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Review

The Impact of Artificial Intelligence Marketing on E-Commerce Sales

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Abstract: This *review* explores the influence of AI marketing on e-commerce sales, examining how AI-driven strategies affect key metrics such as customer acquisition and conversion rates. Given the growing importance of AI in online retail, this paper employs a *critical review* methodology, analyzing 50 documents from the Scopus database. The analysis reveals that AI tools like chatbots, personalization engines, and predictive analytics significantly enhance e-commerce performance. The study provides practical and theoretical contributions, offering recommendations for businesses and suggesting future research directions.

Keywords: business; AI marketing; customer engagement; chatbots; personalization

1. Introduction

E-commerce, or electronic commerce, refers to any activity or service involving the purchase and sale of goods and services via the internet [1–3]. Due to customers' growing need for online services and its potential to provide businesses a competitive edge, businesses are engaging in e-commerce more and more [4–7]. Online sales are now easier thanks to the platform economy's success [8].

Even in the e-commerce age, sales companies' organizational structures continue to undergo significant modifications [9]. Many aspects of existence, including the economic state, were influenced by the development of information and communication technology. E-commerce is the process of purchasing or selling products and services through the internet using electronic media [10]. The transition from traditional, external sales forces to the concurrent use of inside sales personnel results in hybrid sales structures that can handle online seller–buyer interactions and further leverage technological advancements in business intelligence and sales automation to enhance sales performance [9].

These platforms have implemented a product review system that allows customers to easily access information regarding the sales and reviews of vendors, as well as to submit their own reviews for completed transactions. Customers' online evaluations, which serve as an indicator of product quality and sellers' credibility, have a substantial impact on sales [11]. Customers have the option to purchase products online without engaging in specific sensory experiences, such as tasting, inhaling, or touching. As a result, product evaluations are of paramount importance in the implementation of online marketing strategies [12]. However, because of its connection with quickly developing, widely used, and incredibly inexpensive information technology (IT), businesses find it difficult to implement this e-business strategy. As a result, businesses are forced to continuously modify their business plans to accommodate shifting client demands [13].

E-commerce has a number of disadvantages and difficulties, such as the requirement for effective and customized client experiences, which traditional approaches find difficult to deliver in the quickly changing market environment. To address these challenges, businesses are increasingly turning to artificial intelligence (AI) to optimize their marketing efforts and enhance customer experience. The department within a corporation that is most likely to benefit from artificial intelligence (AI) is marketing. The three primary

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responsibilities of marketing are to comprehend client needs, align them with services and products, and persuade individuals to make a purchase. AI has the potential to significantly enhance each of these tasks [14]. AI has the potential to help organizations make better decisions since it can analyze massive amounts of data quickly and reduce the chance of human mistakes [15]. Machines learn, represent, store, and refine their knowledge progressively based on past experiences and existing information to make reasoning and real-time decisions [16].

Lexicon-based solutions and AI/ML-based methods can classify sentiment analysis methods. AI-powered sentiment analysis is essential for businesses and helps understand clients' thoughts and employee feelings and thoughts. It will help computers understand emotions in messages, comments, and feedback [17].

To optimize marketing strategies, AI is essential for automating a number of marketing operations, including content creation, customer relationship management, and predictive analytics [18]. According to research, businesses like Amazon and Netflix use AI to transform customer experiences and obtain an edge over competitors in fast-moving markets [19]. However, the use of AI also brings up moral questions, such as algorithmic prejudices and privacy concerns. Thus, a balanced strategy that puts responsibility and openness first is required [19].

Although AI's applications have been the subject of much research in a variety of industries, there has not been a systematic consolidation of findings specifically related to marketing, especially when it comes to consumer impressions and ethical considerations [20]. Research on niche markets, such as e-commerce for fashion, has revealed a number of important unmet needs in the classification and use of AI methods, indicating the need for further focused studies [21,22]. For example, in fashion e-commerce, unmet needs include the integration of AI tools that can predict fashion trends and personalize recommendations based on individual customer preferences. Consumers often struggle to choose products because of an overwhelming number of options, highlighting the need for better recommendation systems. Personalized fashion recommender systems can improve the user experience by offering outfit suggestions based on individual tastes, but many platforms do not yet provide these customized solutions. Traditional pricing strategies are insufficient in today's rapidly evolving digital environment, creating a demand for AI-driven methods to enhance price forecasting and trend analysis. The integration of varied data sources for price prediction is still not widely utilized, suggesting a significant opportunity for innovation [23].

Although AI has the potential to revolutionize marketing, there has not been enough academic attention paid to its drawbacks, including biases and privacy issues [24]. This suggests that further study is urgently needed to tackle these moral issues and investigate the complex effects of AI on consumer behavior and marketing tactics, enhancing the scholarly conversation on this quickly developing subject. This review aims to address these gaps by examining how AI-driven marketing strategies impact e-commerce sales metrics and by exploring the ethical implications associated with AI use in marketing.

To the best of our knowledge, this review is one of the first in the context of AI marketing in e-commerce, and it will provide an overview of the current state of the field and the areas that need to be improved for future directions. This critical review investigates the following research questions: (1) How do AI-driven marketing strategies impact e-commerce sales metrics such as customer acquisition, conversion rates, and customer lifetime value? (2) What are the ethical implications of using AI in marketing, particularly in terms of privacy, bias, and transparency? (3) How can AI marketing tools be optimized to enhance e-commerce performance?

2. Literature Review

2.1. AI Marketing Overview

The marketing landscape has been transformed by AI, which has accelerated growth, reshaped business strategies, and enhanced processes, thereby promoting rapid digital

transformation [25,26]. AI applications in marketing are diverse, ranging from data-driven decision-making to personalized consumer experiences [27,28]. The marketing field has experienced a significant increase in research interest as organizations continue to invest significantly in AI-based technologies [26]. AI is being employed in marketing for a variety of purposes, as shown in Table 1.

Table 1. Applications of AI in marketing.

Purpose	Description	AI Tools Involved	References
Personalized Product Recommendations	AI algorithms analyze customer preferences and behavior to provide customized product recommendations	Recommendation Systems	[25,28]
Predictive Analytics	AI models optimize marketing campaigns, identify potential prospects, and forecast customer churn	Predictive Models	[27,28]
Automated Content Generation	AI-powered tools generate personalized content at scale, including product descriptions and social media posts	Content Generation Tools	[25,26]
Chatbots and Virtual Assistants	AI-driven chatbots offer round-the-clock customer service, address inquiries, and assist in purchasing	Chatbots, Virtual Assistants	[27,28]

Businesses can enhance customer satisfaction and conversion rates by developing marketing strategies that are customized to individual consumers through the use of AI [29]. Predictive analytics is an essential element of AI marketing. This approach employs historical data to anticipate future trends, consumer behavior, and sales results. Marketers can more effectively allocate resources, identify potential market opportunities, and optimize pricing strategies through predictive analytics. For example, AI algorithms can anticipate the optimal moment to initiate a marketing campaign or modify prices in accordance with real-time market conditions, thereby optimizing revenue. According to a study conducted by Davenport and Ronanki [30], companies that have implemented AI for predictive analytics have experienced substantial enhancements in their marketing return on investment (ROI). Some respondents have reported a 30% increase in marketing efficiency.

AI is instrumental in the automation of consumer interactions by means of virtual assistants and chatbots. These AI-powered tools are capable of managing a diverse array of customer inquiries, including the processing of orders and the resolution of product inquiries, without the need for human intervention. This automation guarantees that customers receive consistent and timely service, in addition to reducing operational costs. As AI continues to develop, its integration into marketing strategies will become more sophisticated, providing businesses with new opportunities to improve customer engagement and generate sales [31]. For instance, AI-driven analytics can provide insights into customer behavior, preferences, and trends, which can be used to create targeted marketing campaigns. This capability not only improves customer engagement but also increases conversion rates, making AI an invaluable asset for marketers seeking to optimize their strategies in a competitive environment [32].

Predictive analytics leverages historical data to forecast future consumer behavior, allowing marketers to anticipate customer needs and adjust their strategies accordingly. Automated content generation tools, like ChatGPT, enable marketers to produce high-quality content at scale, significantly reducing the time and resources required for content creation. This shift towards automation and data-driven decision-making is particularly

beneficial for small and medium-sized enterprises (SMEs), which may lack the resources to conduct extensive market research [33].

2.2. E-Commerce Sales Metrics

Task automation, including customer service and inventory control, not only increases operational efficiency but also lowers expenses, thereby enabling companies to better devote resources toward tactics for client acquisition [34]. Crucially for keeping consumers and increasing repeat purchases, AI-driven products maximize the digital sales funnel, hence improving the customer journey and general experience [35].

E-commerce analytics comes in several forms that improve consumer satisfaction and operational effectiveness. Descriptive, diagnostic, predictive, and prescriptive analytics are among these sorts of analytics, and each has a specific function in assessing and enhancing e-commerce performance. According to Akshara and Jain [36], descriptive analytics examines past data to spot trends like popular products and periods of peak sales. Diagnostic analytics looks into the causes of particular results, assisting companies in identifying their strong and weak points [36]. Inventory management and marketing tactics are significantly improved by predictive analytics, which uses machine learning models to forecast customer behavior and product demand [37,38]. Administering Prescriptive Analytics suggests actions (such as customized product recommendations and dynamic pricing adjustments) based on predicted findings [36].

Important for assessing transaction performance in online trials [39] are Average Basket Value (ABV), Average Basket Size (ABS), and Average Selling Price (ASP). Furthermore, the use of analytics—descriptive, diagnostic, predictive, and prescriptive—helps companies spot patterns, grasp consumer behavior, and project future sales possibilities [36]. For example, a study on the Melatec Company showed that using an e-commerce application resulted in a 48% increase in completed sales and a notable drop in complaints and returns, therefore demonstrating the good influence of e-commerce on sales processes [40]. Social media advertising has become a critical tool impacting e-commerce sales by means of improved consumer involvement and focused marketing campaigns [41].

Essential indicators for assessing the efficacy and performance of online retail tactics are e-commerce sales metrics. These data points shed light on a number of facets of the consumer experience, from their first interaction with the company to their ultimate purchase. Among the most often examined metrics in e-commerce are key performance indicators (KPIs), including conversion rate, average order value (AOV), customer lifetime value (CLV), and cart abandonment rate. A crucial indicator of how well a website converts visitors into actual consumers is its conversion rate, which calculates the proportion of website visitors who finish a transaction. Research indicates that a minor rise in conversion rates can yield a substantial increase in total revenue [42].

Another important indicator is the customer lifetime value (CLV), which calculates the total revenue a company might anticipate from a single customer over the course of their relationship. This measure is essential for comprehending long-term profitability and aids companies in determining the appropriate amount of money to spend on attracting and retaining customers. By examining consumer behavior patterns and identifying high-value clients, AI-driven analytics can improve CLV projections [43].

2.3. Theoretical Frameworks

Theoretically driven marketing techniques that leverage AI can be used to analyze how consumer behavior is affected, how customer experiences are improved, and ultimately, how revenues are increased. Davis [44] developed the Technology Acceptance Model (TAM), which is a fundamental theory that explains the process by which users come to embrace and utilize technology. According to TAM, an individual's intention to utilize technology is primarily determined by perceived simplicity of use and perceived usefulness, which in turn influence their actual usage behavior. TAM posits that the degree to which consumers perceive AI-driven tools, including personalized recommendations, chatbots,

and dynamic pricing models, as beneficial and user-friendly is a significant factor in their acceptance of these technologies in the context of AI marketing. For example, users are more inclined to adopt AI-powered recommendation systems that are perceived as accurately predicting consumer preferences, which results in increased engagement and sales [45].

According to TAM, a person's intention to utilize technology is influenced by how beneficial and simple they believe it to be [46,47]. TAM contributes to the understanding of how consumer attitudes and behavioral intentions are shaped by their perceptions of AI's utility in improving the shopping experience and the ease with which they may interact with AI-powered marketing tools in the context of AI adoption in marketing [47,48]. Numerous studies have used TAM to look into the adoption of AI in different marketing contexts. For instance, one study examined using TAM how consumers' perceptions of AI's utility and ease of use are influenced by relationship marketing elements like trust and commitment, which in turn affect consumers' desire to embrace the technology [48]. In order to comprehend how environmental, technological, and social aspects influence the adoption of AI in manufacturing and production organizations, another study linked TAM with the Technology–Organization–Environment (TOE) framework [49]. These studies demonstrate how adaptable TAM is in offering perceptions into the intricate process of AI adoption in marketing, empowering marketers to create more persuasive consumer-focused campaigns [50].

The Theory of Planned Behavior (TPB), which was introduced by Ajzen [51], augments the TAM by integrating supplementary factors, including subjective norms and perceived behavioral control, that influence an individual's intention to engage in a behavior. In the context of AI marketing, TPB can be employed to ascertain the impact of social influences and perceived control over the use of AI-driven technologies on consumer decisions. For instance, consumers who believe that their peers are favorably inclined toward AI-driven personalized marketing may be more inclined to interact with these technologies. In the same vein, consumers are much more inclined to employ AI tools, such as chatbots, for customer service when they are assured of their ability to interact with them. This can result in increased conversion rates and sales [51]. This theory emphasizes the significance of the social and psychological factors that influence consumer adoption and utilization of AI marketing tools, in addition to the technological attributes.

Positive attitudes regarding AI technology, which are influenced by their perceived utility and usability, can greatly increase marketers' intentions to include AI in their campaigns. Empirical evidence suggests that marketers are more likely to use AI-driven solutions when they believe AI may improve consumer engagement and operational efficiency. Subjective norms, which are a reflection of peer pressure and industry standards, are also quite important. For example, marketers may feel under pressure to adopt similar technology to stay competitive if they witness competitors successfully implementing AI [48]. If marketers believe they have the necessary resources, skills, and support to implement AI technologies, their intention to adopt these innovations is likely to be stronger. Studies have shown that understanding and addressing the perceived risks associated with AI—such as data privacy concerns—can also enhance perceived behavioral control, thereby fostering a more favorable attitude towards AI adoption. By integrating these TPB components, marketers can better strategize their approach to AI technologies, ultimately leading to more effective marketing outcomes and improved customer experiences [52].

The AIDA model, a classic marketing theory that was developed by Lewis in 1898, delineates the phases that a consumer undergoes in the process of purchasing a product: Attention, Interest, Desire, and Action [53]. Each stage of the AI marketing process can be effectively analyzed through the lens of the AIDA model, as AI tools are built to optimize each stage. For instance, personalized advertising that is powered by AI can more effectively captivate the attention of consumers by focusing on their specific preferences and behaviors. In the same way, AI-powered content creation and recommendation engines can sustain consumer interest and cultivate a desire for the product by providing pertinent and enticing information. The implementation of AI-based dynamic pricing and personalized

offers can motivate consumers to act, thereby boosting sales [54]. The AIDA model offers a structured approach to comprehending how AI marketing strategies can be customized to more effectively guide consumers through the purchasing funnel.

Companies may create communications that grab people's attention and pique their curiosity about AI technologies by using the AIDA model. For example, promoting acceptance and reducing public fear regarding AI's benefits can be achieved by transparent communication [55]. Small cultural institutions use social media to improve community participation by utilizing the AIDA model. These groups can increase participation in their events by producing eye-catching content that sparks curiosity and attention [56]. China Construction Bank used the AIDA model to promote its online banking services to college students. The bank concentrated on innovative, hands-on learning methods that would pique students' interest and motivate them to take action, which greatly increased marketing effectiveness [57].

These theories establish a comprehensive theoretical framework for the examination of the influence of AI marketing on e-commerce sales. By employing the AIDA model, TAM, and TPB, researchers, and practitioners can develop a more profound comprehension of the factors that motivate consumer adoption of AI technologies and the mechanisms by which these technologies modify purchasing behavior. This framework not only assists in the evaluation of the current impact of AI marketing but also in the prediction of future trends and the optimization of AI strategies to improve the performance of e-commerce. The use of AI in businesses can be guided by a number of pertinent ideas and models. The hybridization of AI adoption into four macro phases is formalized by the 4S Model for AI Adoption [58]:

1. Storming: Determining use cases, evaluating data, and preparing infrastructure
2. Solving: Constructing and evaluating AI models
3. Scoping: Standardizing data collection and extending AI to new domains
4. Scaling: utilizing AI to automate tasks, integrating AI into processes, and expanding throughout the company

A conceptual framework for assessing AI readiness and encouraging adoption in small and medium-sized businesses (SMEs) is put out by Bettoni et al. [59]. Technology, data, people, organization, strategy, budget, goods and services, ethics and rules, and budget are all important elements.

Investigating pertinent theories in the acceptance of AI exposes numerous models that clarify consumer behavior and trust dynamics. Understanding how perceived benefits—such as enjoyment and immersion—influence customer attitudes toward AI applications in luxury hotel environments, thereby impacting their willingness to pay for and use these technologies, depends mostly on the Value Adoption Model (VAM). Emphasizing the roles of performance expectation and hedonic motivation as main enablers, the Behavioral Reasoning Theory (BRT) also emphasizes the psychological and functional constructions that shape consumer intentions toward AI-based voice assistants, highlighting obstacles, including value and image concerns [60]. As shown by a mixed-methods study that presents a whole model of trust in technological consumption [61], the integration of trust-related elements, including perceived usefulness and transparency, is crucial in building consumer confidence in AI systems.

2.4. Ethical Implications

If AI models are trained on data that are skewed or not representative, it can result in biased targeting, segmentation, and personalization, unfairly benefiting some consumers over others [62]. For instance, an AI system that omits certain demographic groups from specific offers or advertisements would be deemed unethical and discriminatory. It is crucial for marketers to test for and address algorithmic bias in their AI systems. Consumers should have the right to know how their data are being used to influence decisions that affect them [63]. Marketers should offer clear explanations about their data practices and

the rationale behind AI-generated recommendations, offers, and ad targeting. A lack of transparency can undermine consumer trust and create perceptions of unfairness [64].

The use of consumer data by AI introduces significant privacy concerns that marketers need to tackle. Consumers are becoming increasingly aware and concerned about the usage of their personal information, particularly in sensitive areas such as health, finance, and location [65]. Marketers need to secure explicit consent for data collection, provide straightforward opt-out options, and ensure data security to protect consumer privacy and comply with regulations like GDPR and CCPA. As artificial intelligence becomes a fundamental component of marketing strategies, it introduces significant ethical challenges that must be carefully addressed.

- Privacy Issues
  - AI technologies often depend on extensive data collection, which can encroach on consumer privacy. The ways in which personal data are collected and used in AI-driven marketing are facing increased scrutiny [66].
  - The risk of misuse of sensitive data highlights the need for stringent data protection measures to protect consumer rights [67].
- Transparency and Accountability
  - There is a growing consumer demand for transparency about the algorithms and decision-making processes involved in targeted marketing. Such transparency is essential for fostering trust and ensuring ethical practices [19,66].
  - Companies are required to implement responsible AI practices that ensure accountability in their marketing approaches [19,68].
- Discrimination and Bias
  - AI algorithms can unintentionally reinforce biases, resulting in discriminatory marketing practices. This raises ethical concerns regarding fairness and equity in consumer targeting [69,70].
  - Addressing these biases is crucial for creating a marketing environment that is inclusive and respectful of all consumer demographics [67].

3. Research Methodology

This study examines how AI marketing affects e-commerce sales using a critical review methodology. A critical review methodology was chosen for its ability to synthesize existing research comprehensively. The main goal is to compile and assess the body of knowledge on the topic in order to derive a thorough understanding of the ways in which AI marketing tactics affect the success of e-commerce. The review concentrates on publications that particularly discuss AI marketing and how it is used in e-commerce settings.

The data for this review were sourced from the Scopus database, which is a comprehensive and widely used academic resource. A search was conducted using the keywords "Artificial Intelligence Marketing" OR "AI Marketing" in the Title, Abstract, and Keywords fields. This search yielded a total of 60 documents.

The initial dataset of 60 documents was refined through a series of filtering steps:

1. Language Filtering: Documents not published in English were excluded, reducing the dataset to 58 documents.
2. Relevance Filtering: Each document's title and abstract were reviewed to assess its relevance to AI marketing. Eight documents were excluded based on the criterion that they did not focus specifically on AI marketing strategies. The final sample for this review consisted of 50 documents that explicitly address AI marketing in the context of e-commerce.

The analysis involved a combination of quantitative measures, such as frequency analysis of keywords and publication trends, and qualitative synthesis to assess the applicability of various AI marketing strategies.

The selected documents were synthesized using thematic analysis, where each document was coded based on the type of AI marketing strategy, the theoretical framework applied, and the context of the application. Key themes identified included personalization, predictive analytics, and consumer trust. This synthesis provided a comprehensive understanding of how AI marketing strategies influence e-commerce sales (Figure 1).

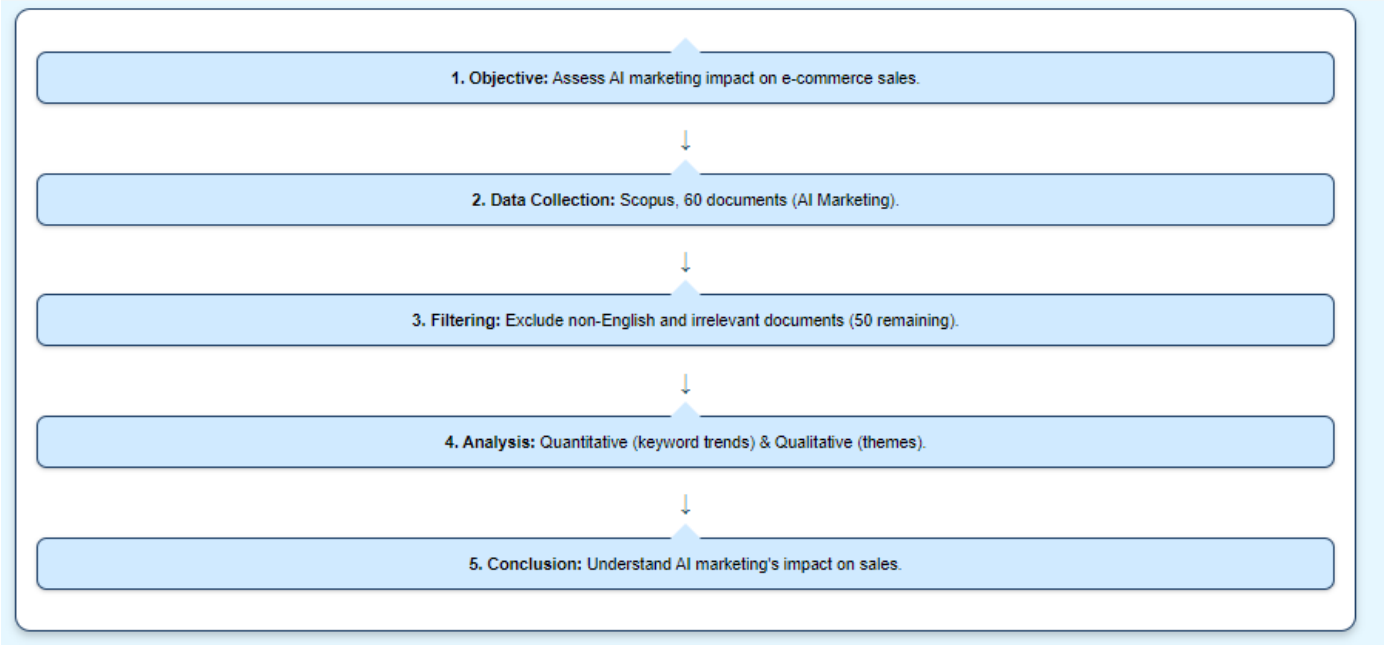

Figure 1. Diagram of review method.

4. Data Analysis

The examination of publishing patterns in AI marketing from 2015 to 2024 indicates a notable surge in research endeavors, especially in the last few years, as illustrated in Figure 2. The data indicate a distinct rising trend, with only one publication in 2015. Following a brief hiatus in 2016 and 2017, research interest started to gradually increase, as evidenced by one publication in 2018 and two in 2019. Additionally, 2020 saw no publications, perhaps as a result of the COVID-19 pandemic's worldwide disruptions. However, there was a considerable increase in 2022 and 2023, with 12 articles each, indicating a boom in interest in the topic that began in 2021 with 5 publications. With 17 publications, the trend peaked in 2024 and continued to increase. This development shows that, as AI marketing has become more important in the academic community and integrated into commercial operations, it has moved from being a specialized field of study to a well-established research domain.

The notable surge in 2022 and 2023 suggests a heightened academic and practical interest in AI's applications and ramifications, while the gradual growth in publications since 2018 demonstrates a rising acknowledgment of the technology's significance in marketing. This surge is consistent with the broader trends of digital transformation and the technological developments in artificial intelligence, indicating that more and more researchers are looking into the ways in which AI may improve marketing tactics and customer engagement. AI marketing is developing into a dynamic subject with a wide range of research fields, including algorithmic advances, ethical considerations, and real-world case studies.

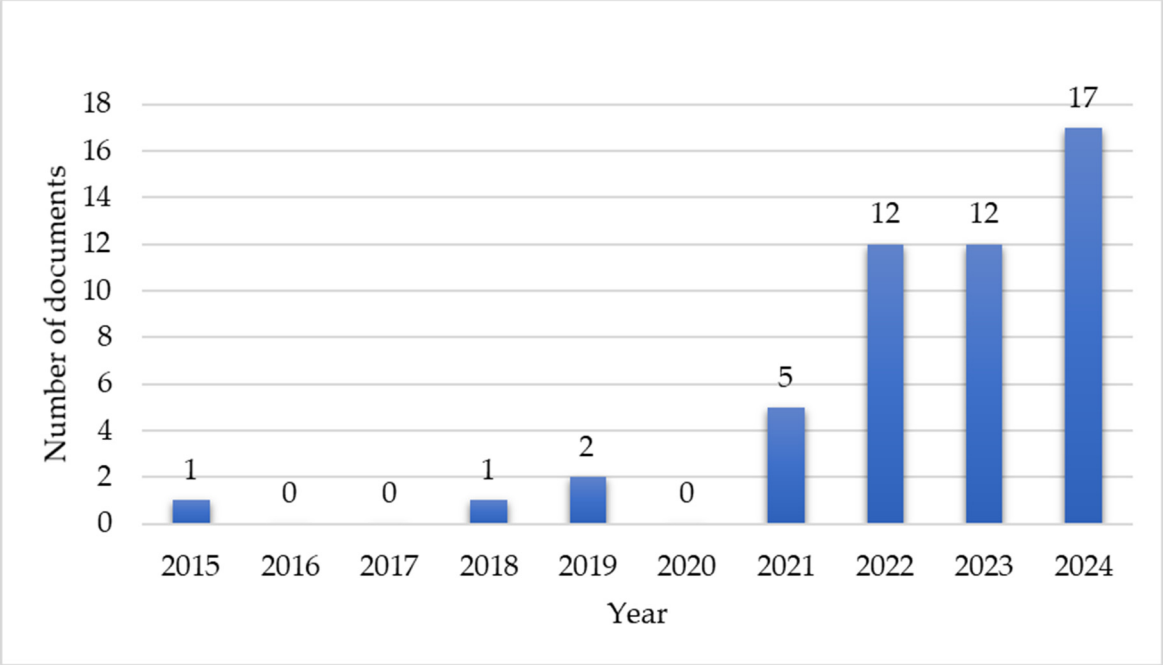

Figure 2. Trend of publications.

Figure 3 illustrates how the dataset's distribution of document types reflects the variety of research products in the field of AI marketing. There is a clear preference for original research and empirical investigations, as evidenced by the fact that the bulk of the documents (26) are research articles. This dominance implies that researchers are actively producing new discoveries and ideas, indicating that the topic is still in its exploratory stages. With fifteen publications, conference papers represent the second-largest category. These papers are a reflection of ongoing talks and presentations at conferences for academia and business. These publications probably reflect new concepts and preliminary research that add to the fluidity of AI marketing studies. There are seven book chapters indicating that the topic of AI marketing is being covered in more widely edited volumes that may offer thorough summaries or theoretical frameworks. The fact that there is only one book among the documents suggests that, although being a new area, AI marketing has not yet produced many stand-alone volumes. One review paper indicates that the synthesis of current knowledge is starting to take shape, albeit it is still not as advanced as original research.

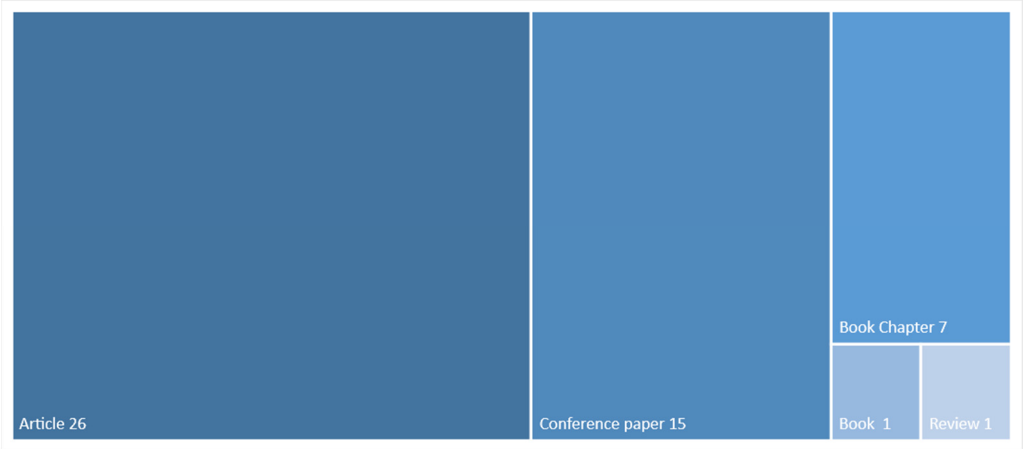

Figure 3. Types of documents based on Scopus categorization.

Keyword analysis provides further insight into the primary themes and concepts explored within AI marketing (Figure 4). The most frequently occurring keywords reflect the central topics of research, with "Artificial Intelligence" (29 occurrences) being the most prevalent, underscoring its foundational role in the studies. "Marketing" (17 occurrences) also appears frequently, highlighting the focus on AI's application within marketing strategies. "Commerce" (13 occurrences) indicates a strong interest in the commercial applications of AI, particularly in e-commerce. These keywords are central to the study's objectives of understanding the intersection of AI and e-commerce sales. They underscore the focus on how AI strategies are shaping consumer interactions and sales outcomes in online retail.

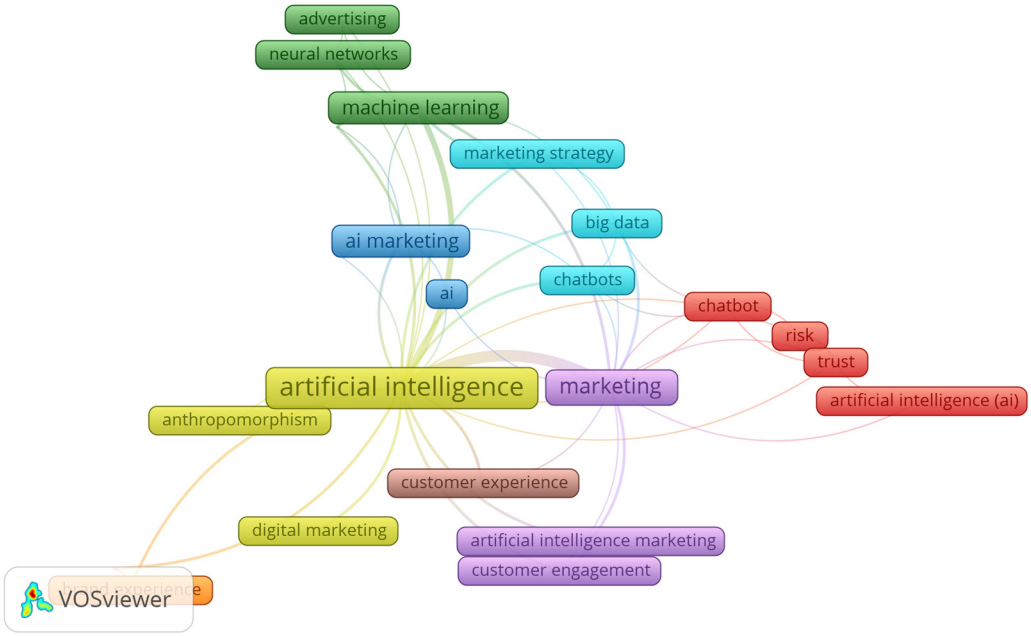

Figure 4. Keywords clustering.

"Machine Learning" (8 occurrences) and "Marketing Strategy" (6 occurrences) highlight the importance of technical approaches and strategic considerations in AI marketing. Keywords such as "Sales", "AI Marketing", "Deep Learning", "Digital Marketing", "Chatbots", and "Consumer Behavior" reflect a broad range of interests, from technical aspects to customer-centric outcomes. The presence of terms like "Trust", "Decision-Making", and "Strategic Planning" suggests an exploration of AI's impact on consumer trust and organizational strategy.

The most significant works in AI marketing are clearly illustrated by the citation analysis of the top 10 papers. The top 10 most-cited AI marketing papers are listed in Table 2, which also highlights their influence over a range of document kinds and years. With 449 citations, the paper from 2021 is the most highly cited work, demonstrating its considerable influence on the area. A 2022 essay with 72 citations and another from the same year with 69 citations, both demonstrating significant academic influence, come after this text. A conference paper from 2019 and an article from 2021 both have 57 citations, demonstrating their importance and contribution to the conversation on AI marketing. A 2022 article with 30 citations and a 2023 piece with 28 citations are also noteworthy documents that demonstrate the ongoing importance of recent research. With 25 citations, a review paper from 2021 emphasizes the value of knowledge synthesis in this expanding topic. Early contributions to the area are still being cited, as evidenced by the 22 citations in a 2015 book chapter, and the 18 citations in a 2024 article highlight the significance of very recent research.

Table 2. Top 10 citations of included publications.

Study	Year	Source Title	Citations	Document Type
[71]	2021	Journal of the Academy of Marketing Science	449	Article
[72]	2022	Journal of the Academy of Marketing Science	72	Article
[73]	2022	European Journal of Marketing	69	Article
[74]	2021	Sustainability (Switzerland)	57	Article
[75]	2019	Proceedings—2019 International Conference on Artificial Intelligence: Applications and Innovations, IC-AIAI 2019	57	Conference paper
[76]	2022	Qualitative Market Research	30	Article
[77]	2023	Journal of Research in Interactive Marketing	28	Article
[16]	2021	Applied Sciences (Switzerland)	25	Review
[78]	2015	Trends and Innovations in Marketing Information Systems	22	Book chapter
[79]	2024	Journal of Financial Services Marketing	18	Article

5. Findings

The development of AI marketing between 2015 and 2023 shows a notable advancement in technology and its potential to enhance marketing tactics. Forrest and Hoanca (2015) [78] investigated how AI, in particular Virtual Personal Shopping Assistants (VPSAs), started to change marketing by optimizing product purchases and personalizing customer interactions. While these early studies laid the groundwork for understanding AI's potential in customizing marketing campaigns, their impact was limited by the nascent stage of AI technology and the relatively simple applications available at that time. The critical analysis here involves recognizing that the initial advancements were more about proof-of-concept than widespread practical implementation. In 2018, Skirpan and Fiesler [80] presented the idea of "Ad Empathy", imagining affective computing and emotion detection to create emotion-sensitive technologies that will influence tailored marketing in the future. An important trend toward interactions that are more human-like was brought to light by the concept of incorporating emotional intelligence into AI systems. This was more of a theoretical framework than a practical tool, as the technology to fully realize affective computing was still under development.

With the release of Arsenijevic and Jovic's [75] chatbot study in 2019, the emphasis on useful applications of AI in marketing became increasingly apparent. They looked at how chatbots could improve customer service by giving prompt, tailored responses, but they also took into account customer concerns about the dependability of AI. This worry about the dependability and trustworthiness of AI tools emerged as a recurrent theme in later studies. The impact of AI on marketing trends was further highlighted in a 2019 study by Nivetha and Sudhamathi [81], who noted how developing technologies like AI and machine learning gave organizations a competitive edge and changed digital marketing strategies. While AI provided a competitive advantage, the rapid pace of technological advancement also posed challenges for businesses to keep up with the latest tools and techniques, potentially widening the gap between early adopters and laggards.

To facilitate AI's integration into several marketing operations, Huang and Rust (2021) [71] presented a strategic framework for AI in marketing. They did this by classifying AI into three categories: thinking, feeling, and mechanical. This framework offered a thorough method for applying AI to marketing research, strategy, and implementation

phases. Similar to this, Yin and Qiu (2021) [74] used a structural equation model to examine how AI affected consumers' intent to make online purchases, emphasizing how AI's precision, understanding, and interaction experience affected attitudes and actions.

According to Yau et al.'s [16] presentation of the AIM framework in 2021, which described how AI might improve consumer connections through big data and knowledge production, the development of AI marketing frameworks had advanced by that point. The Camelot system for AI-powered campaign management was launched by Kulkarni et al. (2021) [82], demonstrating AI's ability to automate and optimize social media marketing initiatives, particularly for SMEs. Kovanova et al. (2021) [83] and Liu-Thompkins et al. (2022) [72] investigated how AI can support strategic decision-making and improve customer interactions through artificial empathy, which resulted in significant advancements in understanding AI's role in marketing management during this period. However, the emphasis on artificial empathy also raises questions about the authenticity of such interactions and their long-term effects on consumer relationships.

Numerous research studies have investigated the application of AI to marketing in 2022. In their analysis of the variables impacting users' first trust in chatbots, Mostafa and Kasamani [73] focused on the significance of compatibility and usability in building trust. According to Chen et al.'s (2022) [76] analysis of consumer perceptions of AI marketing communication, the technology has a minimal but usually positive influence on consumer behavior. Future research orientations in AI marketing will be guided by the important issues and research gaps found by Anayat and Rasool's [84] bibliometric study.

Understanding of AI's impact on marketing performance and customer interactions has continued to be refined by recent studies, such as Wu and Monfort's (2023) [85] investigation into AI's role in marketing strategies and Gao and Liu's (2023) [77] exploration of AI-enabled personalization. The literature from 2015 to 2023 offers a thorough understanding of AI technology's revolutionary impact on marketing strategies and paves the way for further advancements in the sector as it continues to develop.

AI marketing strategies can be categorized into four main themes: AI-driven personalization, predictive analytics, automated content generation, and customer engagement.

5.1. Technological Advancements

The main focus of the research was on how AI might improve marketing tactics. In their investigation of the application of AI to different marketing operations, Kumar et al. [24], for example, emphasized the technology's disruptive potential in consumer insights, automated marketing tactics, and performance monitoring. This study established a standard for further studies on the influence of AI by highlighting its capacity to innovate and adapt marketing techniques.

Particular AI technologies and their uses have received a lot of attention. An outline of the AI methods—like machine learning and deep learning—that are revolutionizing marketing strategies was given by Chandra et al. (2023) [86]. There has been a notable impact of technological breakthroughs on contemporary marketing methods, demonstrating the continuous incorporation of AI into diverse marketing roles. Similarly, Durai et al. (2024) [87] looked at how AI improves customer engagement and personalization, noting that AI-powered virtual assistants and CRM solutions have increased customer happiness and marketing efficacy. However, this positive impact should be viewed in the context of potential challenges, such as the need for personalized approaches that can be resource-intensive and require ongoing refinement.

5.2. Emerging Trends and Consumer Perspectives

Researchers started examining the subtleties of AI marketing as the subject developed, concentrating on customer responses and ethical issues. Li et al. (2023) [88], for instance, investigated how the emotive human likeness of service robots affected customer satisfaction and found that over-anthropomorphism may have a detrimental effect on customer

satisfaction and perceptions. This research emphasizes how important it is to integrate AI in a way that balances customer expectations and relationship norms.

Consumer trust and ethical issues also became important subjects at the same time. In order to comprehend the factors influencing consumer acceptability of AI marketing, Gonçalves et al. (2023) [89] created a conceptual model that places a strong emphasis on perceived risk and ethical considerations. Similarly, Makhlooqa and Mubarakb (2024) [90] highlighted issues with bias and privacy in their discussion of the ethical implications of AI marketing.

5.3. Advanced Applications and Practical Implications

The practical uses of AI in marketing have been the subject of more and more research in recent years. Todorova and Antonova (2023) [91] examined a number of AI-based tools, including chatbots and programmatic advertising, highlighting how they might improve marketing operations and modify plans in response to changing customer demands. In a similar vein, Nguyen et al. (2024) [92] examined the negative aspects of AI advertising and how cognitive appraisal theory may be used to control how customers view information produced by AI.

Another key area of attention has been the incorporation of AI into particular marketing tactics. Shukla and Dwivedi [93] conducted a comparative analysis of emotion detection techniques in social media, highlighting the potential of AI to enhance comprehension of consumer emotions and responses. Jatmika et al. (2024) [94] address how AI-driven frameworks for small enterprises are being developed, which emphasizes the useful advantages of AI in improving marketing capacities for micro-entrepreneurs.

The body of research indicates that further innovation and improvement in AI marketing will be necessary in the future. Marketing managers must adjust to AI-driven developments, according to research by Pugna et al. (2024) [95], which emphasizes both potential and problems. Alenezi et al.'s (2024) [96] analysis of AI's contribution to Industry 5.0 via sustainability and consumer interaction points to a move toward more integrated and comprehensive approaches to AI marketing. These insights suggest a path forward for AI marketing that balances technological advancements with practical considerations and ethical implications.

6. Discussion

Key performance indicators (KPIs) in many different industries have undergone a significant transformation as a result of the application of AI in marketing. Personalized communication, consumer targeting, and overall marketing performance have all improved thanks to AI-driven marketing methods. Metrics including sales growth, customer lifetime value (CLV), customer acquisition cost (CAC), and return on marketing investment (ROMI) are crucial to this transition. The development of these measures has been greatly aided by AI technologies such as machine learning (ML), deep learning (DL), and natural language processing (NLP).

AI marketing strategies significantly impact sales growth by enabling hyper-personalized customer interactions. E-commerce businesses leveraging AI can analyze extensive datasets to deliver tailored content and advertisements. This level of personalization enhances user engagement and, subsequently, conversion rates. For example, research by Li et al. [88] and Lv and Huang [97] shows that AI-driven recommendation engines can significantly increase sales success by customizing product recommendations to each customer's tastes. Businesses have witnessed significant gains in revenue and conversion rates by utilizing AI to forecast customer behavior and enhance marketing strategies.

Customer acquisition cost (CAC) is another vital statistic influenced by AI marketing. Because of their wide targeting and wasteful ad spending, traditional marketing strategies can have large expenses. On the other hand, AI optimizes ad budgets by automating customer interactions and focusing on high-potential leads. This efficiency considerably lowers CAC. Research shows how AI solutions, such as chatbots and automated CRM sys-

tems, improve lead qualifying and conversion procedures to expedite customer interactions and lower acquisition costs [24,98].

AI increases customer lifetime value (CLV) by cultivating enduring customer relationships. Businesses may anticipate customer requirements and personalize experiences by leveraging AI's capacity to evaluate client data over time. CLV rises as a result of this tailored approach's increased client satisfaction and loyalty. The study conducted by Shukla and Dwivedi [93] highlights the potential of AI to personalize marketing campaigns according to client sentiment, thereby increasing customer retention and lifetime value.

AI maximizes return on marketing investment (ROMI) by making marketing efforts more successful and efficient. AI solutions give organizations comprehensive insights into the effectiveness of their campaigns, enabling them to deploy resources more wisely and calculate ROI more precisely. Research by Chandra et al. [86] and Durai et al. [87] shows how AI-driven analytics assist companies in tracking and optimizing their marketing spend, which improves return on investment (ROMI). For e-commerce businesses, this translates to a more efficient marketing strategy and maximized returns.

6.1. Comparative Analysis

Considerable gains in marketing performance are seen when sales data are compared between before and after AI marketing installation. It is clear from a review of numerous studies that AI-driven marketing tactics improve sales metrics in a way that can be measured.

Ghaith et al. [99], who examine the effect of AI technology on marketing success in the banking industry, offer one such comparison. According to the report, implementing AI has enhanced marketing performance measures, such as conversion rates and sales growth, and raised customer happiness. Similarly, Ho et al. [79] demonstrate a significant improvement in sales KPIs following AI adoption and show that AI marketing activities positively impact brand preference and repurchase intentions in the retail banking industry.

Research like that conducted by Shukla et al. [100] and Armutcu et al. [101] supports the idea that AI can improve sales performance. These studies found that AI-driven methods considerably improve consumer engagement and sales outcomes. They used structural equation modeling to evaluate the effect of AI marketing activities on brand experience and buy intentions. Comparative studies also show that AI marketing techniques lead to more client satisfaction and, more precisely, targeted advertising. In exploring the effects of AI on business-to-business (B2B) relationships, for example, Keegan et al. [102] point out that the technology's capacity to collect and analyze data results in more accurate targeting and enhanced relationship management. In a similar vein, Makhlooqa and Mubarakb's [90] research from 2024 emphasizes how AI marketing tools—such as Netflix's—optimize customer targeting and raise overall marketing performance.

6.2. Challenges and Limitations

Although AI has many advantages in marketing, there are also significant obstacles and restrictions when using AI. These difficulties may have an impact on AI marketing techniques' efficacy and present dangers to companies.

Examining how artificial intelligence marketing affects e-commerce sales raises a lot of questions, like endogeneity. Missing variable bias, measurement error, or reverse causality—all of which can compromise the validity of causal inferences—can cause endogeneity. For example, omitting variables such as consumer behavior changes, market competition strength, or the effect of other concurrent technologies could skew the estimated impact of artificial intelligence on marketing outcomes. Biassed coefficients resulting from measurement mistakes in collecting AI technology adoption rates and their exact influence on sales might result from another significant issue: re-verse causality; corporations may invest more in AI marketing instead of AI marketing depending on rising sales.

Reverse causation could be the source of the endogeneity issues in these studies; companies with strong digital marketing plans or already competitive edges could have

been more likely to embrace artificial intelligence technologies. Dealing with these issues could involve natural experiments or difference-in-differences techniques to separate the effect of artificial intelligence acceptance from other influencing elements.

Nevertheless, if other pertinent variables influencing marketing success—such as managerial knowledge or consumer loyalty—are not sufficiently controlled, then omitted variable bias may still exist. By improving the accounting for these unobserved factors, using fixed-effects models or matching approaches could assist in allaying these worries.

The ethical ramifications of AI marketing provide a significant obstacle, particularly in relation to consumer trust and data protection. The Gonçalves et al. [89] study tackles the moral questions raised by AI and how it affects consumer perceptions. The study shows how consumers' adoption of AI can be influenced by perceived risks and ethical concerns, and it suggests that in order for businesses to continue earning customers' trust, they need to address these concerns.

The possibility of prejudice and discrimination in AI systems is another drawback. According to studies by Nguyen et al. [92] and Shen et al. [103], prejudices may unintentionally be reinforced by AI algorithms, which could result in unfair marketing practices. This problem emphasizes the necessity of strong moral standards and legal protections to guarantee that AI marketing techniques do not target particular customer segments unfairly.

Putting AI marketing techniques into practice can be expensive and difficult. The study conducted by Pugna and colleagues [95] sheds light on the difficulties marketing managers encounter while implementing AI technology, such as the requirement for specialized knowledge and resources. To effectively use AI, businesses must invest in technology and training, which can be a major obstacle for smaller businesses.

The accuracy and quality of the data used might have an impact on how effective AI marketing methods are. The study by Moutinho et al. [104] highlights how crucial high-quality data are to successful AI marketing. Incomplete or inaccurate data can result in less effective AI-driven initiatives and less-than-ideal marketing judgments. Figure 5 visually represents the main insights and contributions identified in the study. It organizes these insights into several key areas, including the significant impact of AI on enhancing customer engagement, improving personalization, and optimizing marketing strategies, and highlights the challenges and limitations associated with AI marketing, such as data privacy concerns and the need for ethical considerations.

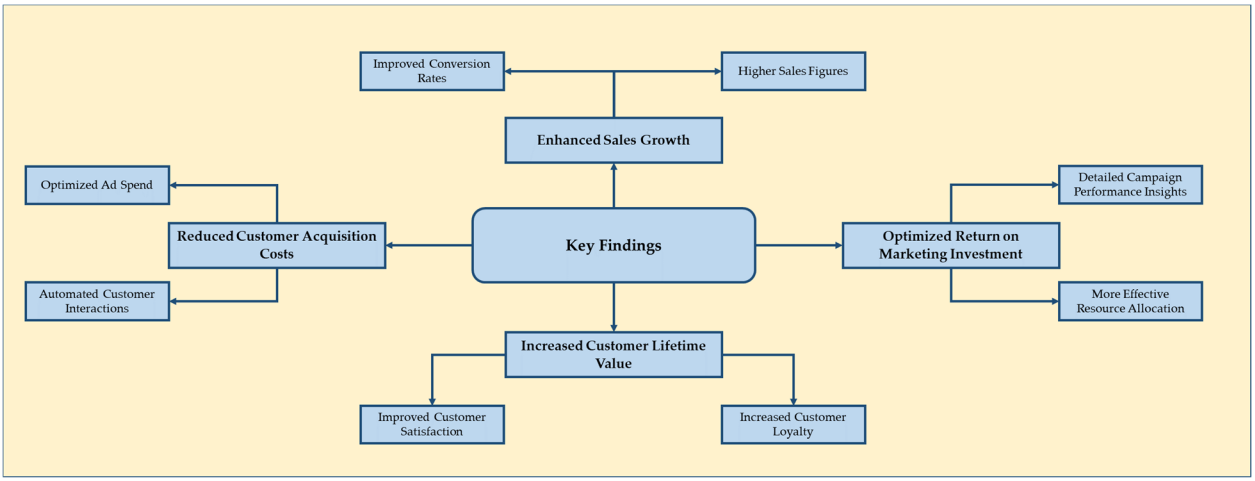

Figure 5. Key findings and contributions of AI marketing in e-commerce.

The scalability of AI marketing solutions varies across e-commerce sectors. Sectors like fashion and electronics benefit more from AI due to their reliance on personalization, dynamic pricing, and large data volumes, while sectors like groceries face challenges due to lower differentiation and margins. These variations highlight the need for sector-specific AI strategies, considering factors like buying behavior, purchase frequency, and product

complexity. For example, in the luxury sector, AI must enhance personalization without undermining exclusivity, while in fast-moving consumer goods, AI can optimize supply chains and inventory management to reduce costs and improve customer satisfaction.

Conventional marketing methods, like in-person events, direct mail, or television ads, often offer a personal touch that helps build stronger emotional bonds and trust with customers. For example, products or services that demand a high level of trust or target less tech-savvy consumers might gain more from these traditional approaches. Moreover, these methods can be more effective in areas with limited digital infrastructure or markets where digital adoption is still low.

When managing brand crises or reputation issues, human intuition and experience can provide a more reliable and nuanced approach to handling sensitive customer interactions and maintaining brand integrity. Regulatory and compliance concerns can pose challenges for AI-driven marketing in certain regions. As data privacy regulations, such as the GDPR in Europe, become stricter, businesses may find it safer and less complicated to use traditional marketing strategies that do not involve extensive data processing.

7. Conclusions

The study of AI marketing's impact on e-commerce reveals a transformative effect on sales metrics and marketing strategies. AI has significantly enhanced key performance indicators such as sales growth, customer acquisition cost (CAC), customer lifetime value (CLV), and return on marketing investment (ROMI). By leveraging machine learning, deep learning, and natural language processing, AI has enabled businesses to deliver highly personalized and targeted marketing campaigns, resulting in increased engagement, improved conversion rates, and overall sales growth. Key findings from the study include:

- ✓ AI-driven recommendation engines and personalized marketing efforts have led to notable improvements in sales performance, as evidenced by increased conversion rates and higher sales figures.
- ✓ AI optimizes ad spend and automates customer interactions, resulting in reduced CAC. AI tools such as chatbots and automated CRM systems have streamlined customer acquisition processes, leading to cost savings.
- ✓ AI's ability to analyze customer data and anticipate needs has improved customer satisfaction and loyalty, boosting CLV.
- ✓ AI analytics provide detailed insights into campaign performance, enabling more effective resource allocation and improved ROMI.

The comparative analysis of sales data before and after AI marketing implementation underscores the positive impact of AI on marketing performance, highlighting significant improvements in conversion rates, brand preference, and repurchase intentions. Despite the benefits, challenges such as ethical concerns, algorithmic bias, implementation costs, and data quality issues persist.

While the study provides valuable insights into AI marketing's impact, several limitations should be acknowledged. The study's findings are based on a subset of available data, which may not fully represent all e-commerce sectors or global markets. The impact of AI marketing might vary across different industries and regions. The analysis primarily focuses on recent data. As AI technology evolves rapidly, future developments may alter the current understanding of AI marketing's impact. The findings may not be universally applicable to all e-commerce businesses, particularly smaller enterprises with different resource constraints and operational challenges. While the study addresses ethical concerns, further research is needed to explore the full extent of algorithmic bias and its implications for diverse consumer groups.

Businesses are advised to start with AI tools that offer quick wins, such as chatbots for customer service and predictive analytics for inventory management. Additionally, the scalability of AI marketing tools should be assessed based on sector-specific needs and resources. Future research should cover several critical areas to build on the current work and address its limitations. Longitudinal research will help determine AI marketing's

long-term influence on sales KPIs and customer behavior. AI marketing's impact on different e-commerce sectors and geographies requires sector-specific research to discover trends and difficulties that may vary. Another key route is ethical and bias analysis, where research should establish frameworks to address ethical problems and minimize biases in AI algorithms to ensure fair and transparent marketing practices. Understanding how emerging AI technologies like sophisticated natural language processing and autonomous decision-making systems affect marketing tactics and future trends is also important. Consumer views on AI marketing, particularly tailored advertising and data privacy, will help us match AI strategies to consumer needs.

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