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Consumer Response to Anthropomorphism of Text-Based AI Chatbots: A Systematic Literature Review and Future Research Directions

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ABSTRACT

The rapid advancement of artificial intelligence (AI) has not only integrated chatbots like ChatGPT into everyday life but also transformed customer relations in various industries. Despite their growing adoption, research on consumer responses and preferences toward AI chatbots remains limited. Anthropomorphism, the attribution of human characteristics to nonhuman entities, plays a crucial role in shaping these interactions. This systematic literature review (SLR) analyzes 84 research articles within the theories-context-characteristics-methods (TCCM) framework to provide a comprehensive overview of consumer responses to chatbot anthropomorphism. The findings reveal predominantly positive effects, with humanlike communication styles and emotional characteristics eliciting trust, empathy, and a sense of social presence. However, negative outcomes in the form of privacy concerns and AI anxiety from overly humanlike chatbots highlight the complex nature of humanized chatbots. New generative AI models amplify these risks, widening gaps in current research. Future research should address these gaps by exploring the opportunities and challenges of generative AI, emotional adaptability, personalized communication strategies, and the role of consumer technology affinity. By focusing exclusively on text-based chatbots, this review offers a unique perspective that augments existing literature on consumer responses to AI chatbots, contributing to a better overall understanding of the underlying effects of anthropomorphism within the context of human–computer interactions.

1 | Introduction

Advancements in natural language processing and understanding have enabled chatbots to emerge as powerful tools in customer service across a wide range of industries (Adamopoulou and Moussiades 2020). In the global chatbot market, which is projected to grow exponentially from USD 11.57 billion in 2025 to USD 91.33 billion by 2034, text-based chatbots hold a dominant share of 38.8% (Market.us 2025). These artificially intelligent (AI) systems can simulate text-based human interactions through natural written language to provide individual support to consumers (Adam et al. 2021; Rapp et al. 2021). Due to their cost-effectiveness and service efficiency, text-based chatbots have become some of the most widely deployed AI tools in industry and everyday life (Kim and Baek 2024; Shwedeh 2024). At the same time, consumers are showing a growing preference for chatbot interactions, particularly in conversational commerce and customer service (Sharma et al. 2025). With the rising popularity of generative AI models such as ChatGPT, chatbots are not only easily accessible but also capable of understanding and adapting to user preferences. Particularly in e-commerce, text-based chatbots like Amazon's Rufus, Huawei's WeiKnow, or Uniqlo's IQ are widely adopted to deliver highly personalized and

satisfying experiences (Sidlauskiene et al. 2023). As consumers increasingly seek emotional and personal connections to firms and brands, chatbots have become indispensable tools for automating personalized service operations (Markovitch et al. 2024; Shwedeh 2024).

Today, chatbots can mimic humanlike conversational behaviors and personalities to the point where consumers find it difficult to distinguish between human agents and machines (Candello et al. 2017). This effect is achieved through anthropomorphism, the "attribution of uniquely human characteristics and features to nonhuman beings or objects" (Aggarwal and McGill 2012, 308). It embraces how consumers view chatbots as unique digital personalities capable of building trust, emotional connections, and rapport (Fatima et al. 2024). The concept of anthropomorphism dates back to Gilmore's (1919) theory of animism, which states that ascribing humanlike thoughts and personalities to objects stems from humans' innate need to create interactions (Guthrie 2015). This cognitive bias enables people to transfer personal attributes and qualities to inanimate objects, metaphorically imbuing them with human traits (Aaker and Fournier 1995; Delgado-Ballester et al. 2020). Perceptions are often shaped by individual beliefs, expectations, and desires, influencing how consumers interact with anthropomorphized entities (Waytz, Cacioppo, and Epley 2010; Waytz, Morewedge, et al. 2010; Xin and Liu 2025).

Research shows that chatbot anthropomorphism enhances user experiences through social interactions (Pentina et al. 2023), psychological closeness (Baek et al. 2022), warmth (Roy and Naidoo 2021), and trustworthiness (Agnihotri and Bhattacharya 2024). These emotional responses foster personal connections and relationships between humans and technology (Klein and Martinez 2023). Particularly, text-based chatbots rely on linguistic cues such as message interactivity (Go and Sundar 2019) and conversational style (Araujo 2018) to activate human schemas. As a result, interactions feel more natural and socially dynamic (Epley et al. 2007). However, chatbot anthropomorphism can also trigger negative responses in service failure scenarios or during emotional states of anger, where consumers may perceive chatbot actions as more intentional or deliberate (Crolic et al. 2022).

With rapid technological advancements, many aspects of chatbot anthropomorphism remain underexplored or report inconsistent findings. Areas for future research include opportunities and challenges that arise through anthropomorphic generative AI chatbots, personalized services versus process automation, the role of consumer technology affinity in shaping perceptions, and the impact of chatbot emotional range. Cost-cutting pressure and fierce competition in many industries lead to increased adoption of automated processes. Here, companies have to make sure to stay in touch with consumers and appear human.

To explore future research opportunities in chatbot anthropomorphism, it is essential to first understand the current state of research in this field. However, existing review articles only focus broadly on anthropomorphic AI technologies or robotics (e.g., Blut et al. 2021; Li and Suh 2022), without a specific emphasis on chatbots. Similarly, prior systematic literature reviews (SLR) only address either anthropomorphism (e.g., Ding et al. 2022; Husain et al. 2023; Khan et al. 2024) or chatbots in general (e.g., Rapp et al. 2021). To date, no SLR combines both research domains with a dedicated focus on consumer behavior. This review hence addresses this critical gap in literature by providing a detailed and unique perspective on chatbot anthropomorphism, while simultaneously reflecting emerging market trends. An SLR was chosen as the methodical approach, as it allows for a structured and systematic analysis of literature (Paul 2024). Following the suggestions by Paul et al. (2021) on creating meaningful academic value, this review accordingly pursues three main objectives:

- To synthesize extant knowledge and advance current understanding of consumer responses to chatbot anthropomorphism.
- To identify limitations and inconsistencies of existing studies on chatbot anthropomorphism.
- To propose suggestions and avenues for future research on exploring and improving chatbot anthropomorphism.

This SLR aims to contribute to both scholarly and practical understanding of how anthropomorphic chatbots impact consumer responses. First, it provides a comprehensive overview of the current state of research and captures the latest developments in this domain (Palmatier et al. 2018). Second, it highlights gaps in the literature to lay theoretical and managerial recommendations on how future chatbots can be optimized to meet diverse consumer needs effectively (Snyder 2019). Particularly as generative AI continues to advance, research on this topic becomes more critical than ever. Earlier literature reviews did not consider generative AI models in their reviews. This SLR is among the first to do so, thereby providing completely new insights and substantial academic value. While anthropomorphic chatbots have yet to fully replicate human intelligence or service provision, they hold significant potential to transform customer service and consumer experiences.

The review first employs the Scientific Procedures and Rationales for Systematic Literature Reviews (SPAR-4-SLR) protocol by Paul et al. (2021) to thoroughly explain the search process and research methodology. Second, it uses the theories-contexts-characteristics-methods (TCCM) framework by Paul and Rosado-Serrano (2019) to identify key research themes, trends, gaps, and future directions, emphasizing the role of anthropomorphic cues in shaping consumer perceptions, emotions, and behaviors. The widely adopted TCCM framework was selected as it systematically structures the review, categorizing the literature findings into clearly defined sections and allowing for a logical and transparent analysis. Through the analysis, the following research questions (RQ) are addressed:

- RQ1. *What is the current state of research on consumer responses to chatbot anthropomorphism?*
- RQ2. *Where are gaps in current research on chatbot anthropomorphism?*
- RQ3. *Where should research on chatbot anthropomorphism head in the future?*

2 | Research Methodology

This study follows the SPAR-4-SLR protocol to ensure structure, transparency, and replicability in the search and review processes. The protocol consists of three stages, namely assembling, arranging, and assessing (Paul et al. 2021).

2.1 | Assembling

The assembling stage begins with the identification substage, in which the domain (consumer response to anthropomorphism of AI chatbots), the research questions (RQ1, RQ2, and RQ3), the source type, and the source quality are defined. Following the recommendations of Paul et al. (2021), only peer-reviewed journal articles were included in this review to maintain academic rigor. Conference proceedings, book chapters, editorials, and other sources lacking scholarly quality were not considered. To ensure source quality, only articles published in journals ranked on the Australian Business Deans Council Journal Quality List (ABDC JQL) were included. This list was chosen for its extensive coverage of high-quality global business journals (Pawar 2023).

In the acquisition substage, the systematic search was performed using two online databases, Scopus and Web of Science (WOS). Aligning with Paul et al.'s (2021) recommendations, both search engines were selected for their comprehensive coverage of potentially relevant publications, assuring source quality and eliminating potential biases from either database (Mongeon and Paul-Hus 2016). Scopus is currently the world's largest database for academic literature, while WOS offers extensive access to articles published in highly impactful journals (Chadegani et al. 2013; Schotten et al. 2017). The search timeline's start date was initially left open, with the earliest publication found in 1972. Data collection was completed on February 1, 2025. A search query was formulated, using a combination of selected keywords and Boolean operators (OR, AND), as recommended by Paul et al. (2021). The keywords were chosen based on prior literature reviews on anthropomorphism (e.g., Khan et al. 2024) and chatbots (e.g., Rapp et al. 2021). To ensure that only AI-based chatbots were included and to capture the variety of relevant chatbot synonyms, the keyword "AI" was additionally added. This resulted in the search string: ("anthropomorphism" OR "anthropomorphic") AND ("AI" OR "chatbot"). This query was applied to both databases to ensure a comprehensive coverage of publications. The initial search on Scopus and WOS yielded a total of 3035 articles.

2.2 | Arranging

In the organization substage, the dataset was organized and coded by article title, journal title, author name, publication year, and number of citations. Additionally, the dimensions of the TCCM framework, theories, contexts, characteristics, and methods, were included.

In the purification substage, the dataset was refined by applying inclusion and exclusion criteria. According to the inclusion criteria, eligible publications were required to (1) include the defined keywords as specified in the search string, (2) be research articles, (3) be published between 1972 and 2025, (4) be written in English, and (5) fall within the subject areas of Business, Management and Accounting (Scopus) or Business and Management (WOS). Applying the inclusion filters resulted in an initial dataset of 730 articles, with 558 articles from Scopus and 172 from WOS. Duplicates ($n = 56$) found on both databases were removed, leaving 674 potentially relevant articles.

The remaining dataset was further refined using the exclusion criteria, eliminating articles that (1) did not include both relevant terms "chatbot" and "anthropomorphism", (2) were not listed on the ABDC JQL, (3) did not include an original empirical study, (4) were not conducted in the context of consumer studies, (5) did not consider anthropomorphism as an influencing factor in their conceptual model, and (6) did not report significant effects related to anthropomorphism.

Titles were initially scanned to confirm the presence of both relevant search terms "chatbot" and "anthropomorphism." For articles that only contained one term, the abstract and conceptual study were reviewed to identify whether synonyms such as "humanlike" for anthropomorphism or "AI service agent" for chatbot were used. Articles meeting this criterion were also included in the selection. In total, 528 articles were excluded for not addressing the specific topic of chatbot anthropomorphism.

Two articles (one on Scopus, one on WOS) were omitted from the selection for not being listed on the ABDC JQL, reaffirming the suitability of Scopus and WOS as high-quality databases. While the inclusion filters were chosen to select only research articles, 37 articles (17 on Scopus, 20 on WOS) were excluded for lacking an original empirical study, as this review only draws on empirical articles (Paré et al. 2015). Seven articles (five on Scopus, two on WOS) were omitted for analyzing chatbot anthropomorphism in contexts other than consumer studies or consumer behavior. Thirteen articles (nine on Scopus, four on WOS) did not consider anthropomorphism as an influencing factor in their conceptual model (Paul et al. 2021). Finally, three articles (two on Scopus, one on WOS) did not report significant effects related to anthropomorphism and were also removed. After this screening process, the final dataset consisted of 84 research articles, with 40 articles from Scopus and 44 from WOS. Table S1 in the Appendix: Supporting Information provides an overview of all selected articles.

2.3 | Assessing

The evaluation substage involves a content analysis of bibliometric data on publication trends over time, the most highly cited articles, journals with the most publications and highest citation counts, and countries with the most affiliated authors. All citation numbers were gathered from Google Scholar to maintain consistent and comparable data. Next, an in-depth analysis based on the four dimensions of the TCCM framework, theories, contexts, characteristics, and methods, was

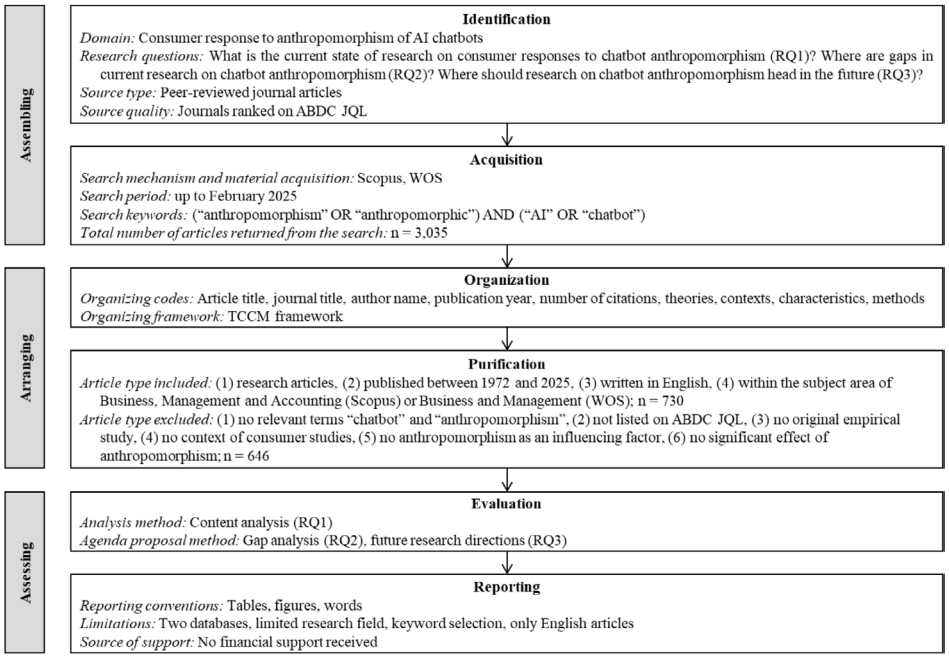

FIGURE 1 | SPAR-4-SLR protocol. *Source:* Own elaboration.

conducted (RQ1). Building on these findings, the proposed agenda includes a research gap analysis of existing literature derived from the TCCM findings (RQ2). From these identified gaps, future research directions are proposed, providing suggestions and specific research questions for academics pursuing further studies in the field of chatbot anthropomorphism (RQ3).

In the final reporting substage, the findings are summarized and presented in the discussion section and visualized through tables and figures. The review acknowledges certain limitations, including the exclusive article selection from Scopus and WOS, the focus on business and management contexts, and the chosen set of search keywords. These limitations are addressed in further detail in the final limitations section of this review. Figure 1 illustrates the SPAR-4-SLR protocol as applied to this SLR.

3 | Bibliometric Analysis

3.1 | Publication Years

Research interest in AI chatbots has grown rapidly since 2016 with the availability of advanced tools and technologies (Adamopoulou and Moussiades 2020). Specific research on chatbot anthropomorphism, however, did not emerge until 2018, led by Araujo's (2018) pioneering work. With no relevant publications on this topic prior to 2018, the review's timespan is limited to 7 years. The number of publications increased notably from 2022 onward, with the highest number of publications in 2024, indicating growing academic interest in this field. Notably, seven articles have already been published in the first 2 months of 2025, suggesting that research on AI chatbots is expected to continue expanding significantly across various domains and industries. This highlights the growing importance of research on chatbot anthropomorphism, especially when compared to more traditional research areas (Schöbel et al. 2024). Figure 2 illustrates the number of publications per year from 2018 to February 2025.

3.2 | Citation Counts

The 84 articles selected for this SLR have yielded a total of 8775 citations, according to data from Google Scholar as of February 1, 2025. Figure 2 depicts the total number of citations for each year. As expected, older research articles generally have higher citation counts than more recent ones, reflecting the time needed to accumulate citations. There is a noticeable decline in citations per year from 2021 to 2025, with many of the 2025 publications still too recent to have garnered any citations.

Table 1 shows the top 10 most cited and impactful articles on consumer perceptions and behaviors toward chatbot anthropomorphism. Leading the list is Araujo's (2018) highly impactful paper, which has gained 1214 citations to date. The table also provides details on the journal, the affiliated country with the author(s), and the journal ranking according to ABDC.

3.3 | Most Impactful Journals

The 84 selected articles were published in 31 academic journals, accessible through Scopus or WOS. The *Journal of Retailing and Consumer Services* published the highest number of research articles (14 articles), followed by the *Journal of Business Research* (10 articles), *Technological Forecasting and Social Change* (7 articles), and *Computers in Human Behavior* (5 articles). Notably, the highly impactful and widely cited works of Araujo (2018) and Go and Sundar (2019) both appeared in *Computers in Human Behavior*, significantly contributing to the journal's high total citation count of 2536 citations.

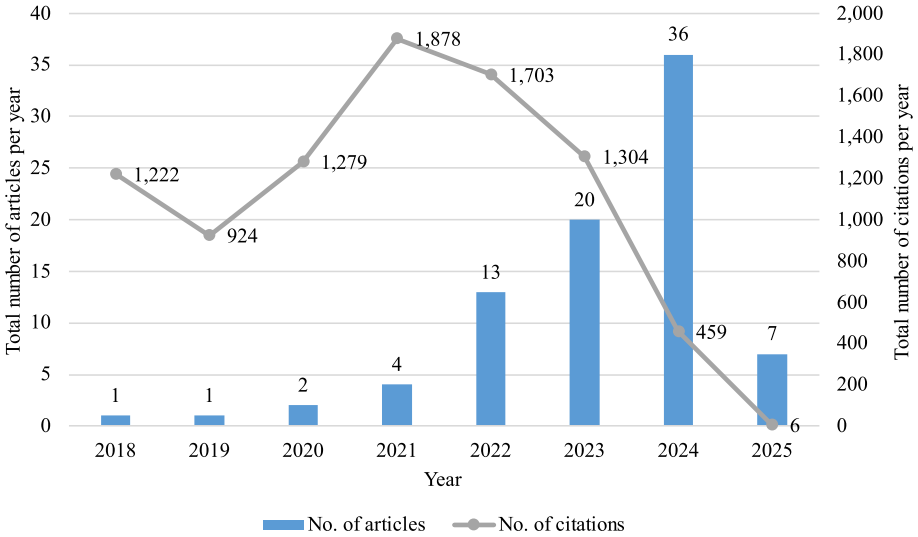

FIGURE 2 | Yearly distribution of articles and citation counts. *Source:* Own elaboration.

TABLE 1 | Top 10 most cited articles (as of February 1, 2025).

Research article	Journal	Country	Citations	ABDC ranking
Araujo (2018)	*Computers in Human Behavior*	Netherlands	1222	A
Adam et al. (2021)	*Electronic Markets*	Germany, Denmark	1188	A
Go and Sundar (2019)	*Computers in Human Behavior*	USA	924	A
Pillai and Sivathanu (2020)	*International Journal of Contemporary Hospitality Management*	India	706	A
Sheehan et al. (2020)	*Journal of Business Research*	Australia	573	A
Crolic et al. (2022)	*Journal of Marketing*	UK	488	A*
Roy and Naidoo (2021)	*Journal of Business Research*	Australia	265	A
Tsai et al. (2021)	*Journal of Research in Interactive Marketing*	USA	265	B
Song, Xing, et al. (2022)	*Journal of Retailing and Consumer Services*	China, South Africa, South Korea	251	A
Pentina et al. (2023)	*Computers in Human Behavior*	USA	225	A

Note: A* was a rating cateogry used by ABDC, which denotes the highest ranking tier.

The *Journal of Business Research* ranks second in total citations, with 1399 citations. *Electronic Markets* follows with a total of 1320 citations, 1188 of which stem from the article by Adam et al. (2021). Other influential journals in this review include the *International Journal of Contemporary Hospitality Management*, *Journal of Research in Interactive Marketing*, *International Journal of Human–Computer Interaction*, *Electronic Commerce Research*, and the *International Journal of Consumer Studies*.

These journals span a broad range of disciplines, including research on computers, electronics, and technology, particularly with a focus on psychological and behavioral perspectives. They address topics like marketing, branding, market research, consumer behavior, and hospitality and tourism management. This highlights the interdisciplinary nature of research on chatbot anthropomorphism and its relevance for consumer studies across various academic fields and industries.

3.4 | Most Impactful Countries

The most impactful countries affiliated with the authors emphasize the global dynamics of chatbot anthropomorphism research and reveal regional concentrations of impactful works. Many articles are co-authored by researchers from different countries, resulting in a total of 158 authors from 32 countries.

Authors from the United States receive the highest number of citations, with 2005 citations across 17 research articles (20.24%). The USA is also the most represented country

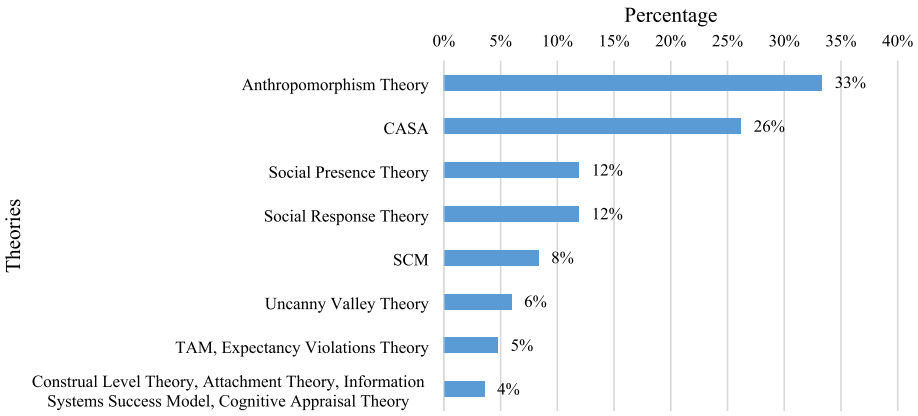

FIGURE 3 | Theoretical frameworks. *Source:* Own elaboration.

among the top 10 most cited publications, including notable works by Go and Sundar (2019), Tsai et al. (2021), and Pentina et al. (2023). European countries follow, specifically with authors from Germany (1362 citations), the Netherlands (1240 citations), Denmark (1188 citations), and the UK (773 citations). Interestingly, authors from other European countries, such as Italy, Switzerland, and Spain, receive relatively fewer citations. Altogether, European authors contribute 27 research articles (32.14%). Australian researchers are also well represented, achieving a total of 962 citations across their 6 publications.

In Asia, Chinese researchers lead with 25 articles and 964 citations, followed by India (5 articles with 916 citations) and South Korea (16 articles with 655 citations). Other Asian countries remain underrepresented, with only one recent study from Japan published in 2025. This low representation is unexpected, given Japan's prominent role in technological innovations and its integration of robots into everyday society (Schodt 1988; Dutta et al. 2023). This finding aligns with observations by De Keyser and Kunz (2022), who also noted an absence of Japanese studies in their literature review on service robots. Cultural factors may explain this gap, as Japanese concerns over data privacy and anxiety toward AI are higher compared to other countries, such as Taiwan (Kanoh 2017).

Research on chatbot anthropomorphism in Africa is almost entirely absent, with only one study by Mpinganjira et al. (2024) partially affiliated with South Africa. Given that North African countries, such as Morocco and Jordan, are well represented in tourism research, the lack of contributions from African authors signals that chatbot anthropomorphism has not yet been a major research focus and is only now gaining academic interest.

4 | Theories-Contexts-Characteristics-Methods Framework

4.1 | Theories (T)

All except 3 of the 84 selected articles incorporate a theoretical or conceptual framework to underpin their experimental studies and hypothesis development. In total, 77 key theories and models were identified, with several articles employing multiple theories to develop their conceptual models. This diversity indicates the broad applicability of different theoretical concepts when studying the effects of consumer interactions with chatbots. Theories used to explain effects unrelated to chatbot anthropomorphism were excluded from the analysis. Figure 3 shows an overview of the most frequently applied theories and models.

The largest number of articles (33.33%) apply the three-factor theory of anthropomorphism developed by Epley et al. (2007). This theory assesses the psychological and motivational determinants relevant for people to humanize inanimate objects. Authors use this theory across various contexts to explain the underlying mechanisms that drive chatbot anthropomorphism. These studies primarily investigate how anthropomorphic chatbots affect consumers psychologically, evoking positive emotional reactions, feelings of empathy, and increased customer satisfaction (e.g., Klein and Martinez 2023; Le et al. 2023). Notably, the theory of anthropomorphism is never applied in isolation but is always combined with other theoretical frameworks. For example, researchers pair it with attachment theory to assess psychological risk attachment (Cui 2022), construal level theory to analyze psychological distance (Baek et al. 2022), or theory of mind to explore consumer trust and skepticism toward chatbots (Pizzi et al. 2023).

Second, 26.19% of research articles refer to the Computers Are Social Actors (CASA) Paradigm by Nass and Moon (2000) to explain interactions between humans and chatbots. As defined by the CASA, people respond to computers as if they were real social actors, despite knowing they are machines without feelings (Nass et al. 1994; Moon 2000). When chatbots display social cues, users automatically and unconsciously react as they would to another human being (Nass and Moon 2000). Similar to the theory of anthropomorphism, the CASA is used to explain the psychological mechanisms behind consumer responses to anthropomorphic chatbots. It is often applied in studies focusing on humanlike communication cues or in comparisons between chatbots versus humans. Song, Xing, et al. (2022) emphasize that consumers expect anthropomorphic chatbots to exhibit the same communication skills as humans would. Consequently, communication quality and response type wield significant influence on consumer satisfaction (Sheehan et al. 2020; Zhu et al. 2023).

Third, the social presence theory was applied by 11.90% of the articles. This theory focuses on the communication between humans and how communication technologies lead people to believe that they are interacting with another social actor (Short et al. 1976). Anthropomorphic communication cues enhance user experiences through social presence by creating a psychological connection between the chatbot and the user (Rizomyliotis et al. 2022). Visual cues cause consumers to perceive chatbots as social entities, enhancing a sense of presence and trust (Liu et al. 2024). The stronger this sense of social presence, the more likely consumers are to associate social attributes with the chatbot (Murtaza et al. 2024). The created connection often results in positive evaluations, increased satisfaction, and greater compliance with chatbot requests (Adam et al. 2021; Janson 2023). However, the extent of perceived social presence depends largely on the consumer's subjective perceptions of the chatbot's anthropomorphic characteristics (Konya-Baumbach et al. 2023; Jin and Youn 2023). In e-commerce research, social presence theory is often applied alongside the CASA to test customer service interactions (Janson 2023; Xie et al. 2024). Multiple studies even examine social presence solely through the lens of the CASA without explicitly applying the social presence theory (e.g., Araujo 2018; Shams et al. 2024). Others employ frameworks like the expectancy violations theory (Sun et al. 2024) or the social exchange theory (Khan et al. 2025).

The social response theory, also applied by 11.90% of the articles, describes how people perceive computers as social actors and respond to them accordingly (Nass et al. 1994). According to this theory, consumers apply social norms and rules to their interactions with humanlike computers or technologies (Moon 2000; Wang et al. 2007). The more humanlike an entity appears, the more socially engaged consumers tend to become (Gong 2008; Waytz, Cacioppo, and Epley 2010; Waytz, Morewedge, et al. 2010). As a result, anthropomorphic chatbots are treated more socially, leading to higher persuasion, greater engagement, but also increased privacy concerns (Li, Yao, and Nan 2024; Song et al. 2024). Like the CASA, the social response theory is mainly applied in studies testing anthropomorphic communication cues (e.g., Zhu et al. 2023). It is either used to explain why consumers treat chatbots as social actors (e.g., Adam et al. 2021), or to understand how chatbot anthropomorphism drives consumer responses (e.g., Nguyen et al. 2023). Social response becomes particularly relevant in scenarios of service failure and recovery, where the recovery effectiveness depends on the chatbot's response type (Song, Du, et al. 2022).

8.33% of the articles opt for the Stereotype Content Model (SCM) to support their research. This model defines perceived warmth and perceived competence as dimensions that people utilize to make sense of groups (Fiske et al. 2002). These dimensions are also applied when consumers assess anthropomorphic chatbots and are either included as facets of anthropomorphism or treated as communication styles (Choi and Zhou 2023). When combined with the theory of anthropomorphism, the SCM helps to explain how verbal anthropomorphic cues are perceived. For instance, Xu et al. (2023) find that while an anthropomorphic conversation style increases perceived warmth, it simultaneously decreases perceived competence.

Lastly, the uncanny valley theory was applied less frequently (5.95%), particularly in earlier studies. However, recent research adopts the digital agenticity theory (e.g., Kim and Lee 2025) and the Artificially Intelligent Device Use Acceptance (AIDUA) model (e.g., Khan et al. 2025), which incorporate fundamental ideas from the uncanny valley theory (Mori et al. 2012). These newly derived theories reflect the growing interest in understanding consumer anxiety and concerns that highly anthropomorphic chatbots may possess humanlike intentions to misuse their data (Kim et al. 2024).

Surprisingly, some widely recognized theories in robotics literature, such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), are less frequently employed. Lu et al. (2019) argue that the TAM is more suitable for assessing non-intelligent technologies and less effective for understanding AI devices. Instead, alternative frameworks such as the human-machine communication theory (Guzman and Lewis 2020), derived from the TAM, have been applied (Rizomyliotis et al. 2022). Similarly, Pizzi et al. (2023) and Lu et al. (2024) employ extended versions of established theories, such as the humanness-value-loyalty theory (Fiske et al. 2007) derived from the SCM, or the media naturalness theory (Kock 2005) derived from the social presence theory. These adaptations not only reflect the wide variety of applicable theories but also how rapidly this research field is evolving, emphasizing the need for new and adapted models and theories to better explain its dynamics.

4.2 | Context (C)

The contextual factors encompass the research countries and industries considered (Paul and Rosado-Serrano 2019). Across the 84 articles, a total of 174 relevant empirical studies were identified, with pilot studies and pretests excluded from the analysis.

First, looking at the research countries offers valuable insights into the regional distribution of research. As cultural backgrounds strongly shape consumer responses, these differences must be carefully considered when selecting research settings and interpreting results. China emerges as the leading research location, hosting 31.61% of the studies. This prominence reflects its rapidly evolving and expansive market for AI chatbots (Cheng and Zeng 2023). Overall, Asia accounts for the largest share of study locations (42.53%), particularly concentrated in countries such as South Korea, Indonesia, and Vietnam. India represents 3.45% of the studies, reflecting the country's growing adoption of computer technologies and AI automation. This aligns with Dhanabalan and Sathish's (2018) findings on the transformative impact of AI across Indian industries.

The USA follows as the second most prominent research location (24.14%). In contrast, research in Europe is less frequent (6.90%), although Crolic et al. (2022) note that their five studies took place within Europe without specifying the exact country. Several factors may explain this disparity. First, European articles mostly focus on a smaller number of studies (averaging 1.33 studies per article), whereas research conducted in Asia, particularly in China, often includes multiple studies (averaging 2.29 studies per article). Second, Europeans tend to be more sensitive

TABLE 2 | Considered industries.

Industries	Example	No. of studies	Percentage
E-commerce	Ahn et al. (2022); Li, Hou, and Tan (2024)	73	42%
Tourism and hospitality	Shin et al. (2023); Scarpi (2024)	47	27%
Customer service	Balakrishnan et al. (2022); Hao and Li (2025)	10	6%
Conversational/social chatbot	Pentina et al. (2023); Ahn et al. (2024)	10	6%
Financial services	Adam et al. (2021); Cheng et al. (2023)	9	5%
Restaurant and food	Chakraborty et al. (2024); Li, Yao, and Nan (2024)	8	5%
Healthcare services	Kim et al. (2022); Pinochet et al. (2024)	7	4%
Multiple industries	Chen et al. (2022); Jin and Youn (2023)	4	2%
Charity donations	Baek et al. (2022); Park et al. (2024)	3	2%
Telecommunications	Crolic et al. (2022); Shin et al. (2023)	2	1%
Online gaming	Chakraborty et al. (2024)	1	1%
Total		174	100%

to data privacy compared to Asian participants (Li 2022), posing challenges in recruiting participants in Europe. This may also explain why European researchers such as Ruan and Mezei (2022), who are partially affiliated with Finland, chose to conduct their study in China.

Despite the lower number of European studies, they tend to receive higher average citation counts. On average, European studies garner 177.1 citations per article, compared to 63.8 citations per article for studies in Asia. However, as research trends gradually shift more toward Asian countries, 20 of the 36 Asian articles were published in 2024 or 2025 and have not yet had sufficient time to accumulate citations.

Table 2 maps the industry-specific contexts in which research on anthropomorphic chatbots has been conducted. As shown, research spans across various industries but is heavily concentrated in B2C contexts such as e-commerce, retail, and online shopping as well as tourism and hospitality. These areas alone account for almost 70% of the entire research body. Highly underrepresented industries include healthcare, charities, telecommunications, and online gaming, leaving opportunities for future studies.

Within e-commerce, consumer behavior is frequently analyzed in product categories like electronics, such as smartphones (e.g., Cheng et al. 2024), smart speakers (e.g., Lu and Zhang 2025), wireless headphones (e.g., Ahn et al. 2022), and cameras (e.g., Choi and Zhou 2023). This highlights the practical application of chatbots in online shopping for electronics, along with the importance of understanding consumer interactions and purchasing behaviors for technological products. The second most studied category is fashion and apparel, including sport shoes (Yang and Hu 2022), home wear (Song, Xing, et al. 2022), winter jackets (Nguyen et al. 2023), and trousers (Zogaj et al. 2023). Additional consumer goods like books (e.g., Konya-Baumbach et al. 2023) and perfumes (e.g., Sidlauskiene et al. 2023) have also been explored in multiple studies.

In tourism and hospitality, research primarily explores general services, with some studies focusing on travel insurance (Pizzi et al. 2023), airline services (Shin et al. 2023), and hotel bookings (Scarpi 2024). Recent studies have further discovered the use of chatbots to provide personalized travel recommendations (e.g., Baek et al. 2025; Kim et al. 2025). Research in the financial industry primarily investigates services such as online banking (e.g., Adam et al. 2021). Jin and Youn (2023) conduct their study in multiple industries, comparing chatbots in both e-retail and tourism service settings.

4.3 | Characteristics (C)

Figure 4 provides an overview of the variables examined across the 84 articles, categorized based on their conceptual frameworks. As many studies incorporate multiple variables in their models, the total number of variables in each category exceeds the number of selected articles. The relative variable frequencies were calculated based on their total count within each category.

A total of 120 antecedents were identified in the form of independent variables influencing consumer responses to chatbots. Chatbot characteristics represent anthropomorphic cues embedded in the chatbot's design, such as verbal cues (e.g., Adam et al. 2021) or visual cues (e.g., Janson 2023). Anthropomorphism is also represented in perceived personality traits like cuteness, authenticity, and humor (e.g., Kim et al. 2022; Xie et al. 2024), and demographics like chatbot gender and race (e.g., Liang et al. 2024; Lu and Zhang 2025). Demographic cues are often shaped by user stereotypes that influence how they react to anthropomorphic chatbots (Ahn et al. 2022). Chatbot behaviors focus on interaction style, communication quality, and service recovery strategies (e.g., Hsu and Lin 2023; Klein et al. 2024). For text-based chatbots, communication styles play a particularly important role in shaping interaction outcomes. Verbal cues such as responsiveness (e.g., Li et al. 2023), message interactivity (e.g., Go and Sundar 2019), and communication speed (e.g., Pham et al. 2024) affect consumer trust and usage intentions.

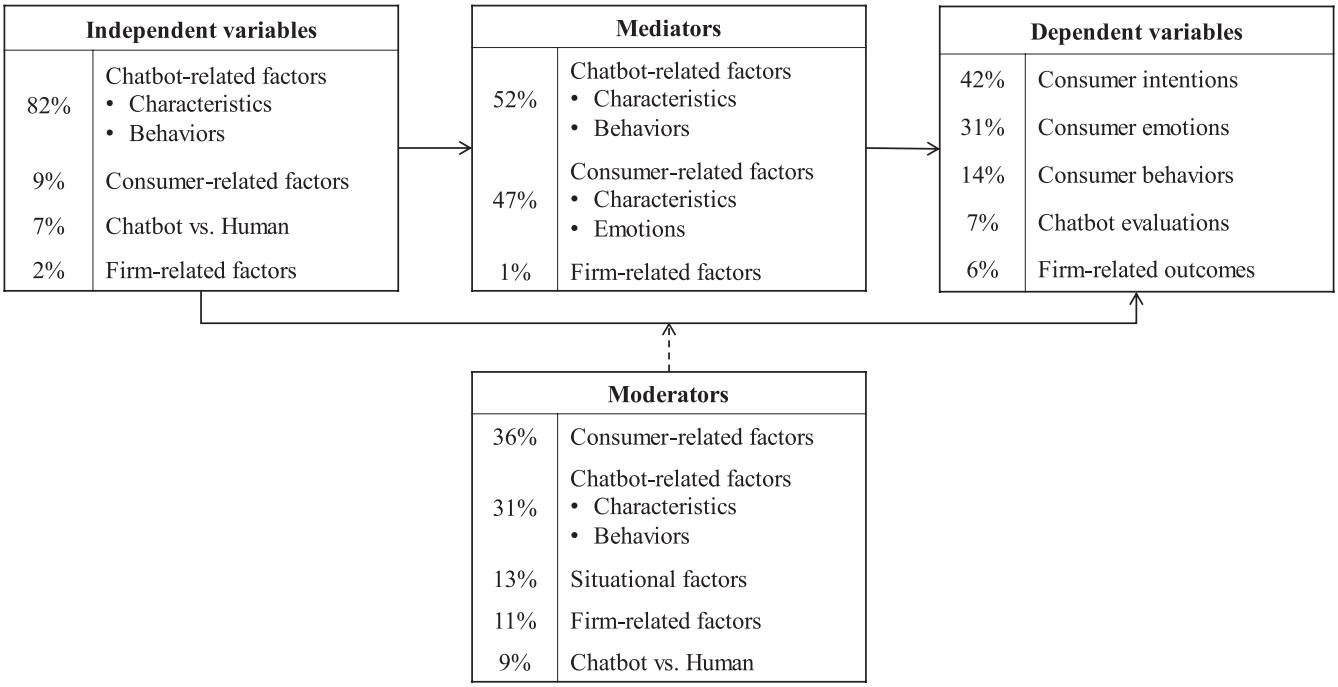

FIGURE 4 | Conceptual model. *Source:* Own elaboration.

Consumer-related factors encompass individual characteristics and personal preferences, such as privacy concerns or regret avoidance (e.g., Agnihotri and Bhattacharya 2024; Chakraborty et al. 2024). These predispositions strongly affect how consumers perceive anthropomorphic chatbots, with trust mediating perceptions. Firm-related factors reflect dimensions related to the company or brand personality. Here, consumer responses are not only shaped by chatbot characteristics but also by firm perceptions. For example, brand trust enhances consumer trust in chatbots (Li et al. 2023), whereas preferences for chatbot services depend on the brand personality (Yang and Hu 2022).

The 143 mediators cover chatbot-related characteristics and behaviors, which positively influence the effect of anthropomorphism on consumer emotions and intentions. Chatbot characteristics include perceived anthropomorphism or humanness of the chatbot (e.g., Yang et al. 2024), social presence (e.g., Adam et al. 2021), and functionality (e.g., Arce-Urriza et al. 2025). Chatbot behaviors include communication quality, interaction style (e.g., Fatima et al. 2024), and expressed empathy (e.g., Zhu et al. 2023). Consumer-related mediators cover characteristics like privacy concerns (e.g., Kim et al. 2024), social judgment concerns (e.g., Kim et al. 2022), and AI anxiety (e.g., Mulcahy et al. 2024), which undermine trust in anthropomorphic chatbots and negatively impact usage intentions. On the other hand, consumer emotions like trust, entertainment (e.g., Wei et al. 2025), satisfaction (Schillaci et al. 2024), and rapport (e.g., Hao and Li 2025) promote consumer intentions and positive emotional responses toward chatbots. Firm-related factors focus on brand and company perceptions (e.g., Yang and Hu 2022; Chakraborty et al. 2024). While positive brand perceptions increase purchase intentions and brand evaluations, their effectiveness strongly depends on consumer-related moderators such as time orientation (Roy and Naidoo 2021) and consumer involvement (Yang and Hu 2022).

The 78 moderators cover consumer-related factors like demographics (e.g., Fatima et al. 2024), motivations (e.g., Pentina et al. 2023), expectations (e.g., Markovitch et al. 2024), and the need for human interaction (e.g., Sheehan et al. 2020). These factors strongly influence how effective anthropomorphism is in shaping consumer intentions, emotions, and behaviors. Chatbot-related moderators include characteristics like anthropomorphism, intelligence, and cuteness (e.g., Song, Du, et al. 2022; Zhu et al. 2023), and behaviors like conversation strategies, recovery strategies, and interaction initiation (e.g., Le et al. 2023; Cheng et al. 2024). Anthropomorphism as a moderator often interacts with another anthropomorphic feature (i.e., combination of verbal and visual cues), creating an interaction effect between two chatbot designs on consumer intentions and behaviors. Particularly in the context of the uncanny valley, combining high levels of anthropomorphism can have adverse effects, mediated by privacy concerns or AI anxiety (Mulcahy et al. 2024). Situational moderators examine contexts like customer anger or service failure (e.g., Crolic et al. 2022; Kim et al. 2022), and severities like task criticality or information sensitivity (e.g., Konya-Baumbach et al. 2023; Lu et al. 2024). In more serious situations, users often prefer humans or anthropomorphic chatbots over non-anthropomorphic chatbots, which are mediated by their expectations. Firm-related moderators reflect brand and company perceptions, as well as differences in business or product types (e.g., Ruan and Mezei 2022; Youn and Cho 2023). Here, the effectiveness of verbal anthropomorphic cues often depends on how consumers perceive the brand's personality (e.g., Nguyen et al. 2023).

The 124 dependent variables depict the consequences of chatbot anthropomorphism and can be categorized into three groups: consumer-related outcomes, chatbot-related outcomes, and firm-related outcomes. First, consumer-related outcomes include intentions, emotions, and behaviors,

with anthropomorphic chatbots positively influencing all three. Consumers perceive humanlike chatbots as more trustworthy, resulting in higher usage intentions (Li and Lee 2024). Humanlike chatbots also elicit higher social presence, which enhances consumer continuance intentions (Jin and Youn 2023) and purchase intentions (Konya-Baumbach et al. 2023). Anthropomorphism further improves consumer emotional outcomes like satisfaction, trust, and forgiveness, through enhancing consumer perceptions of trustworthiness and empathy (e.g., Agnihotri and Bhattacharya 2024; Markovitch et al. 2024). Behavioral outcomes encompass recommendations, compliance, and engagement. Consumers are more willing to follow anthropomorphic chatbot recommendations as they are perceived as more competent (Nguyen et al. 2023) and capable of generating personalized recommendations (Kim et al. 2025). Second, chatbot-related evaluations include perceived friendliness, expertise, and attitude, with anthropomorphic chatbots eliciting more favorable evaluations (e.g., Youn and Cho 2023). However, anthropomorphic chatbots are also judged more for unethical behavior, leading to worse attitudes toward the chatbot (Ahn et al. 2024). Third, firm-related outcomes, such as brand and company evaluations, are studied to a lesser extent. Here, using anthropomorphic chatbots results in positive company and brand perceptions, depending on the brand personality (Araujo 2018; Yang and Hu 2022). Anthropomorphism can also have negative effects on firm evaluations when consumers are in an angry emotional state (Crolic et al. 2022).

4.4 | Methods (M)

Table 3 summarizes the distribution of research methods across the 174 studies. Reflecting the current technological landscape and digital nature of chatbots, a significant majority of studies were conducted online (148 studies, 85.06%). Offline methods like field experiments (5.75%) or field surveys (2.30%) were applied less often. One study combines online and offline methodologies, while five studies did not specify whether their approach was online or offline. Since all selected articles include empirical studies collecting primary data, the research tools employed were either quantitative or qualitative. Quantitative methods clearly dominate the field, with experiments (79.89%), particularly scenario-based experiments (63.79%), being the most common. Qualitative methods like interviews (4.60%) lack application, while other qualitative approaches (e.g., case studies) are entirely absent.

Several research articles include multiple studies, each testing various hypotheses through the same analysis techniques. To avoid redundancy, each technique is listed only once per article. As some articles employ multiple statistical methods, the total number of analysis techniques exceeds the number of 84 selected articles. Most studies use a combination of regression analysis (76.19%) and variance analysis (63.10%) to test their hypotheses. Structural equation modeling (SEM; 41.67%) is used in different variations, such as PLS-SEM or multi-group analysis. Other quantitative techniques include path and trend analyses. In the few qualitative studies, the most used approaches are content or textual analysis (7.14%). Less common methods include fuzzy set qualitative comparative analysis (2.38%) and scale development (1.19%). Statistical tools used for manipulation tests, validation checks, or common method biases were excluded. Only techniques used for hypothesis testing were considered. All findings are presented in Table 4.

5 | Discussion

The findings from the SLR reveal various key research themes and trends with a focus on consumer responses to AI and automation. These themes were identified through the analysis of the TCCM dimensions and categorized based on how frequently

TABLE 3 | Research methods used.

Research methods	Example	No. of studies	Percentage
Quantitative			
Experiments			
Scenario-based experiment	Song, Du, et al. (2022); Mulcahy et al. (2024)	111	64%
Online experiment	Sheehan et al. (2020); Janson (2023)	14	8%
Field experiment	Roy and Naidoo (2021); Liu et al. (2024)	10	6%
Laboratory experiment	Kim et al. (2022); Xie et al. (2024)	4	2%
Surveys			
Online survey	Balakrishnan et al. (2022); Fu et al. (2023)	21	12%
Field survey	Rizomyliotis et al. (2022); Hsu and Lin (2023)	4	2%
Qualitative			
Interview	Pillai and Sivathanu (2020); Pentina et al. (2023)	8	5%
Others		2	1%
Total		174	100%

TABLE 4 | Analysis techniques used.

Analysis technique	Example	No. of articles	Percentage of articles
Quantitative			
Regression analysis	Adam et al. (2021); Zhou and Chang (2024)	64	76%
Variance analysis	Ruan and Mezei (2022); Klein et al. (2024)	53	63%
SEM	Pham et al. (2024); Sarraf et al. (2024)	35	42%
Other		5	6%
Qualitative			
Content/textual analysis	Lu et al. (2024); Pathak et al. (2025)	6	7%
Other		5	6%

they were the subject of analysis in the selected articles. Themes addressed in more than five articles are classified as a key research theme. These findings help answer RQ1: What is the current state of research on consumer responses to chatbot anthropomorphism?

As established in the theories section, social presence theory is one of the major theories applied when studying chatbot anthropomorphism. Consequently, social presence emerges as a prominent research theme in this field. Araujo (2018) introduced the concept of social presence, exploring how emotional connections are affected by verbal and visual chatbot anthropomorphism in e-commerce. Subsequent research confirms that both verbal (e.g., Konya-Baumbach et al. 2023; Shams et al. 2024) and visual anthropomorphism (e.g., Adam et al. 2021; Jin and Youn 2023) have positive effects mediated through social presence. Some studies also combine both visual and verbal cues (e.g., Chen et al. 2022; Kim et al. 2022). Notably, verbal cues, such as message interactivity (Sun et al. 2024), humor (Xie et al. 2024), and emotional text expressions (Zhang, Chen, et al. 2024; Zhang, Wang, et al. 2024) play a particularly significant role. Tsai et al. (2021) propose the usage of social presence communication as a verbal anthropomorphic cue, which can amplify the effects of visual anthropomorphism. Khan et al. (2025) establish how social presence positively moderates the relationship between anthropomorphism and trust. Rizomyliotis et al. (2022) and Fu et al. (2023) analyze social presence as a humanoid dimension of anthropomorphism, showing positive effects on customer experience and trust in chatbots.

Similarly, several studies apply the SCM dimensions of perceived warmth and perceived competence in their research. While some include these dimensions as components of anthropomorphism (e.g., Roy and Naidoo 2021; Xiao et al. 2024), others study how anthropomorphism influences perceived warmth and competence. In particular, verbal anthropomorphism and communication styles positively influence these perceptions (e.g., Cheng et al. 2024; Hao and Li 2025). However, the effect strength depends on contextual factors and consumer characteristics (Roy and Naidoo 2021; Choi and Zhou 2023). For instance, competent chatbots are preferred for cognitive service tasks, whereas warm chatbots elicit better consumer responses in emotional services (Li, Yao, and Nan 2024). Ahn et al. (2022) and Schillaci et al. (2024) employ this framework to explore the impact of chatbot genders on consumer attitudes and intentions.

Third, the functionality dimensions of perceived ease of use and perceived usefulness, derived from the TAM, were first explored in the context of chatbot research by Pillai and Sivathanu (2020). Their findings reveal that anthropomorphism positively affects both dimensions. Subsequent studies by Selamat and Windasari (2021) and Rizomyliotis et al. (2022) provide additional support for these results. Further, Cheng et al. (2023) demonstrate how perceived chatbot intelligence enhances perceptions of both ease of use and usefulness. Finally, Arce-Urriza et al. (2025) reveal that generative AI models increase consumer perceptions of chatbot usefulness compared to non-generative AI models.

In the context section, service failure and service recovery emerge as key research themes. Sheehan et al. (2020) were the first to explore the role of anthropomorphic chatbots in scenarios of service failure and recovery, studying how consumers' need for human interaction influences the adoption of anthropomorphic chatbots. Their findings are supported by research from Song, Du, et al. (2022), in that self-recovery strategies implemented by chatbots are more favorably received than unresolved errors. The effectiveness of these strategies depends significantly on the situation (e.g., process or outcome failure; Zhou and Chang 2024), and the failure severity (Zhang et al. 2022; Shams et al. 2024). Anthropomorphism plays a dual role in mitigating service failures. First, verbal anthropomorphism (e.g., humanlike understanding, message responsiveness, and interactivity) enhances satisfaction (Klein et al. 2024), loyalty (Hsu and Lin 2023), and purchase intentions (Le et al. 2023). Second, visual anthropomorphism increases consumer forgiveness, reduces negative word of mouth (Agnihotri and Bhattacharya 2024), and lowers the likelihood of switching to a human agent (Lu et al. 2024). Anthropomorphism also raises consumers' recovery expectations while amplifying the attribution of responsibility for service failures (Pavone et al. 2023; Lu et al. 2024). It hence can mitigate negative perceptions, as consumers assign higher accountability to chatbots. Therefore, using chatbots should be carefully considered, particularly for consumers with a high need for human interaction or privacy concerns (Pavone et al. 2023).

As for characteristics, four major research themes can be identified. First, chatbot vs. human: Expanding Araujo's (2018) findings, Go and Sundar (2019) introduce a third humanness factor, namely identity cues, which shape consumer expectations based

on whether they identify the chatbot as human or machine. Their findings reveal that a fit of an anthropomorphic cue with consumer expectations (i.e., high (low) anthropomorphism when the chatbot is identified as human (machine)) is crucial for eliciting favorable attitudes and behavioral intentions. Research comparing chatbots and human frontline services shows that chatbots perform well in functional or competent contexts (Ruan and Mezei 2022; Yang and Hu 2022). Humans are better suited for emotional or social interactions as well as situations requiring empathy (Markovitch et al. 2024). In some cases, anthropomorphism can reverse these dynamics by reducing consumers' willingness to disclose personal information to chatbots due to heightened social judgment concerns (Kim et al. 2022).

Second, privacy concerns and AI anxiety: While much research highlights the positive effects of anthropomorphism, it can also lead to adverse outcomes. Excessive anthropomorphism risks evoking the uncanny valley effect, increasing consumer anxiety (Mulcahy et al. 2024). AI or technology anxiety has negative effects on chatbot usage intentions (Pham et al. 2024), though different strategies can counterbalance these effects. For instance, in service recovery scenarios, behavioral strategies such as chatbot cuteness can improve consumer responses (Zhang et al. 2022). Similarly, concerns about safety, privacy, and ethical responsibilities can negatively affect anthropomorphic chatbots (e.g., Ahn et al. 2024; Song et al. 2024). These concerns can diminish the positive effects of anthropomorphism on trust (Li et al. 2023; Agnihotri and Bhattacharya 2024) and chatbot usage intentions (Song, Xing, et al. 2022). The chatbot's perceived intelligence is strongly correlated with this effect, with higher intelligence negatively affecting privacy concerns (Song, Du, et al. 2022). Particularly, new technological advancements like generative AI models amplify consumer privacy concerns (Arce-Urriza et al. 2025). This can be solved by displaying chatbots in a more machinelike manner or by disclosing the AI's identity (Kim et al. 2025).

Third, empathy: Overall, empathetic chatbots tend to elicit positive consumer responses, particularly on trust (Fu et al. 2023; Agnihotri and Bhattacharya 2024), usage intentions (Kim and Hur 2024), human-AI relationships (Yang et al. 2024), and attitudes toward the chatbot (Zhang, Lu, et al. 2024). They can also help mitigate negative emotions caused by service failures (Zhu et al. 2023). However, despite the positive impact of anthropomorphism on empathy, consumers still expect human agents to display more empathy than chatbots, leading to overall higher empathy ratings of human services (Markovitch et al. 2024).

Finally, trust: The concept of trust has been extensively studied, with numerous studies emphasizing its positive impact on consumers (e.g., Klein and Martinez 2023; Li and Lee 2024). While anthropomorphism can directly enhance trust (e.g., Klein and Martinez 2023; Liu et al. 2024), perceived chatbot expertise (Li et al. 2023) and competence (Pinochet et al. 2024) can also increase trust ratings. Lu and Zhang (2025) suggest that chatbot demographics, such as gender, race, and job rankings, significantly impact trust, with participants in their study preferring female, non-Caucasian AI chatbots. Yet, this finding should be interpreted with caution, as two-thirds of their participants were non-Caucasian, potentially skewing the results. Conversely, Fu et al. (2023) argue that anthropomorphism can have a negative influence on trust, as consumers' expectations increase for highly humanlike chatbots, making their mistakes seem more severe. Particularly in situations of specific sales problems, chatbots still struggle to answer subjective questions that exceed their programming.

Regarding methods, qualitative studies are generally underrepresented, as already noted in the methods section. Quantitative studies dominate the field, with scenario-based experiments being especially common in research themes on perceived ease of use, perceived usefulness, and empathy.

Other emerging research themes include consumer-related psychological concepts, such as social self-efficacy (Balakrishnan et al. 2022) and self-congruence (Zogaj et al. 2023; Liang et al. 2024). Behavioral concepts, such as smiling chatbots (Baek et al. 2022; Zhu et al. 2023) and chatbots displaying humor (Shin et al. 2023; Shams et al. 2024; Xie et al. 2024) have also been studied. Kim et al. (2024) and Sun et al. (2024) introduce the concept of anthropomorphism in combination with chatbot advertising and its effectiveness, providing a basis for future studies in marketing.

6 | Future Research Directions

The findings from the TCCM framework reveal several gaps in current research, thereby addressing RQ2: Where are gaps in current research on chatbot anthropomorphism? By identifying these gaps, an outlook into potential future research directions can be given, answering RQ3: Where should research on chatbot anthropomorphism head in the future?

6.1 | Theory (T)

The analysis reveals that many articles employ Epley et al.'s (2007) theory of anthropomorphism as their theoretical framework. This theory outlines three factors of anthropomorphism: elicited agent knowledge, effectance motivation, and sociality motivation. Despite its frequent application, limited attention has been given to the distinct effects of each of these factors on consumer responses to anthropomorphic chatbots. Future studies should aim to assess these effects to provide a more comprehensive and holistic understanding of anthropomorphism on AI technologies.

While Epley et al.'s theory and the CASA paradigm dominate research on chatbot anthropomorphism, theories from the broader field of human–computer interactions (HCI) remain underutilized. Established frameworks like the TAM (Davis 1989) and UTAUT (Venkatesh et al. 2003) offer valuable insights into how consumers perceive and interact with anthropomorphic AI. Newer theories, specifically tailored for generative AI, such as the digital agenticity theory (Kim and Lee 2025) or the AIDUA model (Gursoy et al. 2019), warrant additional empirical testing. Incorporating these theories along with generative AI features, such as advanced intelligence and adaptability, could allow studies to uncover novel ways in which chatbot anthropomorphism affects consumer behavior. With increased risks of privacy concerns and AI anxiety, highly anthropomorphic generative AI

chatbots may not always elicit the same positive responses as traditional chatbots have until now, calling for further exploration to understand these changes.

Basic psychological and consumer behavior theories, such as the signaling theory and the fluency theory, are notably absent from the reviewed literature. These frameworks could explain how consumers interpret anthropomorphic cues and how these cues affect their perceptions and behaviors. Zogaj et al. (2023) have started to incorporate related concepts, such as the congruence theory, into chatbot research. Future studies now can delve deeper into consumers' psychological processing, mental imagery, cue interpretation, and cognitive evaluations of anthropomorphic chatbots within the context of HCI.

6.2 | Context (C)

Current research is predominantly concentrated in East Asian countries, particularly in technologically advanced regions like China and South Korea. Expanding research to other countries could provide more diverse insights. For instance, studies in Japan could reveal how the cultural integration of chatbots and robots in society impacts consumers. Similarly, studies in Europe, particularly in Germany, could show how consumers respond to chatbots when concerned about data protection and privacy (Li 2022). Finally, expanding research into underrepresented regions, such as Africa and South America, could help gain a more comprehensive global perspective. Comparative studies focusing on cultural differences in how chatbot anthropomorphism affects consumer behavior across different countries and societies could reveal diverse findings. By emphasizing cross-national and cultural comparisons, such as between individualist and collectivist cultures (Morris and Peng 1994), these studies could explain differences in consumer responses to anthropomorphic chatbots. With this, future research could explore how chatbot design and anthropomorphic features should be tailored to fit the consumers' cultural values and expectations.

Current literature lacks diversity in industries and business functions, with research largely focusing on chatbot anthropomorphism in customer service contexts or with customers as target groups. Future studies should examine how chatbot anthropomorphism can be integrated into new fields such as marketing, human resources, finance, and purchasing. Particularly in marketing, future research should consider the integration of anthropomorphic chatbots into advertising. Only two articles have recently begun exploring the use of chatbots in advertisements. With the increasing prominence of social media marketing, social media channels can be utilized as valuable platforms for chatbot research, especially in combination with online advertisements and consumer brand engagements. Interactions with other AI entities, such as virtual influencers, in e-commerce scenarios on social media platforms should be examined for a deeper understanding of consumer decision-making processes.

Lastly, while service recovery and its strategies emerge as a key research theme in this review, only two articles specifically focus on consumer responses in service failure scenarios. Future research should address this gap by investigating how different levels of anthropomorphism affect consumers in failure contexts, such as scenarios with varying degrees of severity.

6.3 | Characteristics (C)

Current research covers several chatbot characteristics and personality traits, such as cuteness, humor, and intelligence. While functionality dimensions like ease of use and usefulness initially received attention (e.g., Pillai and Sivathanu 2020; Selamat and Windasari 2021), they have since been underexplored. Compared to perceived warmth and competence from the SCM, ease of use and usefulness need further investigation, particularly outside of the traditional TAM framework, for instance as moderators or with dependent variables beyond consumer usage intention.

Research predominantly focuses on positive chatbot emotions, such as empathy and smiling, while negative emotions, such as anger and sadness, remain unexplored. These emotions could be particularly relevant in critical situations, such as service failures, where understanding consumer reactions to negative chatbot emotions could advance knowledge on chatbot effectiveness in solving conflicts. While some chatbot personality traits have been studied, future research could systematically examine more dimensions, including the Big Five personality traits (openness, conscientiousness, extroversion, agreeableness, and neuroticism), in both chatbots and consumers. Comparing the congruence between chatbot and consumer personalities could reveal whether a fit between both personalities has a positive or negative impact in different situations. Applying the concept of congruency and self-congruence in this context could provide a valuable foundation.

Another significant gap lies in the perceived age of chatbots. None of the reviewed studies have explored how age-related cues, that is, a chatbot appearing or sounding younger versus older, affect consumer perceptions and behaviors. Analyzing how consumers respond to chatbots of different ages across various contexts (e.g., healthcare services vs. e-commerce) could provide new insights into the optimal design of anthropomorphic features.

Text-based communication remains a key aspect of chatbot interactions, making message and response content a crucial factor in consumer engagement. Recent studies (e.g., Cheng et al. 2024; Klein et al. 2024) have analyzed chatbot responses, with generative AI models offering many more opportunities for innovation. Tailored responses, such as personalized messages and adaptive communication styles, could deepen consumer engagement and provide a more humanlike experience.

Consumer demographics, such as gender, have been addressed in multiple studies (e.g., Zhang et al. 2022; Fatima et al. 2024). Only one article by Cheng et al. (2023), however, includes consumer age by analyzing the impact of anthropomorphic chatbots on elderly consumers. Additional demographic factors, such as income and education level, as well as consumer characteristics, such as situational loneliness and the need for human interaction, lack research on chatbot anthropomorphism and present opportunities for future studies.

Existing studies on AI or technology anxiety provide conflicting findings. Contrary to the uncanny valley theory, Pillai and Sivathanu (2020) suggest that technology anxiety does not significantly influence chatbot usage. Pham et al. (2024) indicate that technology anxiety weakens consumer connections to anthropomorphic chatbots, whereas Zhang et al. (2022) state that it enhances the effectiveness of cuteness strategies. These inconsistencies highlight the need for further research to clarify the role of technology anxiety on consumer behavior and HCI. In contrast to technology anxiety, research on consumer innovativeness remains scarce, with Fu et al. (2023) being the only article addressing this topic within the Technology Readiness Index. Similar concepts, such as technological affinity and computer self-efficacy, as outlined in the TAM 3 model, remain unresearched. As consumer responses are often strongly shaped by their anxiety toward AI and automation, these factors represent essential aspects for future research.

Cultural differences in technological affinity and anxiety also present new research directions. Although previous studies have examined technology acceptance through cultural frameworks, such as Hofstede's dimensions of Masculinity/Femininity and Uncertainty Avoidance (Srite and Karahanna 2006), the specific connection between cultural values and consumer traits like technology anxiety or affinity remains unexplored. For instance, in China, consumers' frequent exposure to innovative technologies fosters higher technological affinity and acceptance compared to countries with less exposure (Yam et al. 2023).

At the same time, ethical considerations in chatbot research are highly underrepresented. While Ahn et al. (2024) find that anthropomorphic chatbots are judged more harshly for unethical behavior, which in turn worsens consumer perceptions, no other articles address ethical issues. These concerns are becoming increasingly important and require consideration, as chatbot designs incorporate anthropomorphic features tied to race or gender. For example, Lu and Zhang (2025) show that consumers apply racial bias when interacting with racially diverse service chatbots. With AI technologies raising ethical concerns about integrity and morality (Paul et al. 2024), future scholars and practitioners must pay attention to these aspects of chatbot usage. Scholars must ensure clear AI disclosure in experimental settings (Mpinganjira et al. 2024), whereas practitioners must implement ethical policies and principles for responsible consumer–chatbot interactions (Song, Du, et al. 2022; Paul et al. 2024).

Firm-related factors are generic and underrepresented in existing literature. Future academics could include comparisons between different brands or the creation of a fictitious brand with varying brand images.

Lastly, anthropomorphism is often studied in the context of relationship-based constructs, such as brand attachment or brand love (e.g., Rauschnabel and Ahuvia 2014). While Pentina et al. (2023) demonstrate that social interaction fully mediates the relationship between anthropomorphism and attachment, the concept of emotional attachment to chatbots needs further investigation. Emotional attachment extends beyond usual interactions and relationships, whether between humans or between humans and machines (Park et al. 2010). Understanding how emotional attachment influences consumer responses could provide valuable insights for long-term marketing strategies in consumer behavior. This is particularly relevant in scenarios of service failures or chatbot wrongdoings, where studies could explore whether such attachments potentially amplify levels of consumer disappointment.

6.4 | Methods (M)

Quantitative experimental studies dominate current research on chatbot anthropomorphism (94.25%), which is consistent with the nature of consumer studies. Only 10 out of 174 studies (5.75%) utilize qualitative methods, one of which is part of a mixed-method approach combining quantitative and qualitative data. While underrepresented, these research methods are particularly suitable for the still-emerging field of AI chatbots, as their exploratory nature aids in understanding unresearched and unexplored facets of chatbots (Patton 1990).

Since research in this field is still developing, the conceptual models used in existing research are relatively simple. To advance understanding of how consumer perceptions are affected by anthropomorphic chatbots, future academics should opt for more complex models, incorporating moderations, mediations, moderated mediations, and serial mediations. For instance, interaction effects between visual and verbal anthropomorphism have been addressed in a limited number of studies, with room for future researchers to consider how visual and verbal cues in chatbots interact and influence consumer perceptions.

Lastly, studies up until now only focus on a shorter research timespan. Longitudinal studies are needed to examine the long-term effects of anthropomorphic chatbot usage on consumer relationships. For instance, studying long-term effects of repeated chatbot usage on consumers with high needs for human interaction or situational loneliness could reveal insights into how emotional connections to chatbots evolve over time. Such research could additionally show how these emotional connections influence consumer relationships with other people, providing implications on their social and emotional well-being.

In addition to suggestions for future research directions within the TCCM framework, recommendations can also be made for the research themes identified in Section 5. Potential research questions to explore in the future are listed in Table 5. While qualitative methods are not considered a key research theme in this review, they still offer beneficial insights into consumer perceptions for future studies and are hence also included in Table 5.

7 | Conclusion

The purpose of this SLR is to provide a comprehensive overview of current research on consumer responses in the rapidly evolving field of anthropomorphic AI chatbots. Drawing on the SPAR-4-SLR protocol, a total of 84 academic publications

TABLE 5 | Potential future research questions by key research themes.

	Research theme	Potential future research questions
Theories	Social presence	• In which industries or scenarios beyond e-commerce does social presence in chatbots enhance consumer experiences, and how does this vary by industry? • What conditions lead chatbot anthropomorphism to reduce social presence, and what factors drive this effect? • In what context does social presence have negative effects, and what mechanisms are responsible?
	Perceived warmth and competence	• Which specific anthropomorphic features simultaneously increase both perceived warmth and competence? • How does chatbot anthropomorphism improve perceived competence while lowering perceived warmth in emotional or relational contexts?
	Perceived ease of use and usefulness	• How does chatbot anthropomorphism negatively affect ease of use and usefulness, particularly for users with high technological anxiety? • How does chatbot anthropomorphism impact ease of use and usefulness in scenarios of service failure or recovery? • How do different consumer demographics like age or innovativeness shape perceptions of ease of use and usefulness in anthropomorphic chatbots?
Contexts	Service failure and recovery	• Which industries beyond e-commerce and tourism are affected by anthropomorphic chatbot service failures, and how do industry characteristics shape this effect? • How does the severity of a service failure impact consumer responses to anthropomorphic chatbots in healthcare services? • Which visual anthropomorphic features are most effective in improving service recovery by chatbots?
Characteristics	Chatbot vs. human	• What theories explain the differences in consumer reactions to chatbots versus humans, and what key factors drive these differences? • How do consumer expectations vary between chatbot and human interactions in service recovery scenarios, and how do they influence outcomes? • How do consumer perceptions differ when interacting with undisclosed anthropomorphic chatbots versus humans? • How do consumer perceptions differ when interacting with anthropomorphic chatbots displaying emotions compared to real humans expressing the same emotions?
	Privacy concerns and AI anxiety	• Which anthropomorphic features are most likely to trigger consumer anxiety, and how do demographics like gender and age influence this effect? • Which anthropomorphic features mitigate AI anxiety and privacy concerns, and how do different industries benefit from these designs? • Which anthropomorphic features reverse the uncanny valley effect, and how are consumer perceptions of data privacy affected by this? • How do consumers perceive personalized recommendations by anthropomorphic chatbots regarding privacy concerns?
	Empathy	• Which theories explain the effect of chatbot anthropomorphism on empathy? • How does chatbot anthropomorphism influence empathy in healthcare services, particularly when moderated by disease severity? • In which contexts do anthropomorphic chatbots struggle to elicit empathy, and what are the underlying factors? • How does cognitive empathy in chatbots benefit from anthropomorphic features?
	Trust	• What theories explain the relationship between chatbot anthropomorphism and trust? • How does trust in anthropomorphic chatbots affect consumer perceptions in healthcare services or service failures, and what factors shape these interactions? • In which context does chatbot anthropomorphism negatively impact consumer trust, and what mitigates this risk? • What anthropomorphic behavioral features reduce consumer trust in chatbots, and how do contextual settings moderate this effect?
Methods	Qualitative methods	• Which qualitative methods can explore the different effects between AI vs. generative AI anthropomorphism? • Which qualitative methods can be used to develop new scale items on generative AI chatbots? • How can case studies be included in qualitative research studies on anthropomorphic chatbots?

were systematically selected for review. Employing the TCCM framework for a structured analysis, the study explores relevant theoretical frameworks, contexts, characteristics, statistical methods, and key research themes and trends in consumer perceptions of chatbot anthropomorphism. By addressing research questions RQ1–RQ3, the current research landscape is systematically explored, identifying significant gaps and providing clear suggestions for future research directions.

7.1 | Contribution

This review contributes to existing literature by synthesizing the positive and negative effects of chatbot anthropomorphism. First, the findings reveal that anthropomorphic chatbots are viewed as friendlier, authentic, and trustworthy, which improves their overall evaluations. Driven by key mechanisms such as social presence, empathy, and functionality, these perceptions enhance consumer trust, emotional engagement, and affection. Consumers also report greater satisfaction, usage intentions, and a higher likelihood of recommending the chatbot to others when interacting with anthropomorphic chatbots. These benefits further extend to firms and brands. Companies employing anthropomorphic chatbots are viewed as more likable and capable of forming emotional connections, which in turn increases purchase intentions.

However, the analysis also exposes challenges and negative effects. The effectiveness of anthropomorphic chatbots is not universal but depends heavily on consumer characteristics. Traits like skepticism, privacy concerns, and technology anxiety can cause discomfort and distrust, particularly when users are expected to share sensitive personal information. Anthropomorphism also raises consumer expectations, making service failures and recoveries more complex and less forgiving. With new generative AI models, which are perceived as even more intelligent than earlier models, these concerns become more compelling. Highly intelligent or highly anthropomorphic chatbots can trigger the uncanny valley effect and elicit negative responses through anxiety and distrust. As a result, anthropomorphism can have opposing effects on usage intentions, trust, and overall evaluations. Consumers then either prefer non-anthropomorphic chatbots or revert to human frontline services, making chatbot anthropomorphism counterproductive (RQ1).

Second, the review identifies notable research gaps, such as the need to investigate additional anthropomorphic characteristics (e.g., chatbot age and emotional range), personalized communication strategies, consumer technological affinity, and the role of chatbots in social media marketing (RQ2). Third, the analysis offers clear guidance for future research, with proposed questions such as which anthropomorphic features trigger consumer anxiety, how demographic factors influence these responses, and how consumer expectations and responses differ between chatbot and human interactions in service recovery scenarios. As generative AI and automation become more advanced and integrated into everyday life, researchers need to understand and adapt designs accordingly. The goal is to strike a balance in creating humanlike chatbots by using anthropomorphic features that improve consumer experiences while avoiding those that could pose threats or trigger the uncanny valley effect. Throughout this process, consumers' well-being should remain central to HCI research, with future studies optimizing chatbot anthropomorphism to meet consumer expectations and enhance their overall experience (RQ3).

Beyond its academic contributions, the review also offers meaningful practical implications for businesses, chatbot developers, and designers. It provides a systematically structured overview of the key mechanisms that shape consumer responses, identifies conditions under which anthropomorphic chatbots perform best, and highlights design elements that trigger negative reactions. The review further outlines the opportunities and risks of using AI in business and summarizes how anthropomorphic chatbots have been studied across different industries. Practitioners planning to use text-based chatbots can draw on this SLR for evidence-based guidance. For example, anthropomorphic chatbot designs can benefit companies (e.g., higher purchase intentions, better brand evaluations), chatbot developers (e.g., higher continuance intentions, user recommendations of chatbot), and consumers (e.g., satisfaction, emotional well-being, attachment). Overall, three key managerial implications emerge from this SLR.

First, practitioners must understand consumers and their characteristics. As chatbot effectiveness is shaped by consumer characteristics (e.g., technological affinity, personality, culture) and expectations (e.g., service quality, recovery), it is essential for firms to analyze their target audience. Research highlights the importance of designing chatbots to elicit self-congruence, both visually and verbally. For example, consumers respond better to chatbots that match their own gender. Yet, many companies still intentionally design gender-neutral chatbots, such as Kasisto's banking chatbot KAI or Dreams for Life's charity chatbot GURU. Although these choices aim to avoid bias, they miss opportunities to engage consumers and offer personalized services.

Second, chatbot effectiveness also depends on context and industry. In e-commerce, where text-based chatbots are employed the most, positive effects have been linked to situational factors. For example, a match between the chatbot characteristic (e.g., chatbot gender) and the situational factor (e.g., product type, task type) can significantly improve the chatbot's recommendation effectiveness. To optimize results, practitioners should ensure that chatbot designs align with firm factors, company perceptions, and brand personality. A strong example is Domino's chatbot Dom, which effectively reflects the company's branding and design. With research suggesting that sincere brands profit from highly anthropomorphic chatbots, companies like Disney or Whole Foods could benefit from adapting their non-anthropomorphic chatbots to build stronger emotional connections to users.

Third, with the rise of generative AI, combining visual and verbal anthropomorphism can trigger the uncanny valley effect and lead to consumer anxiety. This is especially relevant in the healthcare industry when dealing with sensitive information. To prevent this, healthcare chatbots like Pact Care's Florence or Woebot opt for low anthropomorphic designs. Here, AI disclosure and transparency are not only ethically important but can help mitigate negative effects of privacy concerns and distrust.

Overall, this review offers a timely contribution with insights into the potential of chatbot anthropomorphism to both academic research and industry practice. Unlike prior review articles that analyze a broad range of AI technologies or automation, this SLR specifically focuses on the role of text-based chatbots in shaping consumer responses. This targeted approach aligns with industry trends and the rise of conversational commerce, as various sectors increasingly adopt text-based chatbots in their customer service. With generative AI enabling more natural and humanlike interactions, text-based chatbots like ChatGPT can enhance user experiences and increase sales and business growth (Paul et al. 2024). By offering a clear understanding of the underlying mechanisms and drivers of HCI, this review guides practitioners in designing and implementing anthropomorphic chatbots effectively.

7.2 | Limitations

This literature review, however, is not without limitations. First, the study relies on two databases, Scopus and WOS, to search for relevant articles. Although these databases cover extensive academic work, the reliance on these two sources may have omitted some relevant articles from other databases. The search criterion was set to articles written only in English, excluding studies from non-English-speaking countries, thereby limiting the scope of research. Similarly, by focusing exclusively on chatbots within the context of consumer behavior in business, management, and accounting, the review omits studies from other disciplines, potentially narrowing the overall research perspective. Expanding the search criteria to include book chapters, monographs, and meta-analyses could enrich the scope, yet this should be done under consideration of the source quality.

While the keywords were carefully selected to include as many relevant articles as possible, future reviews could broaden the scope by including additional terms, such as "humanoid" alongside "anthropomorphism" or "conversational agent" in addition to "chatbot." Furthermore, this review specifically focuses on consumer responses to text-based anthropomorphic chatbots, excluding other AI technologies, such as physical service robots, virtual influencers, or voice-based entities like smart devices and voice assistants.

Lastly, the study employs the TCCM framework due to its systematic and comprehensive structure, making it particularly well-suited for SLRs. Future studies could, however, consider alternative methodologies, such as domain-based reviews, meta-analytical reviews, or reviews aiming for theory development (Paul and Criado 2020). Adopting these methodologies could offer new and different perspectives on the rapidly expanding field of chatbot anthropomorphism.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data sharing are not applicable to this article as no new data were created or analyzed in this study.

References

Aaker, J., and S. Fournier. 1995. "A Brand as a Character, A Partner and a Person: Three Perspectives on the Question of Brand Personality." *Advances in Consumer Research* 22, no. 1: 391–395.

Adam, M., M. Wessel, and A. Benlian. 2021. "AI-Based Chatbots in Customer Service and Their Effects on User Compliance." *Electronic Markets* 31, no. 2: 427–445. https://doi.org/10.1007/s12525-020-00414-7.

Adamopoulou, E., and L. Moussiades. 2020. "Chatbots: History, Technology, and Applications." *Machine Learning With Applications* 2: 100006. https://doi.org/10.1016/j.mlwa.2020.100006.

Aggarwal, P., and A. L. McGill. 2012. "When Brands Seem Human, Do Humans Act Like Brands? Automatic Behavioral Priming Effects of Brand Anthropomorphism." *Journal of Consumer Research* 39, no. 2: 307–323. https://doi.org/10.1086/662614.

Agnihotri, A., and S. Bhattacharya. 2024. "Chatbots' Effectiveness in Service Recovery." *International Journal of Information Management* 76: 102679. https://doi.org/10.1016/j.ijinfomgt.2023.102679.

Ahn, J., J. Kim, and Y. Sung. 2022. "The Effect of Gender Stereotypes on Artificial Intelligence Recommendations." *Journal of Business Research* 141: 50–59. https://doi.org/10.1016/j.jbusres.2021.12.007.

Ahn, J., J. Kim, and Y. Sung. 2024. "The Role of Perceived Freewill in Crises of Human-AI Interaction: The Mediating Role of Ethical Responsibility of AI." *International Journal of Advertising* 43, no. 5: 847–873. https://doi.org/10.1080/02650487.2023.2299563.

Araujo, T. 2018. "Living Up to the Chatbot Hype: The Influence of Anthropomorphic Design Cues and Communicative Agency Framing on Conversational Agent and Company Perceptions." *Computers in Human Behavior* 85: 183–189. https://doi.org/10.1016/j.chb.2018.03.051.

Arce-Urriza, M., R. Chocarro, M. Cortiñas, and G. Marcos-Matás. 2025. "From Familiarity to Acceptance: The Impact of Generative Artificial Intelligence on Consumer Adoption of Retail Chatbots." *Journal of Retailing and Consumer Services* 84: 104234. https://doi.org/10.1016/j.jretconser.2025.104234.

Baek, T. H., H. J. Kim, and J. Kim. 2025. "AI-Generated Recommendations: Roles of Language Style, Perceived AI Human-Likeness, and Recommendation Agent." *International Journal of Hospitality Management* 126: 104106. https://doi.org/10.1016/j.ijhm.2025.104106.

Baek, T. H., M. Bakpayev, S. Yoon, and S. Kim. 2022. "Smiling AI Agents: How Anthropomorphism and Broad Smiles Increase Charitable Giving." *International Journal of Advertising* 41, no. 5: 850–867. https://doi.org/10.1080/02650487.2021.2011654.

Balakrishnan, J., S. S. Abed, and P. Jones. 2022. "The Role of Meta-UTAUT Factors, Perceived Anthropomorphism, Perceived Intelligence, and Social Self-Efficacy in Chatbot-Based Services?" *Technological Forecasting and Social Change* 180: 121692. https://doi.org/10.1016/j.techfore.2022.121692.

Blut, M., C. Wang, N. V. Wünderlich, and C. Brock. 2021. "Understanding Anthropomorphism in Service Provision: A Meta-Analysis of Physical Robots, Chatbots, and Other AI." *Journal of the Academy of Marketing Science* 49, no. 4: 632–658. https://doi.org/10.1007/s11747-020-00762-y.

Candello, H., C. Pinhanez, and F. Figueiredo. 2017. "Typefaces and the Perception of Humanness in Natural Language Chatbots." In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems. CHI'17: CHI Conference on Human Factors in Computing Systems*. ACM. 3476–3487. https://doi.org/10.1145/3025453.3025919.

Chadegani, A. A., H. Salehi, M. M. Yunus, et al. 2013. "A Comparison Between Two Main Academic Literature Collections: Web of Science and Scopus Databases." *Asian Social Science* 9, no. 5: 18. https://doi.org/10.5539/ass.v9n5p18.

Chakraborty, D., A. Kumar Kar, S. Patre, and S. Gupta. 2024. "Enhancing Trust in Online Grocery Shopping Through Generative AI Chatbots." *Journal of Business Research* 180: 114737. https://doi.org/10.1016/j.jbusres.2024.114737.

Chen, Q., Y. Gong, Y. Lu, and J. Tang. 2022. "Classifying and Measuring the Service Quality of AI Chatbot in Frontline Service." *Journal of Business Research* 145: 552–568. https://doi.org/10.1016/j.jbusres.2022.02.088.

Cheng, J., and J. Zeng. 2023. "Shaping AI's Future? China in Global AI Governance." *Journal of Contemporary China* 32, no. 143: 794–810. https://doi.org/10.1080/10670564.2022.2107391.

Cheng, X., L. Qiao, B. Yang, and Z. Li. 2023. "An Investigation on the Influencing Factors of Elderly People's Intention to Use Financial AI Customer Service." *Internet Research* 34, no. 3: 690–717. https://doi.org/10.1108/INTR-06-2022-0402.

Cheng, Z., W. Fan, B. Shao, W. Jia, and Y. Zhang. 2024. "The Impact of Intelligent Customer Service Agents' Initial Response on Consumers' Continuous Interaction Intention." *Journal of Retailing and Consumer Services* 76: 103585. https://doi.org/10.1016/j.jretconser.2023.103585.

Choi, S., and J. Zhou. 2023. "Inducing Consumers' Self-Disclosure Through the Fit Between Chatbot's Interaction Styles and Regulatory Focus." *Journal of Business Research* 166: 114127. https://doi.org/10.1016/j.jbusres.2023.114127.

Crolic, C., F. Thomaz, R. Hadi, and A. T. Stephen. 2022. "Blame the Bot: Anthropomorphism and Anger in Customer–Chatbot Interactions." *Journal of Marketing* 86, no. 1: 132–148. https://doi.org/10.1177/00222429211045687.

Cui, Y. 2022. "Sophia Sophia Tell Me More, Which Is the Most Risk-Free Plan of All? AI Anthropomorphism and Risk Aversion in Financial Decision-Making." *International Journal of Bank Marketing* 40, no. 6: 1133–1158. https://doi.org/10.1108/IJBM-09-2021-0451.

Davis, F. D. 1989. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology." *MIS Quarterly* 13, no. 3: 319. https://doi.org/10.2307/249008.

De Keyser, A., and W. H. Kunz. 2022. "Living and Working With Service Robots: A TCCM Analysis and Considerations for Future Research." *Journal of Service Management* 33, no. 2: 165–196. https://doi.org/10.1108/JOSM-12-2021-0488.

Delgado-Ballester, E., M. Palazón, and J. Peláez. 2020. "Anthropomorphized vs Objectified Brands: Which Brand Version Is More Loved?" *European Journal of Management and Business Economics* 29, no. 2: 150–165. https://doi.org/10.1108/EJMBE-04-2019-0063.

Dhanabalan, T., and A. Sathish. 2018. "Transforming Indian Industries Through Artificial Intelligence and Robotics in Industry 4.0." *International Journal of Mechanical Engineering and Technology* 9, no. 10: 835–845.

Ding, A., R. H. Lee, T. S. Legendre, and J. Madera. 2022. "Anthropomorphism in Hospitality and Tourism: A Systematic Review and Agenda for Future Research." *Journal of Hospitality and Tourism Management* 52: 404–415. https://doi.org/10.1016/j.jhtm.2022.07.018.

Dutta, S., B. Lanvin, L. Rivera León, and S. Wunsch-Vincent. 2023. "Global Innovation Index 2023: Innovation in the Face of Uncertainty." WIPO.

Epley, N., A. Waytz, and J. T. Cacioppo. 2007. "On Seeing Human: A Three-Factor Theory of Anthropomorphism." *Psychological Review* 114, no. 4: 864–886. https://doi.org/10.1037/0033-295X.114.4.864.

Fatima, J. K., M. I. Khan, S. Bahmannia, S. K. Chatrath, N. F. Dale, and R. Johns. 2024. "Rapport With a Chatbot? The Underlying Role of Anthropomorphism in Socio-Cognitive Perceptions of Rapport and e-Word of Mouth." *Journal of Retailing and Consumer Services* 77: 103666. https://doi.org/10.1016/j.jretconser.2023.103666.

Fiske, S. T., A. J. C. Cuddy, and P. Glick. 2007. "Universal Dimensions of Social Cognition: Warmth and Competence." *Trends in Cognitive Sciences* 11, no. 2: 77–83. https://doi.org/10.1016/j.tics.2006.11.005.

Fiske, S. T., A. J. C. Cuddy, P. Glick, and J. Xu. 2002. "A Model of (Often Mixed) Stereotype Content: Competence and Warmth Respectively Follow From Perceived Status and Competition." *Journal of Personality and Social Psychology* 82, no. 6: 878–902. https://doi.org/10.1037/0022-3514.82.6.878.

Fu, J., S. Mouakket, and Y. Sun. 2023. "The Role of Chatbots' Human-Like Characteristics in Online Shopping." *Electronic Commerce Research and Applications* 61: 101304. https://doi.org/10.1016/j.elerap.2023.101304.

Gilmore, G. W. 1919. *Animism: Or, Thought Currents of Primitive Peoples*. Marshall Jones company.

Go, E., and S. S. Sundar. 2019. "Humanizing Chatbots: The Effects of Visual, Identity and Conversational Cues on Humanness Perceptions." *Computers in Human Behavior* 97: 304–316. https://doi.org/10.1016/j.chb.2019.01.020.

Gong, L. 2008. "How Social Is Social Responses to Computers? The Function of the Degree of Anthropomorphism in Computer Representations." *Computers in Human Behavior* 24, no. 4: 1494–1509. https://doi.org/10.1016/j.chb.2007.05.007.

Gursoy, D., O. H. Chi, L. Lu, and R. Nunkoo. 2019. "Consumers Acceptance of Artificially Intelligent (AI) Device Use in Service Delivery." *International Journal of Information Management* 49: 157–169. https://doi.org/10.1016/j.ijinfomgt.2019.03.008.

Guthrie, S. E. 2015. *Faces in the Clouds: A New Theory of Religion*. Oxford University Press.

Guzman, A. L., and S. C. Lewis. 2020. "Artificial Intelligence and Communication: A Human–Machine Communication Research Agenda." *New Media & Society* 22, no. 1: 70–86. https://doi.org/10.1177/1461444819858691.

Hao, R., and C. Li. 2025. "How AI Chatbots Shape Satisfactory Experiences: A Combined Perspective of Competence Expansion and Emotional Extension." *Technological Forecasting and Social Change* 212: 123979. https://doi.org/10.1016/j.techfore.2025.123979.

Hsu, C.-L., and J. C.-C. Lin. 2023. "Understanding the User Satisfaction and Loyalty of Customer Service Chatbots." *Journal of Retailing and Consumer Services* 71: 103211. https://doi.org/10.1016/j.jretconser.2022.103211.

Husain, R., V. V. Ratna, and A. Saxena. 2023. "Past, Present, and Future of Anthropomorphism in Hospitality & Tourism: Conceptualization and Systematic Review." *Journal of Hospitality Marketing & Management* 32, no. 8: 1077–1125. https://doi.org/10.1080/19368623.2023.2232382.

Janson, A. 2023. "How to Leverage Anthropomorphism for Chatbot Service Interfaces: The Interplay of Communication Style and Personification." *Computers in Human Behavior* 149: 107954. https://doi.org/10.1016/j.chb.2023.107954.

Jin, S. V., and S. Youn. 2023. "Social Presence and Imagery Processing as Predictors of Chatbot Continuance Intention in Human-AI-Interaction." *International Journal of Human Computer Interaction* 39, no. 9: 1874–1886. https://doi.org/10.1080/10447318.2022.2129277.

Kanoh, H. 2017. "Immediate Response Syndrome and Acceptance of AI Robots-Comparison Between Japan and Taiwan." *Procedia Computer Science* 112: 2486–2496. https://doi.org/10.1016/j.procs.2017.08.184.

Khan, F. M., M. Anas, and S. M. F. Uddin. 2024. "Anthropomorphism and Consumer Behaviour: A SPAR-4-SLR Protocol Compliant Hybrid Review." *International Journal of Consumer Studies* 48, no. 1: e12985. https://doi.org/10.1111/ijcs.12985.

Khan, M. I., J. K. Fatima, S. Bahmannia, S. K. Chatrath, N. F. Dale, and R. Johns. 2025. "Investigating the Influence of Perceived Humanization of Service Encounters on Value Creation of Chatbot-Assisted Services." *Journal of Service Theory and Practice* 35, no. 1: 56–88. https://doi.org/10.1108/JSTP-10-2023-0282.

Kim, J. H., J. Kim, T. H. Baek, and C. Kim. 2025. "ChatGPT Personalized and Humorous Recommendations." *Annals of Tourism Research* 110: 103857. https://doi.org/10.1016/j.annals.2024.103857.

Kim, J. S., and T. H. Baek. 2024. *Motivational Determinants of Continuance Usage Intention for Generative AI: An Investment Model Approach for ChatGPT Users in the United States*, 1–17. Behaviour & Information Technology. https://doi.org/10.1080/0144929X.2024.2429647.

Kim, M. G., and K. C. Lee. 2025. "Proposing the 'Digital Agenticity Theory' to Analyze User Engagement in Conversational AI Chatbot." *Journal of Business Research* 189: 115162. https://doi.org/10.1016/j.jbusres.2024.115162.

Kim, T. W., L. Jiang, A. Duhachek, H. Lee, and A. Garvey. 2022. "Do You Mind if I Ask You a Personal Question? How AI Service Agents Alter Consumer Self-Disclosure." *Journal of Service Research* 25, no. 4: 649–666. https://doi.org/10.1177/10946705221120232.

Kim, W. B., and H. J. Hur. 2024. "What Makes People Feel Empathy for AI Chatbots? Assessing the Role of Competence and Warmth." *International Journal of Human-Computer Interaction* 40, no. 17: 4674–4687. https://doi.org/10.1080/10447318.2023.2219961.

Kim, W., Y. Ryoo, and Y. K. Choi. 2024. "That Uncanny Valley of Mind: When Anthropomorphic AI Agents Disrupt Personalized Advertising." *International Journal of Advertising*: 1–30. https://doi.org/10.1080/02650487.2024.2411669.

Klein, K., and L. F. Martinez. 2023. "The Impact of Anthropomorphism on Customer Satisfaction in Chatbot Commerce: An Experimental Study in the Food Sector." *Electronic Commerce Research* 23, no. 4: 2789–2825. https://doi.org/10.1007/s10660-022-09562-8.

Klein, S. H., D. Papies, and S. Utz. 2024. "How Interaction Mechanism and Error Responses Influence Users' Responses to Customer Service Chatbots." *International Journal of Human-Computer Interaction* 41, no. 7: 1–19. https://doi.org/10.1080/10447318.2024.2351707.

Kock, N. 2005. "Media Richness or Media Naturalness? The Evolution of Our Biological Communication Apparatus and Its Influence on Our Behavior Toward E-Communication Tools." *IEEE Transactions on Professional Communication* 48, no. 2: 117–130. https://doi.org/10.1109/TPC.2005.849649.

Konya-Baumbach, E., M. Biller, and S. Von Janda. 2023. "Someone out There? A Study on the Social Presence of Anthropomorphized Chatbots." *Computers in Human Behavior* 139: 107513. https://doi.org/10.1016/j.chb.2022.107513.

Le, H. T. P. M., J. Park, and S. Lee. 2023. "Emotion and Trust in Virtual Service Assistant Design for Effective Service Recovery." *Journal of Retailing and Consumer Services* 74: 103368. https://doi.org/10.1016/j.jretconser.2023.103368.

Li, B., R. Yao, and Y. Nan. 2024. "How Does Anthropomorphism Promote Consumer Responses to Social Chatbots: Mind Perception Perspective." *Internet Research*: 1–25. https://doi.org/10.1108/INTR-04-2024-0583.

Li, J., L. Wu, J. Qi, Y. Zhang, Z. Wu, and S. Hu. 2023. "Determinants Affecting Consumer Trust in Communication With AI Chatbots: The Moderating Effect of Privacy Concerns." *Journal of Organizational and End User Computing* 35, no. 1: 1–24. https://doi.org/10.4018/JOEUC.328089.

Li, M., and A. Suh. 2022. "Anthropomorphism in AI-Enabled Technology: A Literature Review." *Electronic Markets* 32, no. 4: 2245–2275. https://doi.org/10.1007/s12525-022-00591-7.

Li, Y. 2022. "Cross-Cultural Privacy Differences." In *Modern Socio-Technical Perspectives on Privacy*, edited by B. P. Knijnenburg, X. Page, P. Wisniewski, H. R. Lipford, N. Proferes, and J. Romano, 267–292. Springer International Publishing. https://doi.org/10.1007/978-3-030-82786-1_12.

Li, Y., and S. O. Lee. 2024. "Navigating the Generative AI Travel Landscape: The Influence of ChatGPT on the Evolution From New Users to Loyal Adopters." *International Journal of Contemporary Hospitality Management* 37: 1421–1447. https://doi.org/10.1108/IJCHM-11-2023-1767.

Li, Y., R. Hou, and R. Tan. 2024. "How Customers Respond to Chatbot Anthropomorphism: The Mediating Roles of Perceived Humanness and Perceived Persuasiveness." *European Journal of Marketing* 58, no. 12: 2757–2790. https://doi.org/10.1108/EJM-11-2022-0827.

Liang, S., R. Li, B. Lan, Y. Chu, M. Zhang, and L. Li. 2024. "Untouchable Them: The Effect of Chatbot Gender on Angry Customers." *Journal of Research in Interactive Marketing* 18, no. 6: 1099–1135. https://doi.org/10.1108/JRIM-02-2023-0061.

Liu, W., M. Jiang, W. Li, and J. Mou. 2024. "How Does the Anthropomorphism of AI Chatbots Facilitate Users' Reuse Intention in Online Health Consultation Services? The Moderating Role of Disease Severity." *Technological Forecasting and Social Change* 203: 123407. https://doi.org/10.1016/j.techfore.2024.123407.

Lu, L., R. Cai, and D. Gursoy. 2019. "Developing and Validating a Service Robot Integration Willingness Scale." *International Journal of Hospitality Management* 80: 36–51. https://doi.org/10.1016/j.ijhm.2019.01.005.

Lu, Y., and J. Zhang. 2025. "Balancing Identity Diversity and Product Contexts: Understanding Consumer Trust in AI-Enhanced Chatbot Services." *Journal of Retailing and Consumer Services* 84: 104205. https://doi.org/10.1016/j.jretconser.2024.104205.

Lu, Z., Q. Min, L. Jiang, and Q. Chen. 2024. "The Effect of the Anthropomorphic Design of Chatbots on Customer Switching Intention When the Chatbot Service Fails: An Expectation Perspective." *International Journal of Information Management* 76: 102767. https://doi.org/10.1016/j.ijinfomgt.2024.102767.

Market.Us. 2025. "Chatbot Market." https://market.us/report/chatbot-market/.

Markovitch, D. G., R. A. Stough, and D. Huang. 2024. "Consumer Reactions to Chatbot Versus Human Service: An Investigation in the Role of Outcome Valence and Perceived Empathy." *Journal of Retailing and Consumer Services* 79: 103847. https://doi.org/10.1016/j.jretconser.2024.103847.

Mongeon, P., and A. Paul-Hus. 2016. "The Journal Coverage of Web of Science and Scopus: A Comparative Analysis." *Scientometrics* 106, no. 1: 213–228. https://doi.org/10.1007/s11192-015-1765-5.

Moon, Y. 2000. "Intimate Exchanges: Using Computers to Elicit Self-Disclosure From Consumers." *Journal of Consumer Research* 26, no. 4: 323–339. https://doi.org/10.1086/209566.

Mori, M., K. MacDorman, and N. Kageki. 2012. "The Uncanny Valley [From the Field]." *IEEE Robotics and Automation Magazine* 19, no. 2: 98–100. https://doi.org/10.1109/MRA.2012.2192811.

Morris, M. W., and K. Peng. 1994. "Culture and Cause: American and Chinese Attributions for Social and Physical Events." *Journal of Personality and Social Psychology* 67, no. 6: 949. https://doi.org/10.1037/0022-3514.67.6.949.

Mpinganjira, M., N. Dlodlo, and E. C. Idemudia. 2024. "Perceived Experiential Value and Continued Use Intention of e-Retail Chatbots." *International Journal of Retail & Distribution Management* 52, no. 13: 121–135. https://doi.org/10.1108/IJRDM-04-2023-0237.

Mulcahy, R. F., A. Riedel, B. Keating, A. Beatson, and K. Letheren. 2024. "Avoiding Excessive AI Service Agent Anthropomorphism: Examining Its Role in Delivering Bad News." *Journal of Service Theory and Practice* 34, no. 1: 98–126. https://doi.org/10.1108/JSTP-04-2023-0118.

Murtaza, Z., I. Sharma, and P. Carbonell. 2024. "Examining Chatbot Usage Intention in a Service Encounter: Role of Task Complexity, Communication Style, and Brand Personality." *Technological Forecasting and Social Change* 209: 123806. https://doi.org/10.1016/j.techfore.2024.123806.

Nass, C., and Y. Moon. 2000. "Machines and Mindlessness: Social Responses to Computers." *Journal of Social Issues* 56, no. 1: 81–103. https://doi.org/10.1111/0022-4537.00153.

Nass, C., J. Steuer, and E. R. Tauber. 1994. "Computers Are Social Actors." In *Conference Companion on Human Factors in Computing Systems – CHI'94*: *Conference Companion, ACM Press*. 204. https://doi.org/10.1145/259963.260288.

Nguyen, M., L. Casper Ferm, S. Quach, N. Pontes, and P. Thaichon. 2023. "Chatbots in Frontline Services and Customer Experience: An Anthropomorphism Perspective." *Psychology & Marketing* 40, no. 11: 2201–2225. https://doi.org/10.1002/mar.21882.

Palmatier, R. W., M. B. Houston, and J. Hulland. 2018. "Review Articles: Purpose, Process, and Structure." *Journal of the Academy of Marketing Science* 46, no. 1: 1–5. https://doi.org/10.1007/s11747-017-0563-4.

Paré, G., M.-C. Trudel, M. Jaana, and S. Kitsiou. 2015. "Synthesizing Information Systems Knowledge: A Typology of Literature Reviews." *Information & Management* 52, no. 2: 183–199. https://doi.org/10.1016/j.im.2014.08.008.

Park, C. W., D. J. Macinnis, J. Priester, A. B. Eisingerich, and D. Iacobucci. 2010. "Brand Attachment and Brand Attitude Strength: Conceptual and Empirical Differentiation of Two Critical Brand Equity Drivers." *Journal of Marketing* 74, no. 6: 1–17. https://doi.org/10.1509/jmkg.74.6.1.

Park, G., J. Chung, and S. Lee. 2024. "Scope and Limits of AI Fundraisers: Moderated Serial Multiple Mediation Model Between Artificial Emotions and Willingness to Donate via Humanness and Empathy." *Technological Forecasting and Social Change* 201: 123211. https://doi.org/10.1016/j.techfore.2024.123211.

Pathak, K., G. Prakash, A. Samadhiya, A. Kumar, and S. Luthra. 2025. "Impact of Gen-AI Chatbots on Consumer Services Experiences and Behaviors: Focusing on the Sensation of Awe and Usage Intentions Through a Cybernetic Lens." *Journal of Retailing and Consumer Services* 82: 104120. https://doi.org/10.1016/j.jretconser.2024.104120.

Patton, M. Q. 1990. *Qualitative Evaluation and Research Methods*. 2nd ed, 532. Sage Publications, Inc.

Paul, J. 2024. "Publishing in Premier Journals With High Impact Factor and Q1 Journals: Dos and Don'ts." *International Journal of Consumer Studies* 48, no. 3: e13049. https://doi.org/10.1111/ijcs.13049.

Paul, J., A. Ueno, C. Dennis, et al. 2024. "Digital Transformation: A Multidisciplinary Perspective and Future Research Agenda." *International Journal of Consumer Studies* 48, no. 2: e13015. https://doi.org/10.1111/ijcs.13015.

Paul, J., and A. R. Criado. 2020. "The Art of Writing Literature Review: What Do We Know and What Do We Need to Know?" *International Business Review* 29, no. 4: 101717. https://doi.org/10.1016/j.ibusrev.2020.101717.

Paul, J., and A. Rosado-Serrano. 2019. "Gradual Internationalization vs Born-Global/International New Venture Models: A Review and Research Agenda." *International Marketing Review* 36, no. 6: 830–858. https://doi.org/10.1108/IMR-10-2018-0280.

Paul, J., W. M. Lim, A. O'Cass, A. W. Hao, and S. Bresciani. 2021. "Scientific Procedures and Rationales for Systematic Literature Reviews (SPAR-4-SLR)." *International Journal of Consumer Studies* 45, no. 4: O1–O16. https://doi.org/10.1111/ijcs.12695.

Pavone, G., L. Meyer-Waarden, and A. Munzel. 2023. "Rage Against the Machine: Experimental Insights Into Customers' Negative Emotional Responses, Attributions of Responsibility, and Coping Strategies in Artificial Intelligence–Based Service Failures." *Journal of Interactive Marketing* 58, no. 1: 52–71. https://doi.org/10.1177/10949968221134492.

Pawar, S. K. 2023. "Marketing Education to International Students: A Systematic Literature Review and Future Research Agenda." *International Journal of Consumer Studies* 47, no. 1: 42–58. https://doi.org/10.1111/ijcs.12883.

Pentina, I., T. Hancock, and T. Xie. 2023. "Exploring Relationship Development With Social Chatbots: A Mixed-Method Study of Replika." *Computers in Human Behavior* 140: 107600. https://doi.org/10.1016/j.chb.2022.107600.

Pham, H. C., C. D. Duong, and G. K. H. Nguyen. 2024. "What Drives Tourists' Continuance Intention to Use ChatGPT for Travel Services? A Stimulus-Organism-Response Perspective." *Journal of Retailing and Consumer Services* 78: 103758. https://doi.org/10.1016/j.jretconser.2024.103758.

Pillai, R., and B. Sivathanu. 2020. "Adoption of AI-Based Chatbots for Hospitality and Tourism." *International Journal of Contemporary Hospitality Management* 32, no. 10: 3199–3226. https://doi.org/10.1108/IJCHM-04-2020-0259.

Pinochet, L. H. C., F. S. De Gois, V. I. Pardim, and L. M. Onusic. 2024. "Experimental Study on the Effect of Adopting Humanized and Non-Humanized Chatbots on the Factors Measure the Intensity of the User's Perceived Trust in the Yellow September Campaign." *Technological Forecasting and Social Change* 204: 123414. https://doi.org/10.1016/j.techfore.2024.123414.

Pizzi, G., V. Vannucci, V. Mazzoli, and R. Donvito. 2023. "I, Chatbot! The Impact of Anthropomorphism and Gaze Direction on Willingness to Disclose Personal Information and Behavioral Intentions." *Psychology & Marketing* 40, no. 7: 1372–1387. https://doi.org/10.1002/mar.21813.

Rapp, A., L. Curti, and A. Boldi. 2021. "The Human Side of Human-Chatbot Interaction: A Systematic Literature Review of Ten Years of Research on Text-Based Chatbots." *International Journal of Human-Computer Studies* 151: 102630. https://doi.org/10.1016/j.ijhcs.2021.102630.

Rauschnabel, P. A., and A. C. Ahuvia. 2014. "You're So Lovable: Anthropomorphism and Brand Love." *Journal of Brand Management* 21, no. 5: 372–395. https://doi.org/10.1057/bm.2014.14.

Rizomyliotis, I., M. N. Kastanakis, A. Giovanis, K. Konstantoulaki, and I. Kostopoulos. 2022. "'How mAy I Help You Today?' The Use of AI Chatbots in Small Family Businesses and the Moderating Role of Customer Affective Commitment." *Journal of Business Research* 153: 329–340. https://doi.org/10.1016/j.jbusres.2022.08.035.

Roy, R., and V. Naidoo. 2021. "Enhancing Chatbot Effectiveness: The Role of Anthropomorphic Conversational Styles and Time Orientation." *Journal of Business Research* 126: 23–34. https://doi.org/10.1016/j.jbusres.2020.12.051.

Ruan, Y., and J. Mezei. 2022. "When Do AI Chatbots Lead to Higher Customer Satisfaction Than Human Frontline Employees in Online Shopping Assistance? Considering Product Attribute Type." *Journal of Retailing and Consumer Services* 68: 103059. https://doi.org/10.1016/j.jretconser.2022.103059.

Sarraf, S., A. K. Kar, and M. Janssen. 2024. "How Do System and User Characteristics, Along With Anthropomorphism, Impact Cognitive Absorption of Chatbots – Introducing SUCCAST Through a Mixed Methods Study." *Decision Support Systems* 178: 114132. https://doi.org/10.1016/j.dss.2023.114132.

Scarpi, D. 2024. "Strangers or Friends? Examining Chatbot Adoption in Tourism Through Psychological Ownership." *Tourism Management* 102: 104873. https://doi.org/10.1016/j.tourman.2023.104873.

Schillaci, C. E., L. M. de Cosmo, L. Piper, M. Nicotra, and G. Guido. 2024. "Anthropomorphic Chatbots' for Future Healthcare Services: Effects of Personality, Gender, and Roles on Source Credibility, User

Satisfaction, and Intention to Use." *Technological Forecasting and Social Change* 199: 123025. https://doi.org/10.1016/j.techfore.2023.123025.

Schöbel, S., A. Schmitt, D. Benner, M. Saqr, A. Janson, and J. M. Leimeister. 2024. "Charting the Evolution and Future of Conversational Agents: A Research Agenda Along Five Waves and New Frontiers." *Information Systems Frontiers* 26, no. 2: 729–754. https://doi.org/10.1007/s10796-023-10375-9.

Schodt, F. L. 1988. *Inside the Robot Kingdom: Japan, Mechatronics, and the Coming Robotopia*. Kodansha International.

Schotten, M., M. El Aisati, W. J. N. Meester, S. Steiginga, and C. A. Ross. 2017. "A Brief History of Scopus: The World's Largest Abstract and Citation Database of Scientific Literature." In *Research Analytics*, edited by F. J. Cantú-Ortiz, 31–58. Auerbach Publications. https://doi.org/10.1201/9781315155890-3.

Selamat, M. A., and N. A. Windasari. 2021. "Chatbot for SMEs: Integrating Customer and Business Owner Perspectives." *Technology in Society* 66: 101685. https://doi.org/10.1016/j.techsoc.2021.101685.

Shams, G., K. K. Kim, and K. Kim. 2024. "Enhancing Service Recovery Satisfaction With Chatbots: The Role of Humor and Informal Language." *International Journal of Hospitality Management* 120: 103782. https://doi.org/10.1016/j.ijhm.2024.103782.

Sharma, N., R. Payal, and J. Paul. 2025. "Hello! How Can I Help You? Role of Technology Appetite on AI Adoption in the Post-Pandemic Era." *R&D Management*: radm.12771. https://doi.org/10.1111/radm.12771.

Sheehan, B., H. S. Jin, and U. Gottlieb. 2020. "Customer Service Chatbots: Anthropomorphism and Adoption." *Journal of Business Research* 115: 14–24. https://doi.org/10.1016/j.jbusres.2020.04.030.

Shin, H., I. Bunosso, and L. R. Levine. 2023. "The Influence of Chatbot Humour on Consumer Evaluations of Services." *International Journal of Consumer Studies* 47, no. 2: 545–562. https://doi.org/10.1111/ijcs.12849.

Short, J., E. Williams, and B. Christie. 1976. *The Social Psychology of Telecommunications*. Wiley.

Shwedeh, F. 2024. "Designing Delight: Exploring the Nexus of Interactive Design, User Experience, and Psychological Theory in Banking Chatbot." *Nanotechnology Perceptions* 20, no. S4: 378–398. https://doi.org/10.62441/nano-ntp.vi.650.

Sidlauskiene, J., Y. Joye, and V. Auruskeviciene. 2023. "AI-Based Chatbots in Conversational Commerce and Their Effects on Product and Price Perceptions." *Electronic Markets* 33, no. 1: 24. https://doi.org/10.1007/s12525-023-00633-8.

Snyder, H. 2019. "Literature Review as a Research Methodology: An Overview and Guidelines." *Journal of Business Research* 104: 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039.

Song, M., J. Du, X. Xing, and J. Mou. 2022. "Should the Chatbot 'Save Itself' or 'Be Helped by Others'? The Influence of Service Recovery Types on Consumer Perceptions of Recovery Satisfaction." *Electronic Commerce Research and Applications* 55: 101199. https://doi.org/10.1016/j.elerap.2022.101199.

Song, M., X. Xing, Y. Duan, J. Cohen, and J. Mou. 2022. "Will Artificial Intelligence Replace Human Customer Service? The Impact of Communication Quality and Privacy Risks on Adoption Intention." *Journal of Retailing and Consumer Services* 66: 102900. https://doi.org/10.1016/j.jretconser.2021.102900.

Song, M., Y. Zhu, X. Xing, and J. Du. 2024. "The Double-Edged Sword Effect of Chatbot Anthropomorphism on Customer Acceptance Intention: The Mediating Roles of Perceived Competence and Privacy Concerns." *Behaviour & Information Technology* 43, no. 15: 3593–3615. https://doi.org/10.1080/0144929X.2023.2285943.

Srite, M., and E. Karahanna. 2006. "The Role of Espoused National Cultural Values in Technology Acceptance." *MIS Quarterly* 30, no. 3: 679. https://doi.org/10.2307/25148745.

Sun, Y., J. Chen, and S. S. Sundar. 2024. "Chatbot Ads With a Human Touch: A Test of Anthropomorphism, Interactivity, and Narrativity." *Journal of Business Research* 172: 114403. https://doi.org/10.1016/j.jbusres.2023.114403.

Tsai, W.-H. S., Y. Liu, and C.-H. Chuan. 2021. "How Chatbots' Social Presence Communication Enhances Consumer Engagement: The Mediating Role of Parasocial Interaction and Dialogue." *Journal of Research in Interactive Marketing* 15, no. 3: 460–482. https://doi.org/10.1108/JRIM-12-2019-0200.

Venkatesh, M., M. G. Morris, G. B. Davis, and F. D. Davis. 2003. "User Acceptance of Information Technology: Toward a Unified View." *MIS Quarterly* 27, no. 3: 425. https://doi.org/10.2307/30036540.

Wang, L. C., J. Baker, J. A. Wagner, and K. Wakefield. 2007. "Can A Retail Web Site Be Social?" *Journal of Marketing* 71, no. 3: 143. https://doi.org/10.1509/jmkg.71.3.143.

Waytz, A., C. K. Morewedge, N. Epley, G. Monteleone, J.-H. Gao, and J. T. Cacioppo. 2010. "Making Sense by Making Sentient: Effectance Motivation Increases Anthropomorphism." *Journal of Personality and Social Psychology* 99, no. 3: 410–435. https://doi.org/10.1037/a0020240.

Waytz, A., J. Cacioppo, and N. Epley. 2010. "Who Sees Human?: The Stability and Importance of Individual Differences in Anthropomorphism." *Perspectives on Psychological Science* 5, no. 3: 219–232. https://doi.org/10.1177/1745691610369336.

Wei, Y., J. Syahrivar, and A. E. Simay. 2025. "Unveiling the Influence of Anthropomorphic Chatbots on Consumer Behavioral Intentions: Evidence From China and Indonesia." *Journal of Research in Interactive Marketing* 19, no. 1: 132–157. https://doi.org/10.1108/JRIM-09-2023-0295.

Xiao, R., M. Yazan, and F. B. I. Situmeang. 2024. "Rethinking Conversation Styles of Chatbots From the Customer Perspective: Relationships Between Conversation Styles of Chatbots, Chatbot Acceptance, and Perceived Tie Strength and Perceived Risk." *International Journal of Human Computer Interaction* 41, no. 2: 1343–1363. https://doi.org/10.1080/10447318.2024.2314348.

Xie, Y., C. Liang, P. Zhou, and L. Jiang. 2024. "Exploring the Influence Mechanism of Chatbot-Expressed Humor on Service Satisfaction in Online Customer Service." *Journal of Retailing and Consumer Services* 76: 103599. https://doi.org/10.1016/j.jretconser.2023.103599.

Xin, X., and W. Liu. 2025. "Exploring the Balance Between Functionality and Aesthetics: An Analytical Framework and Pragmatic Consideration of the Anthropomorphism of Service Robots." *Frontiers in Psychology* 16: 1555395. https://doi.org/10.3389/fpsyg.2025.1555395.

Xu, Y., N. Niu, and Z. Zhao. 2023. "Dissecting the Mixed Effects of Human-Customer Service Chatbot Interaction on Customer Satisfaction: An Explanation From Temporal and Conversational Cues." *Journal of Retailing and Consumer Services* 74: 103417. https://doi.org/10.1016/j.jretconser.2023.103417.

Yam, K. C., T. Tan, J. C. Jackson, A. Shariff, and K. Gray. 2023. "Cultural Differences in People's Reactions and Applications of Robots, Algorithms, and Artificial Intelligence." *Management and Organization Review* 19, no. 5: 859–875. https://doi.org/10.1017/mor.2023.21.

Yang, B., Y. Sun, and X.-L. Shen. 2024. "Building Harmonious Human–AI Relationship Through Empathy in Frontline Service Encounters: Underlying Mechanisms and Journey Stage Differences." *International Journal of Contemporary Hospitality Management* 37: 740–762. https://doi.org/10.1108/IJCHM-05-2024-0676.

Yang, C., and J. Hu. 2022. "When Do Consumers Prefer AI-Enabled Customer Service? The Interaction Effect of Brand Personality and Service Provision Type on Brand Attitudes and Purchase Intentions." *Journal of Brand Management* 29, no. 2: 167–189. https://doi.org/10.1057/s41262-021-00261-7.

Youn, K., and M. Cho. 2023. "Business Types Matter: New Insights Into the Effects of Anthropomorphic Cues in AI Chatbots." *Journal*

of Services Marketing 37, no. 8: 1032–1045. https://doi.org/10.1108/JSM-04-2022-0126.

Zhang, J., J. Lu, X. Wang, L. Liu, and Y. Feng. 2024. "Emotional Expressions of Care and Concern by Customer Service Chatbots: Improved Customer Attitudes Despite Perceived Inauthenticity." *Decision Support Systems* 186: 114314. https://doi.org/10.1016/j.dss.2024.114314.

Zhang, J., Q. Chen, J. Lu, X. Wang, L. Liu, and Y. Feng. 2024. "Emotional Expression by Artificial Intelligence Chatbots to Improve Customer Satisfaction: Underlying Mechanism and Boundary Conditions." *Tourism Management* 100: 104835. https://doi.org/10.1016/j.tourman.2023.104835.

Zhang, J., X. Wang, J. Lu, L. Liu, and Y. Feng. 2024. "The Impact of Emotional Expression by Artificial Intelligence Recommendation Chatbots on Perceived Humanness and Social Interactivity." *Decision Support Systems* 187: 114347. https://doi.org/10.1016/j.dss.2024.114347.

Zhang, T., C. Feng, H. Chen, and J. Xian. 2022. "Calming the Customers by AI: Investigating the Role of Chatbot Acting-Cute Strategies in Soothing Negative Customer Emotions." *Electronic Markets* 32, no. 4: 2277–2292. https://doi.org/10.1007/s12525-022-00596-2.

Zhou, C., and Q. Chang. 2024. "Informational or Emotional? Exploring the Relative Effects of Chatbots' Self-Recovery Strategies on Consumer Satisfaction." *Journal of Retailing and Consumer Services* 78: 103779. https://doi.org/10.1016/j.jretconser.2024.103779.

Zhu, Y., J. Zhang, and J. Liang. 2023. "Concrete or Abstract: How Chatbot Response Styles Influence Customer Satisfaction." *Electronic Commerce Research and Applications* 62: 101317. https://doi.org/10.1016/j.elerap.2023.101317.

Zogaj, A., P. M. Mähner, L. Yang, and D. K. Tscheulin. 2023. "It's a Match! The Effects of Chatbot Anthropomorphization and Chatbot Gender on Consumer Behavior." *Journal of Business Research* 155: 113412. https://doi.org/10.1016/j.jbusres.2022.113412.

Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** Supporting Information.