

Chatbot Integration in E-Commerce Customer Relationship Management: A Structure of Literature Review

Chhayna Cheng¹

¹Faculty of Business Administration, BELTEI International University, Phnom Penh, Cambodia

*E-mail Correspondence: chhaynacheng@gmail.com

Abstract-While research on AI tools is growing, studies on chatbot integration for customer relationship management (CRM) in e-commerce remain limited. This review addresses this gap by analyzing chatbot features within a unified model. Using a literature review approach, inclusion criteria, and document analysis, 77 scholarly articles published between 2020 and 2025 were synthesized. Chatbots, originating with ELIZA in the 1960s, are categorized as AI-based, rule-based, or voice-activated. They play a substantial role in digital marketing by managing customer expectations, increasing satisfaction, and fostering long-term relationships on major platforms such as Amazon, Shopify, Alibaba, Domino's Pizza, and eBay. Key functions, including quick responses, personalized interactions, automated replies, and 24/7 support, enhance information quality, customer satisfaction, retention, and loyalty. The review concludes by suggesting future research to further explore chatbot integration in E-commerce platforms across industries and contexts.

Keywords: Chatbot, Customer Relationship Management (CRM), E-commerce.

I. INTRODUCTION

Nowadays, the electronic commerce environment (e-commerce) is undergoing a progressive transformation, driven by customers' expectations for individual and seamless purchasing experiences [1]. It has become an essential tool for supporting and changing the processes of users and businesses to communicate, discover, and purchase products and services [2]. Consumer behavior has been significantly reshaped by e-commerce, offering greater access, simplified product discovery, and a wider range of product choices [1].

Consumers require fast, personalized, and convenient service through online shopping, available 24 hours a day, 7 days a week [3]. Businesses are exploring innovative strategies to enhance user engagement and experience on their e-commerce platforms as the technological market grows [2]. In the current trend, Artificial Intelligence (AI) is increasingly integrated into business operations across firms of all sizes, as presented in Fig. 1 [4].

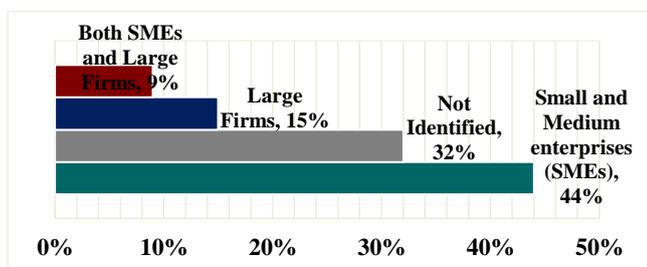


Fig.1. Distribution of respondents by firm size
Source: Adapted from [10]

Additionally, AI adoption aims to enhance operational efficiency and effectiveness [5] improve profitability and competitive advantage [6] and support process innovation across business functions such as customer service, supply chain, finance, and human resources, as shown in Fig. 2 [7].

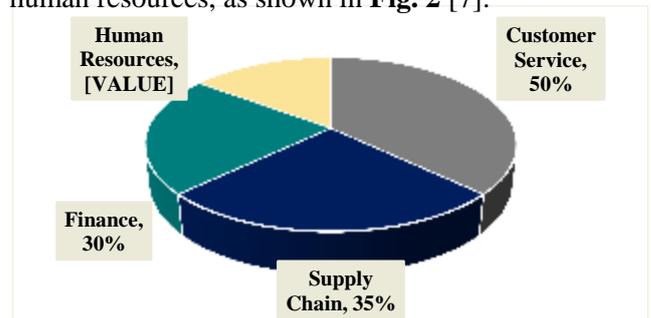


Fig. 2. Primary applications of AI in business
Source: Adapted from [7]

By leveraging AI applications, businesses can track their progress, deliver efficient prompts, save time, and increase accuracy in customer connections, offering greater flexibility, customization, and enhancing customer relationship management (CRM) [8]. AI enhances user engagement through advanced segmentation and targeting based on demographics, purchase data, and consumption patterns [9]. It supports and supervises customer relationships, enriching CRM with advanced tools [10]. For instance, [11] found that AI-driven CRM enables effective service support, audience targeting, and personalized marketing, helping businesses



understand customer needs, engage in real time, and improve strategic planning. Another study by [12] conducted interviews with four experts to explore AI's impact on service support, highlighting its role in improving customer service through faster responses, easier navigation, and higher-quality performance.

Similarly, [13] studied 112 Texas enterprises, showing that AI adoption in e-commerce enhances CRM by improving efficiency, customer experience, personalization, accurate responses, and customer retention. Despite the rapid expansion of e-commerce and growing AI integration, the literature remains fragmented regarding the strategic role of chatbots in CRM. Existing studies largely emphasize operational efficiency and personalization, with limited attention to how chatbot integration enhances broader CRM outcomes, such as customer retention, loyalty, and long-term relationship development [14].

As chatbot adoption accelerates in online retail, a structured review is needed to consolidate current findings and clarify their strategic contribution to CRM. Therefore, this study aims to bridge this gap by analyzing the key role of chatbots in enabling CRM for e-commerce platforms [15]. It synthesizes recent research to explore how chatbots contribute to technological transformation, facilitate competitive advantages, and support customer engagement in the e-commerce market [16].

By examining these aspects, the study highlights the mechanisms through which chatbots enhance customer retention, satisfaction, and relationships. Additionally, to address this objective, the study focuses on the following research questions:

- [1] How are chatbots adopted in e-commerce platforms as a strategic tool to improve CRM?
- [2] What are the key chatbot dimensions integrated to enable CRM on e-commerce platforms?
- [3] What roles do chatbots play in supporting CRM functionality in e-commerce platforms?

The study first presents the methods, core concepts, and chatbot dimensions in e-commerce, then examines their role in enhancing CRM, and concludes with recommendations for future research in advanced industry contexts.

II. METHODS

According to [17], a literature review serves as a scientific method for synthesizing and connecting relevant studies, drawing conceptual insights beyond individual empirical findings, and bridging different academic disciplines. It consists of relevant stages, including formulating review questions, defining

main concepts, justifying the review's needs, and sustaining a concise and well-organized structure [60]. Additionally, this analysis involves searching reliable literature using accurate keywords and controlled terms, assessing quality through credible sources, summarizing evidence in tabular, textual, or graphical methods, and interpreting findings into a coherent set of evidence that informs a new design

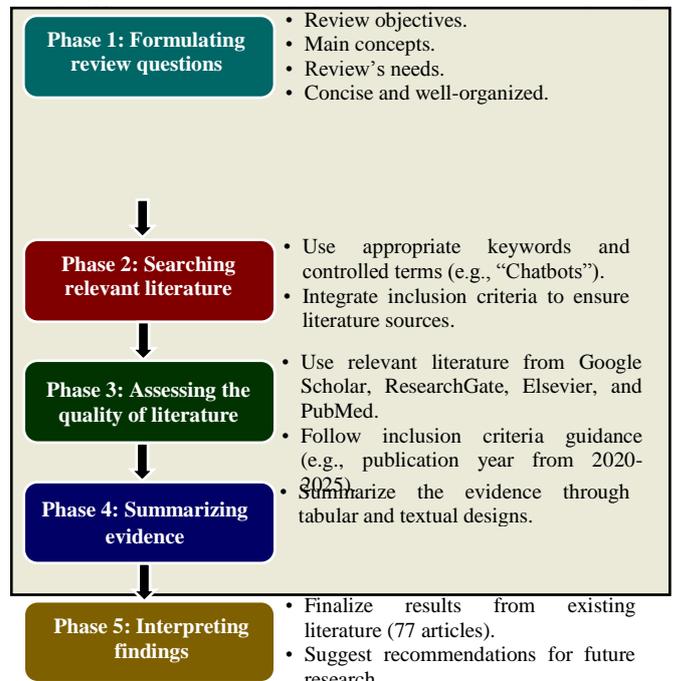


Fig. 3. Procedural framework for conducting a literature review
Source: Adapted from [60]

According to [50], document analysis follows a structured process to identify, select, examine, and interpret existing literature, providing holistic insights that guide the development of a novel framework and the integration of relevant studies. Overall, this study adopts a literature review and document analysis technique to synthesize the existing literature on the role of chatbots in enhancing CRM on e-commerce platforms. To ensure the relevance and quality of the reviewed literature, inclusion criteria were adopted in this study to guide the academic document synthesis. This integration also aimed to strengthen the clarity of the research design and uphold academic integrity in presenting findings across diverse sources. The inclusion criteria for this study are outlined as follows:

- [1] Scholarly works in journals, conferences, or institutional publications.
- [2] Focus on chatbots in CRM within e-commerce.
- [3] Written in English.



- [4] Published between 2020 and 2025.
 [5] Sourced from Google Scholar, ResearchGate, Elsevier, and PubMed.

Following these established criteria, the total number of articles used for analysis was 80. Of these, 77 articles were relevant in this review, as shown in Table 1, while three documents related to methods. The selected articles focused on e-commerce sectors, mainly emphasizing AI and chatbots, and technology adoption in business, and were published in English

to ensure quality and consistency in knowledge dissemination. The search strategy encompasses various keywords, such as “E-commerce,” “Chatbots,” “Customer Relationship Management,” “Artificial Intelligence,” and “2020-2025”. Relevant studies were identified through manual searches in academic databases, including Google Scholar, ResearchGate, Elsevier, and PubMed.

Table 1. Studies by database and publication year (2020–2025)

N ^o	Database Sources	2020	2021	2022	2023	2024	2025	Articles reviewed
1	Google Scholar	7	4	4	10	12	6	43
2	ResearchGate	2	6	2	6	6	2	24
3	Elsevier	1	–	3	2	–	1	7
4	PubMed	1	–	1	1	–	–	3
Articles reviewed		11	10	10	19	18	9	77

III. RESULT AND DISCUSSION

Result

The findings of this review are organized into three primary categories: Chatbot adoption in e-commerce platforms, Chatbot dimensions, and Chatbot roles in e-commerce CRM. The following section offers an insightful explanation and discussion of each part.

3.1.1 Chatbot adoption in e-commerce platforms

Based on the findings of the literature review, the table below summarizes the key results for chatbot adoption in e-commerce platforms.

Table 2. Chatbot adoption in e-commerce platforms

E-commerce platforms	Trademarks	Sources
1) Amazon		
2) Shopify		[57]
3) Alibaba		
4) 1-800-Flowers		
5) PVR Cinemas		[41]
6) Sephora		
7) Vainu		
8) American Eagle Outfitters		[23]
9) Domino’s Pizza		[62]
10) eBay		
11) Facebook		
12) WeChat		

Table 2 demonstrates the broad adoption of chatbots across various industries. Companies such as Amazon, Shopify, Alibaba, 1-800-Flowers, PVR Cinemas, Sephora, Vainu, American Eagle Outfitters, Domino’s Pizza, eBay, Facebook, and WeChat are using them for orders, support, personalized recommendations, and checkout assistance to boost efficiency and cut service costs.

3.1.2 Chatbot dimensions in e-commerce platforms

Based on the results of the literature review screening that has been conducted, the following chatbot features in e-commerce platforms are summarized in the table below:

Table 3. Chatbot dimensions in e-commerce CRM

Chatbot dimensions	Context	Sources
1) Increasing Engagement	Customer	India [17] China [9]
2) Enhancing User Experience		Spain [49] Palestine [79]
3) Increasing Engagement	Customer	India [55]
4) Enabling Purchase Intentions		UAE [24] Thailand [66] USA [27]



Table 3 highlights the key dimensions of chatbots in e-commerce platforms. Chatbots enhance customer engagement, improve user experience, assist in product selection, and drive purchase intentions, enabling businesses to provide personalized support, seamless interaction, and timely recommendations across various online shopping contexts.

3.1.3 Chatbot roles for CRM in E-commerce platforms

Based on the results of the literature review conducted, the following table presents a brief overview of chatbot roles for CRM in e-commerce:

Table 4. Chatbot Roles for CRM in E-commerce

Chatbot roles	Context	Sources
1) Information Quality	Indonesia	[71]
2) Customer Satisfaction	Indonesia	[70]
3) Customer Retention	Nigeria	[74]
4) Customer Loyalty	Pakistan	[48]
	India	[64]

Table 3 summarizes the contribution of chatbots to CRM on e-commerce platforms. By delivering accurate, comprehensive product and service information, chatbots enhance customer satisfaction, retention, and loyalty through quick responses, 24/7 availability, and personalized support tailored to customers' preferences.

Discussion

3.2.1 Chatbot adoption in e-commerce platforms

Chatbots originated in the 1960s with ELIZA, a program designed to simulate human conversation [18]. Advances in artificial intelligence (AI), machine learning (ML), and natural language processing (NLP) have transformed them into sophisticated conversational agents capable of personalized, real-time interaction [6, 29]. These capabilities make chatbots a crucial tool in e-commerce, enhancing customer experience by providing fast responses, tailored recommendations, and seamless support [57]. In practice, chatbots are integrated into digital marketing and service strategies to improve customer satisfaction, engagement, and long-term relationships [75].

Leading e-commerce platforms have widely adopted chatbots to enhance business operations and customer experiences [75]. For example, Amazon uses chatbots for order management, answering inquiries, providing personalized suggestions, and supporting the checkout process, which reduces costs and improves service efficiency [57]. Shopify and Alibaba have similarly implemented chatbots to

streamline interactions and support online transactions [57]. Other companies, such as 1-800-Flowers, PVR Cinemas, Sephora, and Vainu, leverage chatbots to assist with ordering, offer product ideas, provide personalized recommendations, facilitate ticket booking, track sales, and respond to customer questions [41].

Additionally, American Eagle Outfitters, Domino's Pizza, eBay, Facebook, and WeChat have integrated chatbots to deliver digital sales assistance, product recommendations, conversation support, and order management, further improving efficiency and customer satisfaction [23, 62]. Collectively, these examples illustrate the diverse purposes of chatbot adoption across global e-commerce platforms. For instance, empirical evidence highlights chatbots' contribution to Customer Relationship Management (CRM) [51, 28, 5]. A study by [51] found that chatbots enhance sales and customer support through timely assistance and product recommendations. [28] showed that chatbots improve communication effectiveness, trust, and dialogue quality across medium and large enterprises in Asia, Europe, and Africa.

Similarly, [2] reported that chatbots foster customer fulfillment and purchase intention through human-like, ethically guided interactions in Turkey. Overall, chatbots have become integral to e-commerce operations, providing 24/7 customer support, handling inquiries efficiently, and enabling CRM by enhancing engagement, satisfaction, and loyalty [77, 34, 65]. Their adoption allows businesses to deliver consistent, personalized service while reducing operational costs and improving overall customer experience [77, 34, 65].

3.2.2 Chatbot dimensions in e-commerce platforms

Chatbots have emerged as an advanced tool in marketing strategies, supporting the rapid digital transformation of e-commerce to meet customers' evolving needs and expectations [12]. These digital innovations, particularly chatbots, are increasingly integrated into e-commerce platforms to strengthen customer relationships and engagement without requiring direct human interaction [12]. Therefore, the capabilities of chatbots have increasingly attracted many online businesses through essential aspects to grow their enterprises and maintain a better connection with customers, such as increasing customer engagement, enhancing user experience, assisting precise product selection, and enabling purchase intentions [55].



a. Increasing Customer Engagement

According to [67], chatbots, as AI-based technologies, enhance convenient engagement between online sellers and purchasers through textual and vocal linkages, utilizing advanced NLP. The key benefits of chatbots include instant response time, continuous availability, and 24/7 support, owing to their advanced capabilities and multifunctional performance across diverse inquiries [36]. Additionally, chatbots decode customer input in natural language to yield accurate answers, all while supervising interactions with multiple users at the same time, such as performing common dialogue and enabling a sense of closed interaction [1]. Hence, online businesses have implemented chatbots to build a greater customer relationship and engagement, and their effective abilities to transmit direct customer requirements, individually discuss, and encourage customer engagement [75].

For instance, a study by [17] in India on the behavior of experienced online shoppers highlighted that chatbots are the key components contributing significantly to online business practices by emerging pleasurable emotions, fulfilling customer satisfaction, enabling continuous engagement in online purchases, and boosting stronger electronic word of mouth. Likewise, another study by [9] investigated in China with university students experienced in online purchase, illustrating that chatbots positively influence both psychological and behavioral engagement of clients. This involves offering accurate and real-time responses, helping in task completion, assisting with customized search features, facilitating a high-performing suggestion engine, and supporting smart after-sales services [9].

b. Enhancing User Experience

Chatbots have become essential tools for online businesses through their capacity to enhance user experience in online shopping [20,19,39]. With their potential, they can provide several important features to foster user experience, such as efficiently supporting information searches, customizing product discovery, offering reliable recommendations, and enabling highly accurate sharing of current trend information [4, 22]. Therefore, chatbots, which play a key role in guiding and supporting customers during online purchases through quick responses or direct replies [22], enable efficient interaction between online sellers and customers, including reduced costs and convenient communication for both parties [63].

A study by [49] investigated the incorporation of chatbots into e-commerce platforms among small and medium-sized enterprises in Spain, showing that chatbots have a significant enhancement on customer experience in online shopping, such as supporting customers in purchasing processes, keeping privacy confidence, and offering seamless user-friendly design (visual appeals, common response language, and accessibility). Another examination by [70] was conducted among Palestinian e-commerce users, illustrating that the adoption of chatbots has positively reshaped a greater customer experience in the online market through improved service quality, including prompt responses, accurate information, personalized and customizable communication, and 24/7 accessibility to inquiries.

c. Increasing Customer Engagement

Chatbots are characterized as smart and modern electronic agents, designed to offer a warm greeting, manner, and communication as human-like actions [61]. They play a major role in supporting, serving, and guiding customers to minimize their obstacles in seeking products and asking customers all the significant inquiries to explore the appropriate options for them [61]. Additionally, chatbots have become modern assistants in supporting online businesses by providing instant assistance, personalized communication, and accessible features [8]. Their capabilities can enhance an e-commerce platform's strengths by improving accessibility, transparency, and smooth user interactions [8].

Therefore, the implementation of chatbots can support online businesses effectively and efficiently through their capabilities to facilitate customer needs [58]. These include flexible analysis to customers' prompt, accurate personalized responses, customizable features, and relevant product recommendations to fulfill customers' exploration and precisely match personal needs and expectations [58]. For instance, [55] conducted an exploration in India, indicating that the incorporation of chatbots has massive support for e-commerce operations through offering accurate recommendations, creating consumer enjoyment, and inspiring customer interaction.

d. Enabling Purchase Intentions

Chatbots play an essential role in boosting e-commerce sales by offering sensible and persuasive



recommendations to customers [43,35]. Customers begin by discovering product information before deciding to purchase, and chatbots are an appropriate tool for delivering relevant, accurate, and prompt product information [3]. Chatbots have attracted many online businesses in both product- and service-based industries because of their capacity to capture customer attention through active communication, advertising, and responses [24]. For instance, an investigation by [24], conducted in Ajman, United Arab Emirates, found that chatbots serve as the key mechanism for attracting customer attention in online advertising through their innovative functions and designs.

These involve promoting brand personality, minimizing client acquisition costs, enlarging brand reach or awareness, and assisting effective communication, thereby driving and enabling significant purchase intention [24]. Another examination by [66], conducted in Thailand, reveals that chatbots have played a significant role in fostering e-commerce sales by capturing consumer purchase intention through pleasant conversations, emotional responses, and perceived benefits. According to [27], a study conducted on university students in the United States showed that chatbots have a significant influence on customers' purchase intentions. Ultimately, the findings highlight that chatbots influence customer interactions by delivering engaging and socially impactful communication, enabling purchase intention within conversational responses [27].

3.3.3 Chatbot Roles for CRM in E-Commerce

In the digital era, online businesses increasingly adopt chatbots to enhance CRM in e-commerce platforms through quick prompts, personalized engagement, automated replies, and 24/7 customer support, enriching satisfaction and boosting sales [37]. Chatbots offer valuable and efficient strategies for managing CRM, transforming traditional interaction into modern communication [25]. Their integration is a smart choice for strengthening customer experience, engagement, satisfaction, and loyalty, making them a crucial part of contemporary business markets [11,53].

a. Information Quality

According to [47], chatbots are recognized as innovative tools that help brands address customer problems effectively and efficiently by providing

accurate, cost-effective, and instant support. They are not only seen as modern assistants, but their interaction approach also helps them connect better with customers [2]. In the e-commerce context, chatbots harness suitable capabilities and features to manage customer queries and challenges while improving customer interest and emphasizing information dissemination [71]. Chatbots are integrated into e-commerce platforms to disseminate quality information and enhance customer attention [50]. Information quality is a major element in building relationships between consumers and brands [52,31,15].

Delivering concise, accurate, and relevant responses supports customer expectations, signals strong involvement, improves anticipation toward the brand, and makes customers feel that their needs are valued [52,31]. Chatbots play a significant role in supporting e-commerce by delivering high-quality information that enhances customer enjoyment, convenience, and overall experience [71]. A study in Indonesia across platforms such as Shopee, Tokopedia, Bukalapak, Blibli, and Lazada found that chatbots provide succinct, precise, and prompt answers, contributing to customer trust, experience, and satisfaction [71].

b. Customer satisfaction

Chatbots, recognized as digital assistants similar to humans, enhance consumer support while reducing operational costs [7]. Studies highlight their pivotal role in developing customer satisfaction in e-commerce platforms [45,70]. Response speed is a key strategy, as chatbots provide faster, more efficient answers and immediate resolutions than traditional methods [45,7]. Chatbots also strengthen interactions through personalization. Equipped with machine learning and consumer information, they deliver individualized suggestions and accurate strategies to address issues, fostering emotional connection and satisfaction [32,14].

Their ability to offer instant, consistent, and accurate responses builds customer confidence and reliable interactions, meeting expectations and boosting satisfaction [21,16]. A study in Indonesia further confirms that response speed, personalization, and reliability shape customer satisfaction through chatbot use in e-commerce platforms [70]. This includes understanding customer preferences in context, providing instant answers to individual needs, and delivering dependable information [70].



c. Customer Retention

The primary obligation of online businesses, beyond persuading customers to make purchases, is to maintain customer relationships [26]. Customer retention illustrates a company's ability to implement strategies that develop long-term connections with existing clients, encouraging repeated purchases [26]. It is a significant operational measurement, since maintaining existing consumers is more efficient than attracting new customers through implementing cross techniques to assist long-term relations and revenue growth [33]. In current technological advancement contexts, chatbots can be used to offer a greater tool to build and foster customer retention through the wide range of their modern features, such as providing quick support, 24/7 availability, and customizable responses [2].

Furthermore, chatbots serve as a vital modern strategic assistant in facilitating, tracking, and examining e-commerce platforms through their functions to enable and retain customer relationships in long-term aspects [74]. A study by [74] investigated Small and Medium-Scale Enterprises (SMEs) in Abuja, Nigeria, highlighting that chatbots positively contribute to enhancing these enterprises' ability to deliver instant service, develop deeper consumer engagement, and implement retention strategies more effectively. These driven benefits to customer retention include efficient responses and an accurate and relevant resolution rate for customer issues [74].

d. Customer Loyalty

Chatbots are adopted as marketing tools to support customer service, convenience, and efficiency through instant prompts and accurate responses [12]. Their integration strengthens consumer enjoyment, communication, and sales, while shaping expectations for on-time support and individualized dialogue [12,44,72]. By collecting customer information, needs, and preferences, chatbots drive strong relationships between product branding and customer loyalty [12,44]. Communication quality is the primary potential of chatbots, playing a major role in capturing customer relationships and reinforcing loyalty [80]. They facilitate concise, accurate, and comprehensive interaction, building effective communication, branding, and loyalty [36,80].

Chatbots also enable customer-brand relationships by fostering emotional and perceptual linkages, strengthening trust, confidence, and sustainable brand loyalty [38,48]. Empirical studies confirm these benefits. Research in Lahore, Pakistan,

shows that chatbots' marketing efforts enhance communication quality, customer interaction, and loyalty [48]. Similarly, a study in India's NCR highlights that chatbots improve information quality and user experience, leading to greater customer satisfaction and brand loyalty [64].

IV. CONCLUSION AND SUGGESTION

This review article explores the role of chatbots in enhancing CRM on e-commerce platforms, highlighting their significant contribution to online branding. It examines core chatbot models, including AI-based, rule-based, and voice-activated systems, and emphasizes their capabilities in addressing customer preferences and interaction patterns. Major platforms such as Amazon, Shopify, Alibaba, 1-800-Flowers, PVR Cinemas, Sephora, Vainu, American Eagle Outfitters, Domino's Pizza, eBay, Facebook, and WeChat illustrate how chatbots drive customer-centric innovation. Chatbots enable online businesses to strengthen customer engagement, user experience, accurate product selection, and purchase intention. Equipped with ML, NLP, and automation, they deliver instant responses, 24/7 accessibility, individualized conversations, and personalized recommendations, enriching CRM and sustaining brand value.

Their capacities allow enterprises to provide diverse and responsive support while maintaining consistent quality, including rapid resolution, continuous availability, and customizable interactions. Drawing from relevant sources, it is evident that chatbots have become essential for online enterprises, supporting information dissemination, customer satisfaction, retention, and loyalty. Their capabilities include quick and contextual responses, accurate information delivery, and personalized recommendations—positioning chatbots as strategic tools for fostering long-term customer relationships and operational efficiency.

E-commerce may face difficulties implementing advanced chatbot systems due to limited resources. Therefore, e-commerce stakeholders should prioritize AI-driven chatbots that enhance trust, personalization, user-friendly design, and 24/7 accessibility, while incorporating features such as adaptive learning, emotional recognition, and multilingual support. Chatbots play a vital role in transforming CRM by enabling responsive and personalized customer



engagement. Continued research and innovation are necessary to maximize their effectiveness and sustain long-term customer satisfaction in an increasingly digital marketplace.

Finally, as this study is a review article based on secondary data, it has inherent limitations. Future research should examine the role of chatbots in enhancing e-commerce CRM across different business sectors and contexts, particularly in both developing and developed countries. Further investigation is needed to understand how cultural, geographical, and technological differences influence chatbot integration and e-commerce performance. Empirical studies using qualitative, quantitative, and especially mixed-methods approaches can provide deeper insights into the challenges, strategies, and overall impact of chatbot adoption on e-commerce business operations in the 21st century.

AUTHORSHIP CONTRIBUTION STATEMENT

Chhayna Cheng¹: The author was responsible for all aspects of the review article, such as study design, document search, manuscript writing, and thorough revision of the review article.

ORCID IDs

<https://orcid.org/0009-0007-5195-8867>

DATA AVAILABILITY

The data used in this review are available from the corresponding author upon reasonable request.

V. REFERENCES

- [1] M. Adam, M. Wessel, and A. Benlian, "AI-based chatbots in customer service and their effects on user compliance," *Electron. Mark.*, vol. 31, no. 2, pp. 427–445, 2021, doi: 10.1007/s12525-020-00414-7.
- [2] E. Adamopoulou and L. Moussiades, "An overview of chatbot technology," *Artif. Intell. Rev.*, vol. 53, no. 1, pp. 65–90, 2020, doi: 10.1007/978-3-030-49186-4_31.
- [3] Y. Afandi and T. R. Arjo, "Use of chatbot on online store website as virtual customer service to improve sales," in *2nd Annual Management, Business and Economic Conference (AMBEC 2020)*, 2021, pp. 55–59, doi: 10.2991/aebmr.k.210717.012.
- [4] E. Agichtein, D. Hakkani-Tür, S. Kallumadi, and S. Malmasi, "ConvERSe'20: The WSDM 2020 workshop on conversational systems for e-commerce recommendations and search," in *Proceedings of the 13th International Conference on Web Search and Data Mining*, 2020, pp. 897–898, doi: 10.1145/3336191.3371882.
- [5] D. M. Akdemir and Z. A. Bulut, "Business and customer-based chatbot activities: The role of customer satisfaction in online purchase intention and intention to reuse chatbots," *J. Theor. Appl. Electron. Commer. Res.*, vol. 19, no. 4, pp. 2961–2979, 2024, doi: 10.3390/jtaer19040142.
- [6] A. Alnefaie, S. Singh, B. Kocaballi, and M. Prasad, "An overview of conversational agent: Applications, challenges and future directions," in *Proceedings of the 17th International Conference on Web Information Systems and Technologies (WEBIST 2021)*, 2021, pp. 388–396, doi: 10.5220/0010708600003058.
- [7] I. M. D. Andrade and C. Tumelero, "Increasing customer service efficiency through an artificial intelligence chatbot," *Rev. Gestão*, vol. 29, no. 3, pp. 238–251, 2022, doi: 10.1108/REGE-07-2021-0120.



- [8] P. Anushree, “The role of AI chatbots and virtual shopping assistants in shaping festive season purchase decisions,” *EduSpectra*, vol. 7, no. 1, pp. 46–56, 2025, doi: 10.34293/eduspectra.v7i1.07.
- [9] I. O. Asante, Y. Jiang, A. M. Hossin, and X. Luo, “Optimization of consumer engagement with artificial intelligence elements on electronic commerce platforms,” *J. Electron. Commer. Res.*, vol. 24, no. 1, pp. 7–28, 2023, doi: 10.1109/jecr.org/node/675.
- [10] A. Barış, “A new business marketing tool: Chatbot,” *GSI Journals Ser. B Adv. Bus. Econ.*, vol. 3, no. 1, pp. 31–46, 2020, doi: 10.5281/zenodo.4030216.
- [11] S. Baloska, D. Mechkaroska, and E. Domazet, “AI-driven chatbot in e-commerce,” *J. UIST*, vol. 3, no. 1, pp. 30–40, 2022, [Online]. Available: https://www.researchgate.net/publication/390348505_AI-driven_Chatbot_in_E-Commerce.
- [12] M. R. I. Bhuiyan, “Examining the digital transformation and digital entrepreneurship: A PRISMA based systematic review,” *Pakistan Journal of Life and Social Sciences*. [pjlss.edu.pk](https://www.pjlss.edu.pk), 2024, [Online]. Available: https://www.pjlss.edu.pk/pdf_files/2024_1/1136-1150.pdf.
- [13] S. Zulfiqar, B. Sarwar, S. Aziz, K. E. Chandia, and M. K. Khan, “An Analysis of Influence of Business Simulation Games on Business School Students’ Attitude and Intention Toward Entrepreneurial Activities,” *J. Educ. Comput. Res.*, vol. 57, no. 1, pp. 106–130, 2018, doi: 10.1177/0735633117746746.
- [14] N. A. Hamdani, A. Solihat, and I. Permana, “Technology Adoption in Home Industry,” *Int. J. Ind. Eng. Prod. Res.*, vol. 34, no. 2, pp. 1–7, 2023, doi: 10.22068/ijiepr.34.2.10.
- [15] N. A. Hamdani, G. A. F. Maulani, S. Nugraha, T. M. S. Mubarak, and A. O. Herlianti, “Corporate culture and digital transformation strategy in universities in Indonesia,” *Estud. Econ. Apl.*, vol. 39, no. 10, pp. 1–8, 2021, doi: 10.25115/eea.v39i10.5352.
- [16] A. Dahlena, G. Abdul, F. Maulani, N. A. Hamdani, and A. Solihat, “The Influence of Creative Economy-Based Entrepreneurial Cognitive on Entrepreneurial Success,” vol. 7, no. 4, pp. 249–258, 2025.
- [17] M. L. L. Costa, *Strategies for Developing Entrepreneurial Capacity and Capability in Coffee Industry Sect in Timor-Leste*. search.proquest.com, 2021.
- [17] A. H. Butt and H. Ahmad, “AI chatbot innovation – Leading toward consumer satisfaction, electronic word of mouth and continuous intention in online shopping,” *Journal of Telecommunications and the Digital Economy*, vol. 11, no. 4, pp. 156–184, 2023, doi: 10.18080/jtde.v11n4.735.
- [18] D. Calvaresi, A. Ibrahim, J. P. Calbimonte, R. Schegg, E. Fragnière, and M. Schumacher, “The evolution of chatbots in tourism: A systematic literature review,” in *Information and communication technologies in tourism 2021*, W. Wörndl, C. Koo, and J. L. Stienmetz, Eds., pp. 3–15, Springer, 2021, doi: 10.1007/978-3-030-65785-7_1.
- [19] J. S. Chen, T. T. Y. Le, and D. Florence, “Usability and responsiveness of artificial intelligence chatbot on online customer experience in e-retailing,” *International Journal of Retail & Distribution Management*, vol. 49, no. 11, pp. 1512–1531, 2021, doi: 10.1108/IJRDM-08-2020-0312.
- [20] Y. Cheng and H. Jiang, “How do AI-driven chatbots impact user experience? Examining gratifications, perceived privacy risk, satisfaction, loyalty, and continued use,” *Journal of Broadcasting & Electronic Media*, vol. 64, no. 4, pp. 592–614, 2020, doi: 10.1080/08838151.2020.1834296.
- [21] C. C. Nwokedi and C. A. Nwafor, “Enhancing customer service and user experience through machine learning powered intelligent chatbots,” *World Journal of Advanced Research and Reviews*, vol. 23, no. 2, pp. 181–191, 2024, doi: 10.30574/wjarr.2024.23.2.2307.
- [22] M. Chung, E. Ko, H. Joung, and S. J. Kim, “Chatbot e-service and customer satisfaction regarding luxury brands,” *Journal of Business Research*, vol. 117, no. 5, pp. 587–595, 2020, doi: 10.1016/j.jbusres.2018.10.004.
- [23] R. De Cicco, S. C. Silva, and F. R. Alparone, “Millennials’ attitude toward chatbots: An experimental study in a social relationship perspective,” *International Journal of Retail & Distribution Management*, vol. 48, no. 11, pp. 1213–1233, 2020, doi: 10.1108/IJRDM-12-2019-0406.
- [24] B. Eyada and N. Ahmed, “Effectiveness of chatbot advertising on consumer buying



- decision: An analytical study,” *Journal of Design Sciences and Applied Arts*, vol. 3, no. 2, pp. 74–87, 2022, doi: [10.21608/jdsaa.2022.121166.1158](https://doi.org/10.21608/jdsaa.2022.121166.1158).
- [25] J. A. Gamboa-Cruzado, C. Menendez-Morales, C. F. Del Carpio, J. E. López-Goycochea, A. Alva, and C. R. V. Arévalo, “Use of chatbots in e-commerce: A comprehensive systematic review,” *Journal of Theoretical and Applied Information Technology*, vol. 101, no. 4, pp. 1172–1183, 2023. [Online]. Available: <https://www.jatit.org/volumes/Vol101No4/3Vol101No4.pdf>
- [26] D. Grewal, J. Hulland, P. K. Kopalle, and E. Karahanna, “The future of technology and marketing: A multidisciplinary perspective,” *Journal of the Academy of Marketing Science*, vol. 48, no. 1, pp. 1–8, 2020, doi: [10.1007/s11747-019-00711-4](https://doi.org/10.1007/s11747-019-00711-4).
- [27] 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](https://doi.org/10.1080/15332861.2020.1863022).
- [28] M. Hasan Miraz, A. Ya’u, S. Adeyinka-Ojo, J. B. Sarkar, M. T. Hasan, K. Hoque, and H. H. Jin, “Intention to use determinants of AI chatbots to improve customer relationship management efficiency,” *Cogent Business & Management*, vol. 11, no. 1, Art. no. 2411445, 2024, doi: [10.1080/23311975.2024.2411445](https://doi.org/10.1080/23311975.2024.2411445).
- [29] H. Hassani and E. S. Silva, “The role of ChatGPT in data science: How AI-assisted conversational interfaces are revolutionizing the field,” *Big Data and Cognitive Computing*, vol. 7, no. 2, pp. 1–16, 2023, doi: [10.3390/bdcc7020062](https://doi.org/10.3390/bdcc7020062).
- [30] Q. Hossain, A. Hossain, M. Z. Nizum, and S. B. Naser, “Influence of artificial intelligence on customer relationship management (CRM),” *International Journal of Communication Networks and Information Security*, vol. 16, no. 3, pp. 653–662, 2024. [Online]. Available: <https://ijcnis.org/index.php/ijcnis/article/view/7046>
- [31] K.-L. Hsiao and C.-C. Chen, “What drives continuance intention to use a food-ordering chatbot? An examination of trust and satisfaction,” *Library Hi Tech*, vol. 40, no. 4, pp. 929–946, 2022, doi: [10.1108/LHT-08-2021-0274](https://doi.org/10.1108/LHT-08-2021-0274).
- [32] G.-Q. Huang, D.-S. Liu, and R.-C. Xiong, “A revision of the genus *Trichohoplorana* Breuning, 1961 (Arthropoda, Insecta, Coleoptera, Cerambycidae, Lamiinae, Acanthocinini),” *ZooKeys*, vol. 1160, no. 2, pp. 191–205, 2023, doi: [10.3897/zookeys.1160.103596](https://doi.org/10.3897/zookeys.1160.103596).
- [33] M.-H. Huang and R. T. Rust, “A strategic framework for artificial intelligence in marketing,” *Journal of the Academy of Marketing Science*, vol. 49, no. 1, pp. 30–50, 2021, doi: [10.1007/s11747-020-00749-9](https://doi.org/10.1007/s11747-020-00749-9).
- [34] F. Huseynov, “Chatbots in digital marketing: Enhanced customer experience and reduced customer service costs,” in *Contemporary approaches of digital marketing and the role of machine intelligence*, pp. 46–72, IGI Global, 2023, doi: [10.4018/978-1-6684-7735-9.ch003](https://doi.org/10.4018/978-1-6684-7735-9.ch003).
- [35] A. Janssen, D. R. Cardona, J. Passlick, and M. H. Breitner, “How to make chatbots productive: A user-oriented implementation framework,” *International Journal of Human-Computer Studies*, vol. 168, Art. no. 102921, 2022, doi: [10.1016/j.ijhcs.2022.102921](https://doi.org/10.1016/j.ijhcs.2022.102921).
- [36] H. Jiang, Y. Cheng, J. Yang, and S. Gao, “AI-powered chatbot communication with customers: Dialogic interactions, satisfaction, engagement, and customer behavior,” *Computers in Human Behavior*, vol. 134, Art. no. 107329, 2022, doi: [10.1016/j.chb.2022.107329](https://doi.org/10.1016/j.chb.2022.107329).
- [37] H. Joshi, “Perception and adoption of customer service chatbots among millennials: An empirical validation in the Indian context,” *Website*, vol. 2021, no. 17, pp. 197–208, Oct. 2021. [Online]. Available: <https://orcid.org/0000-0002-4774-7983>
- [38] S. Madasamy and L. L. C. Aquilanz, “The evolution of chatbots: Cloud and AI synergy in banking customer interactions,” *Journal of Emerging Technologies and Innovative Research*, vol. 10, no. 10, pp. 127–137, 2023.
- [39] H. Malik and J. Asim, “Chatbot efforts: Unveiling the influence on customer-brand connections,” *Indus Journal of Social Sciences*, vol. 3, no. 1, pp. 47–60, 2025, doi: [10.59075/ijss.v3i1.528](https://doi.org/10.59075/ijss.v3i1.528).
- [40] S. Martínez Puertas, M. D. Illescas Manzano, C. Segovia López, and P. Ribeiro Cardoso, “Purchase intentions in a chatbot environment:



- An examination of the effects of customer experience,” *Oeconomia Copernicana*, vol. 15, no. 1, pp. 145–194, 2024, doi: [10.24136/oc.2914](https://doi.org/10.24136/oc.2914).
- [41] C. V. Mischia, F. Poetze, and C. Strauss, “Chatbots in customer service: Their relevance and impact on service quality,” *Procedia Computer Science*, vol. 201, pp. 421–428, 2022.
- [42] S. Morsi, “Artificial intelligence in electronic commerce: Investigating the customers’ acceptance of using chatbots,” *J. Syst. Manag. Sci.*, vol. 13, no. 3, pp. 156–176, 2023, doi: [10.33168/JSMS.2023.0311](https://doi.org/10.33168/JSMS.2023.0311).
- [43] D. M. Nguyen, Y.-T. H. Chiu, and H. D. Le, “Determinants of continuance intention towards banks’ chatbot services in Vietnam: A necessity for sustainable development,” *Sustainability*, vol. 13, no. 14, pp. 1–24, 2021, doi: [10.3390/su13147625](https://doi.org/10.3390/su13147625).
- [44] E. Olawuyi and P. Fadeyi, “Enhancing customer experience through AI-driven chatbots in customer relationship management,” *Ofuruma: Journal of the Humanities*, vol. 4, no. 1 & 2, p. 147, 2024. [Online]. Available: <https://journals.fuotuo.ke.edu.ng/index.php/ofuruma/article/view/200>
- [45] C. L. Pedersen and T. Ritter, “Digital authenticity: Towards a research agenda for the AI-driven fifth phase of digitalization in business-to-business marketing,” *Industrial Marketing Management*, vol. 123, no. 1, pp. 162–172, 2024, doi: [10.1016/j.indmarman.2024.10.005](https://doi.org/10.1016/j.indmarman.2024.10.005).
- [46] M. Rahevar and S. Darji, “The adoption of AI-driven chatbots into a recommendation for e-commerce systems to targeted customers in the selection of products,” *International Journal of Management, Economics and Commerce*, vol. 1, no. 2, pp. 128–137, 2024, doi: [10.62737/m1vdpdq75](https://doi.org/10.62737/m1vdpdq75).
- [47] J. Rana, R. Jain, and V. Nehra, “Utility and acceptability of AI-enabled chatbots on the online customer journey,” *International Journal of Computing and Digital Systems*, vol. 15, no. 1, pp. 323–335, 2024, doi: [10.12785/ijcds/150125](https://doi.org/10.12785/ijcds/150125).
- [48] M. Rasheed, I. Sami, and A. Tabassam, “The impact of AI-powered chatbots on customer satisfaction and business performance in e-commerce,” *Social Science Review Archives*, vol. 3, no. 1, pp. 2390–2401, 2025, doi: [10.70670/sra.v3i1.547](https://doi.org/10.70670/sra.v3i1.547).
- [49] D. V. Reddy, M. Padmaja, K. M. Kumar, K. S. Kiran, and P. Pramod, “Chatbot-based online shopping web application,” *International Journal of Digital Communication and Networking (IJDCN)*, vol. 3, no. 4, pp. 7–14, 2024, doi: [10.54105/ijdcn.B9782.03040623](https://doi.org/10.54105/ijdcn.B9782.03040623).
- [50] A. Salminen, K. Kauppinen, and M. Lehtovaara, “Towards a methodology for document analysis,” *Journal of the American Society for Information Science*, vol. 48, no. 7, pp. 644–655, 1997, doi: [10.1002/\(SICI\)1097-4571\(199707\)48:7](https://doi.org/10.1002/(SICI)1097-4571(199707)48:7).
- [51] S. Samnani, M. Vaska, S. Ahmed, and T. C. Turin, “Review typology: The basic types of reviews for synthesizing evidence for the purpose of knowledge translation,” *Journal of the College of Physicians and Surgeons Pakistan*, vol. 27, no. 10, pp. 635–641, 2017.
- [52] P. M. Shafi, G. S. Jawalkar, M. A. Kadam, R. R. Ambawale, and S. V. Bankar, “AI-assisted chatbot for e-commerce to address selection of products from multiple products,” in *Internet of Things, Smart Computing and Technology: A Roadmap Ahead*, P. K. Mallick, S. Balasubramaniam, and P. K. Sahoo, Eds. Cham, Switzerland: Springer, 2020, pp. 57–80, doi: [10.1007/978-3-030-39047-1_3](https://doi.org/10.1007/978-3-030-39047-1_3).
- [53] J. Sidlauskienė, Y. Joye, and V. Auruskeviciene, “AI-based chatbots in conversational commerce and their effects on product and price perceptions,” *Electronic Markets*, vol. 33, no. 1, pp. 1–24, 2023, doi: [10.1007/s12525-023-00633-8](https://doi.org/10.1007/s12525-023-00633-8).
- [54] S. C. Silva, R. De Cicco, B. Vlačić, and M. G. Elmashhara, “Using chatbots in e-retailing—How to mitigate perceived risk and enhance the flow experience,” *International Journal of Retail & Distribution Management*, vol. 51, no. 3, pp. 285–305, 2023, doi: [10.1108/IJRDM-05-2022-0163](https://doi.org/10.1108/IJRDM-05-2022-0163).
- [55] A. Singh, A. Das, and N. Y. Das, “Assessing the impact of chatbot on customer loyalty: A study in NCR region,” *Journal of Southwest Jiaotong University*, vol. 59, no. 2, pp. 178–195, 2024. [Online]. Available: <https://jsju.com.cn/index.php/JSJU/article/view/12/12>
- [56] G. Singh and J. Singh, “Enhancing customer experience and engagement on e-commerce platforms through AI-integrated chatbot



- solutions,” *SSRN Electronic Journal*, 2023, doi: [10.2139/ssrn.4483813](https://doi.org/10.2139/ssrn.4483813).
- [57] S. Siripipatthanakul, W. Nurittamont, B. Phayaphrom, and S. Nuanchaona, “Factors affecting consumer’s purchase intention of chatbot commerce in Thailand,” *International Journal of Business, Marketing and Communication*, vol. 1, no. 3, pp. 1–13, 2021.
- [58] P. Smutny and P. Schreiberova, “Chatbots for learning: A review of educational chatbots for the Facebook Messenger,” *Computers & Education*, vol. 151, p. 103862, 2020, doi: [10.1016/j.compedu.2020.103862](https://doi.org/10.1016/j.compedu.2020.103862).
- [59] A. Soni and S. Dubey, “The impact of AI-powered chatbots on customer satisfaction in e-commerce marketing (TAM approach),” *Journal of Public Relations and Advertising*, vol. 3, no. 1, pp. 12–18, 2024.
- [60] T. S. Stăncioiu, A. E. Spînu, C. M. Sanda, G. Sanda, and V. A. Trifan, “Customer relationship management, operational digitization, production optimization and value creation through artificial intelligence in e-marketing,” *Proceedings of the International Conference on Business Excellence*, vol. 17, no. 1, pp. 1148–1157, 2023, doi: [10.2478/picbe-2023-0103](https://doi.org/10.2478/picbe-2023-0103).
- [61] D. Suleman, I. Zuniarti, S. Rusiyati, N. Joesah, L. Hakim, and R. A. Haryati, “The role of AI-powered chatbots in enhancing consumer satisfaction: Case study of e-commerce platforms in Indonesia,” *Golden Ratio of Mapping Idea and Literature Format*, vol. 5, no. 2, pp. 1–11, 2025, doi: [10.52970/grmilf.v5i2.1430](https://doi.org/10.52970/grmilf.v5i2.1430).
- [62] R. Syafitri and L. Alfansi, “The power of information: Boosting users' chatbot trust and satisfaction in Indonesian e-commerce,” *Manajemen dan Bisnis*, vol. 23, no. 1, pp. 137–150, 2024, doi: [10.24123/jmb.v23i1.743](https://doi.org/10.24123/jmb.v23i1.743).
- [63] C. A. J. Tamara, W. J. A. Tumbuan, and E. M. Gunawan, “Chatbots in e-commerce: A study of Gen Z customer experience and engagement – Friend or foe?” *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis dan Akuntansi*, vol. 11, no. 3, pp. 161–175, 2023, doi: [10.35794/emba.v11i3.49501](https://doi.org/10.35794/emba.v11i3.49501).
- [64] M. N. Uddin, W. Thiam Low, M. Afjalur Rahman, and S. Mokhtar, “An exploration of millennials’ attitudes towards the use of artificial intelligence chatbots for customer service within e-commerce platforms,” in *Proc. Int. Conf. on Business, Management and Leadership*, vol. 1, no. 1, May 2024, pp. 1–19, doi: [10.33422/icbml.v1i1.374](https://doi.org/10.33422/icbml.v1i1.374).
- [65] N. Usman and I. Yusuf, “Artificial intelligence and enterprise performance: Investigating the effect of chatbots and virtual assistants on SMEs’ customer retention in FCT Abuja,” *Abuja Journal of Business and Management*, vol. 3, no. 2, pp. 200–209, 2025, doi: [10.70118/ajbam-02-2025-126](https://doi.org/10.70118/ajbam-02-2025-126).
- [66] R. Vebrianti, M. Aras, M. S. S. Putri, and I. A. Swandewi, “AI chatbots in e-commerce: Enhancing customer engagement, satisfaction and loyalty,” *PaperASIA*, vol. 41, no. 2b, pp. 248–260, 2025, doi: [10.59953/paperasia.v41i2b.445](https://doi.org/10.59953/paperasia.v41i2b.445).
- [67] J. F. Wang, “The impact of artificial intelligence (AI) on customer relationship management: A qualitative study,” *International Journal of Management and Accounting*, vol. 5, no. 5, pp. 74–88, 2023, doi: [10.34104/ijma.023.0074090](https://doi.org/10.34104/ijma.023.0074090).
- [68] B. Wibowo, H. Clarissa, and D. Suhartono, “The application of chatbot for customer service in e-commerce,” *Engineering, Mathematics and Computer Science Journal (EMACS)*, vol. 2, no. 3, pp. 91–95, 2020, doi: [10.21512/emacsjournal.v2i3.6531](https://doi.org/10.21512/emacsjournal.v2i3.6531).
- [69] G. Wilson, O. Johnson, and W. Brown, “The impact of artificial intelligence on customer relationship management,” *Preprints*, 2024, doi: [10.20944/preprints202408.0766.v1](https://doi.org/10.20944/preprints202408.0766.v1).
- [70] M. M. A. Zakaria, M. Doheir, N. Akmaliah, and N. B. M. Yaacob, “Infinite potential of AI chatbots: Enhancing user experiences and driving business transformation in e-commerce: Case of Palestinian e-commerce,” *Journal of Ecohumanism*, vol. 3, no. 5, pp. 216–229, 2024, doi: [10.62754/joe.v3i5.3896](https://doi.org/10.62754/joe.v3i5.3896).
- [71] Q. Zhou, B. Li, L. Han, and M. Jou, “Talking to a bot or a wall? How chatbots vs. human agents affect anticipated communication quality,” *Computers in Human Behavior*, vol. 143, no. 3, p. 107674, 2023, doi: [10.1016/j.chb.2022.107674](https://doi.org/10.1016/j.chb.2022.107674).

