

Systematic Review of Chatbot Anthropomorphic Design Features Influencing User Trust

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Abstract

Chatbots have significantly evolved through innovations in anthropomorphic design features and artificial intelligence (AI), enabling them to assist users across various sectors and activities. However, inappropriate or incompatible anthropomorphic features can reduce user trust and lead to unmet expectations. This study presents a systematic literature review (SLR) following the Kitchenham approach to investigate the influence of anthropomorphic features on chatbots. The literature search was conducted for studies published between 2020 and 2025. The studies were identified using Publish or Perish as a supporting tool to retrieve records from Google Scholar and Scopus, while additional studies were identified through EBSCO and Wiley Online Library. The findings indicate that anthropomorphic design features influence user trust through two primary perspectives: emotional and cognitive. Furthermore, user trust in chatbots with anthropomorphic design features has three positive outcomes. The first is user engagement, the second is user satisfaction, and the third is loyalty and future intention. However, one notable negative consequence is the uncanny valley phenomenon. The findings also reveal that elements such as chatbot personification and communication style play important roles in building user trust. In addition, the integration of brand credibility and AI-supported capabilities into chatbot design influences user expectations, which subsequently affects trust in chatbots. The appropriate application of anthropomorphic design features, combined with the effective use of artificial intelligence, can help manage and align user expectations more effectively.

Keywords: chatbot, feature design, anthropomorphism, user trust, artificial intelligence

1 Introduction

Chatbots are technological innovations that generally assist users across various sectors and activities. Chatbots, which are also referred to as conversational agents, have become an important part of daily operational activities in both the business and customer service sectors [1]. Artificial intelligence (AI)-powered chatbots are increasingly used in customer service, while anthropomorphic design features can enhance social presence and influence interactions between chatbots and users [2]. Moreover, AI-based chatbots with anthropomorphic design features can positively affect user experience and increase enjoyment [3].

However, a mismatch between the design of anthropomorphic features, the capabilities of chatbots, and user perception can lead to unmet expectations, and reduced user trust [4]. Several studies have shown that the use of anthropomorphic cues in chatbots can lead to inappropriate user expectations, while service failures, misinterpretations, and mismatches in the design of human-like features pose significant challenges to their effective use [5], [6], [7]. Another study based on Expectancy Violations Theory found that incorporating anthropomorphic features into chatbots can negatively affect future behavioral intentions, particularly when interacting with angry customers [8]. Furthermore, concerns related to the uncanny valley effect, in which chatbots that mimic humans may be perceived as unsettling, and the use of brands in chatbots can also influence user trust [9], [10].

The emergence of AI-powered chatbots has significantly changed user interactions [11]. Therefore, investigating anthropomorphic design features is important for understanding their role in maintaining user trust and aligning user perceptions with chatbot capabilities [12]. Although previous studies have examined anthropomorphic design features in chatbots, a comprehensive synthesis of their influence on user trust from emotional and cognitive perspectives remains limited. Therefore,

this study conducts a systematic literature review (SLR) to investigate how anthropomorphic features influence user trust from emotional and cognitive perspectives, how trust affects chatbot usage, and what design elements of anthropomorphic chatbots contribute to building user trust. This review offers a comprehensive understanding of the relationship between anthropomorphic design features, user trust, and chatbot usage from both emotional and cognitive perspectives.

2 Literature Review

Chatbots are a technology with advanced utilities that can simulate human conversations through text or voice. Advances in Natural Language Processing (NLP) and Large Language Models (LLMs) have enabled chatbots to generate more natural and context-aware responses, enhancing their ability to simulate human like interactions [3],[13], [14], [15]. Current chatbot applications such as Xiaolce, Replika, Woebot, and Tess demonstrate the growing role of chatbots in establishing meaningful human-chatbot relationships [16].

Anthropomorphism refers to the tendency to attribute human characteristics to non-human objects, with the aim of create a stronger connection and emotional attachment between users and these objects [13], [17]. Feature design refers to functionalities that provide signals or prompts through the user interface [11], [18]. In chatbots, anthropomorphic feature design commonly includes human-like attributes such as gender, age, and identity markers [19]. The authenticity of these features should be carefully considered, as social and visual cues can shape users perceptions [2]. Previous researches have shown that anthropomorphic chatbot features influence user trust and intention through two social cognition dimensions: competence and warmth [20], [21].

Trust in technology can be defined as an individual's belief in technological artifacts that develops through Human to Technology interactions [22]. This form of trust encompasses two dimensions, namely cognitive trust and emotional trust [23]. Trust involves expectation regarding future interactions and can be damaged by negative experiences, such as failures in Human-Computer Interaction (HCI), which may result in trust violation [12].

Recent studies suggest that trust plays an important role in determining users' acceptance of interactions with anthropomorphic chatbots. Across different theoretical perspectives, trust consistently emerges as a key factor influencing how chatbot features affect user behavior. Research based on the Elaboration Likelihood Model (ELM) indicates that reliable and accurate recommendations increase users' trust, which subsequently strengthens their intention to adopt chatbot-generated suggestions [24]. Similar findings have been reported in studies grounded in the Stimulus-Organism-Response (S-O-R) framework and Social Presence Theory, which empathy, interactivity, usability, and task-related factors contribute to trust formation and user engagement [25].

Recent research has shown that anthropomorphic design plays an important role in shaping users' perceptions of trust, alongside chatbot capabilities and emotional cues. However, when a chatbot's human-like appearance does not align with its conversational style, it may create inconsistent user expectations and reduce trust [26]. Similarly, a systematic literature review found that anthropomorphic features, such as avatars and emotional expressions, enhance perceptions of social presence, empathy, and authenticity, thereby strengthening trust and emotional engagement. However, individual factors, including skepticism and technology anxiety, may hinder trust formation during chatbot interactions [27].

Furthermore, recent reviews have highlighted various factors that influence user trust in anthropomorphic chatbots across different dimensions. Social presence, branding, and the implementation of AI voice assistants have been identified as important antecedents of trust [28]. Anthropomorphic features may also enhance perceptions of social companionship and emotional engagement, encouraging users to develop stronger relationships with AI agents [29]. In some cases, these interactions may develop into parasocial relationships characterized by a perceived sense of mutual understanding and emotional connection. Such relationships may further increase users' trust and willingness to overlook potential risks associated with AI technologies [30]. Nevertheless, previous studies have also emphasized that trust formation is influenced by contextual conditions and individual user characteristics, including skepticism and technology anxiety [3], [27]. Therefore, further investigation is needed to understand how specific anthropomorphic features of chatbots contribute to the development of user trust.

Unlike previous reviews that examine chatbot trust broadly, this study systematically synthesizes specific anthropomorphic design elements and maps their influence across two perspectives of user trust, namely emotional and cognitive trust, and their subsequent behavioral outcomes. This review brings together specific anthropomorphic elements, including chatbot personification and communication style, with distinct trust perspectives and their behavioral consequences, providing a more differentiated understanding of trust formation in anthropomorphic chatbots. The review further considers the roles of brand credibility and artificial intelligence in shaping user expectations and subsequently influencing trust, while also identifying potential negative consequences, such as the uncanny valley phenomenon. Thus, the present review provides a more integrated understanding of the relationships among anthropomorphic design elements, cognitive and emotional trust, AI-supported chatbot capabilities, user expectations, and behavioral responses across chatbot interaction contexts.

3 Research Method

This study adopts the Systematic Literature Review (SLR) method proposed by Kitchenham to systematically identify, evaluate, and synthesize relevant primary studies related to anthropomorphic design features in chatbots and their influence on user trust. In the context of research, an SLR is considered a secondary study because it synthesizes evidence from primary studies [31]. The SLR provides a structured and systematic approach to identifying, analyzing, and interpreting relevant evidence related to the research questions [32]. The SLR process proposed by Kitchenham consists of three main stages: planning, conducting, and reporting. The planning stage involves defining the research questions, identifying data sources, developing search strategies, and establishing inclusion and exclusion criteria. The conducting stage includes study selection, data extraction, quality assessment, and data synthesis. Finally, the reporting stage involves presenting and discussing the findings of the review. The overall research process is illustrated in Figure 1.

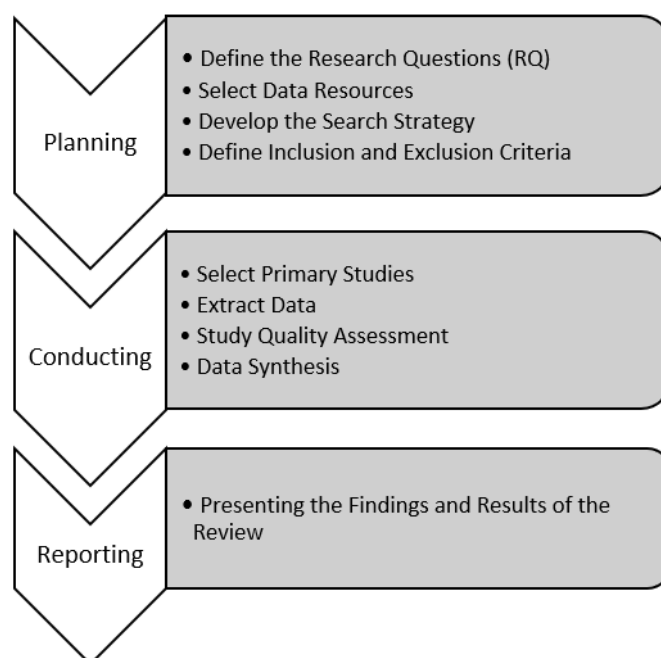


Figure 1 Adopted from Kitchenham's SLR

Research Question

This study aims to analyze the results of the review of sources to answer research questions. In formulating the research questions, this research employs the PICOC framework (Table 1) which is an acronym for Population, Intervention, Comparison, Outcome and Context. Population refers to the target population or research subject. Intervention refers to a specific methodology, tool, or technology being investigated. Comparison refers to alternative interventions or conditions used for

comparison. Outcome refers to the results or effects of the implemented intervention. Context refers to the conditions or environment in which the intervention is applied [33].

1. What is the influence of anthropomorphic features in chatbot design on user trust from emotional and cognitive perspectives?
2. What are the impacts of user trust on chatbot usage in the presence of anthropomorphic design features?
3. What design elements of anthropomorphic features in chatbots contribute to the process of building user trust?

Table 1 PICOC criteria

PICOC	Components
Population	Text-based chatbots in Customer Service and other service oriented
Intervention	Chatbot anthropomorphism design features (includes communication styles, personification, and brand identity integration, with consideration of AI integration)
Comparison	Comparison between different dimensions of social cognition as reflected in chatbot anthropomorphic design features
Outcome	Development of users trust in chatbot and the behavioral outcomes of users' trust
Context	Various service contexts such as customer service

Search Strategy

To address the research questions, a systematic literature search was conducted across four electronic databases, namely Google Scholar, Scopus, EBSCO, and Wiley Online Library. Publish or Perish software was used as a supporting tool to facilitate the search and export of records from Google Scholar and Scopus. The search was conducted several times on Google Scholar between October 29, 2024, and March 18, 2025, while searches were conducted on Scopus, EBSCO, and Wiley Online Library on February 10, February 15, and March 21, 2025, respectively.

The search strategy was developed based on keywords related to chatbot, anthropomorphism, user trust, and artificial intelligence. The keywords were combined using the Boolean operators AND and OR. The search strategy focused on the title, abstract, and keyword fields which these fields were available in the respective databases. The same search string was applied across all databases as follows.

("chatbot" OR "conversational agent") AND ("anthropomorphism" OR "anthropomorphic" OR "anthropomorphic design" OR "anthropomorphic feature" OR "anthropomorphic features") AND ("user trust" OR "trust") AND ("artificial intelligence" OR "AI")

The selection of keywords was based on their relevance to the research topic and their potential to identify studies related to anthropomorphic chatbot design, user trust, and artificial intelligence. The retrieved records were subsequently compiled for the study selection and screening process.

Inclusion and Exclusion Criteria

The selection of studies in this research followed a structured process based on predefined inclusion and exclusion criteria. These criteria were established before the article review process began and were intended to ensure that only studies relevant and aligned with the research objectives were considered.

The inclusion criteria consisted of articles published between 2020 and 2025, available in open access, relevant to the focus of the study, containing at least one of the predefined keywords, and written in English.

The exclusion criteria referred to the process of filtering out studies that did not meet one or more of inclusion criteria. Articles were excluded if they were not available in open access, were published

outside specified year of publication, did not contain any of the predefined keywords, irrelevant to the objectives of this study, and written in a language other than English.

Study Selection Process

The study selection process followed a systematic procedure based on Kitchenham's guidelines for conducting a systematic literature review. The records retrieved from Google Scholar, Scopus, EBSCO, and Wiley Online Library were collected and imported into Mendeley Reference Manager. Duplicate records were identified using the "Duplicates" feature in Mendeley and subsequently removed. The remaining unique records were then screened based on their titles, abstracts, and keywords to determine their relevance to the research objectives.

The overall study selection process was presented using a PRISMA flow diagram, as shown in Figure 2. The diagram illustrates the stages of identification, screening, and inclusion of studies in the systematic literature review.

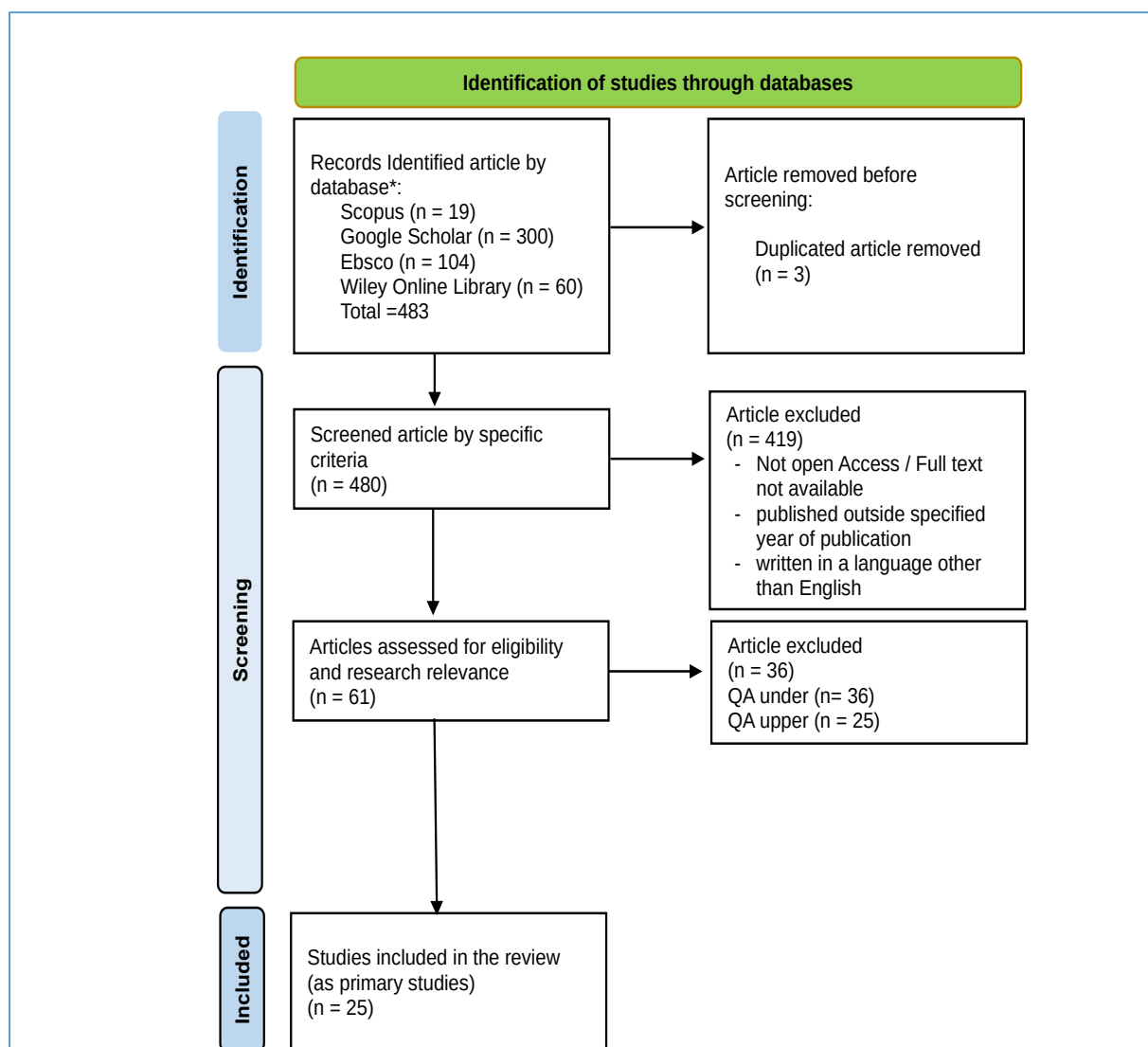


Figure 2 PRISMA diagram

Quality Assessment

At this stage, the selected articles underwent a quality assessment to evaluate their relevance and methodological rigor for in-depth analysis. Title, abstract, and conclusions of each article served as the primary sources for evaluation. The assessment adapted Kitchenham's guidelines and incorporated criteria from recent SLR frameworks in technology adoption [33]. Articles were

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evaluated using six predefined criteria (Table 2) addressing research focus, objective clarity, empirical basis, methodological rigor, and conclusion consistency.

To ensure objectivity and minimize individual bias, a multi-reviewer evaluation process was employed. The primary researcher conducted the initial assessment supported by an AI assistant (ChatGPT by OpenAI) to provide preliminary scores and explanations based on predefined prompts. Subsequently, the scoring results were independently cross-verified and validated by the co-authors/research team. Each criterion was rated as 1 (fully met), 0.5 (partially met), or 0 (not met), yielding a maximum total score of 6.0. A threshold score of 4.0 out of 6.0 (equivalent to $\geq 66.7\%$) was established to ensure that only studies with clear empirical and methodological grounds were included. Disagreements in quality scores between evaluators were resolved through consensus-based discussions among the research team until a final agreement was reached.

Table 2 Quality assessment

QA	Information
QA 1	Does the title clearly reflect the content and main focus of the article?
QA 2	Is the abstract clearly written and informative?
QA 3	Is the purpose or objective of the study clearly stated?
QA 4	Does the article mention the presence of data or research findings?
QA 5	Is the research method or approach explicitly stated in the abstract?
QA 6	Are the conclusions consistent with the stated objectives and findings?

Data Extraction

To obtain relevant information, the selected articles that identified as primary studies were extracted to elicit detailed information including the title, year of publication, author, and key components of the study. The extracted data were organized and managed using Mendeley Reference Manager. The collected references were then exported in RIS format and subsequently mapped using VOSviewer, a tool used to identify the relevance and relationships among studies based on co-occurrence networks and word relationships [34].

Data Synthesis

Data synthesis represents the final stage in the analysis and summarization process, which aims to identify significant research findings and draw informed conclusions. To support this process, ChatGPT developed by OpenAI, was employed to assist in identifying and extracting key insights from the reviewed literature. The extracted data were subsequently coded and thematically categorized based on the formulated research questions to ensure alignment between the findings and the research objectives.

4 Results and Analysis

From the search results obtained through the Publish or Perish database, a total of 319 articles were retrieved, consisting of 300 articles from Google Scholar and 19 articles from Scopus. However, limited access to certain full-text articles posed challenges during this initial phase. To overcome this limitation, an additional search was conducted using external databases not directly accessible via Publish or Perish, specifically 104 articles were retrieved from EBSCO and 60 articles from the Wiley Online Library, resulting in the retrieval of 164 additional articles. In total, 483 articles were collected for further screening. The distribution of the 25 articles selected as primary studies is presented in Figure 3. The selection of these 25 primary studies was based on their strong alignment with the predefined inclusion criteria and their substantial contribution to the research objectives.

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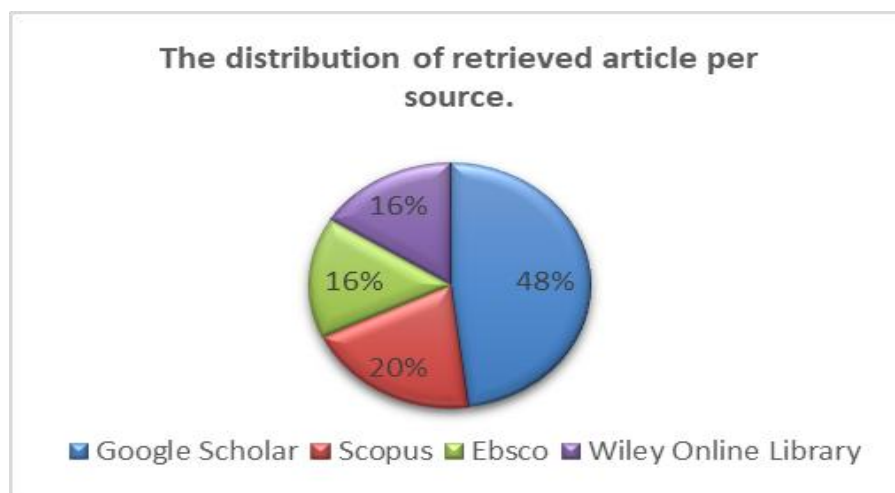


Figure 3 The distribution of retrieved article per source

These articles were selected based on their methodological rigor, relevance to the main research questions, and publication in reputable journals or conference proceedings. The selected primary studies represent recent and relevant contributions to the field of anthropomorphic chatbots and their influence on users' trust. In this study, the literature search covered publications from 2020 to 2025. Among the 25 primary studies, the distribution spans six publication years as illustrated in Figure 4. The years 2023 and 2024 contributed the highest number of relevant articles included in the final review.

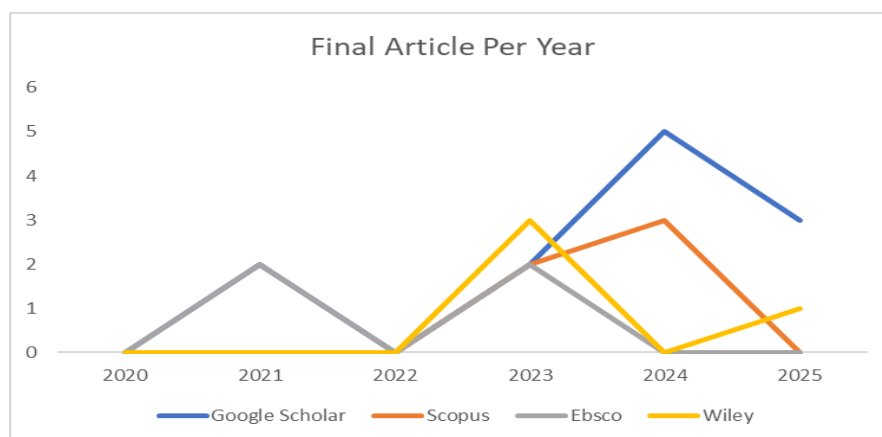


Figure 4 Final article per year

This study employed VOSviewer to visualize the relevance and relationships among the selected articles serving as primary studies. The VOSviewer visualization results revealed five (5) clusters. Among these clusters, three nodes had the highest weights, namely chatbot, trust, and anthropomorphism. As illustrated in Figure 5, the nodes representing chatbot, trust, and anthropomorphism appear larger scales than those of other nodes, indicating their prominence and higher frequency of occurrence within the selected studies. In other words, these three nodes are dominant and highly relevant themes and keywords in the existing literature. Moreover, the chatbot, trust, and anthropomorphism nodes belong to different clusters but are positioned relatively close to one another in the network, indicating a strong relationship and relevancy among these keywords and the topics addressed in the primary studies. This network structure further supports the relevance of the selected primary studies to the research topic. Other nodes, such as intention, interaction, communication style, competence, warmth, engagement, satisfaction, and social presence, although less prominent in terms of occurrence and weight, provide important perspectives for further investigation. These nodes may help identify how different concepts interact with one another and provide potential insights into the findings of this study.

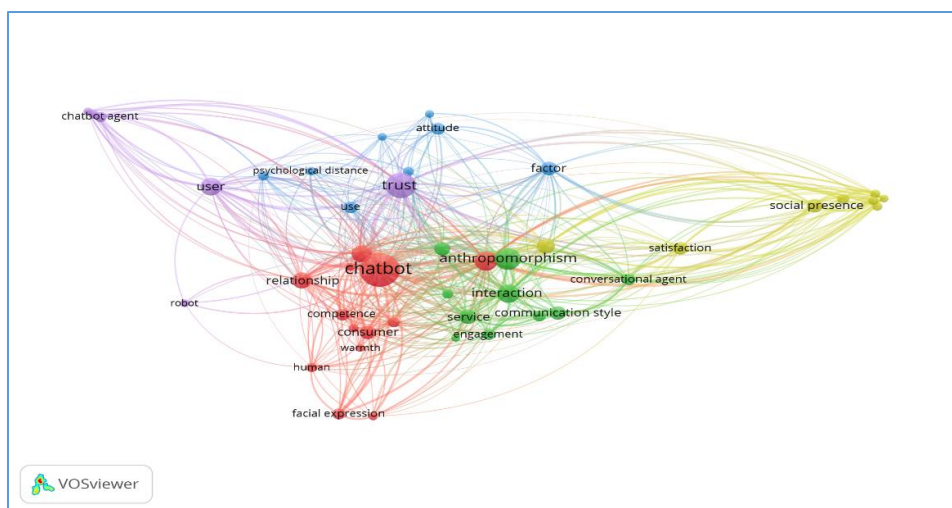


Figure 5 Network visualization

This study also employed VOSviewer to visualize the temporal distribution of the selected primary studies. As shown in Figure 6, the color overlay represents the publication year, with yellow indicating more recent studies published in 2024 and dark blue representing earlier studies from early 2023. This color gradient illustrates how research topics have evolved over time, with more recent themes appearing in lighter shades and earlier themes in darker shades. The decimal values displayed on the color bar (e.g., 2023.4) indicate the average publication year associated with each keyword. The decimal component represents the relative position within the year, with values closer to 0.0 indicating publications from the earlier months and values closer to 0.8 indicating publications from the later months of the same year. This temporal information highlights how certain topics have emerged more recently, suggesting their growing relevance and positioning them as potential future research directions

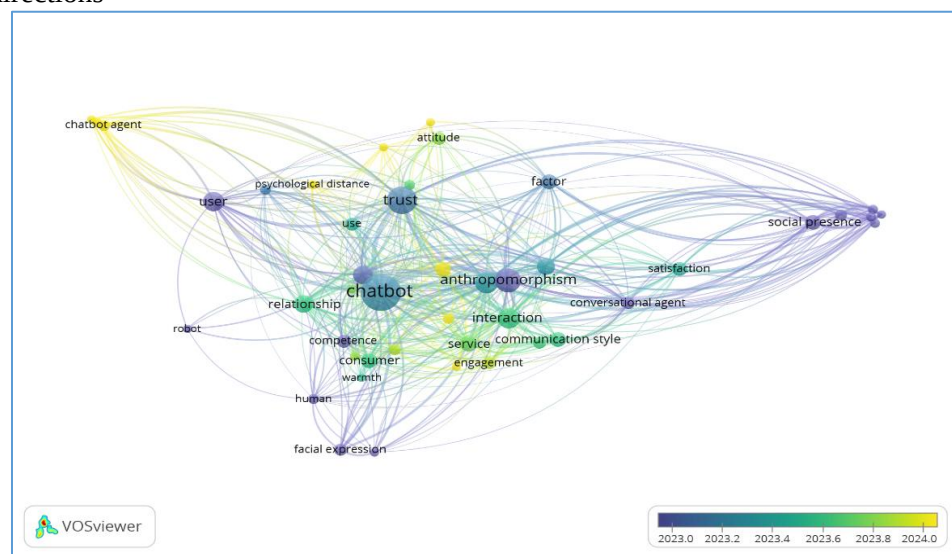


Figure 6 Overlay visualization

RQ 1. What is the influence of anthropomorphic features in chatbot design on user trust from emotional and cognitive perspectives?

From an emotional perspective, chatbot features such as animations (e.g., large jagged eyes, facial expressions (e.g., smiling), naming and other emotional including warm communication designs play an important role in creating an emotional bond between users and chatbots [20], [35], [36], [37]. Empathy and engagement also contribute to foster user trust in anthropomorphic chatbots. This is demonstrated by how anthropomorphic chatbot features, such as animations, facial expressions, and naming, evoke feelings of affection and engagement among users, which subsequently contribute to

trust [20], [35], [36], [37]. The sense of empathy experienced by the user leads to increased trust in anthropomorphic chatbot. Furthermore, when cognition needs are low, users tend to rely on emotional perspectives to make decisions [38], [39].

From a cognitive perspective, users tend to place greater trust in chatbots that demonstrate the ability to provide accurate and competent information. Chatbot performance, usability, and reliability are factors that influence users' trust in anthropomorphic chatbot from a cognitive perspective [35], [37], [40]. Furthermore, the ability of chatbot to mimic human problem-solving and perform tasks contributes to cognitive trust, [38], [41]. In addition, the ability of AI to provide information rapidly and on a large scale significantly influences users' cognitive trust [39], [42].

Both emotional and cognitive perspectives play a crucial role in shaping users' perceptions of trust in chatbot. Emotional trust is influenced by the presence of emotional cues, that elicit affect, empathy and engagement. In contrast, cognitive trust focuses on chatbot performance in solving problems like humans, completing tasks, and providing accurate information rapidly. Furthermore, when users' need for cognition is low, they tend to rely more on emotional cues than on cognitive evaluations when forming trust perceptions.

RQ 2. What are the impacts of user trust on chatbot usage in the presence of anthropomorphic design features?

This study investigated the role of user trust in shaping the perceived effectiveness and behavioral outcomes of chatbots designed with anthropomorphic features. The findings highlight that anthropomorphic design plays a central role in fostering user trust, which is associated with three key positive outcomes in user behavior. The first is user engagement, as trust in anthropomorphic chatbots encourages deeper and more sustained user engagement. Human-like interaction elements, such as empathetic responses, personalized communication, and relatable social cues, foster a sense of connection that encourages users to interact more frequently and meaningfully with the system [10], [42], [43], [44], [45]. The second impact is satisfaction. Trust serves as a mediating factor that significantly contributes to user satisfaction. When users trust a chatbot, they are more likely to perceive their interactions as helpful, enjoyable, and effective, resulting in higher overall satisfaction with the service or platform of chatbot [42], [46], [47]. The third is loyalty and future intention, as high levels of trust strengthen emotional attachment to the chatbot, reduce skepticism, and foster future behavioral intentions. These include continued use of the chatbot, positive word-of-mouth, and an increased likelihood of recommending the service to others [10], [20], [39], [42], [48], [49], [50].

Although these three positive outcomes are generally favorable, there is also a potential negative consequence that can reduce the perceived value of anthropomorphic chatbot design. Chatbots that are excessively human-like can trigger the Uncanny Valley effect, in which users experience discomfort or unease toward the chatbot's appearance or behavior [4], [51], [52]. The use of overly human-like or hyper-realistic avatar designs and animations can increase users' feelings of eeriness and subsequently diminish their trust in the chatbot [4], [44].

Overall, this discussion affirms that trust is a critical mediating factor linking anthropomorphic chatbot design to various user-centered outcomes. However, when the design becomes excessively human-like or hyper-realistic, it can trigger the Uncanny Valley effect, leading to user discomfort and a potential decline in trust.

RQ 3. What design elements of anthropomorphic features in chatbot contribute to the process of building user trust?

The design of anthropomorphic features significantly influences the process of building user trust. This study identified key design elements of anthropomorphic features, particularly in terms of personification and communication style. Personification through perceived enjoyment and chatbot traits such as empathy, credibility, and competence can trigger social presence, reflecting the anthropomorphic attempt of chatbots to build user trust [38], [52], [53], [54], [55]. Communication style is also an important element in forming trust in anthropomorphic chatbots. Chatbots perceived as competent tend to employ a task-oriented communication style that focuses on task completion and efficiency, whereas chatbots perceived as warm tend to use a social-oriented communication style that emphasizes emotional connection and user engagement which fostering trust through emotional connection and attachment [45], [48], [49].

In addition to personification and communication style, chatbot brand credibility plays a significant role in building user trust. Chatbots associated with brands with low credibility tend to reduce user trust. Even when such brands attempt to enhance chatbot competence through anthropomorphic design, the improvement in trust remains insignificant [10]. In contrast, chatbots associated with highly credible brands and AI systems supported by trusted information sources more easily gain user trust [42], [48]. However, high brand credibility also raises user expectations, which can negatively affect trust when users experience expectation violations during interaction [10], [4], [40], [56]. Therefore, the suitability of anthropomorphic feature in the chatbots for user's mindset, ease of use, accurate information delivery supported by AI, and transparent features contribute to more precise management of user expectations [40], [42], [56].

Overall, the findings indicate that anthropomorphic chatbot design features, including personification and communication style, contribute to the process of building users' trust. The implementation of brand credibility also plays important in forming users trust and expectation of chatbot performance. In addition, the compatibility of anthropomorphic features with ease of use and accurate information supported by AI is critical for managing user expectations and fostering sustained trust.

Beyond these findings, the review identifies two theoretical gaps for further investigation. Several studies [4], [53], [54] report negative outcomes associated with the Uncanny Valley effect, in which overly human-like chatbots evoke feelings of uncanniness and discomfort. This finding highlights a trade-off between increasing human likeness to build trust and maintaining user comfort. Future research should investigate this trade-off by identifying the point at which anthropomorphic chatbot design begins to negatively affect user trust.

The second theoretical gap concerns the limited understanding of anthropomorphism across different interaction modalities. This study predominantly focuses on text-based chatbots, particularly anthropomorphic features expressed through communication style, emotional expression, personification, and textual appearance. Limited attention has been given to the combined effects of verbal, visual, and auditory cues in multimodal and voice-based chatbots. Future research should examine these modalities to further understand how different anthropomorphic cues influence user trust and interaction experiences.

5 Conclusion

This study investigated how anthropomorphic features in chatbot design influence user trust through a systematic literature review. The results show that user trust is shaped from both emotional and cognitive perspectives. Emotional trust is fostered by features such as animations, facial expressions, naming, and warm communication, while cognitive trust is built through perceptions of competence, information accuracy, and task completion. User trust positively affects engagement, satisfaction, loyalty, and future intentions. However, overly human-like designs can lead to discomfort associated with the Uncanny Valley effect, which can reduce trust. Key design elements, including personification, communication style, and brand credibility play a crucial role in shaping trust. Furthermore, the alignment between anthropomorphic design, ease of use, and the provision of accurate information supported by artificial intelligence is essential for shaping user expectations. This study is limited by the scope of the databases used and its focus on emotional and cognitive perspectives on trust. Future research should explore other perspectives of trust and multimodal chatbot designs. From a practical perspective, chatbot developers and business practitioners should design anthropomorphic features based on users' interaction needs rather than simply increasing human likeness. Effective chatbot design should balance human-like characteristics with ease of use, accurate information, appropriate communication styles, and reliable AI-supported information.

References

- [1] A. Saini, A. Chandra, S. Agrawal, and M. Kansara, "Chatbots Usage in Online Customer Service: A Review," *Empirical Economics Letters*, Vol. 23, No. 1, pp. 98–113, 2024, DOI: 10.5281/zenodo.11409495.
- [2] S. Morana, U. Gnewuch, D. Jung, and C. Granig, "The Effect of Anthropomorphism on Investment Decision-Making with Robo-Advisor Chatbots," in *Twenty-Eighth European*
<http://sistemasi.ftik.unisi.ac.id>

- Conference on Information Systems (ECIS2020), 2020.
- [3] L. Nicolescu and M. T. Tudorache, “Human-Computer Interaction in Customer Service: The Experience with AI Chatbots—A Systematic Literature Review,” May 01, 2022, MDPI. DOI: 10.3390/electronics11101579.
 - [4] S. W. Song and M. Shin, “Uncanny Valley Effects on Chatbot Trust, Purchase Intention, and Adoption Intention in the Context of E-Commerce: The Moderating Role of Avatar Familiarity,” *Int J Hum Comput Interact*, Vol. 40, No. 2, pp. 441–456, 2024, DOI: 10.1080/10447318.2022.2121038.
 - [5] Y. Sun, J. Chen, and S. S. Sundar, “Chatbot Ads with a Human Touch: A Test of Anthropomorphism, Interactivity, and Narrativity,” *J Bus Res*, Vol. 172, Feb. 2024, DOI: 10.1016/j.jbusres.2023.114403.
 - [6] R. W. Zhang, X. Liang, and S. H. Wu, “When Chatbots Fail: Exploring User Coping Following a Chatbots-Induced Service Failure,” *Information Technology and People*, Vol. 37, No. 8, pp. 175–195, 2024, DOI: 10.1108/ITP-08-2023-0745.
 - [7] N. Cai, S. Gao, and J. Yan, “How the Communication Style of Chatbots Influences Consumers’ Satisfaction, Trust, and Engagement in the Context of Service Failure,” *Humanit Soc SCI Commun*, Vol. 11, No. 1, Dec. 2024, DOI: 10.1057/s41599-024-03212-0.
 - [8] C. Crolic, F. Thomaz, R. Hadi, and A. T. Stephen, “Blame the Bot: Anthropomorphism and Anger in Customer–Chatbot Interactions,” *J Mark*, Vol. 86, No. 1, pp. 132–148, Jan. 2022, DOI: 10.1177/00222429211045687.
 - [9] C. Gu, Y. Zhang, and L. Zeng, “Exploring the Mechanism of Sustained Consumer Trust in AI Chatbots after Service Failures: A Perspective based on Attribution and CASA Theories,” *Humanit Soc Sci Commun*, Vol. 11, No. 1, p. 1400, Oct. 2024, DOI: 10.1057/s41599-024-03879-5.
 - [10] M. Nguyen, L. E. Casper Ferm, S. Quach, N. Pontes, and P. Thaichon, “Chatbots in Frontline Services and Customer Experience: An Anthropomorphism Perspective,” *Psychol Mark*, Vol. 40, No. 11, pp. 2201–2225, Nov. 2023, DOI: 10.1002/mar.21882.
 - [11] N. Zierau, C. Engel, M. Söllner, and J. M. Leimeister, “Trust in Smart Personal Assistants: A Systematic Literature Review and Development of a Research Agenda,” in *15th International Conference on Wirtschaftsinformatik*, 2020. [Online]. Available: <https://ssrn.com/abstract=3920577>
 - [12] A.-M. Seeger and A. Heinzl, “Association for Information Systems Association for Information Systems Chatbots often Fail! Can Anthropomorphic Design Mitigate Trust Chatbots often Fail! Can Anthropomorphic Design Mitigate Trust Loss in Conversational Agents for Customer Service? Loss in Conversational Agents for Customer Service?,” in *Twenty-Ninth European Conference on Information Systems (ECIS)*, 2021, pp. 6–14. [Online]. Available: https://aisel.aisnet.org/ecis2021_rp
 - [13] M. C. Han, “The Impact of Anthropomorphism on Consumers’ Purchase Decision in Chatbot Commerce,” *Journal of Internet Commerce*, Vol. 20, No. 1, pp. 46–65, 2021, DOI: 10.1080/15332861.2020.1863022.
 - [14] L. Sanny, A. C. Susastra, C. Roberts, and R. Yusramdaleni, “The Analysis of Customer Satisfaction Factors which Influence Chatbot Acceptance in Indonesia,” *Management Science Letters*, Vol. 10, No. 6, pp. 1225–1232, 2020, DOI: 10.5267/j.msl.2019.11.036.
 - [15] A. Cuadra et al., “The Illusion of Empathy? Notes on Displays of Emotion in Human-Computer Interaction,” *Association for Computing Machinery (ACM)*, May 2024, pp. 1–18. DOI: 10.1145/3613904.3642336.
 - [16] M. Skjuve, A. Følstad, K. I. Fostervold, and P. B. Brandtzaeg, “My Chatbot Companion - A Study of Human-Chatbot Relationships,” *International Journal of Human Computer Studies*, Vol. 149, May 2021, DOI: 10.1016/j.ijhcs.2021.102601.
 - [17] S. Lee, N. Lee, and Y. J. Sah, “Perceiving a Mind in a Chatbot: Effect of Mind Perception and Social Cues on Co-Presence, Closeness, and Intention to Use,” *Int J Hum Comput Interact*, Vol. 36, No. 10, pp. 930–940, Jun. 2020, DOI: 10.1080/10447318.2019.1699748.
 - [18] T. Rietz, I. Benke, and A. Maedche, “The Impact of Anthropomorphic and Functional Chatbot Design Features in Enterprise Collaboration Systems on User Acceptance,” *AIS E-Library*, 2020.

- [19] A. P. Chaves and M. A. Gerosa, "How Should My Chatbot Interact? A Survey on Social Characteristics in Human–Chatbot Interaction Design," *Int J Hum Comput Interact*, Vol. 37, No. 8, pp. 729–758, 2021, DOI: 10.1080/10447318.2020.1841438.
- [20] M. Kim, J. Park, and M. Lee, "The Effects of Chatbot Anthropomorphism and Self-disclosure on Mobile Fashion Consumers' Intention to Use Chatbot Services," *Journal of Fashion Business*, Vol. 25, No. 6, pp. 120–130, 2021, DOI: 10.12940/jfb.2021.25.6.119.
- [21] L. Christoforakos, N. Feicht, S. Hinkofer, A. Löscher, S. F. Schlegl, and S. Diefenbach, "Connect with Me. Exploring Influencing Factors in a Human-Technology Relationship based on Regular Chatbot Use," *Front Digit Health*, Vol. 3, Nov. 2021, DOI: 10.3389/fdgth.2021.689999.
- [22] N. K. Lankton, D. Harrison Mcknight, and J. Tripp, "Technology, Humanness, and Trust: Rethinking Trust in Technology," *J Assoc Inf Syst*, Vol. 16, No. 10, pp. 880–918, Oct. 2015, DOI: 10.17705/1jais.00411.
- [23] J. Lappeman, S. Marlie, T. Johnson, and S. Poggenpoel, "Trust and Digital Privacy: Willingness to Disclose Personal Information to Banking Chatbot Services," *Journal of Financial Services Marketing*, Vol. 28, No. 2, pp. 337–357, Jun. 2023, DOI: 10.1057/s41264-022-00154-z.
- [24] X. Zhang, A. L. Chen, X. Piao, M. Yu, Y. Zhang, and L. Zhang, "Is AI Chatbot Recommendation Convincing Customer? An Analytical Response based on the Elaboration Likelihood Model," *Acta Psychol (Amst)*, Vol. 250, Oct. 2024, DOI: 10.1016/j.actpsy.2024.104501.
- [25] M. Ltifi, "Trust in the Chatbot: A Semi-Human Relationship," *Future Business Journal*, Vol. 9, No. 1, Dec. 2023, DOI: 10.1186/s43093-023-00288-z.
- [26] J. Chen, F. Guo, Z. Ren, M. Li, and J. Ham, "Effects of Anthropomorphic Design Cues of Chatbots on Users' Perception and Visual Behaviors," *Int J Hum Comput Interact*, Vol. 40, No. 14, pp. 3636–3654, 2024, DOI: 10.1080/10447318.2023.2193514.
- [27] A. Greilich, K. Bremser, and K. Wüst, "Consumer Response to Anthropomorphism of Text-based AI Chatbots: A Systematic Literature Review and Future Research Directions," Sep. 01, 2025, John Wiley and Sons Inc. DOI: 10.1111/ijcs.70108.
- [28] M. M. Mariani, N. Hashemi, and J. Wirtz, "Artificial Intelligence Empowered Conversational Agents: A Systematic Literature Review and Research Agenda," *J Bus Res*, Vol. 161, Jun. 2023, DOI: 10.1016/j.jbusres.2023.113838.
- [29] R. Chaturvedi, S. Verma, R. Das, and Y. K. Dwivedi, "Social Companionship with Artificial Intelligence: Recent Trends and Future Avenues," *Technol Forecast Soc Change*, Vol. 193, Aug. 2023, DOI: 10.1016/j.techfore.2023.122634.
- [30] T. Maeda and A. Quan-Haase, "When Human-AI Interactions Become Parasocial: Agency and Anthropomorphism in Affective Design," in *2024 ACM Conference on Fairness, Accountability, and Transparency, FAccT 2024*, Association for Computing Machinery, Inc, Jun. 2024, pp. 1068–1077. DOI: 10.1145/3630106.3658956.
- [31] B. Kitchenham, "Procedures for Performing Systematic Reviews," 2004.
- [32] B. Kitchenham and P. Brereton, "A Systematic Review of Systematic Review Process Research in Software Engineering," 2013, Elsevier B.V. DOI: 10.1016/j.infsof.2013.07.010.
- [33] A. S. Prihatmanto, R. Andrian, W. D. Sunindyo, and R. Sutriadi, "Transforming Public Services: A Systematic Review of Smart Government Frameworks, Architectures, and Implementation Challenges," *IEEE Access*, 2024, DOI: 10.1109/ACCESS.2024.3450907.
- [34] N. J. van Eck and L. Waltman, "Citation-based Clustering of Publications using CitNetExplorer and VOSviewer," *Scientometrics*, Vol. 111, No. 2, pp. 1053–1070, May 2017, DOI: 10.1007/s11192-017-2300-7.
- [35] L. Gkinko and A. Elbanna, "Designing Trust: The Formation of Employees' Trust in Conversational AI in the Digital Workplace," *J Bus Res*, Vol. 158, Mar. 2023, DOI: 10.1016/j.jbusres.2023.113707.
- [36] G. Park, J. Chung, and S. Lee, "Human vs. Machine-Like Representation in Chatbot Mental Health Counseling: The Serial Mediation of Psychological Distance and Trust on Compliance Intention," *Current Psychology*, Vol. 43, No. 5, pp. 4352–4363, Feb. 2024, DOI: 10.1007/s12144-023-04653-7.

- [37] G. Pizzi, V. Vannucci, V. Mazzoli, and R. Donvito, “I, Chatbot! The Impact of Anthropomorphism and Gaze Direction on Willingness to Disclose Personal Information and Behavioral Intentions,” *Psychol Mark*, Vol. 40, No. 7, pp. 1372–1387, Jul. 2023, DOI: 10.1002/mar.21813.
- [38] A. Agnihotri and S. Bhattacharya, “Chatbots’ Effectiveness in Service Recovery,” *Int J Inf Manage*, Vol. 76, Jun. 2024, DOI: 10.1016/j.ijinfomgt.2023.102679.
- [39] Y. K. Dwivedi, J. Balakrishnan, A. M. Baabdullah, and R. Das, “Do Chatbots Establish ‘Humanness’ in the Customer Purchase Journey? An Investigation through Explanatory Sequential Design,” *Psychol Mark*, Vol. 40, No. 11, pp. 2244–2271, Nov. 2023, DOI: 10.1002/mar.21888.
- [40] A. M. Seeger, J. Pfeiffer, and A. Heinzl, “Texting with Humanlike Conversational Agents: Designing for Anthropomorphism,” *J Assoc Inf Syst*, Vol. 22, No. 4, pp. 931–967, 2021, DOI: 10.17705/1jais.00685.
- [41] K. Haresamudram, N. Van As, and S. Larsson, “Tasks Over Traits: User Perception of Humanlike Features in Goal-Oriented Chatbots,” *Int J Hum Comput Interact*, 2025, DOI: 10.1080/10447318.2025.2470311.
- [42] S. Gomes, J. M. Lopes, and E. Nogueira, “Anthropomorphism in Artificial Intelligence: A Game-Changer for Brand Marketing,” *Future Business Journal*, Vol. 11, No. 1, p. 2, Jan. 2025, DOI: 10.1186/s43093-025-00423-y.
- [43] K. J. Fatima, I. M. Khan, S. Bahmannia, S. K. Chatrath, N. F. Dale, and R. Johns, “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*, Vol. 77, 2024.
- [44] M. Al-Shafei, “Navigating Human-Chatbot Interactions: An Investigation into Factors Influencing User Satisfaction and Engagement,” *Int J Hum Comput Interact*, 2024, DOI: 10.1080/10447318.2023.2301252.
- [45] M. M. E. van Pinxteren, M. Pluymaekers, J. Lemmink, and A. Krispin, “Effects of Communication Style on Relational Outcomes in Interactions between Customers and Embodied Conversational Agents,” *Psychol Mark*, Vol. 40, No. 5, pp. 938–953, May 2023, DOI: 10.1002/mar.21792.
- [46] K. Klein and L. F. Martinez, “The Impact of Anthropomorphism on Customer Satisfaction in Chatbot Commerce: An Experimental Study in the Food Sector,” *Electronic Commerce Research*, Vol. 23, No. 4, pp. 2789–2825, Dec. 2023, DOI: 10.1007/s10660-022-09562-8.
- [47] Q. Li, Y. Luximon, and J. Zhang, “The Influence of Anthropomorphic Cues on Patients’ Perceived Anthropomorphism, Social Presence, Trust Building, and Acceptance of Health Care Conversational Agents: Within-Subject Web-based Experiment,” *J Med Internet Res*, Vol. 25, 2023, DOI: 10.2196/44479.
- [48] Z. Murtaza, I. Sharma, and P. Carbonell, “Examining Chatbot Usage Intention in a Service Encounter: Role of Task Complexity, Communication Style, and Brand Personality,” *Technol Forecast Soc Change*, Vol. 209, Dec. 2024, DOI: 10.1016/j.techfore.2024.123806.
- [49] Y. Feng, J. Meng, and J. Cheah, “From Virtual Trainers to Companions? Examining How Digital Agency Types, Anthropomorphism, and Support Shape Para-Social Relationships in Online Fitness,” *Psychol Mark*, Vol. 42, No. 3, pp. 842–865, Mar. 2025, DOI: 10.1002/mar.22154.
- [50] H. Meng, X. Lu, and J. Xu, “The Impact of Chatbot Response Strategies and Emojis Usage on Customers’ Purchase Intention: The Mediating Roles of Psychological Distance and Performance Expectancy,” *Behavioral Sciences*, Vol. 15, No. 2, Feb. 2025, DOI: 10.3390/bs15020117.
- [51] S. Bae, Y. K. Lee, and S. Hahn, “Friendly-Bot: The Impact of Chatbot Appearance and Relationship Style on User Trust,” in *UC Merced: Proceedings of the Annual Meeting of the Cognitive Science Society*, 2023, pp. 2349–2354. [Online]. Available: <https://escholarship.org/uc/item/0gr051sj>
- [52] R. Wald, E. Heijsselaar, and T. Bosse, “Make Your Own: The Potential of Chatbot Customization for the Development of User Trust,” in *UMAP 2021 - Adjunct Publication of the 29th ACM Conference on User Modeling, Adaptation and Personalization*, Association for Computing Machinery, Inc, Jun. 2021, pp. 382–387. DOI: 10.1145/3450614.3463600.

- [53] A. Janson, “How to Leverage Anthropomorphism for Chatbot Service Interfaces: The Interplay of Communication Style and Personification,” *Comput Human Behav*, Vol. 149, 2023.
- [54] C. Yen and M. C. Chiang, “Trust Me, if You can: A Study on the Factors that Influence Consumers’ Purchase Intention Triggered by Chatbots based on Brain Image Evidence and Self-Reported Assessments,” *Behaviour and Information Technology*, Vol. 40, No. 11, pp. 1177–1194, 2021, DOI: 10.1080/0144929X.2020.1743362.
- [55] A. Polyportis and N. Pahos, “Understanding Students’ Adoption of the ChatGPT Chatbot in Higher Education: The Role of Anthropomorphism, Trust, Design Novelty and Institutional Policy,” *Behaviour and Information Technology*, 2024, DOI: 10.1080/0144929X.2024.2317364.
- [56] D. Chakraborty, A. Kumar Kar, S. Patre, and S. Gupta, “Enhancing Trust in Online Grocery Shopping through Generative AI Chatbots,” *J Bus Res*, Vol. 180, Jul. 2024, DOI: 10.1016/j.jbusres.2024.114737.