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RAG Agentic AI as Digital Frontline in Service-Based Organizations: A Systematic Literature Review

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Abstract

This study systematically reviews the development of Agentic AI as digital frontline systems within service-based organizations. The increasing adoption of artificial intelligence in organizational environments has accelerated the implementation of conversational systems capable of supporting consultation workflows, operational communication, and information delivery processes. However, conventional chatbot systems still experience limitations related to contextual understanding, reasoning capability, and multi-step task execution. To address these limitations, recent studies increasingly integrate Agentic AI and Retrieval-Augmented Generation (RAG) to support more adaptive and context-aware conversational systems. This study employed a Systematic Literature Review (SLR) approach following the PRISMA guidelines. Literature selection was conducted using several academic databases, including Scopus, IEEE Xplore, ACM Digital Library, ScienceDirect, and Google Scholar. After the screening and eligibility process, 61 articles published between 2020 and 2026 were selected for final review and analyzed using thematic synthesis. The findings identified three dominant research themes consisting of Agentic AI architectures and autonomous systems, Retrieval-Augmented Generation and conversational intelligence, and deployment of Agentic AI in digital frontline systems. The review demonstrates that Agentic AI integrated with retrieval-enhanced conversational mechanisms has strong potential to support contextual interaction, consultation workflows, and organizational communication processes within service-based environments. Nevertheless, several challenges remain related to hallucination, governance, trustworthiness, evaluation reliability, and real-world deployment complexity.

Keywords: Agentic AI; Retrieval-Augmented Generation; Digital Frontline; Conversational AI; Autonomous Agents.

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Abstrak

Penelitian ini secara sistematis meninjau perkembangan Agentic AI sebagai sistem digital frontline dalam organisasi berbasis layanan. Peningkatan adopsi kecerdasan buatan pada lingkungan organisasi telah mendorong implementasi sistem percakapan yang mampu mendukung alur konsultasi, komunikasi operasional, dan proses penyampaian informasi. Namun, sistem chatbot konvensional masih memiliki keterbatasan terkait pemahaman kontekstual, kemampuan penalaran, dan pelaksanaan tugas multi-langkah. Untuk mengatasi keterbatasan tersebut, berbagai penelitian terbaru mulai mengintegrasikan Agentic AI dan Retrieval-Augmented Generation (RAG) guna mendukung sistem percakapan yang lebih adaptif dan sadar konteks. Penelitian ini menggunakan pendekatan Systematic Literature Review (SLR) dengan mengikuti pedoman PRISMA. Proses pencarian literatur dilakukan melalui beberapa basis data akademik, yaitu Scopus, IEEE Xplore, ACM Digital Library, ScienceDirect, dan Google Scholar. Setelah melalui proses screening dan eligibility, sebanyak 61 artikel yang diterbitkan pada periode 2020–2026 dipilih untuk ditinjau dan dianalisis menggunakan thematic synthesis. Hasil penelitian mengidentifikasi tiga tema utama, yaitu arsitektur Agentic AI dan sistem otonom, Retrieval-Augmented Generation dan conversational intelligence, serta deployment Agentic AI pada sistem digital frontline. Hasil tinjauan menunjukkan bahwa integrasi Agentic AI dengan mekanisme retrieval-enhanced conversation memiliki potensi besar dalam mendukung interaksi kontekstual, alur konsultasi, dan komunikasi organisasi pada lingkungan berbasis layanan. Meskipun demikian, masih terdapat berbagai tantangan terkait halusinasi, tata kelola, trustworthiness, reliabilitas evaluasi, dan kompleksitas implementasi di dunia nyata.

***Kata kunci**: Agentic AI; Retrieval-Augmented Generation; Digital Frontline; Conversational AI; Autonomous Agents.*

INTRODUCTION

Digital transformation has significantly influenced how service-based organizations manage communication, consultation workflows, and service delivery processes. Artificial intelligence (AI) is increasingly adopted to improve operational efficiency, responsiveness, and communication quality across various industries. The growing implementation of AI-based digital frontline systems also reflects increasing organizational demand for scalable, adaptive, and context-aware service interaction systems (Harvard Business Review, 2025). Despite these developments, many professional service organizations still rely on manual consultation processes that often result in delayed responses, repetitive communication, fragmented information handling, and inconsistent service quality. These challenges are particularly relevant in consultation-oriented environments where users require fast, accurate, and contextually relevant information during early-stage interactions.

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Recent advancements in large language models (LLMs) have accelerated the development of conversational AI systems. Transformer-based language models increasingly enable conversational systems to support contextual understanding, adaptive reasoning, and multi-turn interaction capabilities within professional service environments (Kaddour et al., 2023). However, conventional chatbot systems still experience limitations related to contextual understanding, reasoning capability, and multi-step task handling. To address these limitations, Agentic AI has emerged as an advanced AI paradigm capable of autonomous reasoning, planning, memory management, and adaptive task execution (Pati, 2025). In parallel, Retrieval-Augmented Generation (RAG) improves conversational reliability by integrating external knowledge retrieval mechanisms to support grounded and contextually relevant response generation (Y. Huang & Huang, 2024; Lewis et al., 2021).

Previous studies have discussed conversational AI, Agentic AI, and Retrieval-Augmented Generation independently. Existing studies also primarily focus on technical architecture, conversational performance, or retrieval optimization rather than examining how these technologies collectively support digital frontline implementation within service-based organizations. Consequently, limited studies systematically review how Agentic AI and Retrieval-Augmented Generation function as integrated digital frontline systems, particularly within professional consultation environments (Hosseini & Seilani, 2025; Ngai et al., 2021). Therefore, this study aims to systematically review the implementation of Agentic AI as digital frontline systems in service-based organizations. This review focuses on Agentic AI architectures, Retrieval-Augmented Generation, and the deployment of Agentic AI systems in digital frontline environments.

METHODS

Research Design

This study employed a Systematic Literature Review (SLR) approach to analyze the development of Agentic AI as digital frontline systems in service-based organizations. The review process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure a structured and transparent literature selection process.

The study was guided by several research questions. RQ1 examined how Agentic AI architectures are implemented in digital frontline systems. RQ2 explored the role of Retrieval-Augmented Generation (RAG) in improving contextual response generation. RQ3 investigated how Agentic AI supports consultation workflows and frontline operations. RQ4 identified evaluation approaches related to governance, trustworthiness, and organizational acceptance.

Table 1. Research Questions of the Study

Code	Research Question
RQ1	How are Agentic AI architectures implemented in digital frontline systems?
RQ2	What is the role of Retrieval-Augmented Generation (RAG) in improving contextual response generation?
RQ3	How is Agentic AI deployed in digital frontline systems within service-based organizations?

The literature search was conducted using several academic databases, including Scopus, IEEE Xplore, ACM Digital Library, ScienceDirect, and Google Scholar. The search process used combinations of keywords such as “Agentic AI,” “Retrieval-Augmented Generation,” “Digital Frontline,” “Conversational AI,” “Customer Service AI,” and “LLM Agents.”

The inclusion criteria consisted of: (1) articles published between 2020 and 2026, (2) English-language journal articles and conference papers, (3) studies discussing Agentic AI, conversational AI, or RAG systems, and (4) articles with accessible full-text documents. Meanwhile, the exclusion criteria included duplicate studies, unrelated AI topics, incomplete papers, and non-scientific publications.

Table 2. Inclusion and Exclusion Criteria for Literature Selection

Criteria	Inclusion	Exclusion
Time Period	2020–2026	Before 2020
Language	English	Non-English
Publication Type	Journal articles & conference papers	Non-scientific publications
Topic	Agentic AI, Conversational AI, or RAG systems	Unrelated AI topics
Accessibility	Full-text accessible	Incomplete or inaccessible papers
Uniqueness	Non-duplicate	Duplicate studies

The overall literature selection process conducted in this study is illustrated through the PRISMA flowchart shown in Figure 1.

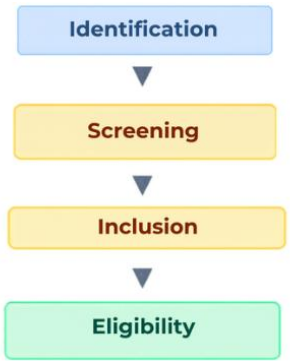

Figure 1. PRISMA Literature Selection Process

Data Collection

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The data collection process in this study was conducted systematically through searches in several academic databases, including Scopus, IEEE Xplore, ACM Digital Library, ScienceDirect, and Google Scholar. These databases were selected because they provide extensive coverage of peer-reviewed publications related to artificial intelligence, conversational systems, natural language processing, and digital technology implementation within organizational environments.

The literature search focused on studies discussing Agentic AI, Retrieval-Augmented Generation (RAG), conversational AI, autonomous agents, and digital frontline systems. To obtain relevant studies, several combinations of keywords were used, including “Agentic AI,” “LLM agents,” “autonomous systems,” “Retrieval-Augmented Generation,” “RAG,” “conversational AI,” “digital frontline,” and “AI customer service.” Boolean operators such as AND and OR were applied to refine and broaden the search process across different databases.

The search process was limited to journal articles and conference proceedings published between 2020 and 2026 to ensure that the selected literature reflected recent developments in autonomous AI systems and retrieval-enhanced conversational technologies. Additional screening was conducted by reviewing article titles, abstracts, and full-text documents to ensure alignment with the objectives of this study.

The collected articles were then filtered based on relevance, accessibility, publication quality, and thematic suitability. Duplicate studies, unrelated AI topics, incomplete publications, and non-scientific sources were excluded from further analysis. The final selected studies were subsequently used as the primary literature sources for thematic synthesis and discussion within this systematic literature review.

Analysis Framework

The selected studies were analyzed using a thematic synthesis approach to identify dominant research patterns related to Agentic AI and digital frontline systems. After the screening and eligibility stages, the selected articles were systematically categorized based on research focus, technological approach, and implementation context.

The thematic analysis process was conducted through several stages. First, the reviewed articles were examined to identify recurring concepts, methodologies, and implementation trends related to Agentic AI systems. Second, the studies were grouped according to similarities in architectural design, Retrieval-Augmented Generation implementation, and deployment characteristics within service-based organizations. Finally, the extracted findings were synthesized into three primary themes: (1) Agentic AI architectures and autonomous systems, (2) Retrieval-Augmented Generation and conversational intelligence, and (3) deployment of Agentic AI in digital frontline systems.

This thematic categorization enabled the study to identify current research trends, implementation challenges, and future opportunities associated with the adoption of Agentic AI technologies in service-based organizational environments.

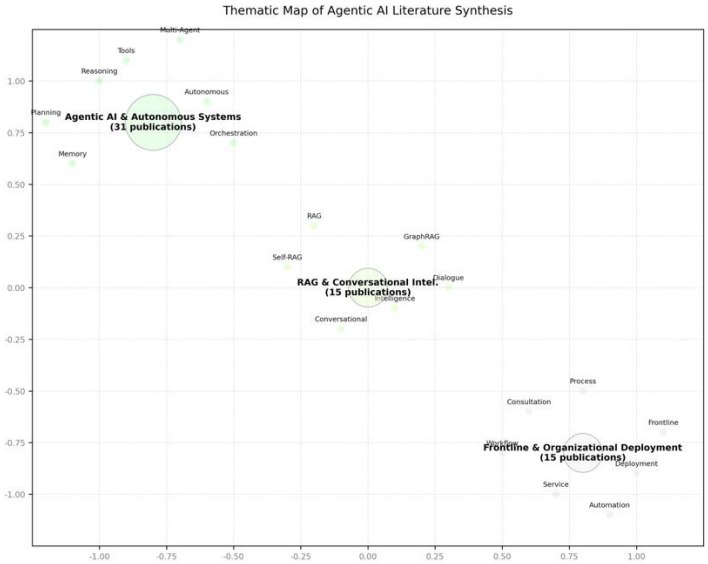

Figure 2. Thematic Mapping of Agentic AI Literature

Figure 2 illustrates the thematic mapping framework derived from the thematic synthesis process conducted in this study. The reviewed literature was manually categorized into three primary themes consisting of Agentic AI architectures and autonomous systems, Retrieval-Augmented Generation and conversational intelligence, and deployment of Agentic AI in digital frontline systems.

The size of each thematic bubble represents the number of reviewed articles categorized into the corresponding theme, while the surrounding keywords indicate recurring concepts, technological focuses, and implementation characteristics identified throughout the literature review process. The visualization demonstrates the relationships between dominant research themes and their associated subtopics within the current development of Agentic AI studies.

The initial search identified more than 100 articles. After the screening and eligibility process based on title relevance, abstract suitability, and full-text evaluation, 61 articles were selected for the final review process. The selected studies were then categorized into three main themes: (1) Agentic AI architectures and autonomous systems, (2) Retrieval-Augmented Generation and conversational intelligence, and (3) Deployment of Agentic AI in digital frontline systems.

RESULT AND DISCUSSION

Descriptive and Thematic Overview

The selected studies indicate a significant increase in research related to Agentic AI, conversational AI, and Retrieval-Augmented Generation between 2023 and 2025. Most publications originated from conference proceedings and high-impact journals in artificial intelligence, natural language processing, and

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information systems. The literature also shows that recent studies increasingly focus on autonomous AI agents, multi-agent collaboration, contextual retrieval systems, and trustworthy AI deployment.

Based on thematic classification, the reviewed studies were grouped into three major categories: (1) Agentic AI architectures and autonomous systems, (2) Retrieval-Augmented Generation and conversational intelligence, and (3) Deployment of Agentic AI in digital frontline systems.

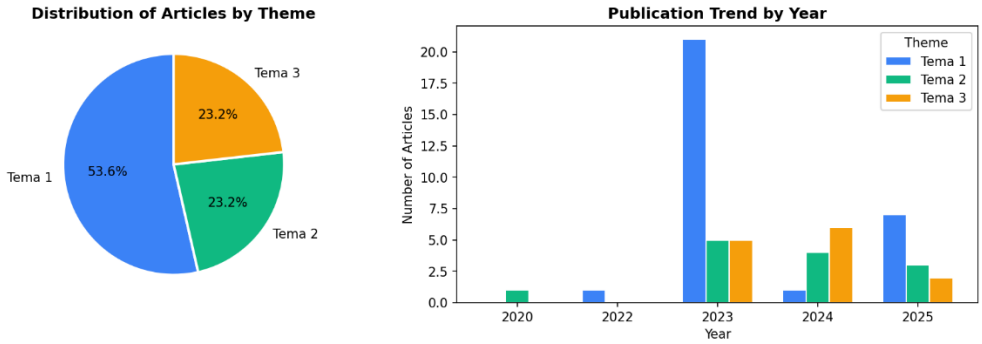

Figure 3. Distribution of Articles by Theme and Publication Trend by Year

Figure 3 illustrates the thematic distribution and publication trends of the reviewed studies. The thematic classification indicates that Theme 1, which focuses on Agentic AI architectures and autonomous systems, dominates the reviewed literature with 53.6% of the selected studies. Meanwhile, Theme 2 related to Retrieval-Augmented Generation and conversational intelligence and Theme 3 concerning the deployment of Agentic AI in digital frontline systems each contributed 23.2% of the reviewed articles.

The publication trend analysis also demonstrates a substantial increase in Agentic AI research between 2023 and 2025. Studies published in 2023 primarily focused on foundational architectures such as reasoning frameworks, autonomous systems, and multi-agent collaboration. In contrast, studies published in 2024 and 2025 increasingly emphasized Retrieval-Augmented Generation, digital frontline deployment, and real-world implementation challenges. These findings indicate that the research landscape is evolving from foundational autonomous architectures toward organizational implementation and deployment-oriented AI systems.

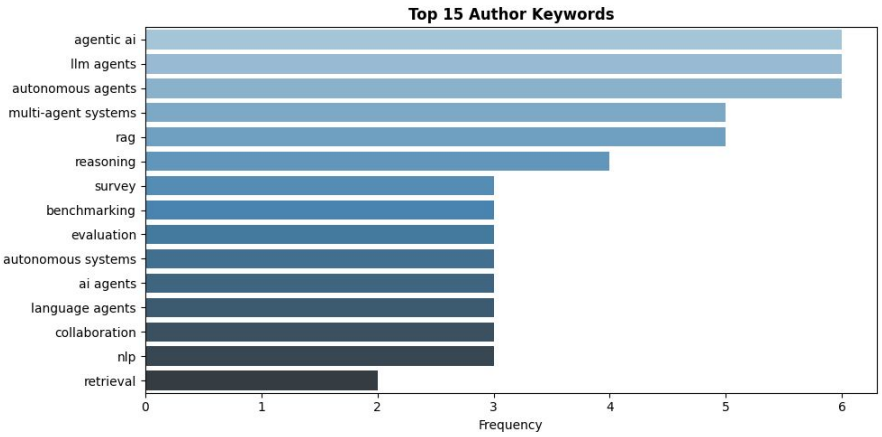

Figure 4. Top 15 Author Keywords Identified in the Reviewed Studies

Figure 4 presents the most frequently occurring author keywords identified across the reviewed studies. The keywords “agentic AI,” “LLM agents,” and “autonomous agents” appeared most frequently, indicating that the current literature strongly focuses on autonomous intelligent systems and large language model agents. In addition, keywords such as “multi-agent systems,” “reasoning,” and “retrieval” demonstrate the growing importance of collaborative AI architectures and retrieval-enhanced conversational systems.

The appearance of keywords related to benchmarking, evaluation, and safety also suggests that researchers increasingly consider implementation reliability and operational performance as important aspects of Agentic AI systems. Furthermore, keywords such as “RAG,” “language agents,” and “collaboration” indicate growing integration between conversational intelligence and autonomous multi-agent architectures.

Figure 5. Word Cloud Visualization of Dominant Author Keywords

Figure 5 visualizes the dominant author keywords identified throughout the reviewed studies. The word cloud highlights the prominence of terms such as “agent,” “agents,” “autonomous,” “systems,” and “retrieval,” indicating that the literature is highly centered on autonomous AI architectures and retrieval-enhanced conversational systems.

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Keywords related to reasoning, memory, collaboration, benchmarking, and deployment also appear prominently, demonstrating that current Agentic AI research increasingly emphasizes intelligent reasoning processes, multi-agent orchestration, evaluation frameworks, and digital frontline implementation mechanisms. Additionally, the visibility of keywords such as “customer,” “conversational,” and “service” suggests that conversational interaction and customer-facing deployment have become important application domains for Agentic AI systems.

Based on the thematic synthesis process, the reviewed literature was categorized into three major research themes consisting of Agentic AI architectures and autonomous systems, Retrieval-Augmented Generation and conversational intelligence, and deployment of Agentic AI in digital frontline systems.

Agentic AI Architectures and Autonomous Systems

Recent studies demonstrate that Agentic AI has evolved beyond conventional conversational systems by incorporating reasoning, planning, memory management, and autonomous task execution capabilities (L. Huang et al., 2025; Xi et al., 2023). Nisa et al. (2025) explained that Agentic AI systems are designed to operate adaptively with minimal human intervention through reasoning and goal-oriented interaction processes. Similarly, Sapkota et al. (2026) emphasized that Agentic AI represents the evolution from reactive AI systems toward autonomous and collaborative intelligent agents.

The reviewed literature demonstrates that recent Agentic AI research increasingly emphasizes autonomous reasoning, multi-agent collaboration, and adaptive task orchestration as core architectural components (Ali & Dornaika, 2025; Xi et al., 2023). The reviewed studies consistently demonstrate that recent Agentic AI frameworks increasingly combine reasoning, reflection, planning, and adaptive orchestration mechanisms to support more autonomous and context-aware AI systems. In addition, frameworks such as AutoGen, CAMEL, MetaGPT, and AgentVerse demonstrate how multi-agent collaboration supports complex task orchestration and adaptive interaction (Chen et al., 2023; Hong et al., 2024; Li et al., 2023; Wu et al., 2023).

Memory and tool integration also play important roles in autonomous AI systems. MemGPT and CoALA provide memory management mechanisms that enable long-context interaction and cognitive reasoning (Packer et al., 2024; Sumers et al., 2024). Meanwhile, Toolformer and ToolLLM allow AI agents to utilize external tools and APIs to support dynamic task execution (Qin et al., 2023; Schick et al., 2023). These developments indicate that modern Agentic AI systems increasingly function as autonomous digital workers rather than traditional chatbot systems.

Within service-based organizations, these capabilities support the implementation of digital frontline systems capable of handling repetitive consultation activities, guiding customer interaction, and improving communication

efficiency. Agentic AI systems therefore provide opportunities for organizations to automate early-stage consultation processes while maintaining contextual and adaptive communication quality.

Retrieval-Augmented Generation and Conversational Intelligence

The reviewed literature indicates that Retrieval-Augmented Generation (RAG) has become a dominant approach for improving contextual grounding and factual reliability within modern conversational AI systems. Traditional large language models rely mainly on parametric memory, which often leads to hallucination and inaccurate information generation. RAG addresses this limitation by integrating external retrieval systems into the response generation process (Y. Huang & Huang, 2024; Lewis et al., 2021).

Several advanced RAG frameworks have further improved conversational intelligence. Self-RAG introduces self-reflection mechanisms that allow models to evaluate retrieved information before generating responses (Asai et al., 2023). GraphRAG incorporates graph-based retrieval structures to improve contextual reasoning and summarization processes (Edge et al., 2025). Adaptive-RAG dynamically adjusts retrieval strategies according to question complexity, while Corrective Retrieval-Augmented Generation (CRAG) focuses on retrieval validation and correction mechanisms to improve response reliability (Jeong et al., 2024; Yan et al., 2024).

The reviewed studies also demonstrate that conversational AI systems increasingly integrate RAG mechanisms into customer interaction workflows. In customer service environments, retrieval-enhanced conversational systems provide more grounded responses by referencing organizational knowledge bases, consultation documents, and operational procedures. This capability is particularly important in professional consultation services where information accuracy and contextual consistency directly influence customer trust and service quality.

In addition to retrieval mechanisms, prompt engineering and conversational design practices significantly influence AI interaction quality. Studies by Ngai et al. (2021) and Monteiro and Salgado (2023) highlighted the importance of communication structure, contextual prompts, and human-centered conversational design in improving customer engagement and interaction effectiveness. These findings indicate that successful digital frontline systems require not only advanced retrieval architectures but also well-designed communication strategies that align with organizational service objectives.

Agentic AI in Digital Frontliner Systems

The reviewed studies indicate that Agentic AI is increasingly implemented as a digital frontliner within service-based organizations due to its ability to automate communication, provide contextual responses, and support customer interaction processes (Hosseini & Seilani, 2025; Roy et al., 2025). Unlike conventional chatbot systems, Agentic AI systems can perform autonomous reasoning, maintain conversational context, and coordinate multiple tasks

simultaneously, making them suitable for consultation-oriented environments (Nisa et al., 2025).

In professional service environments, digital frontliner systems primarily function as the first interaction layer between organizations and customers. These systems are primarily implemented to support consultation workflows, automate repetitive operational communication, and provide structured preliminary information within organizational service environments (Monteiro & Salgado, 2023; Ngai et al., 2021; Roy et al., 2025). According to Hosseini & Seilani (2025), Agentic AI enables more adaptive and goal-oriented communication compared with traditional rule-based conversational systems.

The integration of Retrieval-Augmented Generation further strengthens digital frontline systems by enabling conversational agents to access organization-specific knowledge sources during interaction processes. Through retrieval mechanisms, AI systems can generate responses grounded in consultation documents, operational guidelines, and company procedures, thereby improving response accuracy and reducing hallucination risks (Zheng et al., 2025).

Several studies also emphasize the importance of multi-agent collaboration and orchestration in digital frontliner deployment. Frameworks such as AutoGen, CAMEL, and MetaGPT demonstrate how multiple AI agents can coordinate reasoning, retrieval, and communication tasks to improve operational efficiency. This architecture enables organizations to separate conversational functions into specialized agents, such as customer interaction agents, retrieval agents, and evaluation agents.

Despite its potential benefits, the deployment of Agentic AI in digital frontline systems still faces several challenges. Existing studies identify issues related to governance, trustworthiness, hallucination, data privacy, and evaluation reliability in real-world environments (Y. Huang & Huang, 2024; Kaddour et al., 2023; Shavit et al., 2023). In customer-facing services, these limitations become critical because inaccurate or inconsistent responses may reduce customer trust and organizational credibility. Therefore, several studies highlight the importance of evaluation frameworks, governance mechanisms, and bounded interaction design to ensure reliable AI deployment within professional service organizations.

Overall, the reviewed literature demonstrates that Agentic AI has strong potential to function as an intelligent digital frontliner capable of improving consultation processes, communication quality, and customer interaction processes in service-based organizations.

CONCLUSION

This study systematically reviewed the development of Agentic AI as digital frontline systems in service-based organizations. The findings indicate that recent advancements in Agentic AI have significantly expanded the capabilities of conversational systems through autonomous reasoning, planning, memory management, multi-agent collaboration, and adaptive task execution. In parallel, Retrieval-Augmented Generation (RAG) improves conversational reliability by

integrating external knowledge retrieval mechanisms to support grounded and contextually accurate responses.

The reviewed literature identified three dominant research themes: Agentic AI architectures and autonomous systems, Retrieval-Augmented Generation and conversational intelligence, and deployment of Agentic AI in digital frontline systems. The findings also demonstrate that Agentic AI systems have strong potential to improve consultation processes, operational responsiveness, and organizational information accessibility within service-based organizations.

Despite these benefits, several challenges remain regarding hallucination risks, governance complexity, trustworthiness, evaluation reliability, and real-world deployment limitations. Existing studies also indicate that successful implementation of digital frontline systems requires not only advanced AI architectures but also effective conversational design, organizational alignment, and bounded interaction mechanisms.

This study contributes by providing a comprehensive overview of Agentic AI literature within the context of digital frontline systems. Practically, the findings may support organizations in understanding the opportunities and challenges associated with implementing AI-driven consultation and digital frontline systems. Future research may further explore real-world implementation, multimodal interaction, long-term customer acceptance, and governance frameworks for autonomous AI systems in professional service environments.

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