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Artificial intelligence empowered conversational agents: A systematic literature review and research agenda

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ABSTRACT

Consumer research on conversational agents (CAs) has been growing. To illustrate and map out research in this field, we conducted a systematic literature review (SLR) of published work indexed in the Clarivate Web of Science and Elsevier Scopus databases. Four dominant topical areas were identified through bibliographic coupling. They are 1) consumers' trust in CAs; 2) Natural Language Processing (NLP) in developing and designing CAs; 3) communication with CAs; 4) impact of CAs on value creation and the value of CAs for business. We leverage these findings to provide an updated synopsis of extant scientific work. Moreover, we draw a framework whereby we identify the: 1) drivers of and motivators for adoption and engagement with CAs; and 2) the outcomes of CA adoption for both users and organizations. Finally, we leverage the framework to develop an agenda for future research.

1. Introduction

Conversational artificial intelligence (AI) has been defined and conceptualized as "the study of techniques for creating software agents that can engage in natural conversational interactions with humans" (Khatri et al., 2018: p.41). Conversational AI leads to AI-empowered conversational agents (CAs) that are "software systems that mimic interactions with real people" (Radziwill & Benton, 2017: p. 3) by means of conversation through written and spoken natural language as well as gestures and other body expressions.

CAs are increasingly adopted by many organizations in a wide range of industries and contexts such as retail (Chung et al., 2020), banking (Hari et al., 2022), education (Winkler et al., 2020), hospitality and tourism (Leung & Wen, 2020), healthcare (Laranjo et al., 2018), and media and entertainment (Sajjadi et al., 2019). They allow organizations to identify customer needs and expectations, acquire and retain customers and users, enhance the customer experience and satisfaction, and generate customer and market insights (Verma, et al., 2021). AI-empowered CAs come under different guises and types based on the algorithms they deploy, and their technical features and devices they are attached to (Bérubé, et al., 2021). The most common type of CAs consists of chatbots that can be text- and voice-based (Dilmegani, 2020). Popular examples of such CAs include Siri and Cortana.

The deployment of AI-empowered CAs is particularly important in marketing and sales as suggested by a McKinsey report (Chui, et al., 2018). Machine learning (ML), deep learning (DL), and natural language processing (NLP) can help train CAs to collect and handle large amounts of consumer data in order to generate market intelligence (Bornet et al., 2021).

Due to their growing practical use and relevance in marketing and sales (Chui, et al., 2018), marketing and consumer behavior scholars have increased their intellectual efforts to gain and expand scientific knowledge in this area. However, extant knowledge is currently spread across multiple disciplines in the social sciences as well as computer science and engineering (Lim et al., 2022; Haenlein & Kaplan, 2021; Mariani et al., 2022; Van Doorn et al., 2017), preventing us from capturing knowledge relevant for the advancement of the marketing discipline. Furthermore, a comprehensive and systematic literature review (SLR) of CA research has not been conducted yet. This is a gap that needs to be addressed for several reasons. First, this body of research seems fragmented (Lim et al., 2022) as it is spread across different disciplines and applied domains. By conducting a SLR, we address this issue by generating a holistic view bridging disconnected research streams. In so doing, we gain and provide a bird's eye view of the research field that

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help both researchers and practitioners to overcome silo-based approaches to this (multidisciplinary) field, and generate a more structured and holistic understanding of the key issues, concepts, opportunities, and challenges pertaining to the field (Donthu et al., 2021; Mariani et al., 2022). This also has the advantage of helping to avoid duplication of research efforts, at least in the immediate future (Paul et al., 2021). Second, this body of research has been growing rapidly. By conducting a SLR on the topic, we improve our understanding of the evolution of knowledge over time and capture the most recent advancements. This allows to assess if and to what extent research has evolved over time from an exploratory to an explanatory stage. Moreover, marketing scholars miss a structured framework that clearly maps out extant literature in relation to the *drivers* and *outcomes* of CA adoption and usage. Third, marketing scholars do not have a clear, holistic, and comprehensive picture of what has been researched and where the most relevant new research gaps are. One of the aims of conducting a SLR is to enable researchers to gain a broader, deeper and updated understanding of research gaps and areas that are under-researched or not researched at all (Tranfield et al., 2003). Fourth, through a quantitative and SLR, we can analyse the body of knowledge pertaining to AI-enabled CAs in its entirety and not as a subset (Donthu et al.,2021). We therefore intentionally avoid reviews that are conducted on a sub-sample instead of the entire population of publications (Donthu et al., 2021).

To address the extant gap, this study aims to review and assess the intellectual structure of research on AI-empowered CAs. Accordingly, the aim of this study is to answer the following research question ***"What is the emerging intellectual structure of marketing research related to AI-empowered CAs?"***. To address this question, we adopted a holistic and comprehensive SLR (Tanfield et al., 2003) combined with bibliometric techniques (Donthu et al. 2021; Mukherjee et al. 2022) and applied them to articles pertaining to AI-empowered CAs in the context of marketing and consumer studies. Unlike narrative reviews that are mostly based on the subjective and qualitative judgments of a group of experts, SLRs using bibliometric techniques typically build on a relevant number of quantitative analytical techniques for the same purpose (e.g., bibliographic coupling and co-occurrence analysis), thus improving the rigor of the review and allowing replicability (Tranfield et al., 2003). In addition to the insights and results typically generated by quantitative SLRs deploying bibliometric techniques (Donthu et al., 2021), this work deploys content analysis to illustrate the most recurring topics and research streams, theories, and constructs. Furthermore, it puts forward and develops an interpretative framework identifying and discussing the drivers and outcomes of implementing CAs in marketing and consumption settings, thus engendering finer-grained insights on the existing body of knowledge on AI-empowered CAs.

The remaining part of the paper is organized as follows: Section 2 positions our study in the extant literature by providing a synthetic overview of recent work. Section 3 provides information regarding our methodology and data collection. Section 4 presents the findings. Section 5 portrays a comprehensive interpretative framework identifying and discussing the drivers of CA adoption while Section 6 the outcomes of implementing CAs. In Section 7, we develop a rich research agenda and discuss the limitations. The last section draws the conclusion.

2. Theoretical background

The term "Artificial Intelligence" (AI) was coined in 1954 by computer scientist John McCarthy (Cukier, 2019). It is defined as "the ability of machines to mimic intelligent human behavior, including problem solving and learning" (Michalski et al., 1983: p. 5), and it is a field of computer science that relates to how an information system can act, learn, comprehend and sense (Kolbjørnsrud, et al., 2016). The implementation and meaning of AI have been explored in previous research in various fields. In business and management, AI has been examined in relation to finance, supply chain, human resource management, and especially marketing (Harrison et al., 2022; Mariani and Wirtz, 2023; Mariani et al., 2022) and a wide range of service industries (Bornet et al., 2021; Wirtz et al., 2018).

Recently, AI applications in marketing have attracted significant scholarly attention as witnessed by several recent bibliometric studies and systematic literature reviews (Feng et al., 2021; Mariani et al., 2022; Mustak et al., 2021). These show that there is a growing trend in the scientific production of AI-related research in the marketing field with an exponential increase over the last two years.

A specific form of AI that is growing in relevance both in practice and research is conversational AI also known as CAs. CAs allow humans to interact with computers using text and voice whereby computer programs support spoken, text-based, and multimodal conversational interactions with humans. CAs are influencing business practices and performance by creating opportunities to save costs, improve service quality, and increase user engagement (Bavaresco, et al., 2020; Wirtz and Zeithaml, 2018), CAs are revolutionizing traditional marketing and sales activities and processes. Therefore, the enormous impact of CAs on marketing has pushed marketing scholars to explore their characteristics, customers' perceptions and intentions to adopt CAs (Lee & Choi, 2017; Moriuchi, 2021; Pitardi & Marriott, 2021), CAs as tools supporting purchase decisions (Roy & Naidoo, 2021; Sands, et al., 2021), and CAs' influence on customer satisfaction (Chung, et al., 2020; Mimoun & Poncin, 2015). So far, no study has analyzed in a holistic and systematic way studies on CAs in marketing, except for a recent study by Lim et al. (2022) that systematically reviewed conversational commerce. In this study, we aim to make sense of the emerging intellectual structure of consumer research related to conversational agents using a systematic literature review. This study is distinctively different from previous literature reviews on CAs (e.g., Car et al., 2020; Lim et al., 2022; Montenegro et al. 2019) for a number of reasons. First, we provide the most updated overview of extant marketing literature on conversational agents with a focus on consumer research beyond the more focused approaches to medical or health applications of CAs (Car et al., 2020; Montenegro et al. 2019). Second, and more importantly, we extend an extant review (Lim et al., 2022) by developing an interpretative framework where we identify: 1) the drivers of adoption of and engagement with CAs; and 2) the outcomes of CA adoption on both consumers and organizations. Third, we develop a significantly extended research agenda.

3. Methodology and data collection

In this study, we used a systematic quantitative literature review approach (Tranfield et al., 2003). Consistently, we applied bibliometric and scientometric techniques (Mukherjee et al., 2022) to quantify research and identify potential research gaps on the topic. The SLR includes publications until the 1st of May 2022. To analyse our data, we used Biblioshiny, which carries out science mapping analysis using the main functions of the Bibliometrix R package (Aria, 2021) and, VOSviewer, a software to generate maps based on network data, capable of visualizing and exploring these maps (Van Eck & Waltman, 2020). Next, we systematically reviewed the articles to perform an in-depth evaluation of the articles (Kupiainen, 2015). In the following subsection, we provide details of the data collection, followed by information on the analytical methods and procedures.

3.1. Data collection

To collect data, we developed a search protocol to guide our review. The search was conducted in May 2022, and we deployed two multidisciplinary databases: Elsevier Scopus and Clarivate Web of Science (WoS). These two databases were chosen because of their wide coverage of different journals, subjects, and disciplines. Moreover, they are typically considered as the most complete databases for systematic literature reviews in management (Mariani & Borghi, 2019; Zupic & Cater, 2015).

We developed a data extraction guide covering a set of keywords related to CAs and consumer research. More specifically, the CAs-related keywords are "chatbot", "voice assistant", and "conversational agent". The marketing and consumer research-related keywords are "consumer" and "customer", to which "user" was added. Where pertinent and appropriate, words were taken in both their singular and plural form using suitable syntax (for example, an "*" symbol). We then linked the CAs keywords with the consumer research related keywords using Boolean operators. The way the keywords were matched is shown in Tables 1 and 2. We limited the publications type to journal articles and reviews. The articles retained were in the English language and were related to the fields associated with business, management, psychology, decision-making, social sciences, and related fields. An illustration of the steps followed to generate the final sample is shown in Fig. 1.

As shown in Fig. 1, we initially extracted data from Scopus and WoS separately to obtain two different datasets. Subsequently, we combined the two datasets using the Rstudio software. We also crosschecked other data resources for the missing parts of the records. Overall, we obtained 515 articles indexed in Scopus and 231 articles indexed in WoS. After deleting duplicated records using the R software, 564 articles in total remained for evaluation. We downloaded the metadata for these articles, which entail authors' full names, corresponding authors' countries, publication date, abstract, keywords, journal sources, references, citation counts, average article citations, and number of citing articles (Martynov, et al., 2020). We also collected the PDFs of the journal articles to analyse the content and methodologies of each document. In case a paper was not available in full format, we used the abstract to do the analysis.

3.2. Data analysis

To analyse data, we deployed a systematic literature review (SLR) approach conjointly with a bibliographic coupling analysis. Contrary to co-citation, bibliographic coupling evaluates if two publications are bibliographically coupled, meaning that a third publication is cited by both of the publications (Kessler, 1963) Hence, the larger the number of common references, the stronger the bibliographic coupling relation between two publications. This method allows to understand better the intellectual structure of the literature (Nosella, et al., 2012) and map existing research (Mariani, et al., 2022). Moreover, bibliographic coupling was used to create bibliometric maps (Zupic & Cater, 2015) by relying on the VOSviewer package of Van Eck & Waltman (2010, 2020). The mapping technique used (VOS) did not include multidimensional scaling as VOS has been shown to be better than multidimensional scaling for creating bibliometric maps (Van Eck & Waltman, 2020). In addition to the aforementioned analyses, based on the sampled articles, we developed an interpretative framework to illustrate holistically the drivers and outcomes of CA adoption (Fig. 2).

Table 1
Scopus search details of the study.

Search Terms in Scopus		
Field Tag	Title, Abstract, and Keywords	TITLE-ABS-KEY ("chatbot" OR "voice assistant" OR "conversational agent")
Boolean		AND
		TITLE-ABS-KEY ("user" OR "consumer" OR "customer")
		AND
Document Type	Article, Review	(LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re")
Boolean		AND
Language		LIMIT-TO (LANGUAGE, "English")
Boolean		AND
Subject Area		(LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "BUSI") OR LIMIT-TO (SUBJAREA, "PSYC") OR LIMIT-TO (SUBJAREA, "DECI") OR LIMIT-TO (SUBJAREA, "ECON") OR LIMIT-TO (SUBJAREA, "MULT")

Table 2
WoS search details of the study.

Search Terms in WoS		
Field Tag	Abstract, Title, Author Keywords, Topics	((TS=((("chatbot*" OR "voice assistant*" OR "conversational agent*") AND ("user*" OR "consumer*" OR "customer*")) OR TI=((("chatbot*" OR "voice assistant*" OR "conversational agent*") AND ("user*" OR "consumer*" OR "customer*"))) OR AB=((("chatbot*" OR "voice assistant*" OR "conversational agent*") AND ("user*" OR "consumer*" OR "customer*")))OR AK=((("chatbot*" OR "voice assistant*" OR "conversational agent*") AND ("user*" OR "consumer*" OR "customer*"))
Boolean		AND
LANGUAGE		(English)
Boolean		AND
DOCUMENT TYPES		(ARTICLE OR REVIEW)
Boolean		AND
WEB OF SCIENCE CATEGORIES:		(Business or Psychology or Multidisciplinary or Management or Psychology Experimental or Psychology Applied or Social Sciences Interdisciplinary or Psychology Clinical or Economics or Psychology or Psychology Social or Business Finance or Psychology Developmental or Psychology Mathematical or Social Issues or Sociology)

4. Findings

The number of articles published is shown in Fig. 3, which portrays the cumulative frequency over time. The overall trend suggests that the cumulative growth rate recorded an acceleration starting from 2019. Indeed, we observe a significant increase in the number of articles published, from 24 articles in 2018 to 59 articles in 2019. The growth accelerates further and exponentially in 2020 and 2021, reaching 105 and 192 articles, respectively. This trend is consistent across both datasets (i.e., Scopus and WoS) and is reflected in the trend of the combined dataset in Fig. 3. The exponential growth of articles in the period 2019–2021 could be the consequence of a number of factors. First, the growing introduction and implementation of CAs in many organizations and across multiple industries, as well as the attempt by technology providers and vendors to develop and market new and more effective forms of CAs such as chatbots, digital assistants, and AI-empowered home devices. Second, new applications for CAs are emerging every day in devices that are widely used by consumers, such as cars, homes, and smartphones. Third, it is likely that the COVID-19 pandemic has accelerated the adoption and use of digital technologies in general (Donthu & Gustafsson, 2020) and CAs in particular.

A summary of the information about the articles retrieved from Scopus and WoS is represented in Table 3. A total of 564 papers published until May 2022, in 260 journals, were sampled and evaluated.

4.1. Data Description

The top ten journals that published the highest amount of articles are presented in Fig. 4. If we exclude published proceedings that are indexed as articles (such as the *Proceedings of The ACM on Human-Computer Interaction*), the academic journals that have published the highest number of articles on CAs are *Computers in Human Behavior*, *International Journal of Human Computers Studies,* and *Journal of Business Research,* respectively with 29, 22 and 17 articles. The fact that *Computers in Human Behavior* is the academic journal hosting the largest number of articles on CAs can be explained by its purpose to investigate the

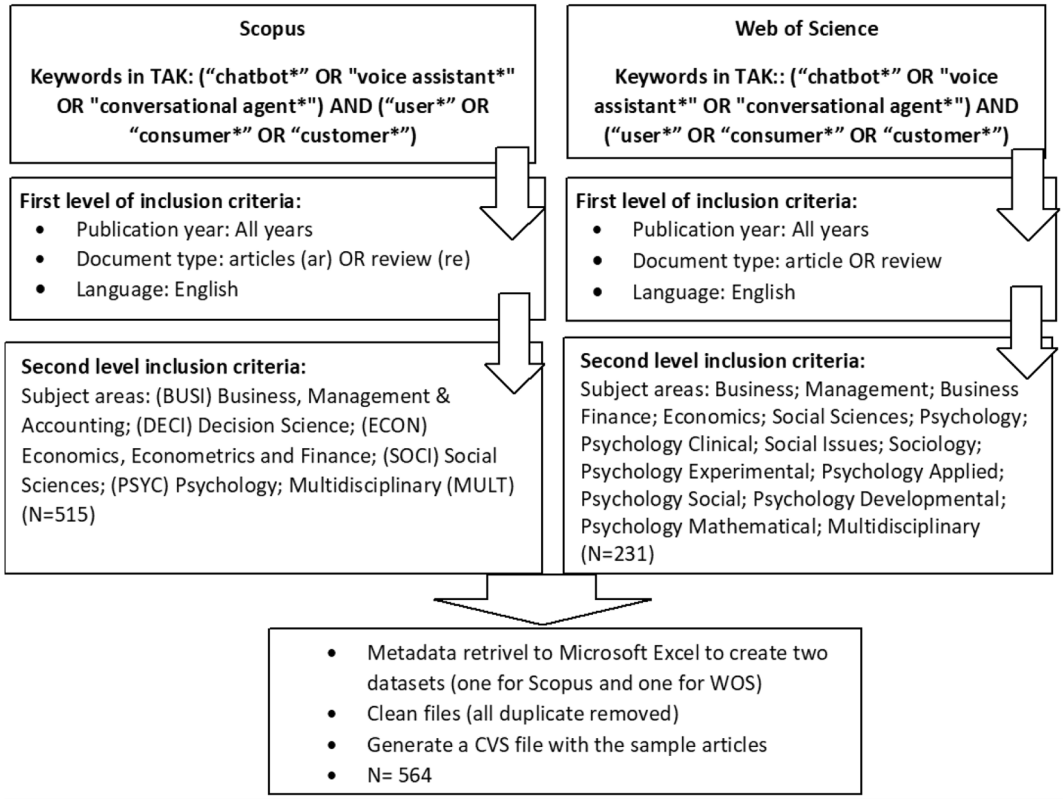

Fig. 1. Steps followed to generate the final sample.

Fig. 2. Drivers and Outcomes of Conversational Agents' adoption.

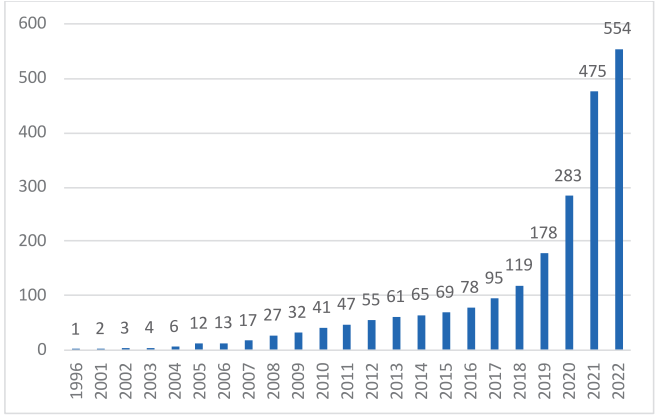

Fig. 3. Cumulative frequency of published documents from the merged sample (WOS and Scopus databases) until May 2022.

interaction between humans and computers/machines and by its high number of special issues (SIs) on new technologies such as CAs (e.g., the SI on "Consumer interaction with cutting-edge technologies"). Out of the 29 papers published in *Computers in Human Behavior*, 24 were published from 2019 to 2022, confirming the previous illustration of the ongoing exponential trend.

Table 3
Dataset Summary.

Description	WoS	Scopus	Combined
Document types			
Article	222	499	545
Review	9	16	19
Authors			
Authors	686	1535	1628
Author Appearances[a]	747	1730	1912
Authors' collaborations			
Single-authored documents	20	55	57
Documents per Author	0.34	0.34	0.35
Authors per Document	2.97	2.98	2.89
Co-Authors per Documents	3.23	3.36	3.39
Collaboration Index	3.17	3.22	3.10

[a]Author appearance refers to the number of times an author was mentioned in different documents.

In Table 4, we present the top ten journal articles with the highest overall number of citations. We also indicate the breakdown of citations in WoS and Scopus. The top ten papers are all indexed in Scopus, while some of them are indexed in WoS as well. Similar to the trends we observed before, eight of the highly cited papers were published 2018 and later, while the other two were published in 2003, and 2005. The most cited paper is "Alexa, Siri, Cortana, and More: An Introduction to Voice Assistants" written by Matthew Hoy and published in *Medical Reference Services Quarterly* in 2018. One of the reasons why the article is largely cited could be that it provides a brief introduction to popular voice assistants in the market and their usage and implications.

In Fig. 5, we list the top ten authors based on their number of publications. The most prolific authors in relation to the topical area are Timothy Bickmore (Northeastern University, Boston), Hermie J. Hermens (University of Twente), and SeoYoung Lee (Yonsei University).

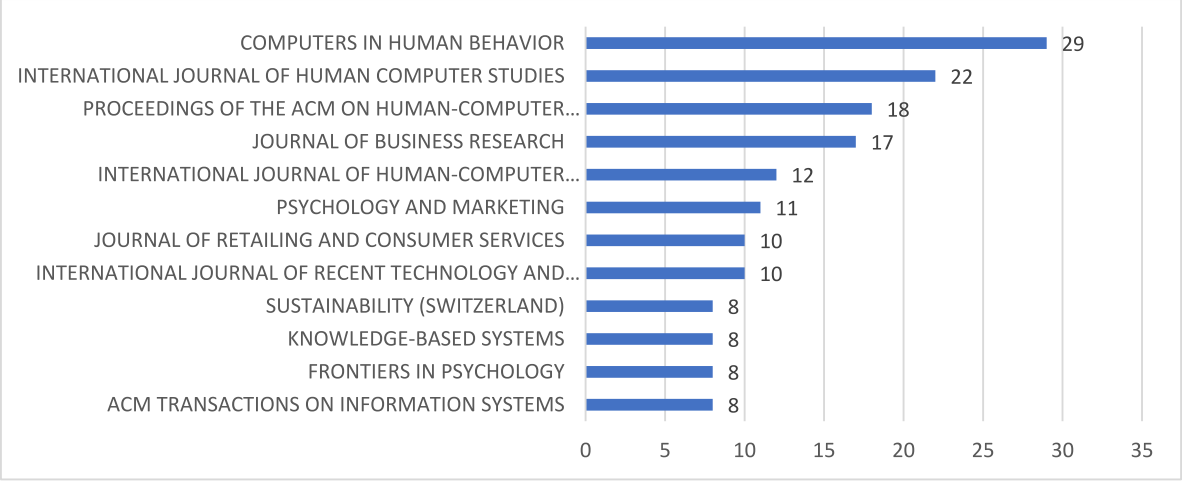

Fig. 4. Journals that published most of the articles on the focal topic.

4.2. Research design and methodologies deployed in the studies

The empirical studies in the sample are 298 (as clear from Table 5). Most of them (200) adopt a quantitative research design (67.2%), followed by qualitative research design (21.1%) and last mixed methods. The most frequently used analytical techniques in quantitative research designs include structural equation modelling (SEM) (with 32 articles), and ANOVA (with 25 articles).

Most of the empirical studies that deployed quantitative methods and experiments are one of the most common quantitative methods used. Among qualitative, the most used method consists of interviews.

As far as the types of conversational agents (CAs) analyzed are concerned, chatbots, voice assistants, and home devices are the most researched forms of CAs with respecively 223, 77, and 32 articles (15 articles cover other unspecified forms of CAs). The reasons why chatbots are the most frequently examined form of CAs are most likely that chatbots are widely applied in a number of fields ranging from education to healthcare to retail and that they have become mainstream in terms of application and usage.

4.3. Bibliographic coupling

We deployed bibliographic coupling analysis by adopting the VOS-Viewer software package (Van Eck & Waltman, 2010) to construct a visualization map of various clusters/topics (Mariani, et al., 2022). We used a minimum citation threshold of at least 10 for the Scopus database, which resulted in 99 articles. The analysis allowed us to generate a visualization of four clusters (Fig. 6). The first cluster, colored in red, includes articles that focus on consumers' trust in CAs. A significant number of articles in this cluster involves the effect of social presence. Cluster 2 (blue), revolves around the possibilities of implementing and improving Natural Language Proccessing (NLP) in developing and designing CAs. Cluster 3 (green), focuses on communication with CA. The fourth cluster (yellow), relates to the impact of CAs on the value creation/destruction and the value of CAs for business.

4.4. Theoretical lenses

The abstract, keywords and body of the articles were analysed to identify the theoretical lenses that were deployed. In our sample, 95 different theories, theoretical frameworks and models were identified, and Table 6 summarizes the ten most frequently used theories and models sorted by frequency.

4.4.1. Technology acceptance model (TAM)

TAM is an influential model that was developed in information management and has been applied across many contexts and industries. In this model, there are two main factors that predict individuals' intention to adopt a new technology: perceived ease of use and perceived usefulness (Davis, 1986). In our sample this model is one of the most frequently used to investigate CAs adoption intention. For instance Moriuchi (2019) used an enriched variant of TAM to study consumer engagement and loyalty (Moriuchi, 2019). To analyse customers' behavioral intention and actual usage of AI-powered chatbots in the hospitality and tourism sectors in India, Pillai & Sivathanu (2020) extended TAM with context-specific variables.

4.4.2. Social presence theory (SPT)

The concept of social presence is often taken into account in the context of mediated communication. Building on symbolic interactionism and interpersonal communication studies, Short et al. (1976) defined social presence as "the degree to which a person is perceived as a 'real person' in mediated communication" (Short et al., 1976: p. 151). In our sample, this theory is widely used to investigate the interaction between humans and CAs. For instance, Jiang et al. (2022) build on social presence theory and self-determination theories to develop a framework that helps elucidate how social characteristics of chatbots influence consumer behavioral intentions. Their findings suggest that the social presence of chatbots has a direct and positive impact on retailer experience innovativeness and intimacy, both of which mediate the influence of the social presence of chatbots on consumers' behavioural intentions, Fan, Lu and Mao (2022) used social presence theory to investigate consumer responses to two forms of hotel in-room technology. They showed that AI-enabled voice assistants (vs. touch panels) generate lower levels of satisfaction owing to a deficiency in perceived control, especially between customers displaying independent self-construal tendency.

4.4.3. Anthropomorphism theory

Anthropomorphism is the tendency to endow nonhuman agents' real or imagined behavior with humanlike characteristics, motivations, intentions, or emotions (Epley, et al., 2007). This field is expanding rapidly as suggested in recent literature reviews on AI in marketing (e.g., Mariani et al., 2022). A number of articles revolving around CAs have deployed the concept of anthropomorphism and its underpinning theories. For instance, Blut et al. (2021) conducted a *meta*-analysis to understand anthropomorphism in service provision and developed a comprehensive model to examine the relationships between anthropomorphism and its antecedents and consequences. The authors clarify the

Table 4
Most Cited Papers.

Paper	Number of Citations in			
	Journal	Scopus	WoS	Total
HOY (2018) "Alexa, Siri, Cortana, and More: An Introduction to Voice Assistants"	• Medical Reference Services Quarterly	280	–	280
ARAUJO (2018) "Living up to the chatbot hype: The influence of anthropomorphic design cues and communicative agency framing on conversational agent and company perceptions"	Computers in Human Behavior	211	46	211
LAU et al. (2018) "Alexa, Are You Listening? Privacy Perceptions, Concerns and Privacy-seeking Behaviors with Smart Speakers"	Proceedings of the ACM on Human-Computer Interaction	191	–	191
CASSEL & BICKMORE (2003) "Negotiated Collusion: Modeling Social Language and its Relationship Effects in Intelligent Agents"	User Modeling and User-Adapted Interaction	162	–	162
GO & SUNDAR (2019) "Humanizing chatbots: The effects of visual, identity, and conversational cues on humanness perceptions"	Computers in Human Behavior	143	46	143
LUO, et al. (2019) "Frontiers Machines vs. Humans the Impact of Artificial Intelligence Chatbot Disclosure on Customer Purchases"	Journal of Service Management	133	26	133
CHUNG, et al. (2020) "Chatbot e-Service and Customer Satisfaction Regarding Luxury Brands"	Journal of Business of Research	126	81	126
MCLEAN & OSEI-FRIMPONG (2019) "Hey Alexa Examine the Variables Influencing the Use of Artificial Intelligent in Home Voice Assistants"	Computers in Human Behavior	122	66	122
BICKMORE et al. (2010) "Usability of Conversational Agents by Patients with Inadequate Health Literacy: Evidence from Two Clinical Trials"	• Journal of Health Communication	122	67	122
LISETTI C et al. (2013) "I can help you change! An empathic virtual agent delivers behavior change health interventions"	ACM Transactions on Management Information Systems	113	–	113

contextual circumstances enabling anthropomorphism to influence customer intention to use a service robot. Their moderation analysis suggests that the impact depends on the type of robot (i.e., robot gender) and the type of service (i.e., possession-processing service vs. mental stimulus processing service) (Blut, et al., 2021). Roy and Naidoo (2021)

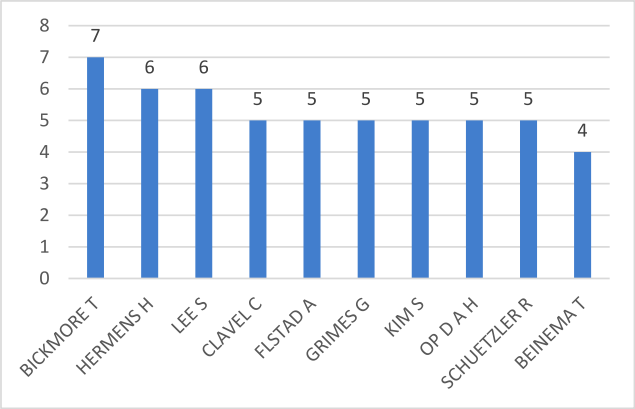

Fig. 5. Most prolific authors.

Table 5
Sampled articles by research design and methodology.

Research design	Number of articles	Research method	
Qualitative	63	Interviews	25
		Case studies	10
		Focus groups	5
		Other	23
Quantitative	200	Experiments	127
		Surveys	68
		Meta-analyses	1
		Text analyses	1
		Other	3
Mixed methods	35		35
Total	**298**		**298**

examined human qualities like warmth and competence that can be attributed to CAs to enhance positive consumer experiences. They found that present-oriented individuals opt for a warm versus competent chatbot conversation, translating into favorable product decisions, whereas future-oriented individuals opt for a competent vs. warm conversation. The effects are mediated by brand perceptions.

4.4.4. Unified theory of acceptance and use of technology (UTAUT)

Besides TAM, the UTAUT is a widely used theoretical framework used to investigate user intention to adopt a new technology, based on technology users' expectations. Developed by Venkatesh et al., (2003), the model entails four predictors: performance expectancy, effort expectancy, social influence, and enabling conditions. The first three predictions have direct effects on behavioural intention, whereas the forth determines usage behaviour (Venkatesh et al., 2003). Moriuchi (2021) applied UTAUT conjointly with the realism maximization theory to determine whether anthropomorphism and engagement play a role in consumers' intention to re-use a voice assistant (Moriuchi, 2021). Melián-González et al. (2021) leveraged UTAUT to model and explain chatbot usage intention. Their results demonstrate that the intentions to use chatbots are influenced by the predisposition to using self-service technologies, the habit of using chatbots, chatbots' expected performance, the hedonic component in using them, the fact that the chatbot behaves like a human, and social influences.

4.4.5. Self-Determination theory (SDT)

SDT is defined by Deci and Ryan (2012) as "an empirically derived theory of human motivation and personality in social contexts that differentiates motivation in terms of being autonomous and controlled" (Deci & Ryan, 2012: p. 416). It stems from experimental work conducted in the 1970 s and 1980 s on the relationship between extrinsic rewards and intrinsic motivation (e.g., Deci, 1971). According to SDT, all humans have three core psychological needs: competence, autonomy,

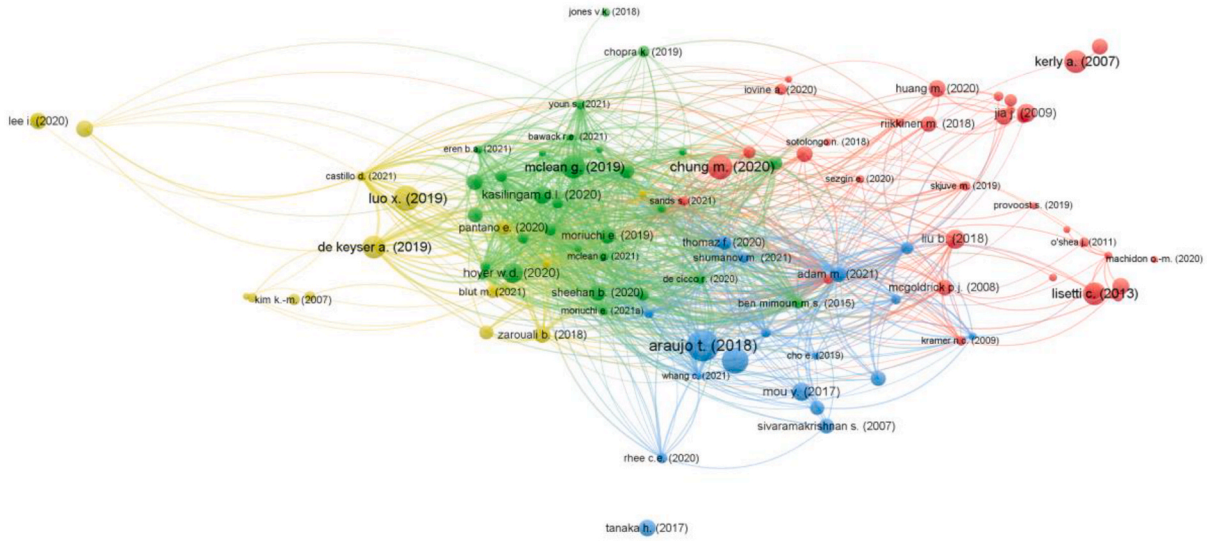

Fig. 6. Bibliographic-coupling network in the Scopus dataset.

Table 6
Prominent theoretical lenses and conceptual models.

Theory	Sample Articles	Number of articles in the sample
Technology Acceptance Model (TAM)	Pillai & Sivathanu (2020), Moriuchi (2019)	14
Social Presence Theory (SPT)	Jiang, Qin and Li (2022) Fan, Lu and Mao (2022)	14
Anthropomorphism Theory	Blut et al. (2021)Roy and Naidoo (2021)	12
Unified Theory of Acceptance and Use Of Technology (UTAUT)	Jain et al. (2022), Moriuchi (2021)	9
Self-Determination Theory (SDT)	Jiménez-Barreto et al. (2021)Nguyen, Sidorova and Torres (2022)	6
Social Response Theory	Adam, Wessel and Benlian (2020) Huang (2022)	6
Uses And Gratifications Theory (UGT)	Rese, Ganster and Bayer (2020) Jian et al. (2022)	5
Uncanny Valley Theory	Skjuve et al (2019) Hoyer et al (2020)	4
Media Equation Theory (MET)	Gennaro, Krumhuber, and Lucas (2020) Xu, Chan-Olmsted and Liu (2022)	4
Social Cognitive Theory (SCT)	Gao et al. (2022) Chong et al (2021)	4

and relatedness, all of which must be met in order to achieve psychological health and well-being (Baltes, 2004). Several scholars have examined how those needs are fulfilled while consumers interact with CAs. For instance, drawing on SDT, assemblage theory and customer experience literature, Jiménez-Barreto et al. (2021) developed a framework to grasp motivational customer experiences with chatbots. To do so they examined the interaction between individuals and airlines' chatbots. They analyzed 3 components of self-determined interaction with the chatbot (autonomy, relatedness, and competence), and 5 components of the customer–chatbot experience (affective, sensory, behavioral, social, and intellectual). The authors found that self-determined interaction directly influences customer experience which, in turn, determines participants' attitudes toward and satisfaction with the chatbot (Jiménez-Barreto, et al., 2021). In their study aimed at understanding the differences in user satisfaction with a chatbot system vis-a-vis a menu-based interface system, Nguyen et al. (2022) draw on SDT and assessed the effect of chatbot use on perceived autonomy, perceived competence, cognitive load, performance satisfaction, and system satisfaction. The authors discover that, compared with menu-based interface systems, chatbot systems lead to a lower level of perceived autonomy and higher cognitive load, resulting in lower user satisfaction.

4.4.6. *Social response theory (SRT)*

SRT posits that humans apply social rules when they interact with machines and computers (Huang and Lin, 2011; Moon, 2000; Nass et al., 1999). More specifically, when humans are exposed to machines and computers that display human-like characteristics (e.g., anthropomorphism) or social cues (e.g., interactivity), they follow social rules and adopt social behaviors (Reeves and Nass, 1996) such as reciprocity (Moon, 2000), politeness (Nass et al., 1999), contact between similar personalities (Nass et al., 1995), and interdependence between group members (Nass et al., 1996). An entire research stream has examined how humans apply social rules to anthropomorphically constructed machines (Nass et al. 1994). For instance, Adam, Wessel & Benlian (2021) drew on social response and commitment-consistency theories, and conducted an experiment to understand how verbal anthropomorphic design cues and the foot-in-the-door technique affect user request compliance. They demonstrated that the need to stay consistent, conjointly with both anthropomorphism, influence positively and significantly the likelihood that users comply with a chatbot's request for service feedback. Huang and Lee (2022) used social response theory to unveil the ongoing intention mechanism behind fintech chatbots. Based on social response theory, this study examines how social capital (social signals) and attitudes regarding fintech chatbots interact to alter continuance intention.

4.4.7. *Uses and gratification theory (UGT)*

UGT is a theory developed to understand mass communication with an audience-centered approach. It focuses on how audiences make a concerted effort to exploit media content to further their goals and

objectives (Saunders et al., 2001). Rather than arguing what media does to people, UGT argues what people do with media. People have a variety of requirements and sources of gratification that can be divided into five categories of needs: cognitive, affective, personal integrative, social integrative, and tension free needs. Rese, Ganster and Bayer (2020) deployed both technology acceptance model (TAM) and UGT to evaluate the acceptance of a text-based chatbot. Their findings suggest that the predictive power of both models was almost similar. In their study on brand credibility and its mitigation role in assuaging privacy risk, Jian et al. (2022) combined UGT with signaling and prospect theories to find that brand credibility moderates the relationship between CA features and the overall perceived value of CAs. They also found that higher brand credibility reduces users' perception of privacy risks.

4.4.8. Uncanny valley theory

The uncanny valley is a concept illustrating the relationship between a robotic item's human-like resemblance and the emotional response it provokes. Individuals react to extremely realistic humanoid robots with uneasiness or even disgust (Cherry, 2020). Originally the circumlocution was coined and depicted by the Japanese roboticist Masahiro Mori in an article published in 1970 (Mori, 1970). Mori discovered that people find that robots are more appealing if they have a more human-like appearance. Mori (1970) described a nonlinear relationship between the degree of human likeness of a robot and individuals' emotional responses towards the robot. He found that humans evaluate robots more positively as they become more human-like, but this is true only up to a certain threshold of human-likeness. After that threshold, people start becoming increasingly uncomfortable. This marks the beginning of the "uncanny valley" (bukimi no tani in Japanese) where individuals respond negatively to humanoid robots such as robot zombies. However, as the objects become a close replica of humans, individuals will gain more affinity with the robots.

Applied to CAs, Skjuve et al (2019) show that even though it is tempting not to be transparent regarding a CA's nature (e.g., chatbot vs. human), the uncanny valley theory suggests that such lack in transparency may cause feelings of discomfort. In their paper, Hoyer et al. (2020) put forward a novel framework to illustrate the role of new technologies in the customer journey and examine the impact of these technologies on each stage of a shopping journey (pre-, during- and post-transaction). Based on uncanny valley theory, they deal with comfort with technology as a dimension of the customer journey, and argue that new technologies such as IoT, AR/VR/MR, virtual assistants, chatbots, and robots, will have a tremendous impact on customer experience.

4.4.9. Media Equation theory (MET)

People will respond to media in the same way they would to humans, according to the MET developed by Reeves and Nass (1996). Indeed, MET posits that media equate real life, as individuals process technology-enabled experiences in the same way (natural and social) as nonmediated experiences. When communicating with CAs, for example, users try to be as courteous as they would with a human. Other virtual objects that do not act or appear human, on the other hand, are not afforded such concerns (de Gennaro et al., 2020). Using MET, Gennaro, Krumhuber, and Lucas (2020) investigated whether an empathic chatbot can mitigate the negative impacts of social exclusion. Their findings suggest interacting with a sympathetic chatbot can have a calming effect when people felt social excluded. Xu, Chan-Olmsted, and Liu (2022) combined UGT, MET, and communication privacy management theory to examine attitudes and behavioural patterns related to smart speaker usage. The study suggests that users utilize interpersonal privacy management rules to interact with smart media. In addition, the authors distinguish two routes influencing users' satisfaction: a precautionary route emphasizing the role of users' social presence experiences, and a protective route highlighting the role of perceived privacy risks.

4.4.10. Social cognitive theory (SCT)

Developed by Albert Bandura (1977) as an expansion of the social learning theory, SCT posits that people learn by observing others in the context of their social interactions and experiences. More specifically, people's development is influenced by 1) the environment they are raised in; 2) others' behaviors; and 3) cognition (i.e., the person's way of thinking). This triadic model (including environment, behaviors, and cognition) is reciprocally causal which implies that the three factors influence each other. In their study on the adoption of smart voice assistants' technology among Airbnb guests, Gao et al. (2022) build on SCT and found that perceived emotional value, perceived functional value, and perceived privacy risk drive Airbnb guests' intention to adopt CAs. Self-efficacy directly influences CAs' adoption intention among Airbnb guests and indirectly impacts it via perceived values. Chong et al. (2021) deploy SCT to analyze AI-chatbots in services frontline and develop a 3-level classification of AI-chatbot design (anthropomorphic role, appearance, and interactivity) (Chong et al., 2021).

5. Drivers of CA adoption

In this section (Section 5) and the next section (Section 6), we describe the core elements of a comprehensive framework that we developed based on the literature reviewed. The framework includes the: 1) Drivers of adoption of and engagement with CAs (i.e., what factors motivate humans to adopt and engage with a CA); and 2) the Outcomes of CA adoption (i.e., the impact of the adoption of CAs on both users and organizations). It is synthesized in Fig. 7 and described below.

The drivers of CAs adoption mentioned in the articles analyzed can be clustered into three main categories: first, those that are linked to CA design; second, those related to the users' perceptions of CAs; third, contextual and environmental factors. The three categories are delineated below.

5.1. CA design

The vast majority of the articles reviewed focused on design as a critical aspect of CA adoption. They looked into what qualities and characteristics a CA should have in order to improve communication and convince the user to act or believe in a certain way. CA design entails: 1) incorporating human characteristics (Guthrie, 1993) into the CA design, thus making sure that the CA is anthropomorphized; and 2) ensuring that the design is customized. The relevance of design has been observed in relation to a number of settings and increasingly in e-health (ter Stal et al., 2020).

5.1.1. Anthropomorphic design

Embedding human characteristics into CA design has been found to be a major driver of CA adoption. In relation to **anthropomorphism**, Han (2021) examined the impact of anthropomorphism on consumer purchase decision in chatbot commerce and found that anthropomorphism is positively associated with social presence and perceived customer enjoyment. Moriuchi's (2021) research, based on realism maximization theory and the Unified Theory of Acceptance and Use of Technology (UTAUT), shows that anthropomorphism and engagement act as serial mediators between CA usage experience and CA reuse intentions. Pillai & Sivathanu (2020) investigate the impact of anthropomorphism on AI-powered chatbot adoption intentions, and find that, according to their technology adoption model (TAM)-derived model, anthropomorphism and perceived intelligence have a substantial impact on AI-powered chatbot adoption intentions in tourism. Anthropomorphism and chatbot adoption were examined by Sheehan, Seung Jin & Gottlieb (2020): their findings supported the idea that anthropomorphism acts as a mediator between chatbot type (error-free, clarification and error) and adoption intention. In their analysis of AI-based customer care chatbots and their effects on user compliance, Adam, Wessel & Benlian (2021) leveraged anthropomorphic design, social response

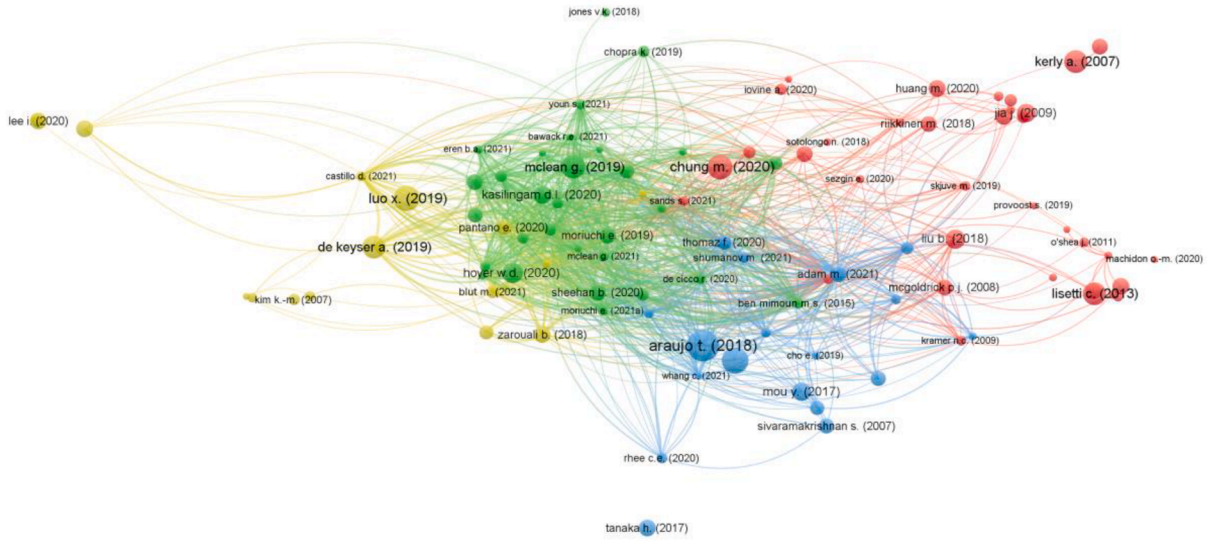

Fig.7. Drivers and Outcomes of Conversational Agents' Adoption: A Holistic View.

theory, and commitment-consistency theory, to find that anthropomorphism design cues have a positive effect on the likelihood that users will comply with CA's requests (Adam, et al., 2021).

However, there are few studies that showed under certain circumstances anthropomorphic design could be unfavorable in terms of the negative impact on the behavioral intentions. For instance, according to Ischen et al. (2020), anthropomorphism as part of entity perception was not a mediator between source of communication (i.e., a chatbot vs a website) and user responses (i.e., recommendation adherence, attitudes towards the recommendation, the medium, and the organization). In their study of functionalist emotion theory and appraisal theory, Crolic et al. (2022) find that when customers are angry during a chatbot service interaction, the anthropomorphism of the chatbot negatively affects customer satisfaction, overall firm evaluation, and subsequent purchase intentions. Sivaramakrishnan et al. (2007) examined the influence of an anthropomorphic information agent (i.e., a humanlike chatbot that works as an interactive online information provider in an online store) on consumers' attitudes regarding the website, product, and purchase intentions. When static product information on the website is restricted, the anthropomorphic information agent has a positive effect. When extensive product information is easily available on the website, the anthropomorphic information agent can be counterproductive if the consumer is motivated by utilitarian drivers.

5.1.2. Customized and personalized design

Scholarly works have emphasized that personalizing CA design based on customer needs and preferences is beneficial in persuading customers to adopt the CA. In this vein, Shumanov & Johnson (2020) suggest that matching a customer's personality to a chatbot could improve customer engagement. Moreover, the features of a CA could be modified based on users' demands: Nawaz and Saldeen (2020) examined chatbots in libraries and found that a CA with personalization and customization is more engaged and supportive. Rhee and Choi (2020) studied the effects of personalization and social role in voice shopping and found that personalization helps to build positive attitudes toward a product offered through an interaction with a CA. Drawing on information boundary theory, Fan et al. (2022) examined the role that chatbots' sales–service ambidexterity can play in adapting to customers' personalization–privacy paradox. Their results show that as the benefits of personalization decrease and the risk to privacy increases, the inherently negative (positive) effects of imbalanced (combined) chatbots' sales–service ambidexterity has an increasing (decreasing) influence on customer experience.

Based on the CASA paradigm, Paul et al (2021) argue that conversational agents, like their human counterparts, are perceived as human-like agents, thus influencing behavior; therefore, they should be designed to reflect an ideal interaction. To accomplish this, the agents should be customized, resulting in a better social experience. Consequently, compliance with agent advice will increase.

Shin et al (2022) investigated cultural difference effects on algorithmic news and they found that the comfort of the users for personalized online news brought to them by chatbots is culture-dependent and must be analysed and interpreted as such. When US users seek individualized news, they like to ensure procedural aspects of personalized curations. UAE users, that display higher uncertainty avoidance levels than US users, show clear preferences for performance over procedural values.

5.2. User related features

The second category covers user-related aspects, which are inherent traits that make CA adoption easier for the user. In our sample of articles, this category features prominently. The five main characteristics that have been found to drive CA adoption are: 1) usage convenience; 2) perceived usefulness; 3) trust; 4) enjoyment; 5) attitude toward technology.

5.2.1. Usage convenience of CA

The term "usage convenience" refers to how a customer perceives CA adoption to be simple and effortless. Therefore, here we include studies focusing on variables that suggest less effort in CA usage, including "perceived ease of use", "effort expectation" and "convenience".

Huang and Chueh (2021) examined chatbot usage among pet owners using a modified version of the technology acceptance model (TAM) and discovered that pet owners' perceived ease of use (PEOU) and perceived convenience greatly boost user satisfaction with utilizing chatbots when users look for pet ailments (Huang & Chueh, 2021). In her study on virtual assistant anthropomorphism, based on realism maximization theory and Unified Theory of Acceptance and Use of Technology (UTAUT), Moriuchi (2021) hypothesizes that effort expectation has a positive impact on consumers' experience with virtual assistants. More specifically, she finds that effort expectation has a strong positive impact on consumers' usage experience of the VA. In their study using the updated UTAUT2 to predict the intentions to use chatbots for travel and tourism, Melián-González et al. (2021) discover a strong negative relationship between inconvenience and chatbot usage intention, but no

relationship for effort expectancy.

By analyzing AI-based chatbots for hospitality and tourism, Pillai & Sivathanu (2020) deploy the uncanny valley theory and the technology adoption model (TAM), to find out that PEOU has a substantial impact on the adoption intention of AI powered chatbots for travel planning. Kasilingam (2020) used TAM to conduct a study on individual attitudes and intentions toward using smartphone chatbots for shopping. The findings suggest that PEOU has a positive and significant relationship with consumers' attitudes toward chatbots. Based on UGT, McLean and Osei-Frimpong (2019) identified and examined the variables impacting the use of home voice assistants and discovered that PEOU positively influences in-home virtual assistant usage. In her empirical study on the impact of voice assistants on consumer engagement and loyalty, Moriuchi used the TAM to discover that PEOU has a positive impact on attitudes.

By utilizing a Consumer Acceptance of Technology model (CAT-model) Zarouali et al. (2018) find that when examining consumer responses to a Facebook chatbot, PEOU does not significantly affect brand attitude. Fernandes & Oliveira (2021) use the Service Robot Acceptance Model (sRAM) to identify the drivers of digital voice assistant adoption and found that PEOU has no effect on customer acceptance of digital voice assistants. Mostafa and Kasamani (2021) investigated the antecedents and consequences of chatbot initial trust drawing on UTAUT and TAM: their findings show that compatibility, PEOU and social influence significantly boost customers' initial trust toward chatbot which, in turn, leads to chatbot usage intention and customer engagement.

Khoa (2021) examined the influence of chatbots on the enterprise integrated marketing communication (IMC) activities and, by leveraging TAM, they found that ease of use and perceived usefulness of chatbots positively affect online consumers' attitude to the IMC activities of businesses. Simultaneously, IMC leads to impulsive buying as well as increased repurchase intention. Murtarelli, Collina, and Romenti (2022) found that PEOU of chatbots positively influences the attitude towards using them by millennials and attitude towards using chatbots positively influence the behavioural intention to use chatbots.

To sum up, most studies (e.g., Huang and Chueh, 2021; Kasilingam, 2020: Moriuchi, 2021; Nguyen et al. 2022) found that usage convenience, especially in the guise of perceived ease of use, has a positive impact on consumer adoption of CAs.

5.2.2. *Perceived usefulness of CA*

The perceived usefulness (PU) of a CA relates to the degree to which the consumer thinks CA can enhance his/her performance (Fernandes & Oliveira, 2021). Pitardi and Marriott (2021) used the Service Robot Acceptance Model (sRAM; Wirtz et al., 2018) to investigate the factors that influence consumer trust in voice-based AI. They discovered that PU had a positive impact on consumer brand engagement via the voice assistant (Pitardi & Marriott, 2021). Fernandes and Oliveira (2021) discovered a substantial and positive association between PU and digital voice assistant adoption using the sRAM. Pillai and Sivathanu (2020) discovered that consumers' PU of trip planning chatbots influences their adoption intention, by means of extending TAM with context-specific variables (Pillai & Sivathanu, 2020). Kasilingam's (2020) findings in a TAM study of attitudes and intentions towards utilizing smartphone chatbots for shopping confirmed that PU has a substantial impact on attitudes toward chatbots. McLean and Osei-Frimpong (2019) used the UGT to show that perceived usefulness, as part of utilitarian benefits, had a positive impact on in-home virtual assistant consumption. Based on TAM, Moriuchi (2019) found that PU has a substantial impact on consumers' engagement and loyalty with voice assistants.

Consumer responses to a Facebook chatbot were investigated by Zarouali et al. (2018): their TAM-based model suggest that PU influences brand perception. In their study, Jain et al. (2022) confirm that enjoyment (as a hedonic feature) significantly improves overall perceived value and the latter affects positively VA continued usage intention. Huang and Kao (2021) researched the factors that can influence customers' evaluations of social distancing as well as how and when these evaluations drive their usage of chatbot services. By leveraging the theory of reasoned action, they show that PU has a significant effect on intention to interact with a chatbot.

In their work on the effects of customer's attitudes towards chatbots, Gumus and Çark (2021) evaluated the effect of PEOU, PU, enjoyment, and risk factors on customer experience and behavioral intention toward chatbots and found no significant effect of privacy risk on customer behavioral intention. Khoa (2021) examined the influence of chatbots on the enterprise integrated marketing communication (IMC) activities and, by leveraging TAM, they found that ease of use and perceived usefulness of chatbots positively affect online consumers' attitude to the IMC activities of firms. Malodia et al (2021) examined the reason for people to embrace AI-enabled voice assistant and did not find a significant effect of convenience on usage. Acikgoz & Perez-Vega (2022) show that PU influences positively attitude toward the usage of CAs. By integrating DeLone and McLean's information systems success model and the expectation confirmation model (ECM) with the factor of trust in the context of banking in Vietnam, Nguyen et al. (2021) found that users' continuance intentions towards the banks' chatbot services were influenced by perceived usefulness.

In sum, most the studies (e.g., Acikgoz & Perez-Vega, 2022; McLean and Osei-Frimpong, 2019; Pitardi & Marriott, 2021) found that perceived usefulness has a positive impact on consumer adoption of CAs.

5.2.3. *Trust and privacy in communication with CA*

Trust is of paramount importance to enable trustworthy conversations. Trust is defined as "wilfully placing confidence in a party while providing personal information" (Hasan et al., 2021: p. 592) and privacy is "one's subjective belief there is some probability of suffering a loss in pursuit of a desired outcome" (Hasan et al., 2021: p. 592). Privacy has emerged in society as a concern to ensure consumers' freedom and control over personal information. The ability to control the release of personal information is a decisive factor for establishing levels of trust in society. A trustworthy communication needs both elements (van Rooy & Bus, 2010). Hence, in this section they are analyzed conjointly under the category of "trust".

In their study on consumer trust and perceived risk for voice-controlled AI, Hasan et al. (2021) discovered that trust in Siri has a strong beneficial impact on brand loyalty for Apple and perceived risk of utilizing Siri has a large negative impact on Apple's brand loyalty. Based on social response theory and TAM, McLean et al. (2021) investigated the impact of voice assistants on consumer brand engagement, and showed that customer trust in VA interactions has a detrimental impact on consumer brand engagement through the VA. Using the Service Robot Acceptance Model (sRAM), Fernandes and Oliveira (2021) investigated the factors that influence digital voice assistant adoption, finding that there is a positive association between digital voice assistant acceptance and perceived trust.

In a study of attitudes and intentions to use smartphone chatbots for purchase decisions, Kasilingam (2020) found that trust had a substantial impact on intention to use chatbots for mobile shopping. In their study of the factors that influence the use of AI in home voice assistants, McLean and Osei-Frimpong (2019) discovered that perceived privacy risk is a concern for individuals and a barrier to using in-home voice assistants. Customers' perceived privacy risk connected with using corporate chatbot services had a negative and direct influence on their satisfaction with the brand's chatbot services, according to a study by Cheng and Jiang (2020a, 2020b) on AI-driven chatbots user experience. In their study of chatbots in retail customer interactions, Rese et al. (2020) found that privacy concerns are negatively connected to both behavioral intention and expected usage frequency (Rese, et al., 2020).

In their study of Millennials' attitudes toward chatbots, De Cicco et al. (2020) found that trust in the chatbot positively predicts attitude. Mostafa and Kasamani (2021) investigated the antecedents and consequences of chatbot initial trust drawing on the UTAUT and TAM, and

their findings show that compatibility, perceived ease of use and social influence significantly boost customers' initial trust toward chatbot which, in turn, leads to chatbot usage intention and customer engagement. Cao et al. (2022) adopted social cognitive theory (SCT), to understand Airbnb guests' intentions to adopt smart voice assistants. Their result show significant negative influence of privacy risk on adoption intention. Drawing on information boundary theory, Fan et al (2022) examined the extent to which chatbot sales–service ambidexterity influences adaptation to the customers' personalization–privacy paradox. Their results show that as the benefits of personalization decreased and the risk to privacy increase, the negative (positive) effects of imbalanced (combined) CA' sales–service ambidexterity had an increasing (decreasing) impact on customer experience. In their work regarding effects of customer's attitudes towards chatbots, Gumus and Çark (2021) found no significant effect of privacy risk on customer behavioral intention. Drawing upon the stimulus–organism–response (SOR) framework, Cheng et al. (2022) found that trust in chatbots negatively affects consumers' intention to switch to a human agent. Hsiao and Chen (2021) deployed service quality, trust and satisfaction to predict users' continuance intention to use a food-ordering chatbot: the results show that anthropomorphism, service quality, trust and satisfaction have significant direct effects on the users' intention to continue use.

In synthesis, most the studies (e.g., De Cicco et al. 2020; Hsiao and Chen, 2021; Kasilingam, 2020) found that trust has a positive impact on consumer adoption of CAs while privacy risks (Thomaz et al., 2020) have been found to show differentiated effects on consumer intention to adopt CAs based on the context analyzed (Cao et al., 2022; Gumus and Çark, 2021).

5.2.4. Enjoyment

Enjoyment can lead to CA adoption. Enjoyment can be defined as "the extent to which a consumer's experience culminates in pleasure and excitement" (Xu, et al., 2020: p.3). In this section, under the label "enjoyment" we include the variables that could lead to pleasant interactions including pleasure, enjoyment, fun, and entertainment.

Based on situational theory of problem-solving (STOPS) and UGT, Cheng and Jiang (2020a, 2020b) found a strong beneficial influence of customer enjoyment on healthcare chatbot users' active communicative activity in relation to the information they obtained from their preferred healthcare chatbot services. Rese et al. (2020) deployed TAM and UGT to assess retailers' customer chatbot acceptability and found that enjoyment had a small but significant positive impact on behavioral intention and intended usage frequency. Using TAM, Kasilingam (2020) discovered a positive influence of perceived enjoyment on the intention to use and attitude to use smartphone chatbots for shopping. Using the Consumer Acceptance of Technology (CAT) model, Zarouali et al. (2018) found that pleasure has a substantial impact on brand attitudes when it comes to Facebook chatbots. According to a study conducted by Ben et al. (2015) perceived enjoyment has a positive effect on satisfaction and behavioral intentions. In their study, Cheng and Jiang (2020a, 2020b) researched the impact of AI-driven chatbots on user experience, and provided evidence that entertainment positively influences satisfaction. In their study of consumers' trust in voice-based artificial intelligence, Pitardi and Marriott (2021) found that enjoyment has a substantial effect on attitude. Building on the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), Melián-González et al. (2021) find that enjoyment has a significant impact on chatbot usage intention in travel contexts. De Cicco et al. (2020) discovered that Millennials' attitudes about chatbots are positively predicted by perceived enjoyment with the chatbot. Based on UGT, McLean and Osei-Frimpong (2019) find that customer enjoyment, as part of hedonic benefits, had a non-significant effect on the use of an in-home voice assistant. Gumus and Çark (2021) found no significant effect of enjoyment on customer behavioral intention to adopt CAs. However, enjoyment was found to influence consumer experience.

Huang and Kao (2021) researched the factors that can affect customers' appraisal of social distancing, and when these appraisals influence their usage of chatbot services: they discovered that consumers' contamination fear affects their use of chatbot during service interactions. Mishra and Shukla (2020) examined the psychological determinants of VA adoption, and their findings suggest that psychological factors such as playfulness, escapism, anthropomorphism, and visual appeal, have a significant positive influence on both hedonic and utilitarian attitudes. Hedonic attitude further influences satisfaction and utilitarian attitude positively impacts usage and satisfaction, which have a positive association with WOM. Ashfagh and Yu (2020) found that consumers' attitude toward smart speakers was influenced by enjoyment as part of hedonic value.

In sum, most the studies (Ashfagh and Yu, 2020; Melián-González et al., 2021; Pitardi and Marriott, 2021) found that enjoyment has a positive impact on consumer adoption of CAs, except for a study (Gumus and Çark, 2021) that found a non-significant effect.

5.2.5. Attitude toward CA technology

Attitude towards CA technology can persuade users to adopt it. Attitude can be defined as "the tendency to respond to an object with some degree of favorableness or unfavorableness" (Ajzen, 2008: p. 530). Here we refer to attitude towards using technology in general and attitude toward using CAs in particular.

In their study on chatbot acceptance in retailing, Rese et al. (2020) provided evidence that immature technology has a detrimental impact on the intended usage frequency and authenticity of dialogue with chatbots used by shops. In their study of consumer trust and perceived risk for voice-controlled artificial intelligence, Hasan et al. (2021) find that the novelty value of using Siri is moderated by consumer innovativeness in such a way that this influence was found to be greater for consumers who are more innovative. Kasilingam (2020) builds on TAM to find that personal innovativeness influences intention to use chatbots for mobile purchasing. By using UTAUT2 with the aim to predict the intentions to use chatbots in travel and tourism settings, Melián-González et al. (2021) found that perceived innovativeness (PI) does not have a direct relationship with chatbot usage intention, but it does have an indirect relationship on it through Self-Service Technologies Attitude (SSTA). Pillai & Sivathanu (2020) find that technological fear has no effect on the adoption intention of AI-powered chatbots for travel planning.

In the study by Jiménez-Barreto et al. (2021), 3 components of self-determined interaction with the chatbot (autonomy, relatedness, and competence), and 5 components of the customer–chatbot experience (affective, sensory, behavioral, social, and intellectual) were examined. The authors find that self-determined interaction and customer experience influence directly participants' attitudes towards the chatbot, and this translates into improved user satisfaction. Building on Social response theory, Huang and Lee (2022) examine the continuous intention mechanism behind fintech chatbots and prove that there is a positive significant effect of attitude toward chatbots on usage continuation intention. To sum up, most of the studies (e.g., Huang and Lee, 2022; Jiménez-Barreto et al., 2021) seem to suggest that attitude influences positively intention to accept and adopt CAs.

5.3. Contextual and environmental factors

A few studies have looked at the contextual and environmental factors that may influence users' decisions to utilize CAs. One example is the work of Ramadan (2021) where the author investigated how Amazon's corporate strategy leads to AI inclusion and elicits the formation of addictive relationships between Alexa users and the Alexa CA. In other papers, the findings are more context-specific. For instance, Liu & Sundar (2018) studied chatbots in health advice and Pillai & Sivathanu (2020) focused on hospitality and tourism. It seems that different macro-environments as well as industries and settings have been analysed in terms of use of CAs, the most typical applications being related to the

education and health care sectors.

6. Outcomes of CA adoption

The outcomes of CA adoption and use mentioned in our sample of articles can be divided into two main categories: first, user-related outcomes; second, business- and firm- related outcomes. An outline of the categories is offered below.

6.1. User related outcomes

6.1.1. Continuance intention to use CAs

Continuance intention to use CA technology happens after CA adoption and can be defined as "behavioural intention to continue usage" (Jain, et al., 2022: p. 704). Balakrishnan and Dwivedi (2021) found that cognitive absorption, user experience and user trust influence positively CA continuation intention. Li et al (2021) find that understandability, reliability, assurance, and interactivity of CAs have a positive impact on satisfaction with chatbot services in the context of Chinese travel firms, that translates into use continuance. Lee, Sheehan, Lee & Chang (2021) studied the desire to promote artificial intelligence-based voice assistant systems (AIVAS) and found that hedonic motivation and compatibility positively influence satisfaction that n its turns translates into use continuance and, eventually, intention to recommend.

Moriuchi (2021) evaluated the intention to re-use in an empirical study aimed at understanding anthropomorphism and engagement with disembodied AIs. Poushneh (2021a, 2021b) looked at how the personality of a voice assistant affects a customer's propensity to use it again. Based on UGT, the influence of AI-driven chatbots on continued use was studied in Cheng and Jiang's study (2020) on how do AI-driven chatbots impact user experience. Based on the stimulus-organism-response framework, Hernandez-Ortega & Ferreira (2021) investigated the role of customer love for CAs in fostering service loyalty. By applying the Elaboration Likelihood Model (ELM), and drawing on inoculation theory, Weiler et al. (2021) studied how inoculation messages, such as communication that seeks to prepare users for a possible response failure, can be used as an alleviation mechanism and the findings indicate that inoculation messages alleviate the negative effects of CA response failures on usage discontinuance.

Jain et al (2022) focused on individuals' perception of the overall value of voice assistants and their behavioral intention towards continued usage of voice assistants and their results confirm that enjoyment as a hedonic feature significantly improves overall perceived value while the latter affects positively the VA continued usage intention. Building on Social Response Theory, Huang and Lee (2022) studied the continuous intention mechanism behind fintech chatbots and their findings showed that attitude positively influences chatbot usage continuation intention. In their study, Hsiao and Chen (2021) applied service quality, trust and satisfaction to predict users' continuance intention to use a food-ordering chatbot: they find that trust has significant direct effect on the users' intention to continue use.

To sum up, several studies (e.g., Balakrishnan and Dwivedi, 2021; Li et al., 2021) have focused on continuance intention to use CA as a dependent variable and have identified a range of predictors.

6.1.2. Purchase intention

Purchase intention relates to the likelihood that a consumer/customer will buy a product or service. Several psychological conditions underpinning purchase intention were investigated by Tassiello et al. (2021): they found that, when experiencing high-power states, consumers are more/less likely to purchase low/high involvement than high/low involvement products by means of CAs. Roy and Naidoo (2021) try to explain purchase intention in their research on the role of anthropomorphic conversational styles in chatbots based on stereotype content model (SCM).

Drawing on social impact theory, Sands et al. (2021) looked at the impact of service scripts in chatbots on purchase intention. Han (2021) examined the effect of anthropomorphism on customer intent to buy. Based on social response theory and TAM, McLean et al, (2021) examined the impact of voice assistants on purchase intention. Trivedi's (2019) study on customer experience using banking chatbots investigated the impact on purchase intention. The Impact of AI chatbot disclosure on customer purchases is investigated in an article by Luo, Tong, Fang & Qu (2019). Lee et al. (2021) investigate the antecedents and consequences of consumers' interaction satisfaction with communication and identify ways to enhance consumer purchase intention via AI chatbot promotion. Based on theory of social support, they find a significant positive effect of interaction satisfaction variables, i.e. social attraction and emotional credibility, on purchase intention and affective attachment. In their study of functionalist emotion theory and appraisal theory, Crolic et al. (2022) explain that, when customers are angry during a chatbot service interaction, the anthropomorphism of the chatbot negatively affects customer satisfaction, overall firm evaluation, and subsequent purchase intentions.

In their analysis of users' affective relationships with voice assistants and their effect on user engagement behaviours toward the brands of smart voice assistants, Hernández-Ortega et al., 2021 found that frequent user-voice assistant interactions evoke positive emotions, which encourage cohesive relationships. Pleasured-satisfaction and interest emerge as strong emotions. Moreover, relational cohesion between users and voice assistants promotes engagement with the brand of the assistant. Hence, relational cohesion after frequent usage of voice assistants affects positively user purchases. Leveraging TAM, Khoa (2021) analyzed the influence of chatbots on the enterprise's integrated marketing communication (IMC) activities, that lead to impulse purchase behavior and repurchase intention behaviour. The findings confirm that IMC leads to customers repurchase intention behaviour. Roy and Naidoo (2021) studied the role of anthropomorphism in the form of warmth vs competence qualities in chatbots to predict purchase intention and attitude toward hotel brand that provided the chatbot: they found that present-oriented users prefer a warm chatbot conversation, that influences positively purchase decisions. Future-oriented users prefer a competent conversation.

In synthesis, multiple studies (e.g., Crolic et al., 2022; Roy and Naidoo, 2021) have focused on purchase intention after the use of CAs as a dependent variable and have identified a range of predictors.

6.1.3. Attitude

Attitude is "the tendency to respond to an object with some degree of favorableness or unfavorableness" (Ajzen, 2008: p. 530). Here, we refer to user attitude towards the offering (product/service) and organization, after adopting a CA.

Leung and Wen (2020) employed social presence theory and contingency theory to study restaurant orders via chatbots: they found that the chatbot method generated higher customer satisfaction and evoked better cognitive attitudes in quick-service restaurants than in full-service restaurants. In their work on anthropomorphism, Ischen et al. (2020) showed that receiving a product recommendation from a chatbot led to more enjoyment of the interaction than receiving a product recommendation from a mere website, leading in turn to more positive attitudes toward (a) the recommendation, (b) the medium, and (c) the organization.

The influence of having an anthropomorphic information agent (a humanlike chatbot that works as an interactive online information provider) in an online store on consumers' attitudes towards the website and product, was studied by Sivaramakrishnan et al. (2007). In their research on effects of message interactivity on user engagement, Sundar et al. (2014) found that interaction history increases perceptions of contingency and dialogue, but is perceived as less interactive than chatting. However, the chat function does not appreciably increase perceived contingency or user engagement, both of which are shown to

mediate the effects of message interactivity on attitudes toward the site.

To sum up, consumer attitudes in the context of CA usage have been investigated extensively (e.g., Ischen et al., 2020; Leung and Wen, 2020) both as ultimate dependent variables and as antecedents of purchase intentions.

6.1.4. Advice adherence

Advice adherence is the extent to which the customer follows the advice of the service provider (Seiders et al. 2015; Wang and Yim, 2019) which in this context is the CA. In their work, Ischen et al. (2020) compare chatbots vs. websites and find that enjoyment is the key mechanism explaining the positive effect of chatbots (vs. Web sites) on recommendation adherence and attitudes. Based on anthropomorphic design, social response theory and commitment-consistency theory, Adam et al. (2021) investigated the effects of chatbots on customer/user compliance, or the likelihood that users will comply with the CA's request. The results of the study reveal that both anthropomorphism and the need to stay consistent significantly increase the likelihood that users comply with a chatbot's request for service feedback. Moreover, social presence mediates the effect of anthropomorphic design cues on user compliance. In their paper on professional service conversations with CAs, Wang and Yim (2019) evaluated the effects of power changes on advice adherence. They found that enabling a "dominance transition" from provider dominance in the pre-advice stage to customer dominance in the post-advice stage, enhances advice adherence because it increases customers' perceived common ground.

Youn & Jin (2021) deployed intention to visit the website recommended by the chatbot to assess the effect of relationship type on parasocial interaction and brand personality. Drawing on social response theory, anthropomorphism theory, task–technology fit theory, and the Stimulus–organism–response model, Zarouali et al. (2021) analysed the impact on message agreement/message credibility in news chatbots. They found that subjects perceived a chatbot news article as more credible than a website article. Cheng et al. (2021) investigated consumers' attitudes on text-based chatbots in e-commerce, looking at whether they rely on them or are resistant to them. They found that consumers' trust in the chatbot increases their reliance on the chatbot and decreases their resistance to the chatbot in future interactions. \.

Based on human computer interaction theory and expectation violence theory, Wilkinson et al. (2021) investigated the effect of "why" and "why not" justifications on users' perceptions of explainability and trust. According to their results, "why" justifications increase users' perception of system transparency, which influences perceived control, trusting beliefs and in turn influences users' willingness to depend on the system's advice. In their study of how conversational robo advisors (as opposed to static, non-conversational robo advisors) alter perceptions of trust and the evaluation of a financial services firm, Hildebrand and Bergner (2020) show that increase in affective trust leads to greater recommendation acceptance.

6.1.5. User engagement

User engagement in technological contexts has been defined as "a quality of user experience characterized by attributes of challenge, positive affect, endurability, aesthetic and sensory appeal, attention, feedback, variety/novelty, interactivity, and perceived user control." (O'Brien & Toms, 2008: 938). Schuetzler et al. (2020) investigated the impact of chatbot conversational skill on engagement and perceived humanness, using Social Presence Theory. Their findings show that increased social presence leads to higher perceived humanness and higher perceived (chatbot) partner engagement. Tsai, Liu, and Chuan (2021) show that chatbots' high social presence communication affects positively consumer engagement outcomes. This relationship is mediated by perceived parasocial interaction and dialogue.

Cheng and Jiang (2020a, 2020b) investigated chatbot user intentions, active communicative action, and online and offline engagement behavior following mass-shooting events. They found that there is a positive effect of active communicative action on healthcare chatbot users' online engagement behaviour and active communicative action has a positive impact on healthcare chatbot users' offline engagement behaviour. Mostafa and Kasamani (2021) investigated the antecedents and consequences of chatbot initial trust drawing on the UTAUT and TAM and found that customers' initial trust toward chatbots leads to usage intention and customer engagement. Jones et al. (2022) investigated the effects of authenticity signals during chat-enabled service recoveries based on communication accommodation theory. Their findings suggest that when an avatar is female and when it is dressed professionally it is perceived as more authenticity. Higher authenticity drives engagement toward CA.

By adopting a theory of consumption values, Malodia et al (2021) developed a model to investigate why people decide to use AI-enabled voice assistants. More specifically, they evaluated the effects of consumption values (social identity, convenience, personification, perceived usefulness and perceived playfulness) on engagement with Google Assistant for transactional as well as non-transactional activities. Only convenience failed to show a significant effect. Ferreira et al. (2022) analysed the consumer-virtual assistant communication by demonstrating the effect of authenticity and attachment as drivers of engagement via psychological ownership. They found that users view their communication with virtual assistants as authentic, and this leads to higher levels of engagement. Grimes et al. (2021) studied user conversational engagement with chatbots deployed for customer support on information systems.

By taking into account mental models and expectation violation, they demonstrated that AI-empowered CAs with higher conversational capabilities lead to higher conversational engagement compared to CAs with lower conversational capabilities. Hernandez-Ortega & Ferreira (2021) studied users' affective relationships with smart voice assistants and found that frequent user-voice assistant interactions evoke positive emotions, which encourage cohesive relationships. Relational cohesion between users and smart voice assistants promotes engagement with the brand of the assistant. Marikyan et al. (2022) examine the impact of digital assistants on individual's satisfaction with use of technology, productivity and job engagement. They find that performance expectancy, perceived enjoyment, intelligence, social presence and trust are positively related to satisfaction with digital assistants. Satisfaction with the digital assistants was found to correlate with productivity and engagement.

6.1.6. Customer satisfaction with the CA

Customer satisfaction can be defined as the "favourability of the individual's subjective evaluation of the various outcomes and experiences associated with using or consuming it" (Westbrook, 1980: p. 49). One of the factors chosen by Youn & Jin (2021) to assess the effect of relationship type on parasocial interaction and brand personality is satisfaction with the chatbot relationship. They found that relationship with brand personality mediates the relationship between relationship type with chatbot (assistant vs. friend) and satisfaction. In their study on service scripts in chatbots, Sands et al. (2021) looked at the impact on customer experience satisfaction. They found that when employing an education script, human service (vs chatbot) has higher positive effect on satisfaction.

In order to uncover key aspects of CAs for companies, Ibáñez Lobato et al. (2021) assessed the impact of CA characteristics on satisfaction with home voice assistants, using the Uncanny Valley Theory. All the tested relationships proved to be significant. Based on theory of social support, Lee et al. (2021) investigated the antecedents and consequences of consumer satisfaction with communication and identify ways to enhance consumer purchase intention via AI chatbot promotion. They find that social attraction and emotional credibility influence purchase intention and affective attachment.

Based on functionalist emotion theory and appraisal theory, Crolic et al. (2022) explain that anthropomorphism exerts a negative impact on

the satisfaction of angry (vs. happy) customers during a chatbot service interaction. Jones et al. (2022) investigated the effects of authenticity signals during chat-based service recoveries based on communication accommodation theory. Their findings suggest that avatar authenticity is higher when the virtual assistant is a female, and the impact is even higher if it is dressed professionally or is of a different race than the consumers'. This increased authenticity is shown to drive satisfaction towards the CA. Roy and Naidoo (2021) show that present-oriented users prefer a warm chatbot conversation, while future-oriented users prefer a competent conversation. In the study by Jiménez-Barreto et al. (2021), 3 components of self-determined interaction with the chatbot (autonomy, relatedness, and competence), and 5 components of the customer–chatbot experience (affective, sensory, behavioral, social, and intellectual) were examined.

They show that there is a direct influence of self-determined interaction on customer experience and measure the direct effects of those two constructs on participants' attitudes toward the chatbot. Moreover, they show that increased attitude significantly improves user satisfaction. Mishra and Shukla (2020) examined the psychological determinants of CA adoption and their findings suggest that several psychological factors (i.e. playfulness, escapism, anthropomorphism, and visual appeal) have a significant positive influence on both hedonic and utilitarian attitudes. The latter ones increase satisfaction.

In their analysis of users' affective relationships with smart voice assistants, Hernandez-Ortega & Ferreira (2021) found that frequent user-voice assistant interactions evoke positive emotions, which encourage cohesive relationships. Pleasure, satisfaction and interest emerge as strong emotions. Fan et al. (2022) studied whether, how, and why using voice assistant (vs. touch panel) affects consumers' satisfaction levels and their behavioral intentions differently. They concluded that using AI-powered voice assistants (vs. touch panel) lead to a lower level of satisfaction due to a deficiency in perceived control, especially among consumers with independent self-construal tendency. Nguyen et al. (2022) studied the differences in user satisfaction with a chatbot system vis-a-vis a menu-based interface system. Chatbot systems lead to a lower level of perceived autonomy and higher cognitive load, compared with menu-based interface systems, resulting in a lower degree of user satisfaction. Marikyan et al (2022) show that performance expectancy, perceived enjoyment, intelligence, social presence and trust were positively related to satisfaction with digital assistants.

6.2. Business- and Firm-Related outcomes

6.2.1. Branding

Branding has a long tradition in marketing studies and relates to the way companies develop brands as well as branding strategies and contribute to create a brand image that might help positioning of products and services and improve brand experience. The definitions of brand and the different approaches taken to define brands have been the object of a large body of research (Bastos & Levy, 2012; Stern, 2006).

Here we consider the outcomes that affect the branding of a company. In their research, Kull et al. (2021) examined the role played by anthropomorphic conversational styles in the context of CAs, and found that brand engagement increases when CAs start a conversation deploying a warm (vs. competent) message and brand-self distance acts as a mediator. A warm (vs. competent) initial CA message allows consumers to feel closer to the brand.. In their paper, Roy & Naidoo (2021) examine the attitude toward the brand and discover that present (future) orientation of subjects enhances favorable product decisions when the chatbot interaction is warm (competent). Brand perceptions mediate these effects.

Tsai et al. (2021) researched how chatbots' social presence influences consumer engagement. Using social presence communication and anthropomorphic profile design, they found that the effect of chatbots' high social presence communication on consumer engagement is mediated by perceived parasocial interaction and dialogue. Moreover, they show that anthropomorphic profile design can boost the positive effects of social presence communication via psychological mediators. McLean et al. (2021) studied how voice assistants influence consumer brand engagement. They proved the importance of voice assistants' attributes of social presence, perceived intelligence, and social attraction in influencing consumer brand engagement.

Poushneh (2021a, 2021b) examined the impact of auditory sense on trust and brand affect. She found that perceived auditory sense drives perceived auditory control through auditory social interactions with a voice assistant that lead to brand affect and consumers' trust in the voice assistant. In their exploratory qualitative study on the brand anthropomorphisation strategies adopted by companies in the field of name-brand voice assistants, Vernuccio et al. (2021) detect human-like design and dialogue as the drivers that lead to brand personality and the strength of consumer-brand relationships. In their analysis of users' affective relationships with smart voice assistants, Hernandez-Ortega & Ferreira (2021) found that relational cohesion between users and voice assistants promotes engagement with the brand of the assistant.

6.2.2. Wom

WOM has been defined as communication between consumers about a product, service, or company whereby the sources are considered independent from commercial influence (Huete-Alcocer, 2017; Mariani & Borghi, 2023). Focusing on customer love for CAs in building service loyalty, Hernandez-Ortega & Ferreira (2021) found that consumer intimacy and commitment for smart voice assistants lead to WOM and eWOM as part of service loyalty. Based on the post-acceptance model of information system continuance (PAMISC), Lee et al. (2021) studied social diffusion of smart technologies and found that hedonic motivation and compatibility are significant predictors of satisfaction, which leads to use continuance and, eventually, intention to recommend.

Technology anxiety was found to be indirectly (but not directly) associated with a lower intention to recommend. Van den Broeck et al. (2019) examine chatbot advertising effectiveness and evaluate the effects on the patronage intentions (i.e., purchase and recommendation intention of the product).The results show that message acceptance mediates the effect of perceived intrusiveness of chatbot advertising on patronage intentions. Zarouali et al. (2018) studied the determinants that potentially influence consumers' attitude toward brands deploying chatbots. The study provided evidence that attitude toward the brand explained a significant amount of variation in likelihood to use and recommend the chatbot. Mishra and Shukla (2020) examined the psychological determinants of CA adoption, and their findings suggest that psychological factors, i.e. playfulness, escapism, anthropomorphism, and visual appeal, have a significant positive influence on utilitarian attitude which positively impacts satisfaction. In its turn, satisfaction has a positive impact on WOM. Fan et al (2022) show that using CAs (vs. touch panels) impacts negatively satisfaction caused by weak perceived control. In a nutshell, perceived control influences satisfaction and behavioral intentions under the guise of WOM and consumption preference.

6.2.3. Loyalty

Loyalty represents the probability that consumer will continue communicating and engaging effectively with a company and brand over time. Moriuchi (2019) performed an empirical study on voice assistants on consumer engagement and loyalty: she found that increased avatar authenticity is shown to drive engagement, loyalty, and satisfaction. Cheng and Jiang (2020a, 2020b) focused on how AI-enabled chatbots impact user experience and influence customer loyalty. They found that user satisfaction positively affected both the continued use intention of chatbot services and customer loyalty. In a study on consumer trust and perceived risk for voice-controlled AI, Hasan et al. (2021) investigated the impact on brand loyalty for Apple. They demonstrated that perceived risk seems to have a significantly negative influence on brand loyalty; however, consumer trust, interaction, and

novelty value have a significantly positive influence on brand loyalty. In the context of name-brand voice assistants, Vernuccio et al. (2021) found that human-like design and dialogue strengthen consumer-brand relationships which in turn influence multidimensional brand loyalty. Based on communication accommodation theory, Jones et al. (2022) suggest that enhanced avatar authenticity drives engagement, loyalty, and satisfaction toward CA.

6.2.4. Customer satisfaction with the Product, Brand, and firm

In their research on human–computer interaction, Pizzi et al. (2020) find that non-anthropomorphic digital assistants enhance reactance, which reduces product choice satisfaction. Poushneh (2021a) looked at how the personality of a voice assistant affects customer satisfaction. More specifically, the author shows that voice interaction with a CA entailing functional intelligence, sincerity, and creativity allows consumers to engage in exploratory behavior that translated into satisfaction and consumers' willingness to continue using voice assistant. Chung et al. (2020) use customer data to test a five-dimension model entailing customer perceptions of trendiness, interaction, customization, entertainment, and problem-solving. They find that chatbot e-service is conducive to interactive and engaging brand/customer service encounters. CAs' impact on website customers' satisfaction with the website and their behavioral intention was investigated by Ben Mimoun and Poncin (2015). They found that hedonic value mediates the effects of playfulness and social presence on satisfaction and behavioral intentions.

7. Discussion and agenda for future research

7.1. Discussion

To the best of our knowledge, this study represents the first comprehensive and systematic literature review (SLR) of the body of marketing research on artificial intelligence-empowered conversational agents. Conducting this SLR was critical for four reasons. First, unlike narrative reviews that are mostly based on the subjective and qualitative judgments of a group of experts, this SLR allowed us to build on a relevant number of quantitative analytical techniques (e.g., bibliographic coupling and co-occurrence analysis) to generate a comprehensive, holistic, and up-to-date overview of the research field of AI-empowered conversational agents in marketing. The SLR approach adopted allowed to synthesize comprehensively a body of research that seems significantly fragmented (Lim et al., 2022) as it is spread across different disciplines and applied domains. By conducting a SLR, we addressed this problem. Accordingly, this work provides a bird's eye view of the research field that helps both researchers and practitioners overcome silo-based approaches to this multidisciplinary field, and generates a more organized scholarly overview of key issues, concepts, opportunities, and challenges pertaining to the field (Donthu et al., 2021; Mariani et al., 2022). In line with methodological reflection on the advantages of SLRs (Mariani et al., 2021; Paul et al., 2021), it is hoped that in the immediate future this could allow other researchers to avoid duplicating their research efforts when trying to identify meaningful and novel research gaps worth of conceptual and empirical investigation.

Second, as this body of research has expanded rapidly and in a sustained manner over the last lustre, conducting a SLR on the topic allowed us to enhance our comprehension of the temporal evolution of knowledge and identify the most recent advancements. Relatedly, we were able to observe that research in the area is somehow mostly at an exploratory stage and relying on experiments (Crolic et al., 2022; Garvey et al., 2023) with a very few studies trying to move to an explanatory stage. Furthermore, by reading our work, marketing scholars can now rely on a structured framework that clearly maps out extant literature in relation to the *drivers* and *outcomes* of CA adoption and usage.

Third, hopefully this study has allowed marketing scholars to gain a clearer and more holistic and comprehensive picture of what has been researched, through which theories and where the most relevant new research gaps are. We developed an interpretative framework identifying and discussing the drivers and outcomes of implementing CAs in marketing and consumption settings, thus engendering finer-grained insights on the existing body of knowledge on AI-empowered conversational agents. The framework proposed includes (1) Drivers of CA usage and adoption such as CA design, user-related features, contextual and environmental factors; and (2) Outcomes of CA usage such as user-related outcomes, and business- and firm-related outcomes. Additionally, this work deployed content analysis, to illustrate the most recurring topics and research streams, theories, and constructs. More specifically, we found that the most commonly deployed theories are: Technology Acceptance Model, Unified Theory of Acceptance and Use Of Technology, Social Presence Theory, Self-Determination Theory, Anthropomorphism Theory, Social Response Theory, Uses And Gratifications Theory, Uncanny Valley Theory, Media Equation Theory, Social Cognitive Theory. This extends recent research on conversational commerce (Lim et al., 2022) that did not dig in depth about theories. Furthermore, in our agenda for future research (see Section 7.2), we identify several research directions pertaining to *drivers* of CA usage and adoption, and *outcomes* of CA usage. This will enable researchers interested in CA to gain a broader, deeper and updated understanding of research gaps and areas that are under-researched or not researched at all.

Fourth and last, by means of a quantitative SLR, we were able to analyse the body of knowledge pertaining to AI-enabled CAs in its entirety and not as a subset (Donthu et al.,2021), thus advancing and extending recent work (Lim et al., 2022) trying to organize extant research. In line with the existing guidelines on SLRs (Donthu et al., 2021), we intentionally collected data on the entire population of publications and used bibliometric techniques to allow replicability and improve the rigor of this review study.

7.2. Agenda for future research

Based on the review carried out, we identified several research directins that reflect our drivers-processes-outcomes framework. These research directions pertain to: (1) Drivers of CA usage and adoption such as CA design, user-related features, contextual and environmental factors; and (2) Outcomes of CA usage such as user-related outcomes, and business- and firm- related outcomes. We discuss them below and synthesize them in Table 7.

7.2.1. Drivers of CA usage

As far as CA design is concerned, researchers interested in design might need to dig in more depth about issues related to anthropomorphism and human likeness of the CA and extend and enrich previous reference work (e.g., Adam et al., 2021; Araujo, 2018; Go & Sundar, 2019; Moriuchi, 2021). More specifically, scholars willing to engage with this research strand might need to understand: (1) if and to what extent human likeness of a CA constitutes a more effective driver of adoption for certain types of CAs than others; (2) if users' reactions to anthropomorphism in CA design change over time; (3) what anthropomorphic design factors have the greatest impact on CA adoption and use; (4) what anthropomorphic design factors enable the creation of effective human-bot communication; (5) if there are industries where CA anthropomorphic design is most effective to trigger CA adoption and use. As far as Customized and Personalized Design is concerned, researchers interested in design might also extend other studies pertaining to customized and personalized design of CAs (e.g., Fan et al., 2022; Rhee and Choi, 2020; Shumanov & Johnson, 2020).

More specifically, scholars willing to engage with this research strand might need to understand: (1) the effects of auditory and visual design customization on CA adoption and use; (2) what elements of CAs are customizable to enhance CA adoption; (3) what element influences the most CA adoption intention; (4) what user expectations should be

Table 7
Research directions and open research questions.

Research directions	Research Questions
1. Drivers of CA Usage and Adoption	
1.1 CA Design	
Anthropomorphic Design	1. Do users' perceptions of anthropomorphism differ across different types of CAs, implying that human likeness works as a more effective driver of adoption for certain types of CAs than for other types? 2. Do the reactions of users to anthropomorphism in CA design change over time thus suggesting that CA adoption might change over time depending on the degree of anthropomorphism? 3. What are the factors that most likely increase CAs' humanlikeness ultimately driving CA adoption? 4. What anthropomorphic design factors have the greatest impact on CA adoption and use? 5. What anthropomorphic design factors enable the creation of effective human-bot communication? 6. Are there industries where CA anthropomorphic design is most effective to trigger CA adoption and use?
Customized and Personalized Design	1. What effect do auditory and visual design customization factors have on CA adoption and use? 2. Which elements of CAs are customizable to enhance CA adoption and use? 3. Which CA characteristic is the most important to be customized in order to significantly influence CA adoption intention? 4. What are the user expectations that should be considered when personalizing communication with CAs to increase the likelyhood of CA adoption and use? 5. What are the differences in messaging behavior that require personalization of CAs due to demographic differences such as age, gender, culture, country of origin, language? 6. How should the communication strategy be tailored to the needs and expectations of the users to enhance CA adoption and use? 7. How the messaging strategy of CAs should be aligned with the preferences of the target customers in terms of tone, appeal, clarity, appropriate length, and layout to enhance CA adoption and use?
Other	1. What are the factors influencing the design of different types of CAs allowing CAs to be effective in conversation and enhancing the likelihood of CA adoption and use? 2. How human-AI collaboration influence the effectiveness of CAs in developing communication, thus enhancing the likelyhood of CA adoption and use?
1.2.User Related Features	
Usage Convenience	1. Are certain types of CAs perceived as easier to use than others? 2. Does perceived ease of use of CAs differ across contexts of application? 3. Is perceived ease of use of CAs augmented or diminished by factors like trust and privacy concerns? 4. Is perceived ease of use of CAs augmented or diminished by demographic or cultural factors?
Perceived Usefulness	1. Are certain types of CAs perceived as more useful than others? 2. Does usefulness of CAs differ across contexts of application? 3. Is perceived usefulness of CAs augmented or diminished by factors like trust and privacy concerns? 4. Is perceived usefulness of CAs augmented or diminished by demographic or cultural factors?
Trust and Privacy in Communication with CA	1. Does previous experience with a brand affect user trust in CAs? 2. What factors make human communication with CAs trustworthy? 3. How do privacy and risk interact with trust to influence the adoption and CAs? 4. Is trust in CAs augmented or diminished by demographic or cultural factors? 5. Is trust in CAs augmented or diminished by the context where CAs are applied?
Enjoyment	1. What are the characteristics of a CA that increase the lieklyhood that a customer will have an enjoyable communication with the CA? 2. Are certain types of CAs perceived as more enjoyable than others? 3. Does enjoyment using CAs differ across contexts of application? 4. Is enjoyment using CAs augmented or diminished by factors like trust and privacy concerns? 5. Is enjoyment using CAs augmented or diminished by demographic or cultural factors? 6. Is there an optimal level of enjoyment in communication with CAs that can induce adoption intention?
Attitude toward CA Technology	1. Can training potential consumers affect their attitude toward CA technology? 2. What is the effect of time on attitude towards CA technology acceptance and adoption?
Other	1. Does one or more of the user features described above play a more pronounced role than others in consumers acceptance of CAs? 2. Do consumers communication skills affect their CA adoption intentions?
1.3 Contextual and Environmental factors	1. Is human-CA communication influenced by geographical settings? 2. Is human-CA communication influenced by the industrial context/setting (e.g. health-care, education, entertainment, retailing)? 3. Is human-CA communication influenced by consumer demographics? 4. Is human-CA communication influenced by organizational culture? 5. Is human-CA communication influenced by management strategies? 6. Is human-CA communication influenced by individual values? 7. Does the effective use of CAs change the way customers evaluate the environmental footprint of the brand/firm?
2. Outcomes of CA usage	
2.1 User Related Outcomes	
Continuation Intention to Use CAs	1. Which factors have the greatest influence on continuation intention to use CAs? 2. How intention to reuse CAs is evolving in different contexts and industries? 3. What are the hindrances and motivators of CAs continued usage in complex service senarios? 4. What impact does CA usage continuation intention have on value creation for customers?
Purchase Intention	1. What type of offerings are best suited for CA communications that stimulate purchase intention? 2. How can CA communication strategy persuade purchase intention? 3. How does prior experience with a brand/ product influence users' purchase intentions after interaction with CAs?

(*continued on next page*)

Table 7 (*continued*)

Research directions	Research Questions
	4. How does a company's reputation influence CA users' purchase intentions of the company's products?
Attitude	1. Which factors play a critical role in customer attitude towards the brand/offering after CA adoption? 2. What are the user characteristics that create positive user attitude towards organizations after using their CAs for purchase decisions? 3. What are the environmental characteristics that drive positive attitude toward CAs?
Advice Adherence	1. How does a CA's (verbal and non-verbal) communication style influence users' adherence to the advice received from the CA? 2. How does a CA's communication style influence users' nonadherence to the advice received from the CA? 3. How does users' assessment of communication styles influence users' intention to adhere to the advice received from the CA? 4. What CA user characteristics influence advice adherence? 5. Has CA design an impact on advice adherence? 6. What messaging strategy leads to advice adherence? 7. How does prior/offline experience with brand/product influence users' acceptance of CA advice? 8. How does a company's reputation influence CA communication effectiveness and user adherence to that communication?
User Engagement	1. What characteristics of the users influence their intention to enhance engagement through communication with a CA? 2. What CA features and messaging strategies encourage human engagement with CA? 3. Does the user's level of online and offline engagement after communicating with CA vary across various contexts and industries?
Customer Satisfaction with CA	1. What are the overall factors influencing customer satisfaction after interaction with a CA? 2. How does customer satisfaction with a CA relate to customer satisfaction with the organization deploying the CA? 3. What are the consequences of customer dissatisfaction with CA? 4. What are the factors allowing to lower the probability of customer dissatifaction during a CA encounter?
Other	1. Are there any other critical factors pertaining to users that are influenced by CA use? 2. How do the other user related outcomes mentioned above interact with and influence one another? 3. How do CAs affect information search after interaction of the user with the CA?
2.2Business Related Outcomes	
Branding	1. How can brand strategies become more effective by embedding CA characteristics? 2. How should the CA communication strategy be tailored to be consistent with the brand tone? 3. How can brand identity be incorporated into CA design and communication? 4. To what extent CAs' improvement influences brands' perception? 5. How does effective CA use improve the company/brand image?
WOM	1. What effect does CA adoption have on WOM vs. eWOM? 2. How does the effectiveness of CA communication affect WOM and eWOM?
Loyalty	1. How does the adoption and development of CAs affect the expectations of loyal customers?
Customer Satisfaction with Product, Brand, Firm	1. How does satisfaction with the communication strategy of CA impact customer satisfaction with the product/brand? 2. How does satisfaction with the communication strategy of CA impact product/brand reputation? 3. How does satisfaction with the communication strategy of CA impact customer satisfaction with the company?
Other	1. What are the outcomes of CA adoption that have the greatest impact on value creation? 2. How can organizations control the (un) desired outcomes of CAs being embraced by users? 3. How is CA adoption by competitors affecting relative market shares? 4. How is the use of CAs affecting the communication style of businesses? 5. How can CA adoption by organizations and their customers influence pricing decisions? 6. How can CA adoption by organizations and their customers influence distribution decisions? 7. How can CA adoption by organizations and their customers influence new product launch decisions? 8. How can CA adoption by organizations and their customers influence promotion decisions?

considered when personalizing communication with CAs to increase the likelihood of CA adoption; (5) how and if the personalization of CAs should be performed based on the demographics of the user; (6) how the communication strategy should be tailored to the needs of the users to enhance CA adoption and use; (7) how the messaging strategy of CAs should be aligned with the preferences of the target customers in terms of tone, appeal, clarity, appropriate length, and layout to enhance CA adoption. As far as other aspects of CA design, researchers might try to examine in depth: (1) the factors influencing the design of different types of CAs to enhance the likelihood of CA adoption and use; (2) if and how human-AI collaboration can influence the effectiveness of CAs in developing communication.

As far as user-related features are concerned, researchers interested in usage convenience may want to extend previous research (e.g., Huang and Chueh, 2021; Kasilingam, 2020; Moriuchi, 2021; Nguyen et al., 2022) and dig in more depth about issues related to ease of use to understand: (1) if certain types of CAs are perceived as easier to use than others; (2) if perceived ease of use of CAs differs across contexts of application (e.g., different industries and markets); (3) if perceived ease of use of CAs is augmented or diminished by factors like trust and privacy concerns; (4) if perceived ease of use of CAs is augmented or diminished by demographic or cultural factors. Scholars dealing with perceived usefulness of a CA, could extend previous research (e.g., Acikgoz & Perez-Vega, 2022; McLean and Osei-Frimpong, 2019; Murtarelli et al., 2022; Murtarelli et al., 2021) and dig in more depth about issues related to ease of use to understand: (1) if certain types of CAs perceived as more useful than others; (2) if usefulness of CAs differ across contexts of application (e.g., industry or markets); (3) if perceived usefulness of CAs is augmented or diminshed by factors like trust and privacy concerns; (4) if perceived usefulness of CAs is augmented or diminshed by demographic or cultural factors.

Researchers examining trust and privacy issues pertaining to CA, might extend extant studies (e.g., Cao et al., 2022; De Cicco et al., 2020; Gumus and Çark, 2021; Hsiao and Chen, 2021 Kasilingam, 2020) and

analyze more deeply issues related to ease of use to understand: (1) if previous experience with a brand affects user trust in CAs; (2) what are the factors making human communication with CAs trustworthy; (3) how and to what extent privacy and risk interact with trust to influence the adoption and CAs; (4) if trust in CAs is augmented or diminished by demographic or cultural factors; (5) if trust in CAs is augmented or diminished by the context where CAs are applied.

Scholars dealing with enjoyment as a driver of CA adoption and use, could extend previous research (e.g., Ashfaq et al., 2020; Gumus and Çark, 2021; Melián-González et al., 2021; Pitardi and Marriott, 2021) and dig in more depth about issues related to enjoyment to understand: (1) and identify the characteristics of a CA that increase the likelihood that a customer will have an enjoyable communication with a CA; (2) if certain types of CAs perceived as more enjoyable than others; (3) if enjoyment using CAs differs across contexts of application (e.g., industry and markets); (4) if enjoyment using CAs is augmented or diminished by factors like trust and privacy concerns; (5) if enjoyment using CAs is augmented or diminished by demographic or cultural factors; (6) if there is an optimal level of enjoyment in communication with CAs that can induce adoption intention.

Researchers examining atttude towards CA technology, might extend extant studies (e.g., Huang and Lee, 2022; Jiménez-Barreto et al., 2021) and analyze more deeply issues related to attitude towards CA technology to understand: (1); if training potential consumers affect their attitude toward CA technology (2); the effect of time on attitude towards CA technology acceptance and adoption.

Scholars dealing with context and environment as drivers of CA adoption and use, could extend previous research and dig in more depth about issues related to context and environment to understand: (1) if human-CA communication is influenced by geographical settings; (2) if human-CA communication is influenced by the industrial context/setting (e.g. healthcare, education, entertainment, retailing); (3); if human-CA communication is influenced by consumer demographics (4) if human-CA communication is influenced by organizational culture; (5) if human-CA communication is influenced by management strategies; (6) if human-CA communication is influenced by individual values; (7) the effective use of CAs modifies the way customers evaluate the environmental footprint of the brand/firm.

7.3. Outcomes of CA usage: User-related outcomes

Researchers investigating user related outcomes in the guise of continuance intention, might extend extant studies (e.g., Balakrishnan and Dwivedi, 2021; Huang and Lee, 2022; Li et al., 2021) and analyze more deeply issues related to attitude towards CA technology to understand: (1) what factors have the greatest influence on continuation intention to use CAs; (2) if and how intention to reuse CAs is evolving in different contexts and industries; (3) the hindrances and motivators of CAs continued usage in complex service senarios; (4) the impact of CA usage continuation intention on value creation for customers.

Scholars dealing with purchase intention as outcome of CA use, could extend previous research (e.g., Crolic et al., 2022; Roy and Naidoo, 2021) and dig in more depth about issues related to context and environment to understand: (1) what type of offerings are best suited for CA communications that stimulate purchase intention; (2) how CA communication strategy can persuade purchase intention; (3); if and how prior experience with a brand/product influences users' purchase intentions after interaction with CAs; (4) how a company's reputation influences CA users' purchase intentions of the company's products.

Researchers examining attitude towards purchasing, might extend extant studies (e.g., Ischen et al., 2020; Leung and Wen, 2020; Sivaramakrishnan et al., 2007; Sundar et al., 2014) and analyze more deeply issues related to attitude as an outcome of CA usage to understand: (1) what factors play a critical role in customer attitude towards the brand/offering after CA adoption; (2); the user characteristics that create positive user attitude towards organizations after using their CAs for purchase decisions (3) the environmental characteristics that drive positive attitude toward CAs.

Scholars dealing with advice adherence as outcome of CA use, could extend previous research (e.g., Adam et al., 2021; Youn & Jin, 2021; Wilkinson et al., 2021) and dig in more depth about issues related to advice adherence to understand: (1) if and how CA's communication style can influence users' adherence to advice; (2) if there are specific CA user characteristics influencing advice adherence; (3) if CA design has an impact on advice adherence; (4) if there are messaging strategies that lead to advice adherence; (5) if prior/offline experience with brand/product influence users' acceptance of CA advice; (6) if a company's reputation influences CA communication effectiveness and user adherence to that communication.

Researchers examining user engagement, might extend extant studies (e.g., Cheng and Jiang, 2020a, 2020b; Ferreira et al., 2022; Grimes et al., 2021; Hernandez-Ortega & Ferreira, 2021; Jones et al., 2022; Malodia et al., 2021; Marikyan et al., 2022; Moriuchi, 2021; Mostafa and Kasamani, 2021; Schuetzler et al., 2020; Sundar et al., 2014; Tsai et al., 2021) and analyze more deeply issues related to user engagement as an outcome of CA usage to understand: (1) what are the characteristics of the users that influence the most their intention to enhance engagement through communication with a CA; (2) what CA features and messaging strategies encourage human engagement with CAs; (3) if the user's level of online and offline engagement after communicating with CA varies across different contexts and industries.

Scholars dealing with satisfaction as outcome of CA use, could extend previous research (e.g., Crolic et al., 2022; Jones et al., 2022; Ibáñez Lobato et al., 2021; Tsai et al., 2021) and dig in more depth about issues related to satisfaction to understand: (1) what the overall factors influencing customer satisfaction after interaction with a CA might be; (2); how customer satisfaction with a CA relates to customer satisfaction with the organization deploying the CA; (3) what the consequences of customer dissatisfaction with CA could be; (4) the factors allowing to lower the probability of customer dissatisfaction during a CA-human encounter.

7.3.1. Outcomes of CA usage: Business- and Firm-related outcomes

Researchers investigating business related outcomes in the guise of branding, might extend extant studies (e.g., Kull et al., 2021; McLean et al., 2021; Poushneh, 2021a, 2021b; Vernuccio et al., 2021) and analyze more deeply issues related to branding to understand: (1) how brand strategies can become more effective by embedding CA characteristics; (2) how the CA communication strategy should be tailored to be consistent with the brand tone; (3) how the brand identity can be incoporated into CA design and communication; (4) to what extent CAs' improvement influences brands' perception; (5) how effective CA use can improve the company/brand image.

Scholars dealing with WOM as outcome of CA use, could extend previous research (e.g., Fan et al. 2022; Huete-Alcocer, 2017; Mishra and Shukla, 2020; Zarouali et al., 2018) and dig in more depth about issues related to WOM to understand: (1) what is the effect of CA adoption on WOM vs. eWOM; (2) to what extent the effectiveness of CA communication affect WOM and eWOM.

Researchers investigating business related outcomes in the guise of loyalty, might extend extant studies (e.g., Cheng and Jiang, 2020a, 2020b; Hasan et al., 2021; Jones et al., 2022; Moriuchi, 2019) and analyze more deeply issues related to loyalty to understand: how the adoption and development of CAs might affect the expectations of loyal customers.

Scholars dealing with satisfaction with the business as outcome of CA use, could extend previous research (e.g., Ben Mimoun and Poncin, 2015; Chung et al., 2020; Poushneh, 2021a) and dig in more depth about issues related to satsfaction with the business to understand: (1) if and how satisfaction with the communication strategy of CA influences customer satisfaction with the product/brand; (2) if and how satisfaction with the communication strategy of CA influences product/brand

reputation; (3) if and how satisfaction with the communication strategy of CA influences customer satisfaction with the company.

In addition to the aforementioned research directions, our findings also suggest that: (1) whereas chatbots, virtual assistants, and home devices are the most researched forms of CAs, further research should focus on a wider range of CA types; (2) future scholarly work might engage increasingly in experimental designs to dig in depth about the underlying mechanisms of drivers and outcomes of CA adoption; (3) as most of the studies related to US consumers/users of CAs, cross-cultural and comparative studies examining customer behaviors across customers from different geographical locations/regions and with different cultural backgrounds are needed; (4) as retail and healthcare seem to prevail among the empirical context, studies on other settings should be encouraged; (5) anthropomorphism theory applied to CAs is becoming increasingly relevant to gan a better understanding of CA design and messaging style. However, further research will need to better theorize and explain what role human-like emotions could play in human-CA interactions; (6) the theme of customer privacy during and after the use of CAs deserves much more attention as consumers are often unaware of the use that will be made of data flows stemming from their interaction with CAs; (7) marketing scholars might draw on recent development within psychology, medical and physiology studies to shed light on the challenges and issues that human addiction to CA might bring about. For instance, recently CAs were used to help smokers quit smoking; however it was found that several smokers started a further addiction to the CA itself. Clearly this calls for more research on the ethical issues connected with the (continued) use of CAs.

7.4. Limitations

This study displays several potential limitations. First, our research domain is limited to works indexed in the Web of Science and Scopus databases: including research indexed in other databases such as Google Scholar might contribute to gain a wider picture of the research field. Second, our search protocol focused on specific keywords and the selection criteria are in line with our aim of representing CA literature with a preference for marketing and consumer research. Third, we analyzed articles up to May 2022; however, new publications have appeared over the last weeks. Incorporating new articles could enrich the findings.

8. Conclusion

In this study, we have systematically reviewed consumer research revolving around Conversational Agents (CAs) given their increasing adoption and use across multiple sectors, industries and organizations. By leveraging several bibliometric techniques, we mapped the research field to systematically represent the knowledge available regarding the interaction between consumers and CAs. The findings of our analysis enable scholars to understand the key issues, trends, challenges, and opportunities in the focal research area. We also developed a framework identifying the drivers and outcomes of CA adoption. Relatedly, we also developed a rich research agenda that might be conducive to further enrich our knowledge of CAs in the marketing field.

CRediT authorship contribution statement

Marcello M. Mariani: Validation, Supervision, Methodology, Investigation, Conceptualization, Formal analysis, Project administration, Writing - original draft, Writing - review & editing. **Novin Hashemi:** Methodology, Formal analysis, Data curation, Writing - original draft. **Jochen Wirtz:** Validation, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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