Article Review

Customer Relationship Management (CRM) Based Artificial Intelligence (AI): A Bibliometric Analysis

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Abstract

In an increasingly digital business environment, companies must continuously meet evolving customer expectations. Customer Relationship Management (CRM) has long served as a strategic tool to build and maintain customer relationships, but its integration with Artificial Intelligence (AI) is transforming the depth and quality of these interactions. This study aims to map and critically assess the current state of research on AI-driven CRM, providing a comprehensive foundation for future scholarly inquiry and managerial practice. Employing bibliometric analysis of 987 publications published in 2024 using PoP and VOSviewer, this study identifies emerging themes, research trends, and significant knowledge gaps. Key underexplored areas include organizational efficiency, CRM platforms, customer personalization, PRISMA-based methodologies, big data applications, e-banking innovations, and implementation within higher education institutions (HEIs). By consolidating fragmented insights and highlighting research frontiers, this study contributes to both academia and practice by offering a structured roadmap for advancing the theory and application of AI-enabled CRM.

Keywords: *Publish Or Perish, Vosviewer, Google Scholar*

INTRODUCTION

Customer Relationship Management (CRM) is defined as a strategic process that oversees interactions with customers to optimise value for both the organisation and the customer (Reinartz et al., 2004). The effective deployment of CRM provides organisations with a competitive edge and enhances customer interactions across multiple channels throughout the full customer lifecycle. These systems not only enable operational interactions through digital channels (such as mobile sales) but also offer advanced analytical tools to assist marketing and business teams in comprehending client needs and evaluating campaign efficacy (Lokuge et al., 2020).

Historically, CRM originated as a company-centric, IT-oriented solution for automating sales and marketing functions. Over time, it has progressively transitioned into customer-centric models that emphasise empowerment, value co-creation, and service orientation. This evolution has incorporated organisational culture, interdisciplinary processes, and sophisticated analytics into CRM frameworks, moving beyond mere technology adoption towards comprehensive business transformation (Hsieh, 2009; Saarijarvi et al., 2013). CRM has therefore shifted from a technology-centric instrument for managing customer information to a strategic, customer-focused methodology that amalgamates personnel, processes, and technology. Its escalating importance is driven by the need for organisations to cultivate loyalty, improve client experience, and generate sustainable profits in highly competitive and digitalised markets.

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In recent years, one of the most prominent developments has been the integration of Artificial Intelligence (AI) into CRM. AI-driven CRM enables hyper-personalization, automates engagements, and provides predictive insights, fundamentally transforming how businesses interact with clients (Jamil et al., 2025). Despite these advantages, AI-driven CRM also raises critical challenges such as data protection, algorithmic bias, and transparency. To address such issues, scholars have proposed the integration of federated learning with explainable AI, which offers promising solutions for privacy and interpretability in customer relationship management (Sudhakara et al., 2025; Corcuera et al., 2025). However, Yoo et al. (2024) emphasise that even with increased AI adoption, many organisations still report negligible or no tangible benefits from AI in performance outcomes.

The academic investigation of CRM has a strong foundation. Ngai (2005), as the first researcher conducting a bibliometric analysis of CRM, categorised CRM research into five domains: General CRM, Marketing, Sales, Service and Support, and IT and IS. Major topics have traditionally centred on CRM management, planning, and strategy, followed by studies on software, systems, data mining, knowledge management, and e-commerce. More recently, researchers have pointed out that analysing the ever-growing volume of client data through traditional, human-centred methods is increasingly challenging, thereby necessitating AI integration in CRM (Chatterjee et al., 2023).

Despite its growing practical relevance, research on AI-driven CRM remains nascent and fragmented. Prior studies have focused mainly on conceptual or technological perspectives, yet a systematic mapping of its intellectual structure, thematic evolution, and research trends is still missing (Ledro et al., 2023; Yoo et al., 2024; Li et al., 2023). This study addresses that gap by conducting a bibliometric analysis of AI-driven CRM publications in 2024, using VOSviewer to uncover knowledge structures, dominant themes, and future research directions.

LITERATURE REVIEW

CRM based AI driven

CRM has had to innovate to acquire and analyse an ever-expanding influx of information and data points regarding customers. To address this challenge, CRM is increasingly employing Artificial Intelligence (AI) (Lokuge et al., 2020). AI is defined as a system capable of accurately interpreting extensive data, learning from it, and using those insights to accomplish specific tasks through adaptable methods (Libai et al., 2020).

CRM-based AI-driven systems integrate advanced technologies such as machine learning, natural language processing, and predictive analytics (Ledro et al., 2023). Organisations can leverage AI within CRM's sales components to prioritise and address the most promising leads, forecast outcomes, implement dynamic pricing, and automate sales cycles. In marketing, AI can be applied to automate activities, conduct customer analytics, predict campaign efficacy, analyse trends, and initiate campaigns through machine learning. Additionally, AI enhances the service dimension of CRM by supporting chatbots and mechanisms for monitoring and analysing customer satisfaction (Lokuge et al., 2020).

AI has transformed CRM by creating unprecedented opportunities for customising client interactions. The strategic incorporation of AI into CRM enables organisations to boost productivity, enhance forecasting accuracy, improve customer retention, and derive insights from historical data. It significantly enhances personalisation, thereby augmenting customer satisfaction and loyalty (Averineni et al., 2024; Lokuge et al., 2020).

Previous research on CRM based AI driven

Table 1 presents an overview of previous research on CRM-based AI-driven strategies. Prior studies can be categorised into five themes: technologies used in AI-driven CRM, organisational challenges, explainable and emotionally intelligent AI, hybrid models, and implementation. The majority of research in this field has employed case studies, literature reviews, and exploratory analyses.

Table 1. Previous research on CRM based AI driven

Topic	Key Insights	Authors
AI Technologies in CRM	Machine learning, NLP, predictive analytics, and big data analytics drive personalization and automation	Kopare et al. (2024) Perumal et al. (2025) Zare et al. (2020)
Organizational Challenges	Data privacy, algorithmic bias, and employee resistance are major barriers; leadership and agility are crucial	Ledro et al. (2023) Sharma et al. (2024) Chatterjee et al. (2022)
Explainable and Emotionally Intelligent AI	XAI and emotionally intelligent systems enhance transparency, trust, and personalization	Habiba (2023) Ozay et al. (2025) Gaidhani et al. (2025)
Hybrid Models	Hybrid clustering-classification models improve segmentation accuracy and scalability	Kanokngamwitroj et al. (2024)
Industry Implementation	AI-CRM yields improved retention, cost savings, and multi-channel integration; strategies differ by sector	Jaganathan et al. (2024) Rejitha et al. (2025) Widjaja et al. (2024)

Existing studies show that AI-driven CRM enhances personalisation, automation, and customer engagement while also facing challenges such as data privacy, bias, and organisational resistance. Yet, research remains fragmented, largely centred on individual technologies or sector-specific cases. A systematic bibliometric analysis is still missing, leaving the field without a clear map of its intellectual structure and thematic evolution.

RESEARCH METHOD

This study uses VOSviewer software to conduct a bibliometric analysis. Bibliometric studies are suitable for identifying publication patterns and tracking the development of knowledge in a particular domain (Creswell, 2017). Secondary data in the form of English-language publications on Customer Relationship Management (CRM) based Artificial Intelligence (AI) strategy were collected. The scope of this research is limited to works published in 2024 and indexed in Scopus across all quartiles (Q1–Q4). Scopus was selected because it produces reputable and trustworthy results (Ismail et al., 2019) and offers a broader coverage than other databases such as Web of Science (Islam et al., 2023). To complement Scopus, data were also gathered from Google Scholar using the Publish or Perish (PoP) application.

This study focuses exclusively on 2024 publications to provide a fine-grained snapshot of the most recent developments in AI-driven CRM research. Unlike longer time-span analyses, which capture historical trajectories, this focus allows the study to highlight emerging trends, research fronts, and thematic priorities that characterise the current state of the field. As 2024 represents the most recent complete year of published work, it ensures analytical relevance and timeliness for both academics and practitioners. Following the methodology of Fahimnia et al. (2015), the steps are outlined in Table 2.

Table 2. Analysis data steps

Search for data
Secondary data were collected using Google Scholar through PoP.
Filtering data
1. The keyword *"Customer Relationship Management-based Artificial Intelligence Strategy"* was used, limited to the year 2024. 2. Results were classified into five groups following Indarti et al. (2020) and Rostiani et al. (2023): journal articles, books/book chapters/reports/reviews, conference proceedings, theses, and citations/other items. 3. Journal articles were further screened according to Scimago rankings.
Entering data
Relevant publications were exported into Microsoft Excel and imported into VOSviewer.
Analysis of data
VOSviewer was used to visualise bibliometric networks, while Microsoft Excel tracked the annual growth of Scopus-indexed articles. In this research, VOSviewer was applied to perform co-occurrence (keyword) analysis with clustering themes, detecting emerging topics, and mapping thematic structures.

Validation and Reliability Checks

Several measures were implemented to ensure methodological rigor:

1. Data cleaning: duplicate records, incomplete entries, and irrelevant documents were removed.
2. Keyword normalisation: synonyms, abbreviations, and plural/singular variations were standardised.
3. Threshold adjustments: network inclusion thresholds in VOSviewer were carefully calibrated following Van Eck and Waltman (2010) to avoid distortion by low-frequency items.
4. Cross-validation: network clusters and keyword themes were compared with patterns reported in prior bibliometric studies (Ngai, 2005; Ledro et al., 2023) to ensure interpretive consistency.

Adaptation and Extension of Previous Methods

This study adapts prior bibliometric approaches (Ngai, 2005; Donthu et al., 2021; Fahimnia et al., 2015) but extends them in three ways:

1. Temporal focus: by restricting analysis to a single year, 2024, the study provides a real-time mapping of emerging debates and technologies, complementing earlier long-span analyses.
2. Integrated validation: keyword harmonisation and cross-validation with established studies add methodological robustness.
3. Applied relevance: by linking bibliometric outputs to current AI-CRM debates (e.g., explainability, privacy, hybrid models), the study bridges scholarly insights with practical implications.

FINDINGS AND DISCUSSION

From the PoP and Scopus searches, 987 publications were retrieved, but only 38 high-quality journal articles (29 Q1, 7 Q2, and 2 Q3) met the inclusion criteria. The exclusion of 949 items underscores the uneven quality of AI-CRM research and reinforces the need for systematic screening to ensure reliability. This makes the present study the first systematic bibliometric analysis of AI-driven CRM publications in 2024, offering a clear snapshot of the most immediate

research front. Table 3 shows the article grouping result.

Table 3. Articles grouping

Category		Total
Article journal	Q1	29
	Q2	7
	Q3	2
	Q4	0
	Not ranked	354
	Not accessible/ not English / irrelevant	296
Books/ Book Chapters/ Reports/ Reviews		119
Conference proceeding		46
Theses/ Dissertations		44
Citation Only/ Website/ Unidentified		90
Total paper		987
Total articles according to the criteria		38

Source: data obtained by the researcher, 2025.

Figure 1 shows the results of bibliometric analysis using VOSviewer. Keyword co-occurrence mapping revealed 153 terms, with dominant clusters around artificial intelligence, customer relationship management, machine learning, and chatbots. These results confirm prior findings (Jamil et al., 2025; Ledro et al., 2023) that AI-CRM scholarship is concentrated on automation, personalization, and predictive analytics. Yet, underrepresented keywords, such as business efficiency, e-banking, and higher education institutions, signal areas where practice is advancing but research remains sparse. This indicates that scholarship is lagging behind real-world adoption, particularly in sector-specific and governance contexts.

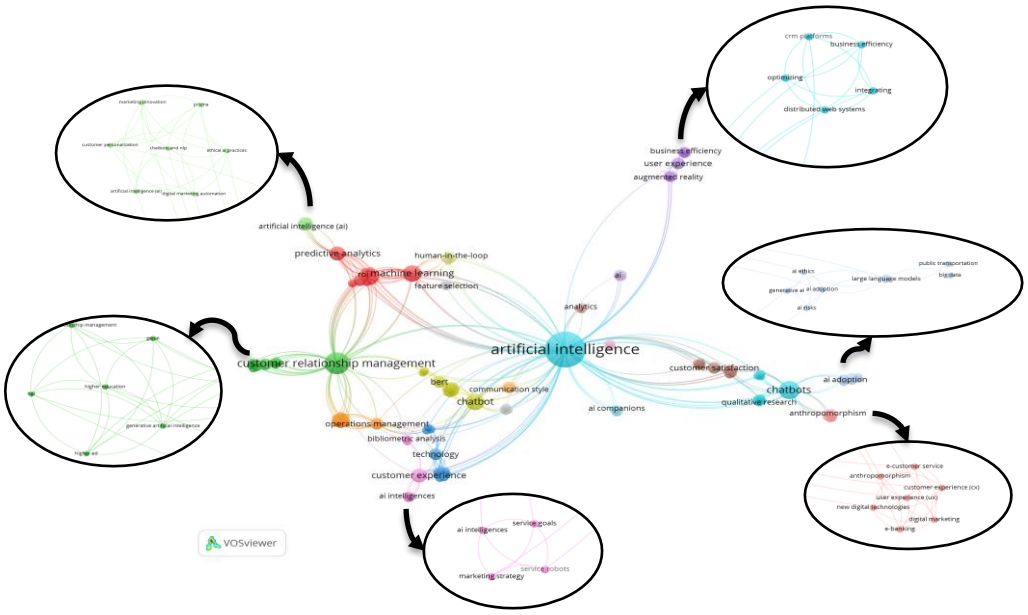

Figure 1. Network map visualization of CRM based AI driven
Source: data obtained by the researcher, 2025.

The analysis both extends and challenges earlier studies. While Leelavathi et al. (2024) and Azevedo et al. (2024) stress operational gains from AI-CRM, our results show that broader issues, privacy, bias, transparency, and human–AI balance, remain peripheral. This contradicts the urgency emphasized by Al-Romeedy et al. (2025) and Ozay et al. (2025) and highlights an enduring gap between technological optimism and ethical preparedness. In banking and higher education, for instance, AI-CRM is already used for personalization and predictive services (Singh et al., 2023; Chenguel et al., 2024; Puthur et al., 2025; Izzard, 2025), but its marginal representation in keyword networks underscores the nascent scholarly attention to these applications.

Overall, this study confirms that AI-CRM research in 2024 is expanding but still fragmented, with disproportionate focus on technical functions and insufficient engagement with governance and sectoral dimensions. By systematically mapping the field, the findings extend prior work and reveal clear research gaps. Future studies must move beyond descriptive accounts toward integrating strategic, ethical, and industry-specific perspectives, ensuring that AI-CRM scholarship evolves in step with its rapid adoption in practice (Ledro et al., 2023; Li et al., 2023).

While AI-driven CRM research in 2024 shows strong momentum, it remains uneven and overly technical. This study demonstrates that the next frontier lies not in proving AI's efficiency, but in addressing its ethical, strategic, and sector-specific implications, ensuring that scholarship keeps pace with practice.

Table 4. Synthesized from bibliometric mapping and literature review

Cluster / Theme	Well-Explored Topics	Underexplored Topics	Research Gaps / Future Directions
Core AI-CRM Applications	Automation of tasks, personalization, predictive analytics (Ozay et al., 2024; Jamil et al., 2025)	Customer sentiment mining, adaptive learning CRM	Need for frameworks integrating multi-AI tools into unified CRM systems
Business Efficiency & Strategy	Operational efficiency, customer retention, hyper-personalization (Ledro et al., 2023)	Long-term ROI, cross-sector comparative studies	Linking AI-CRM adoption with sustainable competitive advantage
Ethics & Governance	Data privacy, algorithmic bias (Al-Romeedy et al., 2025)	Fairness-by-design, regulatory compliance frameworks	Lack of empirical evidence on governance models and responsible AI practices
Sectoral Applications – Banking	E-banking personalization, predictive analytics (Singh et al., 2023; Chenguel et al., 2024)	AI-CRM in FinTech startups, fraud prevention applications	Integration of AI-CRM with blockchain and cybersecurity frameworks
Sectoral Applications – Education	Student engagement, enrollment management (Puthur et al., 2025;	Lifelong learning pathways, alumni relations	How AI-CRM reshapes institutional strategy and stakeholder trust in higher education

Cluster / Theme	Well-Explored Topics	Underexplored Topics	Research Gaps / Future Directions
	Venkateswaran, 2023)		
Methodological Advances	Use of PRISMA for systematic review (Azevedo et al., 2024; Ozay et al., 2025)	Validation of bibliometric indicators, triangulation with case studies	First large-scale bibliometric analysis in 2024, but it lacks integration with qualitative/longitudinal insights

Source: Data obtained by the researcher (2025).

The synthesis in Table X underscores that while AI-driven CRM research in 2024 has advanced in core applications such as automation, personalization, and predictive analytics, much of the discourse remains concentrated on descriptive efficiency gains. Critical areas, such as governance, ethical safeguards, and cross-sector strategies, are still underexplored, highlighting the need for integrative frameworks that balance innovation with accountability. Notably, this study is the first bibliometric mapping of AI-CRM research published in 2024, confirming prior findings on operational benefits (Ozay et al., 2024; Jamil et al., 2025) while extending them by revealing gaps in ethical governance and sectoral adaptation. This positions future research to move beyond efficiency narratives toward deeper inquiry into sustainable adoption, stakeholder trust, and the strategic role of AI in CRM ecosystems.

CONCLUSIONS

This study advances knowledge on AI-driven CRM by offering the first systematic bibliometric mapping of research published in 2024, revealing not only dominant themes such as automation, personalization, and predictive analytics but also underexplored areas, including business efficiency, CRM platforms, PRISMA applications, big data integration, e-banking, and higher education institutions. By highlighting these gaps, the study extends existing scholarship beyond efficiency-focused narratives and directs attention toward ethical, strategic, and sector-specific dimensions that remain insufficiently examined. Practically, the findings guide managers and policymakers to prioritize investments in AI-CRM systems that balance personalization with governance and trust, ensuring sustainable adoption across industries.

LIMITATIONS & FURTHER RESEARCH

The study is limited to a single year, 2024, and relies on Google Scholar and Scopus-indexed publications, which may exclude relevant contributions from earlier years or other databases. Future research should therefore adopt longitudinal designs and incorporate multiple data sources to capture the evolving trajectory of AI-CRM scholarship more comprehensively..

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