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ARTIFICIAL INTELLIGENCE IN ADVERTISING: A SYSTEMATIC REVIEW OF THE 2020-2024 DECADE

LA INTELIGENCIA ARTIFICIAL EN LA PUBLICIDAD: UNA REVISIÓN SISTEMÁTICA DE LA DÉCADA 2020-2024

Reli Gabriel BLANCO SANGUINETI[1]
Carlos Daniel CARDENAS CORDOVA[2]
Ariana TORPOCO BALTAZAR[3]

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ABSTRACT: This study aims to explore the impact of artificial intelligence on advertising applied in companies during the period 2020 - 2024. A methodology based on the review of scientific literature published in Scopus and Web of Science was used to identify trends, advancements, and changes in the use of artificial intelligence for executing advertising strategies. Using the PRISMA methodology, 20 relevant research articles addressing the role of artificial intelligence in advertising were selected and analyzed. The results indicate that artificial intelligence has a significant impact on advertising by enabling more precise and personalized communication with consumers. Advances in machine learning and neural networks have improved the effectiveness of advertising campaigns. However, challenges persist regarding consumers' perception and acceptance of artificial intelligence, highlighting the need to address ethical and privacy issues. The findings underscore the importance of adapting AI strategies to the emotional needs and awareness levels of consumers to maximize their effectiveness.

Keywords: *Machine Learning, Ad personalization, Communication, Algorithmic ethics, Advertising strategies.*

RESUMEN: Este estudio tiene como objetivo explorar el impacto de la inteligencia artificial en la publicidad aplicada en empresas durante el periodo 2020 - 2024. Se utilizó una metodología basada en la revisión de la literatura científica publicada en Scopus y Web of Science en relación al tema, en donde se buscó identificar tendencias, avances y cambios en el uso de la inteligencia artificial para llevar a cabo estrategias de publicidad. Por medio de la metodología PRISMA, se seleccionaron y analizaron 20 artículos de investigación relevantes que abordan el papel de la inteligencia artificial en la publicidad. Los resultados obtenidos indican que la inteligencia artificial tiene un impacto significativo en la publicidad al permitir una comunicación más precisa y personalizada con los consumidores. Los avances en aprendizaje automático y redes neuronales han mejorado la efectividad de las campañas publicitarias. Sin embargo, persisten desafíos relacionados con la percepción y

[1]Universidad Peruana de Ciencias Aplicadas, Lima - Perú, Correo: religabrielbs@gmail.com - ORCID: https://orcid.org/0009-0007-5325-6797
[2]Universidad Peruana de Ciencias Aplicadas, Lima - Perú, Correo: cardecordova@gmail.com - ORCID: https://orcid.org/0009-0006-8461-6890
[3] Universidad Peruana de Ciencias Aplicadas, Lima - Perú, Correo: nianazza@outlook.com - ORCID: https://orcid.org/0009-0002-5315-6802

aceptación de la inteligencia artificial por parte de los consumidores, destacando la necesidad de abordar cuestiones éticas y de privacidad. Los hallazgos subrayan la importancia de adaptar las estrategias de inteligencia artificial a las necesidades emocionales y niveles de conciencia de los consumidores para maximizar su efectividad,

Palabras clave: *Aprendizaje automático, Personalización de anuncios, Comunicación, Ética algorítmica, Estrategias publicitarias.*

INTRODUCTION

In recent years, digital transformation has revolutionized the marketing landscape worldwide, bringing with it challenges and opportunities for companies (Nesterenko, V. et al, 2023). One of these tools is artificial intelligence, also called AI, which has taken a leading role in digital commerce and advertising. Today, AI technology is applied in marketing to provide accurate and personalized services to consumers. Thus, it was found that the knowledge, precision, and interaction experience of AI technology achieve a positive impact of great relevance in the utility value perceived by customers, managing to promote the purchase intention of consumers (Yin and Qiu, 2021). Likewise, the use of Artificial Intelligence for marketing is present through various tools and platforms, one of them being Chatbots, which thanks to the implementation of artificial intelligence can achieve greater personalization with the user and generate a better experience (Li et al., 2023).

In the current business landscape, there is a great opportunity to generate advertising campaigns with a greater impact on the public, making proper use of the tools and platforms that currently have integrated artificial intelligence, as part of the digital transformation, in which all companies are involved. For this reason, they must be aware of the advantages and disadvantages of the use of artificial intelligence in advertising. That is why the correct use of AI technology in advertising can generate an advantage for companies. Companies such as Cruzcampo have achieved through advertising with artificial intelligence, using voice and image generation tools, to generate positive attitudes towards the brand and enhance the strength of the message transmitted (Ferruz-González et al., 2023). Thus, the use of artificial intelligence is expanding through various tools, such as content generation in marketing segments, especially in the food and beverage industry. Using generative AI techniques, the

aim is to evaluate to what extent artificial intelligence can create effective text lines for advertising purposes (Kuang et al., 2024).

Artificial intelligence has been growing exponentially over the years until reaching its current peak. As mentioned by Mani (2021), some important milestones that could be evidenced were the robot that competed against chess players, those machines that solved mathematical problems in seconds, or something more modern, such as real-time translation in a telephone conversation. However, it is currently addressing more challenging problems for society in various sectors such as health, transportation, and manufacturing, among others. In addition, it is important to note that the development of artificial intelligence goes hand in hand with the evolution of machine learning. Machine learning has evolved in parallel to the growth of the Internet, as users generate an increasing amount of data. This situation has made it necessary to develop learning processes that allow this information to be analyzed more efficiently. Thus, the implementation of new machine learning systems has arisen, which enrich artificial intelligence.

Advertising has been around for many years, but its forms of implementation have changed over time, as have consumer attitudes, behaviors, and preferences. Today, online advertising has become a key component, driven by new e-commerce models, the proliferation of apps and websites, as well as the increased use of mobile devices. Therefore, both online advertising and digital marketing have become the main approaches for large companies to connect with their audiences (Miralles-Pechuán et al., 2020).

In this context, the data trail that users leave behind when using various websites and applications has been harnessed over time to refine marketing strategies. Initially, data analysis was performed using machine learning, which facilitated decision-making. Over time, this approach has evolved into automated decision-making through algorithms. Also, it should be noted that much of the impetus for this new advertising in the digital era was the personalization and targeting of segments that can be applied compared to traditional advertising, in addition to the momentum of artificial intelligence has now taken steps in what is the creation of content and strategies, further streamlining the work for companies (Sabharwal et al., 2022).

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According to Janiesch et al. (2021), artificial intelligence "is the cognitive capacity of a system for advanced problem solving, as it is based on analytical models that generate predictions, rules, proposals, recommendations or similar results" (p. 1). Thus, according to Suraña-Sánchez and Aramendia-Muneta (2024), artificial intelligence in the field of marketing "is considered an emerging technology capable of collecting data in real-time, which can be transformed after analysis to meet the needs and demands of customers" (p. 2). Similarly, machine learning is a sub-discipline of artificial intelligence that "seeks to automatically learn meaningful relationships and patterns from examples and observations" (Janiesch et al., 2021). Both are tools that help companies when the customer requires a more personalized product, subtly prompting them to make purchasing decisions (Suraña-Sánchez and Aramendia-Muneta, 2024).

On the other hand, according to Kerr and Richards (2020) advertising is "A form of mediated, paid communication from an identifiable source, designed to persuade the recipient to perform some action, now or in the future" (p. 4). Its goal, according to West et al. (2019), is to attract customers to a brand based on data on their needs and preferences. In this sense, the concept of advertising is strictly related to marketing, but they are not the same. According to Kerr and Richards (2020), marketing is a science that considers several basic criteria to visualize and define an advertising proposal, these are: "changes in consumer empowerment and connectivity, multiplatform media consumption and the inclusion of paid, owned and earned media in advertising decisions, changes in advertising practices, structure, management and remuneration, the regulatory imperatives of a global market, and the meaning and scope of advertising research" (p. 3). On the other hand, "the field of advertising is all about change, and has been riding waves of technological change for the past quarter century and beyond. In this sense, Richards and Curran (2002) define advertising with five descriptors: paid, mediated, identifiable source, persuasion, and action" (p. 10).

The main objective of this research is to analyze the evidence developed on the impact of artificial intelligence on advertising. According to Sands et al. (2024), since the 1990s, "marketers have experienced an avalanche of digital channels, initiated by the Internet and then by social networks, which dramatically changed communications and brand-consumer

interactions" (p. 1). In this sense, "the digitization of advertising has also led to an increasingly data-driven practice. More recently, this has contributed to a significant shift in the advertising industry driven by artificial intelligence capabilities" (Sands et al., 2024). Therefore, today's specialists "can employ sophisticated methods that implement AI to automate media buying, targeting specific audiences based on complex behaviors and demographics" (Sands et al., 2024). As a result, it can be observed that today's artificial intelligence tools "are gaining ground and offer significant opportunities for marketers" (Sands et al., 2024). For this reason, this article aims to conduct a study on the impact that such tools may have on the different ways of advertising in the last decade (2020 - 2024), to provide an overview of how advertisers are likely to take advantage of artificial intelligence.

METHODOLOGY

Design

The present research followed the guideline proposed by the PRISMA methodology - Preferred Reporting Items for Systematic Reviews and Meta-Analysis (Moher et al., 2016). This method "has been conceived as a tool to help improve clarity and transparency in the publication of systematic reviews" (Urrútia and Bonfill, 2010). According to Moher et al. (2016), it aims at "the preparation of protocols for systematic reviews and meta-analyses that summarize the data set of studies, particularly on the effects of interventions".

Bibliographic search strategy

For the search strategy, the Scopus and Web of Science databases were used during March and July 2024, the following search combinations were used in the fields "Keywords", "Abstract" or "Article Name" This search was performed by three researchers applying filters and Boolean terms: [("Publicidad" OR "Advertising" OR "Publicidade") AND ("Computación Cognitiva" OR "Aprendizaje Automático") AND ("Comunicación" OR "Comunicación de Marketing" OR "Marketing Communication" OR "Marketing Promotion") AND ("Inteligencia Artificial" OR "Artificial Intelligence" OR "Inteligência Artificial")]

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Inclusion and exclusion criteria

The databases used were Elsevier Scopus and Thomson Reuters Web of Science. The document search considered articles from all regions of the world and set 2020 as the lower limit for the analysis. In addition, three languages were included in the search: Spanish, English, and Portuguese. In addition, open-access items from the areas of Business, Telecommunications, and Communications were considered because the aim was to analyze the impact of artificial intelligence on advertising. As a result, a database of twenty-two articles was generated after filtering.

Search systematization

Figure 1

Search equation

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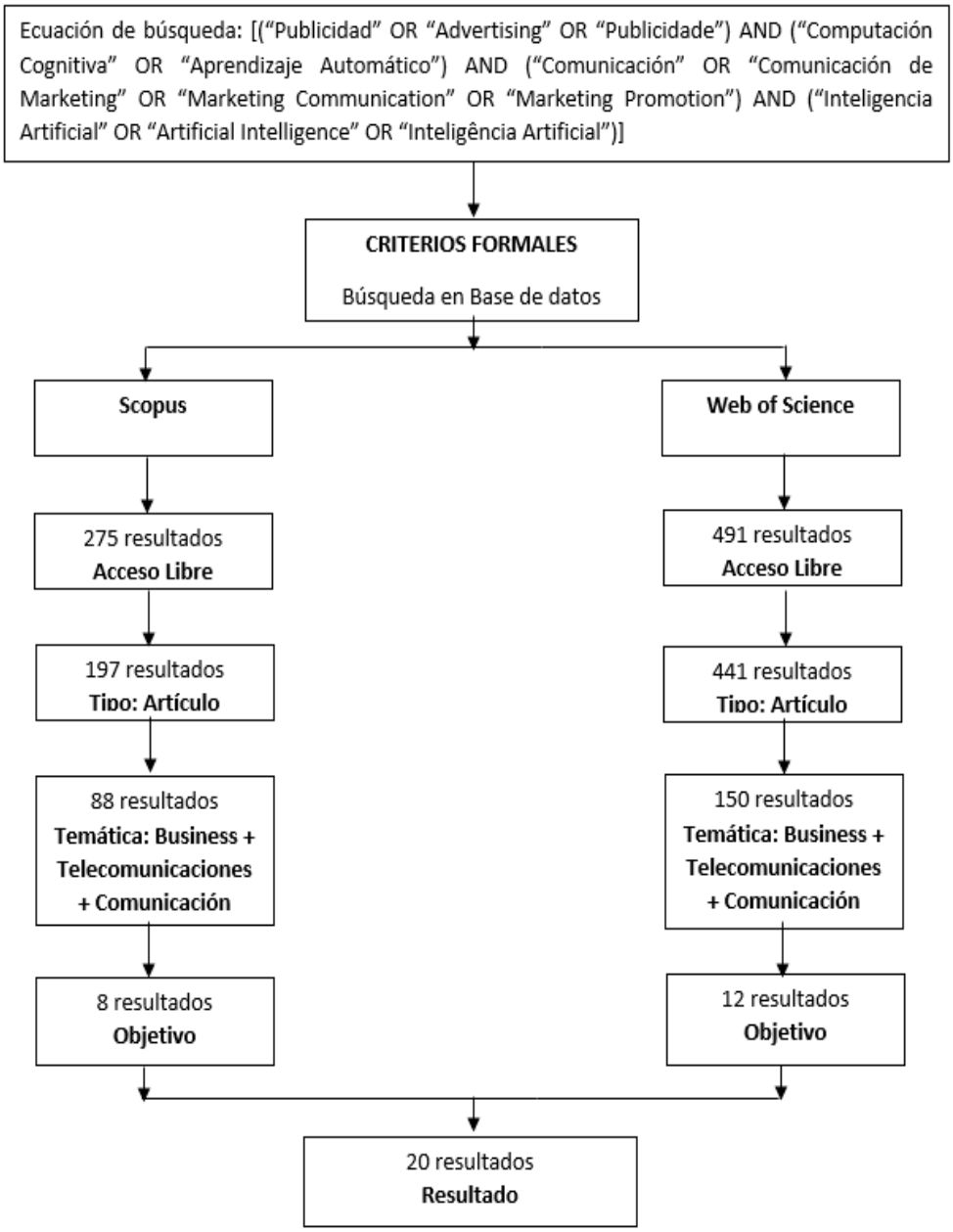

Source: own elaboration.

Table 1

Terminology and synonyms used in the literature

Terminology	Synonyms
Artificial Intelligence	Machine Intelligence, Cognitive Computing, ML, Predictive Analytics, Automated Learning, Neural Networks, Hierarchical Learning, Artificial Neural Networks (ANN), Deep Neural Networks (DNN), NLP, Language AI, Text Analysis
Advertising	Marketing Communications, Promotion, AI-Enabled Advertising, Smart Advertising, Automated Advertising, Real-Time Bidding (RTB), Personalized Advertising, Precision Marketing, Online Advertising, Internet Advertising

Source: own elaboration.

The list of terms and synonyms reveals the diversity of language used in the literature related to artificial intelligence and advertising. The presence of variations such as "Artificial Intelligence" and "Promotion" suggests that authors may use specific terms to highlight different aspects or approaches within the field of artificial intelligence.

RESULTS

Characteristics of the articles (database, country, year)

As a result of the Prisma review process, after processing all the information collected, a total of twenty (20) articles published in the database were selected (Table 2). Of these articles, it can be seen that the majority are from the United States and the United Kingdom. In the current analysis, the United States represents 30% of the publications, while the United Kingdom contributes 20%, totaling eleven (11) articles between the two countries. The Netherlands follows with two (2) articles, and there is one (1) article from Korea, Portugal, Australia, Ukraine, China, France and Lebanon.

Table 2

Articles included in the review

Repository	Author(s), year	Country
Web of Science	(Rodgers and Nguyen, 2022)	United Kingdom
Web of Science	(Lee et al., 2021)	Korea
Web of Science	(Wen et al., 2022)	China
Web of Science	(Liu-Thompkins et al., 2022)	United Kingdom
Web of Science	(Voorveld et al., 2023)	Netherlands
Scopus	(Ciuchita et al., 2023)	United States
Scopus	(Guerreiro, et al., 2022)	Portugal
Scopus	(Arango et al., 2023)	Australia
Scopus	(Choi and Lim, 2020)	United States
Web of Science	Campbell et al., 2022)	United States
Web of Science	(Sands et al., 2022)	United Kingdom
Web of Science	(Efthymiou et al., 2024)	United States
Scopus	(Ho and Chow, 2024)	United States
Web of Science	(Tapu et al., 2020)	France
Scopus	(Zatonatska et al., 2022)	Ukraine
Web of Science	(Wang et al., 2023)	United States
Web of Science	(Méndez-Suárez et al., 2023)	Netherlands
Scopus	(Sands et al., 2024)	United Kingdom
Web of Science	(Halpin, 2023)	Lebanon
Scopus	(Matz et al., 2024)	United States

Source: own elaboration.

Figure 2 shows the country of origin of the articles studied. It shows that the United States and the United Kingdom are the countries from which most of the articles originate, with 35% and 20%, respectively. In addition, the Netherlands contributes 10% of the articles. On the other hand, Ukraine, Portugal, Lebanon, France, Korea, China and Australia contribute less, with 5% each.

Figure 2

Selected research by country

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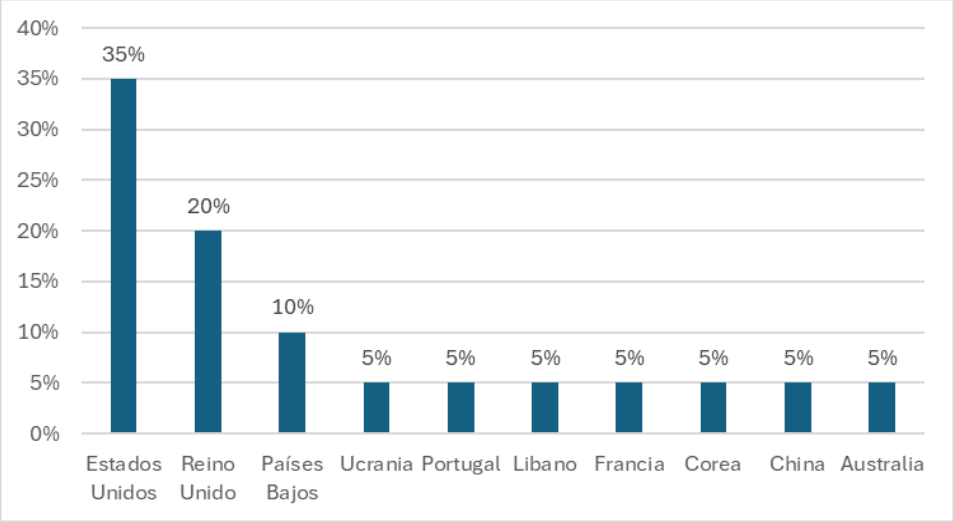


Source: own elaboration.

DISCUSSION OF RESULTS

Specific result 1: Authors' definition of Artificial Intelligence and advertising.

Table 3 shows a direct relationship of the conceptual definitions in the systematically reviewed research, highlighting key potential assumptions about artificial intelligence and its impact on advertising. Artificial intelligence has the potential to drastically improve the efficiency of people and organizations in various Marketing activities (Frankish and Ramsey, 2014). Likewise, going deeper into AIs, there are variations based on machine learning or Machine Learning (ML) that offer a competitive advantage in digital advertising since they can improve the segmentation and prediction of relevant ads for users, using their own resources (Chen et al., 2009). In the same line, graphic or digital media generated by artificial intelligence are called synthetic or generative media, which are ready to revolutionize advertising and marketing, providing new opportunities for personalization and optimization of marketing strategies (Campbell et al., 2022). Finally, the integration of artificial intelligence into digital ads has enabled exciting new forms of communication between companies and customers (Taylor and Carlson, 2021).

Table 3

Premisas conceptuales de cada autor, referente teórico y su definición

Author(s), Year	Theoretical references	Definition
Rodgers and Nguyen (2022)	Frankish and Ramsey (2014)	Artificial intelligence could generate a drastic improvement in the efficiency of both individuals and organizations in almost all efforts involved, including marketing activities.
Lee et al. (2021)	Cui and Curry (2005)	Within artificial intelligence, we find explanatory artificial intelligence (EAI). In previous works, we found information suggesting that EAI has problems in explaining the relationships between explanatory variables and the results of the predictions it generates. Therefore, the importance of investigating EAI in retargeting advertisements that employ a high degree of machine learning is highlighted.
Wen et al. (2022)	Wu and Hu (2008)	In digital advertising, computational logic can be used through models to optimize the selection of individuals that maximize the desired advertising impact. Currently, computational logic integrates technology such as artificial intelligence for its development.
Liu-Thompkins et al. (2022)	Grewal et al. (2016)	In recent years, new interactions between companies and customers have emerged, highlighting mobile marketing. This strategy has gained relevance due to the popularity and new functionalities of mobile devices, which are now capable of performing complex tasks, including purchasing processes and digital content consumption.
Voorveld et al. (2023)	Zarouali et al. (2021)	Algorithmic persuasion can be defined as "any deliberate attempt by a persuader to influence people's beliefs, attitudes, and behaviors as a result of online communication mediated by algorithms."

Ciuchita et al. (2023)	Malthouse et al. (2018)	In terms of targeted advertising, better-targeted and more engaging ads enable online retailers to optimally reach consumers and increase revenues. In addition, higher relevance and frictionless shopping experiences benefit customers.
Guerreiro, et al. (2022)	Taylor and Carlson (2021)	The emphasis has not only been on digital ads as the primary advertising medium but also on exciting new ways of communicating through artificial intelligence, which has allowed companies to see AI as a promising way to reach their customers.
Arango et al. (2023)	Campbell et al. (2021)	Artificial intelligence-generated media, also known as synthetic or generative media, represents a type of content created by artificial intelligence that is poised to revolutionize advertising and marketing in the coming years. These advances promise to transform the way brands create and distribute their messages, offering new opportunities to personalize and optimize marketing strategies.
Choi and Lim (2020)	Chen et al. (2009)	Artificial intelligence technologies create a competitive advantage for online advertising over traditional practices by providing greater computational power to optimize digital ads. Machine learning (ML)--based techniques improve targeting accuracy by predicting the most relevant ads for users based on contextual or pre-existing user data.
Campbell et al. (2022)	Deng et al. (2019)	Interpretive AI can be used to generate personalized advertising copy by processing consumer behavioral and other relevant data. This technology enables advertisers to create more targeted and engaging messages tailored to the individual needs and preferences of each consumer, thereby improving the effectiveness of advertising campaigns.
(Sands et al., 2022)	Ferrara et al. (2016)	Research in artificial intelligence and machine learning also points to the potential positive effects that can be derived from AI influencers. Specifically, the distinction between human behavior and bot-like

		behavior is becoming less clear, making it easier for a bot to gain significant influence.
Efthymiou et al. (2024)	Hartmann et al. (2023)	With the increasing adoption of conversational agents by companies in their digital marketing strategies, new voice interaction opportunities for consumers have emerged.
Ho and Chow (2024)	Fatima et al. (2022)	Researchers identify two main approaches to deep learning models in text generation: traditional and advanced. The former include RNN, LSTM, GRU, and CNN, while the advanced ones encompass LLM, pre-trained models such as attention, Transformers, and BERT.
Tapu et al. (2020)	Liao et al. (2008)	Television broadcasters approach the problem differently, placing ads at fixed times. This strategy, widely used around the world, has as its main disadvantage its highly invasive nature. Interruptions at inappropriate times can disturb the user, making him less receptive to the commercial message.
Zatonatska et al. (2022)	Sekli and Vega (2021)	For example, G. Sekli and Vega, based on the evaluation of 256 respondents, investigate the factors that influence the adoption of big data analytics and assess the relationship it has with performance and knowledge management. This study provides practical guidance for decision-makers involved in or in charge of defining the implementation strategy of big data analytics in higher education institutions.
Wang et al. (2023)	Marikyan et al. (2020)	Convenience and privacy concerns play opposing roles for the Z Generation in the formation of technology dissonance, a finding that contributes to both the understanding of the antecedents of dissonance and the coping literature.
Méndez-Suárez et al. (2023)	Duan et al. (2019)	Government plays a critical role in protecting the impact of artificial intelligence on society, through the development of appropriate policies, regulations, ethical guidance, and legal frameworks, to prevent the misuse of

		artificial intelligence and its potentially disastrous consequences at both the individual and societal levels.
Sands et al. (2024)	Campbell et al. (2022)	Historically, the creation of advertising content, whether visual designs, slogans, or extended narratives, has been the exclusive domain of human creativity. However, with generative AI, there is an opportunity to significantly empower and accelerate this process.
Matz et al. (2024)	Zhang et al. (2022)	Recent research indicates that product descriptions automatically generated by artificial intelligence, along with human review, can increase click-through rates and conversions on e-commerce sites.
Halpin (2023)	Liu-Thompkins (2019)	Advertising seeks to generate purchase intent, and artificial intelligence techniques based on semantic markup can create different intentions, such as voting intent. The ability to predict actual intent is still under debate.

Source: own elaboration.

Specific result 2: Strategy and methodology employed.

Table 4 shows the approach, scope and instrument used in each research collected. Regarding the methodological approach, "quantitative research seeks to measure and quantify social and environmental phenomena in an objective and precise manner. While a qualitative approach focuses on studying the subjective and complex aspects of social and environmental phenomena, using techniques such as interviews, observations and text analysis" (Creswell, 2014). In relation to the scope of the research, descriptive, explanatory, exploratory, correlational types were identified. On the other hand, the instruments used in these investigations were documentary analysis, data prediction model, case studies, cluster analysis, surveys, observation, behavioral analysis and data analysis.

Table 4

Methodology used in the research

Author(s), Year	Approach	Scope	Instrument	Analysis Unit
(Rodgers and Nguyen, 2022)	Qualitative	Descriptive	Documentary Analysis	Six dominant algorithmic pathways for purchasing decisions
(Lee et al., 2021)	Quantitative	Explanatory	Data prediction model	374,749 online consumer behavior data from Google Merchandise Store and an online shopping mall
(Wen et al., 2022)	Qualitative	Descriptive	Case Study	Study the three main strategies of computer communication in the advertising scene
(Liu-Thompkins et al., 2022)	Qualitative	Descriptive	Documentary Analysis	Key components of artificial empathy
(Voorveld et al., 2023)	Quantitative	Explanatory	Cluster Analysis	450 Dutch
(Ciuchita et al., 2023)	Quantitative	Exploratory	Survey	189 consumers
(Guerreiro, et al., 2022)	Quantitative	Descriptive	Survey	326 people
(Arango et al., 2023)	Quantitative	Explanatory	Survey	458 people divided into 2 groups
(Choi and Lim, 2020)	Qualitative	Descriptive	Documentary Analysis	23 Targeted Online Advertising Strategies
Campbell et al., 2022)	Qualitative	Descriptive	Documentary Analysis	Smart artificial intelligence technologies
(Sands et al.,	Quantitative	Descriptive	Survey	455 American

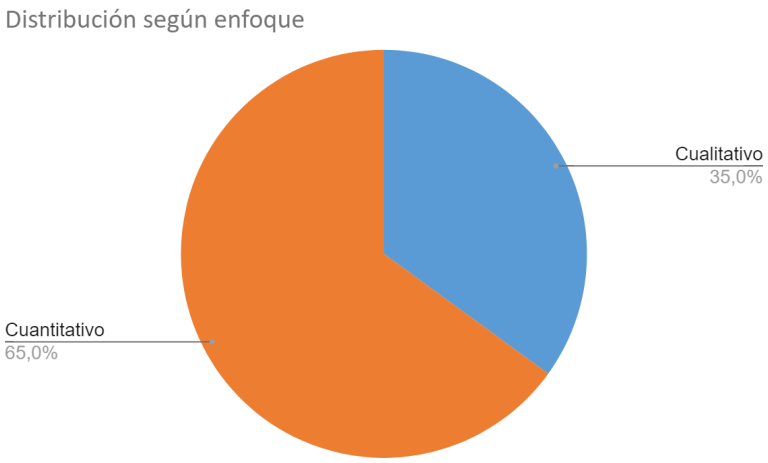
2022)				women
(Efthymiou et al., 2024)	Quantitative	Exploratory	Observation	3,650 Amazon Turk workers
Ho and Chow (2024)	Quantitative	Correlational	Survey	350 consumers from the United States
(Tapu et al., 2020)	Quantitative	Explanatory	Cluster Analysis	30 videos taken from French National Television and the US TV Series
(Zatonatska et al., 2022)	Quantitative	Correlational	Behavioral Analysis	Users of VF Ukraine operator
(Wang et al., 2023)	Quantitative	Descriptive	Survey	300 Z Generation consumers
(Méndez-Suárez et al., 2023)	Quantitative	Exploratory	Data Analysis	31 companies found to be in violation
(Sands et al., 2024)	Qualitative	Explanatory	Documenta ry Analysis	6 principles for responsible advertising using AI
(Halpin, 2023)	Qualitative	Descriptive	Documenta ry Analysis	Facebook, Google
(Matz et al., 2024)	Quantitative	Exploratory	Survey	1788 participants

Source: own elaboration.

Of the studies compiled for this research, 65% used a quantitative approach, while 35% opted for a qualitative approach. Thus, this first type of approach gives greater validity and depth of analysis to the conclusions of this study (see Figure 3).

Figure 3

Distribution by approach

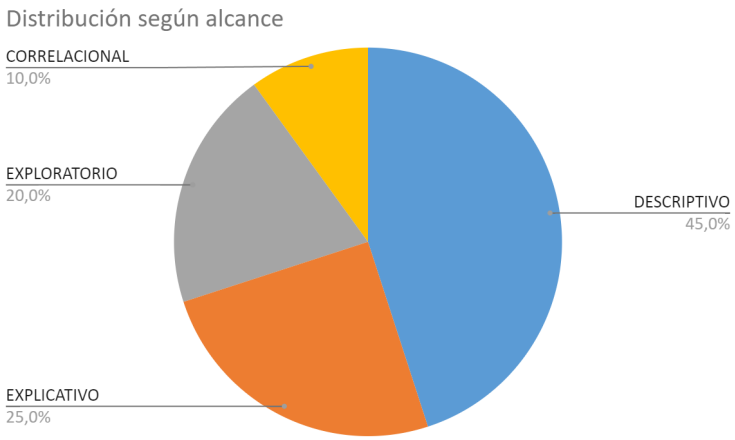


Source: own elaboration.

Figure 4 shows that approximately 45% of the research studies have a descriptive scope, which represents the highest proportion compared to other types of scope, such as correlational, exploratory, and explanatory. However, having studies of different scopes adds value to the phenomenon to be investigated, since it allows analyzing the already defined trends of the variables studied and obtaining a perspective on how these could develop in the future, based on research with exploratory and explanatory approaches. As mentioned by Ramos-Galarza (2020), multi-designs or mixed designs of a phenomenon help to better understand and explain the phenomenon in question. Thus, it can be understood that artificial intelligence in advertising is a field that is also being continuously explored.

Figura 4

Distribution by scope



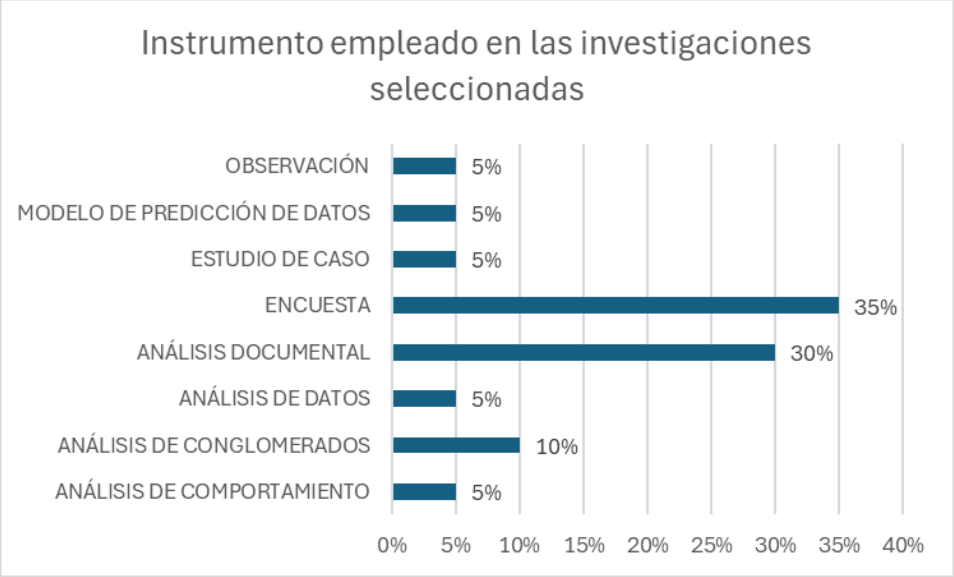
Source: own elaboration.

Of all the studies collected, two types of instruments were identified as the most commonly used to obtain information. In the case of quantitative studies, the most common instrument was the survey, which accounted for 35% of the cases, making it the most widely used of all the research articles. The survey brings great value to this type of study, especially in terms of validity in other regions, since it simply allows mass applications and presents extensive results that enrich the research (Casas Anguita et al., 2003).

On the other hand, as for the qualitative part, the most used instrument was the documentary analysis, which represents 30% of the total number of research articles. This is an important instrument, as it provides value for the research in question since one of its objectives is to keep previous information up to date with contemporary viewpoints and context. The dynamism of this type of research makes it possible to know the evolution of the variables (Peña and Pirela, 2007).

Figure 5

Distribution according to the instrument used in the research



Source: own elaboration.

Specific result 3: Conclusions on the relationship between artificial intelligence and advertising.

Table 5 shows the main conclusions drawn from each research study analyzed, together with their respective authors and year of publication. These allow us to know the main findings of each article and how they support the main idea of each one.

Table 5

Authors and main conclusions of selected research studies

Autor(es), Año	Conclusiones
(Rodgers and Nguyen, 2022)	The study highlights how artificial intelligence has dramatically changed the way organizations communicate, understand and interact with their potential consumers.
(Lee et al., 2021)	The application of explanatory artificial intelligence (XAI) technologies allows for better interpretation of machine learning results, especially in the context of retargeting ads, where a non-linear relationship between consumers and shopping malls was found.
(Wen et al., 2022)	Computational advertising enables intelligent improvements thanks to the combination of artificial intelligence algorithms and big data, achieving greater accuracy, personalized communication and contextual interaction with users.

(Liu-Thompkins et al., 2022)	Integrating artificial empathy into marketing interactions improves the customer experience, aligning the interests of businesses and consumers, and overcoming the preference for human interactions.
(Voorveld et al., 2023)	Four consumer groups were identified in relation to algorithmic persuasion in social networks. The Control Paradox group was aware of and comfortable with algorithmic persuasion. The Fatigued group was also aware but felt unable to deal with it. The Uninformed but Critical group was vulnerable and had little information about algorithms. The Skilled and Critical group was aware and able to deal with algorithmic persuasion.
(Ciuchita et al., 2023)	Consumer attitudes toward programmatic advertising show a positive relationship with attitudes toward the retailer. Likewise, the perceived relevance of ads has a positive relationship with attitudes towards programmatic advertising. In addition, the use of Artificial Intelligence for programmatic advertising shows benefits, and a positive effect was found. However, consumers still show some confusion about Artificial Intelligence.
(Guerreiro et al., 2022)	The results indicate that customer acceptance of advertisements through smart assistants depends on the usefulness of the assistant and hedonistic motivations. However, privacy risk affects the relationship between smart speaker usability and usefulness.
(Arango et al., 2023)	Study 1 found that knowing that a face is fake or generated by artificial intelligence reduces donation intentions, mediated by empathy and anticipatory guilt, as well as empathy and emotion perception. Study 2 showed that charities may benefit from highlighting their ethical motives when using AI-generated images. Study 3 revealed that, in extraordinary situations, consumers accept the use of AI images, obtaining similar results to real images.
(Choi and Lim, 2020)	This study analyzes the use of machine learning techniques in online advertising strategies to improve ad targeting. It classifies strategies into user-centric and content-centric approaches and highlights the importance of detecting click fraud. This lays the groundwork for future research on optimization and safety in online advertising.
(Campbell et al., 2022)	D*eep fakes* and confrontational generative networks leverage powerful artificial intelligence creative tools to generate compelling and realistic advertising content. As these technologies become more widely adopted in the advertising industry, manipulated advertising will present significant

	opportunities and threats.
(Sands et al., 2022)	The study shows that as consumers' need for uniqueness increases, so do the positive effects of an AI influencer. Therefore, for brands that design products, services, or experiences for people who strive to be unique, using an AI influencer will work well.
(Efthymiou et al., 2024)	The results demonstrate that greater voice-to-product congruence leads to substantially more effective advertising performance and overall economic benefits. It is recommended that companies think more systematically about the voice design of AI-driven conversational agents rather than using off-the-shelf alternatives.
Ho and Chow (2024)	Several effective techniques, such as OPT, LSTM and KeytoText, have been discovered and implemented to generate a variety of text-based marketing ads.
(Tapu et al., 2020)	The implementation of the DEEP-AD framework demonstrates the potential of artificial intelligence to significantly improve ad insertion on online video platforms. Using advanced deep neural network algorithms and multimodal video targeting techniques, the system can automatically determine the most appropriate times to insert ads, optimizing contextual relevance and minimizing intrusiveness for viewers.
(Zatonatska et al., 2022)	The use of machine learning algorithms, such as Light GBM, can significantly improve advertising and subscriber retention campaigns. Artificial intelligence makes it possible to accurately identify the subscribers most likely to stop using the service and target personalized campaigns to maintain their loyalty.
(Wang et al., 2023)	It is concluded that, among the Z Generation and the consumption of personalized technology services, the concern for information privacy increases. Likewise, AI-personalized technology services enhance perceptions of desirability among the Z Generation. On the other hand, increased information privacy concerns may promote psychological dissonance about technology.
(Méndez-Suárez et al., 2023)	It is concluded that the public still does not show sufficient interest in the management of their private data about artificial intelligence. For their part, companies seem to be concerned only with avoiding fines and becoming accomplices in unethical practices that affect society.
(Sands et al., 2024)	Advertising with generative AI must be ethical, transparent, and accountable, respecting privacy, avoiding bias, and ensuring human oversight to build trust and efficacy in the

	industry.
(Matz et al., 2024)	The use of large-scale language models (LLMs) such as ChatGPT has proven effective in generating persuasive content. As AI continues to evolve, it is likely to further transform the advertising industry, offering new ways to influence consumer behavior and expanding the role of marketers in creating more effective and personalized strategies.
(Halpin, 2023)	Artificial intelligence has been used to transform the Semantic Web into a means of social and economic control, where digital representations of people and/or businesses are exploited to manipulate purchasing intentions and attitudes towards a brand, whether personal or corporate. To overcome this control, a political and economic revolution is required to reclaim meaning and knowledge from the corporate domain.

Source: Prepared by the authors.

There is a strong relationship between artificial intelligence and advertising in the decade 2020 - 2024. In this sense, artificial intelligence has revolutionized the way organizations communicate, understand, and interact with consumers, and optimize their resources, which has been fundamental for the development of more effective and personalized advertising strategies.

Transformation in communication with consumers

First, according to Rodgers and Nguyen (2022), artificial intelligence and its subsets, such as machine learning, deep learning, and neural networks, have revolutionized advertising. These technological advances allow for greater precision and personalization in communicating with consumers. In this regard, their study suggests that AI systems can analyze large volumes of data to identify individual patterns and preferences, allowing advertisers to tailor their messages more effectively to the specific needs and desires of each user. In addition, they emphasize the inclusion of algorithmic ethical pathways to help address issues such as bias, transparency, ownership, and consent in the use of artificial intelligence. This is because algorithms are designed to assist consumers in their online purchasing decisions, but it is not always done fairly or transparently.

Perception and acceptance of artificial intelligence by consumers.

The Liu-Thompkins et al. (2022) study acknowledges that while the potential benefit of AI is clear, its value is unclear and has raised doubts in marketing. “This is because, in contrast to companies' enthusiasm for the use of artificial intelligence, consumers are still unconvinced by AI-enabled interactions and often opt for actual interactions with human employees” (p. 16). Specifically, the use of artificial empathy in a company benefits consumers with a high need for affection but is unnecessary or even detrimental to consumers with a low need for affection. Therefore, the author concludes that this tool can create value if it is able to close the affective experience gap between humans and AI.

Based on the above, Voorveld et al. (2023) identified four groups of consumers about algorithmic persuasion in social networks. Control Paradox, who are aware of algorithms and consider them appropriate, finding a balance between benefits and costs. Fatigued, who are also aware of algorithms, but find them inappropriate and feel unable to deal with them. Uninformed but Critical, are more vulnerable due to their lack of knowledge and skills. Finally, *Skilled* and *Critical*, are aware and critical of algorithmic persuasion and have skills to handle it.

As a result, the need to adapt artificial empathy to the different needs and levels of awareness of each group is evident. The importance of applying it in marketing is to implement algorithms that can interpret and respond to users' emotional signals so that companies can understand and respond to consumers' needs more effectively.

Improved advertising accuracy and personalization

According to the study by Wen et al. (2022), “Computational advertising, driven by the combination of artificial intelligence algorithms and big data, has enabled significant improvements in accuracy, personalization of communication, and contextual interaction with users.” (p. 9). This has led to greater effectiveness in advertising campaigns, optimizing resources, and improving ROI. Therefore, a positive trend in the field of advertising is the growing perception of the existence of effective algorithms in artificial intelligence. This

implies that digital advertising tools have the potential to generate effective results. In this regard, Li et al. (2023) highlight the ability of AI-based algorithms to tailor advertising according to the user's needs and desires and to expose them voluntarily to ads.

CONCLUSIONS

The analysis of the research collected in this study made it possible to identify a diversity of approaches, scopes, and instruments used. In terms of approach, it was observed that 35% of the studies applied a qualitative approach, while 65% opted for a quantitative approach. This diversity of approaches is important, as it allows for a more complete understanding of the phenomena that impact advertising from different perspectives. The instruments used in the research were conceptual frameworks, surveys, data analysis, and behavioral analysis. Also, it was observed that the scope of the research is variable, indicating that the phenomenon of artificial intelligence in advertising is constantly evolving and has a large interest group that seeks to further understand this phenomenon and share trends with users. In addition, regarding the instruments used, it was evidenced that surveys and documentary analysis are the main resources used by researchers, due to their ease of application, massiveness, and dynamism, which are aligned with the growth of the phenomenon studied.

Based on the literature studied, AI-based advertising presents several significant opportunities, one of the most prominent of which is the ability to improve ad personalization and targeting. This not only improves the relevance of ads but also increases the effectiveness of advertising campaigns and optimizes ROI (Rodgers and Nguyen, 2022). Another important opportunity is the operational efficiency that artificial intelligence can provide. Automating repetitive tasks, such as data analysis and ad placement, allows companies to operate more efficiently and reduce costs. In addition, the ability of logarithms to make real-time bids ensures that ads are shown to the right audience at the right time, maximizing the effectiveness of campaigns (Liu-Thompkins et al., 2022). Finally, artificial intelligence offers innovations in advertising creativity, assisting in the generation of engaging and innovative content, such as personalized videos and interactive ads, which can better engage consumers and improve interaction with brands (Huang and Rust, 2018).

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On the other hand, one of the main challenges in AI-based advertising is algorithmic bias. AI systems, when trained on historical data, can perpetuate and amplify existing biases in the data, leading to discriminatory advertising practices. This not only affects fairness in advertising but can also damage the reputation of brands that implement such systems (Davenport et al., 2020). In addition, consumer privacy is a growing concern. The collection and use of personal data needed for ad personalization can raise privacy concerns, negatively affecting consumer trust in brands using these technologies (Liu-Thompkins et al., 2022). Therefore, it is important to constantly measure and evaluate the results of AI algorithm-based ad campaigns to ensure that they are meeting business objectives and adjust strategies as needed.

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