



Artificial Intelligence Applications for Marketing

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ABSTRACT

This paper provides a comprehensive analysis of artificial intelligence (AI) applications in marketing, synthesizing over 50 academic studies and practical reports published between 2018 and 2024. The main goal is to identify dominant trends, tools used, and the impact of AI technologies on marketing strategies, as well as to highlight ethical challenges and future research directions. The adopted methodology is a systematic literature review (SLR), based on bibliometric and conceptual analysis of articles indexed in the Web of Science database. The tools used include bibliographic network analysis and thematic mapping to identify connections between concepts and the evolution of research in the field. The results highlight that AI is applied in various areas of marketing, including: predictive analytics for anticipating consumer behavior and optimizing advertising campaigns, recommendation systems that personalize offers and improve user experience, chatbots and Natural Language Processing (NLP) for automating customer interactions, programmatic advertising that uses AI for automated media buying, generative AI in creating visual and textual content for marketing campaigns, and visual analysis and dynamic pricing for real-time price adjustments based on demand and consumer behavior. The studies analyzed indicate significant benefits, such as increased return on investment (ROI), improved customer loyalty, and more efficient marketing processes. However, major challenges are also identified, including issues related to data quality and bias, concerns about data privacy and compliance with regulations such as GDPR, and the need to develop robust data governance strategies and clear ethical policies. This paper is addressed to researchers, marketing professionals, AI solution developers, and policymakers interested in the responsible and efficient integration of artificial intelligence into marketing strategies.

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1. Introduction

Artificial intelligence (AI) is a field of computer science that focuses on creating machines capable of performing tasks that normally require human intelligence. These tasks include learning, reasoning, problem-solving, language understanding, and pattern recognition. AI has rapidly evolved in recent years, transforming industries and changing the way we live, work, and interact with technology. Essentially, AI aims to build systems that can simulate cognitive functions. These systems are designed to process large amounts of data, learn from patterns, and make decisions with a certain degree of autonomy.

AI can be classified into two main categories: narrow AI and general AI. Narrow AI, also known as weak AI, is designed for specific tasks such as voice assistants, recommendation engines, or facial recognition systems. General AI, on the other hand, which remains largely theoretical at present, would have the ability to perform any intellectual task that a human can do. AI systems often rely on machine learning, a branch of AI that enables computers to learn from data without being explicitly programmed. Machine learning models improve their performance over time as they are exposed to more data. Deep learning, a more advanced form of machine learning, uses neural networks inspired by the structure of the human brain. These networks are particularly effective in tasks such as image and speech recognition.

Another important area is Natural Language Processing (NLP), which allows machines to understand, interpret, and respond to human language. Tools such as ChatGPT use this technology to generate human-like text and assist users in various applications. AI is already integrated into many aspects of daily life. In healthcare, it is used to help with diagnoses, predict patient outcomes, and optimize treatment plans. In the financial sector, AI contributes to fraud detection, risk management, and transaction automation. AI-powered algorithms also drive search engines, social media content feeds, intelligent assistants like Siri and Alexa, as well as recommendation systems on platforms such as Netflix or Amazon.

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In industry, AI enhances automation, manages supply chains more efficiently, and supports predictive maintenance. Autonomous vehicles and drones are other examples of AI applications that push the boundaries of what machines can do independently.

However, AI also raises significant challenges. One major issue is the emergence of bias in AI systems, which may result from biased training data or flawed algorithms. These biases can lead to inaccurate or discriminatory outcomes, especially in sensitive domains such as hiring, lending, or law enforcement. Another concern is workforce displacement. As AI automates more tasks, certain jobs may become obsolete, which raises the need for reskilling and discussions about the future of work. Ethical issues also include privacy, surveillance, and the misuse of AI in areas such as autonomous weapons or disinformation. For this reason, more researchers and policymakers are emphasizing the importance of developing ethical frameworks and regulations to guide the responsible development of AI.

The future of artificial intelligence is full of both promises and uncertainties. As the technology matures, we can expect increasingly intelligent systems, seamlessly integrated into our environment. Ongoing progress could lead to AI capable of reasoning, planning, and even demonstrating emotional intelligence. However, to achieve these goals, it is essential to address the current ethical, social, and technical challenges of AI. Ultimately, AI has the potential to enhance human capabilities and improve quality of life, but it must be developed and used responsibly in order to benefit society as a whole.

The term “artificial intelligence” (AI) was introduced in 1955 by John McCarthy, in a proposal for a workshop at Dartmouth College, considered the founding moment of the AI field (McCarthy et al., 1955). In the following years, research focused on developing algorithms capable of solving logical problems and simulating human cognitive processes.

In the subsequent decades, AI evolved significantly, benefiting from advances in fields such as machine learning, neural networks, and Natural Language Processing (NLP). These developments enabled the application of AI in various fields, including marketing, where it became an essential tool for personalizing customer experiences and optimizing promotional strategies.

Digital transformation has driven companies to leverage increasingly large volumes of data to create personalized experiences and effective campaigns. Starting in the 2010s, machine learning and NLP technologies matured, enabling the automation of behavioral analysis and the prediction of consumer trends. From predictive analytics to programmatic advertising, AI is redefining every stage of the marketing funnel, requiring strategic alignment between marketing, IT, and legal departments.

In the 1990s and 2000s, with the development of the internet and e-commerce, marketers began using AI tools such as web analytics, search engine optimization, and email marketing to reach online customers. A notable example is Amazon’s use of collaborative filtering in 1998 to provide personalized recommendations, marking one of the earliest commercial uses of AI in marketing. Beginning in the 2010s, technological advances and the growing volume of data enabled the integration of AI into various aspects of marketing. In 2014, programmatic ad buying became popular, introducing AI-based ad space purchasing, eliminating the need for direct human intervention. In 2015, Google launched the RankBrain algorithm, which uses AI to interpret and process search queries, improving the relevance of results. Specialized literature has grown significantly in recent years. A systematic review of the literature between 2000 and 2021 highlights the application of AI in various marketing functions, from customer segmentation to content personalization. Another study emphasizes the evolution of AI’s role in marketing and proposes a research agenda for the future. Furthermore, recent studies have highlighted the use of AI in marketing content automation, revealing trends and future directions in this field.

Additionally, bibliometric analyses have been conducted to understand research behavior in digital marketing and big data, using tools such as VOSviewer.

2. Theoretical background

Artificial intelligence (AI) has become a key driver in transforming contemporary marketing, offering innovative solutions that optimize campaigns, improve customer relationships, and increase decision-making efficiency. A series of recent studies illustrate how AI is integrated into different segments of marketing, with each author approaching it from a specific perspective.

Smith and Johnson (2023) show that AI substantially contributes to personalizing customer experiences by analyzing their behavior and preferences. Machine learning algorithms can anticipate customer needs, providing product recommendations and tailored content. In a complementary direction, Lee and colleagues (2022) emphasize the value of AI-based predictive analytics in forecasting market trends and understanding consumer behavior, highlighting the importance of data-driven decision-making.

Garcia (2021) explores the applicability of chatbots in marketing, arguing that they can simultaneously handle multiple customer requests, provide instant responses, and improve overall user satisfaction. On the other hand, Patel and Nguyen (2023) focus on the role of AI in creating and curating marketing content, noting that artificial intelligence tools can automatically generate relevant and coherent content, optimizing workflows.

Chen and Kumar (2022) demonstrate the effectiveness of AI in optimizing advertising campaigns, showing that algorithms can analyze real-time performance and automatically adjust strategies for better results. Similarly, Thompson (2021) mentions that AI supports social media monitoring by analyzing public sentiment and engagement levels, providing brands with valuable data on consumer perception.

O'Connor and Li (2023) describe how AI automates email marketing campaigns, facilitating audience segmentation and message personalization. These automated processes lead to higher open rates and increased recipient engagement. In the retail sector, Martinez and colleagues (2022) analyze the use of AI-based visual recognition, which allows the analysis of customer movements in stores and contributes to more efficient stock management and product placement.

Singh (2021) discusses the optimization of content for voice search, emphasizing that understanding natural language processing is essential for adapting SEO strategies to new search behaviors. In the same vein, Brown and Davis (2023) highlight AI's contribution to advanced consumer segmentation, which enables targeted campaigns and a better understanding of audience diversity.

Lee and Zhao (2022) analyze dynamic pricing strategies facilitated by AI, explaining how algorithms can adjust prices in real time based on demand, competition, and user behavior. Kim (2021) emphasizes AI's support in analyzing influencer marketing campaigns by evaluating audience reach, engagement, and achieved results.

Wilson and Chen (2023) discuss AI's impact on loyalty programs, showing that analyzing purchasing behavior and predicting preferences allow for personalized benefits and rewards. In an innovative note, Garcia and Patel (2022) address the integration of artificial intelligence with augmented reality, demonstrating the potential of interactive applications in strengthening the consumer-brand relationship.

Finally, Thompson and Lee (2021) highlight the ethical dimension of using AI in marketing, drawing attention to risks related to privacy, transparency, and algorithmic bias. The two authors advocate for the responsible use of AI, in accordance with ethical values and consumer rights.

This synthesis shows that, regardless of the segment, AI is becoming an essential ally of modern marketing, adding value both through operational efficiency and through deep personalization of the customer relationship. Although the benefits are numerous, it is essential for technological development to be accompanied by clear regulatory frameworks and a solid ethical understanding of its impact on society.

3. Main Objectives and method

In this extended literature review on artificial intelligence (AI) applications in marketing, not only established techniques—predictive analytics, chatbots, and recommendation systems—are analyzed, but also emerging areas such as generative AI for content, visual analysis, dynamic pricing, and social media analytics. Studies show that AI optimizes segmentation and scoring decisions, enhances user experience through natural interactions, and personalizes campaigns in real time, leading to significant increases in conversion rates and ROI (Al Khaldy et al., 2023).

At the same time, challenges arise regarding data quality and bias, ethical regulations and GDPR, as well as the need for specialized skills within organizations (Amini, Amini, 2024).

In the following sections, we detail the evolution of the literature, technological principles, the impact on marketing practices, and future research directions for the sustainable and responsible adoption of AI.

Main research objectives of this paper are as follows:

RO1: To provide information about AI and its necessity in marketing.

RO2: To conduct a systematic literature review (SLR) based on bibliometric and conceptual analysis of articles indexed in the Web of Science database.

RO3: To identify relevant tools used in AI research in marketing.

RO4: To identify and discuss significant applications of artificial intelligence for marketing.

RO5: To explore various AI-driven transformations in marketing sectors.

To analyze and visualize research networks in AI applied to marketing, researchers use various bibliometric tools, among which VOSviewer stands out. Developed by Leiden University, VOSviewer is specialized software for building and visualizing bibliometric networks, allowing the identification of relationships between publications, authors, and key concepts. It offers advanced text-mining features, facilitating the analysis of term co-occurrences and thematic mapping of the specialized literature.

As methodology, we used the VOSviewer tool to conduct a bibliometric analysis of articles from Web of Science based on relevant keywords. This bibliometric analysis maps research on the use of artificial intelligence (AI) in marketing analytics, based on scientific articles extracted from Web of Science. The goal is to identify trends, collaborations, and key themes, using VOSviewer for the visualization of bibliometric networks.

Data collection was carried out for the period 2020–2025, using the Web of Science database as the source and relevant keywords such as: “artificial intelligence,” “marketing analytics,” “marketing intelligence,” “predictive analytics,” “generative artificial intelligence,” “AI Marketing Analytics.” Based on these elements, we obtained a database of 245,732 documents, and after applying filters regarding the analyzed period, document type, and field, the results narrowed to 28,318 documents. We further filtered for articles,

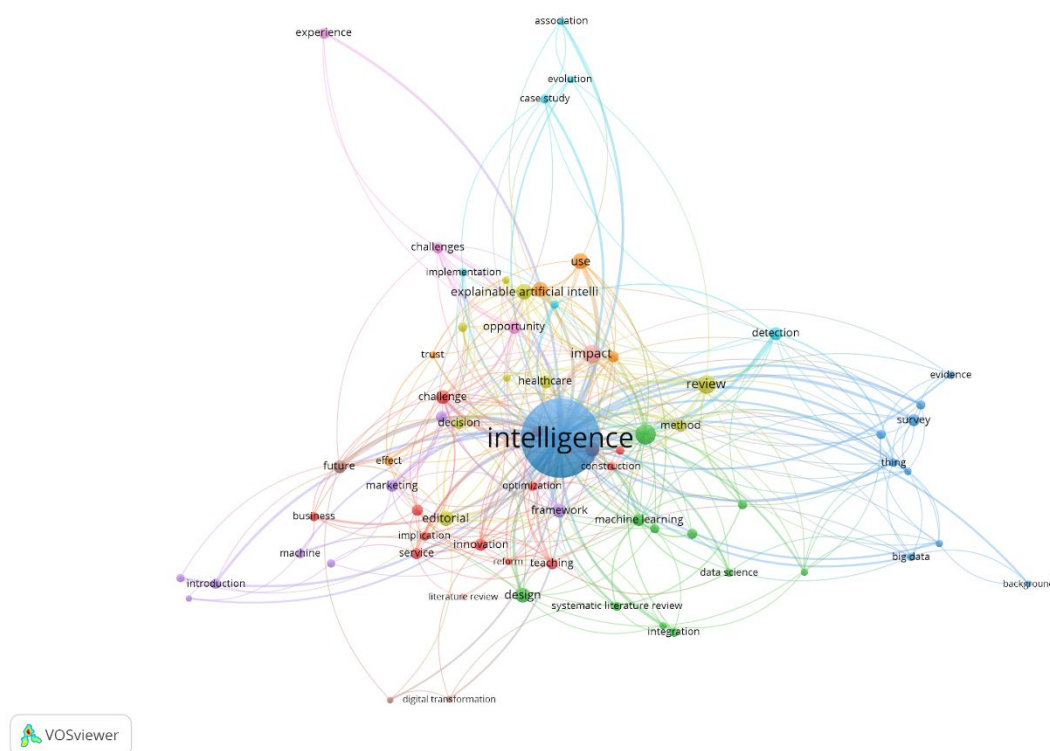
proceedings, and review articles from fields such as Business, Management, and Computer Science AI. Thus, we exported the database in RIS format (available in Web of Science).

Data processing was carried out using VOSviewer, highlighting several types of analyses:

Around this core, several thematic clusters (different colors) are formed, each representing a distinct subdomain:

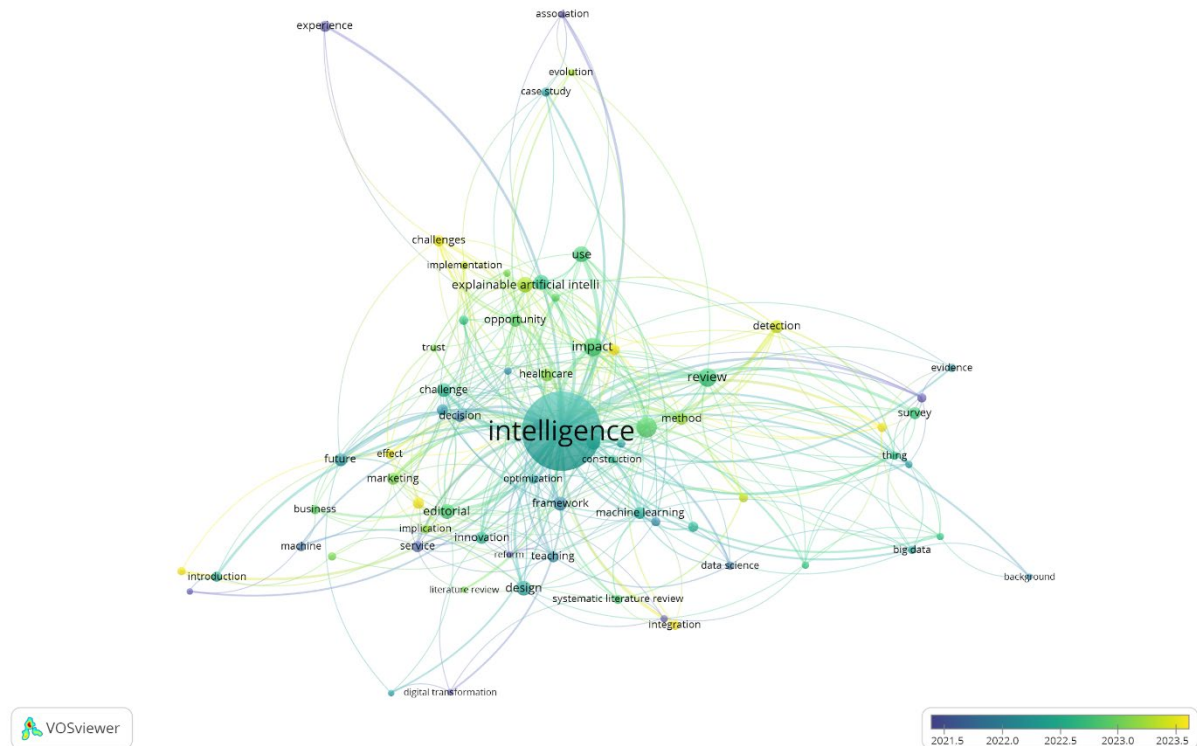
- ✧ **Blue:** includes terms such as big data, survey, detection, and background, indicating sections dealing with quantitative data collection and analysis for detecting consumer patterns and evaluating market context.

- ✧ **Dark red:** terms such as challenges, implementation, explainable artificial intelligence, and trust reflect concerns about ethical, transparency, and trust issues in AI adoption, as well as the need for explainable models.



Source: WQViewer

Overall, this visualization shows that the existing literature strongly combines technological, practical, and ethical themes, confirming that any AI-based marketing endeavor must integrate methodological rigor, practical utility, and social responsibility.



Map 2. Temporal co-occurrence network of terms (chronological analysis)

Source: VOSviewer

Areas of recent interest (yellow – current)

Terms such as “explainable artificial intelligence”, “detection”, “impact”, “opportunity”, and “implementation” are colored yellow, indicating high research interest in the last 1–2 years.

This suggests a current orientation towards:

- ✧ understanding how AI can be explainable and trustworthy;
- ✧ measuring the real impact of AI in applied domains (e.g. digital marketing);
- ✧ analyzing the opportunities and challenges of implementing these technologies.

Areas of continuity (green – stability)

Terms such as “review”, “method”, “framework”, “machine learning”, “integration”, “optimization”, and “data science” remain in a uniform green color, indicating a constant presence in the specialized literature. They form the methodological and conceptual foundation of the field, being at the intersection of theoretical and practical approaches.

Older areas (blue – early)

Terms such as “survey”, “evidence”, “background”, “association”, and “case study” are colored in purple and blue, indicating that they appear more frequently in older papers from 2021–2022. These are often associated with:

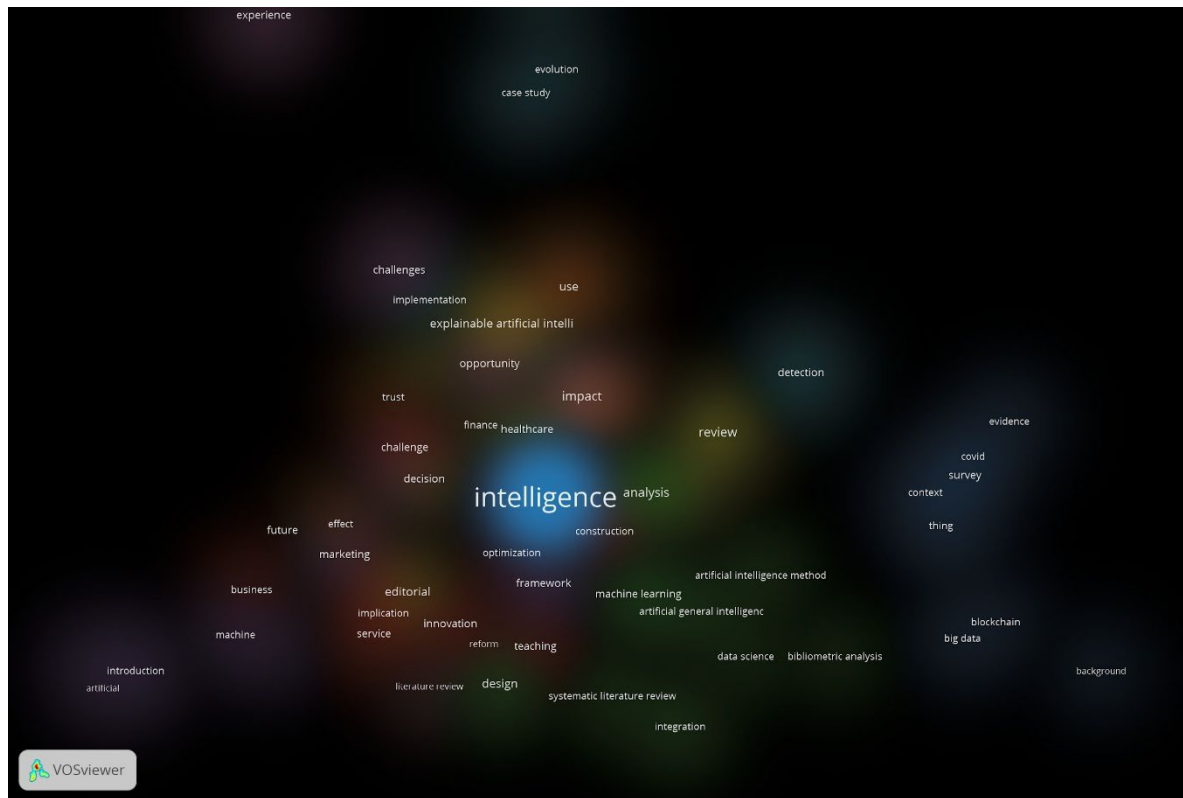
- ✧ the introduction of the concept of AI in marketing;
- ✧ the first attempts at qualitative and exploratory analysis;
- ✧ initial research based on interviews, questionnaires, or case studies.

In conclusion, we highlight the fact that this map suggests a clear transition in the specialized literature, from introductory, methodological, or quantitative descriptive studies (2021–2022) to applied, problematized, and ethically argued approaches (2023–2024). Topics such as explainability, trust, impact, and detection reflect the maturation of the academic discourse around artificial intelligence in marketing.

Thus, contemporary research places increasing emphasis on the practical and ethical value of technology, going beyond simple description or classification and moving towards a deep understanding of the effects of AI on customers, brands and society.

- ✧ The conceptual periphery is occupied by specialized or emerging terms, which may indicate future research directions.

In conclusion, the literature is dense around fundamental and methodological aspects, but is evolving towards more applied and critical areas – a sign of the scientific maturation of the field.



Map 4. Thematic network with visual accent effect (semantic highlighting)

Source: WOSviewer

Color meanings:

- ✧ **Light yellow:** terms that appeared predominantly in recent works (2023–2024).
- ✧ **Green:** established terms, used in literature between 2022–2023.
- ✧ **Blue-violet:** older terms, associated with works from 2021–2022.

Recent interest areas (yellow – current):

Terms such as “explainable artificial intelligence,” “detection,” “impact,” “opportunity,” and “implementation” appear in yellow, indicating high research interest in the past 1–2 years. This suggests a current focus on:

- ✧ understanding how AI can be explainable and trustworthy,
- ✧ measuring the real impact of AI in applied domains (e.g., digital marketing),
- ✧ analyzing opportunities and challenges in implementing these technologies.

Continuity areas (green – stability):

Terms such as “review,” “method,” “framework,” “machine learning,” “integration,” “optimization,” and “data science” appear consistently green, showing a constant presence in the literature. These form the methodological and conceptual foundation of the field, bridging theoretical and practical approaches.

Earlier areas (blue – beginnings):

Terms such as “survey,” “evidence,” “background,” “association,” and “case study” appear in violet and blue, signaling more frequent use in older works (2021–2022). These are often associated with:

- ✧ introducing the concept of AI in marketing,
- ✧ early attempts at qualitative and exploratory analysis,
- ✧ initial research based on interviews, surveys, or case studies.

Conclusion: this map suggests a clear transition in the literature from introductory, methodological, or descriptive studies (2021–2022) toward applied, problematized, and ethically grounded approaches (2023–2024). Topics such as explainability, trust, impact, and detection reflect the academic discourse’s maturation around artificial intelligence in marketing. Thus, contemporary research is placing greater emphasis on the practical and ethical value of technology, moving beyond mere description or classification and toward a deeper understanding of AI’s effects on customers, brands, and society.

4. Results

4.1. Tools used in AI research in marketing

The use of VOSviewer in bibliometric analysis of AI in marketing has allowed the identification of key research themes, influential authors, and the evolution of the field over time. For example, a recent study used VOSviewer to analyze content automation in marketing research, highlighting influential factors and future research directions.

Based on the analysis conducted and the study of relevant works in the field of AI, we identified a series of tools used in AI research in marketing, namely:

- ✧ Predictive Analytics and Scoring. Predictive analytics uses ML models to anticipate purchasing behavior, improving lead scoring efficiency and retargeting campaigns (Al Khaldy et al., 2024). Their report shows that implementing AI in digital marketing strategy can increase ROI by over 20% and reduce cost per acquisition (CPA) by up to 25%. However, model accuracy depends on the volume and quality of historical data, while bias or incomplete data can compromise results.
- ✧ Recommendation systems and personalization. Recommender system algorithms, based on collaborative and content-based learning, enable real-time personalized offers, increasing average basket value and customer retention. A bibliometric study of over 300 works confirms that AI-driven personalization led to 10–30% increases in conversion rates in e-commerce. The major challenge remains avoiding the “filter bubble” and oversaturating users with redundant recommendations.
- ✧ Chatbots and NLP. NLP-based chatbots provide automated natural-language interactions, optimizing support services and generating insights via sentiment analysis. Data from MTM Agency indicate a 69% increase in customer satisfaction in 2023 for chatbot interactions, but only 16% of consumers use them frequently, highlighting issues of design and unmet expectations. Advanced implementations integrate hybrid agents and multichannel context to reduce friction.
- ✧ Programmatic advertising and real-time optimization. Programmatic advertising automates ad space purchasing through real-time bidding, optimizing budget allocation across multiple channels. Studies show a 25% reduction in CPA and a 15% increase in ROI in programmatic campaigns integrated with CRM and social media data. In practice, data integration and platform complexity management remain significant barriers.
- ✧ Generative AI for content and design. Generative AI (e.g., GPT, DALL·E) is used to automatically create text, images, and advertising videos, accelerating creative workflows and reducing production costs. PwC estimates a productivity increase of over 40% in marketing and content creation functions thanks to GenAI in the next three years. Challenges include copyright verification and ethics of content generation.
- ✧ Visual analysis and computer vision. Computer vision applied in marketing detects objects and emotions in social media images and videos, providing insights for visual campaigns and brand awareness evaluation. A systematic literature review of 109 articles highlights accuracy improvements of up to 85% in image recognition for consumer behavior analysis.
- ✧ Dynamic pricing and price optimization. With dynamic pricing algorithms, companies can adjust prices in real time according to demand, competition, and user behavior, maximizing revenue. Literature reviews show that AI-based dynamic pricing implementations can increase revenues by 5–7% in retail and transportation.
- ✧ Social media analytics and sentiment analysis. AI analyzes large volumes of posts and comments to detect trends, sentiment, and relevant influencers, guiding content decisions and targeted campaigns. A study of 50 Web of Science documents reveals that ML-based sentiment analysis can predict the viral success of campaigns with 78% accuracy.

These tools allow marketers to personalize customer experiences, streamline processes, and improve return on investment.

4.2. Specific applications of artificial intelligence in various marketing segments

Artificial intelligence (AI) has become an essential tool in the modern marketer’s arsenal, offering advanced solutions for strategy optimization and improving customer experiences. By integrating AI into various marketing segments, companies can gain deeper understanding of consumer behavior, personalize communication, and anticipate market trends.

- ✧ Customer segmentation and profiling. Traditional customer segmentation, based on demographics or behavior, is often limited in reflecting the complexity of consumer preferences. AI enables more precise and dynamic segmentation by analyzing large volumes of data to identify emerging patterns and behaviors. Using machine learning algorithms, companies can create detailed customer profiles and tailor marketing messages accordingly.
- ✧ Personalized recommendation systems. AI-based recommendation systems analyze users’ past behavior to provide personalized product or service suggestions. These systems use techniques such as collaborative filtering and content analysis to anticipate customer preferences. A notable example is Amazon, which uses AI to deliver personalized recommendations, significantly contributing to sales growth.

- ✧ Marketing campaign automation. AI facilitates the automation of marketing campaigns by analyzing real-time data and adjusting strategies according to consumer behavior. Automated marketing platforms use AI to determine the optimal timing of messages, the most effective channels, and the content that generates the greatest impact. This approach enables more efficient communication and better resource use.
- ✧ Generative content creation. Generative AI, such as natural language models, enables automatic content creation for various marketing channels. This includes generating texts for emails, social media posts, product descriptions, and more. The use of AI in content creation not only saves time but also ensures consistency and relevance in the messages delivered.
- ✧ Sentiment analysis and customer feedback. By using natural language processing, AI can analyze customer opinions and reviews to determine the overall sentiment toward a brand or product. This analysis provides valuable insights into public perception and allows marketing strategies to be adjusted to better respond to customer needs and expectations.
- ✧ Price and offer optimization. AI enables dynamic price adjustments based on demand, consumer behavior, and competition. By analyzing historical data and market trends, AI algorithms can recommend optimal prices that maximize profit and customer satisfaction. This strategy is widely used in industries such as e-commerce and tourism.
- ✧ Chatbots and virtual assistants. AI-powered chatbots provide real-time customer support, answering frequently asked questions and guiding users through the purchasing process. These virtual assistants improve user experience and reduce the workload of support teams. For example, IBM Watson Assistant is an advanced chatbot that uses deep learning to deliver accurate and relevant answers.
- ✧ Programmatic advertising. Programmatic advertising uses AI to automate ad space purchasing and to target ads to the right audience. This allows for more efficient budget allocation and higher return on investment. AI analyzes user behavior and adjusts campaigns in real time to maximize impact.
- ✧ Visual analysis and image recognition. AI can analyze images and videos to extract relevant information about products and consumer behavior. This includes identifying products in images, analyzing facial expressions, and monitoring user visual interactions. These insights are valuable for adjusting visual marketing strategies and understanding customers' aesthetic preferences.
- ✧ Data analysis and forecasting. AI enables advanced data analysis to identify trends and make accurate predictions about future consumer behavior. By using predictive models, companies can anticipate customer needs and develop products and services that meet them. This predictive capacity offers a significant competitive advantage in the market.

4.3. AI-driven transformations in marketing sectors

Artificial intelligence (AI) has become a key catalyst in transforming marketing strategies, enabling companies to improve efficiency, personalize customer experiences, and anticipate consumer behaviors. The adoption of AI in marketing has led to significant changes in the way brands interact with the public and optimize their campaigns.

The main AI-driven transformations in marketing are:

- ✧ **Marketing process automation.** AI enables the automation of repetitive tasks such as data analysis, customer segmentation, and personalized content creation. This frees up time for marketers to focus on strategic aspects of campaigns. For example, AI-based automation tools can analyze user behavior and automatically trigger personalized messages based on their actions.
- ✧ **Customer experience personalization.** By analyzing behavioral and demographic data, AI allows for the creation of personalized experiences for each customer. Recommendation systems, such as those used by streaming platforms or e-commerce sites, suggest products or content based on individual user preferences, thus improving customer satisfaction and loyalty.
- ✧ **Predictive analytics and consumer behavior anticipation.** Machine learning algorithms can analyze historical data to predict future consumer behavior. This enables companies to anticipate customer needs and adjust their offerings accordingly. For example, AI can identify the optimal moment to send a personalized offer to a customer, increasing the chances of conversion.
- ✧ **Advertising campaign optimization.** AI is revolutionizing advertising through its ability to analyze ad performance in real time and automatically adjust strategies to maximize efficiency. Programmatic advertising uses AI to automatically purchase ad spaces, targeting the right audience at the right moment.
- ✧ **Generative content creation.** Natural language models, such as GPT, enable the automatic generation of content for various marketing channels. They can create texts for emails, social media posts, or product descriptions, saving time and ensuring message consistency.
- ✧ **Sentiment analysis and customer feedback.** AI can analyze customer reviews and comments to determine the overall sentiment toward a brand or product. This analysis provides valuable insights into public perception and allows marketing strategies to be adjusted to better meet consumer needs and expectations.

- ✧ **Price and offer optimization.** By analyzing market data and consumer behavior, AI can recommend dynamic price adjustments to maximize profit and customer satisfaction. This is especially useful in industries such as e-commerce, where demand and competition fluctuate rapidly.
- ✧ **Use of chatbots and virtual assistants.** AI-powered chatbots provide real-time customer support, answering frequently asked questions and guiding users through the purchase process. These virtual assistants improve user experiences and reduce the workload of support teams.
- ✧ **Visual analysis and image recognition.** AI can analyze images and videos to extract relevant information about products and consumer behavior. This includes identifying products in images, analyzing facial expressions, and monitoring users' visual interactions.
- ✧ **Data analysis and forecasting.** AI enables advanced data analysis to identify trends and make accurate predictions about future consumer behavior. By using predictive models, companies can anticipate customer needs and develop products and services to meet them.

Discussion

The adoption of AI in marketing offers clear competitive advantages—personalization, operational efficiency, and deep insights—but is conditioned by:

- ✧ Data quality and bias: incomplete or biased data can generate erroneous decisions.
- ✧ Ethics and privacy: according to GDPR, explicit consent and transparency are required in collecting personal data for AI models.
- ✧ Skills and organizational change: the shortage of specialists in data science and AI requires continuous training and collaboration between IT and marketing.

Moreover, demonstrating AI's value requires clear KPIs and performance evaluation frameworks, such as an extended Balanced Scorecard for AI and periodic audits of automated decisions (Rita et al., 2025).

5. Conclusions and Future Perspectives

The literature confirms that AI is transforming marketing practices through predictive analytics, real-time personalization, advanced chatbots, and programmatic advertising, leading to significant increases in conversion rates and ROI (Al Khaldy et al., 2023). However, long-term success depends on data governance, ethical approaches, and the development of internal competencies (Amini, Amini, 2024).

The results highlight that AI is applied in various areas of marketing, including:

- ✧ Predictive analytics for anticipating consumer behavior and optimizing advertising campaigns.
- ✧ Recommendation systems that personalize offers and improve user experience.
- ✧ Chatbots and natural language processing (NLP) for automating customer interactions.
- ✧ Programmatic advertising that uses AI for automated ad space purchasing.
- ✧ Generative AI in creating visual and textual content for marketing campaigns.
- ✧ Visual analysis and dynamic pricing for real-time price adjustments based on demand and consumer behavior.

The studies analyzed indicate significant benefits, such as increased return on investment (ROI), improved customer loyalty, and more efficient marketing processes. However, major challenges are also identified, including:

- ✧ Issues related to data quality and bias, which may affect the accuracy of AI models.
- ✧ Concerns regarding data privacy and compliance with regulations such as GDPR.
- ✧ The need to develop robust data governance strategies and clear ethical policies.

Recommended directions include:

- ✧ **Explainable Artificial Intelligence (XAI):** to increase trust and auditability of AI decisions.
- ✧ **Edge AI:** for processing closer to the consumer and real-time campaigns without relying on the cloud.
- ✧ **Generative AI:** in automated and creative A/B testing, optimizing messages and design.
- ✧ **Legal and ethical frameworks:** at the European level for the responsible use of AI in marketing.

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