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Chatbots in Customer Service: A Systematic Review of Adoption, Performance, and Customer Outcomes

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Abstract

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This article examines how chatbots are adopted and used in customer service and how they influence service performance and customer outcomes. It asks which factors drive customer and provider adoption, under what conditions chatbots improve efficiency and service quality, and how chatbot interactions shape satisfaction, trust, loyalty, and negative reactions such as perceived creepiness or privacy concerns. The study conducts a systematic review of peer reviewed research published between 2018 and 2021, synthesizing quantitative and qualitative evidence across industries and countries. The results show that chatbots can enhance response speed, perceived service quality, and compliance when they are usable, responsive, transparent, and clearly positioned as complements to human agents. However, poorly calibrated social cues, opaque data practices, and weak escalation paths can undermine trust and loyalty, limiting the benefits of automation. The review discusses these patterns by organizing studies around adoption, performance, and customer outcomes and concludes that future work should employ integrated, multi method approaches that link specific design features to both operational metrics and long-term relational outcomes.

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1. Introduction

Chatbots have rapidly evolved from experimental interfaces to mainstream tools in digital customer service. Enabled by advances in artificial intelligence and natural language processing, these conversational agents handle routine enquiries, provide product information, and support transactions in sectors such as retail, banking, and small and medium sized enterprises. In service research more broadly, artificial intelligence is framed as a transformative force that can both enhance service productivity and reshape the division of labor between humans and machines (Huang & Rust, 2018). Within this landscape, chatbots are often positioned as front line service agents that promise faster response times, round the clock availability, and substantial cost reductions relative to human contact centers (Adam et al., 2021; Selamat & Windasari, 2021).

At the same time, emerging empirical work paints a more nuanced picture of chatbot adoption and use in customer service. Studies on customer acceptance highlight that satisfaction, perceived usefulness, ease of use, and trust are critical drivers of willingness to continue using chatbot based channels (Ashfaq et al., 2020; Sanny et al., 2020). Design related factors such as e service quality, responsiveness, and the fit between chatbot communication style and brand positioning also shape customer evaluations, particularly in high involvement settings such as luxury brands (Chung et al., 2020). Research that incorporates business owner or provider perspectives suggests that organizations perceive chatbots as strategic tools for scaling service and collecting customer data, yet they also face challenges in aligning

chatbot capabilities with customer expectations and operational realities (Selamat & Windasari, 2021).

A growing stream of studies investigates how chatbots affect customer service performance and customer outcomes more directly. Experimental and survey-based research finds that AI based chatbots can increase user compliance with recommendations and support tasks when perceived as competent and trustworthy, but that poorly designed interactions may generate frustration or avoidance (Ashfaq et al., 2020; Adam et al., 2021). Evidence from customer experience and service quality research indicates that chatbots can enhance perceived service efficiency and satisfaction, but these benefits are contingent on reliable problem resolution and transparent escalation to human agents when issues become complex (Chung et al., 2020; Sanny et al., 2020). At the same time, systematic reviews of service chatbots point to substantial fragmentation in constructs, methods, and outcome metrics, which complicates efforts to derive cumulative insights for theory and practice (Suhaili et al., 2021).

Against this backdrop, the present article conducts a systematic literature review of peer reviewed studies published between 2018 and 2021 that examine chatbots in customer service, with particular attention to adoption, performance, and customer outcomes. The review seeks to clarify how prior work conceptualizes chatbot adoption drivers, how service performance is operationalized, and what kinds of attitudinal and behavioral outcomes are documented for customers. By organizing the literature across these three dimensions and comparing findings across contexts and methods, the study aims to synthesize scattered evidence,

identify conceptual and empirical gaps, and outline an agenda for future research that can guide more responsible and effective deployment of chatbots in customer service.

2. Literature Review

Empirical research on customer service chatbots has largely focused on adoption and user acceptance, drawing on technology acceptance and information systems continuance theories. Ashfaq et al. (2020) integrated the expectation-confirmation model, information systems success model, technology acceptance model, and the need for interaction with a service employee to show that information and service quality, perceived enjoyment, and perceived usefulness are central to satisfaction and continuance intention toward AI-powered service agents. Complementing these findings in an emerging market, Sanny et al. (2020) identified reliability, responsiveness, and assurance as key satisfaction factors driving chatbot acceptance in Indonesia, while Selamat and Windasari (2021) highlighted the role of perceived usefulness and ease of use for small and medium-sized enterprises. At a more conceptual level, Huang and Rust (2018) framed AI as reshaping service processes and value creation, positioning chatbots as a core frontline application.

A second stream examines performance and service quality outcomes of chatbot interactions. Chung et al. (2020) found that chatbot e-service quality attributes, including interactivity and informativeness, significantly enhance satisfaction with luxury brands. Adam et al. (2021) showed that conversational design and transparency affect user compliance with chatbot recommendations in

customer service encounters. In e-retailing, Chen et al. (2021) demonstrated that chatbot usability and responsiveness improve both extrinsic and intrinsic dimensions of online customer experience, which in turn foster satisfaction. Cheng and Jiang (2020) linked gratifications such as information and entertainment, as well as perceived privacy risk, to satisfaction, loyalty, and continued use of AI-driven chatbots. From a customer-experience assessment perspective, Sidaoui et al. (2020) illustrated how AI-augmented chatbots can elicit rich narrative data about service encounters and use sentiment analysis to derive emotional insights at scale.

Systematic and integrative work on chatbots remains relatively scarce but underscores important fragmentation. Suhaili et al. (2021) reviewed service chatbots across domains and noted heterogeneity in technical approaches, evaluation metrics, and outcome variables. Huang and Rust (2018) called for research that connects AI-enabled automation with customer value and experience, while Selamat and Windasari (2021) emphasized the need to integrate customer and provider viewpoints when designing chatbot systems. Overall, prior studies tend to examine adoption drivers, technical performance, and customer outcomes in isolation, with limited attention to mediating mechanisms such as trust, perceived empathy, and privacy concerns (Ashfaq et al., 2020; Cheng & Jiang, 2020; Adam et al., 2021). These gaps motivate a systematic review that brings together adoption, performance, and customer outcome perspectives to synthesize accumulated evidence, identify consistent and divergent findings, and outline a future research agenda for chatbots in customer service.

3. Methods

This study employed a systematic literature review to identify, evaluate, and synthesize peer reviewed research on chatbots in customer service with a focus on adoption, performance, and customer outcomes. The search targeted articles published in English between 2018 and 2021 in major academic databases, including Scopus, Google Scholar, ScienceDirect, Emerald Insight, and Taylor & Francis Online, complemented by publisher platforms for key journals in marketing, information systems, and service research. Search strings combined terms related to chatbots and conversational agents with terms related to customer service, customer experience, service quality, performance, satisfaction, loyalty, and adoption. The initial search results were exported to a reference manager, where duplicates were removed prior to screening.

Inclusion criteria were restricted to peer reviewed journal articles that explicitly examined chatbots used in customer service or customer support contexts and reported on at least one of the following: adoption or acceptance antecedents, service or operational performance, or customer level attitudinal and behavioral outcomes. Studies focused solely on technical algorithm development without a service or customer context, opinion pieces, editorials, conference papers, book chapters, and non-scholarly reports were excluded. Screening proceeded in two main stages: title and abstract screening against the inclusion criteria, followed by full text assessment for conceptual and empirical relevance. For each included article, a structured coding template captured information on research context, methodological approach, chatbot role and design features, adoption drivers,

performance indicators, and customer outcomes. The coded data were then synthesized narratively and thematically, with studies grouped according to dominant focus on adoption, performance, or customer outcomes, and compared to identify convergent findings, divergences, and gaps.

4. Results and Discussion

Most of the studies included in the review converge on the importance of classic adoption and acceptance drivers, but they do so in slightly different ways across contexts. Ashfaq et al. (2020) show that information quality, service quality, and perceived enjoyment shape perceived usefulness and satisfaction, which in turn drive continuance intention to use AI powered service agents. In the Indonesian market, Sanny et al. (2020) find that reliability, responsiveness, and assurance are central satisfaction factors that support acceptance of chatbots as a legitimate service channel. From a small and medium enterprise perspective, Selamat and Windasari (2021) report that perceived usefulness and ease of use are decisive for chatbot uptake by business owners who see chatbots as tools for scaling service and collecting customer data. Together, these findings suggest that adoption is strongest when chatbots are positioned as usable, reliable complements to human service rather than as opaque replacements, and when their benefits are clearly aligned with both customer and provider goals.

In terms of performance, the reviewed work indicates that chatbots can enhance service efficiency and aspects of service quality, but only under certain design and implementation conditions. Adam et al. (2021) demonstrate that well

designed AI based chatbots can increase user compliance with recommendations, particularly when conversational transparency and perceived competence are high. In luxury settings, Chung et al. (2020) show that chatbot e service quality, especially interactivity and informativeness, improves satisfaction with the brand. Chen et al. (2021) find that usability and responsiveness of chatbots in e retailing strengthen online customer experience, which then boosts satisfaction. At the same time, Cheng and Jiang (2020) report that privacy risk perceptions can offset the positive effects of gratifications such as information and entertainment on satisfaction and loyalty, highlighting the need to balance efficiency with perceived safety. Methodologically richer work, such as Sidaoui et al. (2020), uses chatbot mediated interviews and sentiment analysis to capture nuanced emotional responses, illustrating how chatbots themselves can become tools for monitoring and improving service experience.

Customer outcomes emerge as particularly sensitive to the social and emotional qualities of chatbot interactions. Araujo (2018) finds that anthropomorphic design cues and framing influence perceived social presence and, through this, attitudes toward both the chatbot and the company. However, human likeness is not universally beneficial. Skjuve et al. (2019) show that transparency about the chatbot's non-human nature and avoidance of strange or off topic responses are critical to preventing discomfort associated with the uncanny valley. Rajaobelina et al. (2021) further document that creepiness during chatbot interactions undermines loyalty directly and indirectly via trust and negative emotions. These studies complement earlier findings that satisfaction, perceived

usefulness, and trust drive acceptance (Ashfaq et al., 2020; Sanny et al., 2020) by showing that poorly calibrated anthropomorphism, privacy concerns, or lack of transparency can erode trust and loyalty even when operational performance is high.

Synthesizing across the literature, the evidence suggests that chatbots in customer service perform best when adoption, performance, and customer outcomes are treated as interconnected rather than separate domains. Studies on adoption and continuance often rely on cross sectional surveys, while performance-oriented work tends to use experimental or field designs, and customer outcome research is fragmented across satisfaction, experience, trust, and loyalty constructs (Cheng & Jiang, 2020; Suhaili et al., 2021). This heterogeneity makes it difficult to compare results and to derive clear design principles that hold across industries and cultures. Overall, the findings indicate that chatbots can improve efficiency, perceived service quality, and even compliance, but that these benefits are contingent on careful management of social cues, transparency, privacy, and escalation to human agents. Future research would benefit from integrated models and longitudinal or multi method designs that link specific chatbot features to both operational metrics and long-term customer outcomes, including trust, creepiness, and loyalty.

5. Conclusion

This review shows that customer service chatbots can deliver meaningful gains in efficiency, perceived service quality, and even compliance with recommendations, but only when their design and deployment address core

adoption drivers and customer expectations. Across the studies, satisfaction, perceived usefulness, ease of use, and trust consistently support acceptance and continued use, while usability, responsiveness, and service quality shape performance and experience outcomes. At the same time, social and emotional factors such as perceived social presence, transparency about the chatbot's non-human nature, and the avoidance of creepiness or privacy intrusiveness are crucial in sustaining positive attitudes, trust, and loyalty. In other words, chatbots create value not simply by automating interactions, but by delivering competent, respectful, and well signposted service that fits with the brand and the context.

The evidence also reveals important limitations in the current body of research and in this review. Many studies rely on cross sectional surveys with self-reported intentions, often in specific industries or single countries, which constrains the ability to draw causal inferences or generalize findings across cultures and sectors. Technical details about chatbot architecture, training data, and integration into service processes are frequently under specified, which makes it difficult to link particular design choices to observed outcomes. Methodologically, this review is limited to peer reviewed journal articles in English published between 2018 and 2021, and excludes conference papers, practitioner reports, and non-English work that may contain additional insights or novel applications. These boundaries can bias the picture toward more established platforms and research traditions and may overlook emerging forms of conversational service.

Taken together, the findings suggest that future research and practice should treat adoption, performance, and customer outcomes as tightly interrelated domains

rather than separate topics. Researchers could develop integrated, multi method designs that connect specific chatbot features, such as anthropomorphism, transparency cues, escalation paths, and privacy controls, to both operational metrics and long-term outcomes like trust, loyalty, and perceived creepiness. Longitudinal and experimental studies in real service environments, including cross channel and cross-cultural settings, would help clarify how relationships with chatbots evolve over time and how they coexist with human agents. For managers, the main implication is that chatbots should be designed and governed as part of a broader service system that balances efficiency with emotional, ethical, and relational considerations. A customer service chatbot is most effective not when it simply replaces human contact, but when it complements human service in ways that feel competent, safe, and genuinely helpful to customers.

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