and the complementarities of agency (Table 2).

5. Future research agenda

The aforementioned propositions are aimed primarily at optimizing the value of AI-chatbots on the services frontline from an agency perspective. This is important, as the scale for the delivery of personal services has increased dramatically. In this final section we aim to increase the scope of research on AI-chatbots by developing a wider future research agenda that helps further understanding of the phenomenon and aids in building a solid scholarship base in relation to the three levels of agency.

5.1 Emotion and AI-chatbot agency beliefs

As noted above, there is emerging evidence of the relationship between emotion and agency beliefs. State-of-the-art AI-chatbots are humanlike objects that are designed to induce positive affect and stimulate a sense of social bonding and trust through agency. In relation to emotion manipulation, Caruana et al. (2017) demonstrated that user ratings of AI-chatbot interactions as pleasant and cooperative were higher for humanoid agents. Affective elements

of interaction have emerged as a significant determinant of agency beliefs. However, elicitation of affect is a complex issue that involves an incredibly rich range of emotional cues beyond human appearance and interaction style. Future research is needed to uncover this richness. Advances in chatbot design aimed at eliciting positive emotion and subsequent agency belief adjustment, has been automatic imitation or mimicry (Wang and Gratch, 2009).

However, results so far have remained inconclusive as to whether mimicry by AI-chatbots will result in positive emotions being experienced by users. Thus, a general approach to building mimicry needs to uncover, for instance, in which situations and in combination with what interaction style mimicry by AI-chatbots is effective and optimal. Another emotional cue relevant to chatbot-customer interactions is voice. We increasingly operate in a service ecosystem in which this dimension has moved to center stage with the advent of smart speaker devices, such as Amazon Echo and Apple HomePod and voice-based assistance on search engines (de Ruyter et al., 2018). Adding voice as an emotion cue to regulate chatbot agency raises a number of interesting questions with regards to optimal deployment in terms of agency, as human speech is more than just words and sentences. One challenge is to establish whether voice prompts spoken by a selected voice actor should be used or whether the versatility of an automated voice provides a more optimal customer experience when the information requested is constantly changing. Another issue to address is what 'voice color' (or timbre) fits customer preference and brand values as AI-chatbots are becoming increasingly a voice interface.

5.2 AI-chatbots and the proxy agency dilemma

In relation to proxy agency, we have observed that AI-chatbots can perform a crucial role in performing services that may result in a number of positive outcomes for customers who use this service. Bandura (1997) observed that in fact the combination of a subject's aptitude and that of a proxy agent often results in an optimal approach to enabling self-regulation by proxy

users. At the same time, Bandura (1997) also theorized about the possible occurrence of an undesirable situation that emerges when proxy agency is performed in a less optimal fashion.

At the heart of the so-called proxy agency dilemma lies the risk that a person may become too dependent on the proxy agent. When this occurs proxy agency may stand in the way of self-regulation and the development of knowledge and skills. Ultimately, and as a result of suboptimal dependence, individuals may incur a level of vulnerability that is undesirable from a personal, social and economic point of view. Bandura (2001, p. 13) argues that "part of the price of proxy agency is a vulnerable security that rests on the competence, power, and favors of others". Dependency may also impede the positive collaborative relationship between an individual and a proxy agent's capabilities through decreased engagement, diminished generation of alternative solutions and lack of progress in goal attainment. These negative outcomes may become particularly apparent when users do not have access to a proxy agent and, as a result, become fully dependent on their own agency levels. For instance, when an AI-chatbot is not be accessible as a result of site maintenance or a power outage and a time-critical decision needs to be taken (i.e., selling stocks).

Furthermore, as the technology is increasingly applied in relation to vulnerable users (e.g., mental health coaching), it can be argued that the proxy agency dilemma may have important consequences for well-being or the development of critical coping skills and adherence behaviors (e.g., in the case of diabetes patients). So far, empirical evidence is lacking as to the occurrence and consequences of the proxy agency dilemma in relation to AI-chatbots. Future research is needed to extend scholarship on this important aspect of proxy agency to the development, deployment and use of AI-chatbots on the frontline.

5.3 Collective agency between AI-chatbots and employees

In relation to the retail frontline, there is an interest in insights that contribute to answering the question how can AI-chatbots and employees can collaborate more optimally by means of

collaborative intelligence (van Dolen and de Ruyter 2002; de Jong et al. 2003; Epstein, 2015; Guszcza et al., 2017). As AI-chatbots and human co-workers are distinct entities it is not well understood how value can be optimized by recognizing that machine and human intelligence may be complementary, and what the dynamics of this type of collective agency are. Collective agency through human–AI interaction necessitates the need to analyse collaboration in relation to complex actions including communication, coordination and joint action (Lemaignan et al., 2017). Optimizing conditions for AI-chatbots to work together have not been comprehensively assessed and this may actually impair agency formation. For instance, humanoid AI-agents have been shown to cause consensus, such that subjects' views converged with the views of the agent and marginalized subjects' own judgments in groups (Vollmer et al., 2018).

The use of AI in frontline teams can lead to superior results in terms of operational efficiency and effectiveness (i.e., higher customer satisfaction and trust levels) as AI supported teams can improve decision-making, increase responsiveness and reliability leading to enhanced value creation. At the same time, many potential positive outcomes of collective agency have been linked to negative anticipated consequences, such as value destruction through mindlessness and an overreliance on efficiency parameter tracking. Seeber et al. (2020, p. 9) conclude that lack of equivalence in predicted effects on collective agency between human and AI-agents is the result of the fact that 'AI is a dual-use technology; it can be used for both beneficial and harmful purposes'.

Future research should address dualities of effects in relation to collective agency on the retail frontline through collaborative intelligence. Assessing these dualities could assist in our understanding of the significance of ambivalent effects and identify conditions and boundaries under which they can be resolved. First, frontline service delivery has often been associated with role stress (de Ruyter et al., 2001). Introducing AI based agents in frontline

teams has the potential to increase the intensity of work pace. While this may increase operating efficiency and customer perceived responsiveness and accessibility, it may also lead to increased cognitive overload which may be detrimental to the efficacy of the team. Furthermore, AI-agents arrive at solutions to customer problems based on data-driven 'goodness of fit' and parallels between customers and events. This lack of serendipity may constrain creative input of human agents and result in decreased collective agency needed to service customers. Additional research should explore the risk that existing views on customer issues may come to prevail and how to mitigate this. Also, frontline service delivery often needs to address the personalization paradox: increased personalization and convenience comes at the expense of decreased privacy and transparency levels (Aguirre et al., 2015). Future research on collective agency between virtual and human agents should address the impact of this personalisation paradox and identify factors that may contribute to solving it.

With this research agenda, we hope to extend the current scholarship base on agency in relation to AI-based agents in a services frontline context and assist with addressing current managerial challenges related to AI-chatbot implementation for service encounters across omni-channel platforms.

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Table 1: Examples of current applications of AI-chatbots

Company	Skill area	B2B / B2C	Function	Platform	AI Name	AI Avatar
Amazon.com, Inc.	General	B2C	Perform tasks or services for an individual based on commands or questions	Smart speaker, mobile app	Alexa	(no avatar)
Apple Inc.	General	B2C	Perform tasks or services for an individual based on commands or questions	Smart speaker, mobile app	Siri	(no avatar)
Google LLC	General	B2C	Perform tasks or services for an individual based on commands or questions	Smart speaker, mobile app	Google Assistant	(no avatar)
Cleo Ai Ltd.	Finance	B2C	Budget, save and track spending	Facebook Messenger	Cleo	
Ask Benjamin Inc.	Finance	B2C	Track spending and save	Facebook Messenger	Trim	
Plum Fintech Ltd.	Finance	B2C	Save and invest	Facebook Messenger, mobile app	Plum	
Chip Financial Ltd	Finance	B2C	Track spending and save	Mobile app	Chip	
Luka, Inc.	Mental health	B2C	Personal companion for mental wellness	Mobile app	Replika	
Wysa Ltd.	Mental health	B2C	Stress, depression & anxiety therapy	Mobile app	Wysa	
PocketConfidant AI SAS	Mental health	B2C	Help to reflect and clarify thinking	Website	PocketConfidant	
Xyngular Corp.	Fitness	B2C	Remind user to consume product and give daily tips	Text message	Xander	(no avatar)

Company	Skill area	B2B / B2C	Function	Platform	AI Name	AI Avatar
CoachAi Ltd.	Fitness	B2B	Improve fitness club member retention	Facebook Messenger	CoachAi	
BRiN Global Pty Ltd.	Business	B2C	Provide personalized business education and human-like support	Mobile app	BRiN	BRİN
LifeSpark Inc.	Parenting	B2C	Help user learn parenting skills	Facebook Messenger	Heather	
Kwiziq Inc.	Language	B2C	Help user improve language skills	Website	Kwiziq	
IBM	Career	B2B	Align business goals with employees' career goals	IBM Watson	Myca	
Appynest Inc.	Management	B2B	Teach managers how to develop their leadership skills	Website	Amanda	
Saberr	Teamwork	B2B	Deliver insights and practical skills to help teams improve the way they work	Website	CoachBot	
Bank ABC	Banking	B2C	Respond to customer inquiries	Website	Fatema	
Comcast	Telecommunication	B2C	Respond to customer inquiries	Website	Xfinity	
Noel Leeming	Retail	B2C	Help customers find the product they are looking for	Website	Nola	

Table 2: Potential benefits, agency complementarity and key challenges for AI-chatbot service agents

AI-chatbot design	Characteristics	Potential Benefits	Agency Complementarity	Potential Challenges
Anthropomorphic role	AI-chatbot assistants (e.g., smart voice assistant like Alexa, Siri, Google Assistant)	• Customers can complete more tasks/achieve more using AI-chatbot assistants for relatively simple tasks. • Expanding scope of tasks that one can perform, e.g., people can control their smart electrical appliances at home when they are outside using voice assistant.	Complements self-agency.	• Increasing usability and adoption. • Limited capability of AI-chatbot assistants when based on scripted dialogue. • Difficulty in using voice-based assistants as voice commands can be difficult or unnatural to use, e.g., people need to use the specialised commands that the smart device/assistant can understand.
	AI-chatbot coaches (e.g., AI-chatbot financial coach like Cleo, Trim. Plum, Chip)	• Customers transfer partial or all control to AI-chatbot coaches to automate/manage some aspects of their life so that they can free up time and associated stress, e.g., people get financial coaching from AI-chatbot coaches and automated saving and budgeting to free up their time.	Combination of proxy agency and self-agency.	• Overcoming perceptions of superiority of human agents. • Complex services requirement for comprehensive machine learning abilities • Privacy and security concerns. • Agent design and service expectations.
	AI-chatbot co-workers (e.g., Fatema in banking, Nola in retailing)	• AI-chatbots work as digital co-workers with human employees in a team, augmenting the capabilities of the team, e.g., Conversica helps to attract customers and seamlessly transfers sales-ready leads to human sales staff in order to close a sale.	Interplay between self, proxy and collective agency.	• Strategic misalignment of AI-co-worker and employee capabilities lead to customer dissatisfaction and/or service failure. • Employee fear being replaced by AI-chatbots that take over parts of their jobs, there is a need to overcome tensions, biases and fears of redundancy.
Appearance	Humanlike vs Robotlike	• Humanlike appearance is proposed to increase perception of social presence, credibility and competence. • Robotlike appearance is useful in certain situations to lower customer expectations of chatbot behavioral competence and avoid the uncanny valley effect.	Combination of proxy agency and self-agency.	• Not clear which appearance is the most optimal as findings with respect to the advantages of humanlike over robotlike appearance have been equivocal.
Interactivity	Interaction mode and style	• Chatbot can now deal with more complex tasks in financial services through natural language conversational interfaces.	Combination of proxy agency and self-agency.	• Not clear which interactivity is the most optimal as findings with respect to the interaction styles have been equivocal.

Figure 1: Optimizing the value of AI-chatbots as agents in service through agency