

2021

Factors Influencing Artificial Intelligence Conversational Agents Usage in the E-commerce Field: A Systematic Literature Review

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Recommended Citation

Alnefaie, Ahlam; Singh, Sonika; Kocaballi, A. Baki; and Prasad, Mukesh, "Factors Influencing Artificial Intelligence Conversational Agents Usage in the E-commerce Field: A Systematic Literature Review" (2021). *ACIS 2021 Proceedings*. 47.

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Factors Influencing Artificial Intelligence Conversational Agents Usage in the E-commerce Field: A Systematic Literature Review

Full research paper

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Abstract

Artificial intelligence conversational agents have become an essential strategy for business, both as an online shopping application and as a customer support solution, where they provide interactive communication for online customers. To ensure the effective usage and successful implementation of the conversational agents, the factors influencing customers' attitudes and acceptance towards conversational agents need to be explored. This paper presents a systematic literature review of conversational agents in the field of e-commerce to identify the variables that influence conversational agents' usage and to present the state-of-the-art in this research area. Twenty-four relevant papers are reviewed, and many significant factors are identified that positively influence customers' acceptance, satisfaction, and trust towards conversational agents' technology.

Keywords Artificial Intelligence, Chatbot, Conversational Agent, Systematic Literature Review

1 Introduction

Conversational agents (CAs) are increasingly adopting for customer support and commercial interactions. Many conversational agents have been created with human identities and even personalities (Radziwill and Benton 2017). Chatbots or conversational agents are defined here as digital applications that employ machine learning and artificial intelligence techniques to mimic human-like conversations (Vaidyam et al. 2019). CAs are mainly intended to converse with people utilising natural language conversations through auditory or written means, allowing humans to interact with them effortlessly (Hussain, Sianaki, and Ababneh 2019). While greater human-like conversational skills are unnecessary for all engagements, they may be critical for long-term human-agent connections. The overarching goal of CAs is to simulate both the components and characteristics of human communication. This is particularly true in settings where social contact and bonding are critical to providing certain services (Clark et al. 2019).

Online retailers strive to offer a pleasurable shopping experience for their customers, and many studies have investigated this emerging area. For example, Mimoun and Poncin 2015, suggest that CAs may assist customers in learning about items while minimising the impersonal feel associated with online purchasing. CAs presence on a website has been shown to improve customer engagement, trust, and satisfaction (Sfenrianto and Vivensius 2020). Additionally, when dealing with increasingly demanding customers, businesses attempt to enhance the advantages felt by each customer after each contact, just like a sales representative in a conventional environment may establish and strengthen the company-customer relationship. Thus, in addition to the physical presence of such an individual, virtual engagement may provide perceived advantages to Internet users. As a result, engaging with CAs has a comparable impact to that of actual sales agents in real-world situations, facilitating time savings, simplicity of purchase, guidance, better purchasing choices, and improving customer relationships. According to Bavaresco et al. 2020, Technology development for business has shown a growing interest in conversational agents, where CAs could enhance user engagement by providing customer support, online experiences, and personalized services.

As CAs become a more integral part of marketing and customer relationship management (CRM), understanding the variables that affect customer acceptance of CAs and the desire to utilise them are critical to ensure their effectiveness and successful implementation. More profound knowledge of factors enhancing consumer attitudes regarding the adoption of CAs is required from a theoretical perspective, mainly when such technology plays a significant role in the service quality and business economy. From a practical standpoint, understanding the variables that affect consumers' adoption and usage of CAs, benefits both customers and companies interested in implementing this technology by ensuring that the established conversational agents fulfil customers' needs. However, there have been limited studies on the factors that contribute to the acceptance and usage of CAs from the users' viewpoint.

Prior research has mainly focused on accepting and using CAs in particular contexts, such as healthcare, education, and training (Montenegro et al. 2019; Laranjo et al. 2018; van Oijen et al. 2021). Since existing research on this topic is frequently cross-disciplinary, there is a need to provide a more synthesised view of the factors affecting consumers' adoption and use of CAs in e-commerce domains. This paper fills the need by conducting a systematic review approach to identify specific articles and synthesize collected evidence that meets the predefined inclusion criteria to answer a research question from numerous empirical studies (Palmatier et al. 2018). The contributions of this review are as follows. First, investigating the use of conversational agents in the business, especially e-commerce domains, over the last decade. Second, identifying factors influencing conversational agents' usage in e-commerce concerning customer intent. Finally, identifying opportunities and future research directions.

2 Methods

This study reviews the literature using the international guidelines established by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al. 2009). The review process has involved the studies published between (2010 to 2021) to attempt to answer the following research questions:

- What are the factors influencing conversational agents' usage in e-commerce domains?
- How effective are conversational agents in supporting customers' needs?

This study seeks to provide an overview of factors that may assist or restrict the deployment of CAs in e-commerce contexts and suggest recommendations for future research within this specific field. The

research question seeks to identify the key variables that influence the use of CAs in e-commerce. Thus, a systematic review may help identify antecedents that increase the acceptability and use intention of CAs. The literature search was performed utilising different search terms of the e-commerce field in the three primary databases: Web of Science, Scopus, and Science Direct, according to a predefined search strategy and the search keywords provided in Table 1. Gusenbauer and Haddaway 2020, shown that Google Scholar is ineffective as a primary search engine. Additionally, the extracting data technique from Google Scholar is currently unreliable and not scalable (Martín-Martín et al. 2018). As a result, Google Scholar was not used in this research as a search database.

The search keywords were selected to focus on studies that examined the acceptance and intention to use CAs as their outcome variables, especially in the e-commerce domain, rather than on publications that examined generalised CAs usage. Because various digital databases use search engines with varied criteria, a preliminary search was performed in each database to verify that the chosen terms were acceptable and relevant. Due to the recent advances in the development of CAs for everyday users, the search method concentrated on papers published between 2010 and 2021 (the last decade) to guarantee that the studies represented state-of-the-art research on this subject.

Table 1. Search keywords	
Major terms	Search terms
E-commerce	“Online commerce” OR e-commerce OR “electronic commerce”
Conversational Agent	AND chatbot OR "conversational agent"
Acceptance	AND satisfaction OR “intention to use” OR “consumer attitude” OR acceptance

Four co-authors conducted searches in Scopus, Science Direct, and Web of Science. The databases were chosen because they include a diverse range of articles from various fields and subjects (Jonnalagadda et al. 2015). In systematic review investigations, these databases are regarded as central search systems (Gusenbauer and Haddaway 2020). Additional searches were conducted by two of the authors through searching in reference lists and working backward via citations, resulting in a snowball effect (Watson and Webster 2020). As a result of snowballing, our study discovered additional seven articles by examining the reference lists and citations of publications. The database search resulted in 671 articles. Four co-authors first screened the titles and abstracts of the articles. Each study was evaluated using a predefined set of inclusion and exclusion criteria, as shown in Table 2.

Table 2. Inclusion and Exclusion Criteria	
Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> ▪ The studies should be full academic papers (not a poster or extended abstracts) ▪ Studies should be focused on the evaluation to use conversational agents or impact or satisfaction as outcome variables ▪ The studies should be written in English ▪ The studies should be focused on the use of a conversational agent in e-commerce domains 	<ul style="list-style-type: none"> ▪ The studies that were published earlier than 2010 ▪ The studies conducting of literature reviews or systematic review studies ▪ The studies that are not available for access ▪ The studies that are not related to the research questions ▪ Magazine articles and opinion pieces

The inclusion and exclusion criteria were established and directed by the study's research question and aim. The aims include investigating the factors that affect consumers' attitudes towards CAs in the e-commerce sector in current empirical studies. A total of 44 articles passed the first screening procedure and were selected for a more thorough full-text evaluation. Failure to satisfy any of the inclusion criteria resulted in the study's elimination. At each step of screening, the number of rejected studies was noted, along with the reasons for exclusion. This research identified new studies via a forward snowballing search method by examining the citations to the articles included. These articles were evaluated for eligibility using the same inclusion and exclusion criteria as the previous ones.

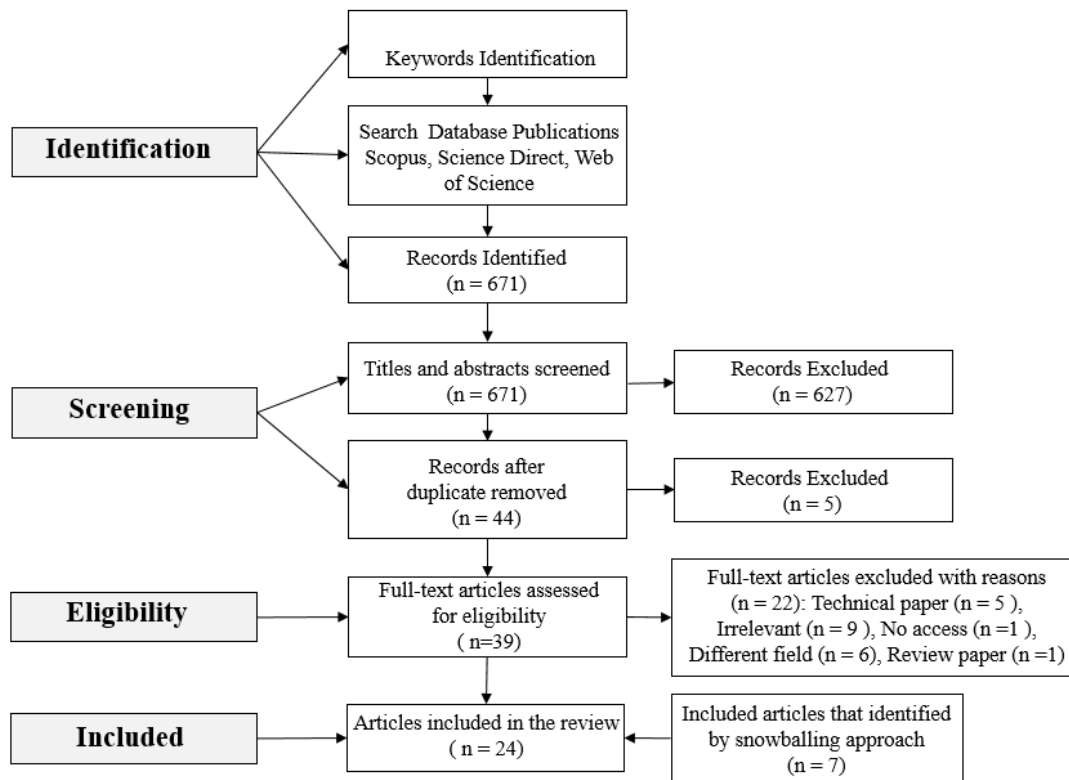


Figure 1. Systematic review process

3 Results

This review includes a total of twenty-four publications, seventeen through database searches, and seven articles using the snowball method, as shown in Figure 1. Most studies have been published in the last three years, as shown in Figure 2. The publication dates suggest that interest in CAs has just lately begun to grow among academics. The target populations in the experiments of these published studies are from 12 countries. The United States of America (37.5%) is the primary country that involved nine studies. The second one is Korea (12.5%), which involved three studies, followed by six studies conducted in India, Indonesia, and China (each of them has two studies, 8.33%), six studies conducted in the United Kingdom, Germany, South Africa, French, Norway, and Turkey (each of them has one study, 4.16 %). Table 3 presents a summary of the outcomes of the literature review according to the research questions.

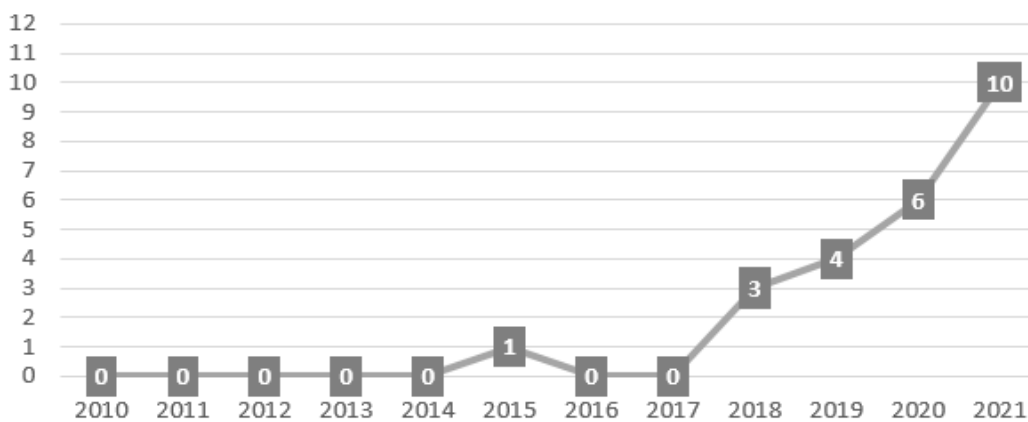


Figure 2. Number of published studies by year during the last decade

According to the type of CAs, we found two types of CAs, based on the interaction style, text-based and voice-based. Text-based CAs offer interaction through text or written conversation, Voice-based CAs

interact with users through auditory conversation. Therefore, all two types (text-based and voice-based) are addressed. The majority of studies (23 of 24) are focused on text-based chatbots due to their popularity in the e-commerce and marketing discipline. However, (Rhee and Choi 2020) investigate the impact of personalization of messages under the condition of limited information for a product recommendation in a voice-based conversational agent. The researchers found that a voice-based agent with a social role has a positive effect on a product in the context of voice shopping (Rhee and Choi 2020). Most reviewed studies (22 of 24) have used the survey as the data collection method. However, Selamat et al. 2021, conducted mixed research methods that involved a semi-structured interview as the first stage of the study and then conducting a survey. Luo et al. 2019, applied an experiment by sending structured sales calls to more than 6,200 customers, and they found that undisclosed chatbots are as effective as proficient human workers.

Research on the factor of perceived usefulness of text based CAs (8 of 24) found that the perceived usefulness influences consumers' intention to use CAs (Ashfaq et al. 2020; Selamat et al. 2021;), attitude toward CAs (Kasilingam 2020; Zarouali et al. 2018), lower intrusiveness of chatbot advertising (Van et al. 2019), user acceptance of chatbots (Rese et al. 2020), behavioural shopping intention (Pillai et al. 2020), customer experience, and users' satisfaction (Lubbe and Ngoma 2021). Studies that addressed the factor of anthropomorphic as a human-like agent (6 of 24) outlined that this factor increases users' perception of the agent as being human-like (Araujo et al. 2018), evaluate the chatbots as a useful agent (Selamat et al. 2021), adoption intent towards text-based CAs (Sheehan et al. 2020), behavioural intention to reuse text-based CAs (Go and Sundar 2019), users' trust towards chatbots (Nordheim 2018), positive users' perceptions into intentions to purchase through commerce chatbots (Han 2021). Furthermore, studies that focused on the factor of perceived ease of use (4 of 24) found that perceived ease of use is a significant predictor of intention to reuse text-based CAs (Ashfaq et al. 2020), attitude toward chatbots (Kasilingam 2020), behavioural intention to shop by AI-powered automated retail agent (Pillai et al. 2020), and customer experience and satisfaction (Lubbe and Ngoma 2021). Customization is a marketing strategy that can lead to enduring customer relationships through delivering relevant content based on customers' interests and preferences (Ansari and Mela 2003). However, only two studies have investigated the feature of customization services provided by text based CAs (Pillai et al. 2020; Chung et al. 2020). Concerning the participants' experience in the research methods used in the reviewed studies, most studies restricted the participants who have previous experience with conversational agents. Therefore, only one study investigated the first-time experience with conversational agents (Kull et al. 2021). One study found an initial chatbot message that involves warmth or competence may enhance consumer engagement by providing more authentic users responses and emotional tone (Kull et al. 2021). Effective conversational agents support customers' needs by providing immediate answers to consumers' queries (Moriuchi et al. 2021). Therefore, CAs should be integrated as a communication tool for consumers seeking specific information and service support, not just be integrated as an engaging technology.

Table 3. A summary of studies according to the research questions

Study	Major outcome	Study	Major outcome
Ashfaq et al. 2020	Information quality and service quality positively influence consumers' satisfaction with text based CAs. Perceived enjoyment, usefulness, and ease of use are significant predictors of continuance intention to use text based CAs.	Araujo et al. 2018	The usage of human-like language or the identity of chatbots increases the perception of the chatbots as being human-like. Chatbots with human-like cues can have a positive effect on customer relationship building.

Kasilingam 2020	Perceived usefulness, ease of use, enjoyment, price consciousness, perceived risk, and personal innovativeness influence attitude toward chatbots. Trust, personal innovativeness, and attitude directly influence intention to use chatbots.	Selamat et al. 2021	Responsive, simple steps to trigger customer actions, humanized conversations, and personalized recommendations impact anthropomorphism, perceived enjoyment, and usefulness. Perceived enjoyment and usefulness positively affect customers' intention to shop and intention to use the chatbot.
Rese et al. 2020	The authenticity of conversation, perceived usefulness, and enjoyment positively influence the acceptance of text based CAs. Privacy concerns and the immaturity of the technology harmed the usage intention of text based CAs.	Van et al. 2019	When chatbots are perceived as helpful and useful, the intrusiveness of chatbot advertising is perceived as lower. Perceived relevance is a significant moderator for the relation between perceived intrusiveness and message acceptance provided by chatbots.
Kull et al. 2021	An initial chatbot message that conveys warmth or competence can enhance consumer engagement. Competence chatbot messages lead consumers to provide more authentic responses and emotional tone.	Sheehan et al. 2020	Clarification by the chatbot to identify the source of the miscommunication affects the adoption intent of chatbots. Perceived human-like factor affects adoption intent and satisfies the social desires of consumers' interaction.
Pillai et al. 2020	Perceived usefulness, ease of use, interactivity, enjoyment, and customization influence behavioural intention to shop at AI-powered automated retail stores. Innovativeness and optimism of consumers affect the perceived ease of use and usefulness of AI-powered automated retail stores.	Go and Sundar 2019	Message interactivity is an important factor in determining psychological, attitudinal, and behavioural outcomes on CAs. Anthropomorphic (identity cue (human-associated names), visual cues, and conversational cues lead to more favourable attitudes and greater behavioural intention to return to a website that provides the online chat agent.
Rhee and Choi 2020	Personalized content and the social role of a friend (informal language style) lead to a more positive attitude toward the product in a voice-based conversational agent.	Lubbe and Ngoma 2021	Perceived ease of use, perceived playfulness (user's enjoyment), and perceived usefulness of chatbots influence customer experience and users' satisfaction.

Elsholz et al. 2019	The language style (modern English) factor of chatbots increases user satisfaction in terms of ease to use. The language style (Shakespearean-styled) factor of chatbots enhances user engagement and perceived product value in terms of fun to use.	Moriuchi et al. 2021	Chatbot engagement did not change users' attitudes toward the company. However, Chatbot engagement affects users' satisfaction toward the shopping experience. Chatbots are suitable for consumers who are looking for information about a product by providing immediate responses for consumers' query.
Li et al. 2020	The ability to respond to consumer needs immediately is a predictor of customer acceptance of using AI customer services and being objective and neutral in choosing information without deliberately enhancing consumers' acceptance of AI customer service.	Sfenrianto and Vivensius 2020	Information quality, system quality, service quality, e-trust, e-satisfaction, and e-loyalty positively influence customer experience towards e-commerce chatbots usage.
Mimoun and Poncin 2015	Using an embodied conversational agent on a commercial website can improve perceived shopping value and behavioural intentions to use CAs. Satisfaction is influenced by the playfulness, decision quality, and social presence of CAs.	Chung et al. 2020	E-service agents' marketing efforts (interaction, entertainment, trendiness, customization, and problem-solving) evoke communication quality. Accuracy and credibility of e-service agents' communication positively influence customers' satisfaction.
Nordheim 2018	Expertise, fast response, anthropomorphism, absence of marketing as chatbot-related factors affect users' trust in chatbots for customer service. External factors (brand, low risk, access to human operator) and user-related factors (propensity to trust technology) also affect users' trust in chatbots.	Han 2021	Anthropomorphism (human-like talking) leads to positive users' perceptions of the social presence of commerce chatbots. Perceived enjoyment affects consumers' intentions to purchase through chatbot commerce.
Kim and Chang 2020	User satisfaction positively influences the immersion with chatbots and increases the likelihood of reusing the chatbot service. The reliability of the chatbot services enhances the immersion and consumers' reuse intention.	Eren 2021	Perceived performance, trust, and corporate reputation have a positive impact on customer satisfaction towards chatbot use. Customer expectations positively affect the perceived performance of the chatbot agents. Perceived performance has a positive impact on the confirmation of customer expectations.

Luo et al. 2019	An undisclosed chatbot is better than an identity disclosed bot as less knowledgeable and less empathetic. The chatbot that has identity disclosure before the machine–customer conversation reduces purchase rates by more than 79.7%.	Zarouali et al. 2018	Perceived usefulness, perceived helpfulness, and three affective (pleasure, arousal, and dominance) potentially influence consumers’ attitudes toward brands that provide a chatbot and consumers’ patronage intention (likelihood to use and recommend the chatbot).
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4 Limitations

This review presents limitations as any other literature review that may affect the scope of the outcomes. However, the planning and decisions taken during the conducting this study try to mitigate them. In the planning of this review, three databases are selected to reduce bias. These sources contain peer-reviewed publications from information systems and business research. However, this review may have missed some articles due to the fact the ACM and IEEE libraries are not included. We defined the search string considering three major terms and search terms. The search terms are selected in order to increase the relative and assertiveness of the search. Therefore, the “e-commerce” search terms are defined based on synonyms from the thesaurus, while “conversational agent” and “acceptance” search terms are defined from keywords of relevant studies. However, we used a limited number of search terms that may affect the number of studies as the terms like an intelligent assistant, voice assistant, and virtual assistant were not used. Finally, this review focuses on empirical studies and does not consider technical papers.

5 Discussion and Directions for Future Research

This literature review aims to explore the factors that influence the CAs usage within the field of electronic commerce and provide directions for future work. This section discusses the results and proposes directions for prospective studies on CAs for electronic commerce and marketing communication. Overall, the literature review shows an increasing interest in CAs for business and e-commerce domains by many scholars as more than half of the identified studies are published in 2020 and 2021. Additionally, the reviewed studies explore different factors that influence CAs usage for different outcomes variables such as user perception and attitude, user experience, and customer engagement offers possibilities for future research in this area. Future research may conduct a study with a specific characteristic of participants, such as users who never interacted with CAs for online shopping, to measure the first impression of this technology. Furthermore, future research may expand the scope of this review study to include other search words, such as "virtual assistant," "dialogue system," "smart speaker," or "Alexa," to encompass other kinds of applications of conversational agents. Finally, future studies may investigate alternative roles for CAs as an expert in product-recommendation, fashion stylist, personal shopper, or effective communicator.

6 Conclusion

This research has performed a systematic review to undertake an in-depth examination of the variables affecting the use of conversational agents in e-commerce domains. Twenty-four relevant scholarly papers were analysed to determine the factors that impact the intention to use, users' attitudes, or acceptance of CAs technology. Several variables were identified, including perceived information quality, perceived ease of use, perceived usefulness, perceived enjoyment, anthropomorphism, customization, and message interactivity.

Overall, investigating the different uses of conversational agents in e-commerce presents itself as a promising research area. Especially, increasing the capabilities of conversational agents will likely further improve the perception of the humanness of conversational agents and provide new opportunities for scalable interactive communication with customers.

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