

Navigating Avatar-Based Marketing from Value Aspects: A Systematic Literature Review and Forward-looking Research Agenda

Abstract

Virtual avatar deployment has opened a new window for many industries in service personalization and customization, offering customers ‘anytime-anywhere’ services. It becomes increasingly essential for marketing practitioners and scholars to clearly understand how avatar attributes and traits are reshaping customer value perceptions in the digital world. Despite the exponential growth of research interest within this area in the last decade, the literature on avatar attributes and consumer-perceived values remains fragmented and isolated. Given this circumstance, this review draws on the theory-context-characteristics-methods framework and explores the extant literature to provide a collective and comprehensive insight into dominant theories, contexts, characteristics, and methodologies in the context of avatar-based marketing (ABM). A systematic literature review was applied to rigorously review 57 published articles on avatars and ABM from 2005 to 2023. Using in-depth content analysis, the current review sheds light on the opportunity to extend the theoretical foundations for the ABM literature. It also identifies gaps in understanding avatar attributes and the associated consumer values, with potential implications for consumer behavior. Finally, it sums up a comprehensive future research agenda.

Keywords: avatar marketing, chatbot marketing, digital consumer, TCCM framework, value-based aspects, virtual entity.

1. Introduction

Digital transformation has profoundly influenced all business sectors over the last decade, leading to widespread change across businesses, society, and consumer behaviors (Paul et al., 2024). This shift is particularly evident as modern technologies are reshaping users' online experiences with various virtual interactive animated characters or avatars. Holzwarth, Janiszewski, and Neumann (2006, p. 19) conceptualized avatars as “general graphic representations that are personified by means of computer technology”. From the marketing perspective, Keeling, McGoldrick, and Beatty (2010, p. 793) defined them as “interactive representations of sales assistants on retail websites, including all types, whether realistic or cartoon humans, animals, or objects.” Although the literature has used a variety of terms (elaborated in section 4.2) to define avatars, at single point researchers have contended that globally the adoption of avatars within the marketing realm represents an emerging business phenomenon (Garnier & Poncin, 2013; Gonzales-Chávez & Vila-Lopez, 2021; Miao, Kozlenkova, Wang, Xie, & Palmatier, 2022; Nicolescu & Tudorache, 2022; Nowak, Fox, & Ranjit, 2015). Consequently, avatar-based marketing (ABM) has gained heightened attention from various stakeholders, including consumers, marketers, policymakers, service providers, and scholars (Hemp, 2006; Miao et al., 2022). Companies like Nike have introduced Nikeland to establish a robust presence in the Metaverse through platforms like Roblox. Similarly, IKEA has introduced a customer-focused avatar named Anna, who can address inquiries regarding IKEA's products, services, and operating hours.

Behind such heightened popularity of avatars, there are mainly two factors: first, the advancement of digital technologies, e.g., artificial intelligence (AI) (Garnier & Poncin, 2013; Hemp, 2006; Miao et al., 2022; Paul, Ueno, & Dennis, 2023); second, the growing importance of avatars in online services (e.g., banking, gaming, education, shopping, m-health, etc.) (Hitti, 2020; Huang, Hew, & Fryer, 2022; Jenneboer, Herrando, & Constantinides, 2022; S. Kim, Chen, & Zhang, 2016; SeoYoung Lee & Choi, 2017). In the recent past, the COVID-19 pandemic has also compelled the altering of many customers' traditional purchase patterns to online shopping (Noble et al., 2022). This shift highlights consumers' inclination to obtain information from websites conveniently and effortlessly, thus justifying the deployment of virtual agents or avatars.

Research indicates that avatars can enhance customer value through service customization, personalization, responsiveness, and convenience (Miao et al., 2022; Verhagen, Van Nes, Feldberg, & Van Dolen, 2014; Zhang et al., 2023). Indeed, avatars are becoming integral in marketing strategies, offering immersive engagement opportunities and influencing consumer perceptions and behaviors in the digital era (Kovacova, Machova, & Bennett, 2022; Latoschik et al., 2017). This creates implicit and explicit competition among companies over gaining a more extensive consumer base through better customer service, driving firms toward investing heavily in avatar-based service offerings. The major goals are to engage consumers actively and serve them better than others. Companies may realize that service employees cannot provide a relentless service (Schuetzler, Giboney, Grimes, & Nunamaker Jr, 2018), and this gap can be bridged by utilizing avatars. Consequently, the usage of avatars is not limited to a particular industry, like banking or hotel; it is seen as a huge prospect in the virtual gaming,

smartphone, and fashion industries. For instance, Samsung has launched an AI-supported virtual avatar called Neon to provide customers with real-time information (Hitti, 2020). Similarly, the famous fashion brand Calvin Klein has deployed Lil Miquela, a virtual influencer (another form of avatar); interestingly, Lil Miquela has more than 2.4 million followers on Instagram (Mosley, 2021). According to recent statistics from the American Marketing Association (AMA), the avatar market is projected to grow by 47.01% annually (Bhavsar, 2023).

Scores of studies have been undertaken in the context of exploring ABM (see Brendel, Hildebrandt, Dennis, & Riquel, 2023; Butt, Ahmad, Goraya, Akram, & Shafique, 2021; Chocarro, Cortiñas, & Marcos-Matás, 2023; de Brito Silva & de Oliveira Campos, 2024; Hemp, 2006). Corroborating with Hemp (2006) and Miao et al. (2022), we define avatar marketing as using avatars to create a more engaging and personalized experience for consumers, which can enhance their interaction trust and ultimately influence their purchase decisions. However, comprehensive review studies depicting the emergence of avatar marketing are still lacking. Gaps also exist in defining avatars and elucidating their characteristics (Miao et al., 2022). With evolving ABM applications, there is also a noticeable lack of synthesis of theories, avatar design, characteristics, deployment, current research trends, and contextual considerations (de Brito Silva & de Oliveira Campos, 2024; Emergen Research, 2023; Laszkiewicz & Kalinska-Kula, 2023). In addition, previous reviews have not delved into the avatars' value-based aspects (e.g., social, functional, emotional, epistemic, and conditional value), strongly triggering consumers' purchase decisions. Essentially, customer values cannot be ignored in marketing (Mason, Oduro, Umar, & Zamparo, 2023; Yang & Lin, 2017), whether in an online or offline context. As ABM is relatively new and emerging, presenting a review drawing on value-based aspects may add fresh insights to the extant literature. Thus, to explore customer value aspects, this review relies on the Theory of Consumption Values (TCV), which has been utilized from diverse behavioral elements, such as intention (Joibi & Annuar, 2021; Yang & Lin, 2017), adoption (Turel, Serenko, & Bontis, 2010), and use continuance (Yang & Lin, 2017). Moreover, Sheth, Newman, and Gross (1991) urged investigating customer values through the lens of the TCV to better understand and influence consumer behavior. The importance of TCV is also highlighted in predicting digital consumer behavior (Tanrikulu, 2021).

Microsoft's virtual assistant, Cortana, struggled with consumer adoption, primarily due to customer value perceptions, compared to competitors like Amazon's Alexa and Google Assistant. Many users found Cortana less intuitive and useful, leading to its diminished presence in the market (Warren, 2023). This example again underlines the criticality of understanding customer-perceived values in ABM. Although several former studies (e.g., Bialkova, 2023; van Pinxteren, Pluymaekers, Lemmink, & Krispin, 2023) have underscored avatar attributes and customer-perceived values within a customer behavioral context, the majority of studies have not thoroughly addressed these aspects. For instance, Van Pinxteren, Pluymaekers, and Lemmink (2020) highlighted conversational agents' communicative behaviors from two dimensions: modality (verbal, nonverbal, appearance) and footing (similarity, responsiveness). Barrera and Shah (2023) illustrated how firms utilize avatars' immersiveness, sociability, and environmental realism in the metaverse. In a similar context,

de Brito Silva and de Oliveira Campos (2024) have traced the evolution of the avatars and uncovered several key agents involved in the ABM strategy (please see Figure 1 for more details). However, these reviews have overlooked how avatar attributes can evoke customer values and how these values can drive customers toward desired behavioral outcomes from a marketing perspective. Hence, by highlighting the functional, social, emotional, epistemic, and conditional values based on TCV, the current review helps devise more effective customer-oriented ABM strategies. From a methodological perspective, there is a dearth of studies addressing popular research methods within the ABM context (de Brito Silva & de Oliveira Campos, 2024; Miao et al., 2022). Thus, an extensive review is needed to deeply understand ABM and synthesize the theories, contexts, characteristics, and methods applied and explored thus far to outline a potential research agenda for further advancement of this promising research domain. To supplement our arguments, Table 1 presents the major findings of recent review studies in this domain and highlights how this study is unique to those.

Intending to fill up the aforementioned gaps in the context of ABM, we aim to achieve the following research objectives (RO): (1) shedding light on the concepts of avatars and ABM (RO 1); (2) navigating the progression on ABM research in terms of (a) theories (RO 2a), (b) research contexts (RO 2b), (c) characteristics (with a specific focus on avatars' characteristics and value-based aspects) (RO 2c), and (d) methods (RO 2d); (3) proposing a conceptual framework based on the findings of 2c (RO 3); (4) outlining directions for future research to advance the knowledge and applications of ABM (RO 4).

This review thus adds value to the existing literature in the following ways. *First*, this study summarizes two key elements: form realism and behavioral realism of ABM. Although the form and behavioral realism have been illustrated in some studies (see S. Kim et al., 2016; Y. Kim & Sundar, 2012; Miao et al., 2022; Moon & Nass, 1996), comparative discussions between these elements in review studies are scant. A comparative discussion may help online marketers optimally blend and effectively design the form and behavior realism of avatars. *Second*, this study comprehensively summarizes the major theories and models employed to investigate ABM in various studies. This snapshot view would enable scholars and practitioners to swiftly grasp and pursue further research based on the prevalent theories, frameworks, and models of avatar marketing. Furthermore, this study represents the first exploration of customers' value-based aspects within the ABM context. Our study explicitly underlines the independent, moderating, mediating, and outcome variables grounded in customer value dimensions, including functional, social, emotional, epistemic, and conditional values. This discussion would enable marketers to understand how effectively deploying avatars can enhance customer engagement by delivering meaningful interactions that meet consumer needs while maintaining trust and privacy.

Third, this review clearly illustrates the diverse contexts (e.g., industry, avatar label, and country) of ABM. Although many studies (e.g., Apoki, Hussein, Al-Chalabi, Badica, & Mocanu, 2022; Barrera & Shah, 2023; Berberović, Alić, Činjarević, & Mešanović, 2023) have attempted to illustrate the contexts of ABM, they are scattered and limited to one or two areas. In this regard, our study can assist practitioners in understanding the industries investigated and how the specific values provided by avatars are relevant to particular sectors/industries, avatar labels, and country contexts within ABM research. *Fourth*, former scholars (e.g.,

Gonzales-Chávez & Vila-Lopez, 2021; Schuetzler et al., 2018) have demonstrated the future research directions of ABM based on some specific perspectives (e.g., avatars' design and industry context). This study addresses these gaps by emphasizing the theories, contexts, characteristics, and methodologies explored in existing ABM research and offering in-depth future research directions and practical implications based on value aspects, aiming to accelerate both ABM research and practice.

Table 1. Recent review papers on avatar-based marketing (ABM)

Authors	Type of agents	Subject	Key Findings
Van Pinxteren et al. (2020)	Conversational Agent	Customer service interaction	Conversational agents' communicative behaviors have two significant dimensions: modality (verbal, nonverbal, appearance) and footing (similarity, responsiveness).
Nicolescu and Tudorache (2022)	Chatbot	Customer service interaction	Response relevance and solving problems are the most critical variables in chatbot customer service, which generally lead to customer happiness, chatbot use continuance, product sales, and product recommendations.
Jenneboer et al. (2022)	Chatbot	Customer loyalty	Chatbots and customer loyalty are strongly connected, and this technology is helpful for customers suffering from the privacy paradox because of personalization.
Ogilvie, Prescott, and Carson (2022)	Chatbots	People seeking help with substance use disorder	The use of chatbots in the realm of addiction, particularly for those afflicted with drug use disorders, is very beneficial and helpful.
Apoki et al. (2022)	Pedagogical Agents	Personalized adaptive learning	Agents that possess flexibility and provide a range of options, together with realistic simulation, have a noteworthy impact on learning, enhancing performance, motivation, and engagement.
Huang et al. (2022)	Chatbots	Language learning	Findings revealed three technological affordances of using chatbots: timeliness, ease of use, and personalization. There are five pedagogical uses of using chatbots: as interlocutors, as simulations, for transmission, as helplines, and for

			recommendations. Besides, the challenges in using chatbots were identified, including technological limitations, the novelty effect, and cognitive load.
Barrera and Shah (2023)	Avatar	Metaverse marketing	Firms use immersiveness, sociability, and environmental realism to create and define customer experiences in the metaverse.
Berberović et al. (2023)	Avatar	Metaverse video gaming	Avatar use is associated with the manifestation of identity and the creation of several consumer personas.
Laszkiewicz and Kalinska-Kula (2023)	Virtual Influencer	Social media marketing	The study identified the fundamental processes that contribute to the attractiveness of virtual influencers and their impact on molding consumer attitudes and behaviors.
de Brito Silva and de Oliveira Campos (2024)	Avatar	Broader aspects of marketing	This review identifies the emergence of avatar marketing. It also reveals the primary agents engaged in avatar marketing strategy and delineates the rationales for investigating and implementing avatar marketing.
This study	Avatar	Broader aspects of marketing	Drawing on the TCCM framework, the current review highlights the progression of ABM research in terms of theories, research context, characteristics (with a specific focus on avatars' characteristics and value-based aspects), and methods.

1 *Source: Authors' analysis*

2. Review structure and methodology

We adopted a framework-based review approach (Paul & Criado, 2020; Paul, Khatri, & Kaur Duggal, 2023; Paul, Lim, O’Cass, Hao, & Bresciani, 2021) with the ‘scientific procedures and rationales for systematic literature reviews’ (SPAR-4-SLR) protocol (Khan, Anas, & Uddin, 2024; Paul, Lim, et al., 2021) consisting of three stages and six sub-stages (see Figure 1).

2.1 Assembling

Assembling is the first stage, comprising two sub-stages: identification and acquisition (Paul, Lim, et al., 2021).

The identification sub-stage involves conceptualizing the research domain, research questions, source type, and source quality. Our research domain is centered on ‘avatars and avatar-based marketing.’ The research questions of this review were formulated to examine the domain’s knowledge structure, emergence, and performance. Hence, we considered peer-reviewed research articles and conference proceedings (S. Kumar, Pandey, Lim, Chatterjee, and Pandey (2021). In doing so, we selected three major databases: Web of Science (WoS), Scopus, and Google Scholar, providing high accuracy in retrieving relevant journal articles (Falagas, Pitsouni, Malietzis, & Pappas, 2008; Gusenbauer & Haddaway, 2020).

In the acquisition sub-stage, additional refinement was applied, such as the search period, subject area, document type, and publication stage, to sort out relevant documents in the subject context. We set a time frame from 2005 to September 10th, 2023. Previous review studies in a similar context (i.e., chatbots) have considered ‘2005’ as the starting point (Pérez, Daradoumis, & Puig, 2020) due to the widespread popularity of computer-mediated communication devices since the early 2000s (de Brito Silva & de Oliveira Campos, 2024). The initial search string was: (“Avatar Marketing” OR “Avatar-Based Marketing” OR “Human-Computer Interaction”) AND (“Chatbot” OR “Embodied Conversational Agent” OR “Virtual Influencer” OR “Virtual Service Assistant” OR “Virtual Assistant” OR “Digital Assistant”). Before performing the inclusive search syntax, the opinions of two academic experts in a similar research field were consulted. The search resulted in 1237 documents from Scopus, 1428 documents from WoS, and 12541 documents from Google Scholar.

2.2 Arranging

The arranging stage consisted of two sub-stages: organization and purification (Paul, Lim, et al., 2021).

In the organization sub-stage, we applied the author, article title, journal title, theories, contexts, determinants, and methods as organizing codes. Next, we selected the TCCM organizing framework following prior studies (Basu, Paul, & Singh, 2022; A. Kumar, Dhingra, & Falwadiya, 2023; Paul, Merchant, Dwivedi, & Rose, 2021; Paul & Rosado-Serrano, 2019; K. Sharma, Aswal, & Paul, 2023). The TCCM framework enables the review to encompass a wide range of elements within the literature of a specific field (Paul, Lim, et al., 2021).

The purification sub-phase involves establishing and applying inclusion and exclusion criteria for publication selection. A two-step screening and evaluating benchmarks were considered in this regard (Mishra, Singh, & Koles, 2021; Paul, Lim, et al., 2021). First, drawing on earlier studies (e.g., Khan et al., 2024; Lim, Kumar, Verma, & Chaturvedi, 2022), we refined

the publications based on the following subject areas: ‘social sciences’, ‘business, management, and accounting’, ‘economics, econometrics, and finance’, and ‘decision sciences’. These subjects are clearly linked to “marketing and behavior science,” thus excluding ABM research that is purely computational and offers little to no inferences for its application in marketing settings. Only the papers published in the English language were included. This process generated 478 finally published (including conference papers and journal articles) and 67 in-press articles for the next stage. Second, duplicate articles and articles not focusing on ABM were removed based on a full-text review performed by two of this study’s authors. This resulted in 57 publications relevant to avatars in the marketing context.

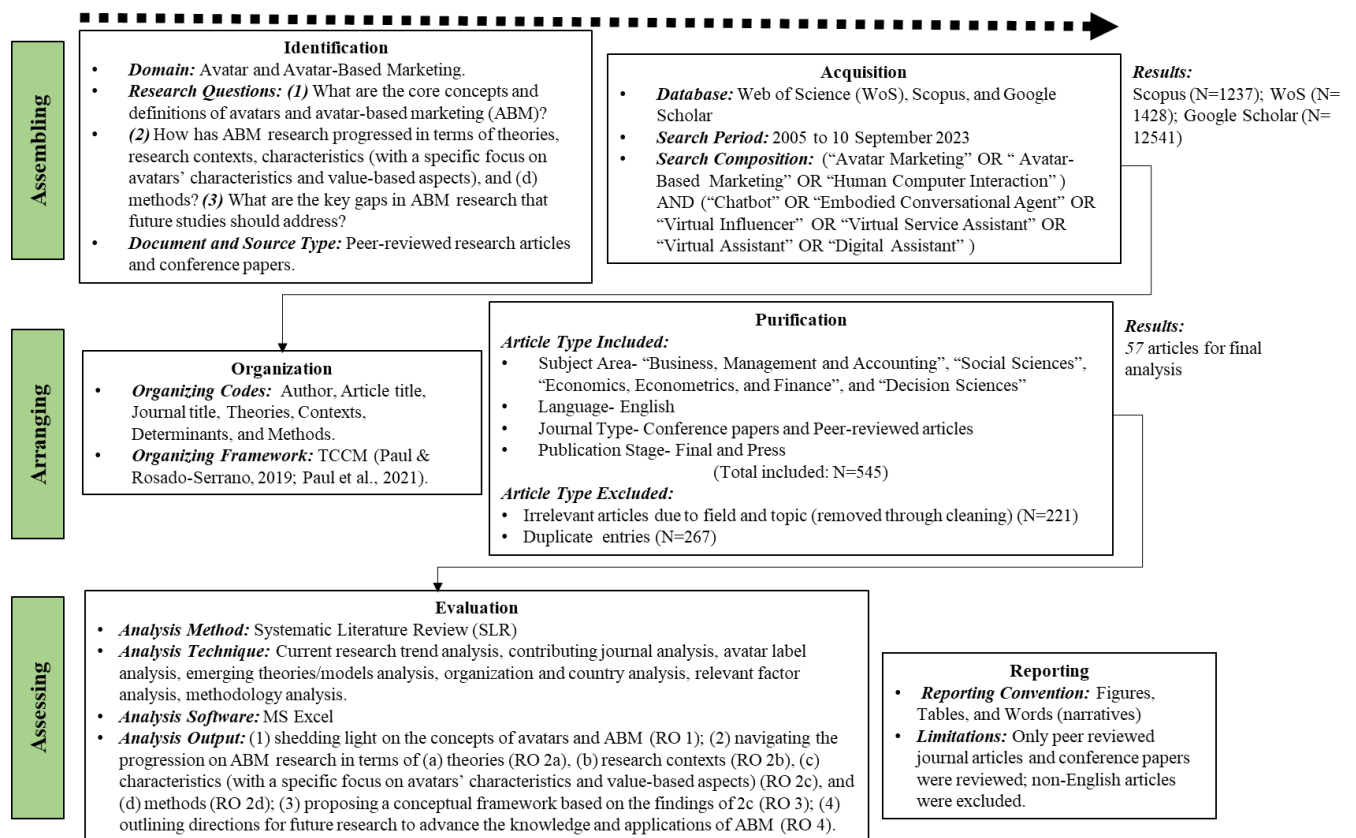
2.3 Assessing

The assessment also comprises two sub-stages: evaluation and reporting (Paul, Lim, et al., 2021).

The evaluation sub-stage details the methods for analysis and further research agenda. Two of this study’s authors were involved in performing SLR through rigorous content analysis for 57 articles following the TCCM framework and considering this study’s research objectives (ROs 1-4). In doing so, we relied on the methodology employed by Paul, Lim, et al. (2021) and Ghorbani, Karampela, and Tonner (2022) to filter the articles and establish a sub-dataset, facilitating a manageable and high-quality content analysis. Microsoft Excel was deployed to conduct the content and descriptive analyses. We followed the TCCM framework to guide future research direction.

The final sub-stage of the review protocol included reporting on the conventions and limitations of this review. Consistent with previous studies (Ghorbani et al., 2022), this review presents its findings using a combination of figures, tables, and words (narratives). In limitations, this review acknowledged that only peer-reviewed journal articles were reviewed, and non-English articles were excluded.

Figure 1. Execution of the SLR according to the SPAR-4-SLR protocol



Source: Paul, Lim, et al. (2021)

3. Avatar and avatar-based marketing (RO 1)

3.1 Who/What is an Avatar?

Scholars have used different terminologies to define avatars. Al-Natour, Benbasat, and Cenfetelli (2011) implied shopping assistants as avatars. Ho, Hancock, and Miner (2018) affirmed that chatbots with human embodiment can be referred to as avatars. Other studies have noted avatars as virtual customer agents (Verhagen et al., 2014), digital or virtual assistants (Freeman & Beaver, 2018), or embodied conversational agents (SeoYoung Lee & Choi, 2017; Schuetzler et al., 2018; Sriwisathiyakun & Dhamanitayakul, 2022). Regardless of all these arguments, the majority of the scholars are in line in defining avatars with inclusive traits, such as anthropomorphic appearance, interactivity, and controlling entity (SeoYoung Lee & Choi, 2017; Miao et al., 2022; Schuetzler et al., 2018; Sriwisathiyakun & Dhamanitayakul, 2022). Indeed, many scholars have noted the effectiveness of an avatar's anthropomorphic appearance (a human-like appearance), playing a crucial role in attracting users' responses (S.-L. Han & Kim, 2020; Yen & Chiang, 2021). In addition, research highlights the necessity of avatars' interactive capability to foster customer-perceived social presence and active engagement (Chattaraman, Kwon, Gilbert, & Ross, 2019). Miao et al. (2022) surmised that an avatar is a virtual entity with an anthropomorphic appearance and interactive competence controlled by computer programs or human operators.

Sometimes, personas (self-avatar) and avatars seem to be interchanging. Ang, Bobrowicz, Siriaraya, Trickey, and Winspear (2013) argued that the term ‘avatar’ denotes the representation of other individuals as humans in digital interactions. de Brito Silva and de Oliveira Campos (2024) referred to avatars of other people as personas, synonymously known as self-avatars. Notably, the distinction between a persona and an avatar depends on the observer’s point of view. For example, sometimes users may perceive an avatar as their own representation (self-avatar), whereas the same avatar may be perceived as an external entity (avatar) by another user.

3.2 Avatar-Based Marketing

While studies on virtual avatars, such as chatbots (Chocarro et al., 2023; Go & Sundar, 2019; Huang et al., 2022; Jenneboer et al., 2022; Jin & Eastin, 2023; Seyoung Lee, Park, & Park, 2024; Nicolescu & Tudorache, 2022; Ogilvie et al., 2022; Pérez et al., 2020; H. Shin, Bunosso, & Levine, 2023; Yen & Chiang, 2021; Zhang et al., 2023), virtual shopping agents (Y.-T. Lin, Doong, & Eisingerich, 2021), embodied conversational agents (Derrick & Ligon, 2014; Nelekar, Abdulrahman, Gupta, & Richards, 2022; van Pinxteren et al., 2023), and online assistants (Chattaraman et al., 2019) are proliferating, only a few studies (see de Brito Silva & de Oliveira Campos, 2024; Miao et al., 2022) have defined ‘avatar marketing’ or ‘avatar-based marketing’. The term avatar-based marketing was popularized by Paul Hemp through his article in the Harvard Business Review (Hemp, 2006). According to de Brito Silva and de Oliveira Campos (2024), avatar marketing started emerging in 2005. Nevertheless, the research domain is fragmented, making it challenging to build a solid foundation for ABM (de Brito Silva & de Oliveira Campos, 2024). In this regard, Miao et al. (2022) focused on how virtual avatars are emerging as a marketing tool. According to their study, the deployment of avatars in business organizations to create, communicate, and exchange customer value is known as ABM. de Brito Silva and de Oliveira Campos (2024) opined that avatars act in multiple marketing roles, e.g., generating customer interest and engagement, increasing consumer responses, reducing uncertainty, and fostering customer confidence.

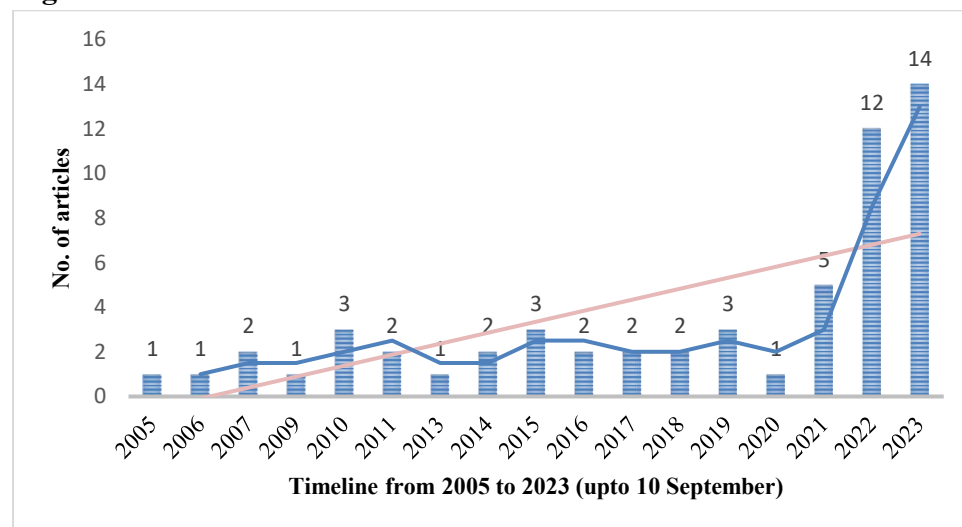
Given that avatars play a vital role as recommenders of products and brands (Y.-T. Lin et al., 2021), they are becoming increasingly popular in contemporary marketing strategies. Garnier and Poncin (2013) and Gonzales-Chávez and Vila-Lopez (2021) predicted that ABM is likely to be the next-level marketing weapon for organizations. As a result, companies that provide customer services online are investing in virtual avatars to ensure customer engagement and serve customers better (Liew, Tan, & Ismail, 2017). Emergen Research (2023) shows that globally, the human avatar market size was \$29.51 billion in 2021 and is expected to register revenue with a CAGR of 34.2% from 2023 to 2032. Based on these estimations, we believe that a large proportion of digital marketing ahead will be centered on avatars; indeed, this, in return, will provide a competitive edge for many firms assisting in sustaining the marketplace in the long run.

4. General Overview

4.1 Research trends

Technological innovations in the recent era have pushed academicians and managers to rethink ABM (Y.-T. Lin et al., 2021), as evidenced by the current publication trends. Figure 2 demonstrates the emergence of ABM based on the timeline from 2005 to September 10, 2023. While avatars and ABM have been booming recently, they have been studied since the emergence of the internet (de Brito Silva & de Oliveira Campos, 2024). However, Figure 2 presents that 56% (32) of research articles were published from 2020 to 2023. We believe such an exponential growth in publications presents rising interest among researchers exploring the ABM.

Figure 2. Publication trends of ABM from 2005 to 2023

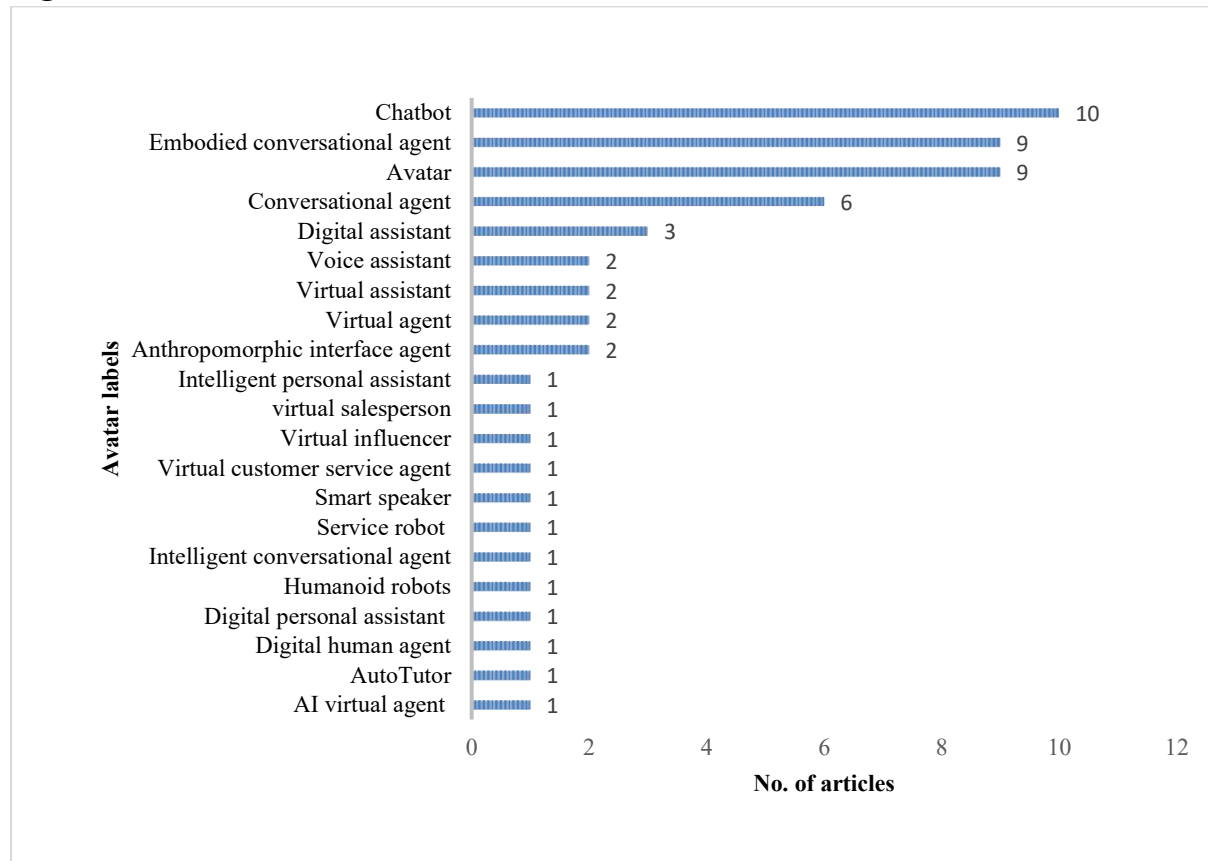


Source: Authors' analysis

4.2 Avatar labels

Scholars (e.g., Miao et al., 2022; Von der Pütten et al., 2010) have acknowledged that a diverse range of labels, such as virtual/digital assistants, chatbots, autonomous agents, and conversational agents, are often used interchangeably to describe avatars. Likewise, ABM has been investigated in different industries with various labels (Figure 3). Based on Figure 3, chatbots were examined in most studies (10). Avatar and embodied conversational agents were studied in nine papers each. At the same time, conversational agents were covered by approximately 11% of total studies. In practice, chatbots and conversational agents are primarily employed in service organizations, suggesting a steady growth of service-based chatbots' popularity due to their relentless 24/7 work efficiency.

Figure 3. Different labels of ABM

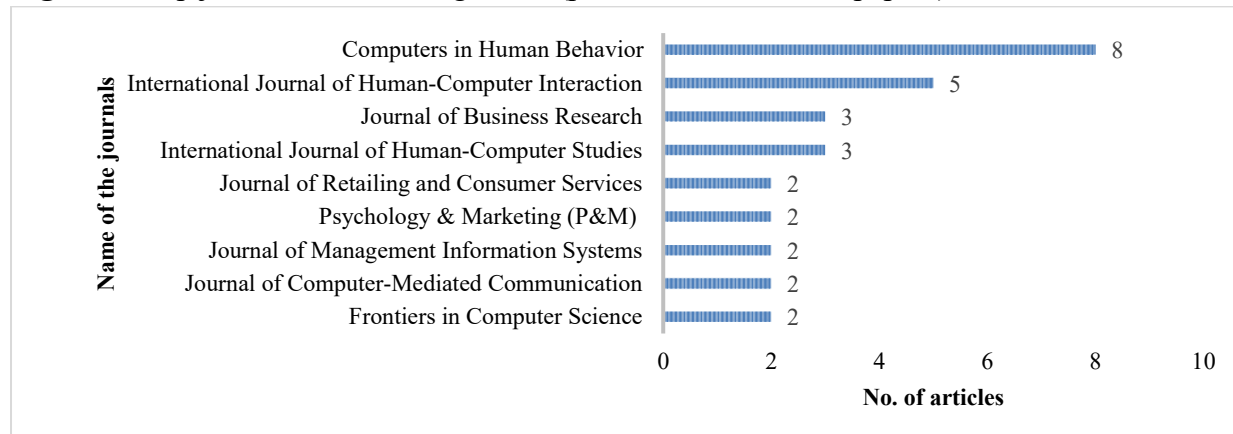


Source: Authors' analysis

4.3 Contributing journals

ABM is now a focal point for many publishers across the world. Figure 4 depicts the top nine journals publishing research papers on ABM. Among the 37 sources, the *Computer in Human Behavior* is ranked first, with eight articles published covering this domain. The *International Journal of Human-Computer Interaction* has the second-highest number of papers (5). *Journal of Business Research* and *International Journal of Human-Computer Studies* each have published three articles, while the others have published two papers each. Clearly, non-marketing journals dominate publications; however, the ABM domain is gaining traction in marketing journals.

Figure 4. Top journals contributing ABM (published at least two papers)



Source: Authors' analysis

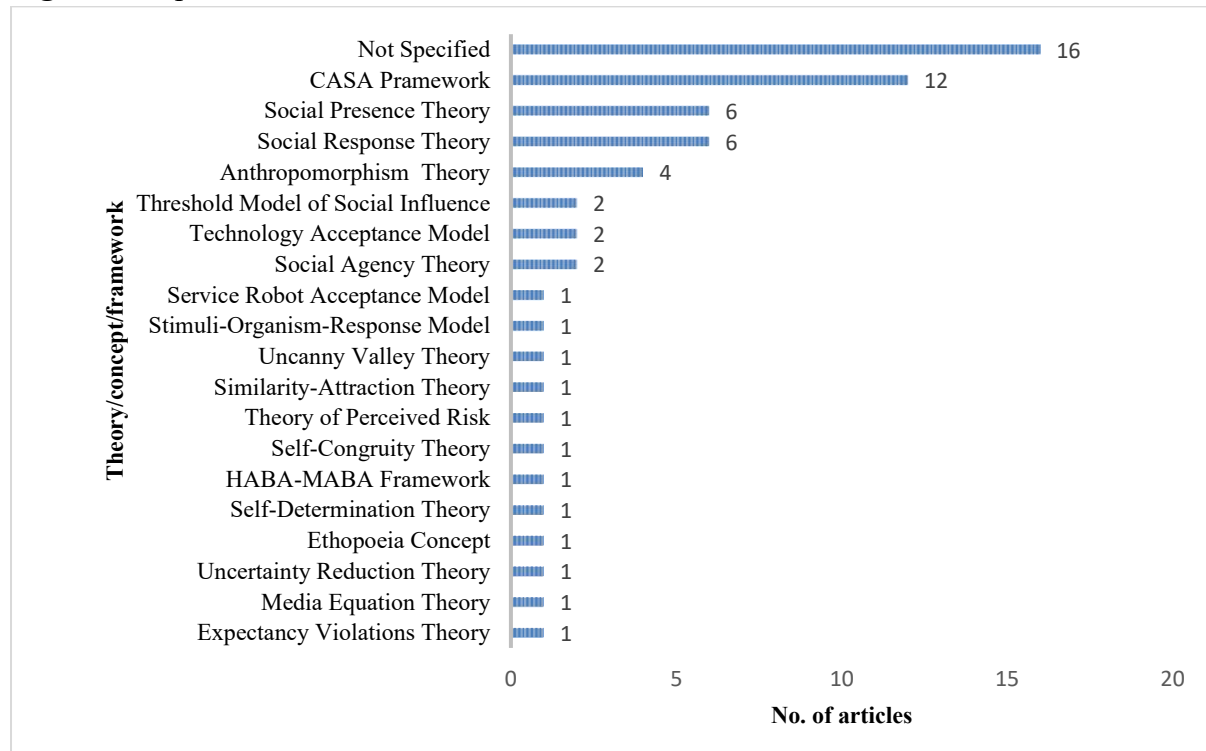
5. The TCCM framework-based findings

Table A1 outlines the key findings related to the TCCM framework, which are elaborated upon in the subsequent sections.

5.1 Theories (RO 2a)

Figure 5 and Table 2 present the theoretical frameworks utilized to examine the various dimensions of ABM, including chatbot, virtual agent, digital assistant, online shopping agent, conversational agent, AutoTutor, and virtual salesperson. Among the 57 research papers, most studies (21%) use Computers As Social Actors (CASA) as the theoretical framework. Al-Natour et al. (2011) noted that the CASA framework is remarkably utilized in determining consumers' purchase intention toward electronic, gaming, and apparel items. The Social Presence Theory and the Social Response Theory (SRT) each covered approximately 11% of all papers. Nevertheless, a single theory cannot provide a holistic view of ABM. For instance, Social Response Theory may not solely explain the different dimensions of an avatar; instead, an integrated theoretical approach can portray the context more comprehensively. The following section presents the dominant theories applied in ABM research.

Figure 5. Popular theories utilized in ABM



Source: Authors' analysis

5.1.1 CASA framework

Users respond similarly to digital and offline stimuli (Brave, Nass, & Hutchinson, 2005). This notion is consistent with the CASA framework. Yokotani, Takagi, and Wakashima (2018) noted that the CASA paradigm implies that people unconsciously apply social rules when they face human-like attributes. Thus, when consumers interact with taking avatars, they use expressions and behaviors similar to those they use in the real world (Miao et al., 2022). Based on a conversation between human and computer-supported agents, a bunch of social cues can be found: personality matching or mismatching, politeness, emotional cognition, empathy, inhibition, or facilitation (Brave et al., 2005; Nass & Moon, 2000). Besides, consumers perceive avatars as friendly hosts, virtual assistants, and virtual recommenders. Derrick, Jenkins, and Nunamaker Jr (2011) investigated managerial tactics among embodied conversational agents to discern how customer perceptions are influenced by gender in making purchase decisions. In this context, Miao et al. (2022) and Go and Sundar (2019) found that consumers' interactivity rises when avatars' anthropomorphism increases. Users feel free and comfortable if avatars seem human. Thus, many prior studies (Brave et al., 2005; J.-E. R. Lee & Nass, 2010; SeoYoung Lee & Choi, 2017; Yokotani et al., 2018) assert the suitability of deploying the CASA framework when users' perception, interactivity, personality, and emotional condition are some key concerns.

However, the Uncanny Valley Effects (UVE) contradict the CASA paradigm. Many studies (for instance, Brave et al., 2005; J.-E. R. Lee & Nass, 2010; SeoYoung Lee & Choi, 2017; Yokotani et al., 2018) have shown that avatars with anthropomorphic avatars yield a positive impact on customer perception, while Sproull, Subramani, Kiesler, Walker, and

Waters (1996) reported that the negative impact of avatars' humanization. Such impact is known as the UVE (M. Shin, Song, & Chock, 2019), referring to a phenomenon in which users experience eerie feelings after being exposed to an almost authentic yet imperfect depiction of real persons (Song & Shin, 2024).

5.1.2 Social Response Theory

Humans cannot be on the internet in person and cannot socially interact as they do in person (Chattaraman et al., 2019; Fernandes & Oliveira, 2021; Sayago, Neves, & Cowan, 2019). Avatars may help consumers feel social through human-like conversations. Avatars may persuade customers like a human salesperson can do in physical outlets (Miao et al., 2022). Hereby, Social Response Theory (SRT) denotes that human-like traits of avatars, including voice, language, interaction, and social role, may trigger customers' social responses even though they understand that machines cannot possess human characteristics (Holzwarth et al., 2006; Nass & Moon, 2000). Hence, they behave socially with avatars. For instance, when an avatar salesperson interacts with customers, it can enhance their perceptions of socialness toward a website and ultimately influence their purchase decisions (Wang & Russo, 2007). Schuetzler et al. (2018) and Verhagen et al. (2014) stated that human-like avatars elicit more socially responsive responses from users. However, Schuetzler et al. (2018) argued that consumer responses to human-like avatars are not rewarding if the issues under consideration are sensitive and personal (e.g., sexual and personal health). Within such a complex, sensitive, and relational transaction context, intelligent, unrealistic avatars (e.g., MIT's REA) could be practical (Miao et al., 2022).

5.1.3 Social Presence Theory

Social presence implies the ability of any medium to provide users with a sense of social environment (Hassanein & Head, 2007; Konya-Baumbach, Biller, & von Janda, 2023). More precisely, the Social Presence Theory ensures the vividness and interactivity of any social stimuli in a communication process (Hassanein & Head, 2007). D'Mello, Graesser, and King (2010) noted that the anthropomorphic appearance of avatars creates a sense of social warmth among consumers when interacting with these virtual agents. On the contrary, Liew et al. (2017) found that social presence in online stores is lower than in offline stores, where customers have the opportunity to touch, feel, and browse products. Besides, offline stores offer a chance to build a social relationship between sales personnel and customers based on lively communication (Clark et al., 2019). This is hardly seen online due to automated and anonymous platforms with limited active social contact (Schuetzler et al., 2018). Contrarily, many researchers argue that if avatars have human-like traits and behave accordingly, active social contact with customers is possible (Calvaresi et al., 2021; Verhagen et al., 2014).

5.1.4 Anthropomorphism Theory

Anthropomorphism denotes employing human-like attributes, characteristics, and properties to non-human virtual objects (Epley, Waytz, & Cacioppo, 2007; Khan et al., 2024; Waytz, Cacioppo, & Epley, 2010). Due to modern technologies like AI and machine learning, many anthropomorphic devices ranging from self-driving cars to voice-activated virtual agents (e.g.,

Amazon's Alexa) have emerged (Hoy, 2018; Waytz, Heafner, & Epley, 2014). Scholars (see Aggarwal & McGill, 2007; Wan & Aggarwal, 2015) affirm that human-like entities can easily foster brand rapport with customers and help sustain the marketplace for a long time. Anthropomorphism is believed to create trust among consumers whenever they adopt new technology (H. Han, Kim, & Jeon, 2021; Yen & Chiang, 2021). H. Han et al. (2021) also identified that avatars with human-like characters can make online purchasing more interesting. Touré-Tillery and McGill (2015) contended that anthropomorphic virtual messengers can be more effective than salespeople in certain contexts, such as selling medical goods, where a high level of cognitive intelligence and technical knowledge is required.

5.1.5 Social Agency Theory

In the digital arena, Social Agency Theory (SAT) postulates that human-like interaction with the users impels a social conversation in return (Liew et al., 2017). More specifically, computer-assisted avatars can foster building relationships with customers who might take avatars as a social entity (Mayer, Sobko, & Mautone, 2003). This happens when verbal and social cues are employed in a computer-based environment. Besides, because of the persona and human-like qualities, avatars possessing similar characteristics to humans, such as voice, appearance, and cognitive intelligence, tend to be more widely accepted (Miao et al., 2022). Atkinson, Mayer, and Merrill (2005) found that while the relationship between avatars and customers is built as a partnership, customers realize that they interact with any digital entity like a human-to-human interaction. For instance, when an organization utilizes an animated computerized agent with human-like expressions (e.g., gesture, gaze, and facial expression), it quickly boosts confidence and helps build customer rapport (Moon & Nass, 1996).

5.1.6 Technology Acceptance Model

The Technology Acceptance Model (TAM) has been utilized to determine new technology adoption behavior in many contexts. TAM describes consumers' emotional and cognitive reactions toward adopting new technology (C. H. Lin, Shih, & Sher, 2007). Several empirical studies (e.g., T. Bickmore, Vardoulakis, Jack, & Paasche-Orlow, 2013; Butt et al., 2021; Chocarro et al., 2023) have used TAM to investigate consumers' interaction with avatars. In the gaming industry, Butt et al. (2021) claimed that AI-based avatars are employed to assist consumers in feeling more comfortable when obtaining products and services, owing to their ease of use and usefulness. Former studies have concluded that consumers are more inclined to use products and services favorably when they can easily discern their benefits in terms of ease and usefulness (Butt et al., 2021; Mimoun & Poncin, 2015). Hence, academicians suggest that avatars should be user-friendly and offer clear benefits (T. Bickmore et al., 2013; Chocarro et al., 2023).

A gamer may face difficulties passing and going to the next level in gaming. An avatar can assist the gamer in progressing through levels by providing interactive support (Butt et al., 2021). In addition, Chattaraman et al. (2019) have found various contexts where avatars can support customers. For example, an online purchase agent can aid older customers in finding athletic shoes, an intelligent conversational agent can provide necessary information to make purchase decisions on a cellular phone (K.-M. Kim, Hong, & Cho, 2007), or an automated tutor

can provide students with a learning experience in natural language (text or voice) like a traditional human tutor (D'Mello et al., 2010). These are all instances where different forms of avatars aid customers' ease and usefulness, which are desired when they face difficulties.

However, despite ABM being a technology-driven domain, the TAM model has been relatively less explored. A possible reason for this is that the interaction between consumers and avatars involves nuanced psychological and anthropomorphic factors, such as emotional engagement, trust, and social influence, which TAM might not fully address.

5.1.7 Threshold Model of Social Influence

According to the Threshold Model of Social Influence (TMSI) (Blascovich et al., 2002), individuals initially react socially only to other people or, in the context of virtual reality, to avatars - fully controlled virtual versions of humans with high behavioral realism. However, they would not react socially to virtual agents (entities not entirely under human control) unless the agent's behavior is so authentic (high behavioral realism) that the user cannot tell the difference between the agent and the avatar. In this regard, Von der Pütten, Krämer, Gratch, and Kang (2010) found that when a situation incorporates social cues (e.g., interactivity and natural speech), people's responses to agents and avatars do not differ significantly, regardless of high or low behavioral realism, suggesting that the TMSI's underlying assumptions are not entirely supported. Drawing on the TMSI, Yokotani et al. (2018) discovered that respondents were more comfortable sharing delicate, sex-related symptoms (e.g., menstruum and body weight) with virtual agents exhibiting lower behavioral realism compared to actual experts.

5.1.8 Self-Determination Theory

Self-Determination Theory (SDT) differentiates intrinsic and extrinsic motivation (T. W. Bickmore, Utami, Matsuyama, & Paasche-Orlow, 2016). Intrinsic motivation implies doing something inherently to satisfy oneself, whereas extrinsic motivation is driven by several external stimuli (e.g., money, goods, and services). In modern marketing, SDT is a well-accepted theory (Gim, Bae, & Kang, 2022). Interestingly, gamers like to pay money even if they have a chance of being rejected. This is an example of an intrinsically satisfying behavior. Wong, Yuen, and Li (2015) identified that intrinsic motivations (e.g., curiosity, a sense of belonging, exploration, autonomy, and competence) act more profoundly than extrinsic motivations (e.g., fame, comments from peers, and power).

Indeed, the SDT theory has been widely used in different contexts, such as gaming (Neys, Jansz, & Tan, 2014), robotics (Chen et al., 2017), chatbots (Q. N. Nguyen & Sidorova, 2018), virtual agents (Linares-Garcia, Roofigari-Esfahan, Pratt, & Jeon, 2022), and avatars (Fong, Quinlan, & Mar, 2023). In the ABM context, Q. N. Nguyen and Sidorova (2018) aligned users' acceptance of chatbots with the paradigm of SDT and found that chatbots' social entities (e.g., warm interaction and presence) are designed to meet users' intrinsic needs. Similarly, Fong et al. (2023) showed how avatars might help students fulfill psychological needs (i.e., perceived warmth) and functional benefits.

1 **Table 2.** List of popular theories/concepts/frameworks

Theories	Studies	No of papers
CASA framework	e.g., Jin and Eastin (2023); H. Nguyen (2023)	12
Social Response Theory	e.g., Brinkschulte, Schlögl, Monz, Schöttle, and Janetschek (2022); Chattaraman et al. (2019)	6
Social Presence Theory	e.g., Y.-T. Lin et al. (2021); Bialkova (2023)	6
Anthropomorphism Theory	e.g., Brendel et al. (2023); Zhang et al. (2023)	4
Social Agency Theory	D'Mello et al. (2010); Qiu and Benbasat (2009)	2
Technology Acceptance Model	Mimoun and Poncin (2015); Butt et al. (2021)	2
Threshold Model of Social Influence	Von der Pütten et al. (2010); Yokotani et al. (2018)	2
Self-Determination Theory	Y.-T. Lin et al. (2021)	1
Uncertainty Reduction Theory	SeoYoung Lee and Choi (2017)	1
Ethopoeia Concept	Von der Pütten et al. (2010)	1
Expectancy Violations Theory	Burgoon et al. (2016)	1
Media Equation Theory	SeoYoung Lee and Choi (2017)	1
HABA-MABA framework	Riva, Aureli, and Silvestrini (2022)	1
Self-Congruity Theory	Na, Kim, and Lee (2023)	1
Theory of Perceived Risk	Zhang et al. (2023)	1
Similarity-Attraction Theory	Jin and Eastin (2023)	1
Service Robot Acceptance Model	Fernandes and Oliveira (2021)	1
Stimuli-Organism-Response Model	Alimamy and Kuhail (2023)	1
Uncanny Valley Theory	M. Sharma, Joshi, Luthra, and Kumar (2022)	1

2 *Source:* Authors' analysis

3

4 **5.2 Contexts (RO 2b)**

5 The industry-wise and country-wise exploration of ABM is discussed below.

6

7 **5.2.1 Industry**

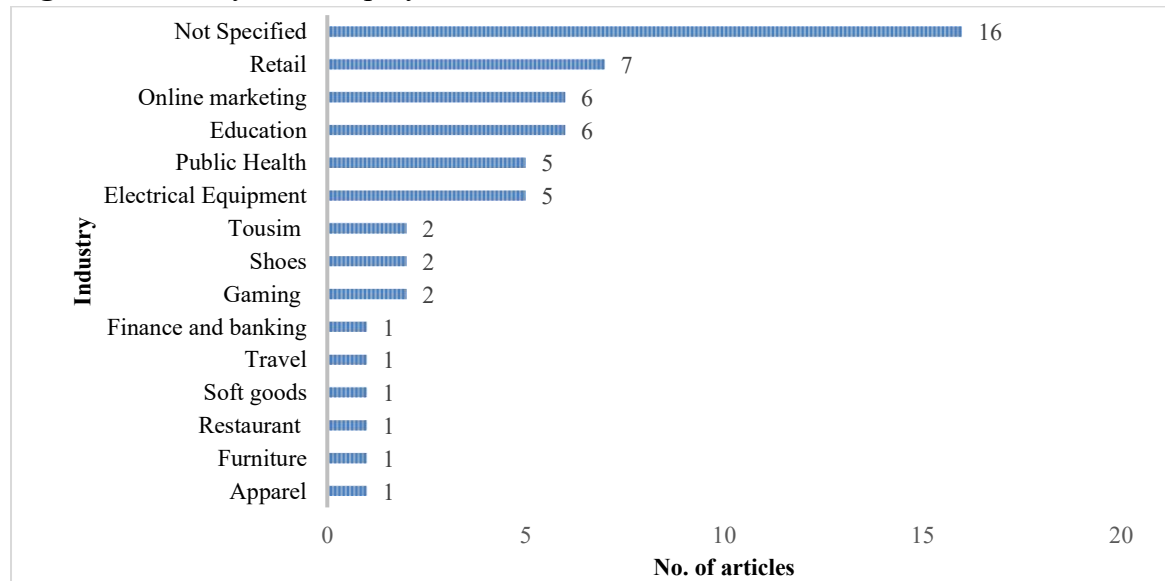
8 Studies researched various avatars in different industries (see Figure 6). Specifically, seven
9 research papers highlighted avatar deployment in the retail sector, leading among the industries
10 in terms of published articles. They can enhance customer engagement by offering convenient,
11 personalized, and interactive shopping experiences. Six papers addressed the implications of
12 avatars in online marketing, indicating that investigations of avatars and their robustness in
13 online or digital marketing are inadequate. To this end, Bialkova (2023) assessed the
14 importance of chatbots' functionalities (i.e., information quality, accuracy, and competence)
15 on consumer satisfaction. Na et al. (2023) urged to explore the role of virtual influencers
16 (another form of avatar) on consumer behavior in online shopping. Avatars in the education
17 sector have been highlighted in six articles, indicating the importance and emergence of avatars
18 in education disbursement. In addition, five research papers related to public health underscore
19 the recent deployment of avatars in this sector. This trend could be attributed to the COVID-

19 pandemic or concerns regarding information sensitivity, suggesting a sharp increase in the utilization of avatars within the pharmaceutical and online health industries. On the other hand, five studies were conducted in the electronic equipment industry (e.g., laptops, digital cameras, and cellular phones), focusing on how avatars can add value to consumers. Several studies (4) focused on manufacturing industries, including shoes, apparel, and furniture.

In addition, we found two studies specifically focused on the gaming industry, whereas in the context of the restaurant industry, one paper demonstrates how avatars can help choose restaurants. Similarly, avatar engagement is rising in the travel and tourism industry, as evidenced by the two reviewed papers (Singh, Olson, & Tsai, 2021; Wang & Russo, 2007). However, a single study addressed the finance and banking industry. In banking, avatars are expected to provide instant 24/7 assistance and minimize customer waiting times. They can swiftly handle various customer inquiries, including providing information on account balances and transaction history and guiding users through different banking processes. Surprisingly, we identified that sixteen articles lacked industry-wise focus. This can be attributed to several key factors, including the broad applicability of avatars across industries, the interdisciplinary interest in the phenomenon, and the early stage of this research domain. In this respect, scholars (Holzwarth et al., 2006; Liew et al., 2017) opined that avatars can enhance online consumer experiences across product categories by creating social presence and trust, suggesting a wide-ranging utility rather than sector-specific impacts.

From a value perspective, avatars are crucial in shaping value perception for service industries. The authenticity of an avatar can improve consumer perceptions of service encounters by increasing engagement, loyalty, trust, and satisfaction (Jones, Hancock, Kazandjian, & Voorhees, 2022). For example, using avatars in e-learning impacts trust development and perceptions. Thus, educators may use avatars to influence trust in student-teacher interactions in online environments (Morrison, Cegielski, & Rainer, 2012). Avatars in service delivery, especially online retailing, can also streamline procedures, reduce mistakes, and provide inclusive, customized services that benefit both the public and private industries. In the apparel industry, avatars facilitate functional and emotional values by enabling mass personalization through customer co-creation and virtual prototyping based on scanned body measurements, ultimately enhancing user experience and comfort of clothing (Uduwela, De Silva, & Rupasinghe, 2020).

Figure 6. Industry-wise employment of avatars



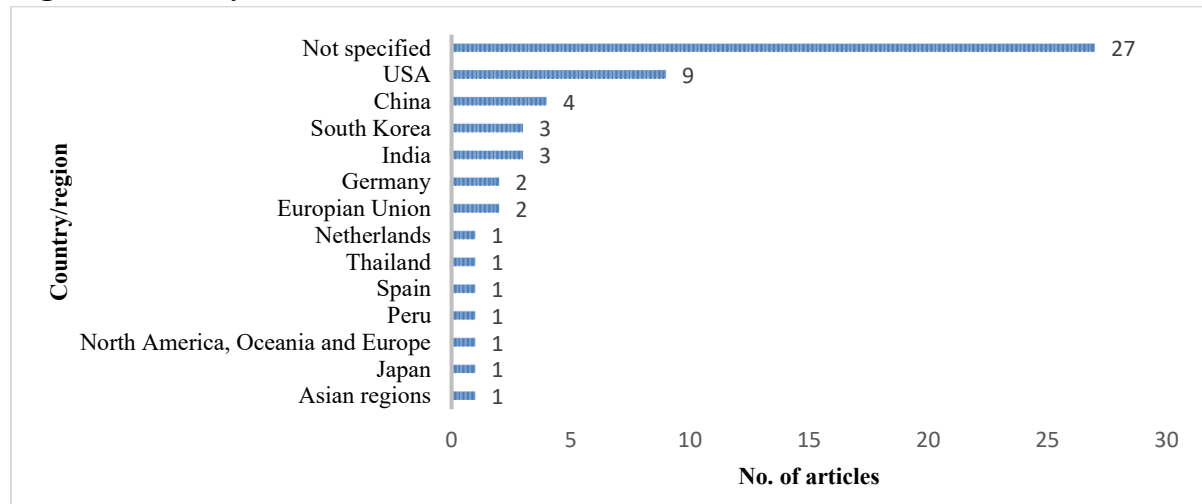
Source: Authors' analysis

5.2.2 Country

Economic growth and technological advancement are interconnected, as reflected in Figure 7. Figure 7 represents the country or regional context of ABM. The figure shows that 27 ABM research studies concentrated on global perspectives, indicating no country or region. In terms of specific countries, the United States has the highest number of studies (9). This might be because of its increased technological advancement, and a substantial number of US-based giant firms (e.g., IBM, Amazon, and Microsoft) are deploying avatars, such as IBM's Sam, Amazon's Alexa, and Microsoft's XiaoIceare, for better user satisfaction. Four studies relating to ABM were conducted in China, whereas South Korea and India had three studies, respectively.

Notably, several studies have been performed in developing countries, including Thailand and Peru. This trend may be driven by the growth in gross domestic product and the emphasis on developing a digital economy in these regions. However, a noticeable gap exists in research within least-developed countries (LDC). Furthermore, there is a lack of investigation of avatar and ABM research in Middle Eastern countries, such as Saudi Arabia, the United Arab Emirates, and Kuwait. This warrants further research attention in Middle Eastern countries, considering their high per capita income, the promising economic impact of AI, and substantial opportunities for AI-based businesses in these regions (PwC, 2018).

Figure 7. Country-wise studies conducted on ABM



Source: Authors' analysis

5.3 Characteristics (RO 2c)

This section illustrates the dimensions of influential factors relating to ABM. The significant factors are discussed based on value aspects through the lens of the TCV (Sheth et al., 1991).

5.3.1 Avatar attributes

Avatars' features mainly comprise two main dimensions (Table 3): a) appearance and b) behavior (Blascovich et al., 2002; Nowak et al., 2015). This classification is in line with Miao et al. (2022), who also divided anthropomorphism into form realism (appearance) and behavioral realism (behavior). Form realism denotes virtual avatars' spatial and dynamic capabilities similar to human beings (Miao et al., 2022). On the other hand, behavioral realism relates to the ability to interact naturally with users (Blascovich et al., 2002). Past studies have verified that form and behavioral realism significantly improve customer engagement and loyalty experiences (Mimoun & Poncin, 2015; Qiu & Benbasat, 2009; van Pinxteren et al., 2023). For instance, Nowak et al. (2015) affirmed that a higher degree of form embodiment (e.g., gender, voice, cuteness, and hair) of avatars drives consumer credibility and source trust.

Similarly, behavioral realism in forms of humanlike expression, communication style, interactivity, authenticity, and reciprocity is positively connected to consumers' psychological and behavioral responses (Burgoon et al., 2016; Crolic, Thomaz, Hadi, & Stephen, 2022; Derrick & Ligon, 2014; Mimoun & Poncin, 2015). Crolic et al. (2022) argued that avatar anthropomorphism is positively related to customer satisfaction and plays a substantial role in transforming other behavioral outcomes, including purchase intention, electronic word-of-mouth intention (Gonzales-Chávez & Vila-Lopez, 2021), use intention (Van Pinxteren, Wetzels, Rüger, Pluymaekers, & Wetzels, 2019), enjoyment (Bialkova, 2023), and purchase recommendations (Y.-T. Lin et al., 2021).

Modern technologies, such as 2D and 3D, may help managers to develop human-like avatars with the ability to move their face or body and even with other characteristics like name, gender, race, nationality, and age. Yun, Deng, and Hiscock (2009) reported that virtual dynamic avatars with facial expression abilities can evoke emotions from consumers based on

different cultures. For example, Sophie, a female customer service avatar of Air New Zealand, with human characteristics like name and gender, can increase customer trust and emotion. Although a substantial number of previous studies (e.g., Bialkova, 2023; Y.-T. Lin et al., 2021; Yun et al., 2009) addressed these two crucial attributes (i.e., appearance and behavior) of various avatars, these domains of avatar literature still require more scholarly attention. In particular, there is a paucity to specify which forms of humanoid appearances and behaviors can evoke the highest level of consumer engagement in modern-day marketing.

Table 3. Avatar attributes studies in the extant literature

	Attributes	Studies
Avatar Attributes	Appearance: Attractiveness; homophily; humanoid embodiment (age, gender, voice, and hair); humanness (physical appearance); dress appropriateness; sexism	Derrick and Ligon (2014); Burgoon et al. (2016); Qiu and Benbasat (2009); Schuetzler et al. (2018); Nowak et al. (2015); Mull, Wyss, Moon, and Lee (2015); Crolic et al. (2022); Brendel et al. (2023); Zhang et al. (2023); Holzwarth et al. (2006); Derrick et al. (2011)
	Behavior: Personality similarity; communication style; behavioral realism; human voice-based communication (message clarity); conversational relevance; message interactivity; reciprocity; output modality (human voice vs. text); decision quality; information quality; conversational tone	Derrick and Ligon (2014); Burgoon et al. (2016); Qiu and Benbasat (2009); Keeling et al. (2010); Mimoun and Poncin (2015); Von der Pütten et al. (2010); van Pinxteren et al. (2023); Al-Natour et al. (2011); SeoYoung Lee and Choi (2017); Guo and Luo (2023); M. Sharma et al. (2022)

Source: Authors' analysis

5.3.2 Consumption Values Generated by Avatars

This section classified customer-perceived values derived from avatar interaction drawing on the TCV (Sheth et al., 1991). Value implies a set of concepts or beliefs that drive an individual's behavior and attitude (Chakraborty, Siddiqui, & Siddiqui, 2022; Schwartz & Bilsky, 1987). Customer-perceived value is the difference between the benefits and sacrifices customers make while considering a product (Zeithaml, 1988). Putting it differently, customer values refer to customers' subjective assessment of the benefits they receive - such as quality and satisfaction - compared to costs and sacrifices they incur, such as price and time (Tanrikulu, 2021; Zeithaml, 1988). In the TCV, Sheth et al. (1991) identified five types of values: functional, social, emotional, epistemic, and conditional. The present review draws on TCV (refer to Table 4) to categorize the examined drivers, primarily for two reasons. First, delving into consumption values stands out as one of the most effective approaches to understanding why consumers are inclined toward specific goods or services (Sheth et al., 1991). Consequently, it

is crucial to grasp the types of customer values that can be collectively generated, as these values largely influence customer choices or behaviors. Secondly, the existing review studies have yet to categorize customer-perceived values through the lens of TCV within the context of ABM. This review is the first of its kind to thoroughly investigate customer value drivers and organize them for better understanding and further investigation (please refer to Table 5 and Figure 8 for summary).

Table 4. Value conceptualization

Value aspects	Definition	Source
Functional value	Consumers' perception of a product in terms of quality, durability, and performance (e.g., perceived usefulness).	Sheth et al. (1991)
Social value	The value of a product or service is seen from social, demographic, and socioeconomic perspectives (e.g., interactivity).	Sheth et al. (1991)
Emotional value	Consumers' perceived utility is associated with the ability of a product or service to arouse feelings or affective states (e.g., satisfaction).	Sheth et al. (1991)
Epistemic value	Consumption values are linked with customer curiosity or the desire to learn, which is active in buying new items.	Sheth et al. (1991)
Conditional value	Factors (i.e., time, place, and reason) influencing consumers to consume a product.	Sheth et al. (1991)

Functional values are conceptualized as the functional or utilitarian benefits (e.g., quality, durability, and performance) derived from a good or service (Sheth et al., 1991). In the context of ABM, most researchers have studied diverse functional values linked with customers' behavioral outcomes. For example, Bialkova (2023) demonstrated that chatbots' information quality, response accuracy, and competence are positively related to customer enjoyment. Butt et al. (2021) identified perceived easiness, usefulness, and relative advantage as functional values of deploying avatars to trigger gamers' intention to play. Similarly, Van Pinxteren et al. (2019) focused on the functional values of humanoid robots and claimed that marketers need to ensure convenience, flexibility, availability, and efficiency to induce end-user adoption intention. In sum, perceived ease of use and usefulness were mainly explored as the driving force for adopting avatars in digital contexts (e.g., online shopping and gaming) (see for details, Al-Natour et al., 2011; Butt et al., 2021; Chattaraman et al., 2019).

The extant research on ABM has shown that avatar anthropomorphic attributes such as humanoid expression, appearance, communication style, and cognitive intelligence impact customers perceived social values (Al-Natour et al., 2011; Burgoon et al., 2016; Chattaraman et al., 2019). For instance, Al-Natour et al. (2011) demonstrated that when customers identify themselves with avatars, it creates a sense of social presence and impacts buying laptops online. Highlighting customer-perceived two-way interactivity and perceived synchronous interactivity, Chattaraman et al. (2019) illustrated how older consumers' purchasing of athletic

shoes is amplified via avatars (i.e., digital assistants). In this respect, the current review has mapped out various customer-perceived social values, including social presence, social response, synchronous interactivity, interactivity, connectedness, social interaction, and compatibility (Bialkova, 2023; Burgoon et al., 2016; Chattaraman et al., 2019; Singh et al., 2021; Verhagen et al., 2014; Yim, 2023). These social values have a direct impact on customers' behavioral outcomes (e.g., online purchasing) (Al-Natour et al., 2011) and are seen simultaneously as critical as functional values (Chattaraman et al., 2019; Fong et al., 2023).

In many cases, it is seen that when avatars are human-like and act accordingly, they can easily elicit consumers feeling and excitement. Brendel et al. (2023) investigated how AI avatars can handle frustration and aggression and satisfy customers properly. Most of the papers studied in this review showed that trust and credibility of avatars play a robust role in driving customers' desired behavior (SeoYoung Lee & Choi, 2017; Liew et al., 2017; Mull et al., 2015; Nowak et al., 2015; Wienrich, Carolus, Roth-Isigkeit, & Hotho, 2022). SeoYoung Lee and Choi (2017) also noted that interactional enjoyment helps hold customers' attention by offering fun and enjoyment.

On the other hand, research shows that customer epistemic value is linked with curiosity or the desire to learn (Sheth et al., 1991). According to them, epistemic value is mainly evident when customers intend to buy new items. Interestingly, none of our reviewed studies have explored customer epistemic value (see Table 5) in the context of ABM. Nevertheless, these values might significantly impact customers' purchase or adoption intentions, especially first-time users who want to purchase via avatars.

Conditional values mainly comprise a product's ability to yield short-term functional or social value in a particular situation or context that aligns with customers' circumstances at the point of choice (Sheth et al., 1991; Sweeney, Soutar, Whiteley, & Johnson, 1996). Scholars have charted several conditional values in the context of ABM, such as interaction comfort, virtual reality, and source trust avatars provide (Brave et al., 2005; Nowak et al., 2015; Van Pinxteren et al., 2019). However, some conditional risk/cost factors might affect customer-perceived conditional values. For instance, Zhang et al. (2023) identified that risk factors (i.e., perceived time and privacy risk) negatively impact users' continuance intention with AI-based chatbot services. The current review identifies that less scholarly attention has been given to exploring the conditional value predictors affecting customers' adoption or post-adoption behaviors regarding avatars.

1 **Table 5.** Value-based factors of avatars

	Values	Studies
Consumption Values Created by Avatars	Functional: Perceived ease of use; perceived usefulness; ease of interaction; convenience; flexibility; availability; efficiency; cost-savings; expertise; perceived easiness; accessibility; accuracy; competence; performance expectancy; personalization; responsiveness; informational support	Derrick and Ligon (2014); Al-Natour et al. (2011); Chattaraman et al. (2019); Burgoon et al. (2016); Schuetzler et al. (2018); Y.-T. Lin et al. (2021); Van Pinxteren et al. (2019); Nowak et al. (2015); Butt et al. (2021); Sriwisathiyakun and Dhamanitayakul (2022); Bialkova (2023); Zhang et al. (2023); Guo and Luo (2023)
	Social: Perceived social presence; perceived synchronous interactivity; perceived interactivity; perceived two-way interactivity; connectedness; social interaction; compatibility; perceived anthropomorphism	Chattaraman et al. (2019); Burgoon et al. (2016); Holzwarth et al. (2006); Singh et al. (2021); Verhagen et al. (2014); Butt et al. (2021); Bialkova (2023); Yim (2023); M. Sharma et al. (2022)
	Emotional: Perceived trust/trustworthiness; perceived enjoyment; perceived caring; likeability; credibility; playfulness; hedonic value; interactional enjoyment; emotional contagion; anger; enjoyment; personal caring; frustration; aggression; emotional attachment; perceived friendliness; intimacy; emotional support; perceived warmth; perceived animacy	Al-Natour et al. (2011); Brave et al. (2005); Chattaraman et al. (2019); Derrick and Ligon (2014); Holzwarth et al. (2006); Keeling et al. (2010); SeoYoung Lee and Choi (2017); Mimoun and Poncin (2015); Qiu and Benbasat (2009); Verhagen et al. (2014); Y.-T. Lin et al. (2021); Nowak et al. (2015); Mull et al. (2015); Liew et al. (2017); Crolic et al. (2022); Wienrich et al. (2022); del Valle-Canencia, Moreno Martínez, Rodríguez-Jiménez, and Corrales-Paredes (2022); Bialkova (2023); Brendel et al. (2023); Na et al. (2023); van Pinxteren et al. (2023); Jin and Eastin (2023); Gelbrich, Hagel, and Orsingher (2021); Priya and Sharma (2023)
	Conditional:	Van Pinxteren et al. (2019); Brave et al. (2005); Nowak et al. (2015);

	Interaction comfort; virtual reality; source trust; perceived risk	Hasan, Shams, and Rahman (2021);
Outcome variables	Patronage intention; behavioral intention to return to a website; trust; user satisfaction; intention to use; usage intention; willingness to follow; purchase recommendations; intention to interact; intention to play; purchase intention; enjoyment; word of mouth intention; attitudes; continuance intention; acceptance	Chattaraman et al. (2019); Go and Sundar (2019); Keeling et al. (2010); K.-M. Kim et al. (2007); SeoYoung Lee and Choi (2017); Mimoun and Poncin (2015); Von der Pütten et al. (2010); Y.-T. Lin et al. (2021); Van Pinxteren et al. (2019); Liew et al. (2017); Butt et al. (2021); Crolic et al. (2022); Bialkova (2023); Yim (2023); Zhang et al. (2023); Fernandes and Oliveira (2021)
Other variables	Involvement; dominance; self-disclosure; perceived rapport; self-efficacy; self-congruity; engagement; power; need for cognition, sensation seeking	Burgoon et al. (2016); SeoYoung Lee and Choi (2017); Yokotani et al. (2018); Wienrich et al. (2022); Na et al. (2023); van Pinxteren et al. (2023); Derrick and Ligon (2014); Go and Sundar (2019); Keng and Liu (2013)

Source: Authors' analysis

5.4 Overview of Independent, Mediating, Moderating, and Outcome Variables

5.4.1 Appearance-centered

Table 6 highlights appearance-related independent, mediating, and moderating variables. As shown, avatar attractiveness was extensively studied in four articles. For instance, Derrick and Ligon (2014) reported that embodied conversational agents' visual attractiveness sharply triggers users' perceptions in the digital environment. Similarly, Gonzales-Chávez and Vila-Lopez (2021) reported that attractiveness stimulates millennials' acceptance of buying intentions and electronic word of mouth. On the other hand, homophily, a human tendency to bond or associate with similar others, was explored in the extant ABM literature. It positively predicts customers' intention to interact with avatars as salespersons (Mull et al., 2015). Other studies have explored various factors that elicit customers' or users' behavioral outcomes, including human embodiment (Qiu & Benbasat, 2009), human identity cues (Go & Sundar, 2019), visual interface cues (Kang & Kang, 2023), sexism (Nowak et al., 2015), smiling (Verhagen et al., 2014), and visual embodiment (Schuetzler et al., 2018). Unexpectedly, this review found no empirical studies that have investigated any mediating or moderating effects of avatar appearance-related variables.

Table 6. Appearance-related independent, mediating, and moderating variables

Independent Variables	Frequency	Mediating Variables	Frequency	Moderating Variables	Frequency
Attractiveness	4	x	x	x	x
Homophily	2	x	x	x	x
Human embodiment	1	x	x	x	x
Human identity cues	1	x	x	x	x
Visual interface cue	1	x	x	x	x
Sexism	1	x	x	x	x
Smiling	1	x	x	x	x
Visual embodiment	1	x	x	x	x
Dress appropriateness	1	x	x	x	x

Note: 'x' indicates null values

Source: Authors' analysis

5.4.2 Behavioral-centered

The current review revealed that past studies have determined multiple independent variables related to their behavioral aspects (see Table 7). These include information quality, communication style, decision quality, ease of interaction, human voice-based communication, realism, reciprocity, and conversational tone. van Pinxteren et al. (2023), for instance, found a significant impact of conversational agents' communication style on use intentions. However, previous studies ignored the mediation mechanism of the behavioral-related variables. Verhagen et al. (2014) showed how avatars' communication style moderates the relationship between agents' characteristics and both social presence and personalization, shaping the overall experience of online service encounters.

Table 7. Behavioral-related independent, mediating, and moderating variables

Independent Variables	Frequency	Mediating Variables	Frequency	Moderating Variables	Frequency
Information quality	2	x	x	Communication style	1
Decision quality	1	x	x	x	x
Ease of interaction	1	x	x	x	x
Communication style	1	x	x	x	x
Human voice-based communication	1	x	x	x	x
Realism	1	x	x	x	x
Reciprocity	1	x	x	x	x
Conversational tone	1	x	x	x	x

Note: 'x' indicates null values

Source: Authors' analysis

5.4.3 Functional value-centered

Referring to Table 8, most of the previous studies (6 articles) assessed the effects of avatar expertise as an independent variable in relation to users' responses (e.g., buying intentions and satisfaction). Verhagen et al. (2014) noted the positive and significant effects of expertise on social presence and personalization to trigger service encounter satisfaction. Holzwarth et al. (2006) reported that at high degrees of product involvement, an expert avatar performs better as a sales representative. Drawing on the TAM, Chattaraman et al. (2019) identified that digital assistants' perceived ease of use and usefulness significantly shape users' patronage intentions. We discovered that the influence of other functional values-related variables, such as accuracy, perceived intelligence, personalization, competence, customization, dominance, perceived relative advantage, authentic experiences, subjective social norms, performance expectancy, task orientation, and informational support were thoroughly examined in the reviewed articles (e.g., Burgoon et al., 2016; Butt et al., 2021; Keeling et al., 2010; Zhang et al., 2023). Besides, perceived usefulness, perceived ease of use, personalization, and utilitarian value were assessed as mediating variables (e.g., Butt et al., 2021; Qiu & Benbasat, 2009). For instance, Butt et al. (2021) showed that perceived ease of use and usefulness mediated the connection between compatibility and attitudes toward gamer inclination to play with AI-powered avatars. However, none of the reviewed studies have examined the moderating effects of functional value-based variables.

Table 8. Functional value-related independent, mediating, and moderating variables

Independent Variables	Frequency	Mediating Variables	Frequency	Moderating Variables	Frequency
Expertise	6	Perceived usefulness	2	x	x
Personalization	3	Perceived ease of use	1		
Perceived ease of use	2	Personalization	1	x	x
Perceived usefulness	2	Utilitarian value	1	x	x
Accuracy	1	x	x	x	x
Perceived intelligence	1	x	x	x	x
Competence	1	x	x	x	x
Customization	1	x	x	x	x
Dominance	1	x	x	x	x
Perceived relative advantage	1	x	x	x	x
Authentic experiences	1	x	x	x	x
Performance expectancy	1	x	x	x	x
Subjective social norms	1	x	x	x	x

Task orientation	1	x	x	x	x
Informational support	1	x	x	x	x

Note: 'x' indicates null values

Source: Authors' analysis

5.4.4 Social value-centered

Social values-related independent variables include anthropomorphism, social presence, interactivity, connectedness, perceived humanness, personal similarity, compatibility, synchronous, two-way interactivity, social influence, and social orientation (see Table 9). Among these variables, anthropomorphism was highlighted in seven articles (e.g., Crolic et al., 2022; Nowak et al., 2015; van Pinxteren et al., 2023). Perceived anthropomorphism evokes individuals' intentions to interact with avatars (van Pinxteren et al., 2023). Driven by the anthropomorphic attributes of avatars, customers feel a sense of social presence (highlighted in 7 articles) as they do in human interaction (e.g., Bialkova, 2023; Yim, 2023). This drags customers to interact with humanlike avatars actively. This is why past studies explored the effects of interactivity on behavioral aspects (Bialkova, 2023; Yim, 2023). For instance, Yim (2023) reported that customers' electronic word of mouth significantly depends on avatars' ability to perform vivid interactions. Moreover, past studies identified several mediating variables, including social presence (3 articles) (e.g., Qiu & Benbasat, 2009; Verhagen et al., 2014) and rapport or relationship (2 articles) (Y.-T. Lin et al., 2021; van Pinxteren et al., 2023). Specifically, Singh et al. (2021) observed that the impact of the type of service provider on satisfaction levels is significantly mediated by perceptions of social presence. Y.-T. Lin et al. (2021) found substantial mediation of the relationship between conflict and trust. On the other hand, we identified the moderating effects of anthropomorphism, automated social presence, interactivity, involvement, human interaction, and the need for human interaction (Go & Sundar, 2019; Y.-T. Lin et al., 2021; van Pinxteren et al., 2023; Verhagen et al., 2014). Notably, social presence was used as an independent, mediating, and moderating variable among the social values-related variables.

Table 9. Social value-related independent, mediating, and moderating variables

Independent Variables	Frequency	Mediating Variables	Frequency	Moderating Variables	Frequency
Anthropomorphism	7	Social presence	3	Anthropomorphism	2
Social presence	7	Rapport	2	Automated social presence	1
Interactivity	5	Engagement;	1	Interactivity	1
Perceived humanness	2	Interactional enjoyment	1	Involvement	1
Connectedness	1	Intimacy	1	Human interaction	1
Perceived personal similarity	1	x	x	Need for human interaction	1

Compatibility	1	x	x	x	x
Perceived synchronous	1	x	x	x	x
Perceived two-way interactivity	1	x	x	x	x
Social influence	1	x	x	x	x
Social orientation	1	x	x	x	x

Note: 'x' indicates null values

Source: Authors' analysis

5.4.5 Emotional value-centered

In emotional values-related variables (see Table 10), credibility (3 articles), likeability (3 articles), trustworthiness (2 articles), and perceived trust (2 articles) were the significant independent variables. Holzwarth et al. (2006) noted that the credibility of avatars drives users' favorable attitudes toward products and satisfaction with retailers, leading to their purchase intentions. Gonzales-Chávez and Vila-Lopez (2021) affirmed that credibility and likeability ultimately drag customers toward positive word of mouth. Highlighting avatar likeability and trustworthiness, Derrick and Ligon (2014) argued that these features significantly shape users' perceptions of human-computer interaction. Among the mediating variables, we found that the mediation effect of satisfaction was investigated in three studies (e.g., Brendel et al., 2023; Jin & Eastin, 2023). Brendel et al. (2023) showed the mediation mechanism of satisfaction between perceived humanness and frustration. Additionally, Jin and Eastin (2023) reported that user satisfaction and chatbot friendliness mediated the relationship between attitudes and use intention, leading to more favorable product attitudes and more use intention. Apart from the mediation effects, some studies showed the moderating effects of customer anger, eeriness, high impulsivity, and brand credibility (Brendel et al., 2023; Crolic et al., 2022; Singh et al., 2021).

Table 10. Emotional value-related independent, mediating, and moderating variables

Independent Variables	Frequency	Mediating Variables	Frequency	Moderating Variables	Frequency
Credibility	3	Satisfaction	3	Customer anger	1
Likeability	3	Credibility	1	Eeriness	1
Trustworthiness	2	Emotional attachment	1	High impulsivity	1
Perceived trust	2	Friendliness	1	Brand credibility	1
Empathy	1	Frustration	1	x	x
Perceived caring	1	Hedonic value	1	x	x
Perceived enjoyment	1	Service encounter satisfaction	1	x	x
Perceived information credibility	1	Perceived warmth	1	x	x
Conflict	1	Commitment	1	x	x

Personal care	1	x	x	x	x
Playfulness	1	x	x	x	x
Emotional support	1	x	x	x	x

Note: 'x' indicates null values

Source: Authors' analysis

5.4.6 Conditional value-centered

We identified a set of conditional values-related independent variables (see Table 11), which are mainly based on two dimensions: trust (trust, trust benevolence, trust ability, and trust integrity) and risk (privacy risk and time risk). Five articles presented the mediating effects of trust in the ABM context (e.g., Keeling et al., 2010; SeoYoung Lee & Choi, 2017). For instance, SeoYoung Lee and Choi (2017) discovered that trust mediated between self-discloser and user satisfaction. Identity threat, interaction comfort, and online advertising complexity were examined as moderating variables (Keng & Liu, 2013; Singh et al., 2021; Van Pinxteren et al., 2019). For example, Van Pinxteren et al. (2019) noted that interaction comfort moderates gaze cues' impact on anthropomorphism.

Table 11. Conditional value-related independent, mediating, and moderating variables

Independent Variables	Frequency	Mediating Variables	Frequency	Moderating Variables	Frequency
Privacy risk	1	Trust	5	Identity threat	1
Time risk	1	Source trust	1	Interaction comfort	1
Trust benevolence	1	Transactive exchange	1	Online advertising complexity	1
Trust	1	Trusting beliefs	1	x	x
Trust ability	1	x	x	x	x
Trust integrity	1	x	x	x	x

Note: 'x' indicates null values

Source: Authors' analysis

5.4.7 Outcome variables

In the context of ABM, this review reveals several key outcome variables (see Table 12). Satisfaction, highlighted in six studies, indicates that users' positive experiences with avatars enhance their overall satisfaction, which is crucial for long-term engagement (e.g., Gim et al., 2022; Mimoun & Poncin, 2015; Park, Chung, & Lee, 2023). Five studies examined how avatars influence customers' purchase intentions (Holzwarth et al., 2006; Keng & Liu, 2013; Wienrich et al., 2022). Four articles examined intention to use, reflecting users' willingness to engage with avatars in future interactions, driven by their satisfaction and positive initial experiences (e.g., Park et al., 2023; van Pinxteren et al., 2023; Zhang et al., 2023). Among the other outcome variables, frequently studied factors are attitudes (3 articles) (e.g., Butt et al., 2021; Na et al.,

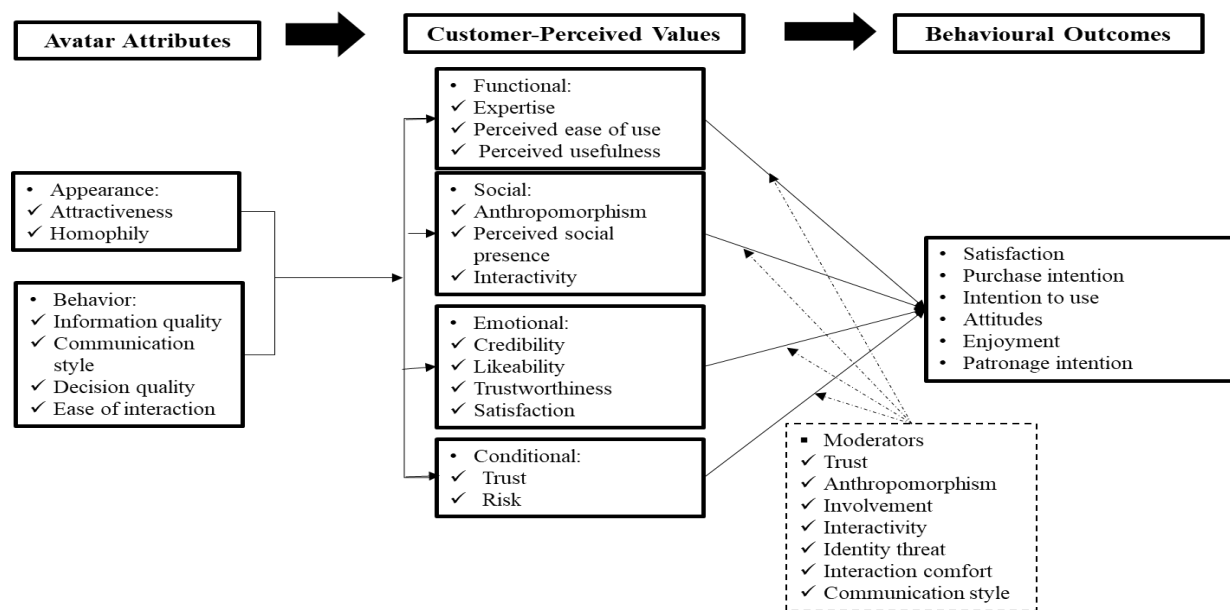
2023), enjoyment (3 articles) (e.g., Bialkova, 2023; van Pinxteren et al., 2023), and patronage intention (3 articles) (e.g., Keeling et al., 2010; Liew et al., 2017).

Table 12. Outcome variables

Variables	Frequency
Satisfaction	6
Purchase intention	5
Intention to use	4
Attitude	3
Enjoyment	3
Patronage intention	3
Others (e.g., acceptance, advertising attitudes, behavioral intentions, brand attitudes, continuance intention, electronic word of mouth, intention to interact, intention to play, interactivity, persistence, purchase recommendation, re-usage, trust, usage intentions, user's perception, willingness to follow, word-of-mouth intention)	36

Source: Authors' analysis

Figure 8. A holistic view of the predictors and outcomes of customer-perceived values (RO 3)



Source: Authors' own work

5.4 Methods (RO 2d)

Table 13 shows that the majority of the studies on ABM are quantitative (e.g., Al-Natour et al., 2011; Brave et al., 2005; Chattaraman et al., 2019). Among 57 articles, 50 were quantitative studies where primary data were collected from different age groups, genders, income groups, and educational backgrounds, with the adoption and post-adoption behaviors of diverse groups of users being studied empirically. However, a substantial number of quantitative articles lack conceptual frameworks, leading to inconsistencies in developing a theoretical foundation with

the drivers or predictors mentioned above.

In addition, 24 articles have used experimental design, accounting for 48% of the quantitative studies. For instance, Keeling et al. (2010) conducted experimental studies to find avatars' efficiency in selling online books. These experimental studies have mainly used t-tests, ANOVA, and MANOVA as statistical tools for analyzing hypothetical relationships. Experimental consumer research employs more behavioral measures and is deemed more effective in uncovering significant insights into real consumer behavior (Morales, Amir, & Lee, 2017). We identified that several studies integrated experiments with cross-sectional research designs (11 articles) (e.g., Gelbrich et al., 2021; van Pinxteren et al., 2023). On the other hand, fifteen articles used a cross-sectional survey with various data analyzing techniques, e.g., structural equation modeling, hierarchical multiple regression, cluster analysis, and discriminant analysis (Al-Natour et al., 2011; Alimamy & Kuhail, 2023; Butt et al., 2021; Fernandes & Oliveira, 2021; Guo & Luo, 2023; Nowak et al., 2015). Evidence shows that cross-sectional surveys in information system (IS) research can provide a snapshot of user behaviors, attitudes, and preferences at a single point in time (Maier, Thatcher, Grover, & Dwivedi, 2023; Morales et al., 2017). Although we have identified three articles utilizing qualitative methods, incorporating in-depth interviews (2 articles) and focus groups (1 article), this review calls for more exploratory research. Stokes and Bergin (2006) reported that in-depth interviews are ideal for investigating specific, well-defined issues requiring detailed consumer insights, while focus groups are better suited for broad exploratory research. This is particularly relevant since avatars and ABM are still novel concepts in many countries (Miao et al., 2022), especially developing and least-developed nations. While a mixed-methods approach is crucial for constructing and validating new theories, our findings showed that four articles (K.-M. Kim et al., 2007; Schuetzler et al., 2018; Sriwisathiyakun & Dhamanitayakul, 2022; Yokotani et al., 2018) employed this method, emphasizing the need for more utilization of this approach.

Table 13. Research approaches

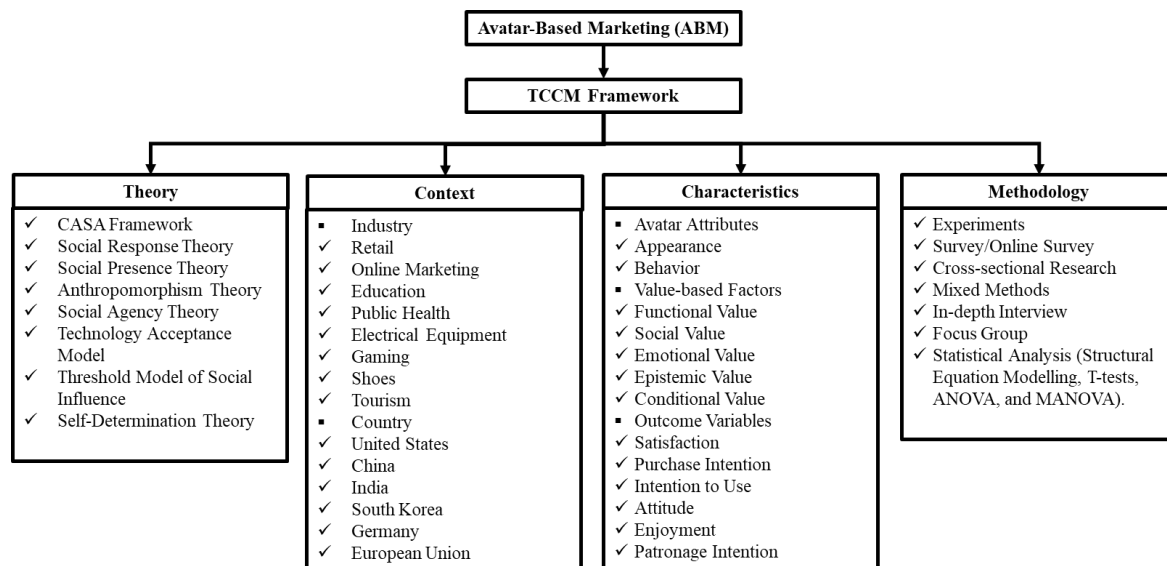
Research approach (and data analysis techniques)	Frequency	%
Quantitative	50	88.00
Experiments (e.g., regression analysis, ANOVA, t-test, MANOVA)	24	42.11
Cross-sectional survey (e.g., structural equation modeling, hierarchical multiple regression, cluster analysis, discriminant analysis)	15	26.32
Cross-sectional survey and experiments (e.g., regression analysis, structural equation modeling)	11	19.30
Qualitative	03	5.00
Interviews	2	3.51
Focus groups	1	1.75
Mixed approach	04	7.00
Interview and cross-sectional survey (e.g., ANOVA and structural equation modeling)	3	5.26
Experiment and Focus group discussion	1	1.75

	Total	57	100.00
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Source: Authors' analysis

Figure 9 provides a synthesized overview of the findings, organized according to the key dimensions of the TCCM framework.

Figure 9. The review summary using the TCCM framework



Source: Authors' own work

6. Future research directions (RO 4)

Drawing on similar TCCM-based studies (Ghorbani et al., 2022; Harju, 2022; Jebarajakirthy et al., 2021; Roy Bhattacharjee, Pradhan, & Swani, 2022), future research trajectories are delineated in accordance with the basic premises of ABM literature as follows.

6.1 Theories

The findings of this review indicate that the existing literature is insufficient to establish a robust theoretical foundation for ABM research. Notably, the absence of conceptual papers suggests the gap and opportunity to conceptualize constructs of human-computer interaction-based research from the marketing perspective. Moreover, the articles reviewed by this study merely employed theories, models, and frameworks from technology adoption and IS perspectives, neglecting their marketing implications. Therefore, future research is suggested to introduce a broader set of theories, going beyond the technology adoption and IS settings, to examine how avatars reshape consumers' perceptions and attitudes to elicit favorable business outcomes (e.g., customer retention and profit maximization).

In particular, this review's findings indicate that most empirical studies have adopted classic human-computer interaction-based theories (e.g., SRT, SAT, CASA paradigm, and Anthropomorphism Theory). This entails a narrow and inward perspective of ABM and consumer perceptions. However, more recent and contemporary theoretical perspectives from

marketing paradigms signify that ABM literature could benefit from theories like the TCV, Customer Engagement Theory (CET), SDT, and Uncertainty Reduction Theory (URT) to rethink consumers' attitudes, lifestyles, and habits in the spatial dimension. For instance, De Vreede, Raghavan, and De Vreede (2021) suggest re-examining the SDT to find how consumers respond differently in an AI-supported environment. Another recent review has urged incorporating consumer consumption values in digital marketing research to predict what digital technology attributes reshape consumption values (Tanrikulu, 2021). To address the literature gap in applying TCV within the ABM context, future studies should focus on categorizing customer-perceived values (e.g., functional, emotional) derived from different attributes (e.g., appearance, behavior) of ABM through the lens of TCV. Research further shows that the URT holds significant relevance within the context of ABM (SeoYoung Lee & Choi, 2017; Park et al., 2023). This theory suggests that the emotional exchange relationship between humans and avatars reduces uncertainty and facilitates more engaging emotional exchanges, such as fun and entertainment (Park et al., 2023). This emotional engagement aligns with the CET, which posits that as customer engagement increases, individuals are more likely to invest additional time and money, recognizing that the adopted technology is designed to fulfill both their functional and hedonic needs (Liu, Lim, Li, Tan, & Cyr, 2020).

Importantly, our findings reveal that several theories within the realm of ABM are closely connected to customer-perceived value. For instance, the CASA framework and social response theory highlight how customers may intuitively treat avatars as social entities, triggering perceived social (e.g., perceived social presence) and emotional (e.g., building trust and credibility) value components. Similarly, social presence theory emphasizes how avatars foster emotional values in digital environments, including perceived warmth, social presence, and interaction. Anthropomorphism theory, on the other hand, explains how avatars' perceived humanness boosts customers' emotional connection. Moreover, TAM underlines that the implementation of avatars should prioritize perceived ease of use and usefulness to enhance users' perceptions of functional value.

In contrast, the Uncanny Valley Theory advocates that when avatars appear almost human but not quite, they can evoke negative values, such as discomfort, reducing users' emotional connection and trust. Thus, we reckon it is crucial to thoroughly understand how theories related to ABM influence the perception of customer values, both positively and negatively. We recommend that future research delve deeper into this domain to uncover more nuanced insights into the theories applied and the value generated.

Our review also reveals a noteworthy theoretical gap in the interplay between avatar attributes, customer values, and customer responses. This is crucial for unveiling the attribute-value-outcome process, as customer-perceived values operate like a 'black box' within the buyer's mind (Lanzini & Tencati, 2023). Understanding and diagnosing customer minds and subsequent behavioral outcomes within the context of ABM necessitates further exploration of predictors and attributes to shed in-depth light on this process. Hence, we suggest further assessment of avatars' attributes to see how they impact consumer values. This examination would aid in the development of a potentially new attribute-value-outcome-linked theory.

6.2 Context

This section outlines future research directions based on multiple contexts. First, the findings of this review reveal that avatar's efficiency varies across industries based on their forms (i.e., embodiment and non-embodiment). In this regard, Miao et al. (2022) argued that embodied avatars (e.g., SK-II's YUMI) have realistic appearance (i.e., 3D), high cognitive intelligence, and can communicate with a human voice. Hence, the scholars concluded that these avatars are suitable for complex transactions and highly personalized services (i.e., skin care). On the contrary, avatars, such as Amazon's Alexa, with no anthropomorphic appearance, can be good at meeting 24/7 customer queries and exploring online content. From the synthesis of avatar-related studies, this review shows that various forms of avatars are utilized in different industries (e.g., apparel, education, electrical equipment, furniture, gaming, public health, restaurant, retail, shoes, soft goods, travel, and tourism). The findings of this review reveal that the extant literature is inadequate or scattered in providing a holistic view of industry-wise usage of avatars. Hence, future research studies on specific industries and products need to clearly explain the industrial context of avatar deployment and which forms of avatars are more suitable for what products.

Second, ABM needs to be explored from diverse industries and cultural settings, especially in emerging economies such as India, Malaysia, and Bangladesh. Importantly, scholars should emphasize Middle Eastern countries (e.g., Saudi Arabia, United Arab Emirates, Kuwait, etc.) considering their high per capita income and substantial opportunities for AI-based businesses in these regions. Besides, it would also be interesting to explore customer perceptions and behavioral intentions toward avatars in LDCs. Although AI exposure in LDCs is lower and growing steadily than in high-income and developed countries (Dlugatch, Georgieva, & Kerasidou, 2024), AI-enabled smartphones and easy Internet access might be the potential reason the ABM could progressively embark on these countries. Besides, cross-cultural investigation is needed as evidence suggests that consumer demand and attitudes toward avatars are expected to vary across cultures and countries (Jin & Eastin, 2023). Accordingly, future studies may explore how consumers' purchasing or service-taking behavior with avatars differs across developed, less developed, and emerging economies. Besides, the concepts of avatars and ABM are still emerging in developed and developing countries (Miao et al., 2022). To this end, we urge future research to examine how consumers perceive avatars, especially consumers who fear augmented technologies (e.g., AI) due to perceived risk and uncertainty in developing countries.

Third, existing research highlights that customer value perception is subject to variation among individuals and across different products (Sheth et al., 1991). Customers who are satisfied with a product or service today may become dissatisfied in the future. This phenomenon is also relevant in the realm of human-computer interaction, where the role of avatars is crucial (Garnier & Poncin, 2013; S. Kim et al., 2016). However, the current literature on ABM lacks a thorough discussion on how avatars can effectively persuade dissatisfied and frustrated consumers and what service recovery strategies could be implemented if avatars fail in their intended purpose.

6.3 Characteristics

This section outlines several key avenues for future research in terms of attributes, dimensions, determinants, and consequences to extend our knowledge and understanding of the characteristics of avatars and ABM.

First, the review synthesizes avatars' attributes from two perspectives (Table 3), namely appearance and behavior, to show how these anthropomorphic and humanoid drivers affect customers' diverse value sets and move toward behavioral outputs (e.g., use intention, satisfaction, attitudes, purchase intention, patronage intention). With humanoid embodiment (gender, voice, and hair) and cognitive intelligence, avatars are replacing the role of frontline employees (Epley et al., 2007; Waytz et al., 2010). Considering the importance of these key avatar dimensions, this review unveils that there is a paucity of extant literature about what dimensions of avatars' anthropomorphic appearances (e.g., facial expression) can evoke customers' anthropomorphic expectations (Miao et al., 2022). For instance, users may expect avatars they are interacting with to be realistic, cute, and intelligent. Hence, we recommend future research to investigate different dimensions of avatars' anthropomorphic appearances and how those dimensions effectively satisfy consumers' expectations.

Second, we have identified that many avatars have no human appearance (e.g., Alexa, Cortana, SILVIA) but possess anthropomorphic traits, such as name, gender, and cognitive intelligence like humans. Drawing on the findings of this review, we have seen scattered and isolated literature of ABM that compares these digital assistants, herein avatars, with anthropomorphic avatars. To address this gap, further study is suggested to determine if a virtual agent without an anthropomorphic appearance (e.g., Alexa and Cortana) can perform better or worse than an avatar with anthropomorphic entities (e.g., SK-II's YUMI).

Third, according to this review, very few studies have shed light on avatar attributes and the corresponding value aspects. It is important to note that avatar attributes significantly impact customers' perceived values (Butt et al., 2021; S. Kim et al., 2016). Many previous studies (Butt et al., 2021; J. Lin, Guo, Turel, & Liu, 2020; Tanrikulu, 2021) have emphasized exploring consumers' value perceptions in a digital environment. This review's findings show that most studies (e.g., Bialkova, 2023; Butt et al., 2021; Y.-T. Lin et al., 2021; Nowak et al., 2015; Sriwisathiyakun & Dhamanitayakul, 2022; Van Pinxteren et al., 2019; Yim, 2023) have investigated functional, social, and emotional value dimensions, while little is known about the epistemic and conditional values of avatars (Table 5). Among the reviewed studies, no study has elaborately and comprehensively illustrated the epistemic values of using avatars by consumers. These findings are novel and indicate research gaps that could be filled by conducting future research on epistemic values (e.g., novelty, curiosity, and knowledge) derived from avatar attributes. On the other hand, a few studies (Noble et al., 2022; Zhang et al., 2023) have emphasized incorporating conditional values (e.g., time, place, and occasion) in the digital context. For instance, Noble et al. (2022) have shown how the interaction between customers and different virtual agents (i.e., chatbots) was intensified during the COVID-19 pandemic due to social distancing and other health protocols. However, it is crucial to uncover how epistemic and conditional values strengthen avatar adoption and post-adoption behavior of consumers from marketing aspects, as these values are the initial antecedents affecting consumers' decision-making in product trials (Sweeney et al., 1996). Moreover, our review

revealed 21 different labels (Figure 3) used in ABM. This opens avenues for future research to look into customer value aspects from the perspective of different labels used in ABM.

Finally, this review shows that many studies have focused on user adoption-related factors like usage and adoption intention (Go & Sundar, 2019; SeoYoung Lee & Choi, 2017; Qiu & Benbasat, 2009). However, scant attention has been paid to consumer and marketing-related factors, such as customer engagement, enjoyment, satisfaction, word of mouth, brand recommendation, and purchase behavior (Crollic et al., 2022; Gonzales-Chávez & Vila-Lopez, 2021; Yim, 2023). Notably, it is not yet evident in the avatar literature to what extent AI-augmented avatars foster positive (or negative) attitudes and trigger relevant outcomes (e.g., product or service purchasing or rejection). These factors may provide more comprehensive insights to predict customer behavior and formulate customer-centered strategies from marketers' points of view.

6.4 Methods

This review reveals that the leading methods utilized for research on ABM are quantitative, including experimental and cross-sectional designs. The findings of this review have shown that there is no longitudinal research, a type of correlational research that typically entails observing subjects over an extended period, in contrast to a cross-sectional study, which gathers data at a single point in time (Rindfleisch, Malter, Ganesan, & Moorman, 2008). In the context of ABM, it is crucial to assess avatar users' behavioral changes in usage, satisfaction, awareness, loyalty, and trust to adjust marketing strategies over time. Hence, there is enough scope for future researchers to use longitudinal research in the ABM domain.

The findings also show that most researchers employed a primary survey, preferably on young customers. Future studies are recommended to be conducted on other age groups (e.g., mid or older) to identify the differences in response and perception that vary with age. Besides, we have found that many researchers considered different forms of avatars (static vs. animated) to collect data, primarily for experimental research. In further research, avatars and customers can be simultaneously used as samples, providing a more holistic understanding of how avatar reflects on customer response.

Although many investigations have used qualitative and experimental approaches, mixed-method approaches have rarely been used. Research demonstrates that mixed methods provide a clear understanding of the contexts (the what), conceptualizations, norms, and values (the why or how) in a single research question, combining two different approaches (qualitative and quantitative) (Harrison III, 2013). Thus, we suggest using qualitative and quantitative research tools to better understand the context of ABM across countries. Additionally, there is a scope for conducting empirical research through a hybrid analytical approach (e.g., integration of PLS-SEM-ANN-fsQCA). Integrating multiple analytical approaches enriches the rigor and depth of examining a particular research domain. In the context of ABM, this may allow researchers to detail and nuance the interpretation of their findings and draw conclusions for further study.

Table 14 below delineates the gaps and future research agenda flagged in sections 6.1-6.4.

1 **Table 14.** Gaps and agenda for future research

Topic	Research Gaps	Future Research Agenda
Theory	▪ New and less explored theories need to be introduced	✓ What marketing theories/frameworks/models can be applied to ABM regardless of technology acceptance-based paradigms? ✓ How can human-computer interaction and value adoption-based theories collectively shed light on consumers' consumption values? ✓ How do theories related to ABM influence the perception of customer values, both positively and negatively? ✓ What attributes/traits of avatars can impact consumer perceived values based on a potentially new attribute-value-outcome-linked theory? ✓ What disciplines and research domains can help marketing scholars develop theories on ABM?
Context	▪ Unexplored or under-explored industries require attention and further exploration. ▪ Apart from the highly industrialized economies (e.g., United States, China, Germany, European Union, South Korea), less developed and emerging economies (e.g., India, Bangladesh, Malaysia) could be included for further investigation.	✓ Which form of avatars (embodiment vs. non-embodiment) can be highly efficient and more expert in specific industries? ✓ How do consumer perceptions of avatars vary across industries and cultures? ✓ To what extent does the purchasing or service-taking behavior of consumers of the developed countries using avatars vary from the less developed and emerging economies? ✓ In which industry can human-computer collaborations be more optimized? ✓ Where are human employee and consumer interactions more crucial (e.g., convincing dissatisfied and frustrated consumers), and will avatars take a leading service role there? ✓ What kind of service recovery strategies can be initiated if the avatars are a failure? ✓ How do consumers perceive avatars where these technologies are relatively new, and consumers fear augmented technologies (e.g., AI) due to perceived risk and uncertainty?

Characteristics	▪ Various dimensions of avatars' form and behavioral realism need to be examined from marketing aspects. ▪ Epistemic and conditional values derived from avatars require further investigations.	✓ What dimensions of avatars' anthropomorphic appearances (e.g., facial expression, movement with 3D dimension, and other human characteristics) can elicit the highest customers' anthropomorphic expectations? ✓ How effectively can a virtual agent without an anthropomorphic appearance, like Alexa, perform better than an avatar with anthropomorphic entities, such as SK-II's YUMI? ✓ To what extent can AI augmentation of avatars create the best positive (or negative) attitude and trigger consumer outcomes (e.g., product or service purchasing or rejection)? ✓ What epistemic values (e.g., curiosity and knowledge) drive consumers to adopt and use avatars in decision-making? ✓ How do conditional values (e.g., time, place, and occasion) strengthen avatar adoption and continuance behavior? ✓ Do epistemic and conditional values have a short or long-term impact on consumer behavior in the context of ABM?
Methodology	▪ Scope for longitudinal research ▪ Need for mixed method research (i.e., the combination of qualitative and quantitative research) ▪ Scope for hybrid analytical approach (e.g., integration of PLS-SEM-ANN-fsQCA) for empirical research	✓ How can longitudinal research assess changes in behaviors, satisfaction, awareness, and other behavioral outcomes? ✓ What exploratory or qualitative research (e.g., focus group, in-depth interview, or combination) is necessary to investigate the role of avatars in human-computer interaction of different age groups (elderly vs. young consumers)? ✓ How can quantitative research prove the impact of avatars on consumers' perceptions driving toward purchase and post-purchase behavior? ✓ How can mixed method research collectively explore and examine consumer behavior derived by avatars in less or underexplored contexts (e.g., industry and country)?

✓ How can a hybrid analytical approach ensure the robustness of insights into ABM research?

Source: Authors' own work

7. Implications and Conclusions

7.1 Key Implications

This review offers valuable practical insights for marketers and industry practitioners.

First, avatar deployment in the ABM context has proven to be crucial for marketers due to its ability to yield various functional values for customers. Expertise, a dominant functional value yield from avatars, is deemed quite indispensable for marketers as it enhances customer perception of other functional benefits (e.g., customization, convenience, and personalization). In case of sensitive and complex information, for instance, expert avatars can answer detailed inquiries and provide personalized recommendations (Miao et al., 2022), reducing customers' time and effort costs/sacrifices. Similarly, marketers and industry practitioners should prioritize enhancing customers' perceived ease of use and usefulness of avatars. When customers find avatars intuitive to interact with and view as beneficial, they are more inclined to engage with a particular brand or firm's website (Chattaraman et al., 2019; Van Pinxteren et al., 2020). This increased engagement can lead to higher customer traffic and improved conversion rates.

Second, the social values derived from avatars are also pivotal for marketers and industry practitioners to effectively engage customers in active interactions with avatars. By attributing human-like characteristics (e.g., humanly interaction skills), they can create more relatable and personable social interactions between customers and avatars (Schuetzler et al., 2018; van Pinxteren et al., 2023). This can enhance customers' sense of social presence, which fosters a deeper social bonding in human-to-avatar interaction (Liew et al., 2017; Verhagen et al., 2014). In such cases, marketers and avatar designers should embody aspirational social traits or attributes with avatars to encourage customers to align their behaviors and preferences with those represented by the avatars.

Third, our review shows that the emotional values related to the ABM context are well-explored in academia. It suggests marketers should actively highlight the emotional values avatars yield while communicating with customers. By leveraging anthropomorphic design elements, such as facial expressions, gestures, and voice, into avatars, marketers and designers can encourage customers to perceive avatars as more credible and friendly (Keeling et al., 2010; Liew et al., 2017). For instance, Brave et al. (2005) found that embodied conversational agents' likeability and trustworthiness evoke greater perceived caring and felt support. This is reflected in customers' behavioral outcomes. For example, Yim (2023) noted that interactivity in chatbots garners users' perception of empathy, lightening customer anger and lowering negative word-of-mouth intentions.

Fourth, although the current review presents epistemic values still latent in the extant ABM literature, avatars can be crucial in enhancing the learning experience and satisfying customers' curiosity and desire for knowledge. Especially for new customers, avatars' personalized, real-time information and feedback can make complex product or service content

1 more accessible and easier to understand. This could help marketers convert new customers
2 into loyal ones.

3 Fifth, the findings of this review show that trust and privacy are the two fundamental
4 conditional value aspects that can guide a successful avatar deployment. Research indicates
5 that conditional values directly influence customer adoption and post-adoption behaviors (e.g.,
6 enjoyment and purchase intention) (Masri, Ruangkanjanases, & Chen, 2020; Song & Shin,
7 2024; Van Pinxteren et al., 2019). Building trust, in particular, is crucial because customers
8 need to believe that the avatars will provide accurate and reliable information, maintain
9 confidentiality, and act in their best interest. It may involve designing avatars with transparent
10 communication, consistent behavior, and a clear demonstration of expertise. Privacy is equally
11 important, as customers are more likely to engage with avatars if they feel their personal
12 information is secure and handled respectfully (Youn, Hwang, Zhao, & Kim, 2023; Zhang et
13 al., 2023). Ensuring robust data protection measures and giving users control over their
14 information can increase their comfort, ease anxieties related to data privacy (sources of
15 potential costs or sacrifices), and enhance their willingness to engage with avatars.

16 The above discussions clearly signify the practical marketing implications of this
17 review's findings, suggesting that effective deployment of avatars can lead to enhanced
18 customer engagement by providing meaningful interactions that meet multiple functional,
19 social, emotional, and epistemic needs of the consumers while ensuring trust and privacy. This
20 enhanced customer engagement and trust can foster long-term relationships with the brand,
21 resulting in strong brand loyalty.

22 23 **7.2 Concluding Remarks**

24 This review investigates and synthesizes avatar and ABM corpus from customer value aspects
25 using the TCCM framework. It addressed four primary research objectives: (1) elucidating the
26 concepts of avatars and ABM, (2) examining the progression of ABM research in terms of (a)
27 theoretical frameworks, (b) research contexts, (c) characteristics—mainly focusing on avatars'
28 features and value-based aspects—and (d) methodologies, (3) proposing a conceptual
29 framework drawing on the findings of 2c, and (4) identifying future research directions to
30 enhance the understanding and application of ABM. To do so, we reviewed a total of 57
31 academic publications published since 2005. The output of the publication trends revealed a
32 rising trajectory since the 2020s. We attribute this to the increased use of technology in
33 consumer interactions necessitated by social distancing during the COVID-19 pandemic. In
34 fact, the trend is upward in the post-pandemic era due to firms' widespread deployment of
35 avatars (chatbots, conversational agents, and service agents) by businesses, advancing the field
36 of research under review. Besides, this review conceptualizes avatars and ABM through the
37 lens of marketing and value perspective, which is still lacking in the extant literature. In this
38 respect, we propose an inclusive ABM definition drawing on this study's findings and
39 discussions: *ABM is the strategic approach of creating and deploying virtual characters, or*
40 *avatars, with varying levels of form and behavior in an online environment to enhance*
41 *consumer engagement and drive marketing outcomes by leveraging various customer values*
42 *- such as functional, social, emotional, epistemic, and conditional values.*

1 Furthermore, using the TCCM framework, we conducted an in-depth content analysis to
2 evaluate dominant theories, emerging contexts, key characteristics (values derived from
3 avatars), and popular research methods from the most cited, recent, and highly ranked journal
4 articles on avatars and ABM. Our study explicitly underlined the independent, moderating,
5 mediating, and outcome variables grounded in customer value dimensions, including
6 functional, social, emotional, epistemic, and conditional values. Lastly, we draw future
7 research trajectories, followed by critical insights and implications for marketing practitioners.

8 Nonetheless, this study has some limitations. First, though we have thoroughly elucidated
9 the consumption values generated by avatars, future researchers could extend this inquiry by
10 investigating which types of avatars (e.g., virtual/digital assistants, chatbots, autonomous
11 agents) are most effective in generating specific customer values (e.g., social, emotional).
12 Second, we used three major databases (i.e., WoS, Scopus, and Google Scholar); however, to
13 add more rigor, future research endeavors may use other databases, including PsycINFO and
14 EBSCO. Third, this review only considered the articles written in English and published
15 between 2005 and 2023, meaning relevant articles written in other languages may have been
16 excluded. Fifth, excluding manuscripts under review or still in progress overlooks a specific
17 portion of the research landscape regarding ABM. As the domain continues to evolve, there
18 remains ample opportunity for additional seminal works to advance our understanding further.

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Appendix A: Summary of the reviewed articles

Authors	Objective	Context	Avatar Label	Name of the Journal	Industry	Country	Theory	Research Design	Key Findings
(Al-Natour et al., 2011)	Examine how consumer beliefs are affected by perceived personality similarity (PPS) and perceived decision process similarity (PDPS).	Online shopping for a laptop computer	Automated Shopping Assistant	Journal of the Association for Information Systems	Electrical Equipment	Not Specified	CASA Framework	Quantitative (survey, n=181)	- Users' relational, social, and emotional beliefs to adopt automated shopping assistant are predicated by PDPS, and the effects of PPS are mostly mediated via PDPS. - Perceived similarity generally has greater effects than the effects of the individual assessments of the user's and the assistant's personalities and decision processes.
(T. W. Bickmore et al., 2016)	Outline a conversational search engine interface that helps people with minimal computer literacy and health literacy find and learn about online clinical trials.	Cancer patients identifying and learning about clinical trials on the internet	Embodied Conversational Agent	Journal of Medical Internet Research	Public Health	Not Specified	Not Specified	Quantitative (survey, n=89)	Based on self-reported satisfaction ratings ranging from 1 to 7, all participants expressed greater pleasure with the conversational interface compared to the traditional Web form-based interface.
(Brave et al., 2005)	Examine the psychological impacts of emotion in agents upon users.	Casino-style blackjack game	Embodied Conversational Agent	International Journal of Human-Computer Studies	Gaming	Not Specified	CASA Framework	Quantitative (survey, n=96)	It was discovered that when an agent exhibited empathy, users rated them higher on likeability and trustworthiness and higher on perceived caring and felt support.
(Chattaraman et al., 2019)	Examine if older consumers with low versus high Internet competency benefit differently from the social-versus-task-oriented interactions of virtual shopping assistants in terms of the social, functional, and behavioural intended outcomes in an online buying task.	Online purchase of athletic shoes by older consumers	Digital Assistant	Computers in Human Behavior	Shoes	USA	Social Response Theory	Quantitative (survey, n=121)	The social, functional, and behavioural intended results were significantly impacted by the relationship between users' Internet proficiency and the conversational style of the digital assistant.
(Derrick & Ligon, 2014)	Emphasize the theoretical foundations of human impression management strategies and establish a connection between them and the ongoing study of embodied conversational agents.	Avatar-based screening checkpoint experiment	Embodied Conversational Agent	Computers in Human Behavior	Not Specified	USA	CASA Framework	Quantitative (survey, n=88)	Gender differences influenced the changes in users' perceptions caused by the impression management approaches.

(Burgoon et al., 2016)	Analyze the effects of various interface types that either meet or violate user expectations on the accuracy of recall, social judgements, communication process, and ability to influence in human-to-embodied agents communication (HtEAC).	Online communication with humanlike agents	Embodied Conversational Agent	International Journal of Human-Computer Studies	Not Specified	USA	Expectancy Violations Theory	Quantitative (survey, n=70)	The findings indicate that there may be more noticeable effects on the HtEAC process and associated outcomes when embodied agents deviate from expectations.
(D'Mello et al., 2010)	Estimate that oral tutorial conversations will enhance learning more than written ones.	Computer literacy learning with a fully automated computer tutor	Autotutor	Human-Computer Interaction	Education	Not Specified	Social Agency Theory	Quantitative (survey, n=24)	Both modalities' learning gains were comparable to or higher than those of a no-instruction control.
(Go & Sundar, 2019)	Evaluate the usability of anthropomorphic visual cues and determine the main elements that affect a chatbot's humanness.	Online digital camera purchase	Chatbot	Computers in Human Behavior	Electrical Equipment	Not Specified	CASA Framework	Quantitative (survey, n=187)	- When a chatbot has a high degree of message interactivity, it compensates for its lack of anthropomorphic visual cues. - The user's expectations for interaction are increased when they recognize the agent as human.
(Holzwarth et al., 2006)	Evaluate the impact of the avatar sales agent on customer satisfaction, attitudes, and intent to buy.	Online purchase of shoes that are customizable via online consultation	Avatar	American Marketing Association	Shoes	Germany	Social Response Theory	Quantitative (survey, n=400)	- Avatar sales agents increase customer satisfaction with the retailer, improve customer perception of the goods, and increase sales. - At low degrees of product participation, an attractive avatar proves to be a more effective sales representative; but, at high levels of product involvement, an expert avatar outperforms the former.
(Keeling et al., 2010)	Examine if, given the moderating effects of product/service type, avatars with social- or task-oriented communication styles add to user trust and patronage intentions.	Online experiments of retail websites selling books/CDs and travel insurance	Avatar	Journal of Business Research	Retail	Not Specified	CASA Framework	Quantitative (survey, n=636)	- Especially for search goods/services, task-oriented communications help build trust, which in turn helps with intentions to patronize. - Social media communications also have a direct impact on patronage intentions and trust, especially when it comes to credibility goods and services.
(Singh et al., 2021)	Analyze the impact of social presence while elucidating the moderating effects of identity threat and eeriness.	Service robots in an event setting	Service Robot	Journal of Hospitality and Tourism Management	Tourism	USA	Not Specified	Quantitative (survey, n=85)	Attendees at the event expressed greater satisfaction with service employees (SE) compared to humanoid service robots (HSR); the association between satisfaction and service provider type

									(HSR versus SE) was mediated by social presence. ▪ The study findings suggest that eeriness and identity threats function as moderators, as they considerably reduce the indirect impact of service provider type (HSR vs. SE) on satisfaction through social presence.
(K.-M. Kim et al., 2007)	Make a proposal for a system that leverages semantic Bayesian networks to deduce user intentions from Bayesian networks and semantic data.	Online electronic product (e.g., cellular phone) information search	Intelligent Conversational Agent	Information Processing & Management	Electrical Equipment	China	Not Specified	Mixed Method (focus group and survey, n=30)	▪ Supporting flexible conversational bots requires handling context and ambiguity.
(SeoYoung Lee & Choi, 2017)	Examine how communication characteristics and the relationship between the user and the conversational agent influence user satisfaction and intention to utilize an interactive movie recommendation system.	Interactive movie recommendation system	Conversational Agent	International Journal of Human-Computer Studies	Soft goods	Not Specified	CASA Framework ; Media Equation Theory; Uncertainty Reduction Theory	Quantitative (survey, n=48)	▪ The study found that while the main impacts of self-disclosure and reciprocity on user satisfaction were both significant, their interaction was not. ▪ There is a substantial association between communication factors and user satisfaction that is mediated by perceived trust and enjoyment of interactions. ▪ Reciprocity is a more reliable indicator of the development of a relationship between an agent and a user than self-disclosure.
(Mimoun & Poncin, 2015)	Examine the potential benefits of using an embodied conversational agent for consumers' hedonic and utilitarian views of shopping value and the effects on repurchase intentions and website satisfaction.	Furniture purchase with Anna on Ikea's website	Embodied Conversational Agent	Journal of Retailing and Consumer Services	Furniture	France	Technology Acceptance Model	Quantitative (survey, n=576)	▪ The impacts of playfulness and social presence on satisfaction and behavioural intentions are mediated by hedonic value, while the effects of decision quality are mediated by utilitarian shopping value.
(Derrick et al., 2011)	Expand on the theory of interpersonal communication to identify four fundamental SPECIES agent design concepts.	Automated kiosk-based interviews	Embodied Conversational Agent	AIS Transactions on Human-Computer Interaction	Not Specified	European Union	Not Specified	Quantitative	▪ SPECIES agents can be used to augment human tasks.
(Von der Pütten et al., 2010)	Give an answer to the question of whether humans respond to agents and avatars in the same ways.	Interactions involving personal questions	Embodied Conversational Agent	Computers in Human Behavior	Not Specified	Not Specified	Threshold Model of Social Influence;	Quantitative (survey, n=83)	▪ The belief of interacting with an avatar or an agent hardly resulted in differences regarding the evaluation of the virtual character or behavioral reactions, whereas higher behavioral realism affected both.

							Ethopoeia Concept		
(Qiu & Benbasat, 2009)	Examine how implementing anthropomorphic interfaces - voice output and humanoid embodiment - affects users' perceptions of their social relationships with software- and technology-based artifact intended for usage in electronic commerce situations.	Online recommendation system for complex and attribute-intensive digital cameras	Anthropomorphic Interface Agent	Journal of Management Information Systems	Electrical Equipment	Not Specified	CASA Framework ; Social Agency Theory	Quantitative (survey, n=25 and n=70)	The employment of humanoid embodiment and human voice-based communication greatly influences users' perceptions of social presence. This enhances users' perceptions of trustworthiness, enjoyment, and ultimately, intentions to utilize the agent as a decision aid.
(Schuetzler et al., 2018)	Expand on ideas of social desirability, self-disclosure, and social presence to elucidate the ways in which conversational agent (CA) anthropomorphism influences the sharing of personally sensitive data.	Responses to sensitive questions to a person vs. a CA vs. Online survey	Embodied Conversational Agent	Decision Support Systems	Not Specified	USA	Social Presence Theory	Mixed Method (in-depth interview, n=20; online survey, n=31)	More socially desirable reactions are elicited from participants by CAs with stronger conversational skills; embodiment has a less significant effect.
(Verhagen et al., 2014)	Examine how virtual customer support representatives incorporate traditional customer care components into the online environment. This could positively impact customer satisfaction by generating social reactions and a sense of customization.	Inquiries about online mobile phone service	Virtual Customer Service Agent	Journal of Computer-Mediated Communication	Electrical Equipment	Not Specified	Social Response Theory	Quantitative (survey, n=296)	The ability of friendliness and competence to be applied across channels determines social presence and personalization.
(Wang & Russo, 2007)	Give a theoretical outline in relation to the functions of destination marketing systems (DMS).	Online travel information service	Virtual Agent	Journal of Vacation Marketing	Travel	USA	Social response theory	Quantitative (survey, n=260)	Examining the applications in the four elements of DMS indicates that DMS are still in the early phases of development, illustrating a hierarchical progression of usage and sophistication.
(Yokotani et al., 2018)	Discover the benefits of virtual agents compared to clinical psychologists during comprehensive mental health interviews.	Mental health interviews	Virtual Agent	Computers in Human Behavior	Public Health	Japan	Threshold Model of Social Influence	Mixed Method (survey, n=55; interview, n=28)	Respondents were more comfortable sharing delicate, sex-related symptoms (e.g., menstruum and body weight) with virtual agents exhibiting lower behavioral realism compared to actual experts
(Y.-T. Lin et al., 2021)	Examine customers' satisfaction with trust in the Virtual Salesperson (VS) that contributes to	Customer relationship management	Virtual Salesperson	Journal of Service Research	Not Specified	Not Specified	Self-Determination Theory; Social	Quantitative (survey, n=339 and n=381)	VS designs that include a high level of automated social presence (ASP) can mitigate the adverse effects of conflict.

	customer willingness to adhere to the recommendation provided by the VS, particularly in situations when there is a conflict in recommendations.						Presence Theory		▪ However, ASP minimizes the adverse consequences of conflict for avatars with a low cuteness score (vs. High cuteness).
(Gonzales-Chávez & Vila-Lopez, 2021)	Identify the key attributes that a commercial avatar promoting a leisure service must possess in order to be likable, knowledgeable, credible, and attractive to encourage millennials to accept the avatar, evoke emotions, generate buying intentions, and stimulate electronic word of mouth (eWOM).	Designing the best avatar to reach millennials: gender differences in a restaurant choice	Avatar	Industrial Management & Data Systems	restaurant	Peru	Not Specified	Quantitative (survey, n=104)	▪ Avatars' design attributes and the desired effects were related. ▪ An expert avatar proved more effective than an attractive or popular one, particularly among feminine targets.
(Keng & Liu, 2013)	Examine the impact of verbal and visual stimulation in online advertising on the cognitive process of internet users, and gather useful information for effectively aligning advertising aspects with each other.	Avatar and self-referencing really increase the effects of online 2-d and 3-d advertising	Avatar	Computers in Human Behavior	Not Specified	Not Specified	Not Specified	Quantitative (survey, n=1514 and n=687)	▪ Participants select medium-complex advertising comprising "3D advertising elements with an avatar" or "2D advertising elements with self-referencing": ▪ High-sensation seekers and low-need-for-cognition viewers prefer the former, whereas low-sensation seekers and high-need-for-cognition viewers prefer the latter.
(Van Pinxteren et al., 2019)	Investigate to determine the most effective technique for promoting trust: traits that resemble those of humans in terms of physical appearance or social behavior.	Drivers of trust in humanoid robots	Humanoid Robots	Journal of Services Marketing	Not Specified	Not Specified	Anthropomorphism Theory	Quantitative (survey, n=114)	▪ The level of interaction comfort influences the impact of gaze cues on anthropomorphism; specifically, when comfort is low, gaze signals enhance anthropomorphism, but when comfort is high, they diminish it. Anthropomorphism strongly influences trust, intention to use, and pleasure.
(Nowak et al., 2015)	Evaluate the CASA framework along with Objectification Theory to forecast how characteristics such as sexism impact the way virtual representations are seen and the ascription of both the source and the message.	Inferences about avatars: sexism, appropriateness, anthropomorphism, and the objectification	Avatar	Journal of Computer-Mediated Communication	Apparel	USA	CASA Framework	Quantitative (survey, n=397)	▪ Higher levels of sexism were associated with less human and trustworthy representations. Clothing appropriateness and anthropomorphism affected source trust and message clarity.

(Mull et al., 2015)	Analyze how customers perceive the use of various forms of 3D animated avatars as salesmen, focusing on their credibility, homophily, attractiveness, and intention to engage.	3d avatars as online salespeople	Avatar	Journal of Fashion Marketing and Management	Retail	Not Specified	Social Response Theory	Quantitative (survey, n=141)	▪ The avatar type significantly influences the perception of credibility, homophily, and attractiveness. Additionally, the intention to interact with the avatar is influenced considerably by credibility, homophily, and attractiveness.
(Liew et al., 2017)	Examine the impact of a non-interactive talking avatar on the perceptions of social presence, credibility, website trust, and patronage intention in an online store.	Effects of a non-interactive talking avatar on social presence, credibility, trust, and patronage	Avatar	Human-centric Computing and Information Sciences volume	Not Specified	Asian Countries	Social Presence Theory	Quantitative (survey, n=116)	▪ The presence of the non-interactive conversing avatar significantly increased the perceived social presence. ▪ The avatar's presence positively impacted the trust and patronage intention of male participants on the website; however, it negatively impacted the perceptions of information veracity and website patronage intention of female participants.
(Butt et al., 2021)	Examine the influence of perceived ease, usefulness, advantage, compatibility, enjoyment, customization, and interactivity on the intention of players to engage with AI-powered avatars.	Avatars in shaping the gamers' intention	Avatar	Psychology & Marketing	Gaming	China	Technology Acceptance Model	Quantitative (survey, n=500)	▪ The findings provide substantial support for the hypothesized relationships regarding the adoption of an AI-powered avatar and the psychological association of consumers.
(Hasan et al., 2021)	Examine the impact of consumer trust, interaction, perceived risk, and novelty value on brand loyalty for AI-supported devices.	Consumer trust and perceived risk for voice-controlled artificial Intelligence	Voice Assistant	Journal of Business Research	Online Marketing	Not specified	Not specified	Quantitative (Survey, n=675)	▪ Perceived risk has a significant negative impact on brand loyalty, while other factors positively influence brand loyalty. ▪ The novelty value of using Siri was found to be moderated by brand involvement and consumer innovativeness, with its influence being stronger for consumers who are less involved with the brand and more innovative.
(Gelbrich et al., 2021)	Determine the influence of emotional support provided by digital assistants in technology-mediated services positively impacted customer satisfaction and behavioral persistence	Emotional support from a digital assistant in technology-mediated services	Digital Assistant	International Journal of Research in Marketing	Online Marketing	Not Specified	Not Specified	Quantitative (survey, n=77)	▪ The rise in satisfaction is driven by the perceived warmth of the digital assistant, while the increase in persistence is influenced by a chain of effects involving perceived warmth and resulting satisfaction.
(Fernandes & Oliveira, 2021)	Investigate the key factors that drive consumer acceptance and adoption of digital voice	consumers' acceptance of automated	Voice Assistant	Journal of Business Research	Online Marketing	Not Specified	Service Robot	Quantitative (survey, n=238)	▪ Functional, social, and relational factors drive adoption, with crossover effects between these elements; this research

	assistants in service encounters, focusing on the underlying motivations and barriers.	technologies in service encounters					Acceptance Model		explores the moderating roles of experience and the need for human interaction.
(M. Sharma et al., 2022)	Evaluate the influence of digital assistant attributes on the purchasing intention (PUI) of millennials.	Purchase intentions of millennials	Digital Assistant	Information Systems Frontiers	Retail	India	Uncanny Valley Theory; Social Presence Theory	Quantitative (survey, n=345)	- Attributes of digital assistants can boost purchasing intentions among millennials, particularly through perceived interactivity and anthropomorphism. - Additionally, gender was found to significantly moderate the relationship between perceived interactivity and purchasing intention.
(Crolic et al., 2022)	Explore anthropomorphism's impact on customers' responses to chatbots in service environments.	Anthropomorphism and anger in customer-chatbot interactions	Chatbot	Journal of Marketing	Not Specified	Not Specified	Anthropomorphism Theory	Quantitative (survey, 1st study-n=101, 2nd study-n=197, 3rd study-n=419, 4th study-n=192, 5th study-n=31)	Chatbot anthropomorphism has a negative effect on customer satisfaction, overall firm evaluation, and subsequent purchase intentions when customers engage in a chatbot-led service interaction in an angry emotional state.
(Wienrich et al., 2022)	Examine the extent to which conversational entities replicate human-human interactions.	The external appearances and the characteristics that people associate with voice assistants	Smart Speaker	Frontiers in Computer Science	Not Specified	Not Specified	Not Specified	Quantitative (survey, n=60)	The most frequent associations were between human beings and (humanoid) robots, and they were rated as being intelligent, conscientious, amiable, and trustworthy.
(Riva et al., 2022)	Explore whether individuals who are presented with distinct tasks (objective versus subjective) may be more susceptible to the information provided by an AI or another human.	Social influences of an artificial intelligence-supported virtual agent	Ai Virtual Agent	Acta Psychologica	Not Specified	Not Specified	HABA-MABA framework,	Quantitative (survey, 1st study-n=156, 2nd study-n=102)	The results indicated that the AI's responses were more closely replicated by the participants than the human responses.
(del Valle-Canencia et al., 2022)	Examine the design attributes of an avatar that functions as a virtual assistant in educational settings.	The emotions effect on a virtual character's design	Avatar	Frontiers in Computer Science	Education	Spain	Not Specified	Qualitative (in-depth interview, n=69)	- Including other bodily parts, their spatial orientation, and contextual elements facilitates effective emotional communication. - The results also emphasize the importance of considering the complexity of facial gestures and variations in relation to the

									vertical axis and dimensions of movement when designing a virtual character.
(Brinkschulte et al., 2022).	Investigate the perspectives of conversational agents who are socially intelligent.	Perspectives on socially intelligent conversational agents	Conversational Agent	Multimodal Technologies and Interaction	Not Specified	Not Specified	Social Response Theory	Qualitative (Interview, n=121)	The results demonstrate 14 unique characteristics of social intelligence, which are categorized into distinct levels of consensus, maturation, and abstraction. These characteristics may be deemed pertinent and can aid in the definition and subsequent development of socially intelligent conversational agents.
(Noble et al., 2022)	Assess the efficacy of the Mental Health Intelligent Information Resource Assistant in guiding healthcare workers and their families in the Canadian provinces of Alberta and Nova Scotia by providing pertinent information on mental health issues, services, and programs that are tailored to individual needs.	Artificial intelligence-guided mental health resource navigation chatbot for health care workers	Chatbot	JMIR Research Protocols	Public Health	Not Specified	Not Specified	Quantitative (survey, n=747)	Chatbots offer novel and thrilling opportunities to address substantial voids in providing mental health care services, mitigate stigma barriers, and enhance the health outcomes of patients and the integration and efficacy of the mental health system.
(Sriwisathiyakun & Dhamanitayakul, 2022)	Examine the potential of an intelligent conversational agent to improve digital literacy among senior citizens in Thailand.	Digital literacy with an intelligent conversational agent for senior citizens	Conversational Agent	Education and Information Technologies	Education	Thailand	Not Specified	Mixed Method (focus group, n=10; survey; n=422)	The Chatbot innovation was exhaustive in content and functionality, artistically appealing, and simple to access, making it convenient to request operations. It also enhanced digital literacy skills by facilitating access, analysis, evaluation, participation, and action.
(Nelekar et al., 2022)	Evaluate the efficacy of embodied conversational agents in alleviating academic stress at an Indian university (ARU) during the COVID-19 pandemic.	Embodied conversational agents for managing academic stress	Embodied Conversational Agent	British Journal of Educational Technology	Education	India	Not Specified	Quantitative (survey, n=61)	- Stress was decreased across all student groups, with various causes suggested. - Moreover, the students demonstrated trust, a strong working relationship with the conversational agent, and a determination to modify their behavior in response to all explanations.
(Moldt, Festl-Wietek, Mamlouk, & Herrmann-Werner, 2022)	Evaluate a chatbot's efficacy in gauging medical students' stress levels during everyday conversations and determine the primary need for considering a chatbot as a conversational companion using recognized	Medical students' perceived stress levels by comparing a chatbot-based approach	Chatbot	Digital Health	Education	Not specified	Not Specified	Quantitative (survey, n=136)	Specific functional and technological criteria have a substantial influence on the predicted use and success of the chatbot.

	stress assessment tools, such as the Perceived Stress Questionnaire (PSQ20).								
(B.-S. Kim & Seo, 2022)	Propose a framework for an intelligent agent information service that utilizes digital human and deep learning technologies.	Intelligent digital human agent service with deep learning face recognition	Digital Human Agent	IEEE Access	Not Specified	South Korea	Not Specified	Quantitative (survey, n=2000)	Advanced methods, such as Graph Neural Network (GNN), are necessary for future research to represent interpersonal relevance graphs more analytically.
(Paay et al., 2022)	Examine the efficacy of Digital Personal Assistants (DPAs) in promoting individuals' physical exercise inside their own homes.	Digital personal assistants to persuade people to exercise	Digital Personal Assistant	Behaviour and Information Technology	Public Health	Not specified	Not Specified	Quantitative (survey, n=48)	DPAs has the capacity, based on their existing technological and responsive skills, to influence individuals to enhance their physical activity levels at home. This may be achieved via Suggestions to motivate physical exertion, Virtual Rewards to foster endurance, and Praise to instil confidence in newcomers.
(Bialkova, 2023)	Examine the factors that determine the efficacy of chatbots and comprehend the functionality and enjoyment that are emerging as critical drivers of satisfaction.	Optimized interaction with chatbot	Chatbot	International Journal of Human-Computer Interaction	Online Marketing	European Union	Social Presence Theory	Quantitative (survey, n=40)	- The functionality of a chatbot is contingent upon the quality, accuracy, and competence of the information. - Social presence and personal care improved the perception of interactivity and the delight of interacting with the chatbot.
(Yim, 2023)	Analyze the "native state" of two-way communication between humans and chatbots.	Effect of AI chatbot's interactivity on consumers' negative word-of-mouth intention	Chatbot	International Journal of Human-Computer Interaction	Retail	USA	Social Presence Theory	Quantitative (survey, n=300)	Chatbots effectively evoke users' perception of empathy through social and message interactivity, alleviating customer wrath and reducing deleterious word-of-mouth (WOM) intentions.
(Brendel et al., 2023)	Understand user aggression towards Conversation Agents (CAs) better.	The paradoxical role of humanness in aggression towards conversational agents	Conversational Agent	Journal of Management Information Systems	Not Specified	Germany	Anthropomorphism Theory	Quantitative (survey, n=175 and n=201)	- Aggression is exacerbated by frustration with errors, and individuals with a higher impulsivity are more likely to become aggressive when frustrated. - The results also indicate that users' antagonism toward CAs is influenced by three pathways through which perceived humanness is mediated.

(Weber et al., 2023)	Employ a participatory approach to co-designing and developing a nutrition chatbot for elderly individuals within a design case study.	Participatory design and evaluation of a nutrition chatbot for older adults	Chatbot	i-com	Public Health	Not specified	Not Specified	Qualitative (focus group, n=15)	It illustrates the long-term use of a chatbot in nutrition, the design implications that arise for the development of nutrition chatbots, and the feasibility of a participatory design approach to the design, evaluation, and development of nutrition chatbots.
(Na et al., 2023)	Evaluate the impact of emotional attachment to virtual influencers on attitudes toward virtual influencers and the self-congruity of virtual influencers and users, including their actual and ideal selves.	Effect of self-congruity on attitudes toward virtual influencers	Virtual Influencer	International Journal of Human-Computer Interaction	Online Marketing	South Korea	Self-Congruity Theory	Quantitative (survey, n=344)	Significant effects of the real self-congruity between virtual influencers and users were seen on emotional attachment, particularly when virtual influencers were categorized into exterior and interior images. Moreover, the alignment between the mental representations of the virtual influencers and the user's desired self-congruity had a significant impact on emotional connection.
(Zhang et al., 2023)	Investigate the determinants behind customers' continuance intention to use chatbots for tourism.	Predicting continuance intention to use ai-based chatbots for tourism	Chatbot	International Journal of Human-Computer Interaction	Tourism	China	Theory of Perceived Risk; Anthropomorphism Theory	Quantitative (survey, n=613)	Performance expectancy, social influence, habit, anthropomorphism, and personalization have beneficial effects. Conversely, the results indicate that time and privacy risks have detrimental impacts.
(van Pinxteren et al., 2023)	Examine how conversational agents should verbally interact with customers and whether they should adapt to customers' verbal behavior.	Effects of communication style on relational outcomes in interactions between customers and embodied conversational agents	Embodied Conversational Agent	Psychology and Marketing	Retail	Netherlands	CASA Framework	Quantitative (survey, n=147)	- In hedonic services, social cues significantly influenced rapport in the agent's communication style (static or mimicked), and mimicry substantially impacted engagement. - In utilitarian service, only social cues strongly affected rapport.
(H. Nguyen, 2023)	Explore how different role designs of a text-based agent (i.e., chatbot) can facilitate discussion patterns and systems thinking in small-group discussions, and identify for whom these designs are most effective.	Role design considerations of conversational agents to facilitate discussion and	Conversational Agent	Computers and Education	Education	USA	CASA Framework	Quantitative (survey, n=172)	Both agents enhanced transactive exchange, enabling students to build on prior ideas and thereby facilitating the learning of systems mechanisms within their discussion groups.

		systems thinking							
(Jin & Eastin, 2023)	Examine how the interaction between the chatbot's and user's personalities can enhance favorable product attitudes and future intentions to use the chatbot.	Personality effects of product recommendation chatbots and users	Chatbot	Journal of Research in Interactive Marketing	Retail	Not specified	CASA Framework ; Similarity-Attraction Theory	Quantitative (survey, n=291)	▪ The high extroversion chatbot elicited greater user satisfaction and perceived friendliness among highly extroverted users. Conversely, the chatbot with low extroversion achieved higher satisfaction and perceived friendliness among users with low extroversion.
(Kang & Kang, 2023)	Propose a counseling chatbot for intake interviews, classifying its anthropomorphic characteristics into three dimensions—gender, personality, and visual interface cues—to examine their effects on user self-disclosure and companionship.	Effects of anthropomorphic chatbot characteristics on user self-disclosure and companionship	Chatbot	International Journal of Human-Computer Interaction	Online Marketing	South Korea	Not specified	Quantitative (survey, n=135)	▪ No independent effects were found for the chatbot's gender or personality dimensions. However, visual interface cues negatively impacted participants' self-disclosure and companionship, with interaction effects observed based on the combination of anthropomorphic characteristics.
(Alimamy & Kuhail, 2023)	Investigate the influence of authenticity and personalization of virtual assistants on trust, commitment, and usage intentions.	Virtual assistants authenticity and personalization effects	Virtual Assistant	Computers in Human Behavior	Not Specified	Not Specified	Stimuli-Organism-Response Model	Quantitative (survey, n=243)	▪ The findings demonstrate a positive impact of perceived authenticity and personalization on both commitment and trust. ▪ User involvement and connection with the virtual assistant mediate the relationship between trust, commitment, and intentions to reuse the service.
(Guo & Luo, 2023)	Explore how the intelligent features of intelligent personal assistants (IPAs) influence Gen Z consumers' purchase intentions, and examine the moderating effect of brand credibility.	Purchase intentions of Generation Z consumers	Intelligent Personal Assistant	Journal of Retailing and Consumer Services	Retail	China	CASA Framework	Quantitative (survey, n=428)	▪ Personalization and a conversational tone significantly enhance informational and emotional support, while autonomy and responsiveness boost informational support. Both types of support positively influence purchase intentions, with brand credibility strengthening the link between support and purchase intentions.
(Priya & Sharma, 2023)	Determine how virtual assistants impact customer responses in the financial services sector.	Users' adoption intentions of virtual assistants in financial services	Virtual Assistant	Computers in Human Behavior	Finance and Banking	India	Not Specified	Quantitative (survey, n=435)	▪ Perceived intelligence, anthropomorphism, and animacy significantly affect user attitudes, except for the influence of perceived anthropomorphism on hedonic attitudes, which was found to be insignificant.