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# Search Engine Evolution with Generative AI: Rethinking Search-Based Advertising Strategies in the Era of AI-Overviews and Answer Engines

**Tarun Gupta*[1] and Supriya Bansal[2]**

[1]Marketing, Reckitt, New Jersey, USA

[2]E-commerce, LuxeWeavers, New Jersey, USA

**ABSTRACT**

This research describes the technology that generative artificial intelligence (AI) is using in search advertising, as well as Google's Search Generative Experience (SGE), Bing Copilot, and conversational services such as ChatGPT and Perplexity AI. To explore a qualitative analysis approach, it examines the shift from the search engine results pages to AI-produced summaries, conversational responses, and multimodal interfaces between text, image, and voice. It focuses on the AI-Integrated Search Marketing Model, which describes how to design conversational ads, predict audience targeting, and adaptive bidding in real-time AI environments. Studies indicate that generative AI reduces organic visibility and provides a more participatory discovery by enhancing engagement-based knowledge, and marketers also need to prioritize semantic relevance, contextual authenticity, and multimodal creativity. As the paper concludes, the future of search advertising needs to incorporate AI-driven personalization with ethical and transparent marketing practices. The recommendations are for continued adaptation to increasingly dynamic conversational and multimodal search environments.

***Corresponding author**

TarunGupta, Marketing, Reckitt, New Jersey, USA.

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## Introduction

Over the last twenty years, information search methods have changed drastically among the population. The early search engines worked mainly by indexing words and providing the relevance of links to give a list of the blue links in a ranked fashion. Both organic discovery and search-based advertising were based on this traditional ten-blue-links model, with advertisers bidding on keywords and paying when user clicks through advertisements or listings. Nevertheless, the introduction of large-scale language models and language models powered by generative-AI search experiences is starting to change that. Functions such as AI-generated summaries or answer engine-like results no longer simply redirect a user to a link- they are engineered answers displayed as text directly on a search results page [1]. These developments are a great reconsideration of both user experience and monetization paradigms in search.

This paradigm is an explicit issue: generative AI is threatening the old paradigm of search-advertising. As searches have concise AI-overviews or conversation responses instead of a list of links, the advertising/bidding strategies based on the link-driven clicks and keyword auctions are not necessarily the best anymore. As an example, it is revealed that even when brands are presented in the AI-overview citations, the clicks per link decline significantly in comparison with the traditional organic links [2]. Furthermore, according to market projections, shoppers are already switching to the AI-powered search engine, and a considerable share of search traffic and ad income will be jeopardized [3]. Such changes cause advertisers to question: how do we need to replenish our tools in bidding, targeting, and ad-format design when these underlying user interface and intent cues have changed?

It is on this backdrop that this study will set about analyzing how generative-AI-driven search experiences are changing user behaviour, query intent, and ad visibility- then subsequently offering a proactive, futuristic, strategic model of search-based advertising in the answer engine age. In particular, the paper will address the technology that facilitates these changes (large language models, retrieval-augmentation generation pipelines, real-time data feeds), chart the transformation in user search behavior towards conversational versus multi-link SERP models, and relate these changes to wider trends in paid search revenue, bidding, and ad design. The main research questions that can guide this research study are:

1. What effects do AI-overviews/conversational answer engines have on user behavior and ad visibility?
2. How do you propose strategic modifications to bidding, targeting, and ad-format design as the generative-AI-enabled search changes the ecosystem?

The research method will be as following: first, the literature review will trace the development of search engines and advertising models, second, the methodology section will explain how data and analysis have been collected; third, the technical under-pinning and changes in search-experience will be discussed; fourth, market dynamics and advertising implications will be analysed,

fifth, two generative-AI use-case (conversational interactions and predictive analytics) will be thoroughly discussed; sixth a strategic framework will be proposed; seventh, implications and limitations will be discussed and finally conclusions will be given and research-suggestions will be provided:

## Literature Review

### Evolution of Search Engines

A wider technological change towards the generation, as opposed to the retrieval of information, is seen in the development of search engines as the generation of dynamic, contextually based knowledge. Primitive forms of search, including the PageRank, were search engines that used a link-based relevancy approach to ranking web pages based on the amount and quality of inbound links [4]. This model was also dependent on matching keywords and backlink structures and practically rewarded popularity instead of relevance and depth of semantics. This method was efficient in the early web, but it could frequently fail to grasp the purpose of the queries of the users, particularly when they are in natural language [5].

Semantic search developed as a reaction to these shortcomings in the 2010s. Through natural language processing (NLP) developments, algorithms started to analyze the overall context of querying information instead of focusing on single words [6]. These systems enabled search engines to learn about connections among the entities to enhance relevance and personalization.

User data analytics also supported the move toward more personalization, whereby the results varied based on where users were, which device they were using, and previous interactions [7]. But with the newest occurrences in artificial intelligence (AI), search has changed once again, returning the applicable links to creating artificial responses. The search has also turned into content generation as generative models have emerged, such as GPT produced by OpenAI and GM produced by Google [8]. This change ushers in "answer engines that are AI that produce coherent responses, not a summation of answers. The more that users interact with conversational interfaces, the less competitive the classic metrics of click-through rate (CTR) and dwell time will matter, meaning that the traditional modes of information discovery and monetization on the Internet are changing fundamentally [9].

### Generative AI and LLM Technologies

Generative search is based on large language models (LLMs). GPT-4, Claude 3, and Google Gemini are trained on large text collections where they learn probabilistic language patterns as a result of which they are able to generate coherent, human-like responses [10]. In contrast to previous AI systems, which used structured databases to provide information, LLMs use unstructured data across fields and contextually synthesize information. This recommender ability restates the meaning of search: rather than a list of relevant pages, the AI summarizes information in the immediate response to a query [11].

One important development that makes this possible is Retrieval-Augmented Generation (RAG). RAG models integrate the accuracy of search retrieval systems with the fluency of generative ones, accessing current, factual information at external sources and then providing answers [12]. Such a hybrid structure alleviates the hallucination issue of generative models in which the model directly generates output based on unrealistic data [13]. Such firms as Microsoft and Google have implemented analogous architectures in Bing Copilot and the Search Generative Experience (SGE), respectively, backing retrieval systems with LLM reasoning to provide contextual and citation-supported responses [14].

These systems are further augmented with real-time data pipelines, which enable them to learn continuously based on the interactions of the users. Rather than unchanging model updates, AI-driven search engines currently use reinforcement learning based on human feedback (RLHF) and streaming APIs to make contextual accuracy more accurate as time elapses [15]. This continuous adaptation positions generative AI as an active learning agent rather than a static index, reshaping both the reliability and personalization of results.

But researchers claim that this progress is accompanied by transparency as well. The higher the autonomy of a model, the more difficult it is to audit the logic behind its responses [16]. This uncertainty puts advertisers and content creators in a tough situation when they want to be visible in AI-driven output, as ranking algorithms have been stripped in favor of probabilistic generative synthesis, which is not readily optimized using existing data optimization tools (e.g., SEO and paid) or commonly used algorithmic marketing tactics (e.g., re-targeting).

### Theoretical Lens: Attention Economy and Search Advertising Models

The use of generative AI in search should also be perceived in the context of the attention economy, in which user attention is a limited resource that is exchanged between advertisers, platforms, and consumers [17]. The classic search advertising also leveraged user intent, which was expressed through the means of a keyword, where marketers could bid to get attention through cost-per-click (CPC) auctions [18]. Paid search was based on three such mechanisms, including keyword relevance, quality of ads, and bid price, which all influenced the prominence of an advertiser on a results page.

This model is, however, challenged by the emergence of zero-click searches, whereby users get the answer without going to other websites [19]. Attention in AI-overview worlds is focused on a single synthesized response instead of being spread over many links. This narrowing of attention essentially modifies conversion pathways. When the search results provide a unique conversational output, it causes cognitive focus amongst users that minimizes the opportunity to see ads and enhances consumer interaction with the platform [20]. Therefore, the value chain is shifting to in-platform monetization of engagement, which is based on external web traffic, as opposed to being based on advertisers.

Temporal dynamics of attention also vary when conversational interfaces are introduced. Traditional search takes the user through a list of multiple search listings, whereas AI-powered chat presents interaction in a one-way manner that can often appear as a conversation [21]. This continuity gives a greater level of engagement but restricts the amount of visible ad opportunities. According to some researchers, it may be an incentive for building native conversational advertisements-sponsored prompts within AI conversations [22]. However, ethical controversy continues regarding the merging of sponsored posts and natural AI-supported reactions.

Economically, the shift between the way keyword auctions work and how personalization is achieved under the limits of AI can be viewed as the redistribution of visibility and bidding positions. Because generative engines in their current form read intent

dynamically as opposed to explicitly themed, advertisers will need to embrace models of predictive analytics and contextual relevance to compete successfully. Contextual resonance, as opposed to the acquisition of attention by the use of keywords, is becoming part of a new ecosystem of advertising and a new era of measurement, representing a paradigm shift in the advertising approach.

## Methodology

The type of secondary data to be used in this study will be publicly-accessible repositories, which are the Online Retail Dataset, published by the UCI Machine Learning Repository, and the E-commerce Customer Data, published by Kaggle. The datasets are established benchmarks of CLV and churn prediction studies, providing anonymized transaction-level data of online retail companies [16]. The combined dataset comprises approximately 8,500 unique customers with a time range from January 2018 to December 2022, containing over 28 features: 20 transactional, 5 behavioral, and 3 demographic variables. The data will be divided into three categories: transactional data, behavioral data, and demographic data. Transactional data comprises order frequency, average order value (AOV), and recency, which are the direct purchasing behavior variables. Examples of metrics in behavioral data are the number of web page visits, the e-mails, and the duration of browsing, whereas the demographic data will encompass their age, location, and job title [17].

The research design used in the study is a qualitative-analytical research design, which will combine technological mapping with market trend analysis to explore the way in which generative artificial intelligence (AI) is changing search-based advertising. This qualitative method is suitable as the aim of the study is to describe and explain dynamic changes, but not to quantify fixed variables [23]. Through secondary data analysis based on industry reports, technical documents, and peer-reviewed studies, the approach aimed to develop a conceptual explanation of how online advertising is reorganized and re-priced through the use of large language models (LLMs) and answer engines.

The study is based on a variety of secondary data to provide triangulation validity. The primary resources are the official market reports and white papers of Google, Microsoft, and OpenAI, which outline the implementation of generative search algorithms, such as Search Generative Experience (SGE), Copilot, and ChatGPT with browsing [24-27]. Additional information is provided in industry revenue sources, including Statista, eMarketer, and McKinsey market outlooks, which monitor paid search behavior and spending on advertising. These are supplemented by scholarly literature in consumer search behaviour and interaction between consumers and conversational systems [20]. The retrieval-augmented generation (RAG) and reinforcement learning using human feedback (RLHF) are also discussed to trace how the computational processes of ad delivery and personalization work [12,15].

The analytical framework integrates technological mapping, which involves mapping the development of AI architectures in search and market trend analysis, which links such developments in relation to the economic and behavioral consequences. Technological mapping explains change in search functionality and ad placements, as enabled by RAG systems, data pipelines, and real-time feedback loops. The market trend analysis looks at how such developments impact the click-through rates, cost-per-click bidding, and the advertiser's ROI. Collectively, the techniques demonstrate the way technological development works with business concepts and user behavior and are used to construct the strategic framework of adaptation in the subsequent sections.

The study will be restricted to generative AI in search engines, meaning Google, Microsoft, and other new engines like Perplexity AI. The research does not consider AI-based advertisement on social media or retail websites to stay conceptually focused. Robust to these weaknesses, this analysis will rely on publicly available data, which might be missing proprietary algorithms or internal revenue breakdowns. Further, since the generative search is still in the active research stage, the results are to be considered exploratory and not definitive in nature, and thus provide a theoretical base to further empirical studies.

## Technical Evolution and Shifts in Search Experience

### From SERPs to AI-Overviews

Generative AI technologies are changing the basic structure of the traditional Search Engine Results Page (SERP), which, until recently, has been the backbone of the online search experience. The Search Generative Experience (SGE) of Google and Microsoft Copilot Bing is a movement from the stale list of links to dynamic, synthesized summaries of data [25]. These systems do not provide a list of multiple blue links as they would have done before, but instead, in a condensed form, they tend to combine material from more than one high-authority body. The engine is based on the large language models (LLMs) presented in the form of a user query, which is contextualized to retrieve the necessary web data and formulate a coherent narrative response with citation links to provide transparency and accuracy [27].

The user behavior and the economics of the search advertising are directly impacted by this change. Because artificial intelligence (AI) overviews can provide adequate answers without a user having to leave the tool and visit websites, the number of organic clicks has decreased, and the visibility of paid advertisements has been diminished in certain industries [1]. An example is that researchers have found a drop in the click-through rates (CTR) up to 25% of traditional advertisements in search experiences where SGE works [28].

**Table 1: Comparative Overview of Traditional serp vs. AI-Generated Overview Models**

| Search Format | Key Characteristics | User Behavior | Ad Visibility |
|---|---|---|---|
| Traditional SERP | List of ranked links | Click-driven | High |
| SGE / Copilot | AI-summarized responses | Engagement-driven | Moderate to Low |

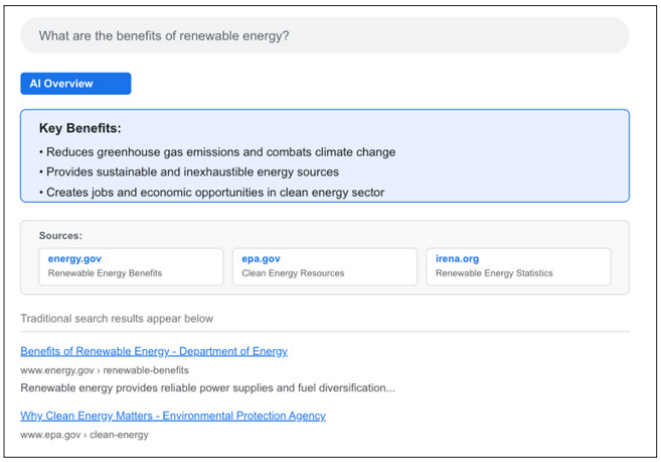


**Figure 1:** Illustration of the AI-Overview Layout Showing Condensed Answer Boxes and Citation Links Beneath the Generative Summary

The larger implication is that marketers have to reconsider the visibility strategies in AI-edited spaces. Instead of maximising with regard to rank, the semantic relevance and prompt-level optimization, where content is also preferred by the LLM retrieval models, are taking center stage in sustaining digital presence [20].

### Conversational Answer Engines

The generative AI has led to the development of conversational answer engines, which focus more on dialogue and contextual meaning than on matching search terms. Visually interactive systems like Perplexity AI and ChatGPT have features to browse and allow users to pose follow-up questions, refine search queries, and conduct compound interactions [29]. It is the first break in the linearity of traditional search, and is an improvement over the ten blue links model, favored by fluid, changeable interactions that can simulate a human conversation.

The process of query formulation in conversational search is changing. Rather than the short, transactional queries, such as best running shoes, descriptive queries are now being entered by the user, such as Running shoes with high ankle support to train in a marathon. The AI model deciphers intent, contextualizes preferences, and customizes results on-the-fly [30].

Advertising-wise, with this development, there are challenges and opportunities. Contextual prompt targeting and conversational relevance scoring are becoming crucial in placement in advertising, where ads can no longer rely on keyword bids [24]. Otherwise, sponsored responses should be organic in a conversation and not disruptive. This is a move towards exposure-based advertising, to engagement-focused messaging in which the AI agent selectively presents the brands that align with the inferred intent of the user.

Subsequently, advertisers are encouraged to make their advertisement content conversationally ready so that their product or service can be surfaced as a part of an AI response. The loss of the so-called ten blue links would imply a situation in which brand recall is determined by the dynamics and continuity of dialogue and the reinforcement of context, but not visible presence, in isolation [31].

### Multimodal Search Interfaces

Multimodal integration into AI-driven technology is the next frontier in search experience as images, voice, and videos come together in search. Google Lens, Bing Visual Search, and the GPT-4 of OpenAI have already shown positive results in processing mixed input, including a verbal query and an image upload, to produce more adaptable and richly contextualized answers [27]. It is a combination of modalities that broadens the way the user can communicate intent and the way the advertiser can communicate value.

Multimodal AI builds on contextualized personalization in a real-time environment, where environmental and location cues, along with past engagements, perk up the search results [32]. To illustrate, local search results are activated, as is the AI-generated summary, by a user who takes a picture of a product and asks, Where can I buy this nearby? This situation combines old-fashioned search features, recommendation engines, and e-commerce channels in one streamlined experience.

To the advertisers, the implications are far-reaching. The advertising ecosystems that prioritize visual and display advertising should adjust to an AI-fueled curation, whereby the location of ads is informed by multimodal contextual features but not by targeting parameters, which remain fixed. One of the innovations taking shape is adaptive creative optimization (ACO), which is a visuals that automatically matches the context of a multimodal search [33].

**Table 2: Interaction of Input Types with AI Search Interpretation and Advertising Opportunities**

| Input Type | AI Interpretation | Ad Integration |
|---|---|---|
| Text Query | Semantic parsing | Contextual prompts |
| Image Upload | Visual recognition | Visual product ads |
| Voice Command | Intent detection | Audio-based recommendations |

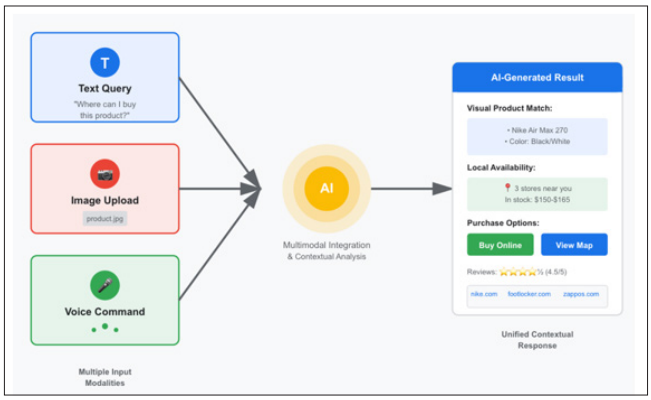


**Figure 2:** Concept Diagram of Multimodal Search Integration, Showing Text, Image, and Voice Inputs Converging into a Unified AI-Generated Result Panel.

### Impact on Search Advertising and Market Dynamics

### Changing User Behaviour and Query Intent

Generative AI has transformed the process of searching through engines in the simplest way. Users are gradually giving up typing fragmented keywords, querying both conversational prompts that resemble natural conversation [34]. This transition towards intent-based search is indicative of a greater contextualization and personalization of AI-based search engines like Google Search Generative Experience (SGE) and Microsoft Copilot Search [25,26]. Since the answers generated by AI are at the top of the search when they are in answers, users can find their full responses without clicking on the outcomes leading to other webOS.

Recent data indicate that more than two-thirds of transactional clicks (the search to an external site) have begun to decrease by up to 20 percent after the addition of AI overviews [35]. Users spend more time in the interface provided by the AI, which implies an increase in the contextual and informational intentions and a decrease in immediate purchase behavior [36]. This change lessens conventional ad stock, specifically that of cost-per-click advertisers who rely on high-traffic keywords.

What this means is that advertising techniques need to adapt to conversational search patterns, where user interaction is measured not by the number of clicks but by the exposure within responses provided by the artificial intelligence engine. Instead of bidding on a specific transactional keyword, marketers are optimizing on semantic relevance and brand location in AI summaries.

**Table 3: Change in User Search Behaviour (2023-2025)**

| Behavior Type | Traditional Search (%) | AI-Driven Search (%) | Change Trend |
|---|---|---|---|
| Transactional queries | 45 | 30 | -15 |
| Informational queries | 35 | 40 | +5 |
| Conversational queries | 20 | 30 | +10 |

### Ad Visibility and Revenue Models

The visibility of ads in search ecosystems is being shaken by generative AI. In the traditional search, sponsored links would be displayed at the top or at the side of the natural results. But where AI is involved, as with Google SGE or Bing Copilot, fashion ads are competing with AI-created summaries to capture the attention of users [24]. Since such systems focus on user-centric solutions, the traditional ad placements fall into the background, so the share of impressions decreases.

According to the financial report by Google in Q2 2024, search ad revenue growth slowed by 5 percent, which is explained by the fact that the full monetization of the outcomes of generative AI has not yet occurred [37]. This degradation is a way to express the increasing difficulty in placing advertisements in conversation replies without intruding on the user experience. Consequently, the big platforms are testing AI-generated sponsored replies, where the advertisement is contextually inserted into the summaries produced by intent detection [38].

In addition, engagement-based pricing models are replacing the classic CPC model, as advertisers are required to pay to be included or seen within the contexts created by AI-based sources instead of paying immediately when someone clicks on an advertisement [39]. This may transform into a cost-per-engagement (CPE) model or even a contextual impression, rewarding relevance as opposed to volume.

**Table 4: Evolution of Ad Pricing Models in Search**

| Period | Dominant Pricing Model | Key Metric | Platform Example |
|---|---|---|---|
| 2015–2022 | CPC (Cost-per-Click) | Clicks | Google Ads |
| 2023–2024 | CPA (Cost-per-Acquisition) | Conversion | Meta Ads |
| 2025–Future | CPE (Cost-per-Engagement) | Contextual Relevance | SGE, Bing Copilot |

A possible prospective scenario includes the AI-generated advertisement synthesis, wherein the generational models generate customized advertisement plots that are perfectly aligned with user intent. An example would be where a user queries, what is the best electric car to drive in the city? The AI would incorporate sponsored recommendations into the answer, so that it flows as part of the generated answer.

### Competitive Landscape and Market Trends

The search advertising change is creating a more competitive and fragmented market. Smaller AI-based companies, like Perplexity AI, Claude by Anthropic, and You.com, are already fighting back against Google by providing privacy-friendly and conversational search [29,40]. Such competitors use large language models (LLMs) to provide more contextually correct responses without excessive advertisements and attract users who are depressed by the traditional ad experience in search.

The development of a substitute ecosystem is transforming the competitive scale within digital advertising. Newer players are now developing independent AI ecosystems by partnering strategically with publishers and data providers, as Google and Microsoft still hold the majority of the market share [41]. Nonetheless, it might also result in the consolidation of markets since the cost of running generative AI systems is excessive and may make smaller players become targets of mergers and acquisitions by tech giants [42].

In the long term, the development of proprietary artificial intelligence systems may strengthen monopolies instead of making access democratic. The digital ad market is becoming more and more monopolized amid these platforms taking full control of the data pipelines and the delivery process of ads, which could ultimately become the duty of some select large AI service providers.

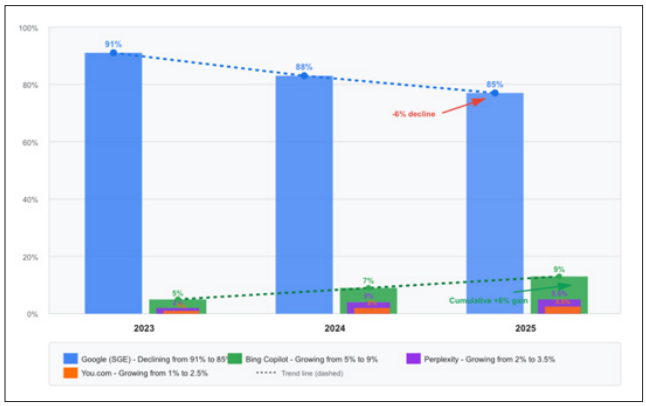


**Figure 3:** Concept Diagram of Multimodal Search Integration, Showing Text, Image, and Voice Inputs Converging into a Unified AI-Generated Result Panel.

### Generative AI Use Cases in Advertising Transformation Conversational Interactions and Voice Search

Generative AI has reinvented search as a dynamic, conversational experience, changing the way people explore, judge, and engage with material. Layered questions, answers presented through dialogues, and follow-ups processed naturally are replacing traditional keyword-based queries, where users pose layered questions and get answers [34]. It is a change that is being facilitated by conversational agents like the SGE offered by Google, the Microsoft Copilot, and the ChatGPT-powered search offered by OpenAI, which will enable the search to become a two-way dialogue instead of a one-off query [25,26].

The development takes the form of new touchpoints of advertising integrated into the conversations. As an example, Microsoft has

tested Copilot Ads that are displayed in the form of contextual sponsored prompts or conversational suggestions based on user intent. Likewise, conversational shopping experiments by Google incorporate product placements into the artificial conversations generated by AI, like proposing a product or brand when a buyer is searching for what to buy [25]. Ads do not appear as banners or permanent links and thus are less disruptive, but more relevant to the context, instead of appearing through dialogue with AI [39].

Nonetheless, entry opportunities for smaller advertisers are also diminished by the move towards conversational interfaces. Since generative AI tends to rank very narrow, high-relevance responses, few brands are given placement in AI responses, resulting in possible concentration of visibility between large advertisers [38]. This interaction may lead to solidifying the dominance of the platforms that are tech giants and can incorporate paid placement into proprietary AI ecosystems [42].

**Table 5: Evolution of Advertising in Conversational and Voice Search Environments**

| Era | User Interaction Type | Ad Format | Key Platform Example | Impact on Advertisers |
|---|---|---|---|---|
| 2015–2020 | Text-based keyword search | Display/CPC Ads | Google Search | Broad visibility, multiple ad slots |
| 2021–2024 | Conversational AI Search | Sponsored Chat Prompts | Microsoft Copilot | Reduced ad slots, context-driven engagement |
| 2025–Future | Voice and multimodal search | Contextual Voice Ads | Google Assistant, Alexa | Narrow ad access, higher personalization |

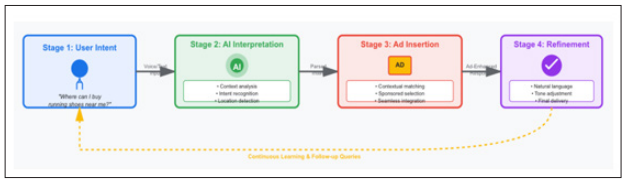


**Figure 4:** Conversational Flow of AI-Powered Advertising

### Predictive Analytics and AI-Enhanced Targeting

Predictive analytics is a generative AI-powered technology that reinvents the process of advertising. Through the use of large language models (LLMs) as well as transformer-based designs, advertisers will be able to read the minds of their users even prior to them clearly declaring their needs [27]. Such models examine the user embeddings, which are multi-dimensional user behavior, intent, and preference representations, to develop predictive intent models used in delivering advertisements [39].

Using these pipelines, AI can predict which piece of a message, form, or product is most likely to result in conversion at a particular time. Intelligence Advertising systems, such as Google Ads and Microsoft Advertising, currently incorporate AI-powered projection systems that project campaign performance based on both historical data and present contextual features, as well as behavioral feedback [24,26]. This preventive cycle enables real-time efficiency of budget expensing, advertisement creatives, and timing delivery.

Another interesting development is dynamic audience segmentation, in which AI constantly optimizes audience clusters based on live behavioral information. Advertisers have the opportunity to use hyper-personalized segmentation instead of using static demographic targeting, which is updated in response to an actual interaction or feedback loop [41]. As an example, whenever one interacts with content related to electric vehicles, the AI can instantly change the way ads are delivered to products or services like eco-friendly solutions.

**Table 6: Voice Search Environments**

| Feature | Traditional Targeting | AI-Enhanced Predictive Targeting |
|---|---|---|
| Basis | Keywords & demographics | Behavioral embeddings & context |
| Frequency | Static (set pre-campaign) | Dynamic (real-time updates) |
| Optimization | Manual (A/B testing) | Automated (reinforcement learning) |
| Personalization | Limited | Hyper-personalized |

Creative optimization is also reconstituted by generative AI. Rather than just applying ad copy as designed by human advertisers, thousands of combinations of ad text, images, and call-to-actions are created and tested in real-time by AI systems [38]. This creative AI-enhanced generation can assist in aligning tone, visuals, and message to the user sentiment and context, and can increase the level of engagement by 15-30% based on recent trend reports [35].

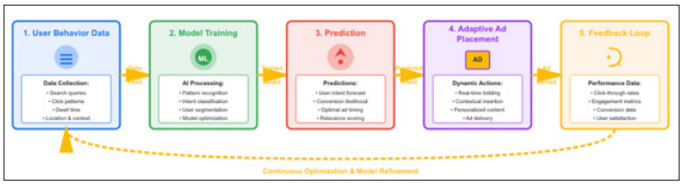


**Figure 5:** AI Predictive Pipeline for Ad Optimization

### Ethical and Privacy Considerations

Generative AI increases the level of personalization and precision of targeting, although the ethical and privacy issues have also been quite pressing. Deep behavioral data should be used by ensuring clear consent and disclosure to keep the user confident [39]. Model bias would cause discrimination in targeting or exclusion of certain groups, whereas opaque data also compromises accountability [42]. Explainable AI systems and legislation about data protection are being prioritized by the regulators, thus making advertisers make sure that their personalization does not overstep their privacy limits and that their use is within personal authority. Striking the right balance between the commercial interests and ethical responsibility will be the key to sustainable advertising led by AI.

### Strategic Framework for Future Search Advertising

This new requirement of transforming search into an AI-programmed answer engine requires a new strategy for advertisers. The proposed research framework is the AI-Integrated Search Marketing Model (AISMM) that incorporates the concept of conversational optimization, predictive analytics, adaptive bidding, and multimodal placements to allow the brands to keep their presence and stay engaged in the context of generative AI search input.

**Layer 1:** Conversational Experience Optimization is concerned with aligning the ad design with the dialogue-based search interfaces. The traditional banner or link-based advertisements cannot be used in AI-based environments in which users communicate using natural language [34]. Managed by an adequately trained, certified, and authorized fake assistant, brands should create contextual conversational advertisements, such as sponsored prompts, embedded product mentions, or virtual brand assistants, so that they are present in AI-generated reactions [25]. The goal is to develop advertisements that fit in with user conversations, and they need to be authentic and relevant.

**Layer 2:** Predictive Audience Intelligence uses AI-based segmentation and user embeddings to predict intent, the probability of engagement, and the probability of converting [39]. The advertisers can predict user requirements, optimise messaging, and focus on high-value groups in real-time. This layer provides hyper-personalization whereby audience groups are constantly being updated based on behavioral feedback, resulting in dynamic targeting and not being directly reliant on any specific keyword [27].

**Layer 3:** Adaptive Bidding Mechanisms presents real-time contextual bidding. Traditional CPC auctions are determined by historical data; in unstructured AI feedback, AI forecasts ad relevancy on the fly, and optimizes bids to create the largest number of impressions or to stitch the most compelling AI summaries [38]. This method is more efficient yet relevant enough so that brands will not pay too much money for impressions in restricted AI-generated advertisement placements.

**Layer 4:** Cross-Modal Integration deals with multimodal, voice, and the visual interface. With the growth of generative AI in voice assistants and search features, advertisers need to plan both cross-modal campaigns to retain brand awareness [36]. This layer unifies search, image, video, and voice advertising into a more integrated ecosystem, enabling brands to further reinforce messaging and attention gain in a wide range of touchpoints.

**Table 7: AISMM Layers and Key Strategies**

| Layer | Objective | Key Strategy | Example Platform |
|---|---|---|---|
| Conversational Experience Optimization | Seamless integration in dialogue | Sponsored prompts, chat assistants | Microsoft Copilot |
| Predictive Audience Intelligence | Anticipate user needs | AI-driven segmentation, intent forecasting | Google Ads AI |
| Adaptive Bidding Mechanisms | Dynamic ad placement | Real-time contextual CPC/CPE | Bing Copilot |
| Cross-Modal Integration | Unified multi-touch visibility | Voice, image, and video coordination | Google Assistant, Alexa |

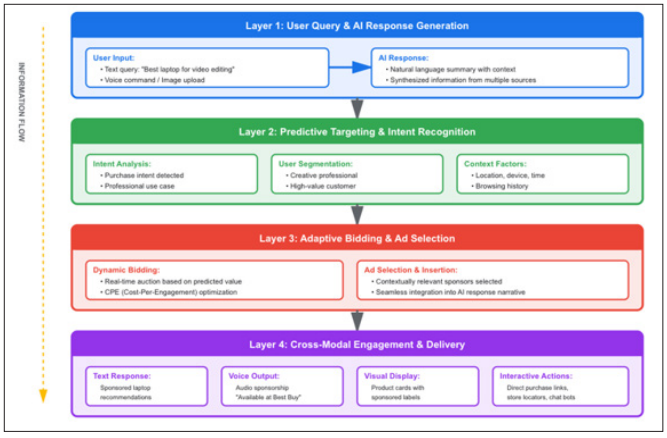


**Figure 6:** AI-Integrated Search Marketing Model (AISMM) Framework

### Discussion

The results of the research point to the significant upheaval of the old system of advertising with the help of keywords to the new one, where AI finds the necessary information. The traditional models of paid search used CPC bidding, keyword targeting, and positioning in numerous links of the search engine results pages (SERPs) to draw user interest [18]. The introduction of generative AI might lead to a situation where search engine results are presented as unit responses, or even appear as AI-edited summaries, condensing the user's interest and interfering even more with the conventional advertising placements [20]. This shift marks one of the major implications: advertisers cannot hope to focus on the optimization of keywords anymore and have to incorporate contextual and intent-conscious ideas into the scope of planning the campaign [34].

Strategically, predictive analytics and conversational interfaces are used most effectively through AI to offer new opportunities for personalization and interaction. Predictive intent modeling enables advertisers to predict user needs, optimize creatives on the fly, and focus on segments that are most likely to convert [39]. At the same time, conversational ads contained in AI-generated replies can ensure a constant presence and relevance, providing contextually relevant interactive touchpoints ([24]). Nevertheless, these opportunities also have challenges: as the visibility consolidation of the AI products is being done, it is possible that some exposure is concentrated and only the bigger brands are left without the smaller advertisers [38].

Advertising creativity should also change. Unlike conventional search, in which formulaic ad copy could be competitive in terms of clicks, AI-based search requires dynamic, story-consistent visits, which can fit within the arena of conversations or multiple modalities. Brands have to consider how automation and authenticity are attained and how the AI-generated messaging reflects the central brand voice and makes use of AI efficiency in targeting and optimization [27]. Automation of content can lead

to the creation of impersonal or generic experiences that can decrease engagement and destroy brand trust [42].

Lastly, measurement frameworks need to be reconsidered. Measures like CTR and ad impressions are no longer sufficient; engagement in AI responses, engagement in conversational prompts, and prediction model alignment should be added to conventional KPIs [36]. Hybrid analytics models incorporating behavioral feedback, predictive performance based on AI, and cross-modal attribution should be embraced by advertisers in order to fully comprehend the impact of campaigns in generative search spaces.

## Conclusion

With generative AI, the search and advertising industry is undergoing a fundamental redefinition. Changing SERP into AI-generated summaries and chatbots, these systems modify user behavior, reduce attention, and change value based on clicks to contextually meaningful interactions. Advertisers should also embrace adaptive formats, including the incorporation of conversational ad formats, predictive audience intelligence, real-time bidding, and cross-modal placements, in order to ensure visibility and relevance in the AI-based ecosystem.

Marketers can learn important lessons, such as focus more on contextual and chatbot-relevant quirks than on the dominance of key terms in the search, using AI-driven advancements in predictive targeting to better campaign results, and balancing automation and brand equity to make engagement and exchanges interesting and trustworthy.

The future directions in AI advertising are the mitigation of bias, consent of users, and the transparency of AI-generated advertisements, which need to be addressed in future research. Also, voice, image, and video interaction-based multimodal campaign analytics are under-investigated, and so is the issue of conversational brand presence measurement in AI outputs. Researching into these fields will also be instrumental in creating sustainable priorities for marketers in this fast-changing age of generative AI search.

## References

1. Makrydakis N S, Spiliotopoulos D, Lymperi A (2025) Analysis of search engine optimization tactics in the context of digital marketing for enhancing websites ranking and visibility in Generative AI and large language models. International Journal of Research in Management 7: 1107-1113.
2. Beshay (2025) Google users are less likely to click on links when an AI summary appears in the results. Pew Research Center https://www.pewresearch.org/short-reads/2025/07/22/google-users-are-less-likely-to-click-on-links-when-an-ai-summary-appears-in-the-results/.
3. Silliman E, Boudet J, Robinson K (2025) New front door to the internet: Winning in the age of AI search. McKinsey & Company https://www.mckinsey.com/capabilities/growth-marketing-and-sales/our-insights/new-front-door-to-the-internet-winning-in-the-age-of-ai-search.
4. Brin S, Page L (2012) Reprint of: The anatomy of a large-scale hypertextual web search engine. Computer Networks 56: 3825-3833.
5. Lewandowski D (2015) Evaluating the retrieval effectiveness of web search engines using a representative query sample. Journal of the Association for Information Science and Technology 66: 1763-1775.
6. Shanmugalakshmi RR., Ragunathan A (2025) A Survey of Semantic Web in Search Engines. ResearchGate https://www.researchgate.net/publication/390318976_A_Survey_of_Semantic_Web_in_Search_Engines.
7. Pan B, Hembrooke H, Joachims T, Lorigo L, Gay G (2007) In Google We Trust: Users' Decisions on Rank, Position, and Relevance. Journal of Computer-Mediated Communication 12: 0801-0823.
8. Kshetri N, Dwivedi YK, Davenport TH, Panteli N (2023) Generative artificial intelligence in marketing: Applications, opportunities, challenges, and research agenda. International Journal of Information Management 75: 102716.
9. Coghlan S, Chia HX, Scholer F, Spina D (2025) Control search rankings, control the world: What is a good search engine? AI and Ethics 5: 4117-4133.
10. Brown TB, Mann B, Ryder N, Subbiah M, Kaplan J, et al (2020) Language models are few-shot learners. Ar Xiv preprint 14165: 1-75.
11. Bommasani R, Hudson DA, Adeli E, Altman R, Arora S, et al. (2021) On the opportunities and risks of foundation models. Ar Xiv preprint 2108.07258: 1-98.
12. Lewis P, Perez E, Piktus A, Petroni F, Karpukhin V, et al. (2020) Retrieval-augmented generation for knowledge-intensive NLP tasks. Ar Xiv preprint 11401: 1-29.
13. Izacard G, Grave E (2020) Leveraging passage retrieval with generative models for open domain question answering. Ar Xiv preprint 01282: 1-18.
14. Al-Busaidi A S, Raman R, Hughes L, Albashrawi M A, Malik T, et al (2024) Redefining boundaries in innovation and knowledge domains: Investigating the impact of generative artificial intelligence on copyright and intellectual property rights. Journal of Innovation and Knowledge 9: 100630.
15. Christiano P, Leike J, Brown TB, Martic M (2017) Deep reinforcement learning from human preferences. Ar Xiv preprint 1706.03741: 1-19.
16. Weidinger L, Mellor J, Rauh M, Griffin C, Uesato J, et al. (2022) Ethical and social risks of harm from language models. Ar Xiv preprint 2112.04359: 1-47.
17. Belanche D, Ibáñez-Sánchez S, Jordán P, Matas S (2025) Customer reactions to generative AI vs. real images in high-involvement and hedonic services. International Journal of Information Management 85: 102954.
18. Balseiro S, Bhawalkar K, Deng Y, Feng Z, Mao J, et al. (2025) Position auctions in AI-generated content. Ar Xiv preprint 2506.03309: 1-32.
19. Bradley S (2025) How the semantics of search are changing amid the zero-click era. Digi day 1-6.
20. Kim D, Park M, Lee J, Lee I, Jin J, et al. (2025) Enhanced semantic retrieval with structured prompt and dimensionality reduction for big data. Mathematics 13: 2469.
21. Aldreabi H, Alhur M, Al-Okaily M, Qasim D, et al. (2025) Unveiling the dynamics of generative AI adoption: A business intelligence analysis through topic modeling-based bibliometric study. Computers and Education: Artificial Intelligence 9: 100456.
22. Lopez-Lopez D, Iniesta MB (2025) The impact of conversational AI on consumer decision-making: A systematic review and cluster analysis. International Journal of Engineering Business Management 17: 1-20.
23. Tarnoki C, Puentes K (2019) Something for everyone: A review of qualitative inquiry and research design. The Qualitative Report 24: 1-6.
24. Google (2024) Put Google AI to work with search ads. Google Product Blog 1-5.

25. Google (2024) Generative AI in search: Let Google do the searching for you. Google Product Blog 1-6.
26. Grover D (2024) The AI assistant revolution: Microsoft Copilot and the future of programming. Educational Administration: Theory and Practice 30: 1-12.
27. OpenAI (2024) How people use ChatGPT. OpenAI Economic Research Report 1-45.
28. Microsoft Advertising (2024) Conversational AI redefines audience engagement. Microsoft Advertising Insights 1-8.
29. Anthropic (2024) Anthropic economic index report: Uneven geographic and enterprise AI adoption. Anthropic Research Report 1-40.
30. Farshidi S, Rezaee K, Mazaheri S, Rahimi AH, Dadashzadeh A, et al. (2024) Understanding user intent modeling for conversational recommender systems: A systematic literature review. User Modeling and User-Adapted Interaction 34: 1643-1706.
31. Vinnakota S (2025) Revolutionizing ad placement in streaming with context-driven strategies and generative AI. European Journal of Computer Science and Information Technology 13: 139-151.
32. Shi Y, Xu M, Zhang H, Zi X, Wu Q (2024) A learnable agent collaboration network framework for personalized multimodal AI search engine. Ar Xiv preprint 2409.00636: 1-22.
33. Wang Y, Jia Y, Guo F (2025) Research on the application of artificial intelligence in advertising creativity in the context of metaverse based on XG Boost. Proceedings of GAIB 2025: 338-343.
34. Wagner N, Kraus M, Minker W, Griol D, Callejas Z (2025) A survey on multi-user conversational interfaces. Applied Sciences 15: 7267.
35. Search Engine Land (2025) What is AI SEO? How artificial intelligence is changing search optimization. Search Engine Land Guide 1-10.
36. Dillon E, Jaffe S, Immorlica N, Stanton C (2025) Shifting work patterns with generative AI. NBER Working Paper 33795: 1-58.
37. Alphabet Inc (2026) 2024 financial performance report. Alphabet Annual Report 1-120.
38. Hermann E, Puntoni S, Schweidel DA (2025) Conversational AI: The next frontier of digital platform monetization. SSRN Electronic Journal 1-42.
39. Palmucci DN, Jabeen F, Santoro G (2025) From funnels to feedback loops: Rethinking customer-centric digital marketing with AI and behavioural psychology in new ventures. EuroMed Journal of Business 1-14.
40. Perplexity (2025) Introducing Perplexity deep research. Perplexity Blog 1-5.
41. Gruetzemacher R, Avin S, Fox J, Saeri AK (2025) Strategic insights from simulation gaming of AI race dynamics. Futures 167: 103563.
42. Tu X, He Z, Huang Y, Zhang Z, Yang M, et al. (2024) An overview of large AI models and their applications. Visual Intelligence 2: 1-18.