

## GENERATIVE ENGINE OPTIMIZATION (GEO): A NEW PARADIGM OF DIGITAL VISIBILITY IN THE AGE OF AI-POWERED SEARCH

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### Abstract

*This article examines the concept of Generative Engine Optimization (GEO) in the context of the transformations enabled by the integration of generative artificial intelligence into contemporary information search and retrieval practices. The aim of the paper is to clarify the conceptual standing of GEO in connection with Search Engine Optimization (SEO) and to explore its consequences for digital marketing strategy. Methodologically, the study adopts an integrative review approach, combining selective analysis of emerging literature with the integration of established theoretical frameworks, in order to build a coherent interpretative framework for a field still in the conceptualization phase. The analysis suggests that GEO does not replace SEO, but introduces a complementary logic of digital visibility, in which the main stake is no longer exclusively positioning in the results pages, but the probability that a brand, a source, or a content will be taken up, mentioned, or cited in the responses generated by platforms based on large-scale linguistic models. The article discusses GEO theoretically in relation to the diffusion of innovations theory, the technology acceptance model, and the consumer-based brand equity perspective. In terms of application, the implications for content production, informational authority, performance measurement, and the ethical dimension of optimization practices are highlighted. The paper also highlights the main limitations of the field: algorithmic opacity, lack of standardized evaluation methods, and the incipient nature of academic validation. Finally, useful research directions are proposed to consolidate GEO as a relevant topic in the marketing literature.*

**Keywords:** GEO, generative engine optimization, technology adoption, digital visibility, SEO, digital marketing

**JEL:** M31, M37, O33

### 1. Introduction

The digital landscape of information search is undergoing an accelerated transformation, driven by the development and widespread adoption of generative artificial intelligence systems. For over two decades, the online visibility of brands and content has been defined mainly by their positioning in the results pages of traditional search engines. In this context, Search Engine Optimization (SEO) has been a central practice of digital marketing, influencing both the technical structure of websites and the strategies for producing and distributing content. In recent years, this logic has begun to be modified by the expansion of search and information assistance platforms based on large-scale linguistic models, such as ChatGPT, Google AI Overviews, Perplexity, or Microsoft Copilot. Unlike classic search engines, which return a list of links to the user, these systems provide synthetic, contextualized, and directly formulated answers in natural language by integrating and summarizing information extracted from multiple sources. The magnitude of this transition is reflected in concrete data: ChatGPT exceeded 900 million weekly active users in 2025, and AI-powered search engines captured between 12% and 15% of the global search share by the end of the same year, compared to approximately 5 - 6% at the beginning (DemandSage, 2026; Gartner, 2024). As a result, information selection is no longer carried out exclusively by the user, but also by the generative system, which decides which sources are exploited, how, and at what level of visibility.

This change raises an important strategic issue for digital marketing. In the new information context, simply being in a favorable position in search engine results no longer automatically guarantees the effective presence of the brand in the user's information experience. It is becoming

increasingly important that the information published by organizations is sufficiently clear, credible, structured, and accessible to be selected and integrated into the responses provided by generative platforms. This need has given rise to Generative Engine Optimization, or GEO — a set of practices designed to help content show up, get cited, or get mentioned in AI-generated responses (Aggarwal et al., 2024).

Interest in GEO is relatively recent, and the academic literature dedicated exclusively to this topic is still limited. However, the topic has quickly become relevant for both research and practice, as it affects content strategy, building digital authority, evaluating online performance, and the relationship between brand and consumer (Dwivedi et al., 2021). In this sense, GEO can be seen not only as a technical extension of SEO practices, but also as an interdisciplinary subject located at the intersection of digital marketing, information retrieval, communication, and studies on the adoption of emerging technologies. This intersection recalls the broader mutations that artificial intelligence produces in the logic of services and customer value (Vargo and Lusch, 2004).

This article asks a simple question: what is GEO, how is it different from SEO, and why should marketers care? To answer this question, the paper synthesizes the available literature and relevant secondary sources, in order to outline a coherent and useful conceptual framework for understanding this emerging field.

## **2. Theoretical background**

The concept of GEO can be better understood in relation to established theoretical frameworks that explain how innovations are adopted, how users evaluate new technologies, and how a brand's visibility is transformed into salience and symbolic capital in consumers' minds. In this regard, three theoretical perspectives are particularly relevant: the diffusion of innovations theory, the technology acceptance model, and the consumer-based brand equity theory.

### **2.1. Diffusion of Innovations Theory**

Rogers' diffusion of innovations theory looks at how new ideas and products spread through a community over time. It maps out different adopter types and identifies the key factors that shape how quickly people embrace something new: perceived benefits, compatibility with what they already know, complexity, whether they can try it first, and how visible the results are (Rogers, 2003). Applied to the case of GEO, this theory allows its understanding as an emerging practice, still in an early adoption phase. Large organizations and teams specialized in digital marketing tend to experiment with such practices first, while many companies are still in the familiarization stage with the concept.

From this viewpoint, GEO clearly has an advantage over the SEO-only approach because it addresses real changes in how people search for and consume information. However, the technical challenges, lack of clear standards, and difficulties in measuring results can slow down how quickly organizations, especially those with limited resources, adopt it (Tornatzky & Fleischer 1990). Compatibility with existing content marketing and branding practices can, however, facilitate the integration of GEO into existing digital strategies.

### **2.2. Technology Acceptance Model**

According to Davis' Technology Acceptance Model (TAM), people adopt a new technology based on two key factors: perceived usefulness and ease of use (Davis, 1989). In the case of GEO, both dimensions are relevant. Perceived usefulness increases as organizations notice that being present in the responses generated by AI platforms can contribute to visibility, awareness and, potentially, traffic or conversions. However, perceived ease of use remains low, as the field is marked by the lack of standardized tools, the opacity of the platforms and the absence of unanimously accepted procedures.

Therefore, TAM helps to explain the current ambivalence surrounding GEO: on the one hand, there is a growing interest in its adoption; on the other hand, implementation is often perceived as uncertain, costly or difficult to measure. This tension is typical of emerging technologies in an early stage of maturation (Venkatesh et al., 2003).

### **2.3. Consumer-based brand equity**

A third relevant perspective is provided by the consumer-based brand equity theory formulated by Keller. In this model, brand equity derives from brand awareness in the consumer's mind, structured by notoriety and image (Keller, 1993). GEO is particularly relevant for the brand salience dimension, understood as the propensity of a brand to be noticed or come to mind in relevant search or purchase situations (Romaniuk & Sharp, 2004). This dimension takes on new significance in an ecosystem where generated responses can partially substitute for active exploration of sources: the absence of a brand from these responses can significantly reduce its chances of entering the set of cognitively available options to the consumer.

Thus, GEO can be interpreted not only as a technical optimization tool, but also as an emerging mechanism for consolidating brand salience in a digital environment where visibility is mediated by generative platforms. From this perspective, the issue is no longer exclusively whether a brand appears in a search result, but whether it is included in the response that the user receives and retains.

### **2.4. The Evolution of Digital Visibility Paradigms**

Beyond these three theories, GEO can also be understood as a stage in a broader evolution of digital visibility paradigms. If in the early stages of the internet the emphasis was placed on directory presence and display advertising, then on search engine ranking, and later on the authority built through content marketing, the current stage introduces a different logic: that of visibility mediated through the selection and synthesis carried out by generative systems (McKinsey, 2024). So, it is no longer enough for content to exist and be indexable; it must also be sufficiently relevant, clear, and credible to become usable in an AI response.

Together, these theoretical perspectives allow for the interpretation of GEO both as an organizational innovation in the adoption process and as an emerging mechanism for building brand visibility and salience in a digital ecosystem mediated by generative systems.

## **3. Research methodology**

This article adopts an integrative review approach, considered appropriate for synthesizing diverse and heterogeneous bodies of literature on emerging topics where the academic corpus is still limited (Torraco, 2005; Snyder, 2019). Unlike systematic reviews, which require a large homogeneous corpus and quantitative data extraction, integrative reviews allow the combination of academic and industry sources in order to construct a coherent conceptual framework for a field still in the early stages of consolidation. The current state of the field justifies this methodological choice: GEO is a new concept, the academic literature dedicated exclusively to it is still limited, and the aim of the article is not to produce an exhaustive synthesis of the literature, but to build a coherent interpretative framework through which the concept can be understood, theoretically positioned, and applied in digital marketing practice. The approach involves the selective analysis of the available literature (academic and industry), integrating established theoretical frameworks and formulating practical implications and future research directions.

The documentation was based on two categories of sources, selected according to their relevance to the research question. The first category targeted academic literature, identified by consulting the Google Scholar, Scopus, and ACM Digital Library databases, using terms such as generative engine optimization, GEO marketing, LLM search visibility, AI search optimization, and large language models marketing, for the time period 2020–2026. The second category

included industry sources like reports, analyses, and recognized specialized publications in technology and digital marketing. Their inclusion is justified by the fact that, in the case of emerging topics, industry literature often signals trends and empirical results before they are systematically absorbed by academic research, a practice also recognized in the specialized methodological literature (Snyder, 2019).

The selection of sources was purposive, guided by the research question and the need to cover the main dimensions of the GEO concept. Sources that simultaneously met three conditions were retained: direct relevance to the analyzed topic; verifiable credibility, expressed through academic indexing or clear institutional affiliation; and topicality, with priority for materials published after 2022. Materials with a predominantly promotional nature and information not supported by corroborating sources were excluded. The analysis followed five thematic dimensions: the definition and origin of the concept, the mechanisms of operation, the relationship with SEO, the implications for marketing, and the main limitations or challenges.

Like any conceptual paper approach, this one also has limitations that must be recognized. The recent nature of the subject narrows the available academic base and leads to a partial dependence on industry sources. The accelerated dynamics of the technological ecosystem mean that some data have a limited validity in time. Finally, the paper does not include its own empirical research, so the statements about the effectiveness of GEO come from the analyzed literature, not from direct testing. The conclusions should be understood as the results of an analytical and conceptual synthesis, useful for guiding future research and for practice, not as definitive empirical demonstrations.

## **4. The concept of Generative Engine Optimization (GEO)**

### **4.1. Definition and origin**

Generative Engine Optimization (GEO) designates the set of practices by which digital content is adapted in such a way as to increase the probability that it will be used, mentioned, or cited in the answers formulated by generative engines. Unlike traditional SEO, which is mainly oriented towards obtaining a favorable position in a list of results, GEO aims at a different type of result: the inclusion of content in a synthetic answer produced by a platform based on large-scale linguistic models.

In the academic literature, the concept was formalized by the work of Aggarwal et al. (2024), which proposes a first systematic framework for analyzing visibility in generative engines and introduces a series of dedicated metrics and evaluation tools. In parallel, the concept was quickly taken up in the industry literature, where partially similar names began to circulate, such as AEO (Answer Engine Optimization), LLMO (Large Language Model Optimization), or GSO (Generative Search Optimization). Although these labels are not perfectly overlapping conceptually, they indicate the same underlying concern: adapting content strategies to new forms of algorithmic mediation of information.

Therefore, GEO can be defined as an emerging field at the intersection of content optimization, information retrieval, and digital marketing, whose central objective is to increase visibility in an ecosystem in which the generated response tends to serve as a dominant interface for accessing information.

### **4.2. The technical mechanism: from query to response**

To understand the specifics of GEO, a brief clarification of how generative engines work in relation to traditional search engines is necessary. In the case of classic engines, the process involves indexing web pages, evaluating relevance through ranking algorithms, and returning an ordered list of links (Brin and Page, 1998). The user is the one who subsequently accesses the sources and synthesizes the information.

In contrast, generative systems frequently operate through Retrieval-Augmented Generation (RAG) architectures, which combine the retrieval of relevant documents with the generation of a synthetic response (Lewis et al., 2020). In the first stage, the system identifies sources considered useful for the user’s query; in the second stage, the linguistic model synthesizes the information and produces a coherent response, in which the sources may appear explicitly or implicitly. This architecture introduces a crucial difference for marketing: being indexed is no longer enough; the content must also be usable for generative synthesis.

From this perspective, the space for GEO’s intervention is given by the shift from the logic of “being found” to the logic of “being extracted and cited”. Content that benefits from conceptual clarity, logical structure, verifiable data, and credibility signals is more likely to be leveraged by generative platforms.

#### **4.3. GEO strategies identified in the literature**

The existing literature suggests that effective GEO practices differ in part from tactics associated with traditional SEO. The study by Aggarwal et al. (2024) shows that strategies with higher impact are those that increase the intrinsic quality and credibility of the content, not those based on mechanical repetition or lexical over-optimization. In this regard, several recurring directions can be highlighted.

A first direction consists of the inclusion of quantitative data, statistics, and verifiable examples, which increase the degree of accuracy and usefulness of the content. A second concerns the integration of references to credible and recognized sources, capable of strengthening the informational authority of the material. A third concerns the clarity and fluency of the writing, since well-structured, easy-to-follow texts formulated in a precise register seem to be more suitable for extraction and synthesis. Finally, the tone of the discourse matters: overly promotional, vague, or redundant formulations seem less compatible with the selection logic of generative engines.

These observations suggest that GEO rewards, above all, informed, well-organized, and evidence-based content, which brings this practice closer to the demands of credible writing and information authority, rather than just technical optimization in the narrow sense.

#### **4.4. GEO as a multidisciplinary practice**

A relevant aspect for marketing is the transversal nature of GEO. Unlike some forms of technical SEO, which could be treated predominantly as a problem of digital infrastructure, GEO involves the convergence of several skills: strategic writing, content marketing, digital public relations, technical structuring of information, and understanding how generative platforms use online sources (Similarweb, 2026).

This reality suggests that GEO cannot be reduced to a specific tactic, but must be understood as a broader organizational practice, involving both content production and the consolidation of digital authority. At the same time, its multidisciplinary nature explains why performance evaluation is still difficult: classic SEO metrics do not adequately capture citation frequency, share of voice in AI responses, or visibility in an environment dominated by zero-click interactions (Search Engine Land, 2026).

### **5. GEO versus SEO**

Before discussing the differences between GEO and SEO, it is important to emphasize that the two approaches are not mutually exclusive. GEO does not appear in a vacuum, but develops on foundations already established by SEO: the importance of content quality, technical structure, accessibility, source authority, and relevance to the user. In this sense, poorly structured content, lacking clarity or credibility, will perform modestly in both SEO and GEO logic (Vargo & Lusch, 2004).

From an analytical perspective, the differences between the two approaches can be more rigorously synthesized through a comparison on conceptual, operational, and strategic dimensions. Table 1 highlights that the major change concerns not only the tools used, but the very definition of visibility and performance in the digital environment.

*Table 1. Analytical Comparison between SEO and GEO*

Dimension	SEO	GEO	Strategic Implication
Main objective	Favorable positioning in the results page	Pickup, mention, or citation in the generative response	Content must be designed for both indexing and synthesis
Dominant interface	List of links	Synthesized conversational response	Visibility depends more on system selection than on user clicks
Performance unit	Ranking, CTR, organic traffic	Citation frequency, share of voice, zero-click presence	Evaluation requires new metrics and dedicated tools
Authority signals	Backlinks, technical signals, domain age	Clarity, verifiable data, logical structure, credible sources	Authority becomes more closely tied to informational quality
User's role	Selects and compares sources	Receives an already mediated synthesis	Brands need to be present in the response, not just in the index
Optimization logic	Matching search intent and ranking criteria	Compatibility with extraction and summarization by the model	Content strategy must become more explanatory and better structured

Source: Authors' own research

The table shows that the transition from SEO to GEO should not be interpreted as a simple terminological change, but as a shift from the logic of ranking to the logic of algorithmic selection and automatic synthesis. From a managerial perspective, this implies a rethinking of the relationship between content, authority, and performance. SEO remains relevant as a basic infrastructure for discovery and accessibility, but GEO adds a strategic layer oriented towards the effective use of content in conversational environments.

Another important difference concerns the selection mechanism. Traditional engines return a list of links to the user, leaving the final exploration decision up to them. Generative platforms intervene more deeply in the mediation of information, since they not only identify sources but also synthesize their content into a single response (GEORaiser, 2026). In this framework, visibility no longer depends exclusively on the presence in a list, but also on the compatibility of the content with the extraction and summary logic of the generative model.

## 6. Implications for Marketing Strategy

The adoption of GEO has important implications for the way organizations design and implement their digital marketing strategies. First, this practice changes the logic of content production. While in the SEO paradigm the emphasis has often been on lexical coverage and optimization for specific queries, the GEO logic seems to favor deep, structured, well-argued content supported by verifiable data. It is no longer enough for a material to be findable; it must also be useful, coherent, and credible enough to be selected in a generative answer (Dwivedi et al., 2021).

Second, GEO has implications for building brand authority. In an environment where the user can receive a complete answer without accessing multiple individual sources, the mere online existence of a brand no longer guarantees its effective participation in the information process. Visibility increasingly depends on the brand's ability to provide content that can function as a credible reference for generative platforms. In this sense, GEO is closely linked to the first dimension of brand equity - salience and awareness (Keller, 1993) - and to the likelihood that the organization is present in the cognitive moment of evaluating options.

Third, GEO requires a rethinking of performance metrics. Traditional search marketing metrics, such as organic traffic or CTR, are no longer sufficient to capture visibility in an ecosystem partially dominated by zero-click responses. Recent data shows that 42% of marketing directors at B2B technology companies in the US and UK recognize that declining performance in traditional search is causing them to adapt their strategy for GEO (eMarketer, 2026). Organizations need new measurement tools and frameworks that can measure citation frequency, the share of brand occurrences in AI responses, and the relationship between this visibility and business indicators. In the absence of stable standards, many strategic decisions still have to be made in a climate of methodological uncertainty.

Fourth, GEO has implications for resource allocation and collaboration across organizational functions. Because it involves both quality content and logical structure, as well as technical accessibility and institutional credibility, GEO cannot be treated exclusively as a single team task. It requires coordination between marketing, content, SEO, digital PR, and sometimes technical or product teams. This need for collaboration explains why GEO is gradually becoming a matter of integrated strategy, not just tactical execution.

Finally, there are ethical implications that cannot be ignored. Optimization for generative systems raises questions about the boundary between legitimate improvement of information quality and attempts to manipulate algorithmic selection. Research by Kumar and Lakkaraju (2024) has shown that adversarially designed text sequences can increase the visibility of content in generative responses without adding real informational value to the user. At the same time, the user is not always aware that the sources included in an AI response may come from content specifically optimized for retrieval - a situation that raises issues of consumer autonomy and transparency in marketing communication (Karami et al., 2025). From this perspective, the development of GEO must also be analyzed in the light of transparency, accountability, and regulatory frameworks under development, such as the European Act on Artificial Intelligence (EU AI Act), which imposes explicit transparency and accountability requirements on providers of language models.

## **7. Challenges and limitations of GEO**

Although GEO represents a relevant direction for contemporary digital marketing, the existing literature highlights a number of challenges and limitations that require analytical and methodological caution. The first of these is the algorithmic opacity of generative engines. Unlike traditional engines, where certain general ranking principles are relatively known, generative platforms often operate as black box systems, and the functions that determine the relevance and impact of a citation are not accessible from the outside (Aggarwal et al., 2024). Consequently, the precise mechanisms by which content is selected, synthesized, or cited are not fully accessible to researchers and practitioners, which limits the possibility of building stable and fully verifiable strategies.

A second challenge is the lack of standardization of metrics and measurement tools. While SEO benefits from a mature ecosystem of indicators and analytical platforms, GEO is still in its infancy in this regard. Notions such as citation frequency, share of voice in AI responses, or zero-click displacement rate are conceptually useful, but they are not yet uniformly defined or measured (eMarketer, 2026). This methodological immaturity makes it difficult to compare results across organizations, platforms, and different contexts.

A third problem is related to the inequality of access to resources and expertise. Although some works suggest that generative engines could offer visibility opportunities to sources with more modest SEO rankings, in practice, organizations with greater resources have clear advantages: they can produce more elaborate content, invest in monitoring tools, and consolidate their digital authority more quickly. There is, therefore, the risk that GEO will not completely democratize visibility, but will reproduce in a new form certain asymmetries already present in the digital environment.

A fourth limit is the volatility of the technological landscape. Generative platforms evolve rapidly, modifying their models, interfaces, and source access policies, and strategies that are effective at one time or on one platform may become less relevant later (GEORaiser, 2026). Furthermore, the fragmentation of the ecosystem between several dominant platforms makes it difficult to formulate general rules. What works for one type of query or in a particular linguistic environment cannot be automatically extrapolated.

The nascent nature of the academic base is itself a structural limitation. GEO is a new field, and much of the available information is either very recent or comes from industry sources. This means that the findings may not apply to all contexts, especially in non-English-speaking regions, emerging markets, or less studied sectors. For now, many statements about how effective GEO is should be seen as possible ideas or early results, not as confirmed facts.

## **8. Conclusions and future research directions**

### **8.1. Conclusions**

This article aimed to clarify the meaning of Generative Engine Optimization and analyze its implications for digital marketing in the context of the transformations driven by the increasingly widespread adoption of search systems powered by generative artificial intelligence. Based on the literature examined, it can be argued that GEO represents an emerging direction of optimizing digital visibility, built around a different logic than that specific to traditional search engines. If SEO were defined mainly by the objective of obtaining a favorable position in the results pages, GEO shifts the emphasis to the probability that the content will be extracted, synthesized, and cited in the answers provided by generative platforms.

The analysis carried out suggests that GEO should not be interpreted as a substitute for SEO, but as an extension of it in a new technological and informational framework. The basic principles associated with quality content, structural clarity, source authority, and technical accessibility remain relevant, but are recontextualized by the mechanisms through which generative models select and capitalize on the information available online. In this sense, GEO can be understood as a strategic adaptation to an environment in which visibility no longer depends exclusively on ranking, but also on the capacity of content to become a usable resource for algorithmic synthesis.

From a theoretical perspective, the article shows that GEO can be interpreted in a relevant way by relating it to the adoption of innovations, the acceptance of emerging technologies, and the building of brand equity. From a managerial perspective, the analysis highlights that the development of content for generative environments involves more than a punctual technical optimization; it involves informational rigor, credibility, clear discursive structure, and coherence between marketing objectives and new forms of information intermediation. At the same time, the article highlights that the field remains marked by important limitations: the lack of standardized metrics, platform opacity, technological volatility, and the still-limited nature of academic validation.

Therefore, GEO should be treated, at the current stage, as a promising field, but still in the process of conceptual and methodological consolidation. Its relevance for marketing is evident, but the full validation of its implications requires additional empirical research, carried out in various contexts, on different markets and with more clearly defined indicators. In this form, GEO does not

appear as a closed or stabilized formula, but as a research topic that reflects the broader transformation of digital visibility in the contemporary information economy.

## 8.2. Future research directions

Given the field's emerging nature, the current literature identifies several relevant research directions.

A first direction aims to develop rigorous frameworks for evaluating GEO effectiveness, including by measuring the relationship between presence in generative responses and indicators such as traffic, conversion, purchase intent, and brand loyalty.

A second direction is to extend the research beyond the English-speaking context to understand how GEO works in other languages, in emerging markets, and across different cultural contexts. It is also worth investigating how small and medium-sized organizations can adopt GEO practices in conditions of limited resources, as well as the extent to which new digital visibility mechanisms risk reproducing or accentuating existing inequalities in the online environment.

Finally, an essential direction of research concerns the ethical and regulatory dimensions of optimization for generative engines, especially in relation to transparency of sources, the risk of manipulation, and the responsibility of platforms in mediating information.

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