



Review

# Chatbots and Voice Assistants: Digital Transformers of the Company–Customer Interface—A Systematic Review of the Business Research Literature

Carmen Bălan

Department of Marketing, Faculty of Marketing, The Bucharest University of Economic Studies, 6 Piata Romana, 010374 Bucharest, Romania; carmen.balan@mk.ase.ro

**Abstract:** Chatbots and voice assistants are digital transformers of the interface between companies and customers. They have become part of the current practice of companies and represent a distinct domain of business research. This trend is significant in the broad business context marked by the digital transformation of companies, the fast development of e-commerce and the omnichannel behavior of customers. This article is a systematic review of the high-quality business research literature on chatbots and voice assistants. The purpose of this review is to critically analyze the current status of this literature from the perspective of the theories, contexts, characteristics and methodologies applied. The final aim of this review is to support the domain of study by suggesting a relevant agenda for future research. This review brings several contributions to the research domain, including the following: the identification of the main streams of high-quality business research in function of the theories in which the studies are grounded; the development of a conceptual framework of the investigated variables (antecedents, mediators, moderators and consequences); the creation of a conceptual framework of the humanlikeness of chatbots and voice assistants; the development of a conceptual framework of the consumer experience with chatbots and voice assistants and the presentation of insights for business practice.

**Keywords:** chatbot; voice assistant; conversational agent; digital transformation; theory, context, characteristics and methodology (TCCM) framework; business research; systematic literature review



**Citation:** Bălan, C. Chatbots and Voice Assistants: Digital Transformers of the Company–Customer Interface—A Systematic Review of the Business Research Literature. *J. Theor. Appl. Electron. Commer. Res.* **2023**, *18*, 995–1019. <https://doi.org/10.3390/jtaer18020051>

Academic Editors: Francesco Bellini, Alina Mihaela Dima, Alessio Maria Braccini and Rocco Agrifoglio

Received: 2 March 2023  
Revised: 12 May 2023  
Accepted: 16 May 2023  
Published: 18 May 2023



**Copyright:** © 2023 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

The conversational agents (CAs) operationalized as chatbots and voice assistants (VAs) have become part of the daily activities of businesses and customers. This trend is significant in the broad business context marked by factors such as the digital transformation of businesses, the fast development of e-commerce and the omnichannel behavior of customers. There is an increasing tendency toward the use of CAs in contact centers and in the following sectors: e-commerce and retailing, banking, telecommunications, travel and hospitality, etc. The importance of chatbots and VAs stems from their roles as digital transformers of the interface between companies and their customers, by facilitating the electronic interactions in a business environment in which the digital dimension either co-exists with or replaces the physical dimension.

The future significance of CAs for businesses and consumers is underlined by the medium-term predictions. In 2021, Juniper Research forecasted that by 2025, chatbots will process purchases amounting to USD 145 billion, which will represent half of the global retail spend of USD 290 billion in the conversational commerce [1]. Additionally, artificial intelligence (AI) enhances the capabilities of CAs for customer service in contact centers and gradually develops the potential of CAs to partially or completely replace the human agents. In August 2022, Gartner estimated that use of conversational AI in contact centers will decrease agent labor costs by USD 80 billion in 2026 [2].

This article is a systematic review of the high-quality business research literature on CAs operationalized as chatbots and VAs. The purpose of this review is to critically analyze the current status of the literature from the perspective of the theories, contexts, characteristics and methodologies applied by researchers. The final aim of this review is to contribute to further research by suggesting a clearly structured and relevant agenda able to support future efforts to develop this domain of study. Additionally, implications for practitioners are underlined and focus on the CA-related actions that might be initiated by executives and professionals to fulfill business and marketing objectives.

Business researchers describe CAs as “computer systems” [3] (p. 875), “computer programs” [4] (p. 49) or “virtual autonomous technological entities” [5] (p. 180). The range of CAs that can be studied is relatively diverse and includes bots on messaging platforms, chatbots used for customer service on websites, digital/voice assistants, voice control integrated in consumer electronics and other information systems [3,6].

The current technical research develops the capabilities of CAs by means of natural language processing and AI algorithms. The intelligent CAs (powered by AI) are able to “understand and produce natural language, learn from experience and portray emotions” [7] (p. 59). An evolving trend is the design of anthropomorphic AI-powered chatbots. They can simulate human beings and human conversations to the point that users think they are interacting with a real person [8]. Nevertheless, the emotional exchange specific to the communication between humans is absent in the case of chatbot–human communication [9]. Another trend is the creation of virtual/disembodied VAs (e.g., Amazon Alexa, Google Assistant, Apple Siri, Microsoft Cortana), which are “goal-oriented CAs” [10] (p. 2), being able to help users to reach their objectives.

Scholars consider that chatbots play a role in digital business transformation [11]. CAs can contribute to the digital transformation (DT) of companies and industries. The improvement objectives of the DT are achieved at societal, industrial and organizational levels by means of “combinations of information, computing, communication, and connectivity technologies” [12] (p. 121). DT generates changes in organizations through the diffusion of digital technologies [13]. During the period 2018–2020, DT went through a thriving stage of evolution [14]. As a result, the research on chatbots and VAs gained momentum.

The business research literature on chatbots and VAs developed progressively during the past two decades. Recent reviews of the business research literature analyze aspects of high interest such as conversational commerce [15]; the impact of chatbots on customer loyalty [16]; factors influencing the adoption of CAs [17]; anthropomorphism in service provision [18] and human-like communication in CAs [19]. A recent review by computer scientists [20] (p. 1) uncovered the absence of studies that combine “self-learning, personalization, and generative-based responses for the same business solution”.

At present, while reviews on CAs such as chatbots and VAs exist in the business literature, there is no systematic review that provides an analysis of the theories, contexts, characteristics and methodologies (TCCM) used in the high-quality business research literature on CAs operationalized as chatbots and VAs. Such a review would be necessary in order to evaluate the current status and identify the next steps for research and practice. This article is a systematic review that aims to contribute to bridging this knowledge gap by providing a critical analysis based on the TCCM framework [21] and by suggesting a structured agenda for further business research on chatbots and VAs.

This review brings the following contributions to the analysis of the high-quality business research on chatbots and VAs: the identification of the main streams of high-quality business research in function of the theories in which the studies are grounded; the elaboration of the list of theories from different domains, which are applied in the high-quality business research on chatbots and VAs; the development of a conceptual framework of the investigated variables; the creation of a conceptual framework of the humanlikeness of chatbots and VAs; the development of a conceptual framework of the consumer experience with CAs operationalized as chatbots and VAs; uncovering insights for practice by underlining the actions to be accomplished by businesses in order to achieve

objectives related to chatbots and VAs; the creation of an agenda for further research by underlining the main directions related to each component of the TCCM framework.

The next sections of the article refer to the following aspects: review methodology; bibliometric aspects; review results based on the TCCM framework; discussion of the results of this review; conclusions; implications for business practice and future research agenda.

## 2. Review Methodology

This review applies the systematic approach which is used and recognized by the research community [22]. From a taxonomic perspective, this review belongs to the category of framework-based reviews [23]. Experts consider that reviews based on frameworks (e.g., TCCM) can have a stronger impact than bibliometric or narrative reviews [24]. The design of this review meets the needs for rigor, transparency and replicability [25,26].

This review process consists in the following steps: (a) definition of the review’s purpose; (b) formulation of the review questions; (c) setting the protocol to be applied for the search and screening of records/ documents; (d) application of the protocol; (e) TCCM-focused analysis of the articles identified on the basis of the protocol; (f) presentation and discussion of the review’s results and (g) development of the future research agenda.

The purpose of this review is to critically analyze the high-quality business research literature on chatbots and VAs, from the perspective of the TCCM framework, as well as to develop an agenda for further research. The review questions are the following:

RQ1: What theories, contexts, characteristics and methodologies are used in the high-quality business research on chatbots and voice assistants?

RQ2: What is the conceptual framework of the humanlikeness of chatbots and voice assistants?

RQ3: What is the conceptual framework of the consumer experience with chatbots and voice assistants?

The protocol elaborated for record search and screening is presented in Table 1.

**Table 1.** Protocol for record search and screening.

No.	Protocol Sections	Section Description
1	Indexes/databases to be searched	Web of Science (SSCI), Scopus, Science Direct, ABI/INFORM, Emerald Insight
2	Terms for the search string	Chatbot, voice bot, voice assistant, conversational agent (The search string connected terms by means of the Boolean operator “OR”)
3	Search locus	Title, abstract and keywords of the records
4	Eligibility criteria	(a) Type of published record <ul style="list-style-type: none"> <li>• To be included: articles published in scientific/scholarly peer-reviewed journals</li> <li>• To be excluded: articles published in non-scientific and non-peer-reviewed journals, reviews, editorials, conference papers, book chapters, etc.</li> </ul> (b) Year of final publication <ul style="list-style-type: none"> <li>• To be included: 1 January 2001–31 December 2021</li> <li>• To be excluded: “early access” or “in press” articles, records finally published after 31 December 2021</li> </ul> (c) Language <ul style="list-style-type: none"> <li>• To be included: records in English</li> <li>• To be excluded: records in other languages</li> </ul> (d) Journal domain/subject area <ul style="list-style-type: none"> <li>• To be included: business or business-related domains (marketing, management, decision support systems, etc.)</li> <li>• To be excluded: other domains/subject areas</li> </ul>

**Table 1.** *Cont.*

No.	Protocol Sections	Section Description
4	Eligibility criteria	(e) Journal rating in the Academic Journal Guide (AJG) 2021 of the Chartered Association of Business Schools (CABS) [27] <ul style="list-style-type: none"> <li>● To be included: ratings of 3, 4 or 4* in the AJG of 2021</li> <li>● To be excluded: no ratings or ratings of 1 and 2 in the AJG of 2021</li> </ul> (f) Availability of a full-text file <ul style="list-style-type: none"> <li>● To be included: available</li> <li>● To be excluded: not available</li> </ul> (g) Relevance to the review purpose and question <ul style="list-style-type: none"> <li>● To be included: relevant</li> <li>● To be excluded: not relevant</li> </ul>
5	Record inclusion/exclusion method	By means of the automatic tools of indexes/databases, followed by human verification

Note: 3, 4 and 4\* are journal ratings.

The application of the protocol is based on the PRISMA 2020 flow diagram [28] (p. 5). Figure 1 presents the results of the record search and screening.

Based on the PRISMA flow diagram, 41 articles [3–8,10,29–62] were included in this review. The reviewed articles were published in 13 journals. Thus, this review meets the requirement to consider a minimum of 40–50 relevant articles published in at least 10–20 significant journals [23].

Along the steps of the review process, bias minimization was a priority and was achieved in the following ways: application of the systematic review approach [26]; rigorous succession of review steps [26,63]; consistent use of the TCCM conceptual framework [21] and elaboration and implementation of a clear protocol for record search and screening.

This review was made according to the TCCM framework. The relevant information from each article was extracted and included in electronic forms. In this article, the results of this review are presented and discussed via the TCCM component. Based on these results, the future research agenda highlights the main directions for the development of the high-quality business research on chatbots and VAs.

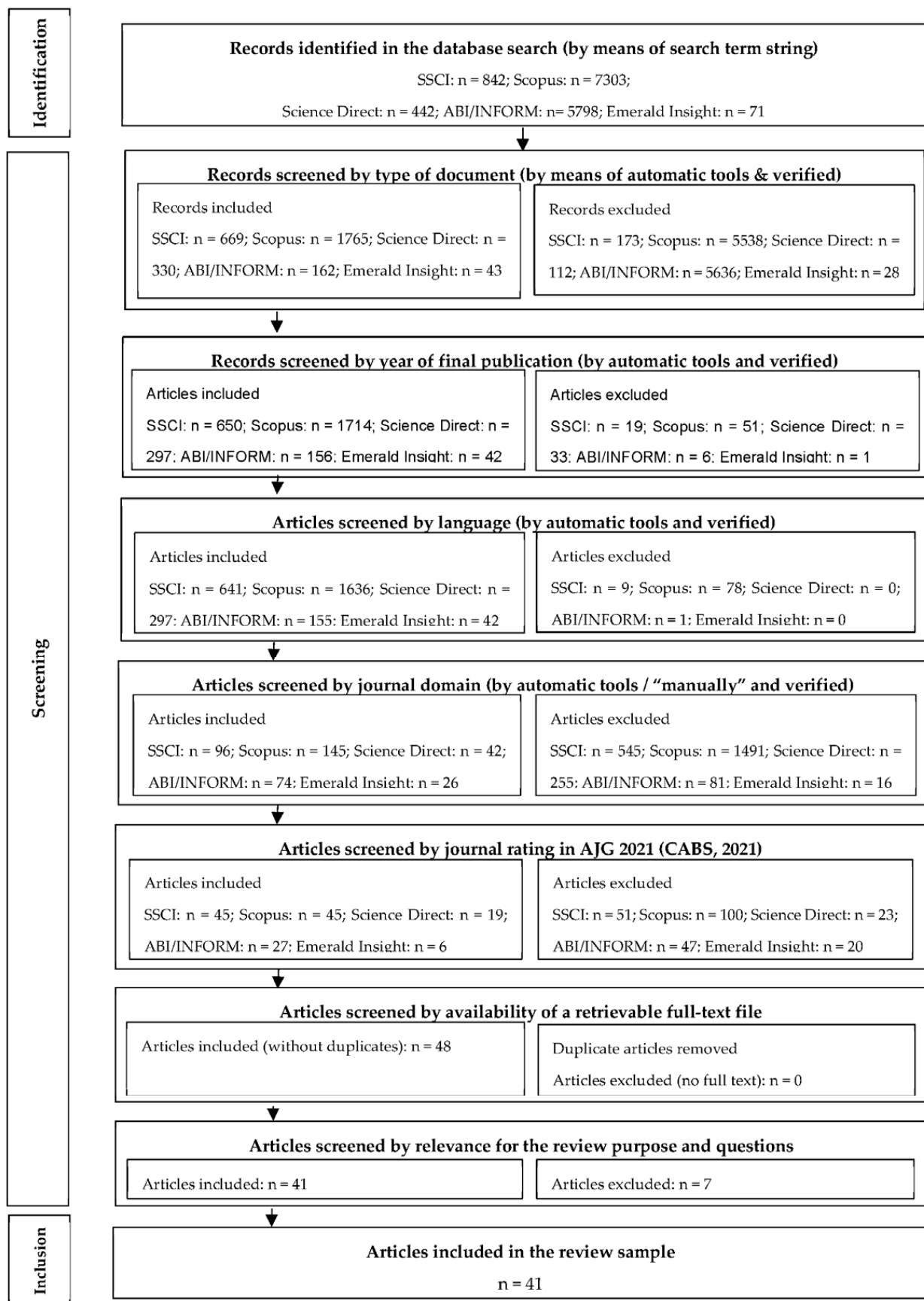


Figure 1. Identification, screening and inclusion of articles (based on the PRISMA flow diagram).

### 3. Some Bibliometric Features

Table 2 presents the journals that published the reviewed articles.

**Table 2.** The list of journals that published the articles analyzed in this review.

Journal Title	Journal Rating in AJG 2021	No. of Articles	%
<i>Accounting Review</i>	4*	1	2.44
<i>Decision Support Systems</i>	3	2	4.88
<i>Industrial Marketing Management</i>	3	1	2.44
<i>Information &amp; Management</i>	3	1	2.44
<i>International Journal of Contemporary Hospitality Management</i>	3	4	9.75
<i>International Journal of Production Research</i>	3	1	2.44
<i>Journal of Business Research</i>	3	11	26.83
<i>Journal of Interactive Marketing</i>	3	3	7.31
<i>Journal of Management Information Systems</i>	4	1	2.44
<i>Journal of the Academy of Marketing Science</i>	4*	2	4.88
<i>Marketing Letters</i>	3	2	4.88
<i>Marketing Science</i>	4*	1	2.44
<i>Psychology &amp; Marketing</i>	3	11	26.83
Total		41	100.00

Note: 3, 4 and 4\* are journal ratings.

The articles were published in 13 high-quality journals with ratings of 3, 4 or 4\* in the AJG 2021 [27], in business and business-related categories. The journals with the rating of 3 published the majority of the reviewed articles (87.8%).

The 41 articles are distributed by year of publication as follows: 1 in 2007; 1 in 2017; 2 in 2019; 10 in 2020 and 27 in 2021. During two decades (2001–2021), few articles were published on chatbots and VAs in these journals. Recently, the interest of business researchers in such topics increased substantially. The high-quality business research on chatbots and VAs is currently in an early growth stage of development. One of the causes of this situation is the initial focus on the study of the technical capabilities of CAs due to the emergence of research in the domain of computer science [3]. Time is necessary to expand research to the human and business perspective of the interactions with chatbots and VAs.

*Journal of Business Research* and *Psychology & Marketing* are the two leading journals that contributed the most (53.8%) to the number of the high-quality business research articles on chatbots and VAs. Almost half (48.8%) of the reviewed articles were published in journals on marketing topics, which underlines the importance of the CA–user interactions.

### 4. Results

The results of this review are structured using components of the TCCM framework.

#### 4.1. Results: Theories

Many of the reviewed articles (70.73%) are based on one or more guiding theories, but a large share of the articles (29.27%) do not specify such theories.

One of the contributions of this review consists of identifying the following four research streams, respectively: stream 1—research based on theories of human behavior (12 articles, 29.27% of the 41 articles); stream 2—research based on theories of interactions and relations between information systems (ISs) and humans (11 articles, 26.83%);

stream 3—research based on theories of communication and personal information disclosure (9 articles, 21.95%) and stream 4—research based on theories of anthropomorphism (5 articles, 12.20%). Another contribution of this review consists of providing a synoptic perspective of the theories applied in the studied articles. For each theory, Table 3 outlines the following aspects: the year when the theory appeared for the first time in the published literature, founder(s) of the theory and reviewed articles that apply that theory.

Table 3. Theories employed in the reviewed articles <sup>1</sup>.

Research Streams Based on Theories (No. of Articles, % <sup>2</sup> )	Year <sup>3</sup>	Theory/Model	Domain	Founder(s) of the Theory	Reviewed Articles
Research stream 1—based on theories of human behavior (12 articles, 29.27%)	1958	Social influence theory	Sociology	Kelman [64]	[48]
	1966	Reactance theory	Psychology	Brehm [65]	[52]
	1975	Theory of reasoned action	Psychology	Fishbein and Ajzen [66]	[41]
	1980	Expectation confirmation theory	Psychology	Oliver [67]	[29]
	1983	Diffusion of innovation (DOI) theory	Communication	Rogers [68]	[40]
	1985	Self-determination theory	Sociology	Deci and Ryan [69]	[38]
	1989	Technology acceptance model (TAM)	Information technology	Davis [70]	[46,47,50,51]
	1998	Paradoxes of technological products	Marketing	Mick and Fournier [71]	[53]
	2001	Social cognitive theory	Psychology	Bandura [72]	[29]
	2003	Unified theory of acceptance and use of technology (UTAUT)	Information technology	Venkatesh, Morris, Davis and Davis [73]	[48,51]
	2005	Behavioral reasoning theory	Psychology	Westaby [74]	[41]
2012	UTAUT2	Information technology	Venkatesh, Thong and Xu [75]	[51]	
2018	Service robot acceptance model (sRAM)	Information technology	Wirtz, Patterson, Kunz, Gruber, Lu, Paluch and Martins [76]	[5]	
Research stream 2—based on theories of interactions and relations between information systems (ISs) and humans (11 articles, 26.83%)	1956	Parasocial theories	Sociology	Horton and Wohl [77]	[51,62]
	1959	Social exchange theory	Sociology	Thibaut and Kelley [78]	[43]
	1968	Information processing theory	Psychology	Atkinson and Shiffrin [79]	[58,60]
	1980	Assemblage theory	Philosophy	Deleuze and Guattari [80]	[38]
	1986	Triangular theory of love	Psychology	Sternberg [81]	[36]
	1990	Flow theory	Psychology	Csikszentmihalyi [82]	[29]
	1992	Information systems success model	Information systems	DeLone and McLean [83]	[40]
	1994	Trust–commitment theory	Marketing	Morgan and Hunt [84]	[40,53]
	1996	Hoffman and Novak’s model		Hoffman and Novak [85]	[40]
	2000	Cognitive absorption theory	Information technology	Agarwal and Karahanna [86]	[29]
	2000	Social response theory	Sociology	Nass and Moon [87]	[39,58]
2007	Attachment theory	Psychology	Mikulincer and Shaver [88]	[43]	

Table 3. Cont.

Research Streams Based on Theories (No. of Articles, % <sup>2</sup> )	Year <sup>3</sup>	Theory/Model	Domain	Founder(s) of the Theory	Reviewed Articles
Research stream 3—based on theories of communication and personal information disclosure (9 articles, 21.95%)	1961	Social judgment theory	Communication	Sherif and Hovland [89]	[55]
	1967	Privacy theories	Law	Westin [90]	[4]
	1976	Social presence theory	Psychology	Short, Williams and Christie [91]	[3–5,30,42,46]
	1986	Media richness theory	Communication	Daft and Lengel [92]	[42]
	1989	Expectation violation theory	Communication	Burgoon, Newton, Walther and Baesler [93]	[6]
	2004	Similarity attraction theory	Psychology	Burger, Messian, Patel, del Prado and Anderson [94]	[49]
Research stream 4—based on theories of anthropomorphism (5 articles, 12.20%)	1970	Uncanny valley theory	Psychology	Mori [95]	[50]
	2007	Three-factor theory of anthropomorphism	Psychology	Epley, Waytz and Cacioppo [96]	[57]
	2009	Realism maximization theory	Human–computer interaction	Groom, Nass, Chen, Nielsen, Scarborough and Robles [97]	[48]
	2013	Humanization and dehumanization theories	Psychology	Haslam, Loughnan and Holland [98]	[31,56]

Note: <sup>1</sup> The articles that employed more than one theory were considered separately for each theory. Thus, the total number of article entries is higher than the number of reviewed articles. <sup>2</sup> Percentages are calculated of the total number of reviewed articles. <sup>3</sup> Year when main aspects related to the theory were mentioned for the first time in a publication.

This review identifies a large theoretical portfolio which includes 35 theories, but the development of the research streams is uneven in terms of the number of theories employed. Together, the streams 1 and 2 encompass a larger number of theories (25 theories) compared with the other two streams (10 theories). Each stream started with a core of mature theories that were validated by different researchers along the time, and progressively added newer theories. Examples of mature theories are those that refer to the acceptance, use and intention to continue to use technology (e.g., diffusion of innovation theory—DOI, technology acceptance model—TAM, unified theory of acceptance and use of technology—UTAUT); the theories of human interaction and relations, which were also validated in the human–computer interaction (HCI) domain (e.g., information processing theory, social exchange theory, attachment theory, triangular theory of love, trust–commitment theory) and theories of anthropomorphism (e.g., uncanny valley theory). Besides the service robot acceptance model published in 2018, the most recent theories date back to 2012 (UTAUT2) and 2013 (humanization and dehumanization theories).

#### 4.2. Results: Context

The main aspects that describe the research context of the reviewed articles are the following: types of CAs, domains of CA use and countries where primary data were collected.

Chatbots are the type of CAs approached by the most reviewed articles (63.41%), followed by VAs (34.51%), while few articles (2.44%) investigated both chatbots and VAs.

The domains of CA use (specified in 60.98% of the articles) are relatively diverse and encompass different service sectors including e-commerce—e.g., [30,32]; retailing of luxury fashion brands [33]; hospitality and tourism—e.g., [38,41]; financial services [37,45]; banking [39]; health care services [31,61]; real estate [29]; telecommunication services and car rental [52] and auto insurance [53]. Other domains of CA use are the food and beverage sector [60], customer service [5,57] and internal audit in companies [49].

Regarding the country where the primary data were collected, the USA ranges first (46.34% of the reviewed articles). In contrast, fewer articles considered other countries, as follows: United Kingdom (9.76%), Canada (9.76%), Australia (4.88%), India (7.32%), etc.



### 4.3. Results: Characteristics

The information on the relationships between the characteristics/variables investigated by the researchers is available in the empirical research articles which present quantitative studies of bivariate or multivariate relationships (33 articles, 80.49% of the 41 reviewed articles). The rest of the articles [4,7,8,32,34,54,56,59] are conceptual or do not include such studies.

This review identifies the studied variables, their role in the research studies (antecedents, mediators, moderators and consequences) and the main aspects to which they refer.

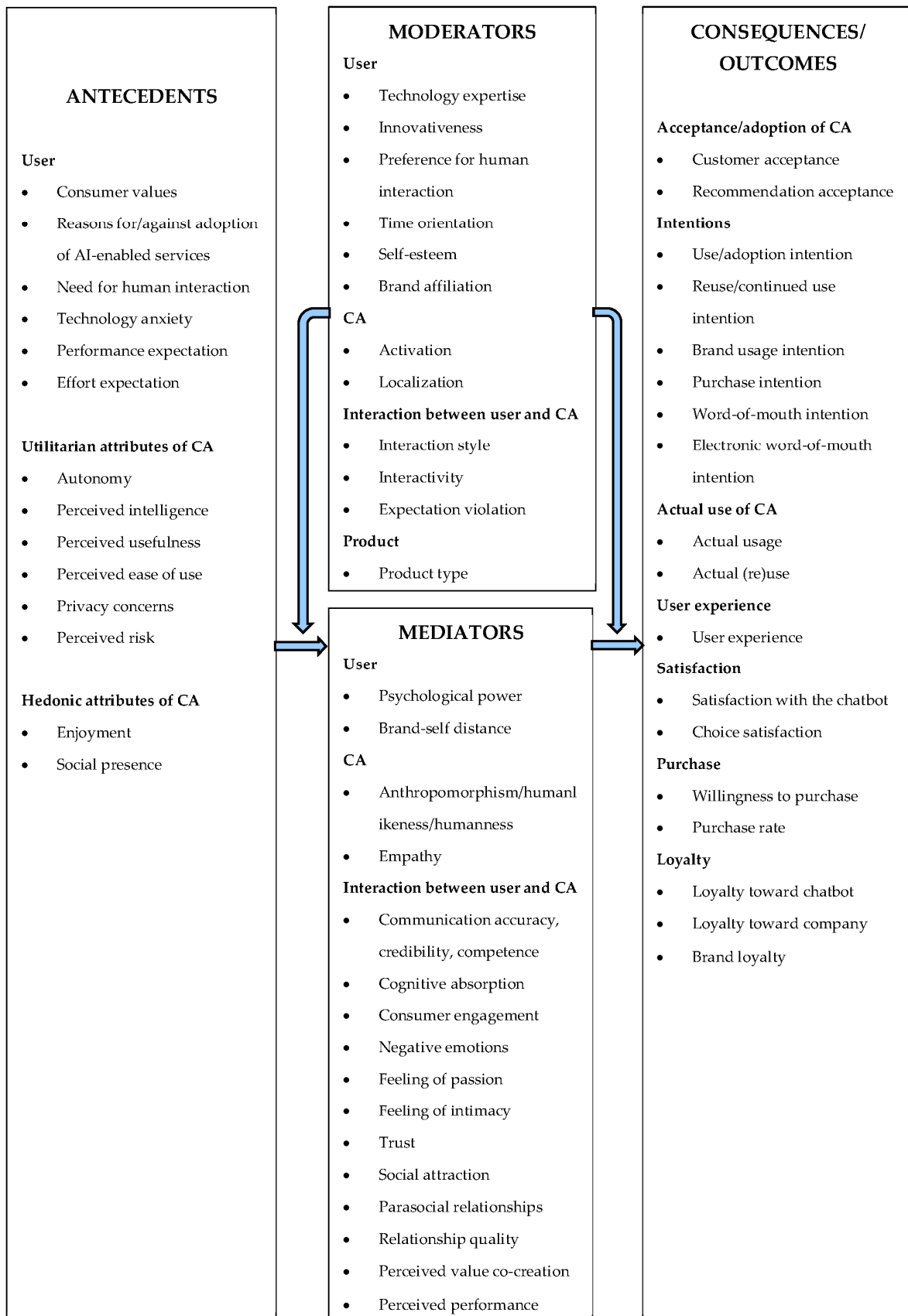
The **antecedents** examined by researchers focus on the user, utilitarian attributes of CA and hedonic attributes of CA. The antecedents related to the user include variables such as consumer values [41]; reasons for/against the adoption of AI-enabled services [41]; the need for human interaction [53]; technology anxiety [50,53]; performance expectation [48] and effort expectation [48]. The following variables range among antecedents related to the utilitarian attributes of CA: autonomy [44]; perceived intelligence [50]; perceived usefulness [50,51]; perceived ease of use [50,51]; privacy concerns [51,53] and perceived risk [48]. The hedonic attributes of CA encompass variables such as enjoyment [51] and social presence [51].

The variables examined as **mediators** refer to the following main aspects: user, CA and the interaction between user and CA. The variables related to the user are psychological power [60] and brand–self distance [39]. The variables related to the CA are anthropomorphism/humanlikeness/humanness [31,48,57,62] and empathy [45]. The variables that describe the interaction between the user and CA are the following: communication accuracy, credibility and competence [33]; cognitive absorption [29]; consumer engagement [47,48]; negative emotions [53]; feeling of passion [36]; feeling of intimacy [36]; trust [5,29,37,42,49,53]; social attraction [42,49]; parasocial relationships [62]; relationship quality [43]; perceived value co-creation [41] and perceived performance [52].

The researchers investigated several **moderators** which refer to the user; the CA; the interaction between the user and CA and the product. The variables related to the user are the following: technology expertise [5,43]; innovativeness [35]; preference for human interaction [5]; time orientation [56]; self-esteem [43] and brand affiliation [39]. The variables that refer to the CA are activation [52] and localization [47]. The variables that refer to the interaction between the user and CA are the interaction style [62]; interactivity [44] and expectation violation [6]. Besides these, the product type was studied as a moderating variable [62].

This review identifies numerous variables referring to the **consequences/outcomes**, respectively, as follows: acceptance/adoption of CA; intentions; actual use of CA; user experience; satisfaction; purchase and loyalty. The variables that refer to the acceptance/adoption of CA are customer acceptance [5] and recommendation acceptance [37]. The intentions are described by variables such as the use/adoption intention [51,57]; reuse/continued use intention [29,36,41,42,48]; brand usage intention [46]; purchase intention [46,55,58]; word-of-mouth intention [36] and electronic word-of-mouth intention [36]. The actual use of CA is studied by means of the following variables: actual usage [50] and actual (re)use [48]. The user experience is investigated as a distinct variable [40,52]. With regard to satisfaction, the following variables are identified: satisfaction with the chatbot [33,38,43,61] and choice satisfaction [52]. The variables related to purchases are the willingness to purchase [60] and the purchase rate [45]. The loyalty is examined by means of variables such as loyalty toward the chatbot [53]; loyalty toward the company [47] and brand loyalty [35].

On the basis of the above-mentioned information on the studied characteristics, this review suggests a conceptual framework of the variables investigated in the high-quality business research on chatbots and VAs (see Figure 2).



**Figure 2.** Conceptual framework of variables investigated in the high-quality business research on chatbots and VAs.

The use of humanlike CAs is an evolving domain of business research. This review contributes to this area of study by suggesting several distinct dimensions of the humanlikeness of chatbots and VAs and by associating to each dimension the corresponding variables analyzed in the reviewed articles. The proposed dimensions are the following: morphological design features; “own mind”, knowledge and intelligence; communication skills and conversational performance; humanlike emotions and behavior and social dimension. The dimension referring to the *morphological design features* includes the following variables: gender [31]; type of chatbot (human or not humanlike appearance) [52]; visual appearance [40]; perceived similarity (between user and embodied CA) [49] and sensory appeal [40]. The dimension focused on “*own mind*”, *knowledge and intelligence* includes the following variables: expertise [49]; perceived knowledge [45] and perceived intelligence [46,50]. The dimension *communication skills and conversational performance* encompasses a larger number of variables, such as verbal elements [40]; anthropomorphic conversation style (warm vs. competent) [55]; type of initial message of a chatbot (warm vs. competent) [39]; conversational capability [6]; tailored responses [3]; response variety [3]; error-free chatbot vs. clarification chatbot vs. error chatbot (ability to resolve or avoid miscommunication errors) [57]; perceived anthropomorphism regarding natural language [57]; perceived interactivity [44]; communication competence [33] and perceived conversational engagement of CA [6]. The dimension *humanlike emotions and behavior* encompasses the following variables: perceived empathy [45]; perceived humanness [5]; perceived agency [61] and focused attention [40]. The *social dimension* is investigated in several studies by means of variables such as social presence [3,5,42,46,49,51] and perceived social interactivity [5].

Based on the above-mentioned dimensions and variables, this review suggests the conceptual framework of the humanlikeness of chatbots and VAs, which is presented in Figure 3.

This review highlights that communication skills and conversational performance represent the most studied humanlikeness dimension in terms of the diversity of the variables considered. The morphological design features of the CAs were analyzed by the researchers, but there are features that can be further studied, such as age, ethnicity, facial traits, etc. The other dimensions and their impact on users were less studied and represent areas for further research.

This review contributes to the field of study by providing a conceptual framework of the consumer experience (CX) with chatbots and VAs. The framework consists of the following three interrelated modules: CX generators (stimuli that determine CX); actual CX (combination of functional, rational, emotional, sensorial, social and relational dimensions) and the CX evaluation by each consumer.

The first module of the conceptual framework consists of the *CX generators*, respectively, in stimuli related to the CA (chatbot/VA), consumer/user and interaction environment. The module referring to the *actual CX* (consumer responses/reactions to stimuli) underlines several dimensions including functional/pragmatic; rational/cognitive; emotional; sensorial; social and relational. The functional dimension includes aspects such as the perceived ease of use [5] and perceived usefulness [61]. The rational/cognitive dimension encompasses a larger range of aspects including cognitive absorption [29]; perceived intelligence [46]; perceived risk [35]; engagement [48]; consumer engagement [47]; perceived conversational engagement [6]; perceived partner engagement [3]; perceived knowledge of chatbot [45]; perceived task attraction [42]; perceived choice difficulty [52]; psychological reactance [52]; perceived performance [52]; choice confidence/certainty [52] and inferred uniqueness of treatment from the bots [31]. The emotional dimension encompasses aspects such as perceived creepiness [53]; negative emotions [53]; perceived empathy of the chatbot [45]; feeling of passion for VA technology [36]; feeling of intimacy with VA technology [36] and commitment to VA technology [43]. The sensorial dimension of the CX with the CA is described by the perceived media richness [42]; challenges/arousal [40] and entertainment [40]. The social dimension includes perceived social presence [42]; perceived social attraction [46]; perceived agency [61]; perceived humanness/anthropomorphism [48]

and perceived social interactivity [5]. The relational dimension is underlined by variables such as perceived trust in the VA [37]; distrust [46]; rapport [5]; the user’s perceived psychological power [60]; parasocial relationships with the VA [62] and perceived intrusiveness of the VA [44]. The third module of the conceptual framework of the CX with chatbots and VAs refers to the *experience evaluation by consumer*. This module is described by aspects such as information quality [40]; service quality [40]; perceived quality of the relationship [43]; perceived novelty value [35]; perceived value co-creation [41]; expectation violation [6] and customer satisfaction with the product/service [40]. Figure 4 presents the conceptual framework with the three modules and the associated variables.

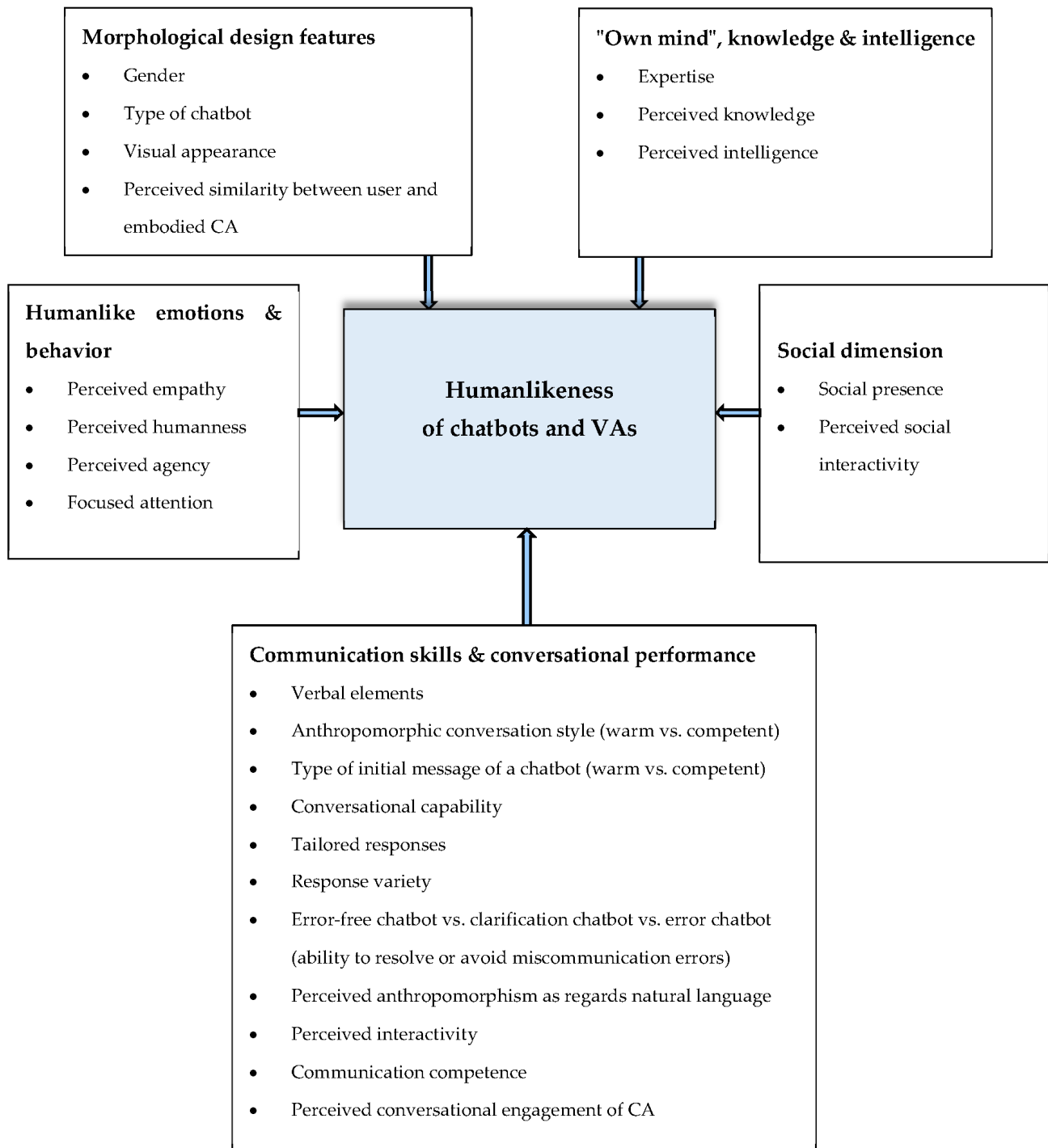
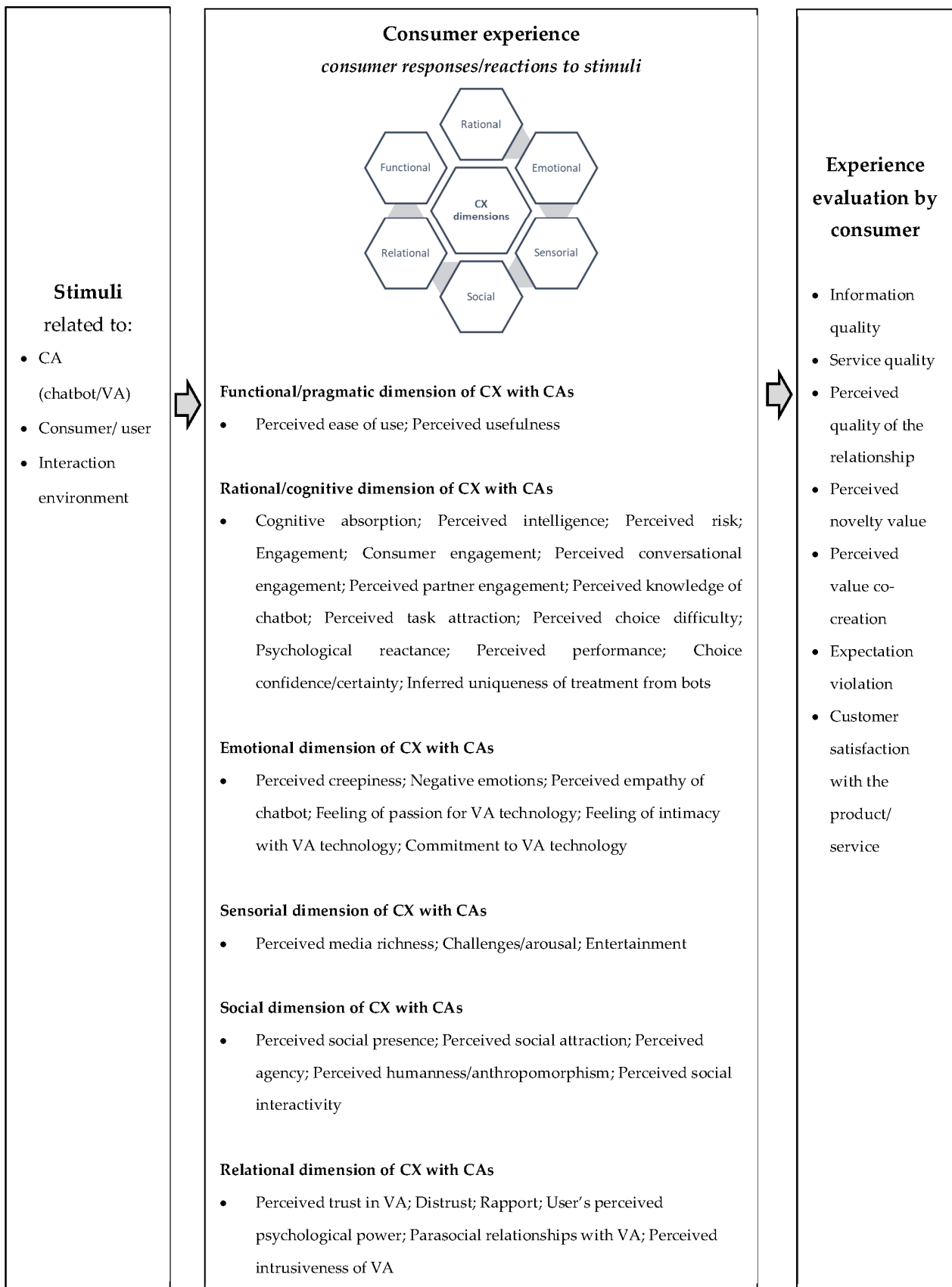


Figure 3. Conceptual framework of the humanlikeness of chatbots and VAs.



**Figure 4.** Conceptual framework of consumer experience with CAs operationalized as chatbots and VAs.

This review identifies that rational dimension is the most studied CX dimension in terms of the diversity of the analyzed variables. Future research can improve the understanding of the emotional, sensorial, social and relational dimensions of the CX.

#### 4.4. Results: Methodology

Within the TCCM framework, the “Methodology” component was studied in the case of 36 empirical articles (87.80% of the total number of reviewed articles), with the other five articles being conceptual [4,7,8,34,56]. Researchers incline toward quantitative studies (34 articles, 94.44% of the 36 articles) in contrast with qualitative studies (10 articles, 27.78%). Eight articles (22.22%) used both quantitative and qualitative research methods.

The main quantitative methods based on the primary data are survey and experiment. Online surveys are preferred—e.g., [30,36,42,48]. The experiments rely on designs such as the  $2 \times 2$  factorial design—e.g., [3];  $3 \times 3$  design—e.g., [29]; within-subjects design—e.g., [10,31] and between-subjects design—e.g., [6,58].

In quantitative studies, the most applied analytical methods are factor analysis and structural equation modeling (SEM). The types of factor analysis are confirmatory factor analysis (CFA)—e.g., [29,33,35]; exploratory factor analysis (EFA)—e.g., [3,30,58]; principal component analysis (PCA) factor analysis—e.g., [47,51,59] and Harman’s single-factor test—e.g., [41,44,50].

Numerous articles employed SEM, such as covariance-based structural equation modelling (CB-SEM)—e.g., [36,51] and Partial Least Squares Structural Equation Modelling (PLS-SEM)—e.g., [5,38,49]. Additionally, the researchers used SEM-related methods, respectively, the maximum likelihood estimation method [29] and the Common Latent Factor (CLF) analysis [29,46].

The “Methodology” analysis also refers to the composition of samples used in the 33 articles comprising quantitative research based on the primary data. The majority of the articles used consumer samples (27 articles, 81.82% of the 33 articles). Few articles used student samples (nine articles, 27.27%), either exclusively (six articles, 18.18%)—e.g., [33,49,61] or besides consumer samples (three articles, 9.09%), respectively [3,39,62], to investigate the use of CAs.

## 5. Discussion

The critical discussion of this review’s results is presented using a component of the TCCM framework.

### 5.1. Discussion about Theories

This review identifies 35 theories applied to the study of chatbots and VAs in 29 of the 41 reviewed articles. These numbers indicate a fragmentation of research in terms of the theories employed. This fact is justified by the need for researchers to use various theoretical lenses to investigate new and evolving topics. Such an approach is useful in the current early growth stage of the high-quality business research on chatbots and VAs.

This review uncovers the following four distinct research streams, respectively, based on the applied theories: theories of human behavior (stream 1); theories of interactions and relations between information systems (ISs) and humans (stream 2); theories of communication and personal information disclosure (stream 3) and theories of anthropomorphism (stream 4). There are significant differences between the research streams in terms of the number of theories employed. The streams 3 and 4 rely on fewer existing theories, which indicates a potential need for theory-building in the research on communication and personal information disclosure, as well as on anthropomorphism.

The theories differ in terms of incidence within the pool of reviewed articles. The theories with the highest incidence are the social presence theory (six articles in the research stream 3) and the technology acceptance model (five articles in the research stream 1). The main reason for such incidence levels is the maturity reached by these well-known theories focused on communication and, respectively, on behavior. A critical aspect is

that more recent theories have lower incidences, which reveals an insufficiently exploited theoretical potential.

A share of 55.17% of the 29 reviewed articles grounded in theories applied more than one theory. This is a positive fact that is justified by the current stage of evolution during which researchers explore the relevance of various theories to the use of CAs. Another reason is the novelty and complexity of the interactions between humans and CAs.

Many of the 41 reviewed articles (12 articles, 29.27%) do not mention a guiding theory. This fact is justified by the current early growth stage of the high-quality business research on chatbots and VAs. Further progress toward superior stages of evolution generates a *strong need* for an increase in the number of studies grounded in theories.

### 5.2. Discussion about Context

Most reviewed articles focus on chatbots, and fewer articles refer to VAs. The main reason is the earlier emergence of the chatbot technology compared to the VA technology. Another reason is the increase in the use of chatbots for customer service.

Among the main service industries, researchers studied the use of CAs in retailing (19.51% of the reviewed articles), and in hospitality and tourism (17.07%). These sectors were chosen due to the present context marked by the fast development of electronic commerce and by the ascending consumer demand for new international experiences.

Many of the reviewed articles include the direct research for which the primary data were collected in the United States. This fact is the result of the more developed use of CAs in the USA compared to other countries. Another reason is the availability of platforms such as the Amazon Mechanical Turk, which can be used for respondent recruitment.

### 5.3. Discussion about Characteristics

Business researchers studied the relationships between the antecedents, consequences, mediating and moderating variables which refer to the use of CAs such as chatbots and VAs. This review develops a conceptual framework of the variables investigated in the high-quality business research on chatbots and VAs (see Figure 2). This framework reveals that high-quality business research on chatbots and VAs applies a conceptual framework similar to that identified by Lim, Kumar, Verma and Chaturvedi [15] in the conversational commerce research.

The study of humanlike CAs and of their impact on humans is under development. This review contributes to the research domain by developing a conceptual framework of the humanlikeness of chatbots and VAs (see Figure 3). The framework underlines the complexity of humanlikeness which encompasses several dimensions besides the morphological design features of CAs. Thus, further research could examine additional dimensions such as “own mind”, knowledge and intelligence; humanlike emotions and behavior; social dimension; communication skills and conversational performance.

Chatbots and VAs represent a new and innovative domain of high-quality business research, which requires further studies on the consumer experience with/via CAs. This review develops a conceptual framework of the consumer experience with chatbots and VAs (see Figure 4). The framework based on the results of this review highlights the multi-dimensional nature of the consumer experience with CAs, which includes the functional, rational, emotional, sensorial, social and relational dimensions. This perspective is coherent with the extant literature that considers the customer experience as spontaneous responses and reactions to stimuli [99], which consists of sensorial, emotional, cognitive, pragmatic, lifestyle and relational components [100], or takes the form of diverse sensory, affective, intellectual, bodily and social experiences [101]. There is a strong need to study the multi-dimensionality of the consumer experience with CAs.

#### 5.4. Discussion about Methodology

Many empirical articles (61.11% of 36 articles) rely on 2–5 studies—e.g., [31,37,43,48]. This fact highlights the need for complex methodologies to be able to investigate the multiple aspects of CA use.

The approach of this research is predominantly quantitative (94.44% of the empirical articles), not qualitative (27.78%). The preference for conclusive research is justified by the interest in the quantitative investigation of the relationships between the variables. The researchers used mostly traditional methods such as in-depth interviews, surveys and experiments. The use of other methods is limited, an example being eye-tracking [30].

In the quantitative studies, the samples of the respondents mainly consisted of consumers. The research by Ben Mimoun et al. [30] found that only users with high or medium levels of Internet skills are able to appreciate the interactions with the CAs. There is a need to study whether respondents should be selected based on their Internet skills and previous experience with CAs.

The analytical method SEM was applied in 17 articles that used quantitative research data. Among them, seven articles applied Partial Least Squares Structural Equation Modelling (PLS-SEM) and two articles used covariance-based structural equation modelling (CB-SEM). This is a positive aspect, because PLS-SEM and CB-SEM are widely used SEM methods [102], which will be further employed in the studies about CAs.

## 6. Conclusions

The results of this review highlight that high-quality business research on chatbots and VAs is in the early growth stage of evolution. A strong and urgent need for further development exists, considering the fast progress in the technological design of CAs and in their business adoption.

The use of the TCCM framework for this review uncovers several critical aspects related to the applied theories, research context, characteristics of the human–CA interactions and methods of study. The high-quality business research on chatbots and VAs shows a fragmentation of the theoretical approach (35 theories and models identified in the 41 reviewed articles), which is justified by the need for various “examination lens”. This review identifies the need to ground each new article in theories, with special attention to the theories focused on anthropomorphism and, respectively, on the theories of communication and personal information disclosure.

There is a need to diversify the research context by extending the scope of studies to more business sectors that can use chatbots and VAs, and by expanding the geographical coverage to countries where CAs are used by companies and consumers. A positive aspect of many reviewed articles is the elaborated examination of the relationships between the variables that describe the use of chatbots and VAs—antecedents, mediators, moderators and consequences. This review points out the multi-dimensional nature of the human-likeness of chatbots and VAs, as well as of the consumer experience with such CAs. The methodology indicates the propensity toward quantitative methods of data collection and analysis. There is a need for new methods of data collection, such as observation by means of technical devices.

The results of this review must be considered while taking into account several limitations. According to the selection criteria, only articles published in the high-quality business journals were analyzed, while other research outputs (e.g., book chapters, conference papers, etc.) were excluded. Additionally, only articles in the English language were reviewed.

This section of the article provides an outlook of the current status of the high-quality business research literature on chatbots and VAs. The conclusions of this review highlight several critical aspects of the current state of evolution and the needs for further development, which can be considered by researchers in the design of their future studies.



### 7. Implications for Business Practice

The researchers demonstrated an increasing interest in the use of chatbots and VAs in business practice. Different case studies focus on aspects such as leading providers of CAs [103], a specific segment of users [104], activity sectors [105,106], types of enterprises [107,108], countries [109,110], etc.

The results of this research can guide the managerial choices of business practitioners (managers, CA developers, etc.). Companies should invest in chatbots and VAs only after they understand how CAs can help them to accomplish business objectives.

Firstly, managers must decide the objectives based on the outcomes they expect to obtain by means of CAs (e.g., increase in consumer intention to adopt CAs, improvement in customer experience with CAs, increase in chatbot effectiveness, etc.). The specific objectives that can be achieved and the associated actions to accomplish the intended objectives are presented in Table 4.

Table 4. Insights for practice.

Objectives to Increase/Improve	Actions to Achieve Objectives
<b>User Intention to Use/Adopt CA</b>	
<ul style="list-style-type: none"> <li>● Intention to use/adopt CA</li> </ul>	To design/develop CAs and service encounters able to enhance the following: <ul style="list-style-type: none"> <li>● Attitude toward AI-VA (by improving perceived usefulness, perceived ease of use, perceived enjoyment, social cognition, data privacy) and trust in AI-VA (by improving perceived ease of use, social presence and social cognition) [51];</li> <li>● Perceived value co-creation by means of superior functionality, high-level personalization and convenience [41];</li> <li>● Perceived ease of use, perceived usefulness, perceived trust, perceived intelligence and anthropomorphism by means of high accessibility of chatbot, user-friendly interface, human-like features, communication in the native language of user [50];</li> <li>● Chatbot capability to resolve miscommunication or to avoid communication errors [57].</li> </ul>
<ul style="list-style-type: none"> <li>● CA adoption</li> </ul>	To improve perceived usefulness, humanlike communication and trust [5].
<b>User Experience with CA</b>	
<ul style="list-style-type: none"> <li>● Perceived conversational performance of the AI-based chatbot</li> </ul>	To develop the conversational capability of the AI-based chatbot and to set expectations so that users experience a positive expectation violation. To avoid deceiving users by not disclosing that they are interacting with a bot [6].
<ul style="list-style-type: none"> <li>● Perceived humanness and partner engagement</li> </ul>	To develop chatbot-perceived social presence and anthropomorphism by improving its conversational skills (tailored responses and response variety) [3].
<ul style="list-style-type: none"> <li>● Business–customer experience with AI-based chatbot</li> </ul>	To monitor and manage factors that influence customer experience (e.g., perceived risk, brand trustworthiness, sensory appeal, touchpoint factors, factors associated with flow, system design, etc.) [40].
<ul style="list-style-type: none"> <li>● Perceived e-consumer productivity</li> </ul>	To use an animated CA only in the case of users with <i>high or medium</i> Internet skills and need for interaction [30].

Table 4. Cont.

Objectives to Increase/Improve	Actions to Achieve Objectives
<b>User Experience with CA</b>	
<ul style="list-style-type: none"> <li>User trust in chatbots</li> </ul>	<p>To enhance task attraction for users by means of chatbots with appropriate problem-solving skills, able to help users accomplish a specific task (e.g., data search, alternative product comparison and selection, etc.) [42].</p>
<ul style="list-style-type: none"> <li>Perceived usefulness of home VA</li> </ul>	<p>To diminish perceived intrusiveness of home VA by developing VA interactivity and building user trust in VA [44].</p>
<ul style="list-style-type: none"> <li>Information disclosure by user of an embodied CA</li> </ul>	<p>To use similarity-enhancing features in the design of embodied conversational agent (e.g., human voice, facial traits, etc.) [49].</p>
<b>Consumer Satisfaction Toward CA</b>	
<ul style="list-style-type: none"> <li>User satisfaction toward a chatbot</li> </ul>	<p>To decrease psychological reactance toward chatbot by using a human-like digital assistant activated by consumer [52]. To develop quality relationship between user and intelligent VA by enhancing user perceived value (Loureiro et al., 2021). To improve the attitude toward chatbot by developing a motivational customer experience with chatbot [38].</p>
<ul style="list-style-type: none"> <li>Customer satisfaction toward the marketing efforts of e-service chatbots for luxury brands</li> </ul>	<p>To improve communication quality in terms of accuracy and credibility [30].</p>
<b>Consumer Loyalty Toward CA</b>	
<ul style="list-style-type: none"> <li>Consumer intention to re-use CA</li> </ul>	<p>To develop cognitive absorption/deep user engagement with chatbots through immersive user experience and trust [29]. To enhance user engagement by using anthropomorphic AI-based VAs, especially for task-completion activities, rather than for information-seeking activities [48].</p>
<ul style="list-style-type: none"> <li>Loyalty toward CA</li> </ul>	<p>To develop user trust and reduce negative emotions by diminishing perceived creepiness of user–chatbot interaction (by means of increased chatbot usability and user privacy concerns, and lower technology anxiety) [53]. To develop consumer engagement with VA for both transactional and non-transactional tasks by increasing perceived ease of use and perceived usefulness [47].</p>
<b>Objectives Related to Firm, Service or Brand</b>	
<ul style="list-style-type: none"> <li>Perception toward the service firm</li> </ul>	<p>To develop users’ affective trust toward the robo-advisor [37].</p>
<ul style="list-style-type: none"> <li>Service loyalty</li> </ul>	<p>To create pleasant consumer experiences that stimulate passion for technology and determine enduring feelings such as intimacy and commitment toward smart VAs [36].</p>
<ul style="list-style-type: none"> <li>Brand humanness</li> </ul>	<p>To use female bots [31].</p>
<ul style="list-style-type: none"> <li>Consumer–brand engagement</li> </ul>	<p>To make consumer feel closer to the brand by means of a warm initial chatbot message in the conversation with user [39]. To develop VAs’ AI-based attributes (social presence, perceived intelligence and social attraction) [46].</p>
<ul style="list-style-type: none"> <li>Brand usage intention</li> </ul>	<p>To develop utilitarian benefits of the interaction of user with brand-related information [46].</p>
<ul style="list-style-type: none"> <li>Brand loyalty</li> </ul>	<p>To develop trust in VA, to ensure easy interactions with VA, to stimulate perceived novelty value of using VA and to mitigate perceived risk of using VA [35].</p>

**Table 4.** *Cont.*

Objectives to Increase/Improve	Actions to Achieve Objectives
<p><b>CA Effectiveness</b></p> <ul style="list-style-type: none"> <li>User acceptance of CA recommendations</li> </ul>	<p>To develop users’ affective trust toward the robo-advisor [37].                      To increase perceived humanlikeness of the AI-based VA that plays a salesperson role, by giving the impression that AI-based VA understands user feelings, discerns right from wrong and works to achieve user goal [62].</p>
<ul style="list-style-type: none"> <li>Purchase intention</li> </ul>	<p>To adapt the anthropomorphic conversation style of the chatbot to the time-orientation of the user (e.g., warm style for users focused on present and competent style for users oriented toward future) [55].                      To limit the availability of detailed static product information on the website when a humanlike chatbot is used as an interactive online information provider. To avoid using an anthropomorphic chatbot when consumers have a utilitarian consumption motive [58].                      To use VAs to influence consumer purchase decision making in the case of low-involvement products, rather than for high-involvement products, especially when consumers experience high psychological power states [60].</p>

Secondly, companies need to pilot-test CAs in order to evaluate the potential impact in the touchpoints along the consumer journey. Businesses must go beyond the functional and rational dimensions when they design the CX with CAs and also master the emotional, sensorial, social and relational dimensions of the CX. Additionally, companies must ensure that the features and behavior of humanlike CAs are in line with their brand identity.

Thirdly, companies must engage the users in providing feedback on their experience with CAs for the continuous improvement of the effectiveness of chatbots and VAs and for new business applications. Without considering the impact on the users, the implementation of the latest CA technology in the company’s interactions with customers will very likely be less successful.

**8. Future Research Agenda**

The high-quality empirical investigations on CAs have many development opportunities stemming from the fast pace of technology evolution. Based on the results of this review, this section presents a structured agenda for further research.

*8.1. Theory-Related Future Research Directions*

The first direction is to advance theories of humanlike CAs. Researchers can verify if traditional theories of human-to-human interaction are applicable, and they can also examine if new theories of humanlikeness can demonstrate their utility to address the specificities of AI-powered CAs. The potential research questions can refer to explaining the impact of humanlike dimensions of CAs on consumer perceptions, behavior and relations toward chatbots and VAs.

The second direction is to develop theories of communication and personal information disclosure. The potential research questions can clarify the conditions in which the interplay between the privacy needs of the consumers and the advanced capabilities of intelligent CAs leads to personal information disclosure and facilitates the human–CA communication.

The third direction is to formulate theories of parasocial relationships between the consumers and CAs. The potential research questions can focus on explaining aspects such as the array of relationships ranging from surrogate of trust [37] to love [36], relationship drivers and the impact on consumer life and wellbeing. Such questions can be addressed to uncover the mechanism of human attachment to AI-based VAs.

The fourth direction is to examine the potential of the information processing theory, which is insufficiently studied in relation to CAs. The potential research questions can refer to explaining how the human mind evaluates the CX with CAs and decides in the HCI context.

### *8.2. Context-Related Future Research Directions*

The first research direction is to provide a business perspective of VAs. The potential research questions can address the evaluation of VAs' potential in brand communication, customer relationship management and in the development of new solutions based on AI-based VAs for specific segments of consumers (retired persons, disabled patients, etc.).

The second direction is to identify new business domains in which CAs can be used. Until present, research focused on services and customer care. Potential research questions can refer to the assessment of CAs' effectiveness and efficiency in other industries (e.g., marketing research, etc.) and in the internal activities of companies (e.g., human resources, logistics, etc.).

The third direction is to expand the geographical area of the studies. Potential research questions can help researchers to assess the generalizability of results to different countries.

### *8.3. Characteristic-Related Future Research Directions*

The first direction is to investigate in-depth the variables related to chatbot and VA humanlikeness and its impact on users. The potential research questions can refer to known and to new variables for the thorough examination of aspects such as the impact of morphological design features, communication skills and conversational performance of CAs; the impact of dimensions that extend CA humanlikeness, respectively, "own mind", knowledge and intelligence of CAs, humanlike emotions and behavior, and social dimensions of the interaction with humans; the evaluation of potential synergies among the humanlikeness dimensions, which can enhance the business effectiveness of CAs; discrimination against anthropomorphic CAs and profiling humanlike CAs with the most favorable impact on users.

The second direction is to study variables that are able to provide a deeper understanding of the consumer experience with/via chatbots and VAs, and of the specific consequences on users. Potential research questions can focus on variables related to aspects such as: the impact of each stage of the consumer journey when interacting with a CA; the most critical touchpoints for a memorable positive CX with/via CAs; the role of the emotional, sensorial, social and relational dimensions of CX with CAs; the evaluation of CX outcomes by CA users; the impact of CX with CAs on the satisfaction and loyalty of users toward the product/service/corporate brand represented by the CA; the impact of the ethical and privacy aspects on the CX with/via CAs and on further behavior toward CAs.

The third direction is to examine the causal chain of relationships between variables related to the use of CAs. Future research can contribute to the development of the conceptual framework of the use of chatbots and VAs. Potential research questions can encompass aspects such as antecedents related to the CAs, user and environment of CA-human interaction; mediators and moderators of the relationships between the independent and the dependent variables related to the human interaction and experience with CAs; consequences in terms of purchase behavior, as well as in terms of user behavior toward CAs and user image of the product brands that employ CAs for the relations with consumers/customers.

### *8.4. Methodology-Related Future Research Directions*

The first direction is to add innovative methods of data collection to the existing portfolio. An example is the observation based on devices that track eye movement, voice pitch or brain flows. The advantage is that such method monitors the actual user response to the CA in real time, during the interaction, in contrast with interviews and surveys that

rely on potentially biased declarations made by users before or after the interaction with the CA.

The second direction is to expand the use of experiments as a quantitative research method. For example, experiments can manipulate humanlike features of CAs (e.g., facial traits, gender, communication skills, etc.) to measure the impact on consumers.

The third direction is to develop the portfolio of analytical methods. The increased application of SEM can be envisaged. Another option is to use complementary methods such as conjoint analysis to identify the trade-offs made by consumers between different features of CAs.

The fourth direction is to design longitudinal studies to monitor the change in time of specific dependent variables. Potential research questions can address aspects such as: changes in the attitude toward CAs determined by the increased exposure of users to CAs; changes in brand loyalty as a result of improved CX with CAs; development of user attachment and feelings of love toward AI-based VAs.

Researchers and practitioners have to investigate in-depth the challenges and opportunities generated by chatbots and VAs, which have already started to digitally transform the interface between businesses and their customers. This is one of the steps toward the transformation of companies by means of innovative digital technologies in the context of the e-commerce expansion and of the more intense omnichannel behavior of consumers.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The author declares no conflict of interest.

## References

1. Juniper Research. Conversational Commerce: 2021–2025 Market Summary. Available online: <https://www.juniperresearch.com/infographics/conversational-commerce-statistics> (accessed on 10 September 2022).
2. Gartner. Gartner Predicts Conversational AI Will Reduce Contact Center Agent Labor Costs by \$80 Billion in 2026. Press Release. Available online: <https://www.gartner.com/en/newsroom/press-releases/2022-08-31-gartner-predicts-conversational-ai-will-reduce-contac> (accessed on 10 September 2022).
3. Schuetzler, R.M.; Grimes, G.M.; Giboney, J.S. The impact of chatbot conversational skill on engagement and perceived humanness. *J. Manage. Inform. Syst.* **2020**, *37*, 875–900. [[CrossRef](#)]
4. Thomaz, F.; Salge, C.; Karahanna, E.; Hulland, J. Learning from the Dark Web: Leveraging conversational agents in the era of hyper-privacy to enhance marketing. *J. Acad. Mark. Sci.* **2020**, *48*, 43–63. [[CrossRef](#)]
5. Fernandes, T.; Oliveira, E. Understanding consumers' acceptance of automated technologies in service encounters: Drivers of digital voice assistants adoption. *J. Bus. Res.* **2021**, *122*, 180–191. [[CrossRef](#)]
6. Grimes, G.M.; Schuetzler, R.M.; Giboney, J.S. Mental models and expectation violations in conversational AI interactions. *Decis. Support Syst.* **2021**, *144*, 113515. [[CrossRef](#)]
7. Hoyer, W.D.; Kroschke, M.; Schmitt, B.; Kraume, K.; Shankar, V. Transforming the Customer Experience Through New Technologies. *J. Interact. Mark.* **2020**, *51*, 57–71. [[CrossRef](#)]
8. Murtarelli, G.; Gregory, A.; Romenti, S. A conversation-based perspective for shaping ethical human-machine interactions: The particular challenge of chatbots. *J. Bus. Res.* **2021**, *129*, 927–935. [[CrossRef](#)]
9. Luo, B.; Lau, R.Y.K.; Li, C.P.; Si, Y.W. A critical review of state-of-the-art chatbot designs and applications. *Wiley Interdiscip. Rev.—Data Min. Knowl. Discov.* **2022**, *12*, e1434. [[CrossRef](#)]
10. Iovine, A.; Narducci, F.; Semeraro, G. Conversational Recommender Systems and natural language: A study through the Converse framework. *Decis. Support Syst.* **2020**, *131*, 113250. [[CrossRef](#)]
11. Miklosik, A.; Evans, N.; Qureshi, A.M.A. The Use of Chatbots in Digital Business Transformation: A Systematic Literature Review. *IEEE Access* **2021**, *9*, 106530–106539. [[CrossRef](#)]
12. Vial, G. Understanding digital transformation: A review and a research agenda. *J. Strateg. Inf. Syst.* **2019**, *28*, 118–144. [[CrossRef](#)]
13. Hanelt, A.; Bohnsack, R.; Marz, D.; Marante, C.A. A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *J. Manag. Stud.* **2021**, *58*, 1159–1197. [[CrossRef](#)]
14. Zhu, X.T.; Ge, S.L.; Wang, N.X. Digital transformation: A systematic literature review. *Comput. Ind. Eng.* **2021**, *162*, 107774. [[CrossRef](#)]

15. Lim, W.M.; Kumar, S.; Verma, S.; Chaturvedi, R. Alexa, what do we know about conversational commerce? Insights from a systematic literature review. *Psychol. Mark.* **2022**, *39*, 1129–1155. [[CrossRef](#)]
16. Jenneboer, L.; Herrando, C.; Constantinides, E. The Impact of Chatbots on Customer Loyalty: A Systematic Literature Review. *J. Theor. Appl. Electron. Commer. Res.* **2022**, *17*, 212–229. [[CrossRef](#)]
17. Ling, E.C.; Tussyadiah, I.; Tuomi, A.; Stienmetz, J.; Ioannou, A. Factors influencing users' adoption and use of conversational agents: A systematic review. *Psychol. Mark.* **2021**, *38*, 1031–1051. [[CrossRef](#)]
18. Blut, M.; Wang, C.; Wunderlich, N.V.; Brock, C. Understanding anthropomorphism in service provision: A meta-analysis of physical robots, chatbots, and other AI. *J. Acad. Mark. Sci.* **2021**, *49*, 632–658. [[CrossRef](#)]
19. Van Pinxteren, M.M.E.; Pluymaekers, M.; Lemmink, J.G.A.M. Human-like communication in conversational agents: A literature review and research agenda. *J. Serv. Manag.* **2020**, *31*, 203–225. [[CrossRef](#)]
20. Bavaresco, R.; Silveira, D.; Reis, E.; Barbosa, J.; Righi, R.; Costa, C.; Antunes, R.; Gomes, M.; Gatti, C.; Vanzin, M.; et al. Conversational agents in business: A systematic literature review and future research directions. *Comput. Sci. Rev.* **2020**, *36*, 100239. [[CrossRef](#)]
21. Paul, J.; Rosado-Serrano, A. Gradual internationalization vs. born global/international new venture models. *Int. Market. Rev.* **2019**, *36*, 830–858. [[CrossRef](#)]
22. Callahan, J.L. Writing literature reviews: A reprise and update. *Hum. Resour. Dev. Rev.* **2014**, *13*, 271–275. [[CrossRef](#)]
23. Paul, J.; Criado, A.R. The art of writing literature review: What do we know and what do we need to know? *Int. Bus. Rev.* **2020**, *29*, 101717. [[CrossRef](#)]
24. Paul, J.; Merchant, A.; Dwivedi, Y.K.; Rose, G.M. Writing an impactful review article: What do we know and what do we need to know? *J. Bus. Res.* **2021**, *133*, 337–340. [[CrossRef](#)]
25. Palmatier, R.W.; Houston, M.B.; Hulland, J. Review articles: Purpose, process, and structure. *J. Acad. Mark. Sci.* **2018**, *46*, 1–5. [[CrossRef](#)]
26. Snyder, H. Literature review as a research methodology: An overview and guidelines. *J. Bus. Res.* **2019**, *104*, 333–339. [[CrossRef](#)]
27. Chartered Associations of Business Schools (CABS). Academic Journal Guide 2021. Available online: <https://charteredabs.org/academic-journal-guide-2021/> (accessed on 5 January 2022).
28. Page, M.J.; McKenzie, J.E.; Bossuyt, P.M.; Boutron, I.; Hoffmann, T.C.; Mulrow, C.D.; Shamseer, L.; Tetzlaff, J.M.; Akl, E.A.; Brennan, S.E.; et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ* **2021**, *372*, n71. [[CrossRef](#)] [[PubMed](#)]
29. Balakrishnan, J.; Dwivedi, Y.K. Role of cognitive absorption in building user trust and experience. *Psychol. Mark.* **2021**, *38*, 643–668. [[CrossRef](#)]
30. Ben Mimoun, M.S.; Poncin, I.; Garnier, M. Animated conversational agents and e-consumer productivity: The roles of agents and individual characteristics. *Inf. Manag.* **2017**, *54*, 545–559. [[CrossRef](#)]
31. Borau, S.; Otterbring, T.; Laporte, S.; Wamba, S.F. The most human bot: Female gendering increases humanness perceptions of bots and acceptance of AI. *Psychol. Mark.* **2021**, *38*, 1052–1068. [[CrossRef](#)]
32. Chiu, M.C.; Chuang, K.H. Applying transfer learning to achieve precision marketing in an omni-channel system—A case study of a sharing kitchen platform. *Int. J. Prod. Res.* **2021**, *59*, 7594–7609. [[CrossRef](#)]
33. Chung, M.; Ko, E.; Joung, H.; Kim, S.J. Chatbot e-service and customer satisfaction regarding luxury brands. *J. Bus. Res.* **2020**, *117*, 587–595. [[CrossRef](#)]
34. Dellaert, B.G.C.; Shu, S.B.; Arentze, T.A.; Baker, T.; Diehl, K.; Donkers, B.; Fast, N.J.; Haubl, G.; Johnson, H.; Karmarkar, U.R.; et al. Consumer decisions with artificially intelligent voice assistants. *Mark. Lett.* **2020**, *31*, 335–347. [[CrossRef](#)]
35. Hasan, R.; Shams, R.; Rahman, M. Consumer trust and perceived risk for voice-controlled artificial intelligence: The case of Siri. *J. Bus. Res.* **2021**, *131*, 591–597. [[CrossRef](#)]
36. Hernandez-Ortega, B.; Ferreira, I. How smart experiences build service loyalty: The importance of consumer love for smart voice assistants. *Psychol. Mark.* **2021**, *38*, 1122–1139. [[CrossRef](#)]
37. Hildebrand, C.; Bergner, A. Conversational robo advisors as surrogates of trust: Onboarding experience, firm perception, and consumer financial decision making. *J. Acad. Mark. Sci.* **2021**, *49*, 659–676. [[CrossRef](#)]
38. Jiménez-Barreto, J.; Rubio, N.; Molinillo, S. "Find a flight for me, Oscar!" Motivational customer experiences with chatbots. *Int. J. Contemp. Hosp. Manag.* **2021**, *33*, 3860–3882. [[CrossRef](#)]
39. Kull, A.J.; Romero, M.; Monahan, L. How may I help you? Driving brand engagement through the warmth of an initial chatbot message. *J. Bus. Res.* **2021**, *135*, 840–850. [[CrossRef](#)]
40. Kushwaha, A.K.; Kumar, P.; Kar, A.K. What impacts customer experience for B2B enterprises on using AI-enabled chatbots? Insights from Big data analytics. *Ind. Mark. Manag.* **2021**, *98*, 207–221. [[CrossRef](#)]
41. Lalicic, L.; Weismayer, C. Consumers' reasons and perceived value co-creation of using artificial intelligence-enabled travel service agents. *J. Bus. Res.* **2021**, *129*, 891–901. [[CrossRef](#)]
42. Lei, S.I.; Shen, H.; Ye, S. A comparison between chatbot and human service: Customer perception and reuse intention. *Int. J. Contemp. Hosp. Manag.* **2021**, *33*, 3977–3995. [[CrossRef](#)]
43. Loureiro, S.M.C.; Japutra, A.; Molinillo, S.; Bilro, R.G. Stand by me: Analyzing the tourist-intelligent voice assistant relationship quality. *Int. J. Contemp. Hosp. Manag.* **2021**, *33*, 3840–3859. [[CrossRef](#)]

44. Lucia-Palacios, L.; Pérez-López, R. Effects of Home Voice Assistants' Autonomy on Intrusiveness and Usefulness: Direct, Indirect, and Moderating Effects of Interactivity. *J. Interact. Mark.* **2021**, *56*, 41–54. [[CrossRef](#)]
45. Luo, X.M.; Tong, S.L.; Fang, Z.; Qu, Z. Frontiers: Machines vs. Humans: The Impact of Artificial Intelligence Chatbot Disclosure on Customer Purchases. *Mark. Sci.* **2019**, *38*, 937–947. [[CrossRef](#)]
46. McLean, G.; Osei-Frimpong, K.; Barhorst, J. Alexa, do voice assistants influence consumer brand engagement?—Examining the role of AI powered voice assistants in influencing consumer brand engagement. *J. Bus. Res.* **2021**, *124*, 312–328. [[CrossRef](#)]
47. Moriuchi, E. Okay, Google!: An empirical study on voice assistants on consumer engagement and loyalty. *Psychol. Mark.* **2019**, *36*, 489–501. [[CrossRef](#)]
48. Moriuchi, E. An empirical study on anthropomorphism and engagement with disembodied AIs and consumers' re-use behavior. *Psychol. Mark.* **2021**, *38*, 21–42. [[CrossRef](#)]
49. Pickard, M.D.; Schuetzler, R.; Valacich, J.S.; Wood, D.A. Innovative accounting interviewing: A comparison of real and virtual accounting interviewers. *Account. Rev.* **2020**, *95*, 339–366. [[CrossRef](#)]
50. Pillai, R.; Sivathanu, B. Adoption of AI-based chatbots for hospitality and tourism. *Int. J. Contemp. Hosp. Manag.* **2020**, *32*, 3199–3226. [[CrossRef](#)]
51. Pitardi, V.; Marriott, H.R. Alexa, she's not human but . . . Unveiling the drivers of consumers' trust in voice-based artificial intelligence. *Psychol. Mark.* **2021**, *38*, 626–642. [[CrossRef](#)]
52. Pizzi, G.; Scarpì, D.; Pantano, E. Artificial intelligence and the new forms of interaction: Who has the control when interacting with a chatbot? *J. Bus. Res.* **2021**, *129*, 878–890. [[CrossRef](#)]
53. Rajaobelina, L.; Tep, S.P.; Arcand, M.; Ricard, L. Creepiness: Its antecedents and impact on loyalty when interacting with a chatbot. *Psychol. Mark.* **2021**, *38*, 2339–2356. [[CrossRef](#)]
54. Ramadan, Z.; Farah, M.F.; El Essrawi, L. From Amazon.com to Amazon.love: How Alexa is redefining companionship and interdependence for people with special needs. *Psychol. Mark.* **2021**, *38*, 596–609. [[CrossRef](#)]
55. Roy, R.; Naidoo, V. Enhancing chatbot effectiveness: The role of anthropomorphic conversational styles and time orientation. *J. Bus. Res.* **2021**, *126*, 23–34. [[CrossRef](#)]
56. Schmitt, B. Speciesism: An obstacle to AI and robot adoption. *Mark. Lett.* **2020**, *31*, 313–316. [[CrossRef](#)]
57. Sheehan, B.; Jin, H.S.; Gottlieb, U. Customer service chatbots: Anthropomorphism and adoption. *J. Bus. Res.* **2020**, *115*, 14–24. [[CrossRef](#)]
58. Sivaramakrishnan, S.; Wan, F.; Tang, Z. Giving an “e-human touch” to e-tailing: The moderating roles of static information quantity and consumption motive. *J. Interact. Mark.* **2007**, *21*, 60–75. [[CrossRef](#)]
59. Sowa, K.; Przegalinska, A.; Ciechanowski, L. Cobots in knowledge work Human—AI collaboration in managerial professions. *J. Bus. Res.* **2021**, *125*, 135–142. [[CrossRef](#)]
60. Tassiello, V.; Tillotson, J.S.; Rome, A.S. “Alexa, order me a pizza!”: The mediating role of psychological power in the consumer-voice assistant interaction. *Psychol. Mark.* **2021**, *38*, 1069–1080. [[CrossRef](#)]
61. Tsai, W.H.S.; Lun, D.; Carcioppolo, N.; Chuan, C.H. Human versus chatbot: Understanding the role of emotion in health marketing communication for vaccines. *Psychol. Mark.* **2021**, *38*, 2377–2392. [[CrossRef](#)]
62. Whang, C.; Im, H. “I Like Your Suggestion!” the role of humanlikeness and parasocial relationship on the website versus voice shopper's perception of recommendations. *Psychol. Mark.* **2021**, *38*, 581–595. [[CrossRef](#)]
63. Denyer, D.; Tranfield, D. Producing a systematic review. In *The Sage Handbook of Organizational Research Methods*; Buchanan, D., Bryman, A., Eds.; Sage Publications Ltd: London, UK, 2009; pp. 671–689.
64. Kelman, H.C. Compliance, identification, and internalization: Three processes of attitude change. *J. Confl. Resolut.* **1958**, *2*, 51–60. [[CrossRef](#)]
65. Brehm, J.W. *A Theory of Psychological Reactance*; Academic Press: Oxford, UK, 1966.
66. Fishbein, M.; Ajzen, I. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*; Addison-Wesley: Reading, MA, USA, 1975.
67. Oliver, R.L. A cognitive model for the antecedents and consequences of satisfaction. *J. Mark. Res.* **1980**, *17*, 460–469. [[CrossRef](#)]
68. Rogers, E.M. *Diffusion of Innovations*; Free Press: New York, NY, USA, 1983.
69. Deci, E.L.; Ryan, R.M. *Intrinsic Motivation and Self-Determination in Human Behavior*; Plenum: New York, NY, USA, 1985.
70. Davis, F. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* **1989**, *13*, 319–340. [[CrossRef](#)]
71. Mick, D.G.; Fournier, S. Paradoxes of technology: Consumer cognizance, emotions, and coping strategies. *J. Consum. Res.* **1998**, *25*, 123–143. [[CrossRef](#)]
72. Bandura, A. Social cognitive theory: An agentic perspective. *Annu. Rev. Psychol.* **2001**, *52*, 1–26. [[CrossRef](#)]
73. Venkatesh, V.; Morris, M.; Davis, G.; Davis, F. User acceptance of information technology: Toward a unified view. *MIS Q.* **2003**, *27*, 425–478. [[CrossRef](#)]
74. Westaby, J.D. Behavioral reasoning theory: Identifying new linkages underlying intentions and behavior. *Organ. Behav. Hum. Decis. Process.* **2005**, *98*, 97–120. [[CrossRef](#)]
75. Venkatesh, V.; Thong, J.; Xu, X. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Q.* **2012**, *36*, 157–178. [[CrossRef](#)]

76. Wirtz, J.; Patterson, P.; Kunz, W.; Gruber, T.; Lu, V.; Paluch, S.; Martins, A. Brave new world: Service robots in the frontline. *J. Serv. Manage.* **2018**, *29*, 907–931. [[CrossRef](#)]
77. Horton, D.W.R.; Wohl, R. Mass communication and parasocial interaction: Observation on intimacy at a distance. *Psychiatry-Interpers. Biol. Process.* **1956**, *19*, 215–229. [[CrossRef](#)]
78. Thibaut, J.W.; Kelley, H. *The Social Psychology of Groups*; John Wiley and Sons: New York, NY, USA, 1959.
79. Atkinson, R.C.; Shiffrin, R.M. Human memory: A proposed system and its control processes. In *The Psychology of Learning and Motivation: Advances in Research and Theory*; Spence, K.W., Spence, J.T., Eds.; Academic Press: New York, NY, USA, 1968; Volume 2, pp. 89–195. [[CrossRef](#)]
80. Deleuze, G.; Guattari, F. *A Thousand Plateaus*; University of Minnesota Press: Minneapolis, MN, USA, 1987.
81. Sternberg, R.J. A triangular theory of love. *Psychol. Rev.* **1986**, *93*, 119–135. [[CrossRef](#)]
82. Csikszentmihalyi, M. *Flow: The Psychology of Optimal Experience*; Harper & Row: New York, NY, USA, 1990.
83. DeLone, W.H.; McLean, E.R. Information systems success: The quest for the dependent variable. *Inf. Syst. Res.* **1992**, *3*, 60–95. [[CrossRef](#)]
84. Morgan, R.M.; Hunt, S.D. The commitment-trust theory of relationship marketing. *J. Mark.* **1994**, *58*, 20–38. [[CrossRef](#)]
85. Hoffman, D.L.; Novak, T.P. Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations. *J. Mark.* **1996**, *60*, 50–68. [[CrossRef](#)]
86. Agarwal, R.; Karahanna, E. Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Q.* **2000**, *24*, 665–694. [[CrossRef](#)]
87. Nass, C.; Moon, Y. Machines and mindlessness: Social responses to computers. *J. Soc. Issues* **2000**, *56*, 81–103. [[CrossRef](#)]
88. Mikulincer, M.; Shaver, P.R. *Attachment in Adulthood: Structure, Dynamics, and Change*; Guilford Press: New York, NY, USA, 2007.
89. Sherif, M.; Hovland, C.I. *Social Judgment: Assimilation and Contrast Effects in Communication and Attitude Change*; Yale University Press: New Haven, CT, USA, 1961.
90. Westin, A.F. *Privacy and Freedom*; Atheneum: New York, NY, USA, 1967.
91. Short, J.; Williams, E.; Christie, B. *The Social Psychology of Telecommunications*; Wiley: London, UK, 1976.
92. Daft, R.L.; Lengel, R.H. Organizational information requirements, media richness and structural design. *Manag. Sci.* **1986**, *32*, 554–571. [[CrossRef](#)]
93. Burgoon, J.K.; Newton, D.A.; Walther, J.B.; Baesler, E.J. Nonverbal expectancy violations and conversational involvement. *J. Nonverbal Behav.* **1989**, *13*, 97–119. [[CrossRef](#)]
94. Burger, J.M.; Messian, N.; Patel, S.; del Prado, A.; Anderson, C. What a coincidence! The effects of incidental similarity on compliance. *Pers. Soc. Psychol. Bull.* **2004**, *30*, 35–43. [[CrossRef](#)]
95. Mori, M. The uncanny valley. *Energy* **1970**, *7*, 33–35.
96. Epley, N.; Waytz, A.; Cacioppo, J.T. On seeing human: A three-factor theory of anthropomorphism. *Psychol. Rev.* **2007**, *114*, 864–886. [[CrossRef](#)]
97. Groom, V.; Nass, C.; Chen, T.; Nielsen, A.; Scarborough, J.K.; Robles, E. Evaluating the effects of behavioral realism in embodied agents. *Int. J. Hum.-Comput. Stud.* **2009**, *67*, 842–849. [[CrossRef](#)]
98. Haslam, N.; Loughnan, S.; Holland, E. The psychology of humanness. In *Objectification and (De)humanization. Nebraska Symposium on Motivation*; Gervais, S.J., Ed.; Springer: New York, NY, USA, 2013; Volume 60, pp. 25–51. [[CrossRef](#)]
99. Becker, L.; Jaakkola, E. Customer experience: Fundamental premises and implications for research. *J. Acad. Mark. Sci.* **2020**, *48*, 630–648. [[CrossRef](#)]
100. Gentile, C.; Spiller, N.; Noci, G. How to Sustain the Customer Experience: An Overview of Experience Components that Cocreates Value with the Customer. *Eur. Manag. J.* **2007**, *25*, 395–410. [[CrossRef](#)]
101. Schmitt, B.; Brakus, J.J.; Zarantonello, L. From experiential psychology to consumer experience. *J. Consum. Psychol.* **2015**, *25*, 166–171. [[CrossRef](#)]
102. Dash, G.; Paul, J. CB-SEM vs PLS-SEM methods for research in social sciences and technology forecasting. *Technol. Forecast. Soc. Chang.* **2021**, *173*, 121092. [[CrossRef](#)]
103. Kot, M.; Leszczy, G. AI-activated value co-creation. An exploratory study of conversational agents. *Ind. Mark. Manag.* **2022**, *107*, 287–299. [[CrossRef](#)]
104. Vieira, A.D.; Leite, H.; Volochchuk, A.V.L. The impact of voice assistant home devices on people with disabilities: A longitudinal study. *Technol. Forecast. Soc. Chang.* **2022**, *184*, 121961. [[CrossRef](#)]
105. Amatulli, C.; Sestino, A.; Peluso, A.M.; Guido, G. Luxury hospitality and the adoption of voice assistants: The role of openness to change and status consumption. In *The Emerald Handbook of Luxury Management for Hospitality and Tourism*; Kotur, A.S., Dixit, S.K., Eds.; Emerald Publishing Limited: Bingley, UK, 2022; pp. 285–303. [[CrossRef](#)]
106. Blöcher, K.; Alt, R. AI and robotics in the European restaurant sector: Assessing potentials for process innovation in a high-contact service industry. *Electron. Mark.* **2021**, *31*, 529–551. [[CrossRef](#)]
107. Vernuccio, M.; Patrizi, M.; Pastore, A. Developing voice-based branding: Insights from the Mercedes case. *J. Prod. Brand Manag.* **2021**, *30*, 726–739. [[CrossRef](#)]
108. Filipczyk, B.; Gołuchowski, J.; Paliszkiwicz, J.; Janas, A. Success and failure in improvement of knowledge delivery to customers using chatbot-result of a case study in a Polish SME. In *Successes and Failures of Knowledge Management*; Liebowitz, J., Ed.; Morgan Kaufmann Publishers: Burlington, MA, USA, 2016; pp. 175–189. [[CrossRef](#)]



109. Skuridin, A. Chatbot implementation in a steel company in Russia: Towards a model for successful chatbot projects. In *Handbook of Research on Digital Transformation, Industry Use Cases, and the Impact of Disruptive Technologies*; Wynn, M.G., Ed.; IGI Global: Hershey, PA, USA, 2021; pp. 268–290.
110. Flanagan, F.; Walker, M. How can unions use Artificial Intelligence to build power? The use of AI chatbots for labour organising in the US and Australia. *New Technol. Work Employ.* **2021**, *36*, 159–176. [[CrossRef](#)]

**Disclaimer/Publisher’s Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.