



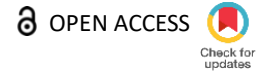
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Artificial Intelligence in Marketing: A Bibliometric Analysis and Integrated AI Marketing Knowledge Framework

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ABSTRACT

Artificial intelligence (AI) has rapidly transformed contemporary marketing by enabling organizations to enhance customer experiences, automate marketing processes, and support data-driven decision-making. Despite the rapid expansion of AI marketing research, the literature remains fragmented across diverse technologies, applications, and disciplinary perspectives. This study aims to map the intellectual structure of AI marketing research and propose an integrated conceptual framework that synthesizes the field's major knowledge domains. A bibliometric co-citation analysis was conducted using 438 journal articles retrieved from the Web of Science Core Collection, from which 34,829 cited references were extracted. The 25 most frequently cited references were analyzed using multidimensional scaling (MDS) through the PROXSCAL algorithm to identify the underlying intellectual structure of the field. The findings reveal ten research groups that collectively describe the evolution of AI marketing research and can be synthesized into three higher-order marketing application domains: Strategic and Service AI, Consumer AI, and Conversational AI. Building on these findings, the study develops an Integrated AI Marketing Knowledge Framework, derived from bibliometric evidence, which synthesizes the field's major knowledge domains into a unified conceptual model explaining how AI capability levels, consumer response mechanisms, and marketing application domains collectively create marketing value.

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INTRODUCTION

Artificial Intelligence (AI) has emerged as one of the most transformative technologies in contemporary marketing, fundamentally reshaping how organizations understand consumers, design marketing strategies, and deliver customer value. Advances in machine learning, predictive analytics, natural language processing, and more recently, generative AI have enabled firms to automate marketing processes, personalize customer experiences, generate marketing content, and enhance strategic decision-making through data-driven insights (Labib, 2024; Mohd Amin et al., 2025; Potwora et al., 2024). Consequently, AI has become an integral component of digital marketing, customer relationship management, recommendation systems, and precision marketing, allowing organizations to improve operational efficiency while creating more relevant and engaging customer experiences (Asuncion, 2024; Sowmya et al., 2025; Yang et al., 2021). Reflecting this growing importance, scholarly interest in AI and marketing has expanded substantially in recent years, with bibliometric evidence indicating an annual growth rate of approximately 27.4% in AI-related marketing publications between 2020 and

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2024 (Zejjari & Benhayoun, 2024). This rapid expansion demonstrates that AI has evolved beyond a technological innovation to become a strategic capability that is increasingly shaping both marketing theory and practice.

More recently, the emergence of Generative Artificial Intelligence (GenAI) has marked a new phase in the evolution of AI by enabling machines not only to analyze data and support decision-making but also to autonomously generate human-like content, including text, images, audio, and video (Gatla et al., 2024; Trigka & Dritsas, 2025). Powered by advanced architectures such as transformer-based large language models, generative adversarial networks (GANs), and diffusion models, GenAI has expanded AI capabilities from predictive analytics toward creativity, knowledge generation, and content innovation (Bhatia et al., 2026). The widespread adoption of applications such as ChatGPT has further accelerated the integration of GenAI into marketing activities, enabling firms to automate content creation, enhance customer interactions, support personalized marketing campaigns, and strengthen brand communication at unprecedented scale (Al-Maaitah et al., 2025; Cui et al., 2024). While these developments present significant opportunities for improving marketing effectiveness and organizational productivity, they also introduce new challenges related to algorithmic bias, misinformation, data privacy, and ethical governance, highlighting the need for responsible implementation and continued scholarly investigation (AbuEid & Jassar, 2025; Kumar & Poonam, 2025). Consequently, the rapid emergence of GenAI has established a new and rapidly evolving research stream within AI and marketing, attracting increasing attention from both researchers and practitioners.

The rapid advancement of AI technologies has led to their widespread adoption across virtually every stage of the marketing process, fundamentally transforming how organizations acquire customer insights, engage consumers, and optimize marketing performance. AI-powered applications now enable marketers to deliver highly personalized customer experiences by analyzing consumer preferences, behaviors, and purchase histories to generate tailored recommendations, targeted promotions, and customized (Hassan et al., 2024; Neetika et al., 2026; Stella, 2025). Recommendation systems have become an essential component of digital marketing, utilizing machine learning algorithms to predict customer preferences and improve purchasing decisions, thereby enhancing customer satisfaction and increasing conversion rates (Jovanović et al., 2025; Rane et al., 2024). Furthermore, predictive analytics has strengthened marketing decision-making by enabling organizations to forecast consumer behavior, segment audiences, predict customer churn, and optimize marketing campaigns using data-driven insights (Asatryan & Schonewille, 2025; Islam et al., 2024; Tomi et al., 2026). AI has also transformed customer service through intelligent chatbots and virtual assistants that provide real-time support, improve service quality, and facilitate continuous customer engagement, while marketing automation has streamlined repetitive activities such as email marketing, content generation, and social media management, allowing marketers to focus on strategic initiatives (Hassan et al., 2024; Jasrotia et al., 2024; Sowmya et al., 2025). Collectively, these diverse applications illustrate that AI has evolved from a supporting technology into a strategic marketing capability that enhances customer value, operational efficiency, and competitive performance across multiple marketing functions, although its widespread adoption also raises important ethical concerns regarding data privacy, algorithmic fairness, and responsible AI governance (Sáez-Ortuño et al., 2023; Savariapitchai & Yenurkar, 2025).

Despite the rapid expansion of AI research in marketing and its growing practical significance, the existing body of literature remains fragmented across multiple disciplines and research streams. Current studies have primarily examined AI from application-oriented perspectives, focusing on specific technologies such as personalization, recommendation systems, customer service chatbots, predictive analytics, marketing automation, and more recently, generative AI (Ertz & Kordi, 2025; Labib, 2024; Mohd Amin et al., 2025). While these studies have generated valuable insights into individual AI applications, they often investigate isolated topics rather than examining how these research streams collectively shape the intellectual development of AI in marketing. Consequently, the relationships among influential publications, dominant research themes, and emerging knowledge domains remain insufficiently understood, making it difficult to establish a comprehensive understanding of the field's intellectual structure.

Although several review studies have attempted to synthesize AI marketing research, the majority rely on traditional narrative or systematic literature reviews that primarily summarize existing findings rather than quantitatively examining the evolution of knowledge within the discipline. Unlike conventional review approaches, bibliometric analysis provides a rigorous and objective methodology for identifying influential

publications, mapping intellectual relationships among studies, uncovering thematic clusters, and visualizing the evolution of research domains through citation-based techniques (Donthu et al., 2021). In particular, bibliographic coupling enables researchers to identify contemporary research fronts by grouping publications that share common intellectual foundations, thereby revealing the current structure of an emerging field. Given the rapid evolution of AI technologies, especially following the emergence of Generative AI and large language models, there is a growing need for an updated bibliometric assessment that captures the latest developments in AI marketing research.

To address these gaps, this study conducts a bibliometric co-citation analysis of AI marketing research using the Web of Science Core Collection. The study makes two primary contributions. First, it maps the intellectual structure of AI marketing by identifying the field's dominant knowledge domains and their conceptual relationships. Second, it develops an Integrated AI Marketing Knowledge Framework, derived from bibliometric evidence, that synthesizes these domains into a unified conceptual model explaining how AI capabilities, consumer responses, and marketing applications collectively create marketing value. Building on this framework, the study identifies emerging research opportunities and practical implications for AI-enabled marketing.

LITERATURE REVIEW

Artificial Intelligence

AI refers to the development of computational systems capable of performing tasks that traditionally require human intelligence, including learning, reasoning, problem-solving, perception, language understanding, and decision-making (Darda & Pendse, 2025; Monostori, 2019). As a multidisciplinary field integrating computer science, cognitive science, mathematics, and engineering, AI seeks to design intelligent systems that can analyze large volumes of data, recognize patterns, adapt to changing environments, and make autonomous decisions with minimal human intervention (Anand et al., 2023; Marjani, 2026). Since the term "Artificial Intelligence" was formally introduced at the Dartmouth Conference in 1956, the field has undergone remarkable transformation, evolving from rule-based symbolic systems toward data-driven approaches powered by machine learning, deep learning, and, more recently, generative artificial intelligence (Lynch & Smith, 2025; Mseer & Al-Qawasmi, 2025). These technological advancements have been facilitated by increasing computational power, the availability of large-scale datasets, and continuous improvements in learning algorithms, enabling AI to address increasingly complex tasks across diverse domains (De Ferrari et al., 2025; Sonawane, 2025). Today, AI is widely recognized not only as a technological innovation but also as a strategic capability that is reshaping industries, organizational processes, and business decision-making, including the field of marketing.

Artificial Intelligence in Marketing

AI has fundamentally transformed modern marketing by enabling organizations to shift from traditional mass marketing approaches toward data-driven, customer-centric strategies. AI-enabled marketing integrates technologies such as machine learning, natural language processing, predictive analytics, and intelligent automation to analyze large volumes of customer data, generate actionable insights, and optimize marketing activities across multiple touchpoints (Hassan et al., 2024; Neetika et al., 2025). Within digital marketing, AI facilitates personalized content delivery, targeted advertising, search engine optimization, and social media engagement by continuously learning from consumer behaviors and preferences (Shafik, 2025; Tran & Ho, 2024). AI has also significantly enhanced customer relationship management (CRM) by enabling firms to automate customer interactions, perform sentiment analysis, predict customer needs, and strengthen customer satisfaction and loyalty through intelligent recommendation systems and personalized communication (Alsalamah, 2025; Chatterjee & Chaudhuri, 2023; Leelavathi et al., 2024). Furthermore, AI-powered marketing automation streamlines repetitive activities such as email marketing, lead management, customer segmentation, and campaign optimization, allowing marketers to focus on strategic decision-making while improving operational efficiency and customer experience (Gujar et al., 2024; Mrohs, 2025; Young, 2025). Beyond automation, AI increasingly functions as a strategic decision-support system by integrating predictive analytics with real-time market intelligence, enabling organizations to forecast consumer demand, optimize pricing strategies, allocate marketing resources more effectively, and improve business performance through evidence-

based decision-making (Abbasi & Esmaili, 2024; AL-Quraishi et al., 2025). Collectively, these capabilities demonstrate that AI is no longer merely a technological tool supporting marketing operations but has evolved into a strategic capability that enhances organizational competitiveness, customer value creation, and marketing innovation, although organizations must simultaneously address challenges related to data privacy, algorithmic transparency, and ethical AI governance to ensure responsible implementation (Islam et al., 2024; Mishra, 2025).

Major AI Marketing Applications

The rapid advancement of artificial intelligence has led to the emergence of a wide range of marketing applications that fundamentally reshape how organizations create, deliver, and capture customer value. One of the most prominent applications is AI-driven personalization, whereby machine learning algorithms analyze customer demographics, browsing behavior, purchase history, and contextual information to deliver highly personalized products, services, promotional messages, and customer experiences (Al-Ababneh et al., 2026; Govindaraj et al., 2025). Closely related to personalization are recommendation systems, which utilize predictive algorithms to identify customer preferences and provide relevant product or service suggestions, thereby increasing customer satisfaction, engagement, and conversion rates (Luthra et al., 2024; Stella, 2025). AI has also transformed customer service through intelligent chatbots and virtual assistants capable of providing real-time assistance, handling routine inquiries, and maintaining continuous customer engagement while simultaneously reducing operational costs (Hassan et al., 2024; Sowmya et al., 2025). Furthermore, predictive analytics has become a critical marketing capability, enabling organizations to forecast consumer behavior, identify purchasing patterns, optimize customer segmentation, predict churn, and improve campaign performance through data-driven decision-making (Harshitha et al., 2025; Islam et al., 2024; Mandaliya & Kulkarni, 2026). Beyond predictive capabilities, AI facilitates the extraction of customer insights from large and complex datasets, allowing marketers to better understand consumer sentiment, preferences, and market dynamics, thereby supporting more informed strategic decisions (Savariapitchai & Yenurkar, 2025). More recently, advances in generative AI have introduced AI-generated marketing content as a rapidly growing application, enabling organizations to automatically create personalized advertisements, product descriptions, email campaigns, and social media content with unprecedented speed and scalability (Hassan et al., 2024; Morais & Lopes, 2026). Collectively, these applications demonstrate that AI has evolved beyond an operational support technology into a strategic marketing capability that enhances customer engagement, organizational efficiency, and competitive advantage. At the same time, the increasing reliance on AI also raises important concerns regarding algorithmic transparency, consumer privacy, data governance, and ethical marketing practices, emphasizing the need for responsible AI implementation in contemporary marketing environments (Islam et al., 2024; Sáez-Ortuño et al., 2023).

Bibliometric Research on AI Marketing

The rapid growth of AI research in marketing has led to an increasing number of bibliometric studies aimed at synthesizing the development of the field and identifying its major research trends. Existing bibliometric research has also demonstrated that AI marketing is an interdisciplinary field, drawing contributions from marketing, information systems, computer science, business analytics, and management. Furthermore, countries such as the United States and China have been identified as leading contributors to AI marketing research, while research activity in Asia and other emerging economies has increased considerably in recent years (Chan et al., 2025; Prakash et al., 2025). Collectively, these studies have improved the understanding of publication trends, influential authors, journals, and emerging research topics.

Despite these valuable contributions, the existing literature primarily focuses on describing publication patterns and research themes, while relatively limited attention has been given to understanding the intellectual structure of AI marketing and the relationships among its influential publications. As AI technologies continue to evolve rapidly, particularly with the emergence of Generative AI, there is a need for updated studies that provide a clearer understanding of the knowledge foundations and conceptual development of the field. Therefore, this study seeks to contribute to the existing literature by providing a comprehensive mapping of the intellectual structure of AI in Marketing and identifying directions for future research.



METHODOLOGY

This study adopts a bibliometric literature review to examine the intellectual structure of Artificial Intelligence (AI) in marketing and identify emerging research directions within the field. Bibliometric analysis is appropriate because it enables the systematic and objective examination of a large body of scientific literature through citation relationships, allowing researchers to identify influential publications, major research streams, and the evolution of knowledge over time (Donthu et al., 2021). Rather than synthesizing previous studies descriptively, this approach uncovers the underlying intellectual foundations that have shaped the development of AI marketing research.

The study is grounded in the social network perspective, which views a scientific field as a network of interconnected publications linked through citation relationships. Within this perspective, influential studies cited together by subsequent publications are assumed to share similar intellectual foundations and contribute to common research domains. Examining these citation relationships provides insights into the conceptual organization of the literature and facilitates the identification of major schools of thought within the AI marketing field (Small, 1973; White & Griffith, 1981).

The literature was retrieved from the Web of Science (WoS) Core Collection, selected for its comprehensive coverage of high-quality peer-reviewed journals and its widespread application in bibliometric research. To identify relevant publications, a three-pronged search strategy was employed. The first search dimension focused on the marketing domain using the keyword "marketing". The second dimension captured AI-related technologies using the keywords "artificial intelligence", "AI", "machine learning", "ML", "generative AI", "GenAI", "large language model", "LLM", "ChatGPT", "AI agent", and "AI-generated content". The third dimension targeted major AI applications in marketing using the keywords "personalization", "recommendation system", "targeting", "customer service", "chatbot", "virtual assistant", "content creation", "market intelligence", "decision support", "automation", "predictive analytic", and "customer insight". These three search dimensions were subsequently combined using Boolean operators to maximize the retrieval of relevant studies while ensuring comprehensive coverage of the AI marketing literature.

The search produced 438 journal articles, from which 34,829 cited references were extracted for subsequent analysis. To identify the intellectual foundations of the field, the cited references were ranked according to their citation frequency. Following established bibliometric practice, the 25 most frequently cited references were selected for the co-citation analysis because they represent the core publications that have exerted the greatest influence on AI marketing research. Together, these publications generated 822 co-citation occurrences, forming the basis for the intellectual structure analysis.

The selected references were subsequently analyzed using co-citation analysis, where the frequency with which two publications are cited together is used as an indicator of their conceptual similarity. A co-citation matrix was constructed and normalized using the Ochiai coefficient to measure the strength of relationships among the selected publications. The normalized matrix was then analyzed using Multidimensional Scaling (MDS) through the PROXSCAL algorithm implemented in IBM SPSS Statistics. The resulting two-dimensional configuration was evaluated based on the model's stress value to ensure an acceptable representation of the co-citation relationships. Finally, the spatial configuration was interpreted to identify the principal research clusters and reveal the intellectual structure of AI in Marketing. The findings from the co-citation analysis provide the basis for discussing the dominant research themes and proposing future research directions within the field.

RESULTS

Descriptive Analysis

Figure 1 illustrates the annual publication and citation trends in AI marketing research. Collectively, these publications have received 22,890 citations, with an average of 52.26 citations per publication and an h-index of 77. These indicators suggest that AI marketing has developed into a well-established and influential research domain, characterized by a substantial body of highly cited literature.

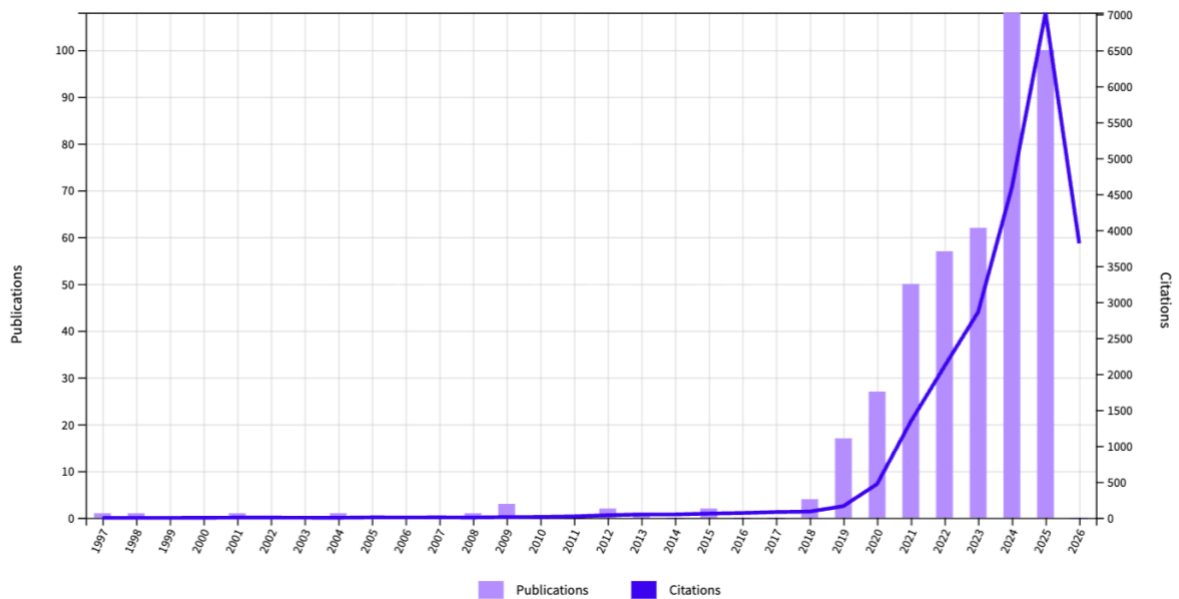


Figure 1. Publication and Citation Trends. Source: *Web of Science*

Although only a limited number of studies were published during the early years, research activity accelerated markedly after 2018. The number of publications increased rapidly between 2019 and 2023, accompanied by a sharp rise in citation counts. This trend reflects the growing academic interest in AI-driven marketing applications, fueled by advances in machine learning, deep learning, natural language processing, conversational AI, and generative AI. The simultaneous growth in publications and citations indicates not only an expansion of the literature but also increasing scholarly recognition of AI as a transformative technology in marketing research.

The publication trend further suggests that AI marketing has transitioned from an emerging topic to a mainstream research area. While earlier studies primarily explored conceptual issues and the potential of AI in marketing, more recent research has diversified into areas such as customer experience, service automation, AI-enabled decision making, chatbot interactions, personalization, consumer trust, and human–AI collaboration.

Table 1. Leading Publication Sources in Artificial Intelligence Marketing Research

Journal Name	Total Paper
Psychology & Marketing	28
Marketing Science	17
Journal of Business Research	15
Journal of Retailing and Consumer Services	14
Industrial Marketing Management	13
Journal of Research in Interactive Marketing	13
Journal of Services Marketing	13
International Journal of Bank Marketing	11
Asia Pacific Journal of Marketing and Logistics	10
International Journal of Research in Marketing	10
Journal of Hospitality Marketing & Management	10
Journal of Marketing	9
Journal of Marketing Analytics	9
Journal of The Academy of Marketing Science	9
European Journal of Marketing	8
Journal of Business & Industrial Marketing	8
Journal of Consumer Marketing	8
Journal of Interactive Marketing	8
Marketing and Management of Innovations	8
Journal of Theoretical and Applied Electronic Commerce Research	7

Marketing Intelligence & Planning	7
Management Science	6
European Journal of Operational Research	5
Innovative Marketing	5
Journal of Marketing Research	5
Marketing Letters	5

Table 1 presents the journals contributing most frequently to AI marketing research. Psychology & Marketing ranked first with 28 publications, followed by Marketing Science (17), Journal of Business Research (15), Journal of Retailing and Consumer Services (14), Industrial Marketing Management (13), Journal of Research in Interactive Marketing (13), and Journal of Services Marketing (13). Other major publication outlets include the International Journal of Bank Marketing (11), Asia Pacific Journal of Marketing and Logistics (10), International Journal of Research in Marketing (10), and International Journal of Hospitality Management (10).

The distribution of publications across these journals demonstrates the interdisciplinary nature of AI marketing research. While leading marketing journals remain the primary publication venues, contributions also appear in journals specializing in services marketing, consumer behavior, hospitality, banking, innovation management, and electronic commerce. This diversity reflects the broad application of AI technologies across different marketing contexts and industries.

Citation Overview

The co-citation analysis was based on the 25 most highly cited publications identified from the Web of Science dataset. These studies represent the core intellectual foundation of AI marketing research and serve as the basis for the subsequent multidimensional scaling (MDS) analysis.

Huang & Rust (2018) is the most frequently cited publication, receiving 81 citations within the dataset. The study proposed a three-stage framework describing how AI transforms marketing, establishing one of the earliest comprehensive conceptualizations of AI's role in marketing activities. The second most cited publication is Luo et al. (2019) with 51 citations, which examined the effectiveness of AI in customer service and demonstrated how AI-enabled chatbots influence customer interactions and firm performance. Chung et al. (2020) ranked third with 44 citations, highlighting the determinants of chatbot adoption in retail banking and extending the understanding of AI-enabled service interactions.

Table 2. Twenty-Five Most Frequently Cited References in Artificial Intelligence Marketing Research

Rank	Publication	Source	Total Citation
1	Huang & Rust (2018)	Journal of Service Research	81
2	Luo et al. (2019)	Marketing Science	51
3	Chung et al. (2020)	Journal of Business Research	44
4	Longoni et al. (2019)	Journal of Consumer Research	44
5	Huang & Rust (2021)	Journal of the Academy of Marketing Science	39
6	Mende et al. (2019)	Journal of Marketing Research	34
7	van Doorn et al. (2017)	Journal of Service Research	34
8	Crolic et al. (2022)	Journal of Marketing	32
9	Adam et al., (2021)	Electronic Markets	31
10	Araujo (2018)	Computers in Human Behavior	31
11	Dietvorst et al. (2015)	Journal of Experimental Psychology	31
12	Sheehan et al. (2020)	Journal of Business Research	31
13	Lemon & Verhoef (2016)	Journal of Marketing	30
14	Longoni & Cian (2022)	Journal of Marketing	30
15	Castelo et al. (2019)	Journal of Marketing Research	29

16	Epley et al. (2007)	Psychological Review	29
17	Go & Sundar (2019)	Computers in Human Behavior	28
18	Puntoni et al. (2021)	Journal of Marketing	28
19	Dwivedi et al., (2021)	International Journal of Information Management	26
20	Kim et al. (2019)	Marketing Letters	26
21	Kumar et al. (2019)	California Management Review	24
22	Ashfaq et al. (2020)	Telematics and Informatics	23
23	Syam & Sharma (2018)	Industrial Marketing Management	23
24	Roy & Naidoo (2021)	Journal of Business Research	22
25	Ameen et al. (2021)	Computers in Human Behavior	21

The remaining highly cited studies generally received between 20 and 44 citations, indicating a relatively balanced distribution of influential contributions. These include Longoni et al. (2019) (44 citations), which investigated consumer responses to AI in healthcare; Huang and Rust (2021) (39 citations), which developed a strategic framework for AI in service marketing; Mende et al. (2019) (34 citations), which explored consumer interactions with humanoid service robots; van Doorn et al. (2017) (34 citations), which examined the changing role of technology in service frontlines; and Crolc et al. (2022) (32 citations), which investigated chatbot failures and customer responses in digital service environments.

Several other influential publications focused on conversational AI, anthropomorphism, consumer behavior, and customer experience. These include Adam (2021), Araujo (2018), Dietvorst et al. (2015), Sheehan et al. (2020), Lemon and Verhoef (2016), Longoni et al. (2022), and Castelo et al. (2019), each receiving between 29 and 31 citations. The remaining publications, including Epley et al. (2007), Go and Sundar (2019), Puntoni et al. (2021), Dwivedi et al. (2021), Kim et al. (2019), Kumar et al. (2019), Ashfaq et al. (2020), Syam and Sharma (2018), Roy & Naidoo (2021), and Ameen et al. (2021), received between 21 and 29 citations, further demonstrating the diversity of influential studies underpinning AI marketing research.

Citation Overview

The multidimensional scaling (MDS) analysis was conducted using the 25 most highly cited references identified from the Web of Science dataset to reveal the intellectual structure of AI marketing research. Figure 2 presents the resulting co-citation map with a stress value of 0.05084, indicating an excellent representation of the similarity relationships among the selected references in a two-dimensional space. Following the standardized distance threshold of 0.25, the co-citation network was partitioned into ten research cliques, representing groups of publications that are frequently cited together and therefore share strong intellectual proximity. The remaining publications occupy independent positions on the map, suggesting that they function either as theoretical bridges connecting multiple research streams or as emerging contributions that have yet to form cohesive co-citation communities.

The spatial distribution of the references demonstrates that AI marketing research has developed through several interconnected yet distinguishable knowledge domains. The upper-left quadrant of the map is dominated by conceptual and strategic studies examining AI from an organizational and customer experience perspective. Moving toward the central region, the literature shifts toward AI-enabled service delivery and frontline technologies. The lower-left region primarily contains studies investigating consumer perceptions, trust, and acceptance of AI-based decision making, whereas the right-hand side is characterized by research focusing on conversational AI, chatbot design, and human–AI interaction. Although these research cliques are clearly differentiated, their relative proximity indicates that they collectively contribute to the broader development of AI marketing as an integrated research field.

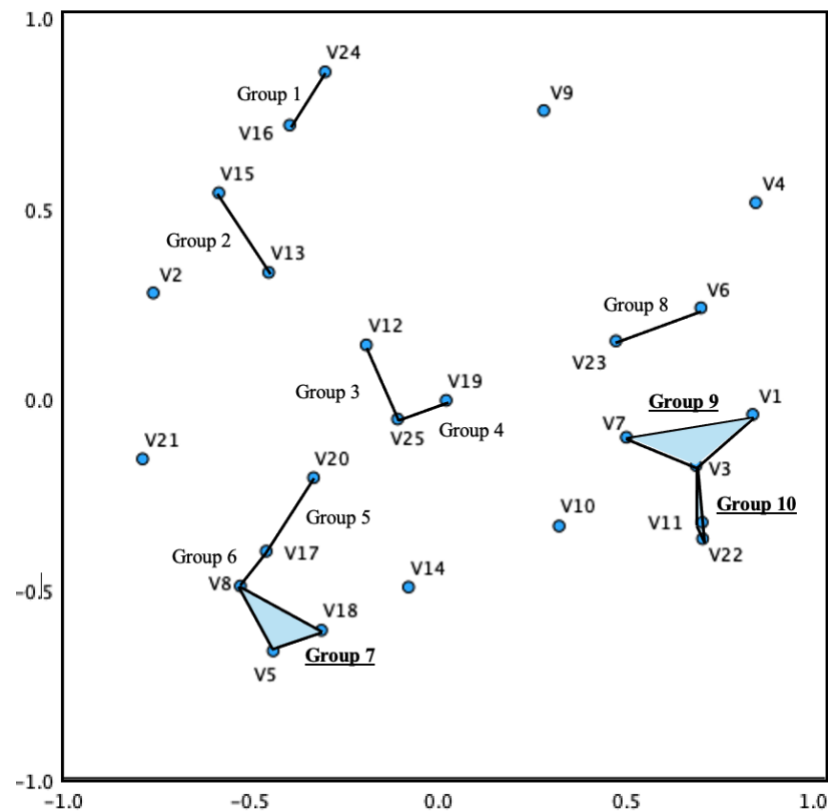


Figure 2. Co-Citation Knowledge Structure of Artificial Intelligence in Marketing

V1 = Adam et al. (2021); V2 = Ameen et al. (2021); V3 = Araujo (2018); V4 = Ashfaq et al. (2020); V5 = Castelo et al. (2019); V6 = Chung et al. (2020); V7 = Crolc et al. (2022); V8 = Dietvorst et al. (2015); V9 = Dwivedi et al. (2021); V10 = Epley et al. (2007); V11 = Go and Sundar (2019); V12 = Huang and Rust (2018); V13 = Huang and Rust (2021); V14 = Kim et al. (2019); V15 = Kumar et al. (2019); V16 = Lemon and Verhoef (2016); V17 = Longoni et al. (2019); V18 = Longoni and Cian (2022); V19 = Luo et al. (2019); V20 = Mende et al. (2019); V21 = Puntoni et al. (2021); V22 = Roy and Naidoo (2021); V23 = Sheehan et al. (2020); V24 = Syam and Sharma (2018); and V25 = van Doorn et al. (2017).

Group 1 (V16 and V24): AI-Driven Customer Experience and Marketing Transformation; Group 2 (V13 and V15): Strategic Applications of AI in Marketing; Group 3 (V12 and V25): AI in Service Encounters and Frontline Services; Group 4 (V19 and V25): Human–AI Collaboration in Service Delivery; Group 5 (V17 and V20): Consumer Acceptance of AI and Service Robots; Group 6 (V8 and V17): Algorithm Aversion and Consumer Resistance to AI; Group 7 (V5, V8 and V18): Consumer Trust and Acceptance of AI Decision-Making; Group 8 (V6 and V23): AI Chatbots in Customer Service; Group 9 (V1, V3 and V7): Chatbot Anthropomorphism and Human–AI Interaction; Group 10 (V3, V11 and V22): Anthropomorphic Chatbots and Consumer Engagement.

Located in the upper-left portion of the map, Group 1 (AI-Driven Customer Experience and Marketing Transformation) consists of Lemon and Verhoef (2016) and Syam & Sharma (2018). These studies occupy one of the highest positions within the co-citation network, indicating their role as foundational conceptual references for AI marketing research. Together, they establish the strategic importance of AI in transforming customer experience management and marketing practices by emphasizing the integration of intelligent technologies throughout the customer journey. Their close co-citation relationship suggests that subsequent research frequently cites these publications jointly when discussing the strategic implications of AI for marketing transformation, digital customer engagement, and organizational competitiveness.

Immediately below Group 1, Group 2 (Strategic Applications of AI in Marketing) is formed by Huang & Rust (2021) and Kumar et al. (2019). This research clique extends the strategic perspective by focusing on the application of AI to marketing decision-making and value creation. Huang and Rust (2021) provide a comprehensive framework explaining how AI reshapes marketing functions, whereas Kumar et al. (2019) discuss how firms leverage AI capabilities to enhance customer value and competitive performance. Their proximity to

Group 1 indicates a strong intellectual relationship, collectively representing the strategic and managerial foundation of AI marketing research.

Positioned near the center-left of the map, Group 3 (AI in Service Encounters and Frontline Services) comprises Huang & Rust (2018) and van Doorn et al. (2017). This clique represents one of the earliest efforts to conceptualize AI within service encounters and frontline service operations. The frequent co-citation of these studies indicates that researchers commonly refer to them when examining the integration of AI technologies into customer-facing service processes. Their central location further suggests that this research stream connects strategic AI applications with empirical investigations of AI-enabled service delivery.

Adjacent to Group 3, Group 4 (Human–AI Collaboration in Service Delivery) links Luo et al. (2019) with van Doorn et al. (2017). While Group 3 primarily establishes the conceptual role of AI in service encounters, this clique emphasizes the operational interaction between AI technologies and human employees in frontline service settings. The presence of van Doorn et al. (2017) in both Groups 3 and 4 highlights its bridging role within the co-citation network, connecting theoretical discussions of frontline technologies with empirical research on AI-assisted customer service and organizational performance.

Moving toward the lower-left section of the map, Group 5 (Consumer Acceptance of AI and Service Robots) consists of Longoni et al. (2019) and Mende et al. (2019). This research clique focuses on consumer evaluations of AI technologies and humanoid service robots. These studies investigate the conditions under which consumers are willing to interact with autonomous technologies and how perceptions of AI influence service evaluations and behavioral intentions. Their close proximity indicates that they are frequently cited together as foundational references in research examining consumer acceptance of AI-enabled services.

Located immediately adjacent to Group 5, Group 6 (Algorithm Aversion and Consumer Resistance to AI) comprises Dietvorst et al. (2015) and Longoni et al. (2019). This clique centers on consumers' reluctance to rely on algorithmic recommendations and AI-assisted decision making. The repeated co-citation of these publications demonstrates that algorithm aversion has become an important theoretical perspective for understanding barriers to AI adoption in marketing contexts. The close spatial relationship between Groups 5 and 6 further illustrates that consumer acceptance and consumer resistance represent complementary streams within the broader literature on AI adoption.

The only research clique containing three tightly connected publications in the lower-left region is Group 7 (Consumer Trust and Acceptance of AI Decision-Making), comprising Castelo et al. (2019), Dietvorst et al. (2015), and Longoni et al. (2022). Unlike Group 6, which primarily addresses resistance toward AI, this clique emphasizes the factors that shape consumer trust, confidence, and willingness to accept AI-generated recommendations. The triangular configuration observed in the co-citation map indicates a particularly strong intellectual relationship among these studies, suggesting that they collectively provide the primary theoretical foundation for research on consumer trust in AI-based decision systems.

Shifting to the right-hand side of the map, Group 8 (AI Chatbots in Customer Service) consists of Chung et al. (2020) and Sheehan et al. (2020). These publications investigate the application of AI-powered chatbots in customer service environments, particularly focusing on chatbot adoption, service quality, and customer experience. Their close co-citation relationship indicates that they are frequently referenced together in studies examining conversational AI as a service delivery mechanism.

Immediately below Group 8, Group 9 (Chatbot Anthropomorphism and Human–AI Interaction) is composed of Adam et al. (2021), Araujo (2018), and Crolc et al. (2022). This clique focuses on the design of anthropomorphic chatbots and their influence on human–AI interaction. The strong triangular relationship among these publications reflects a coherent body of literature examining how human-like characteristics, conversational style, and social presence affect consumer perceptions and interactions with AI-powered chatbots.

The final research clique, Group 10 (Anthropomorphic Chatbots and Consumer Engagement), consists of Araujo (2018), Go and Sundar (2019), and Roy & Naidoo (2021). This group extends the chatbot literature by emphasizing consumer engagement, communication effectiveness, and user responses to anthropomorphic chatbot characteristics. The inclusion of Araujo (2018) in both Groups 9 and 10 indicates that this study serves as a key intellectual bridge connecting research on chatbot design with investigations of customer engagement and interaction outcomes.



DISCUSSION

Interpretation of Findings

The co-citation analysis provides important insights into the intellectual development of AI marketing research. Unlike descriptive bibliometric indicators, which primarily reveal publication growth and citation performance, co-citation analysis uncovers the conceptual relationships among influential studies and illustrates how the knowledge structure of the field has evolved over time (Small, 1973; White & Griffith, 1981). The MDS results indicate that AI marketing is no longer an emerging niche topic but has matured into a multidisciplinary research domain characterized by several interconnected yet distinct streams of inquiry.

One notable finding is that the intellectual foundation of AI marketing is dominated by research published after 2015. Among the 25 most influential references, only a small number of studies, such as Epley et al. (2007), originate from outside the recent AI revolution, whereas the majority were published between 2018 and 2022. This distribution reflects the rapid acceleration of AI research following advances in machine learning, deep learning, conversational AI, and generative technologies. The publication trend presented in the descriptive analysis similarly demonstrates substantial growth in both publication output and citation impact after 2018, suggesting that AI has become a central research agenda within marketing.

The co-citation structure further indicates that strategic marketing perspectives continue to provide the conceptual foundation for AI marketing research. The close relationship among studies addressing AI-driven customer experience, marketing transformation, and strategic AI implementation suggests that researchers increasingly conceptualize AI not merely as a technological innovation but as an organizational capability capable of reshaping customer relationships, marketing processes, and competitive advantage (Lemon & Verhoef, 2016; Syam & Sharma, 2018; Huang & Rust, 2021). This finding supports the argument that AI adoption should be viewed as a strategic transformation rather than simply the implementation of new digital tools.

A second important observation is the central role of service marketing within the AI marketing knowledge structure. Several influential studies focus on AI-enabled service encounters, frontline technologies, and customer service automation (van Doorn et al., 2017; Huang & Rust, 2018; Luo et al., 2019). Their central position within the co-citation network suggests that service contexts have become one of the primary environments through which AI applications are examined. This reflects the increasing deployment of AI technologies (including chatbots, recommendation systems, and intelligent service agents) to enhance operational efficiency while simultaneously improving customer experience.

The findings also reveal a significant shift toward consumer-centered research. Rather than concentrating exclusively on organizational adoption of AI, recent literature increasingly investigates how consumers perceive, trust, and interact with intelligent systems. Studies addressing algorithm aversion (Dietvorst et al., 2015), AI acceptance (Longoni et al., 2019), service robots (Mende et al., 2019), and consumer trust in AI decision-making (Castelo et al., 2019; Longoni et al., 2022) demonstrate that psychological factors have become fundamental considerations in AI marketing research. This shift suggests that technological sophistication alone is insufficient to ensure successful AI implementation; customer acceptance, trust, and perceived fairness are equally critical determinants of AI effectiveness.

Another noteworthy finding is the emergence of chatbot research as one of the most cohesive areas within the co-citation network. The strong connections among studies examining chatbot anthropomorphism, conversational design, and consumer engagement indicate that conversational AI has become one of the dominant applications of AI in marketing (Araujo, 2018; Go & Sundar, 2019; Adam et al., 2021; Roy & Naidoo, 2021; Crolc et al., 2022). The presence of multiple tightly connected research cliques devoted to chatbot studies suggests that this topic has evolved beyond technology adoption toward understanding the social and psychological mechanisms governing human–AI interaction.

Interestingly, several influential publications occupy relatively independent positions within the MDS map. For example, Dwivedi et al. (2021), Puntoni et al. (2021), Kim et al. (2019), Ashfaq et al. (2020), and Ameen et al. (2021) are not incorporated into the identified research cliques despite receiving substantial citations. Their isolated positions indicate that these studies address broader conceptual issues or emerging research directions that intersect multiple areas of AI marketing rather than belonging to a single established stream. Such publications may represent future convergence points as the field continues to evolve.

Overall, the findings suggest that AI marketing research has progressed through three broad stages. Initial studies established conceptual and strategic foundations for integrating AI into marketing activities. Subsequent research concentrated on AI-enabled service delivery and customer experience management, reflecting the increasing adoption of intelligent technologies in organizational practice. More recently, scholarly attention has shifted toward consumer behavior, trust, anthropomorphism, and human–AI interaction, demonstrating a transition from technology-oriented perspectives toward customer-centric and behavioral approaches. This progression reflects the broader evolution of AI marketing from examining what AI can do to understanding how AI creates value for firms while simultaneously shaping consumer experiences and decision-making.

Taken together, the co-citation findings demonstrate that AI marketing is becoming an increasingly integrated research field in which strategic management, service marketing, consumer psychology, and human–computer interaction collectively contribute to the discipline's intellectual development. The identified knowledge structure therefore not only captures the historical evolution of AI marketing research but also highlights the interdisciplinary nature of future investigations in this rapidly expanding field.

Integrated AI Marketing Knowledge Framework

Building upon the ten research groups identified through the bibliometric analysis, this study develops an Integrated AI Marketing Knowledge Framework. Rather than treating the identified research streams as independent topics, the framework synthesizes the bibliometric evidence into a unified conceptual model explaining how AI creates marketing value through the interaction of AI capability levels, consumer response mechanisms, and marketing application domains. Figure 3 presents the proposed framework, illustrating how these three dimensions interact to generate marketing outcomes while providing an integrated representation of the intellectual structure of AI marketing research.

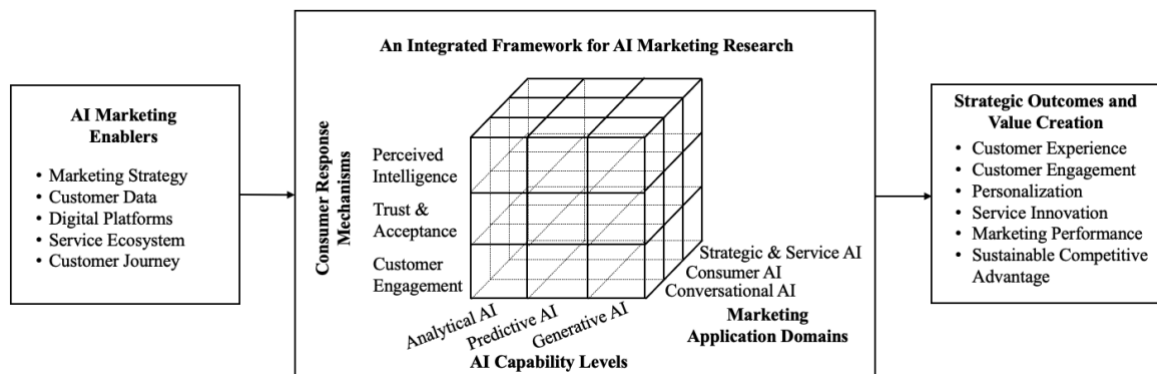


Figure 3. An Integrated Framework for AI Marketing Research

An Integrative Spatial Commerce Consumer Experience Framework

The first dimension of the framework concerns AI Capability Levels, which represent the technological progression of AI within marketing. This dimension extends from Analytical AI, where intelligent systems primarily support data analysis, prediction, and decision support, through Predictive AI, which enables firms to anticipate customer needs and optimize marketing decisions, to Generative AI, which autonomously creates marketing content and facilitates increasingly sophisticated customer interactions. This progression reflects the rapid evolution of AI technologies documented throughout the literature, from machine learning and predictive analytics toward large language models, generative AI, and autonomous marketing applications. As AI capability increases, organizations gain greater opportunities to enhance personalization, automate marketing processes, and generate strategic insights for decision-making.

The second dimension represents Consumer Response Mechanisms, emphasizing that the success of AI marketing depends not only on technological sophistication but also on how consumers perceive and respond to intelligent systems. The co-citation analysis demonstrates that consumer-focused research has become one of the dominant streams within AI marketing, particularly through studies investigating perceived intelligence, trust and acceptance, algorithm aversion, anthropomorphism, and customer engagement (Dietvorst et al., 2015;



Longoni et al., 2019; Castelo et al., 2019; Mende et al., 2019; Longoni et al., 2022; Go & Sundar, 2019; Adam et al., 2021). The framework therefore proposes that consumer evaluations function as the primary mechanism through which AI capabilities influence marketing outcomes. Consumers initially evaluate the intelligence and competence of AI systems, develop varying levels of trust and acceptance, and ultimately determine their willingness to engage with AI-enabled marketing applications.

The third dimension captures Marketing Application Domains, representing the major intellectual streams identified through the co-citation analysis. The first domain, Strategic and Service AI, integrates the research represented by Groups 1–4. This stream conceptualizes AI as both a strategic organizational capability and an operational mechanism for improving customer experience, marketing decision-making, and AI-enabled service delivery (Lemon & Verhoef, 2016; Syam & Sharma, 2018; Huang & Rust, 2021; Kumar et al., 2019; van Doorn et al., 2017; Huang et al., 2018; Luo et al., 2019). Rather than replacing human employees, AI is increasingly viewed as augmenting organizational capabilities by enhancing service efficiency, personalization, and customer responsiveness.

The second application domain, Consumer AI, encompasses the literature represented by Groups 5–7 and focuses on consumers' psychological responses to AI technologies. This stream highlights consumer acceptance of AI, trust in algorithmic decision-making, algorithm aversion, and interactions with service robots (Dietvorst et al., 2015; Longoni et al., 2019; Castelo et al., 2019; Mende et al., 2019; Longoni et al., 2022). Collectively, these studies demonstrate that technological capability alone is insufficient to generate marketing value unless consumers perceive AI as trustworthy, competent, and beneficial.

The third application domain, Conversational AI, corresponds to Groups 8–10 and reflects the growing importance of AI-powered chatbots, conversational agents, and anthropomorphic interfaces in marketing. This stream investigates how chatbot design, conversational quality, social presence, and anthropomorphic characteristics influence customer engagement and service experiences (Araujo, 2018; Chung et al., 2020; Sheehan et al., 2020; Go & Sundar, 2019; Adam et al., 2021; Roy & Naidoo, 2021; Crolc et al., 2022). As conversational AI becomes increasingly sophisticated through generative AI technologies, human–AI interaction is expected to become an even more central component of future marketing practice.

Taken together, the proposed framework conceptualizes AI marketing research as the intersection of these three dimensions. AI capability levels represent the technological evolution of intelligent systems, consumer response mechanisms explain how customers evaluate and respond to AI-enabled interactions, and marketing application domains illustrate where AI capabilities are deployed to create value. Marketing outcomes therefore arise from the alignment of these dimensions rather than from any single factor in isolation. Organizations possessing advanced AI capabilities must simultaneously foster positive consumer responses while deploying AI strategically across organizational processes, service systems, and customer interactions to realize superior marketing performance.

Accordingly, the framework suggests that successful AI marketing requires an integrated perspective in which technological innovation, consumer psychology, and marketing application reinforce one another. When supported by appropriate organizational enablers including marketing strategy, customer data, digital platforms, service ecosystems, and customer journey management, these three dimensions collectively contribute to enhanced customer experience, stronger customer engagement, greater personalization, service innovation, improved marketing performance, and sustainable competitive advantage. The framework therefore provides a conceptual synthesis of the AI marketing literature while offering a foundation for future empirical research examining how AI capabilities, consumer responses, and application domains interact to generate marketing value.

CONCLUSION

This study examined the intellectual structure of AI in marketing through a bibliometric co-citation analysis of publications retrieved from the Web of Science Core Collection. Using multidimensional scaling (MDS), the study identified ten closely related research cliques that collectively reveal the evolution of AI marketing as a multidisciplinary research field. The findings demonstrate that AI marketing has experienced substantial growth in both publication output and scholarly impact, reflecting the increasing strategic importance of AI technologies within contemporary marketing research and practice. The co-citation analysis revealed that the AI marketing



literature has evolved from early conceptual discussions of AI and customer experience toward increasingly specialized research on AI-enabled services, consumer responses to intelligent technologies, and conversational AI. Although ten research cliques were identified, these streams can be synthesized into three broader marketing application domains: Strategic and Service AI, Consumer AI, and Conversational AI. Together, these domains illustrate the progression of AI marketing research from organizational capability development to customer-facing applications and human–AI interaction.

The principal theoretical contribution of this study is the development of an Integrated AI Marketing Knowledge Framework, derived from bibliometric evidence. By synthesizing the field's fragmented research streams into a unified conceptual model, the framework explains how AI capability levels, consumer response mechanisms, and marketing application domains jointly contribute to marketing value creation. From a practical perspective, the findings highlight that successful AI implementation requires more than technological investment. Organizations should simultaneously strengthen AI capabilities, develop customer-centric AI applications, and foster consumer trust and engagement to maximize the benefits of AI-enabled marketing. The framework may therefore assist marketing managers in aligning AI deployment with customer expectations while supporting strategic decision-making regarding personalization, service automation, conversational AI, and customer experience management.

Despite these contributions, the study has several limitations. First, the analysis relied exclusively on publications indexed in the Web of Science Core Collection, potentially excluding relevant studies indexed in Scopus, Dimensions, Google Scholar, or discipline-specific databases. Second, the co-citation analysis was constructed from the 25 most frequently cited references, which represent the intellectual foundation of the field but may not fully capture recently emerging topics such as generative AI, multimodal AI, AI agents, and autonomous marketing systems. Third, the proposed framework is conceptual and has not yet been empirically validated.

Future research should therefore extend this work by incorporating multiple bibliographic databases, applying complementary bibliometric techniques such as bibliographic coupling and keyword co-occurrence analysis, and examining the rapidly evolving literature on generative AI, large language models, AI agents, and autonomous marketing. Future empirical studies are also encouraged to validate the proposed framework by investigating how AI capability levels, consumer response mechanisms, and marketing application domains interact to influence customer experience, marketing performance, and sustainable competitive advantage across different organizational and industry contexts.

Overall, this study provides a comprehensive mapping of the intellectual structure of AI marketing while proposing an integrated conceptual framework that advances understanding of the field's development. As AI technologies continue to evolve rapidly, particularly through generative AI and autonomous intelligent systems, the framework offers a useful foundation for future theoretical development and empirical investigation into the role of AI in shaping the future of marketing.

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Conflict of Interest

The authors declare that there are no financial, professional, or personal relationships that could be perceived as influencing the research reported in this article.

Data Availability

The data underlying the findings of this study may be obtained from the corresponding author upon reasonable request.



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