

Scientific Mapping of Chatbot Literature: A Bibliometric Analysis

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Abstract

The use of chatbots for customer service has gained momentum in recent years. Increasing evidence has shown that chatbots can transform the customer service landscape. Nevertheless, this topic currently lacks adequate bibliometric and visualization research. In order to review and summarise the research on chatbots, the study employs a bibliometric analysis approach to gain a comprehensive understanding of chatbots. The study uses bibliometric analysis of 798 documents sourced from the Scopus database from 2001 to 2022. The combination of biblioshiny (web interface application of Bibliometrix) and VOS viewer software was used to visualize the analysis. The study's findings reveal three prominent areas in the current research: antecedents of the adoption of chatbots, application of chatbots and behavioural & relational outcomes of the application of chatbots. The future directions and implications have been discussed in the study's conclusion.

Keywords- Chatbots, Bibliometric analysis, Marketing, Customer service.

1. Introduction

A chatbot, commonly referred to as a virtual agent or chatterbox, is a conversational machine that uses natural language to communicate (Melián-González et al., 2021). Chatbots are becoming more and more popular among organizations due to their messaging application capabilities (De Cicco et al., 2020). In addition, the exponential growth in technology adoption among consumers has contributed to the popularity of chatbots (Intelligence, 2022). Thus, businesses have invested in chatbots to facilitate customers' decisions. Additionally, it is predicted that globally, over a billion consumers will use chatbots by the end of 2023 (Juniper Research, 2022). Hence, using chatbots as a new marketing tool, marketers communicate with customers online and profile them using information gathered through online discussions (Shumanovand & Johnson, 2021).

Likewise, chatbots have garnered the attention of academia in the past few years. Previous studies have examined the consumers' adoption, experience, and customer interaction with chatbots. For instance, Van Pinxteren et al. (2020) conducted a systematic review of 61 studies examining the influence of conversational agents' communicative behaviours on customer relationship outcomes. Furthermore, Rapp et al. (2021) highlighted the pertinent themes of chatbots' acceptance, experience, and humanness. Similarly, Nicolesu & Tudorache (2022) synthesized 40 studies to analyse the overall customer experience with service chatbots. Along the same line, Gatzoufa & Saprikis (2022) categorized factors, directly and indirectly, affecting the intended adoption of chatbot usage. Further, Camilleri & Troise (2023) outlined the benefits and limitations of using chatbots in customer service settings. The scholars further highlighted how to enhance the relationship between Chatbot and customers. Table 1 briefly

demonstrates the review of selected existing studies in the domain.

Despite the significant contribution made by these above-mentioned reviews regarding the adoption and usability of chatbots in the literature, there is scope for a thorough and systematic evaluation of chatbots research, specifically its application to the marketing domain (Hsu & Lin, 2023). The role and applications of chatbots are increasing in marketing. Marketers are deploying chatbots to understand customer feedback, assess customer demands, improve customer-AI interaction, offer customer support and strengthen brand value (Lim et al., 2022). Thus, to fill the gap in the literature, the present study attempts to examine, review, and offer a thorough understanding of the literature on chatbots in the marketing field.

Table 1. Previous chatbot literature overview.

Authors	Time period	Focus of research	No.of studies reviewed	Methodology
Gatzioufa & Saprikis (2022)	2017-22	Intention to adopt chatbots	39	Systematic Literature review
Nicolesu & Tudorache (2022)	2010-2022	Analyse customer experience with chatbots	40	Systematic literature review
Camerilleri & Troise (2022)	2017-21	Utility of chatbots in business settings	70	Systematic literature review
Rapp et al. (2021)	2010-2021	Interaction of users with chatbots	83	Systematic literature review
Van Pinxteren et al. (2020)	1998-2018	Effect of communicative behaviour of conversational agents on relational outcomes with customers.	61	Systematic literature review
Present study	2001-2022	Chatbots in marketing	798	Structured literature review and bibliometric review

In light of this, the current study uses bibliometric analysis to review the literature on this topic, as this technique is well-suited for mapping scientific knowledge (Donthu et al., 2021; Goel et al., 2022a, b). Hence, this study intends to advance our knowledge of chatbots by offering bibliometric analysis for science mapping, performance analysis, and bibliographic coupling to identify significant trends and areas of research emphasis. In particular, the following research questions are attempted to be answered:

RQ1: What is the current publishing trend in the study of chatbots?

RQ2: What are the key themes emerging in this domain?

RQ3: What areas should be explored in future research?

The structure of the study is as follows: the first section describes the study along with its goals and research issues. A review of the literature on bibliometric analysis is presented in the second section. The search methods used to locate the literature on chatbots are described in the third part, which also serves as the methodology. The fourth part presents the findings, and the fifth discusses them. The final section draws a conclusion and suggests directions for future research.

2. Review of Literature

2.1 Chatbots

According to Shawar & Atwell (2007), AI chatbots with machine learning and natural language processing are very interactive and use text or voice with customers. In recent times, AI-powered chatbots have served in a variety of capacities, including that of service agents, companions and recommenders. Chatbot service technologies can simulate human discussions through electronic user interfaces on websites and/or social media messaging applications (apps), such as Facebook Messenger and WhatsApp Messenger (Chen et al., 2021). The major areas of investigation identified in the literature focussed on the characteristics and capabilities of chatbots (Chung et al., 2020; Cheng & Jiang., 2022), the adoption of

chatbots (Ashfaq et al., 2020; Sheehan et al., 2020) and human chatbot interactions (Hill et al., 2015). The factors influencing intentions to adopt chatbots, user perceptions of chatbots, and comparison with human agents have been explored in the literature. AI-based chatbots can be found in banking (Trivedi, 2019), education (Kerly et al., 2007), healthcare (Oh et al., 2021), government (Adamopoulou & Moussiades, 2020), SMEs (Selamat & Windasari, 2021) and tourism and hospitality (Goel et al., 2022a).

The usage of chatbots in e-commerce is increasing because they enhance customer service (Lin et al., 2022) and shape consumer perceptions about brands (Zarouali et al., 2018). The interactive technologies are meant to support clients with suggestions, help them with inquiries, and reduce complaints. (Camilleri & Troise, 2023). AI-based chatbots significantly improve the efficiency and effectiveness of consumer online service interaction experience (Luo et al., 2019). Chatbot technologies can help businesses gather data from clients and potential consumers. Additionally, they can effectively resolve customer issues and, when necessary, route calls to human agents (Przegalinska et al., 2019). The literature also lists chatbot drawbacks such as linguistic uncertainty, restricted response to closed queries, inflexibility and impersonality. Some researchers asserted that certain chatbots can still not engage in communication actions meant to improve relationship outcomes (Van Pinxteren et al., 2020).

2.2 Bibliometric Analysis

The bibliometric analysis method is employed to examine the topic of chatbots. A science that analyses bibliographic data with quantitative tools is referred to as the bibliometric method. It makes it possible for researchers to deal with a large amount of data without running the risk of bias (Donthu et al., 2021; Goel et al., 2022b). To achieve its goals, the study makes use of keyword co-occurrence and bibliographic coupling. The bibliographic analysis consists of two sections: Science mapping and performance analysis. The performance analysis enables mapping of the field's development trends and the most well-known authors, institutions, and nations. The keyword co-occurrence analysis is performed to determine the chatbots' conceptual structure.

The foundation of keyword co-occurrence analysis is that the conceptual relationship between two terms indicates when they exist in many documents. The author's keywords are used to express the central theme of the study. The analysis of keywords and their co-occurrence can be quite helpful for a thorough understanding of the research field. The most well-known authors, institutions, and nations can all be depicted on a map using the performance analysis. The intellectual structure of chatbots is assessed with the help of keyword co-occurrence analysis. The idea behind keyword co-occurrence analysis is to determine the conceptual relationship between two keywords that appear in various documents. The study's main idea is expressed through the authors' keywords and in-depth comprehension of the research field, greatly aided by examining keyword data and their co-occurrence. The bibliometric method is based on the notion that two publications with many shared references will have similar content (Weinberg, 1974). The similarities in the content can be seen in the shared references to literature.

2.3.1 Database Choice

The information for the review was obtained from the Scopus. The Scopus database has over 60% more inclusion than the Web of Science (WoS). Additionally, 99.1% of the journals listed in WoS are also indexed in Scopus. In this way, the consideration of the two databases for bibliometric examination would prompt the issue of duplication (Singh et al., 2021). Hence, Scopus was preferred.

2.3.2 Data Extraction and Data Cleaning

The study retrieved the data from the Scopus database using the search terms (“chatbot” OR “chatterbots” OR “conversational Agents” OR “virtual assistants” OR “talkbot” OR “conversational AI” in the article’s

title, abstract and keywords. The first set of keywords relates to chatbot research, and for marketing, we included “user” OR “consumer” OR “consumer service” OR “customer”. We used the Boolean operator AND to connect the chatbot research keywords to the marketing research keywords. This implies that wherever the term that has to be searched appears in the article’s title, abstract or keywords, it will be chosen for bibliometric analysis. This resulted in 4922 documents in the initial search. The search criteria were further refined using the inclusion and exclusion criteria.

- (i) Only English-language publications were considered.
- (ii) The study considered only research articles, conference papers and reviews. The conference proceedings, editorials, surveys, and book chapters were excluded.
- (iii) The range of subject areas was restricted to “Business, Management and Accounting”, “Social Sciences”, “Psychology” and “Multidisciplinary”.
- (iv) The timeline for the study was 2001-2022.

Following the application of the data extraction and cleaning process. The final output consisted of 798 articles. Figure 1 depicts the steps taken to create the final sample. A summary of the Scopus search details is represented in Table 2.



Figure 1. Research methodology.
(Source: Created by authors)

Table 2. Scopus search details.

Criteria		Results
Field Tag	Title, Abstract and Keywords	TITLE-ABS-KEY (“Chatbot” OR “Chat bot” OR “Virtual Assistant” OR “Chatterbox” OR “Conversational Agent” OR “Talkbot” OR “Talk Bot” OR “Virtual Agent” OR “Conversational AI” AND “User” OR “Consumer” OR “Consumer Service”
Document Type	Article, Conference papers and Review	Include only articles, conference papers and reviews. (Limit-to-DOCTYPE, “ar”) OR (Limit-to-DOCTYPE, “re”) OR (Limit-to-DOCTYPE, “cp”)
Language	English	Include only English-language published documents. (Limit-to-LANGUAGE, “English”)
Subject area	Business Management and Accounting Social Sciences Psychology Multidisciplinary	Limit-to (SUBJAREA, “soci”) OR (SUBJAREA, “busi”) OR (SUBJAREA, “mult”) OR (SUBJAREA, “psyc”)
Removal of duplicates		Duplicates removed=25 N=798

3. Data Analysis-Research Results, Impact Results, and Collaboration Results

3.1 Publication Trends

The publication trends in the field of chatbots are depicted in Figure 2 from 1993 to 2022. The first article on the topic of chatbots emerged in the year 1993. Thereafter, there has not been much work on it for several years. With the growth in technology since 2015, academic work on chatbots has started to progress, as evidenced by the figure. There has been an upward trend in chatbot research since 2015. Also, the number of publications published over the previous three years accounted for 79 percent of all papers published worldwide. This indicates the rising and persistent academics', researchers, and scholars' interest in this area. Also, by looking at the average citations per year, the years 2007, 2009 and 2011 got the maximum citations, followed by 2008. This implies that the research in this field started picking up after 2005 with the advent of technology worldwide. The papers published in the years with the highest citations imply that research was extremely prominent and significantly impacted studies.

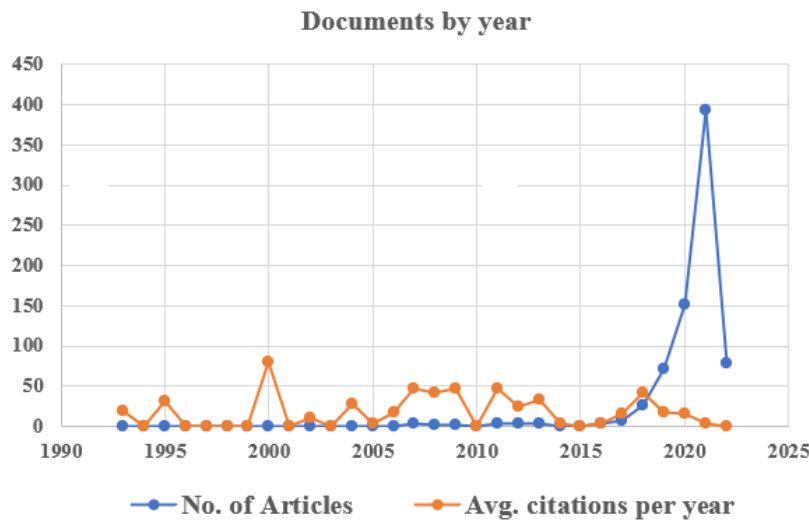


Figure 2. Scientific output.
(Source: Created by authors)

3.2 Most Productive and Influential Countries

The top five nations with the largest publications are the USA, China, India, the UK and Germany (Figure 3). Countries like France, Australia, and South Korea are behind in the number of publications, but the citations and average per citation are quite high. Indian researchers are also quite active in this field, and the number of publications is encouraging. However, the average citations for India are not very impactful. This signifies the ample opportunity for Indian researchers to contribute quality research output in this area.

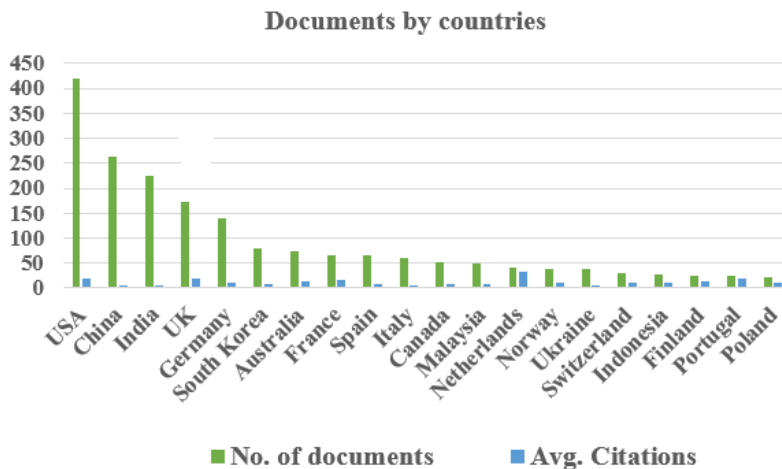


Figure 3. Most productive and influential countries. (Source: Created by authors)

3.3 Most Prolific Authors

Figure 4 depicts the most prolific authors in the chatbot field.

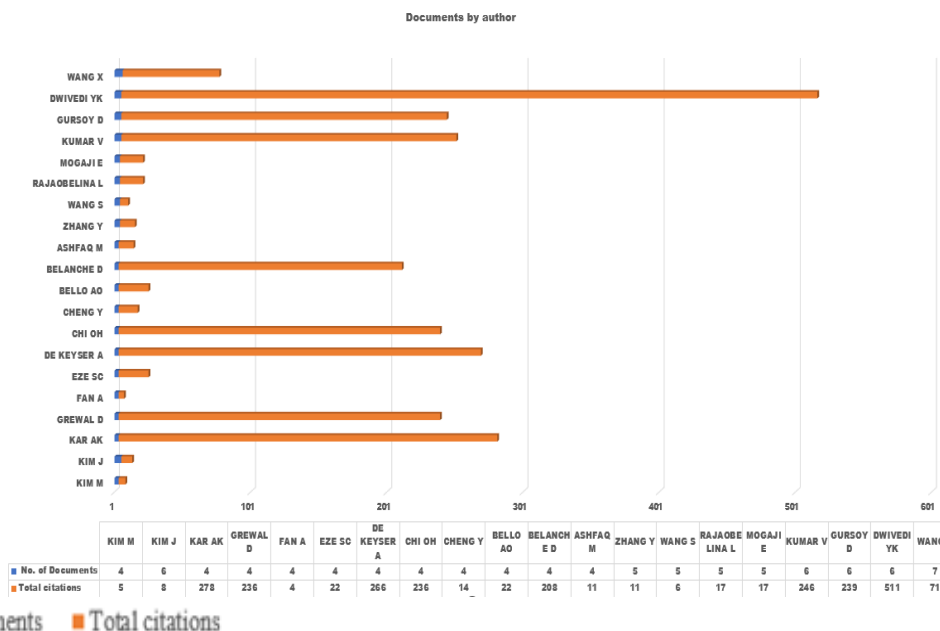


Figure 4. Most prolific authors. (Source: Created by authors)

The most productive creator is Dwivedi (Dwivedi et al., 2021), who has the most noteworthy 511 citations. De Keyser Kumar and D Gursoy distributed six articles each and got 266, 246 and 236 citations, respectively. Eight of the top 20 authors have an average of more than 200 citations, while 16 of the top 20 authors average more than 10. This demonstrates that the number of publications has increased over time. The impact of publications has grown significantly over the years, as well.

3.4 Most Prolific Contributing Institutions

The top 20 most prolific institutions in the chatbots field are presented in the Figure 5. The most significant contribution came from Hong Kong Polytechnic University, with 14 articles. The next institutions are Shandong University, Southwestern University of Finance and Economics and Washington State University, which contributed 13 articles each. The majority of the top institutions are from the U.S.A. and China, highlighting the role of the authors of these institutions.

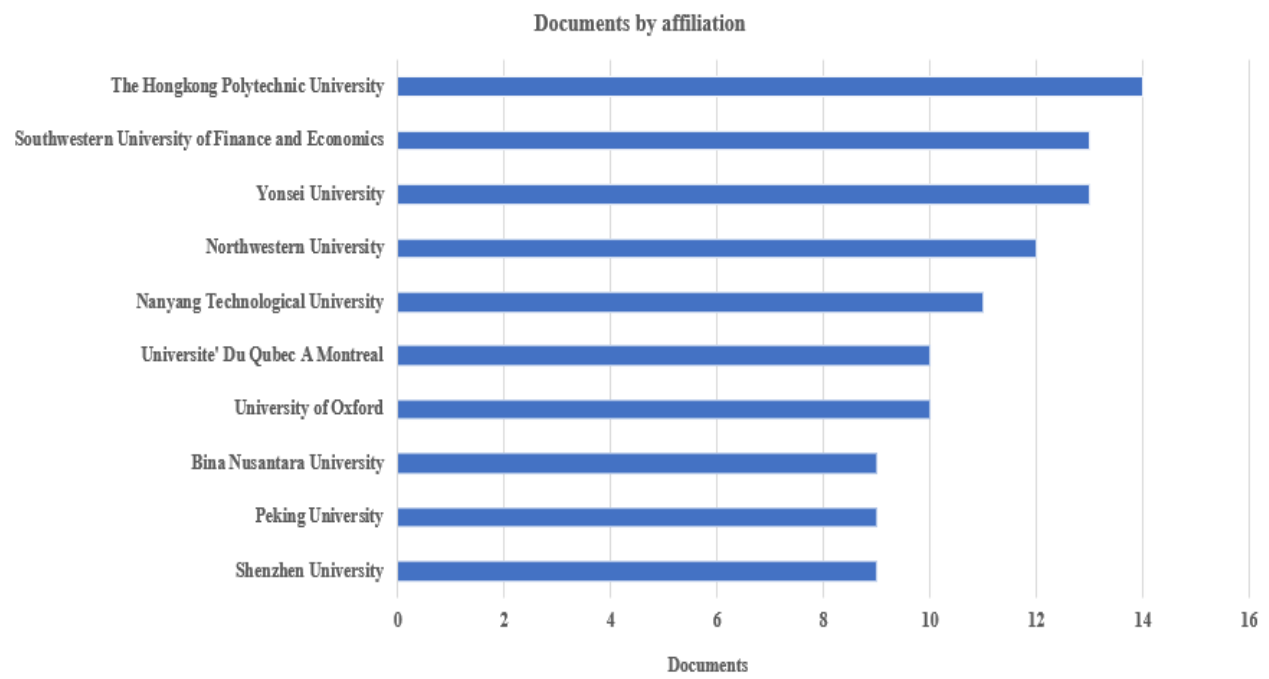


Figure 5. Most contributing institutions.
(Source: Created by authors)

3.5 Most Prolific Journals

Figure 6 represents the journals that publish a volume of articles in the field of chatbots. The most noteworthy is the Journal of Business Research, which includes 905 papers on this topic. It is followed by Computers in Human Behaviour, Journal of Marketing and Journal of Consumer Research with 826,791,660 publications, respectively. Additionally, the Australian Business Deans Council has given the majority of reputable publications in this field an A or A* rank.

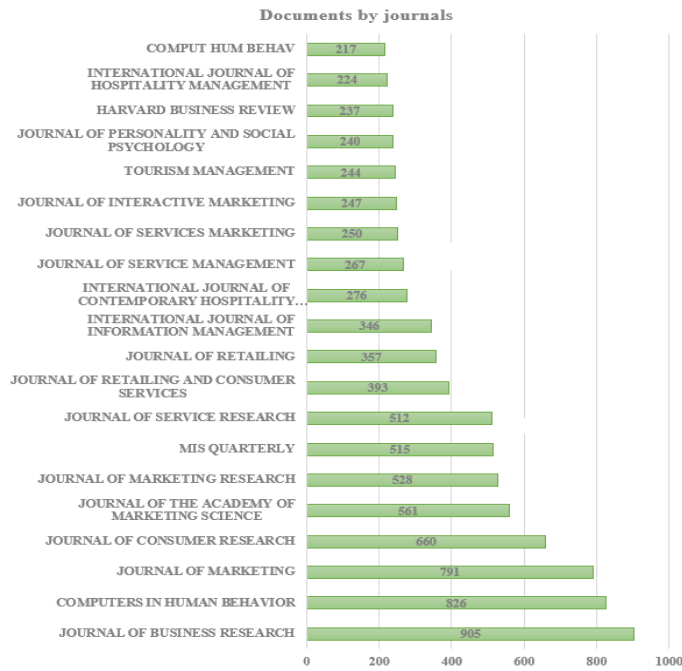


Figure 6. Most prolific journals.
(Source: Created by authors)

4. Intellectual Structure of Chatbots

The intellectual structure of chatbots is shown in Figure 7. More explanation is given in the Result section.

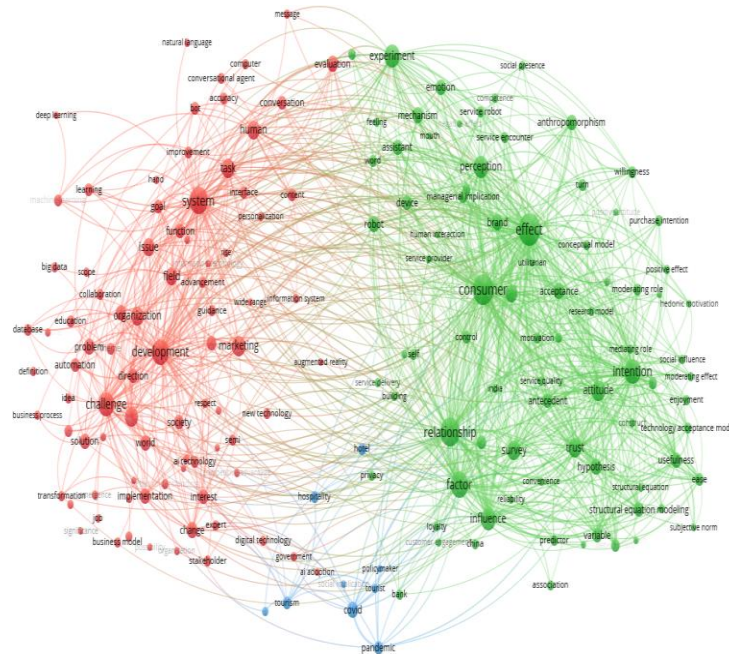


Figure 7. Intellectual structure.
(Source: Generated using VOS viewer)

5. Results

This section provides the details of the intellectual structure of Chatbots to help researchers comprehend this field in an organized manner. Co-word key analysis was used to create the clusters. The above figure shows a network of terms that are commonly used in the field of chatbots. Using the VOS viewer software, 415 keywords were clustered based on their frequency of occurrence (at least ten times). The co-keyword analysis produced three clusters, which were then categorized into three study fields, as shown in Figure 7.

5.1 Antecedents of Chatbot Adoption

The first cluster (green colour) represents the research looking at the causes of chatbot adoption in various contexts, reflecting the core of the customer experience. The studies relating to chatbot quality dimensions, chatbot designs, acceptance, features, experiences of users, and comparison of chatbots with human agents are included in this cluster. The first line of research relates to the chatbot users' experience.

Chatbot user Experience

The research in this corpus describes how users react and perceive chatbots. Research on the acceptance of chatbots has been explored to determine the variables for adoption through the lens of TAM and UTAUT theories. It was found that ease of use, usefulness and service quality are the major factors affecting the variety of service outcomes, including customer satisfaction, trust, loyalty and adoption (Zhang et al., 2017; Cho et al., 2019; Butt et al., 2021; Li et al., 2021; Yoganathan et al., 2021). The AI device user acceptance model has been used to determine customers' intentions to accept or reject the use of AI devices (Gursoy et al., 2019). The first line of research relates to accepting chatbots in different situations. Zarouali et al. (2018) analyzed the interactions of 245 participants of chatbot users for movie reservations. It was discovered that consumer attitude was predicted by pleasure, arousal, perceived usefulness, perceived helpfulness and dominance, which further determines the likelihood of recommending chatbots. Barreto et al. (2021) studied users of chatbots on airlines. The study concluded that customer experience affects users' attitudes and satisfaction with chatbots. Brachten et al. (2021) analyzed the acceptability of chatbots in the business environment. The findings revealed that employees' intrinsic motivations positively influence the intent to utilize enterprise bots, while extrinsic factors were less impactful. Social influence has been found by Kuberkar & Singhal (2020) to influence the decision to use chatbots with AI in public transportation services.

A considerable amount of research highlights that chatbots enhance customer satisfaction across different contexts. Chatbots and customer satisfaction in relation to luxury brands were researched by Chung et al. (2020). They discovered that e-services boosted consumer satisfaction with brands because chatbots can communicate, support and improve customer service. Ashfaq et al. (2020) analyzed drivers of users' satisfaction and continuation intention of using chatbot e-service. It was found that a user's satisfaction with the chatbot e-service influences their intention to continue. Studies have investigated how an AI companion's accuracy, compatibility, responsiveness, and communication quality have a favorable relationship with satisfaction and perceived hedonic value (Adam et al., 2021). Hsiao & Chen (2022) studied the service quality variables of AI chatbots and their impact on trust and satisfaction in the context of ordering meals.

The findings demonstrated that customer satisfaction was a significant indicator of users' intention to continue using chatbots. Cheng & Jiang (2022) suggested that developing a strong customer-brand relationship via chatbots significantly increases customers' purchase intention and brand loyalty. Yen & Chaing (2021) surveyed 204 participants from Taiwan in an e-commerce context and found trust in

chatbots is predicted by competence, credibility, media richness, social presence, playfulness, and informativeness of chatbots. Cheng et al. (2021) explored the trust and response of chatbot users in an e-commerce context. The study advances knowledge about users' reliance on and resistance to text-based chatbots. Mostafa & Kasamani (2022) found perceived ease of use, performance expectancy and compatibility as the antecedents of initial trust towards chatbots, which further enhances the intention to use chatbots and encourages customer engagement.

To sum up, research emphasizes that user's acceptance and adoption of chatbots depends on the context. Various service-related contexts determine the acceptability of chatbots. The expectations of users significantly affect the perceptions of chatbots, which may influence the overall engagement, satisfaction, and trust of users in AI-based chatbots.

Chatbot Design

Another line of research focuses on chatbot design. Researchers have applied the CASA (Computers Are Social Actors) paradigm to study how users react to the social cues from chatbots. The anthropomorphism of chatbots remains a significant topic in human-chatbot interaction research. Anthropomorphism is a fundamental psychological mechanism promoting social human and non-human interaction. However, chatbot anthropomorphism's association with users' perception is complex, and the results are mixed. According to research by Araujo (2018), giving chatbots human-like qualities influences users' perceptions. The anthropomorphic characteristics, including communication style, personality, and user interface, show that users are more satisfied while communicating with extrovert chatbots than with introvert chatbots.

Han (2021) looked into users' opinions of mobile messenger chatbots and how they affected their decision-making. It was found that anthropomorphism played a significant role in influencing users' intention to buy through chatbots. Rhim et al. (2022) compared anthropomorphic chatbots with baseline chatbots and found that users' perceptions of anthropomorphic chatbots were positive as compared to baseline chatbots. Sheehan et al. (2020) found that users with strong interaction needs want the chatbot to be more human-like. Qiu & Benbast (2009) found that anthropomorphizing bots improves social presence, trust and usage intentions. Ahmad et al. (2020) found that certain linguistic styles can affect the unfolding of conversations. The results confirmed that gender also drives the flow of interaction. Pitardi et al. (2022) and Beattie et al. (2020) investigated how the use of emojis by chatbots impacts communication quality and found that emoji-using chatbots are perceived as similar to humans in communication quality factors. Kull et al. (2021) explored how the chatbot's first message (warm vs. competent) could attract and engage customers. The perception of humanness may not always result in positive outcomes (Liu & Sunder, 2018). Skjuve et al. (2019) suggested that higher anthropomorphism induces counterproductive interactions according to the uncanny valley theory.

To summarize, the results of considering chatbots as humans are mixed. On the one hand, human-like chatbots foster engagement, trust, and positive brand outcomes in various service encounters. On the other hand, more human likeness may result in a negative belief of dishonesty, as per the uncanny valley theory (Rapp et al., 2021).

Effect of Emotions

Customer emotions are another emerging sub-theme in human chatbot interaction. Studies have generally concentrated on subjects like happiness, enjoyment, arousal, and warmth, which positively impact perceived value and consumer satisfaction. The positive interaction of users with chatbots results in acceptance, adoption, and the forging of loyalty and trust (Fan & Mattila, 2021; Soderlund & Oikarinen,

2021). On the other hand, when a user encounters unfavorable emotions like creepiness, fear, anger, and discomfort, it impacts trust and loyalty negatively (Rajaobelina et al., 2021). Crolic et al. (2022) found that the user's emotional state impacts satisfaction and subsequent purchase intention. Luo et al. (2019) found showing a chatbot's identity lowers the purchase rate. Lee et al. (2022) outlined how AI chatbots' emotional and cognitive intelligence levels explain customer satisfaction, which promotes affective attachment and purchase intention. However, too sentimental services could disregard their clients' needs regarding information. Consequently, this leads to negative user perceptions. Research highlights the importance of emotions and the user's emotional context in human chatbot interaction.

Comparison of Chatbots and Human Agents

The research examines how users' perceptions and experiences are affected by perceived differences in communication between humans and chatbots in various contexts. Lou et al. (2022) compared the strength of AI chatbots (automation and processing) and humans (emotional intelligence) in brand communication strategies for online apparel shopping. They discovered that participants perceived humans as warmer and more competent than chatbots. Xu et al. (2020) compared the human service agents and chatbots in the banking context. They found that in the case of tasks with low complexity, users preferred chatbots, while for high-complexity tasks, human service agents were preferred over chatbots. Hill et al. (2015) contrasted human-to-human interactions with human-to-chatbot interactions, and they discovered that the latter lasted longer because chatbots offer continuous service and speed up response times. Studies underlined that users' preference for chatbots over human service agents depends on the context and various service-related factors.

5.2 Application of Chatbots in the Service Sector

This cluster represents studies relating to the application of chatbots in various domains. Chatbots are being employed within a wide range of contexts, including online retailing (De Cicco et al., 2020; Cheng et al., 2021), banking (Trivedi, 2019), healthcare (Laranjo et al., 2018), tourism and hospitality (Pillai & Sivanthanthu, 2020), and online media and communication (Zarouali et al., 2021) among others. The study highlighted the importance of having a socially interactive chatbot to compensate for the impersonal nature of online emerging technologies for retailing services (De Cicco et al., 2020). In the context of online mass communication, Zarouali et al. (2021) discovered that users consider news delivered by chatbots more credible than website information. Cheng et al. (2021) investigated the attitude of chatbot users in e-commerce. It was discovered that users' trust in chatbots is positively correlated with their reliance on it and negatively correlated with their resistance.

Pillai & Sivanthanthu (2020) examined the antecedents of chatbot adoption intention in the hospitality and tourism sector. The perceived usefulness, intelligence, trust and anthropomorphism were the predictors of chatbot adoption intention in Indian tourism. In line with this, Trivedi (2019) investigated the impact of chatbot users' satisfaction on brand love for banks. The findings suggested that banking chatbot users expect chatbots to be convenient and reliable and to respond quickly to their queries. Furthermore, the results show that using chatbots in online education is promising. In synthesis, the application of chatbots in different contexts and settings has been investigated extensively.

5.3 COVID-19 and Chatbots

The last cluster relates to the background of the COVID-19 pandemic. The spread of COVID-19 has accelerated the deployment of artificial intelligence in marketing. In recent years, there has been an upward shift in chatbot usage in the hospitality and tourism businesses owing to social distancing and safety concerns. The precautionary measures have directed businesses and consumers to transform their buying behaviour in the physical environment and increasingly rely on digital media and devices for their

requirements (Camilleri & Falzon, 2021). Raza & Khan (2021) employed corona fear as a moderator to test consumers' intention to adopt e-commerce. The role of corona fear was found significant in influencing the transition to e-commerce. Huang & Kao (2021) studied the variables impacting customer evaluations of social distance and how those evaluations affect chatbot usage in the U.S. The findings suggest that social distancing norms and attitudes positively influence chatbot usage, where social distancing norms influence the usage of chatbots in hedonic situations, and attitudes positively influence the case of utilitarian services.

6. Future Research Directions

After evaluating the literature, the study highlights numerous areas for future research that must be addressed immediately to close the knowledge gap in the academic literature. Table 3 provides a concise overview of the research directions extracted from the analysis of existing studies within this field. The key areas can be summarized under the following heads:

6.1 Theoretical Directions

The theories that have been widely recognized and applied in previous research have come up from diverse disciplines, such as information technology (TAM, UTAUT, Information Success Model, Diffusion of Information, CASA paradigm), sociology (Situational theory, Social cognitive theory, social response theory, User and Gratification (U & G) theory and psychology (Flow theory, Theory of reasoned action, Theory of planned behaviour, Uncanny Valley theory). Hence, for a thorough knowledge of this phenomenon, the theories such as the Decomposed Theory of Planned Behaviour (dTPB), Expectation Violation theory (EVT), Social Information Processing theory (SIPT), Para Social Relationship Theory (PSR) theory can be employed to understand the insights of interpersonal relationships between users and chatbots. Therefore, future studies could investigate these possibilities by utilizing or incorporating additional approaches. Based on this, one effective strategy to advance the field of chatbots is to extend the prominent theories in different contexts.

6.2 Contextual Directions

Future studies should concentrate on less researched contexts such as high-credence services like legal, sharing economy and healthcare services (Chen et al., 2021). Moreover, the subjects of context should be extended. The subjects can be based on products (hedonic vs. utilitarian), services or shopping experiences (Ahn et al., 2022).

6.3 Methodological Directions

The maximum number of papers reviewed in the study employed laboratory experiments or mixed-method studies to study chatbot interactions. More research is required to fully comprehend how individuals use this technology in everyday life. Additionally, a dearth of longitudinal studies will aid in understanding the consumer's behavioural changes (Chen et al., 2021; Sands et al., 2021). Future research should use more diverse research designs. Moreover, cross-cultural or international work could be another future research direction. (Brandtzaeg & Følstad, 2018; Rhim et al., 2022).

Antecedents & Outcomes

The studies in this domain have highlighted various quality dimensions, unique attributes, social presence and usefulness factors as antecedents that influence the adoption of chatbots in various domains. The functional factors and chatbot design have been explored widely in the extant literature. The impact of chatbots' design elements and attributes was significant in creating a better and more productive online experience (Go & Sundar, 2019; Cheng et al., 2021; Chen et al., 2021; Lei et al., 2021). Future studies can examine chatbot marketing efforts as antecedents of initial trust in enhancing AI outcomes (Mostafa

& Kasamani, 2022). The effect of chatbot anthropomorphism (low, intermediate, and high) on consumer or frontline agent perceptions (competence, warmth, and attractiveness of chatbots) can be studied (Keyser et al., 2019). Customer segmentation may be studied in future research to understand the preference of human agents over chatbots. It will facilitate the implementation of the ideal chatbot for each of the appropriate customer segments (Tran et al., 2021).

Mediators and Moderators

The Human Chatbot literature examined the mediating impact of attitude, norms, satisfaction and trust on the intent to accept/adopt and continue using chatbots in various service encounters. However, the influence of brand familiarity and consumer characteristics is ill-explored. Also, the interaction effects of emotional differences, consumer expectations and types of service context may significantly influence the interaction. Furthermore, a more thorough grasp of the negative aspects of chatbots has not yet been studied in the literature.

Outcomes

The outcome variables in the research field can be classified into behavioural outcomes and brand-related outcomes. The behavioural outcomes include patronage intention, reuse, continuation intention, satisfaction, and trust are a few examples (Rese et al., 2020; Han, 2021; Cheng et al., 2021; Lei et al., 2021). Brand-related outcomes reported brand engagement (Kull et al., 2021), brand love (Trivedi, 2019) and attitude towards the brand (Roy & Naidoo, 2021). Future studies may observe the interaction of the effectiveness of chatbots and customer expectations in various contexts on recommendation behaviour on WOM and loyalty (Cheng & Jiang, 2022).

Table 3. Research directions.

Perspective	Exemplar research directions
Theory	What theoretical framework can be applied to the study of chatbots across various disciplines? What existing theories can be combined to form a brand-new theory for the investigation of human-chatbot interaction?
Methodology	How can chatbots be employed in high-credibility services, including law, the sharing economy, and healthcare?
Context	How are product differences affecting customers' perceptions regarding the adoption of chatbots? How can chatbots be integrated or used with other AI technologies to provide service to customers? How should they be used across the various service contexts and customer journey touchpoints? How consumer interactions during and after COVID-19 are influenced by fear and health issues. How does the human-chatbot relationship alter as customer emotions shift during and after COVID-19?
Phenomenon	How do different generations interpret responses from AI chatbots? How can AI chatbots be more appealing to consumers and boost their acceptance? How do emotion-related elements like joy and curiosity affect the adoption and use of chatbots? What is the role of age, education, technology preparedness, self-efficacy, and cultural values in commercial and relational outcomes such as sales and brand love? What is the role of chatbots in decreasing online shopping cart abandonment? Which factors are essential for the anthropomorphic branding of chatbots? What emotional resonance do the anthropomorphised chatbots have with users? How do social norms, emotional sources, and emotional complexity affect the anthropomorphic chatbot's effectiveness?
Ethical and Privacy Considerations	How to improve human-chatbot interaction by balancing privacy concerns with personalization? How does the privacy concern affect the efficacy of AI chatbots? How do ethical principles (transparency, justice& fairness, privacy) affect the adoption of chatbots in various domains?

7. Practical Implications

This study is extremely valuable to numerous marketing professionals and researchers. The review highlighted many paths that could be explored in the future. The authors suggest exploring research on

the integration of chatbots with other AI technologies to serve customers better. Hence, deliberate attempts should be made to study customer interactions across different contexts and customer-journey touchpoints. Future researchers could delve deeper into how customer service outcomes and chatbot design are interrelated across different services. Some pitfalls related to the ethics and privacy of chatbot use need thoughtful consideration. Furthermore, governments and policymakers should develop principles and guidelines to address ethical and privacy challenges. Finally, deliberations and collaborations on chatbots among different stakeholders should be encouraged.

8. Conclusion

The review study examined the developments in the field of marketing-related chatbot research globally. The study's findings show the expansion of research in terms of publications. The current research has highlighted three key areas: chatbot application, behavioural and relational effects of chatbot application, and antecedents of chatbot adoption, including barriers to adoption. Research in this field has been constantly and gradually growing since 2005. 798 research publications from the years 2001 to 2022 were examined using bibliometric techniques. The United States has made the most contributions to this field of research in terms of the number of research articles and citations. Based on the existing research in the domain of chatbots, the future avenues for the research have been identified, followed by an exemplary list of questions that could be investigated in future studies.

Conflict of Interest

The authors confirm that there is no conflict of interest to declare for this publication.

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