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Generative Engine Optimization in Marketing: A Bibliometric Review of Emerging SEO Strategies for Digital Brand Visibility

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ABSTRACT

This study performs a bibliometric analysis of research at the convergence of search engine optimization, digital marketing, and novel Generative Engine Optimization (GEO) methodologies. The analysis utilizes papers indexed in Scopus and Web of Science from 2010 to 2024, employing performance metrics and science -mapping tools through VOSviewer and Bibliometrix to identify prominent authors, institutions, nations, and theme clusters. Visualizations of networks, overlays, and densities indicate a stable core centered on search engines, SEO, marketing, and electronic commerce, with an increasing focus on content marketing, artificial intelligence, and strategic planning. Collaboration maps underscore the pivotal roles of India and the United States, illustrating robust connections between computer science and business-oriented departments. The study elucidates the intellectual framework of the discipline and situates GEO as an extension of SEO specifically designed for generative AI contexts, thus providing a basis for future theoretical advancements and practical models regarding digital brand visibility in AI-driven search ecosystems.

Keywords: *Bibliometric Analysis, Search Engine Optimization, Generative Engine Optimization, Digital Marketing, Content Marketing, Artificial Intelligence, VOSviewer.*

1. INTRODUCTION

The swift evolution of artificial intelligence (AI) is transforming fundamental methodologies in digital marketing, especially in the discovery, processing, and delivery of content to users. Conventional Search Engine Optimization (SEO), reliant on ranking algorithms and keyword-centric crawls, faces growing challenges from the emergence of generative AI systems that deliver immediate, conversational replies [1]. Large Language Models (LLMs) like GPT-4, Gemini, Claude, and LLaMA analyze content semantically instead of lexically, thus transitioning optimization from keyword strategies to probabilistic reasoning, contextual embeddings, and knowledge synthesis. This transition supports the advent of Generative Engine Optimization (GEO)—a novel strategy framework aimed at shaping the manner in which generative engines access and express brand information [2]. As AI-driven systems increasingly dominate information retrieval, businesses must adapt to maintain visibility within generative replies, rather than solely on conventional search results pages.

This technical transition is bolstered by significant changes in worldwide search platforms. Google's Search Generative Experience (SGE) and Microsoft's Copilot-enhanced Bing signify a shift from list-oriented results to conversational response structures [3]. Studies demonstrate that generative answers modify user engagement behaviors, diminishing dependence on traditional hyperlinks and producing an increase in “zero-click” searches [4]. These alterations contradict conv entional SEO assumptions, as brand visibility increasingly relies on being quoted, embedded, or referenced in AI-generated summaries instead of merely outranking competitors on SERPs. Thus, GEO represents a significant advancement in digital marketing practices, necessitating revised theoretical perspectives and empirical analysis to comprehend the integration of brand information into generative search frameworks.

Concurrently, the essence of digital content is transforming. Generative models depend on semantic coherence, topical authority, factual consistency, and organized contextual data to construct their internal representations [5]. Marketing professionals encounter novel issues concerning information quality, authenticity, and representational correctness within AI memory frameworks. Strategies include the enhancement of domain authority, optimization of structured data, elevation of content accuracy, and the development of coherent brand narratives across platforms have become essential elements of GEO [6]. This transition signifies a departure from optimizing individual web pages to optimizing entire brand ecosystems to guarantee alignment with generative AI understanding.

The emergence of generative AI exacerbates issues of transparency, attribution, and digital inequality. In contrast to conventional search engines, generative systems amalgamate many knowledge sources without consistently disclosing their origins, prompting concerns regarding traceability and equity [7]. Established brands with significant digital footprints may prevail in generative outputs, while smaller and nascent companies face the threat of obscurity due to inadequate representation in training datasets or a lack of digital credibility [8]. The growing opacity of AI-generated information presents ethical challenges related to power imbalances and algorithmic representation. Consequently, GEO transcends a conventional marketing issue and engages with wider discussions regarding platform governance and AI-influenced information ecosystems.

Notwithstanding increasing industry focus, scholarly investigation on GEO remains disjointed and insufficiently advanced. Current studies is fragmented across digital marketing, AI ethics, information retrieval, and SEO analytics; nevertheless, there is no thorough synthesis that delineates how GEO is conceptualized, theorized, or operationalized within academic discourse. A comprehensive bibliometric evaluation is required to elucidate the intellectual framework of this nascent area and to pinpoint prevailing research clusters, thematic trends, and shifting conceptual parameters [9]. A bibliometric assessment, through the analysis of global publication patterns, keyword co-occurrences, citation networks, and theme clusters, establishes a coherent framework for comprehending how GEO influences the future of digital brand visibility.

Despite the increasing significance of Generative Engine Optimization in digital marketing, academic literature on the subject is limited, theoretically disjointed, and devoid of standardized frameworks. Current research is fragmented across interconnected fields—SEO, AI-based content creation, digital consumer behavior, and algorithmic governance—yet there is no unified academic framework that elucidates the emergence of GEO strategies, identifies prevailing themes in the discourse, or examines the impact of generative engines on brand visibility. This fragmentation restr icts marketers from developing evidence-based GEO strategies and hinders academicians from constructing solid theoretical frameworks based on actual patterns.

This study intends to perform a thorough bibliometric analysis of worldwide research on Generative Engine Optimization in the realm of digital marketing. The objectives are to: (1) delineate the evolution and intellectual underpinnings of GEO-related research; (2) identify thematic clusters, methodological trends, and conceptual intersections within the literature; (3) analyze the relationship between GEO strategies and digital brand visibility, AI-mediated communication, and generative search environments; and (4) offer theoretical and practical insights to inform future scholarship and industry applications. This study enhances academic comprehension of the ways in which generative AI is altering digital visibility, search behavior, and marketing strategy through the creation of a structured knowledge map.

2. METHODS

This study utilized a bibliometric research design to comprehensively map, quantify, and depict the scientific landscape of Generative Engine Optimization (GEO) in digital marketing research. Bibliometric approaches are extensively employed to discern structural patterns, theme clusters, and intellectual advancements in nascent research domains [9]. In accordance with recognized bibliometric criteria, the study employed performance analysis to assess productivity and citation effect, as well as scientific mapping tools to elucidate the conceptual framework and collaboration networks across disciplines [10]. This integrated methodology facilitated a thorough evaluation of the conceptualization of GEO and the progression of academic interest in relation to developments in generative AI and digital search technologies.

The data for this review were obtained from two primary academic indexing databases: Scopus and Web of Science (WoS). These databases were chosen for their extensive disciplinary scope, stringent curation criteria, and dependability in bibliometric research [11]. The search strategy incorporated a collection of terms related to generative AI and search optimization, such as "Generative Engine Optimization," "generative search," "AI-driven SEO," "large language models and marketing," and "digital brand visibility." The search was confined to peer-reviewed journal articles, conference proceedings, and review papers published from 2010 to 2024 to capture the age of significant advancements in generative AI. All records were subjected to duplication elimination and relevance assessment in accordance with PRISMA criteria [12], scrutinizing titles, abstracts, and full texts to confirm conformity with GEO, digital visibility, SEO transformation, or AI-mediated marketing themes.

Bibliometric studies were conducted utilizing VOSviewer and Bibliometrix (R package), both esteemed methods for delineating scholarly networks and deriving quantitative insights from bibliographic datasets [10], [13]. Data preprocessing involved standardizing author names, harmonizing journal titles, and consolidating synonymous keywords to enhance mapping precision. VOSviewer was utilized to create co-authorship networks, keyword co-occurrence maps, and co-citation clusters, facilitating the visualization of conceptual communities and intellectual frameworks within GEO research. Simultaneously, Bibliometrix facilitated performance analysis, topic evolution mapping, and patterns in scientific production. The combined application of these analytical methods enabled a comprehensive understanding of GEO's origin, thematic evolution, and its convergence with digital marketing and AI-driven content optimization.

3. RESULTS AND DISCUSSION

3.1 Network Visualization

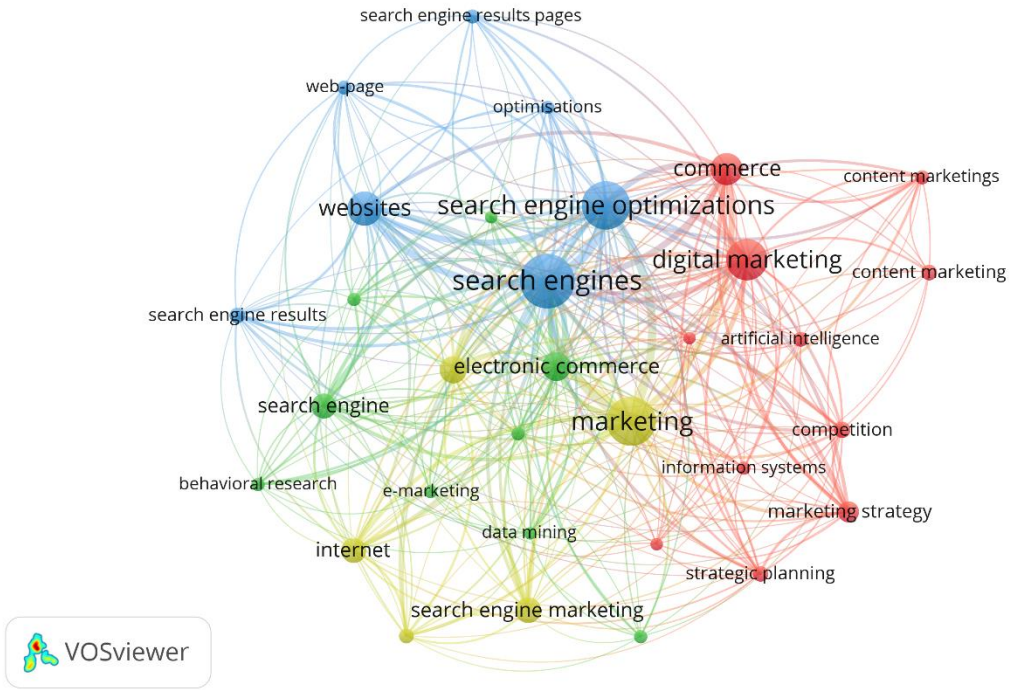

Figure 1. Network Visualization
Source: Data Analysis Result, 2025

The VOSviewer visualization depicts a rich and interconnected realm of research at the convergence of search engines, digital marketing, and e-commerce. The major nodes of the network—search engines, search engine optimization, and digital marketing—represent fundamental notions that underpin the literature. Their robust interconnectedness demonstrates that academic research continually positions digital exposure as a product of search technologies and marketing tactics. The prominent positioning of these terms indicates that research is progressively perceiving SEO not solely as a technical endeavor but as an integral component of a wider digital marketing framework influenced by algorithmic information retrieval.

The blue cluster mostly signifies themes associated with the technical dimensions of SEO and online infrastructure, encompassing websites, search engine results pages, web pages, and optimizations. This cluster encompasses research on website architecture, search engine content ranking, and the impact of optimization techniques on visibility in results pages. The close closeness of these nodes suggests that traditional SEO continues to be a significant field of study, with researchers investigating page-level elements, indexing mechanisms, and ranking algorithms. The technical core of SEO remains pertinent, even if generative AI alters the production and presentation of results.

The green cluster focuses on search engine marketing, the internet, behavioral research, and data mining. This cluster emphasizes research that combines consumer behavior with digital analytics, indicating a focus on comprehending user interactions with search tools. The connections between electronic commerce and marketing illustrate the analysis of search activity alongside purchasing trends and online retail activities. Researchers in this field frequently employ data mining methodologies to analyze user intent, click-through behaviors, and marketing efficacy, illustrating a progressively data-centric strategy for comprehending search ecosystems.

The red cluster highlights the strategic and managerial aspects of digital marketing, incorporating terms such as digital marketing, content marketing, competition, marketing strategy, strategic planning, and artificial intelligence. The existence of AI in this cluster signifies the increasing impact of machine learning and generative technologies on marketing tactics. This

cluster signifies a conceptual transition towards cohesive digital marketing frameworks, wherein content development, strategic positioning, and competitive analysis are enhanced using AI-driven insights. The relationship between digital marketing and artificial intelligence illustrates how advancements such as generative AI, predictive analytics, and automation are transforming marketing methodologies.

The yellow cluster connects marketing, electronic commerce, search engine marketing, and e-marketing, signifying a thematic domain focused on online business efficacy and brand prominence. This cluster significantly intersects with both the technical (blue) and strategic (red) clusters, indicating that contemporary digital marketing research is fundamentally interdisciplinary. The amalgamation of SEO, digital marketing techniques, and e-commerce highlights a significant trend: visibility on digital platforms beyond mere search results and involves the strategic positioning of firms within dynamic digital ecosystems. The network collectively illustrates a study domain evolving from conventional SEO to a more comprehensive, AI-conscious viewpoint—directly correlating with the burgeoning discourse on Generative Engine Optimization (GEO).

3.2 Overlay Visualization

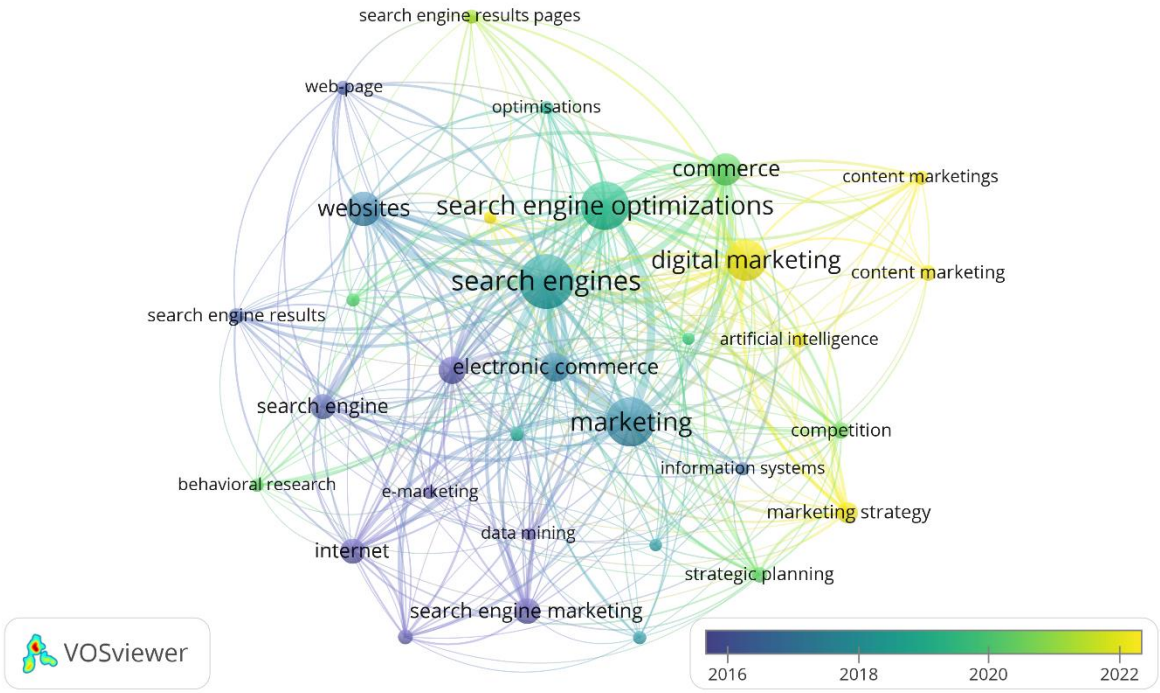

Figure 2. Overlay Visualization
Source: Data Analysis Result, 2025

The overlay visualization illustrates the chronological progression of study topics in the discipline, shown by a color gradient from dark blue (older topics) to yellow (newer themes). The darker blue nodes—specifically internet, search engine, websites, and data mining—signify fundamental trends that prevailed in preceding research from 2016 to 2018. These subjects embody the conventional emphasis of SEO research, which prioritized website architecture, search engine functionality, user click behavior, and data analytics. Their prominence in the earlier years indicates that researchers primarily focused on comprehending the indexing of online pages and the mechanisms by which traditional search algorithms assessed relevance.

As the hues transition to green and light green, emerging themes such as search engine optimization, electronic commerce, marketing, and information systems gain prominence. The mid-range hues (2018–2020) indicate a transitional period in which study extended beyond technical SEO

to interdisciplinary fields that explored the impact of search engines on marketing performance, consumer behavior, and online business ecosystems. This evolution signifies a comprehensive a malgamation of marketing data, competition, and strategic planning within the domain of search visibility, demonstrating how SEO has been intricately woven into digital marketing strategy.

The most luminous yellow nodes—particularly digital marketing, content marketing, artificial intelligence, and commerce—signify the most contemporary and swiftly evolving themes post-2020. Their position and connections underscore a transition towards AI-driven marketing methodologies and content strategies shaped by machine learning and generative technology. The rise of artificial intelligence as a prominent term signifies the industry's rapid shift towards generative search, automated content creation, and algorithm-driven marketing strategies. This overlay map depicts a distinct evolution: from initial SEO techniques to integrated digital marketing, ending in the current period where AI and content-driven optimization dictate the future of digital visibility.

3.3 Citation Analysis

Comprehending the intellectual underpinnings of search marketing, SEO strategy, and digital brand visibility necessitates an analysis of the most significant publications referenced within the bibliometric dataset. These papers constitute the fundamental theoretical and empirical contributions that have influenced the development of search engine optimization, digital marketing strategy, semantic web organization, and AI-driven content creation. The analysis identifies the most-cited studies, illuminating the historical development of the field and its thematic evolution—from initial optimization techniques and ranking algorithms to strategic digital marketing frameworks, culminating in the incorporation of artificial intelligence and natural language generation within contemporary content ecosystems. The subsequent table displays the most frequently cited works that form the foundation of this study domain.

Table 1. The Most Impactful Literatures

Citations	Authors and year	Title
119	Berman, R., Katona, Z. (2013)	The role of search engine optimization in search marketing
110	Sen, R. (2005)	Optimal search engine marketing strategy
109	Olson, E.M., Olson, K.M., Czaplewski, A.J., Key, T.M. (2021)	Business strategy and the management of digital marketing
92	Ziakis, C., Vlachopoulou, M., Kyrkoudis, T., Karagkiozidou, M. (2019)	Important factors for improving Google search rank
64	Reisenbichler, M., Reutterer, T., Schweidel, D.A., Dan, D. (2022)	Frontiers: Supporting Content Marketing with Natural Language Generation
57	Luh, C.-J., Yang, S.-A., Huang, T.-L.D. (2016)	Estimating Google's search engine ranking function from a search engine optimization perspective
54	Ahmed, R.R., Streimikiene, D., Berchtold, G., ... Channar, Z.A.,	Effectiveness of online digital media advertising as a strategic tool for building brand sustainability: Evidence from FMCGs and services sectors of Pakistan

Citations	Authors and year	Title
	Soomro, R.H. (2019)	
50	Sikos, L.F. (2015)	Mastering structured data on the semantic web: From HTML5 microdata to linked open data
48	Sharabati, A.-A.A., Ali, A.A.A., Allahham, M.I., ... Alheet, A.F., Mohammad, A.S. (2024)	The Impact of Digital Marketing on the Performance of SMEs: An Analytical Study in Light of Modern Digital Transformations
46	Shih, B.-Y., Chen, C.-Y., Chen, Z.-S. (2013)	An empirical study of an internet marketing strategy for search engine optimization

Source: Scopus, 2025

The enumerated papers demonstrate a historical and conceptual progression in search marketing and digital optimization. Initial fundamental research, like [14], [15], concentrated on the mechanics of search engine marketing and empirical SEO methods, thereby creating the theoretical framework for comprehending the impact of ranking algorithms on marketing performance. Contr ibutions from [16], [17] enhanced the field by incorporating advanced modeling techniques to measure SEO effects and analyze Google's ranking dynamics. With the evolution of digital ecos ystems, research has integrated strategic viewpoints on digital transformation and brand management, as demonstrated by [18], [19], which contextualize SEO within comprehensive marketing and sustainability frameworks. Recent scholarship indicates a novel frontier propelled by AI and structured data, as evidenced by [20] on linked open data and [21] on natural language generation for content marketing. These highly referenced papers collectively demonstrate the evolution of the research domain from tactical SEO methods to strategic, AI-augmented, and semantically improved approaches that form the foundation of the burgeoning field of generative engine optimization.

3.4 Density Visualization

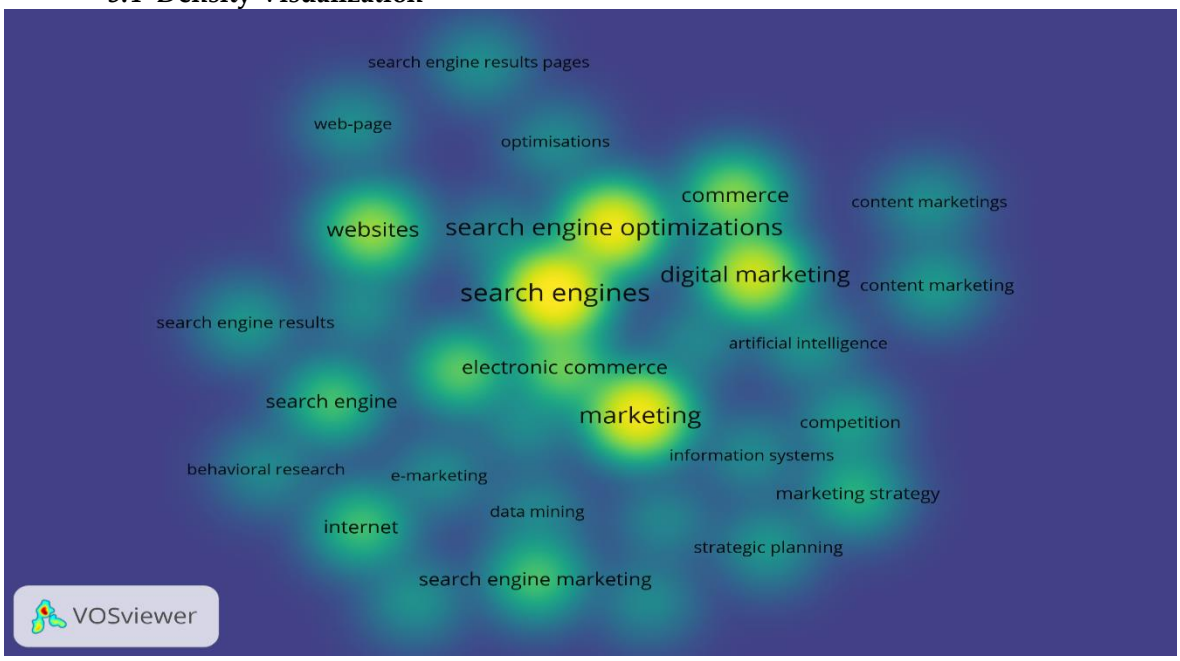

Figure 3. Density Visualization

Source: Data Analysis Result, 2025

The density graphic illustrates the concentration and intensity of research effort surrounding fundamental topics in search marketing and digital optimization. The most luminous yellow regions—search engines, search engine optimization, marketing, websites, digital marketing, and electronic commerce—represent keywords that occur with the highest frequency and exhibit the strongest interconnections within the dataset. These dense clusters indicate that the intellectual nucleus of the area persists in focusing on the interplay between conventional search engines, optimization techniques, and overarching marketing tactics. The dominance of search engines and SEO underscores their essential role in influencing academic discourse and industry practices, while the significance of websites emphasizes the continued relevance of technical content organization and site-level criteria in visibility results.

The lighter green portions encircling the core—namely content marketing, artificial intelligence, search engine marketing, behavioral research, and the internet—indicate secondary yet expanding domains of inquiry. Their moderate density indicates a growing academic focus on user behavior, AI-based marketing techniques, semantic enhancement, and cross-platform digital strategies. Conversely, the darker areas at the periphery indicate subjects that are less prevalent or more specialized, although they nonetheless enhance the diversity of the field. The density visualization illustrates a research landscape rooted on SEO and digital marketing principles, but progressively focusing on new issues such as AI-driven content creation, strategic marketing planning, and cohesive digital commerce ecosystems.

3.5 Co-Authorship Network

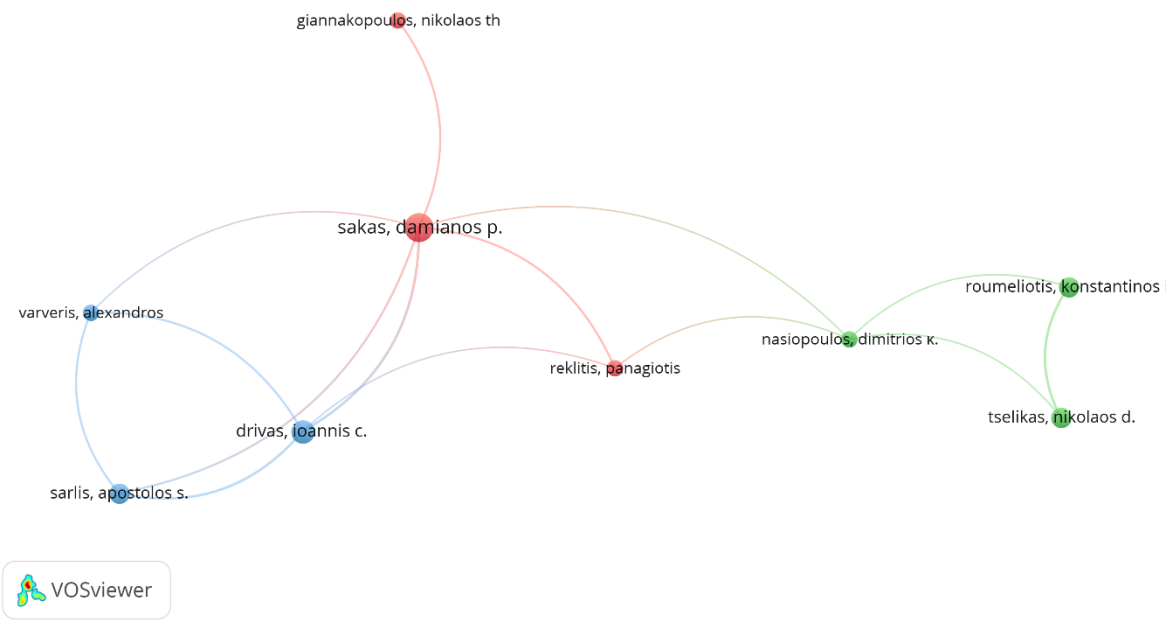

Figure 4. Author Visualization
Source: Data Analysis Result, 2025

The VOSviewer co-authorship network visualization reveals a compact yet distinctly organized array of co-authorship connections in the area, based on a notable core researcher. Sakas, Damianos P. serves as the pivotal connector, situated in the core of the map with connections radiating across several clusters. His collaborations encompass multiple authors, including Giannakopoulos, Nikolaos Th.; Reklitis, Panagiotis; Drivas, Ioannis C.; and Nasiopoulos, Dimitrios K., highlighting his significant coordinating role within this scientific community. The network

delineates three unique clusters: a blue cluster spearheaded by Drivas alongside partners Varveris and Sarlis; a red cluster anchored by Sakas and Reklitis; and a green cluster connecting Nasiopoulos, Tselikas, and Roumeliotis. The color-coded clusters illustrate thematic or institutional proximities, demonstrating the organization of the collaborative landscape around common research interests or affiliations. The map indicates a relatively connected author community, with Sakas serving as a connector between otherwise distinct subgroups, thereby enhancing knowledge exchange in digital marketing, search engine optimization, and related information systems research.

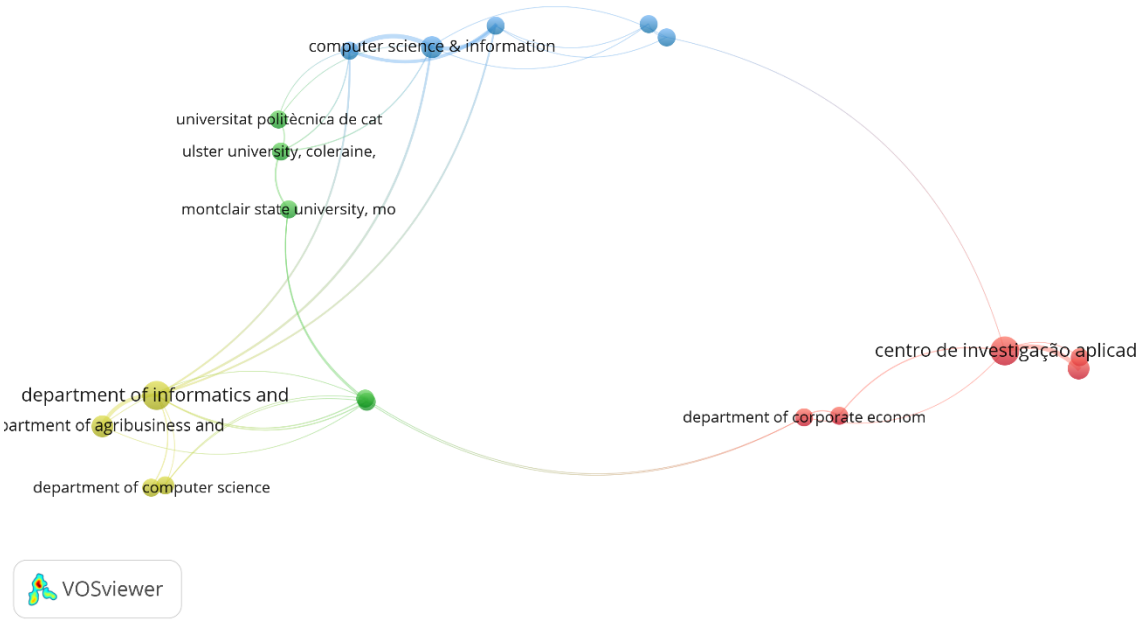

Figure 5. Affiliation Visualization
Source: Data Analysis Result, 2025

The affiliation network delineates the structure of institutional relationships within the research domain, highlighting specific clusters of universities and departments that contribute to the academic advancement of digital marketing, search optimization, and information systems. The most extensive and interconnected cluster is depicted in blue hues, centered on Computer Science and Information units, which engage in close collaboration with institutions such Universitat Politècnica de Catalunya, Ulster University (Coleraine), and Montclair State University (MO). Their robust connections signify a focus of research propelled by technical proficiency in computing, algorithms, and information retrieval—demonstrating the fundamental function of computer science in enhancing SEO and digital marketing analytics. A second cluster, depicted in green and yellow hues, comprises applied and multidisciplinary departments, including the Department of Informatics, Department of Agribusiness, and Department of Computer Science, indicating that research from these entities amalgamates optimization techniques with extensive business, agricultural, and managerial applications. The red cluster on the right, centered around the Applied Research Center and the Corporate Economics Department, indicates a smaller but solid group that focuses on applied and corporate economic perspectives, possibly related to digital marketing performance, competitiveness, and organizational results. The image illustrates a collaborative ecosystem where computer, business, and applied research communities converge, emphasizing the interdisciplinary character of modern SEO and digital marketing academia.

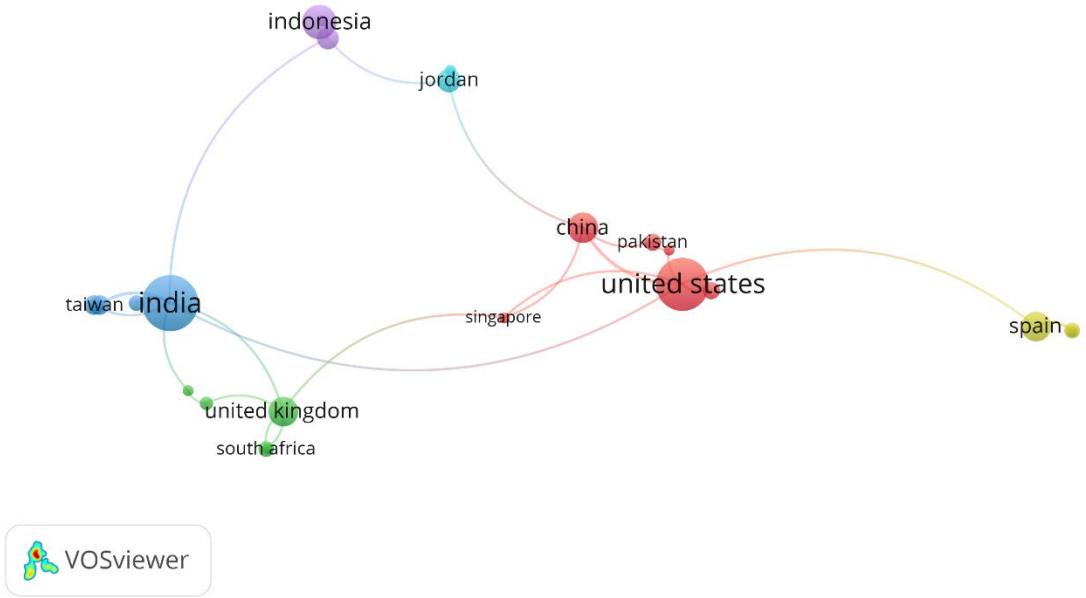

Figure 6. Country Visualization
Source: Data Analysis Result, 2025

The VOSviewer co-country collaboration map network illustrates a geographically varied yet asymmetrically organized research ecosystem, featuring multiple prominent hubs that shape scholarly output in digital marketing and search optimization. India and the United States emerge as the two preeminent nodes, signifying their considerable publishing output and broad collaborative relationships. India establishes robust connections with Taiwan, the United Kingdom, South Africa, and Indonesia, illustrating a dynamic regional network encompassing both Asian and Commonwealth intellectual circles. Simultaneously, the United States establishes significant connections with China, Pakistan, Singapore, and Spain, indicating its pivotal role in linking Western and Asian research networks. The placement of nations such as Indonesia, Jordan, and Spain on the network's periphery signifies nascent involvement with increasing contributions, albeit very limited international cooperation. The map depicts a developing global research ecosystem characterized by concentrated knowledge production in select countries, while cross-regional collaboration, particularly between Asian and Western institutions, is on the rise—underscoring the growing international nature of search marketing and digital optimization scholarship.

Discussions

Practical Implications

This bibliometric analysis yields numerous practical implications for marketers, digital strategists, and organizations aiming to improve brand visibility in an environment increasingly influenced by generative AI technology. The significant emphasis on keywords related to search engines, search engine optimization, digital marketing, and content marketing suggests that professionals should amalgamate conventional SEO principles with innovative AI-based optimization techniques, including structured data enhancement, semantic content alignment, and natural language generation. The emergence of keywords related to artificial intelligence and strateg y planning indicates that firms must invest in sophisticated analytical tools and AI-enhanced content frameworks to maintain competitiveness as search engines evolve towards generative replies. The author, affiliation, and country cooperation networks reveal global concentrations of expertise,

offering insights for practitioners pursuing academic collaborations, benchmarking possibilities, or market entry tactics in places with significant research intensity. This study provides practitioners with a greater comprehension of the field's evolution and identifies focal points for resource allocation to enhance brand awareness in both traditional and generative search environments.

Theoretical Contributions

This study conceptually contributes by providing a systematic intellectual framework of the evolving search marketing domain, emphasizing the convergence of classic SEO studies with emergent themes such as AI-driven content generation, semantic web technologies, and digital strategy formulation. The research delineates the conceptual boundaries of the area by identifying key clusters and high-impact articles, while introducing Generative Engine Optimization (GEO) as a prospective theoretical framework for elucidating optimization approaches specific to generative AI environments. The patterns of term evolution and density indicate a transition from algorithmic ranking models to integrated, AI-driven marketing frameworks, enhancing theoretical discussions on information retrieval, digital consumer behavior, and strategic communication. This study synthesizes principles from computer science, marketing, information systems, and behavioral research to establish a comprehensive theoretical foundation that captures the complexity and technical dynamism of modern digital ecosystems.

Limitations

This study, notwithstanding its contributions, possesses some limitations intrinsic to bibliometric research. The analysis is only based on papers indexed in Scopus and Web of Science, potentially excluding pertinent studies from non-indexed journals, industry reports, or practitioner-oriented sources—especially critical in rapidly expanding fields such as SEO and generative AI. The analysis of keyword co-occurrence and network topologies relies on the consistency and precision of author-assigned keywords, which can differ significantly and add semantic noise. Third, bibliometric methods uncover structural patterns but fail to encapsulate the methodological depth, theoretical richness, or empirical nuances of individual studies; thus, future research could gain from a supplementary systematic literature review or meta-analysis to enhance qualitative understan ding. Lastly, given generative AI is a swiftly evolving domain, current advancements may not be comprehensively captured in the dataset, indicating that the latest breakthroughs in the field could be inadequately represented. Identifying these constraints facilitates a more meticulous analysis of the results and underlines avenues for subsequent academic investigation.

CONCLUSION

This bibliometric review aimed to delineate the intellectual terrain pertaining to search engine optimization, digital marketing, and the nascent principles of Generative Engine Optimization (GEO). The examination of co-occurrence networks, overlay, and density visualizations indicates that the domain is structured around a robust core of concepts—search engines, search engine optimization, digital marketing, websites, and electronic commerce. These terms underpin most publications and demonstrate that, despite swift technical advancements, conventional SEO continues to be a crucial component of internet visibility. Simultaneously, emerging issues such as content marketing, strategic planning, and artificial intelligence are progressively included into this foundation, indicating a shift from solely technical optimization to more comprehensive, strategy-oriented frameworks. The temporal overlay analysis reveals a distinct progression of emphasis. Previous research focused on online infrastructure, search ranking algorithms, and user engagement with search outcomes. Recent studies focus on data-driven marketing, semantic structuring, and AI-enabled content production, leading to a research frontier where generative models and natural language generation facilitate marketing decision-making. This trend offers compelling evidence that the conceptual and methodological

frameworks are established for the formalization of GEO as an extension of SEO: optimization aimed at enhancing not just rankings on results pages but also visibility within AI-generated responses and conversational interfaces.

The collaboration patterns among authors, institutions, and nations highlight the interdisciplinary and international nature of this field. Computer science and information departments often interact with business, economics, and agriculture groups, demonstrating the growing interconnection between technological and managerial perspectives. India and the United States serve as major geographical hubs, linking networks across Europe, Asia, and Africa. These tendencies indicate that GEO and associated subjects are expected to evolve through cross-regional collaborations that integrate computational proficiency with contextual marketing acumen. This study provides a systematic framework for the topic and emphasizes GEO as a valuable conceptual perspective for future research. Researchers can expand upon these findings by enhancing theoretical frameworks regarding the curation and prioritization of brand information by generative engines, investigating consumer reactions to AI-generated suggestions, and analyzing the ethical and governance ramifications of optimization within opaque algorithmic contexts. The findings underscore the necessity for practitioners to uphold strong SEO strategies while also anticipating a future where digital visibility is mediated by generative engines that semantically interpret content, dynamically synthesize information, and increasingly facilitate interactions between brands and users.

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