

The TRISEC framework for optimizing conversational agent design across search, experience and credence service contexts

Optimizing CA
design across
SEC contexts

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Abstract

Purpose – Service providers increasingly use conversational agents (CAs), such as chatbots, to effectively communicate with customers while managing interaction costs and providing round-the-clock customer service. Yet, the adoption and implementation of such agents in service contexts remains a hit-and-miss, and firms often struggle to balance their CAs implementation complexities and costs with relation to their service objectives, technology design and customer experiences. The purpose of this paper is to provide guidance on optimizing CA design, therefore, the authors develop a conceptual framework, TRISEC, that integrates service logic, technology design and customer experience to examine the implementation of CA solutions in search, experience and credence (SEC) contexts.

Design/methodology/approach – The paper draws on service marketing and communications research, combining the service context classification scheme of search, experience and credence and the technology infused service marketing triangle foci (service, technology and customer) in its conceptual development.

Findings – The authors find that an opportunity exists in recognizing the importance of context when designing CAs and aiming to achieve a balance between service objectives, technology design and customer experiences.

Originality/value – This study contributes to service management and communications research literature by providing interactive service marketing researchers with the highly generalizable TRISEC framework to aid in optimizing CA design and implementation in interactive customer communication technologies. Furthermore, the study provides an array of future research avenues. From a practical perspective, this study aims at providing managers with a means to optimize CA technology design while maintaining a balance between customer centrality and implementation complexity and costs in different service contexts.

Keywords Conversational agents, TRISEC, Customer experience, Artificial intelligence, Service logic, Service management

Paper type Research paper

Introduction

Interactive customer communication technologies, namely conversational agents (CA), are attracting the attention of firms by promises of reduced costs and better service coverage. For

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example, predictions have been made on potential savings of over \$8 billion annually 2022 in relation to chatbot adoption in business operations (Juniper Research, 2020). While chatbots are one example of CA implementations, CAs in general act as means of interactive communication with customers and can include or be present as modules in virtual assistants (e.g. Alexa), service robots or even interactive talking holograms and virtual reality experiences (De Keyser *et al.*, 2019; Hollebeek *et al.*, 2020). These CAs perform simple tasks such as straightforward service support requests as well as more complex health, financial or shopping advice services.

Depending on their objectives, CA design and implementation varies widely from simplistic website assistants to emotionally aware CAs meant to aid with well-being and loneliness. When it comes to CA technology, firms need to make decisions on how such agents behave, look and react in an effort to strike a balance between the costs of such feature implementations that aid the service objectives and the customer's experience interacting with such an agent (Van Pinxteren *et al.*, 2020). Thus, be it a museum experience chatbot (e.g. Vassos *et al.*, 2016) or a COVID-19 companion robot with conversational capabilities (e.g. Odekerken-Schröder *et al.*, 2020), CAs are designed with a set of features that aid in the organization's service objectives.

Yet, when CAs fail to perform their service objectives adequately they end up affecting the customer's experience, potentially damaging customer loyalty and satisfaction (Crollic *et al.*, 2022). A recent report revealed that poorly implemented CA solutions could have negative consequences on the customer experience and loyalty, leading to customer churn as stated by 48% of international enterprise customer service decision makers (Forrester, 2019). Such failures could be attributed to insufficient technology availability and design that influence the usefulness, usability and trust perceived by customers (Janssen *et al.*, 2021). Thus, while CAs might range from simple to complex depending on their roles, striking a balance between CA service logic, technology design and the customer's experience can be challenging and varies across service contexts (e.g. banking, healthcare and tourism).

In that respect, two key gaps are identified: first, firms often focus on resolving organizational performance problems when designing/adopting CAs, thereby neglecting the customer's experience and interactive needs (e.g. engagement and communication) as a result. For example, Van Pinxteren *et al.* (2020) discuss that CAs often fail to establish satisfactory relationships with customers. Similarly, Polani (2017) highlights that customers especially with more unusual problems get highly frustrated when they have to endure lengthy, standardized CA communication before reaching a human agent. Also, customers might prefer and trust human actors more in communicating with firms (e.g. Dietvorst *et al.*, 2015). Despite these customer experience issues, CAs provide such cost-saving and service automation benefits that firms will continue to expand these AI-enabled communication services. Previous research has mainly focused on the impact of CAs on either service objectives (e.g. Mozafari *et al.*, 2021), the technical aspects (e.g. Bavaresco *et al.*, 2020) or customer perceptions (e.g. Crollic *et al.*, 2022), while research is still scarce on how CA design simultaneously impacts these different pillars in interactive communication encounters. Therefore, we need more insights on balancing the service logic, the technology design of CAs and customer experiences of a firm designing and implementing such interactive communication technologies.

Second and relatedly, there exists misalignment between the cost and complexity of designing/adopting CAs, and the service and customer-centric features and objectives of such an agent. Firms choosing to integrate CAs into their service offerings need to invest considerable financial and time resources to build the AI-enabled service system (Jang *et al.*, 2021). However, depending on the intricacies and risks of the service context, CA features and capabilities may vary depending on their embedded artificial intelligence (AI) algorithms (Bavaresco *et al.*, 2020). Therefore, next to balancing service logic, technology design and customer experience, we also need more insights that consider the service context and the

resulting CA requirements for optimal CA design. Crolic *et al.* (2022) agree that we need more research on how to best design and deploy CAs.

To address these gaps, we develop a conceptual framework (TRISEC) that balances the service-technology-customer triad and distinguishes between three different types of service contexts (search, experience and credence-SEC). Our TRISEC framework therefore contributes insights on how to effectively design CAs, disentangling how the service logic, technology design and customer experience triad could influence CAs implementation solutions in the different SEC service contexts. Furthermore, we propose a comprehensive research agenda that aims to further explore how CA design can be optimized in both theory and practice via TRISEC.

Literature review

When it comes to service research priorities, both academics and practitioners agree that inputs into how technology influences service provision and customer experiences are critical areas to explore (Ostrom *et al.*, 2021). Thus, to approach the problem of designing effective CAs, it is important to first disentangle how service logic, technology design and customer experience interact within a CA-infused customer journey.

Service, technology and customer

As CAs become increasingly infused in different touchpoints of the customer journey, the role these technologies play toward achieving firm objectives while serving the customer becomes critical (Larivière *et al.*, 2017; Lemon and Verhoef, 2016). Hence, a balance in the technology infused service marketing pyramid foci (Bitner *et al.*, 2000; Parasuraman, 1996, 2000, p. 308,) needs to be achieved between service objectives, optimally serving the customer needs and designing and implementing interactive communication technologies that satisfy the latter. Figure 1 depicts the technology-focused triad that firms need to balance (SEC), their respective interactions (service logic, technology design/implementation and customer experience) and the sufficiency level of CAs with respect to these foci.

Many factors play a role in designing and implementing interactive communication technologies in services. For CAs, the decisions taken based on these factors majorly stem from service objectives (i.e. what goals the firm aims to achieve by adopting such technologies), the technologies used (e.g. a human-like chatbot interface with a sentiment analysis AI algorithm) and customer interactions (i.e. how should these agents interact with customers) (Kumar *et al.*, 2010; Robinson *et al.*, 2020). The interactions as well as the design

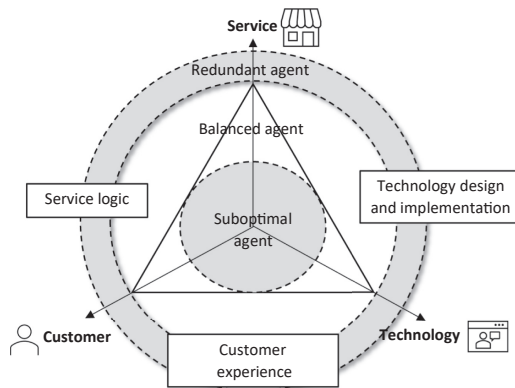


Figure 1.
The service, technology and customer triad

and implementation toward one of the foci or the other could lead to varying results of agent effectiveness and efficiency. Each of the triad foci will be discussed in what follows and their balancing expanded in the conceptual development section.

Service logic. A firm is ultimately judged by its *raison d'être* or the value it provides to its customers (Hindle, 2008). Services are inherently processes, and rely on designed direct and indirect interactions between the firm's resources (e.g. employees, technology) that serve customers (Fisk *et al.*, 1993). Thus, services are designed with a service logic in mind that determines how the service interacts with customers (Grönroos, 2008). From a technological perspective, interactive communication technologies are ideally designed and implemented to facilitate and aid this service logic by being incorporated in the service process (Bitner *et al.*, 2000). Simultaneously, this design and implementation also dictates, with varying degrees (i.e. depending on the role the technology plays), how customers experience both the technology and service (Van Doorn *et al.*, 2017). The value co-created by the service and customers is dictated by their direct or indirect interactions together and describes the underlying service logic (Grönroos and Voima, 2013). These interactions occur within different touchpoints of the customer journey and result in customer experience (Lemon and Verhoef, 2016). Thus, firms need to "engineer" and design service experiences via, for example, blueprinting and servicescape enhancements (Bitner, 1992; Carbone and Haeckel, 1994). As such, the service provider should be in a constant state of service logic optimization, addressing the interaction gaps between design choices made by organizations on the one hand (i.e. choices that create intended experiences), and the design characteristics perceived by customers on the other (i.e. choices that describe the realized experience) (Ponsignon *et al.*, 2017). Bridging this gap requires a conscious effort by the service provider at striking a balance that optimizes the customer experience while maintaining a satisfactory level of return on investment incurred by operational costs involved in this process (Harvard Business Review Analytic Services, 2017).

Technology design and implementation. A critical factor in this optimization procedure is technology and its roles in augmenting, substituting and facilitating service business models (Larivière *et al.*, 2017). In particular, CAs act as a communication bridge between firms (including their employees) and customers, thus CAs can take on multiple roles in service frontlines with different technological infrastructure to match those specific roles (Robinson *et al.*, 2020). For example, a text-based CA (chatbot) can be adopted to aid customers in finding specific information on the website of a service via conversational dialog, or it can even be used as a method to evaluate customer feelings (Sidaoui *et al.*, 2020). For a chatbot to perform its role effectively, it should showcase technology that is able to comprehend the customer's inquiry and retrieve the most relevant information. On the other hand, a health-focused well-being CA that aims at mitigating loneliness would need to develop an emotional understanding (via e.g. sentiment analysis) and respond accordingly to the person it is communicating with (e.g. Odekerken-Schröder *et al.*, 2020). As such, it is not only important for service providers to design technologies that address the utilitarian and hedonic customer needs, but also evaluate whether these technologies are mature enough or even available for the use-case they are implemented for. Furthermore, services need to strike a balance between the costs involved in these technologies and whether they fulfill their roles and objectives adequately (McLeay *et al.*, 2021).

Customer experience. Since CA technology plays an interactive stimulating role with customers, it heavily influences the customer's experience – "non-deliberate, spontaneous responses and reactions to particular stimuli" (Becker and Jaakkola, 2020, p. 637; Sands *et al.*, 2020). This in turn might have grave consequences on the satisfaction and loyalty of customers, especially if the technology design and implementation ends up contributing to service failure (Choi *et al.*, 2021). This is also tied to the complexity of the role the CA assumes and level of the design and implementation of the technology required for this role (Van Pinxteren *et al.*, 2020). For instance, a search-focused CA might do a better job at retrieving relevant information to the user as opposed to an emotionally-aware agent due to the more

complex nature emotional awareness would require from an AI algorithm (Huang *et al.*, 2019). Furthermore, customers themselves might possess negative attitudes toward CAs regardless of how well it was designed and implemented (Davis, 1989). Another dilemma exists in managing organizational expectations that develop from the promises of cost reduction in CA adoption and its possible effects on customer experiences (Brynjolfsson *et al.*, 2017). In other words, firms using CAs might generate human-resource savings, but without proper design and implementation, these savings might be overshadowed by the indirect costs incurred by a negative customer experience (i.e. influencing loyalty or satisfaction).

Service context matters: search, experience and credence services

While the SEC foci aid in describing the service encounter, the context in which the encounter occurs can have a significant impact on how these foci interact. One of CAs' main purposes is to help customers in situations, where they perceive some uncertainty and need support. These situations happen at different touchpoints throughout the customer journey (Lemon and Verhoef, 2016). For example, customers might need help in a pre-purchase situation (e.g. considering different choice options), during the purchase process (e.g. payment options) or have after-sales service issues. To understand such customer situations, the CA needs the respective input from the customer, and therefore engages in information soliciting behavior (e.g. asking various questions to the customer). Simultaneously, the service context plays a large role in these situations, as customers and the CA have varying levels of information needs and availability, situation-related uncertainty and expectations of service complexity. Based on these varying levels of uncertainty perceptions, we propose using the service classification scheme of SEC services to conceptualize these different levels of risk (Chaudhuri, 1998; Girard and Dion, 2010; Hsieh *et al.*, 2005; Mitra *et al.*, 1999; Nelson, 1970; Park *et al.*, 2021). The classification scheme helps to ensure customer centricity while informing organizations to balance their CA technology design in terms of complexity and cost.

Search services represent the lowest level of perceived risk, as attribute information necessary for the service interaction can be relatively easily obtained (Girard and Dion, 2010). Likewise, customers can straightforwardly evaluate service outcomes before consumption (Park *et al.*, 2021). For example, interacting with the CA of a bank about opening hours can be easily imagined *a priori*.

Experience services have a higher level of perceived risk than search services, because relevant attribute information cannot be known until consumption happened (Hsieh *et al.*, 2005). For example, interacting with Pepper, a humanoid service robot who also entertains customers using dialog systems, during a restaurant visit is perceived as experience that is difficult to judge before it happened (Mende *et al.*, 2019).

Credence services have the highest level of perceived risk, as attribute information cannot be easily obtained (Girard and Dion, 2010) and customers have difficulties in evaluating their service outcomes prior and even after consumption for a considerable time period (Park *et al.*, 2021). For example, customers find it challenging to evaluate more complex CA support in mental health care services for the elderly (e.g. Stafford *et al.*, 2014).

Conceptual development – the TRISEC framework

The TRISEC framework

Since SEC contexts influence the interactions between the service, technology and customer triad foci, CA design would need to account for such interactions to build more optimal implementations. Accordingly, we propose the TRISEC framework (Figure 2), which aims at providing academics and practitioners with a more context-aware and comprehensive means to optimize CA design by explicitly considering the SEC contexts. Hence, our TRISEC

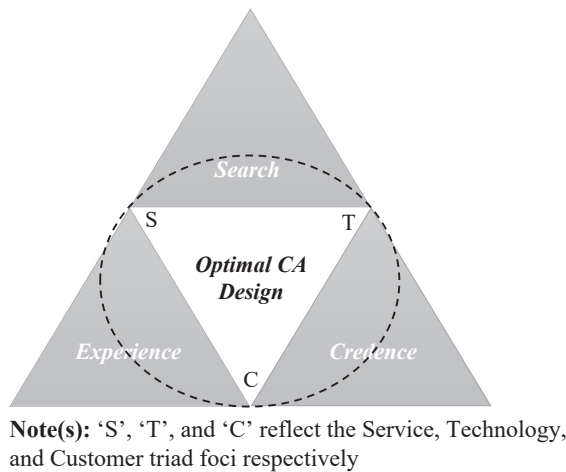


Figure 2.
The TRISEC
framework for
optimizing CA design

framework integrates these theoretical entities to foster their conceptual consolidation. At the same time, the framework enables scholars to simultaneously examine the impact of CAs on the service, technology and customer foci in interactive communication encounters, while it also allows zooming in on particular aspects of each. Firms optimizing their CA design can use it to improve customer experience and interactive communication needs, while balancing the cost and complexity of such designs.

The outermost triangles of the TRISEC framework portray the different context-driven SEC service, technology and customer foci. Aiming toward optimal CA design would mean that CA designers would need to evaluate how much of each of the SEC context characteristics are portrayed in the service offering in relation to the different triad foci (illustrated by the dashed circle). We will now first discuss the importance of balancing the triad foci, followed by an explanation of how the different degrees of SEC context characteristics align with the service, technology and customer triad of the service.

Balancing the service, technology and customer triad

Utilizing CAs without properly balancing service logic, technology design and implementation and customer experience each individually as well as in aggregate, can yield agents that are marginally suboptimal or redundant as shown in [Figure 1](#). First, a CA might be designed as to not being able to fulfill its role toward customers due to using inferior technologies. For example, when customers have a specific question, many CAs simply report links to the frequently asked questions section. This often results in negative customer experiences, such as frustration or even anger, and hence provides a suboptimal solution. At the same time, an overly complex CA implementation that attempts to add value beyond the required service objectives might end up increasing the adoption and maintenance costs while yielding diminishing returns on investment. For example, Poncho, a CA that gave personalized weather forecasts in a cat cartoon format, started to also engage users in conversations unrelated to weather. Customers did not need this chat function in a weather forecast app and Poncho was sold in 2018 ([Dilmegani, 2021](#)). Similarly, Facebook M restricted its scope, probably due to it becoming too expensive without delivering enough value ([Dilmegani, 2021](#)).

To guide a discussion on how the service, technology and customer triad interactions influence optimal CA design, our TRISEC framework examines how these interactions occur within SEC contexts. A healthcare provider for instance, would not approach balancing the

service, technology and customer triad of a CA the same way a museum would since there is a difference in customer expectations and tolerance (i.e. failing a customer in an emergency situation has more grave consequences) (Lu *et al.*, 2020). The SEC dimensions help to disentangle the adoption and implementation of the CA roles in interactive communication encounters.

Disentangling CA-customer interactions within TRISEC

To further disentangle CA-customer communication encounter design, we consider how the three foci, service, technology and customer, differ across the service context.

Service logic. The service logic differs quite broadly across SEC services. Search services are more utilitarian and functional, as their main focus is usually related to convenience (Hsieh *et al.*, 2005), and hence CA-customer interactions should provide customers with what Pine (2021) calls *time well saved*. Service objectives then relate to cost savings and reducing customer waiting when retrieving the needed information from the CA through frictionless assistance in service provision. Hence, the CA design for such services should account for redundancies, as service objectives, customer interactions as well as technology implementation are rather standardized and can be optimized for time and cost efficiencies.

Experience services focus more on hedonic goals, where customers need to invest considerably more time and effort to acquire information through direct experience (Girard and Dion, 2010). Therefore, the CA-customer communication encounter focuses on Pine's (2021) *time well spent*. Next to providing accurate information, service objectives relate more to customizing the service experience and building relationships through repeated CA-customer interactions during the service encounter. Thus, the CA design for experience services is more complex, as customer experiences are more diverse, might fulfill varying service objectives that need to be considered and hence the technology needs to be able to process more data insights. CA design optimization needs to be carefully balanced to deal with this increased level of customization and repeated communication, while still efficiently leveraging the cost efficiencies of deploying a CA.

Credence services are highly involving, often emotionally charged services, where customers perceive not only higher financial risks, but especially higher social and psychological risks (Girard and Dion, 2010). Therefore, the CA-customer interaction centers on what we term *time well sustained*. It requires the CA to have complex, professional knowledge (e.g. medical) in the service domain and maintain a high level of repeated interaction quality in the service encounter. Therefore, the design for these types of services is the most complex, as CAs must fulfill higher-order service tasks, such as empathically interacting with lonely customers over a longer period of time that might be reluctant to provide sensitive information. Service objectives therefore require a large amount of customization, where technology needs even more data insights to adequately service the customers. To optimally design the CA-customer interaction for credence services, companies then need to invest considerable resources to prevent service failures.

Technology design. The highlighted differences also impact the technology implementation in terms of the needed data insights and the level of sophistication. First, as search services are rather standardized, data about customers and their potential interactions are relatively easily collected, making training sets available faster and therefore making them less costly. Experience and credence services even more so, need to deal with a higher variety of interactional data and be able to also process and integrate emotional data as well. Hence, it is more difficult, time-consuming and expensive to gather the data insights and training data sets are more complex in nature. Also, for these types of services, the risk of having biased (e.g. racial or sexist bias) training data sets is larger (Zou and Schiebinger, 2018), which can have a detrimental effect on their deploying services (Akteer *et al.*, 2021). At the same time, the more data organizations have, the more decisions about their CAs they must take, which again complicates CA design optimization and requires more investments.

Second, experience and credence services need CAs that are more sophisticated in nature to have the capabilities to handle the larger interaction range that conversations with customers will take. Thus, they usually require a higher level of verbosity to generate conversational flexibility. In sum, to optimally design the CA in terms of technology implementation, companies should be aware of the considerable investments.

Customer experience. CAs being able to handle emotional data also highlights the importance of the emotional dimension to successfully create the customer experience focus. For example, [Crolic et al. \(2022\)](#) show the importance of the emotional context (i.e. anger, of customers interacting with a CA). While emotional dimensions are important in all service contexts, we expect them to have a more amplified role in experience and credence services, as customers feel higher uncertainty and ambiguity. Therefore, emotional sensitivity capabilities of the CA are more important in these contexts to build up and sustain customer relationships ([Sidaoui et al., 2020](#)). Finally, the CA-customers interactions may differ on a temporal dimension, where search services due to their rather straightforward nature usually involve shorter service episodes than experience and especially credence services. As companies are usually striving for long-term relationships with their customers, they should be aware that optimally CA-customer interactions are co-constituted. If a customer interacts with a CA, the interaction data can be stored and acted upon in a next interaction ([Alaimo, 2021](#)). Hence, optimal CA design, especially for experience and credence services, is based on a longer-term sequence of service episodes that considers all previous CA-customer interactions to better personalize the customer experience.

Implications and future research avenues

Our paper addresses CA design and implementation gaps regarding firms often neglecting customer experience and interactivity needs over organizational performance, as well as the misalignment between cost and complexity, and the service and customer-centric features and objectives of such agent applications. These gaps are addressed by the proposed TRISEC framework ([Figure 2](#)) that contributes to service management and communications research theory by mainly disentangling how the technology infused service marketing triad (service, technology and customer) interacts with the distinct SEC service contexts influencing service logic, technology design and customer experiences. Managerially, TRISEC provides managers with a framework that aids in the optimization of the cost and complexity of CA design and implementation while balancing service and customer needs and objectives. We describe TRISEC's potential theoretical contributions and managerial implications via future research opportunities and a research agenda of research questions ([Table 1](#)) to advance the service management of such interactions.

Theoretical contributions

Theoretically, the TRISEC framework provides a conceptual angle for a more integrative discussion of how the triad of service logic, technology design and customer experience should be simultaneously considered when examining different aspects of CAs. At the same time, our conceptualization opens up many research opportunities to deepen our understanding of how differently designed CAs can be used in service encounters and what their impact is on customer relationship management.

First, an important area for research is why, how, when and where customers like to adopt a CA and how it influences their relationship with the firm. First insights from for example [Park et al. \(2021\)](#), who use the extended technology acceptance model, show that for credence services (as opposed to experience services) consumer perceptions of an AI service robot usefulness significantly impacts consumer attitudes on adopting the AI service robot.

Topic	Research questions
Adoption of CA	<ul style="list-style-type: none"> • In what ways can CA design, using TRISEC, support and facilitate customer adoption decisions and build trust to enable satisfying CA-customer interactions? What level of competence and warmth should CAs convey to foster adoption across SEC service contexts? • What is the impact of brand fit in optimizing CA design? How do branding decisions (e.g. exclusiveness of brand) impact the service, technology and customer foci and their interactions across SEC service contexts?
CA resistance and skepticism	<ul style="list-style-type: none"> • What theories help examine how different customers adopt different CAs? What psychological mechanisms explain customers' adoption process of CAs? • Why and in what situations do customers resist CA-provided services? What drives their skepticisms?
Embedding CAs in service provision	<ul style="list-style-type: none"> • How can CA design manage and address (potential) resistance of using CA-provided services? How does that differ across the SEC service contexts? • How does the technology readiness and acceptance of customers influence CA design in different the SEC contexts? • At what stages of the customer journey are CAs most effective across the SEC service contexts, and how would this effectiveness best be measured? • How should human-handover be designed when a CA is not able to support customers further and how does this influence the customer experience and expectations?
Design and implementation of CAs	<ul style="list-style-type: none"> • What is the role and impact of where the CA is embedded, i.e. on firms' website or in social media channels? What is the impact of embodied vs. disembodied CAs? How does that differ across SEC service contexts? • What is the role of framing in communicating about and introducing customers to the CA? What are the interaction effects of framing with service logic, technology and customer experience? • To what extent do CAs need to be anthropomorphized in relation to the SEC service contexts and what are the effects on service logic, technology and customer experience? • What is the effectiveness of AI algorithms in fulfilling the service logic, technology and customer experience targets? Is such technology ready and capable and how does this effectiveness differ across the SEC contexts?
CA-customer interactions over time	<ul style="list-style-type: none"> • How does the role of perceived CA empathy and warmth vary across the different SEC contexts?
Responsibility in CA design	<ul style="list-style-type: none"> • What is the impact of customers using CAs as their agent for services? How should those CAs be designed across the SEC service contexts? • How can firms use CA collected data for optimizing their business processes, e.g. innovation, procurement and customer experience management? • How do CAs and their data insights fuel new research methods and ways to investigate customer insights? • How should firms manage customer interactions and engagement with CAs over time? How do CA-customer interactions change over time? • How does the level and frequency of contact impact CA-customer interactions over time?
	<ul style="list-style-type: none"> • What theories help examine CA-customer interactions over time? What (psychological) mechanisms explain customers' engagement with CAs over time? • To what extent should CAs be designed to be transparent to customers on how their data is used and stored, and would this differ across SEC contexts? • How can CAs be designed to be more inclusive and accessible (e.g. to people with visual disabilities) and how would this vary across the SEC contexts? • How can firms ensure that their CA data and algorithms act responsibly? What is the impact on customers if they fail to do so? • How can firms ensure a fair transition toward CA technology for their involved stakeholders (e.g. customers, employees)?

Table 1. Future research avenues

Next to studying the factors for the adoption decision, future research could also pay particular attention to CA resistance and skepticism. For example, Müller *et al.* (2020) identify several resistance factors of customers in a medical setting to interact with a chatbot, such as anticipated regret, potential mistakes of CA and misuse of private sensitive data. Their results might be different in a search service setting. Similarly, the literature stream on “algorithm aversion” has shown prominently that customers tend to trust humans easier and longer, even though AIs outperform human forecasters (e.g. Dietvorst *et al.*, 2015). This stream also shows that credibility of human service providers is more easily restored after a (service) failure compared to an AI algorithm. Our TRISEC framework could help to disentangle customer resistance to CAs further by paying particular attention to the different foci and their interactions and examining how results might differ across the SEC service contexts.

Also from a customer resistance perspective, Araujo (2018) studies how a disembodied chatbot should be framed (i.e. how to introduce CAs to customers) and how the level of anthropomorphism influences the perceptions of the CA. Two important areas for future research arise here. First, researchers could study why, how and when the CA should be embedded in the service provision (i.e. website embedded, social media embedded or embodied in a (non-humanoid service robot). Again, our TRISEC framework could inform such studies of different aspects to consider and how service logic, technology design and customer experiences are impacted for these different types of CA service provision.

Second, the question of anthropomorphizing various features of the CA has already sparked recent research (e.g. Crolic *et al.*, 2022; Mende *et al.*, 2019; Sheehan *et al.*, 2020) and helps to understand how to best design the technology-customer experience interaction. However, the effects of anthropomorphizing CAs might differ quite dramatically across different SEC service contexts.

It will also be important to study CA-customer interactions over time and how customer usage behavior might change. For example, Fryer *et al.* (2017) only found a novelty effect for interacting with a chatbot for a language course so that only the interaction with human managed to sustain students’ task interest. Hence, for experience and especially credence services (e.g. health care services), researchers might explore how to best engage customers in CA interactions over time. Engaging customers over time will also deliver a continuous stream of customer data insights, which can then be used in market research, innovation and other business processes to further optimize the CA-customer interaction.

Managerial implications

Managerially, the TRISEC aids executives the strategic planning of high-quality services via CAs including customer experience effects, operational and setup costs and complexity considerations. An important area for future research is how organizations devise their interactive communication technologies in a responsible manner. For example, De Cremer and Kasparov (2021) highlight some ethical areas, such as privacy, biased decision recommendations, lack of transparency and fear of job loss that businesses should consider in their AI strategies and decisions. Our TRISEC framework can guide researchers and managers to systematically contemplate which ethical dilemmas must be addressed along the service logic, technology implementation and customer experience foci and how they might differ in the SEC service contexts.

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