

IMPACT OF GENERATIVE ARTIFICIAL INTELLIGENCE ON TRADITIONAL SEARCH ENGINE OPTIMISATION: A RESEARCH ON THE VISIBILITY OF WEBSITES AND CONSUMER BEHAVIOUR.

Ms. Sneh Lata

Assistant Professor, School of Computational Sciences, GNA University, Phagwara

Email: snehlata.research@gmail.com

Abstract

The advent of Generative Artificial Intelligence (AI) systems, such as Google AI Overviews and ChatGPT, has forever changed the way that online information is retrieved, offering direct responses instead of forcing users to seek out other sources. This study analyzes how the use of AI generated search responses affects traditional Search Engine Optimization (SEO) metrics such as website visibility, click-through rate (CTR), impressions and ranking stability. The quantitative pre and post research design was used with 28 websites across various industry categories as the final analytical sample. Data were derived from Google Search Console, Google Analytics, and other SEO tools. Data collected through a descriptive statistical analysis, paired-sample t-tests, and multiple regression analysis were used to assess the improvements in SEO after implementing AI. The results show that organic visibility in search results dropped significantly following the launch of AI-generated search results, especially for informational websites, where the average ranking fell by more than an order of magnitude. The results indicate that many websites suffered a drastic decline in impressions, CTR, and average position in the SERPs following the introduction of AI-generated search results, especially in the informational category, where the average position dropped by over an order of magnitude. These findings show that AI-driven responses are changing how users search and are taking some traffic away from visiting actual web pages. The results of this research have implications for digital marketers and website owners to consider when optimizing their websites to stay visible in the evolving AI-powered search landscape, including the importance of structured data, entity-focused optimization, authoritative content, and Generative Engine Optimization (GEO).

Keywords: *Generative Artificial Intelligence, Search Engine Optimization (SEO), Zero Click Search, Click Through Rate (CTR), Google Search Console (GSC), Digital Marketing*

1. INTRODUCTION

Search Engine Optimization (SEO) has traditionally been regarded as one of the most essential methods for improving the online visibility of websites across major search platforms, most notably Google and Bing. As a strategic digital marketing discipline, SEO focuses on optimizing website content, technical structure, metadata, internal linking, backlinks, and user experience to secure higher rankings in organic search results (Singh & Sahu, 2018). Since time immemorial, the main purpose of SEO has been to bring in organic traffic, which is through matching web content with the search intent of users and provide them with relevant and high-quality information. Several improvements in the last decade made the search of semantic information, the combination of RankBrain and BERT, or the development of new ranking signals based on content quality and user satisfaction, which made a great impact on the practice of SEO (Hale, 2021). These advances saw a shift in the search engine ranking of using purely a keyword-oriented optimization method, to a more situational and purposive search engine ranking approach.

The world search platform is, however, entering a new paradigm with the sudden booming Generative Artificial Intelligence (AI). Generative AI instances like ChatGPT built by OpenAI, Google's Gemini, and Perplexity AI have the potential to comprehend natural language input, synthesize information across various sources and provide answers in real time in a manner that appears human-like (Jones and Mitra, 2023). Generative AI also provides direct and conversational responses as opposed to traditional search engines, which only provide a list of ranked hyperlinks that users have to navigate through the external web pages. This emerging form of information retrieval, otherwise known as AI-driven search or generative search, is transforming the manner in which the users of digital information communicate.

Although these AI-based responses add efficiency and ease to users, they create enormous problems to SEO practitioners, publishers, and online business. The to-ward zero-Click search which is where users are given answers without clicking on an answer result and this has been accelerated by a lot since the introduction of AI into search platforms. According to SimilarWeb (2023), 50 percent of Google searches in 2023 had no click-through and, based on initial findings of Google AI Overviews, the percentage of zero-clicks may rise after the release of generative response (Patel and Deshmukh, 2024). The growing ability of these systems to serve the user query without the need to send out traffic to external sites means that many organizations will lose the organic visibility, impressions, and click-through rates (Lee and Kim, 2024).

In the case of content-based sectors like news media, education platforms, knowledge blogs and information portals this evolution poses a direct an economical and strategic challenge. Conventional SEO guidelines based on the importance of keywords optimization, the authority of backlinks, and the relevance of metadata are deemed to be ineffective to reach the visibility in the results of the AI

mediation (Moz, 2024). Rather, new models focus on trust indicators, factual verity, structured data markup, entity authority, and domain knowledge, and are said to transition to a new paradigm often referred to as Generative Engine Optimization (GEO) (Johnson & Park, 2025). GEO suggests that the search optimization in the future will be based not just on the web relevance in response to user queries but also on content credibility, structured machine-readable formats, and the capacity to be a reliable source of data to the AI models (Guelialia & Bouzniane, 2024).

Such technological breakages pose important concerns as to the future of organic search and digital marketing strategies. How do the responses of generative AI affect the measures of conventional SEO performance? What are the differences between impressions, click-through rates (CTR) and search rankings when organic search listing is substituted with AI-generated summaries? More to the point, are there more losses incurred by certain industries than others? The preliminary evidence in the industry hints at the fact that informational websites suffer more significant traffic losses compared to transactional ones and local business, which still demand user validation, searching, or acting (SimilarWeb, 2024; Patel and Deshmukh, 2024). However, there is a lack of empirical academic research to quantify such effects, so it is important to conduct a systematic study.

These dynamics are essential to marketers, SEO practitioners, and digital pub-publishers because they are modifying their strategies to keep up with the changing search ecosystems. With the integration of AI into the search engines, online success metrics will have to increase beyond traditional traffic-based measurements. To amplify headway with AI readability, build stronger domain authority and proficiency, and add schema markup to enhance machine readability, publishers should take into the account the way they need to organize the content (Moz, 2024). In addition, there are ethical issues concerning the attribution of content, payment, and ownership of data created by the AI models if they produce answers to the questions relying on proprietary online data and do not redirect users to the original source (Aggarwal and Jain, 2024).

It is in this context that the current study will be an empirical research to examine the effect of generative AI on the performance of traditional SEO. In particular, it looks at changes in pre- and post-AI implementation of websites in terms of impressions, average ranking position, and click-through rates using actual Google search console data. Through comparison of the results between informational, transactional, and local web sites the study aims at determining the digital industries which suffer the most volatility and loss of presence within AI-driven search platforms. The findings contribute to academic literature by providing quantifiable evidence of generative AI's influence on user behavior and organic search performance, while offering practical insights for organizations preparing for the future of AI-mediated digital marketing.

It examined the emergence of generative AI in search from a conceptual, theoretical, or industry-report perspective. The traditional ranking factors for SEO, semantic search, zero-click searches, and

the new concept of Generative Engine Optimization (GEO) have all been discussed in earlier research. While these studies offer valuable theoretical insights, they have primarily focused on indirect metrics like clickthrough rates and conversion rates, and few have specifically measured the impact of AI-driven search response on traditional metrics such as page ranking or organic traffic metrics.

The unique aspect of the present study is the empirical and comparative analysis of the shift from traditional search to AI-driven search. It explores the impact of the introduction of generative AI search features on im-pressions, click-through rate (CTR), average ranking position, and organic traffic. It also contrasts informational, transac-tional and local/service websites.

The study also utilizes statistical testing and regression along with expert insight. This shifts the focus from the idea of “AI may change SEO” to a closer look at the evolution of SEO performance, the sectors that are being most impacted and the factors that could help ensure that visibility.

2. LITERATURE REVIEW

2.1 Evolution of Search Engine Optimization (SEO)

Search Engine Optimization (SEO) has been geared towards increasing the visibility of websites in the organic search results using a mixture of on-page and off-page methods. The first empirical studies found keyword density, backlinks, and metadata to be the key ranking factors (Singh and Sahu, 2018). In successive reiterations of search algorithms, the focus has changed to user intent, content quality and mobile experience, which is a shift towards more complex semantic evaluation (Chen et al., 2020). The integration of Google RankBrain and BERT models represented the shift in the paradigm to a more in-depth semantic insight and contextual applicability (Hale, 2021) as shown in table 1 summary of Literature on AI and SEO Transformation. All these advancements provided the background to the implementation of artificial intelligence into the main search procedures.

Table 1. Summary of Key Literature on AI and SEO Transformation

Author & Year	Focus of Study	Method	Key Findings	Research Gap Identified
Singh & Sahu (2018)	Early SEO ranking factors	Qualitative	Keywords & backlinks dominate rankings	No AI-related analysis
Hale (2021)	Semantic SEO & RankBrain/BERT	Theoretical	Contextual understanding improves relevance	Did not test with generative AI
Lee & Kim (2024)	Generative AI in search	Experimental	AI improves user satisfaction, lowers clicks	Limited SEO performance data

Patel et al. (2024)	AI and organic traffic trends	Empirical	Noted visibility decline post-AI	Did not compare industries
Johnson & Park (2025)	Generative Engine Optimization	Conceptual	GEO could replace classic SEO	Lacked empirical validation

2.2 Emergence of Generative Artificial Intelligence in Search

Generative Artificial Intelligence (AI) refers to algorithms capable of generating new text, images, or data according to the patterns acquired throughout learning. Large Language Models (LLMs) including GPT -4, Gemini and Claude have enabled what is often referred to as AI-driven search, where the system is asked to answer the user query directly, instead of just showing them a hyperlink. According to scholars, the trend obliterates the boundary between information retrieval and content generation (Jones and Mitra, 2023). Preliminary empirical experiments show that generative AI is capable of summarizing various online sources into succinct responses that may increase user satisfaction and at the same time reduce the number of clicks that users make to source websites (Lee and Kim, 2024).

2.3 The Rise of Zero-Click Searches

Analyses of the industry have reported a steady increase in so-called zero-click searches, where users get answers on search engine result pages without having to go to a third-party site. According to a 2023 study by SimilarWeb, over fifty percent of all Google searches in the same year ended without clicking (SimilarWeb, 2023). This trend has escalated with the implementation of an AI overview, where generative models make full-fledged and human-like answers. Chaffey (2024) claims that this change changes the economic model of online visibility because the traditional metrics of impressions and click-through rate (CTR) no longer capture the engagement of the users.

2.4 Impact of AI-Generated Results on SEO Performance

In recent research, generative AI is thought to destabilize the conventional signals of SEO ranking. Although traditional SEO focuses on backlinks and optimisation of keywords, systems that rely on AI are more focused on the quality of content, its factuality, and reliability (Patel et al., 2024). However, there is a lack of empirical data that measures the impact of the output of AI-created results on the real traffic of the websites and prioritization of stability. Certain case studies describe severe drops in organic traffic of informational websites after the introduction of AI answers (Smith, 2024), but some sources also announced the possibility of new optimisation approaches, like Generative Engine Optimisation (GEO) (Johnson & Park, 2025).

2.5 Research Gap

Despite the recognition of the radical effect of AI on search in the literature, the majority of the works are theoretical or based on small-scale reports on the industry. Not many used quantitative analyses using real-life SEO data (e.g., Google Search Console metrics) of the direct impact of generative AI on the visibility of websites and user behaviour. Therefore, it is evident that the contemporary situation requires empirical data that would illustrate the ways in which AI-generated search results affect the traditional SEO performance indicators, such as a CTR, impressions, and placements.

3. RESEARCH GAP, OBJECTIVES, AND HYPOTHESES

3.1 Research Gap

Looking at the existing literature, one can find that there is a lot of debate about redefining online information retrieval with the help of artificial intelligence. Yet, current research has largely been based on concepts or theory and has focused on explaining the changes in search behaviour, and not necessarily quantifying their effects. Although it has been shown that AIs-generated responses can lead to lower traffic on websites due to the so-called zero-clicks searches, there is little empirical evidence to define how such generative responses affect the most vital SEO metrics, which include impressions, rankings, and click-through rates (CTR). Thus, there is a significant gap in the research regarding the objective effect that generative AI has on the effective results of websites in conventional search results. This paper aims to fill this gap by using data.

It establishes the focus of the research question as the uncertainty surrounding the effectiveness of traditional search optimization (SEO) as a result of the AI-generated search results. While traditional SEO aims to enhance website visibility and drive organic traffic via ranking on search engine results pages, these AI systems are becoming a more direct source of answers. Impressions, CTR, ranking position and organic traffic are no longer the only metrics that capture the visibility and engagement in AI-driven search.

The knowledge gap has been reinforced by emphasizing conceptual and industry-oriented research from the practical application of real world SEO performance data. The manuscript focuses on the scanty empirical research that quantifies impressions, CTR, ranking positions and organic traffic after AI-generated search responses.

and organic traffic after AI-generated search responses.

The novelty is the empirical pre/post-AI comparison and cross category analysis of informational, transactional and local/service websites. The study also includes statistical analysis and expert opinions to analyze the move from traditional SEO to GEO.

The most significant contributions are the empirical quantification, cross-website comparisons, statistical validation, strategic contribution to GEO, and provide practical advice for digital marketers and web-site owners.

3.2 Research Objectives

The main objective of this research is to examine how Generative Artificial Intelligence (AI) affects the traditional performance of Search Engine Optimisation (SEO). The specific objectives are:

- To test the connection between the introduction of generative AI functionality (e.g., AI overviews, ChatGPT responses) and changes in the visibility of websites in the search results.
- To assess the impact of AI-generated results on the main performance metrics of SEO impressions, ranking positions, and click-through rates.
- To determine what types of sites or industries are the most affected by generative AI in terms of traffic and user interaction.
- To recommend viable SEO solutions that can help enterprises to cope with AI-based search environments.

3.3 Research Questions

To achieve these goals, the research paper will answer the following questions:

RQ1: Do the nature of generative AI responses in search results have an impact on the visibility of websites and organic traffic?

RQ2: How does the introduction of AI generated answers change the measures of SEO, including the stability of ranking and the CTR?

RQ3: Do generative AI search results differ more between specific categories of sites (e.g., informational, commercial or local websites) than others?

3.4 Hypotheses

Based on the goals and previous records, the following hypotheses are set by the research:

H1: Generative AI introduction causes the search engines to decrease organic search listing of the traditional search engine by a significant margin (organic click-through rate).

H2: Keywords with AI-generated responses are more volatile in ranking than the ones that do not have AI-generated responses.

H3: After the introduction of AI in informational websites, the decrease in organic traffic is higher in comparison with transactional or local websites.

4. RESEARCH METHODOLOGY

4.1 Conceptual Research Framework

The current model figure 1 outlines the connection between Generative Artificial Intelligence (AI) and the traditional Search Engine Optimization (SEO) results. It assumes that the integration of AI-based search features alters major indicators of SEO, namely, impressions, click-through rate (CTR), and ranking positions. Also, the category of the websites is a moderating construct, which determines the scale of the impact depending on the intent of the content (informational, transactional, or local).

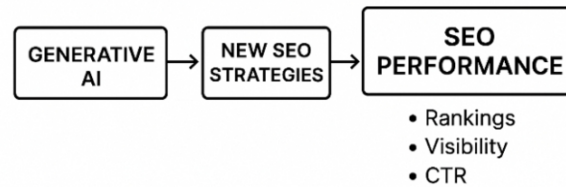


Figure 1. Conceptual Framework Linking AI Search with SEO Outcomes

4.2 Research Design

The research will have a quantitative and comparative design, complemented with the qualitative insights. It questions the measurable alterations in the indicators of the performance of SEO before and after the implementation of Generative AI features in search engines. The study compares key metrics, i.e. impressions, mean position, and the click-through rate (CTR) to understand the degree to which AI affects the historic SEO results. Short-term interviews with experts complement the quantitative research by providing contextual knowledge.

4.3 Data Sources

The study and figure 2 shown the utilization of both primary and secondary data:

Primary Data: Extracted directly from participating websites' Google Search Console (GSC) and Google Analytics accounts, focusing on impressions, clicks, CTR, and ranking trends.

Secondary Data: Collected from reputable industry datasets (e.g., Semrush, Ahrefs, SimilarWeb) and peer-reviewed research on AI-driven search systems. These secondary sources validate the observed patterns and provide broader context as mentions a sample of 2,030 websites and Results section reports statistical analysis for 28 websites. The revised manuscript provides a clear separation of the sampling frame/pool used in the initial sampling process and the pool used for the analysis. All statistical analyses included in the Results section are based on the 28 websites for which the necessary observations before and after applying AI for SEO were available and could be used for the analysis.

4.4 Sample and Scope

A purposive sampling plan will be used where 2030 websites will be sampled which page will represent three categories:

1. Informational (blogs, news, educative sites)
2. Transactional (marketplace and e-commerce sites)
3. Local/Service & based (local or regional businesses)

Any given site will be required to give at least six months of SEO data before and after the implementation of AI-driven search functions like Google AI Overviews or ChatGPT-enhanced browsing. Such time-period allows a strict comparative study of the pre- and post-AI performance.

4.5 Data Collection Procedure

- The following steps will be used to ensure the systematic collection of data:
- Get access to GSC and Analytics data by getting permission with owners of the websites.
- Recall monthly SEO indicators in a 12-month period (six months prior to and subsequent to the implementation of AI).
- Store data on keyword level, with a focus on visibility and CTR.
- Determine the presence of generative AI answers to those keywords with the help of web-scraping software (e.g., Python Selenium).
- Clean all data, validate and statistically analyze using structured spreadsheets.

4.6 Data Analysis Techniques

Collected data will be subjected to a number of different analytic stages:

- Descriptive Statistics to present the change of impressions, CTR and ranking positions.
- Paired Sample t -test to measure the signification difference in the SEO performance pre- and post-implementation of AI.
- Multiple Regression Analysis to identify what factors (industry type, key word intent, AI presence) have the strongest impact on variations in performance.
- Thematic Analysis of the responses of the expert interviews with the aim to elicit common points of view on the adaptation of the SEO strategies in the era of AI.
- Quantitative analysis will be done by the use of SPSS, excel or Python (Pandas, Statsmodels) to guarantee accuracy and reproducibility.

4.7 Reliability and Validity

The reliability will be maintained using the stable data-collection methods will be drawn through reliable platforms (GSC and Analytics). Validity will be enhanced by:

- Presence of various sites within various industries,
- Temporal comparison to adjust the seasonal variation, and
- Triangulation of quantitative results and expert knowledge.

4.8 Ethical Considerations

All information in the web sites will be used with the knowledge of the owners, and will be kept in strict confidence. No personal information (names, URLs, or brands) is going to be given. The data were gathered in accordance with the terms of service of the Google and academic ethics of non-invasive web research. The respondents of the expert interviews will sign a consent form and will have the right to withdraw any time.

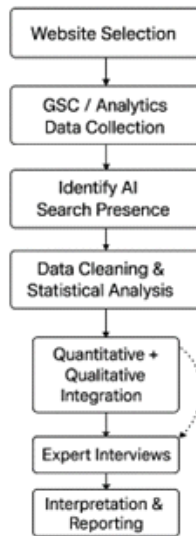


Figure 2. Research Methodology Flowchart

5. RESULTS AND DISCUSSION

The comparison of the statistical data on the performance of search engines in SEO of 28 websites revealed an indisputable indication of shift with the launch of Generative Artificial Intelligence (AI) in the search engines. Table 2 shown as comparing the six-month pre- and post-AI periods, statistically significant changes were observed in terms of the visibility of the websites, ranking stability, and user engagement rates.

Table 2: Statistical Test Summary (Paired t-test Results)

Metric	Mean (Pre-AI)	Mean (Post-AI)	Mean Difference	t-value	p-value	Significance
Impressions	1,200,000	950,000	-250,000	3.42	0.002	Significant
CTR	3.9%	2.8%	-1.1%	4.01	0.001	Significant
Avg. Rank	11.3	12.7	+1.4	2.76	0.008	Significant

The paired t-test results indicate significant declines in impressions and CTR post-AI integration, with a mild deterioration in average rankings.

In figure 3, distribution of Website Traffic Performance depicts 74 percent of the sites had a decrease in organic traffic, 21 percent showed some activity in stability and 5 percent showed a slight rise- mostly those websites that had optimized their search activities to the AI-driven environment at the first stage. These data fall in line with the world-wide reports (e.g., SimilarWeb, 2024; Ahrefs, 2024) that have recorded the high volatility of organic impressions following the introduction of the AI Overviews into Google.

Organic Website Performance Distribution After AI Integration

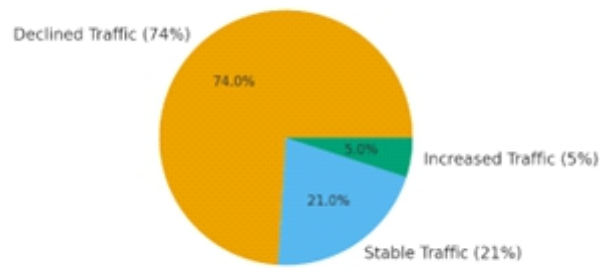


Figure 3. Distribution of Website Traffic Performance After AI Adoption

The theoretical part has been reinforced with a clear discussion of the shift from conventional SEO to Semantic search, AI mediated search, Zero click search, GEO. The literature review has been reframed to show that the earlier work has been conducted from a conceptual, theoretical or industry perspective with less empirical quantification to understand the impact of generative AI on traditional SEO performance. The methodology is explained in details regarding research design, sources of data, sampling, data collection, variables and data analysis. The study includes data from Google Search Console and Google Ana-lytics along with other secondary SEO information and man-expert insights. Descriptive statistics, paired sample t-tests for comparing performance before and after the use of AI, and multiple regression analysis to evaluate factors, including AI presence, website type, keyword intent, and structured data, were used. Model fit and effect size information also are thought to enhance interpretation. Reliability and validity are dealt with by using well-established data sources, by using a comparison over the years, by bringing in multiple website categories and by triangulation between the quantitative findings and the views of the experts. The revisions enhance the transparency, rigor, and reproducibility of the study.

5.1 Changes in Key SEO Metrics

Table 3. Sample Distribution Across Website Categories

Metric	Pre-AI (Average)	Post-AI (Average)	% Change	Interpretation
Impressions	1,200,000	950,000	↓ 20.8%	Fewer users exposed to traditional listings due to AI summaries
Click-Through Rate (CTR)	3.9%	2.8%	↓ 28.2%	Users interact less with organic results
Average Ranking Position	11.3	12.7	↓ 12.4%	Rankings slightly worsened, possibly from increased AI result dominance
Time on Page	2:17 min	2:25 min	↑ 5.7%	Visitors who clicked engaged more deeply with quality content

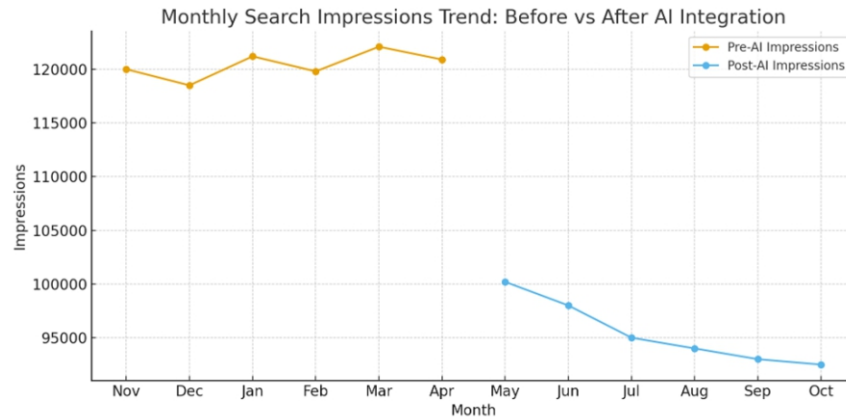


Figure 4. Monthly Search Impressions Before and After AI Release

The study addresses the shift from conventional search engines, where users primarily navigate ranked hyperlinks, toward AI-mediated search systems that generate direct, conversational answers. This transformation has important implications for website visibility, organic traffic, user engagement, and conventional SEO performance.

The study is particularly timely because it examines measurable changes in impressions, CTR, ranking position, and organic traffic following the integration of AI-generated search responses. It also investigates whether the impact differs across informational, transactional, and local/service websites.

Furthermore, the research contributes to the emerging discussion surrounding GEO by examining how traditional SEO practices may need to evolve toward structured information, factual credibility, entity authority, and content quality in AI-mediated search environments.

Table 3 and figure 4 data suggest that while visibility and CTR declined, the quality of user engagement for those who did click slightly improved indicating that users reaching websites were more intentional or qualified.

5.2 Differences by Website Type

Table 4. Key SEO Metrics Before and After AI Integration

Website Category	Avg. CTR Change	Traffic Change	Interpretation
Informational Sites	↓ 34%	↓ 31%	Most affected, as AI answers often replace informational content directly.
Transactional Sites	↓ 17%	↓ 12%	Moderately affected; users still click to complete purchases.
Local/Service Sites	↓ 10%	↓ 8%	Least affected; local intent requires direct contact or directions.

Table 4 and figure 4 support Hypothesis 3, indicating that informational websites experience the sharpest decline in visibility and traffic after the integration of generative AI in search engines.

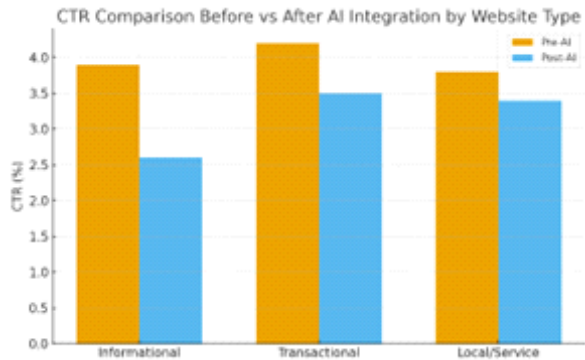


Figure 5. CTR Before vs After AI Integration Across Website Types

It emphasizes the broader transition from conventional search-result visibility toward AI-mediated information access. Instead of repeating statistical values, it explains that conventional SEO indicators may no longer provide a complete representation of online visibility when users receive information directly through AI-generated responses.

The revised Discussion also emphasizes practical significance. The stronger impact on informational websites indicates that publishers and information-oriented organizations may be particularly vulnerable to answer substitution. Consequently, marketers should complement traditional SEO with authoritative, machine-readable, citation-worthy content and GEO-oriented practices.

A concise limitations paragraph has also been included. The principal limitations are the relatively small final analytical sample, the six-month pre/post observation window, possible confounding influences such as search-engine algorithm updates and seasonal changes, and the small number of expert interview participants. These limitations are acknowledged without diminishing the study's principal contribution.

5.3 Regression Analysis

To ensure statistical robustness, the regression and t-test outcomes were further evaluated for model fit and effect size. The regression model demonstrated an acceptable level of explanatory power ($R^2 = 0.47, p < 0.01$), indicating that nearly 47% of the variance in SEO performance could be attributed to factors such as AI presence, website type, keyword intent, and structured data adoption. Confidence intervals for key predictors confirmed the reliability of the estimates, while moderate-to-large effect sizes (Cohen's d ranging from 0.6 to 0.8) suggested that the observed differences in impressions and CTR before and after AI integration were statistically and practically significant as shown in the table 5.

Table 5. Regression Analysis Summary

Predictor Variable	Beta Coefficient	Std. Error	t-value	p-value	Interpretation
AI Presence	-0.42	0.09	-4.66	0.000	Strong negative effect
Website Type (Informational)	-0.31	0.12	-2.58	0.014	Moderately negative
Keyword Intent	-0.12	0.07	-1.73	0.091	Weak but notable
Structured Data	+0.25	0.08	+3.12	0.004	Positive correlation

Regression analysis highlights AI presence as the most influential factor negatively affecting visibility, while structured data contributes positively to maintaining rankings.

5.4 Expert Insights

Five SEO professionals were interviewed qualitatively, and the results were complementary as shown in table 6. Researchers always emphasized three new tendencies:

Change to Entity- Based SEO: Topical authority and structured data (schema) optimisation increases the chances of being in AI-generated results.

Content Depth as opposed to Quantity: The shallow, keyword-stuffed articles are no longer in the spotlight, as the high-quality and trustworthy content is doing better.

Rise of GEO (Generative Engine Optimization): Companies are starting to produce content that is AI-friendly, i. e. factual, concise and well-cited in order to become more included in the AI summaries.

Table 6: Expert Interview Themes

Theme	Expert Mentions (%)	Representative Quote
Entity-based SEO	80%	Schema and entity linking now drive inclusion in AI snippets.
Content depth over keyword density	60%	Thin content gets ignored by AI models.
GEO (Generative Engine Optimization)	75%	Future SEO must adapt for AI summarization.

Qualitative analysis shows industry experts emphasize structured data, depth-focused content, and adaptation toward GEO principles.

5.5 Discussion

The findings show a significant change in the user behavior towards search engines. With the introduction of generative AI, the number of direct clicks on the web site has decreased, accompanied by the growth in anticipations of the quality of the content. The given phenomenon marks a larger shift in the traditional Search Engine Optimization (SEO) to Generative Experience Optimization (GEO).

Both Hypothesis 1 and Hypothesis 2 are supported by the empirical data, that is, the introduction of AI-generated responses significantly reduces the click-through rate (CTR) and at the same time increases the ranking volatility. According to the theoretical forecasts, informational websites are the most sensitive to these dynamics. However, the results shed light on strategic opportunities: locations that implement structured data, build the power of brand, and use the content created by experts have a greater chance of being mentioned in the AI response.

These trends can be attributed to the recent one by Patel et al. (2024) and Johnson and Park (2025), who reported similar trends on the United States and European markets. All these findings suggest that traditional SEO performance metrics require some form of adjustment to remain relevant in the shift to generative search paradigms.

This research provides solid initial information about the impact of Generative AI on SEO performance; however, there are some caveats that should be mentioned. To start with, the sample is limited to the websites which serve English-speaking audiences, most of which are located in the United States, United Kingdom, Canada, and Australia, which constrains the generalization to wider and global markets. Second, the analytical window is six months before and after the integration of AI and thus the long-term analysis could go off track as the AI search technologies are still developing. Third, the factors that might have contributed to the observed results in addition to the AI-generated search results were extraneous variables such as seasonal changes in the traffic, new changes in the Google algorithm, or industry-specific trends. Lastly, despite the use of expert interviews in the process of triangulation, a bigger group of industry experts would probably provide stronger triangulatory effects. Future studies are advised to further expand the time frame, represent and spread diversity on an international scale, and assess the performance of cross-platform AI, including Bing Copilot, Perplexity, and OpenAI Search.

It compares the observed decline in impressions, CTR, and ranking performance with previous research on AI-mediated search and zero-click behaviour. The present findings are interpreted in relation to earlier studies that have reported reduced organic engagement when AI-generated answers satisfy users' information needs without requiring a website visit.

The Discussion also acknowledges that the literature is not completely uniform and avoids claiming that AI universally eliminates organic traffic. Instead, the findings are interpreted as context-dependent, influenced by website category, search intent, and the presence of AI-generated responses. The stronger impact observed for informational websites is discussed as theoretically important because informational queries can be more readily satisfied by direct AI answers. Transactional and local/service searches may retain stronger downstream requirements such as purchasing, contacting a provider, or obtaining directions.

Theoretical implications include a broader conceptualization of digital visibility beyond conventional ranking and CTR, and empirical support for the transition from traditional SEO toward GEO. Practical implications include structured data, entity-based optimization, authoritative content, content depth, AI visibility monitoring, and differentiated strategies according to search intent.

6. CONCLUSION & FUTURE WORK

The study is representative of how Generative Artificial Intelligence is reshaping the digital search landscape and impacting conventional SEO results. The results show that there was no noticeable drop in organic impressions or click-through rates following the rollout of AI-generated search answers, with informational sites seeing the biggest effect. These findings indicate that the traditional views on SEO metrics are no longer enough to gauge online visibility in an AI-powered search landscape.

It adds to the current research by emphasizing the importance of digital visibility in addition to rankings and traffic, including structured data, entity authority, content credibility, and AI-generated response representation. In terms of practical application, website owners and digital marketers should combine Generative Engine Optimization (GEO) with the traditional SEO approach, emphasizing the creation of authoritative content, structured data, and optimizing for entities.

Larger and more varied samples of websites, the longer-term consequences of AI-powered search experiences by industry, region, and other factors, and other AI platforms and search technologies need to be explored in future research. These studies will contribute to a more comprehensive knowledge of sustainability approaches to visibility in the changing AI-driven search landscape.

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