Covering artificial intelligence: the role of European Union, British, and American media outlets in generative AI Visibility

Abstract
Artificial intelligence (AI) has emerged as one of the central topics of 2023 with extensive media coverage of the most relevant technologies and issues associated with this subject. In a highly competitive digital media landscape, search engine optimization (SEO) has become cybermedia’s primary strategy to increase visibility and attract more readers. The objective of this paper is to analyze the visibility of content published by the media relating to artificial intelligence, focusing on a selection of related keywords. The research also aims to investigate how this visibility has impacted both the technologies themselves and the analyzed media outlets. A total of 69 media outlets from 12 European Union countries, the United States, and the United Kingdom were examined. The results reveal a pronounced dominance of U.S. media, closely followed by Spanish media. There is an uneven distribution of media outlets across most of the countries analyzed, with two or three most of the visibility. The search queries that contribute the most visibility to the analyzed media outlets across most of the countries analyzed, with two or three most of the visibility. The search queries that contribute the most visibility to the analyzed media outlets align with an informational intent, are of the long-tail type, and are associated with OpenAI technologies, particularly ChatGPT. Moreover, these queries are primarily found in news sections dedicated to science and technology. The findings underscore both the increasing interest in the subject and the effective SEO practices of certain media outlets.

Keywords
Artificial Intelligence, digital news media, Search Engine Optimization, AI, SEO, web visibility, digital media.

1. Introduction
In 2023, generative artificial intelligence (hereafter referred to as Generative AI) made a significant impact on society, and this influence is expected to persist in the short and medium term (Llaneras et al., 2023). One year after this technology emerged across various sectors and contexts, the media appears to have integrated it into the agenda-setting process, considering it a pertinent topic within the realm of science and technology communication.

Generative AI is a type of artificial intelligence capable of generating creative text and content by consolidating data from various sources (Dasborough, 2023). Among the generative AI technologies, the most popular one is OpenAI's Chat Generative Pre-trained Transformer...
(ChatGPT), which has sparked interest in artificial intelligence across numerous sectors and among professionals. ChatGPT is part of the broader category known as generative pre-trained transformers (GPT), which falls under the umbrella of large language models (LLM). These models are based on deep learning techniques that leverage extensive datasets (Cascella et al., 2023). Deep learning techniques comprise a set of machine learning algorithms focused on assimilating data representations from models closely aligned with theories of human brain development. Consequently, these techniques aim to simulate the way in which people acquire skills (Franganillo, 2023).

Bing Chat is a functionality integrated into the Bing search engine, introduced by Microsoft in February 2023. It incorporates a search-oriented customization of technology developed by OpenAI (Mehdi, 2023) and is trained to understand the search intent, tone, and context of Bing users (Lopezosa, 2023). The chatbot provides informational results generated to fulfill user queries, serving as a complement to web results. Notably, unlike ChatGPT, Bing Chat includes information about the sources used to generate content, along with a list of questions related to the user's query.

Google Bard, recently renamed Gemini, is an artificial intelligence conversational chatbot, similar to ChatGPT. It is based on the large language model PaLM 2 (Pathways Language Model 2), which succeeds LaMDA (Language Model for Dialogue Applications), launched by Google in 2017 (Aydin, 2023). Google Bard was publicly launched in March 2023 in response to the success of ChatGPT and the emergence of Bing Chat.

Also, starting in 2022, the creation of images from text prompts gained popularity through tools like DALL-E (also developed by OpenAI) and Midjourney. According to Borji (2022), Midjourney stands out for its ability to generate highly relevant images based on user prompts, as well as its ability to integrate styles and design elements. DALL-E excels in generating images by combining different elements and concepts. Midjourney and DALL-E are the two most popular applications for generating images with AI, to the extent that media outlets such as The Economist, Cosmopolitan, and The Atlantic have already utilized them to illustrate their covers (Franganillo, 2023).

The internet has become one of the predominant platforms for accessing information. As a result, general search engines, with Google leading the way, have become primary sources of information for many users.

In general, users tend to focus on results displayed on the first page of the SERPs (Search Engine Results Page) of search engines, often overlooking those on subsequent pages (Kulshrestha et al., 2018). This behaviour extends to the first block of ten results, with the first three organic results (28.5%, 15.7%, and 11%, respectively) capturing more than half of user clicks (Beus, 2020).

Given this, the significance of search engines is crucial; in fact, 96.55% of internet pages do not receive organic search traffic from Google (Soulo, 2023) meaning that less than 5% capitalize on the immense amount of traffic that search engines can direct to a website.

The discipline of analysing the factors influencing search results is known as Search Engine Optimization (SEO). Implementing an SEO strategy is crucial for the success of a website, as it enables the positioning of its pages in prominent positions within the SERP in response to user queries. In turn, this enhances website traffic and augments the visibility of its content (Duong, 2019).

While it is true that SEO is a central concern in the business world due to its direct commercial impact, it is also becoming a subject of interest in academia. In recent years, a considerable amount of research has focused on web visibility. More specifically, there has been an emphasis on analysing queries formulated in search engines and studying the impact of search results on consumer decisions, to provide a couple of representative examples.
This has been studied from various perspectives, including the media sector and its visibility. However, to date, there is no specific research dedicated to studying the web visibility of content related to artificial intelligence as published by the media.

The primary objective of this study is to analyse the organic visibility of content related to artificial intelligence published by print media. We aim to identify the media that have achieved greater visibility for a selected set of keywords and examine how this visibility has impacted the commercial brands and technologies that appear to be the main protagonists, namely OpenAI, Google, Microsoft, and Midjourney. Through the gathered data, our goal is to gain insights into the European landscape, with a specific focus on the potential differences between Great Britain and the United States.

The specific objectives of this research are as follows:

O1. Determine the web visibility of the concept of artificial intelligence and its main related keywords on the websites of major European Union, British, and North American media.

O2. Identify which media outlets are more visible when queries are made with keywords such as artificial intelligence, generative artificial intelligence, ChatGPT, GPT-4, GPT-3, OpenAI, Google Bard, Bing Chat, DALL-E, and Midjourney.

O3. Examine the notable differences in web visibility among various European Union media outlets, followed by comparisons with British and American media.

The next section provides a literature review centered on the principles of web visibility and SEO. Following this, we delve into the methodology and the tools employed to gather the data for each selected media outlet. The subsequent sections present and discuss the results. Finally, we conclude with insights, discuss limitations, and outline potential avenues for future research.

2. Literature review

Academic studies on web visibility have focused primarily on the analysis of specific business sectors. Research related to search engine positioning has been conducted in various contexts, including universities (Nevado-Chiné et al., 2021; Vállez et al., 2022), tourism portals on the web (Rovira et al., 2010; Pedraza-Jiménez, 2018), libraries (Onaifo & Rasmussen, 2013; Vállez & Ventura, 2020), cybermedia (Giömelakis & Veglis, 2015; Lopezosa et al., 2019; Pedrosa & Morais, 2021), and other industries (Mladenović et al., 2023).

Similarly, there is a prevalence of quantitative studies focused on SEO auditing tools, especially those associated with the use of products such as SEMrush (Lopezosa & Codina, 2018), Ahrefs (García-Carretero et al., 2016), Sistrix (Vállez & Ventura, 2020), and Majestic (Orduña, 2021).

In terms of the most-researched topics, there is a growing body of literature on the web visibility of social issues. Some studies indicate that search engines like Google, Yandex, or Baidu play a pivotal role in information searches during election periods, with significant implications for information consumption (Metaxas & Pruksachatkun, 2016; Trielli & Diakopoulos, 2020). It is also noted that, often, the first results originate from national media (Unkel & Haim, 2019), playing a crucial role in shaping the image of political candidates (Belt et al., 2012).

In this context, with journalism as a central focus, web visibility plays a significant role, particularly within the realms of generalist search engines and social networks (Noppari et al., 2014). SEO has transformed journalism, presenting new challenges and opportunities for professionals in the field and news agencies (Neuberger, 2014). These entities must develop strategies to optimize their content, thereby attracting more readers.

On the other hand, another equally important body of work has focused on studying the main pillars of SEO. Before delving into these pillars, it is crucial to note that Google’s algorithms, as well as those of other search engines, are constantly evolving. Consequently,
SEO and its techniques are subject to ongoing changes. Thus, research published to date, while currently significant, may become obsolete in the medium and long term.

Considering this dynamic environment, it is worth noting the research by Shahzad et al. (2020) and Mittal et al. (2018), which examine the three most common techniques in SEO (White Hat, Grey Hat, and Black Hat). These studies indicate that employing ethical techniques (White Hat) for positioning is the safest and most enduring strategy. Additionally, the work of Umenhofer (2019) approaches SEO from the perspective of increasing web traffic, emphasizing the effectiveness of using the HTML standard title tag and specific meta tags, coupled with a strategic keyword identification approach, to achieve a greater impact than other SEO techniques. The study conducted by Windia et al. (2018) underscores that the most effective SEO techniques involve optimizing the meta description, utilizing single-focus keywords, and implementing the alt attribute on images. Additionally, the approach proposed by Yudasubrata et al. (2019) centres around methods for identifying keywords, with a particular emphasis on geographic targeting as a differentiating factor.

As for academic studies on SEO in the media, this field has a history dating back to 2011. Collectively, these studies provide a comprehensive overview of how SEO influences the production and dissemination of online news. They delve into specific practices within newsrooms, the training of future professionals, and the strategic importance of SEO in cybermedia. Consequently, they offer a robust theoretical framework for understanding the evolution of journalism within the context of web visibility.

Specifically, the most prominent research about SEO and media have, thus far, focused on the implementation of search engine optimization in news production (Dick, 2011), the impact of SEO on online media traffic (Giomelakis & Veglis, 2015), the strategic importance of SEO in digital media (Iglesias-García & Codina, 2016), SEO tools and indicators for analyzing media web traffic (García-Carretero et al., 2016), and SEO as an integral journalistic routine for news production (Prawira & Rizkiansyah, 2018).

In summary, considering the substantial role of the media as promoters of diverse content, their influence on society and public opinion, and the crucial role of news positioning in their quest for relevance in an exceedingly competitive market, conducting a specific study focused on the objectives outlined in this work is pertinent.

3. Methodology

This research entails an analysis of the web visibility of artificial intelligence content published in media outlets. The study employs a quantitative design, collecting visibility data from sixty-nine media outlets across fourteen countries.

In the process of selecting countries, data provided by Eurostat were utilized to choose European Union countries with populations exceeding ten million inhabitants. This criterion led to the inclusion of twelve countries: Belgium, Czech Republic, France, Germany, Greece, Italy, Netherlands, Poland, Portugal, Romania, Spain, and Sweden. Additionally, to provide a comprehensive overview of developments in the English language context, the USA and the UK were also included.

The media outlets were selected based on data provided by SCImago Media Rankings (SMR), a database that analyzes the web reputation of media outlets worldwide. The top five ranked media were selected for each country. In total, data were obtained from sixty-nine media outlets; one was excluded as it was identified as a generalist portal rather than a media outlet, and another media source was omitted due to poor visibility for the keywords under study (no results related). The data on the web visibility of the media were acquired using SEMrush, a tool that offers competitive SEO research services for websites. SEMrush is

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an internationally recognized company with a customer base exceeding 10 million users. Leveraging big data technology, SEMrush maintains one of the largest databases in the market, encompassing 25 billion keywords and crawling 17 billion URLs daily. In this study, SEMrush was utilized to monitor the domains of the sixty-nine analysed media outlets, exploring their rankings for different keywords related to artificial intelligence, such as artificial intelligence, generative AI, ChatGPT, GPT-4, GPT-3, OpenAI, Google Bard, Bing Chat, DALL-E, and Midjourney. Additionally, the dataset published in CORA, linked to this research, includes all the analysed media and the fundamental data collected using SEMrush.

Table 1. Translation of the keyword used in different languages.

<table>
<thead>
<tr>
<th>Country</th>
<th>Keywords</th>
<th>Keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>Kunstmatige Intelligente</td>
<td>Generatieve Kunstmatige Intelligentie</td>
</tr>
<tr>
<td>Czech</td>
<td>Umělá inteligence</td>
<td>Generativní Umělá intelligence</td>
</tr>
<tr>
<td>France</td>
<td>Intelligence Artificielle</td>
<td>Intelligence Artificielle Générative</td>
</tr>
<tr>
<td>Germany</td>
<td>Künstliche Intelligenz</td>
<td>Generative Künstliche Intelligenz</td>
</tr>
<tr>
<td>Greece</td>
<td>Τεχνητή Νοημοσύνη</td>
<td>Γεννητική Τεχνητή Νοημοσύνη</td>
</tr>
<tr>
<td>Italy</td>
<td>Intelligenza Artificiale</td>
<td>Intelligenza Artificiale Generativa</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Kunstmatige Intelligente</td>
<td>Generatieve Kunstmatige Intelligentie</td>
</tr>
<tr>
<td>Poland</td>
<td>Sztuczna Inteligencja</td>
<td>Generatywna Sztuczna Inteligencja</td>
</tr>
<tr>
<td>Portugal</td>
<td>Inteligência Artificial</td>
<td>Inteligência Artificial Generativa</td>
</tr>
<tr>
<td>Romania</td>
<td>Inteligenţă Artificială</td>
<td>Inteligenţă Artificială Generativă</td>
</tr>
<tr>
<td>Spain</td>
<td>Inteligencia Artificial</td>
<td>Inteligencia Artificial Generativa</td>
</tr>
<tr>
<td>Sweden</td>
<td>Artificiell Intelligens</td>
<td>Generativ Artificiell Intelligens</td>
</tr>
<tr>
<td>UK &amp; USA</td>
<td>Artificial Intelligence</td>
<td>Generative Artificial Intelligence</td>
</tr>
</tbody>
</table>

Source: Own elaboration.

To gather information for each country, the terms were utilized in their respective languages, and the positioning results in the Google search engine, with the corresponding ccTLD (Country Code Top-Level Domain), were analyzed with Semrush’s Domain Overview > Organic Research tool. This tool considers all keywords that have generated result impressions (snippets of any type) for the analyzed domain within the first 100 results displayed by the search engine for each query. Data extraction was confined to the results obtained by each media outlet in its geographic area, for instance, *El País* in the Spanish version of Google or *Le Monde* in the French version of the search engine, achieved by utilizing Semrush’s options to limit queries to specific geographic areas. In addition to the keywords, various metrics and related data were extracted. Specifically, the collected metrics include the position, indicating the ranking obtained for the result triggered by the keyword; the search volume (SV), representing the estimated number of monthly queries for the keyword; keyword difficulty (KD), a value between 0 and 100 predicting how challenging it is to position content for that keyword; SERP features (SF), encompassing the types of snippets or result blocks that the keyword can “trigger” (organic snippet, featured stories, recipes, video carousel, “more questions” block, among others); and the type of search intent (SI), which can be informational, commercial, transactional, or navigational. Additionally, various user-formulated queries were recorded, applying query expansion techniques (Efthimiadis, 1996).

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3 https://www.doi.org/10.34810/data1070
This process was replicated for all the media under examination, resulting in an extensive corpus of data available for reference in the aforementioned dataset. The data collection occurred in December 2023 and corresponds to the rankings of October 2023.

4. Results

Below are the web visibility results of the analyzed media outlets in relation to the terms associated with artificial intelligence as set out in the methodology section.

First, we present the dataset collected using the SEMrush tool, which served as the basis for subsequent analysis and study. The web pages of the various analyzed media outlets that appeared in the top 100 positions of the SERPs (Search Engine Results Pages) were obtained (Figure 1). The collected data includes: the number of web pages retrieved, the number of unique web pages, and the number of queries (keywords) in whose results a web page of the analyzed media appears.

![Figure 1](source: Own elaboration based on Semrush data.)

As depicted in the preceding figure, with the data collected have a funnel-like appearance, transitioning from the most general to the most specific: total number of web pages retrieved, unique (distinct) web pages, and the number of user queries entered into the search engine (keywords) to access content related to artificial intelligence. Additionally, as shown in the figure, the total number of keywords used is greater than the number of unique web pages positioned, indicating the capability of these pages to rank for various keyword combinations.

When analyzing the distribution by countries, there is a clear predominance of American media outlets in terms of the visibility of their content, as observed in Figure 2. Collectively, these outlets rank first in both total web pages, unique web pages, and positioned keywords, surpassing other media sources. Between the first (USA) and the second country (Spain), there is a difference of 178.2% in terms of positioned pages, 326.6% in the quantity of keywords, and 11.6% in terms of unique positioned pages.
Figure 2. Distribution by countries of the web visibility of media outlets.

Source: Own elaboration based on Semrush data.

The majority of search queries are informational, specifically, 68.8% of keywords. They are followed by those related to commercial research (26.1%), navigational queries (8.5%), and finally, transactional queries (1.8%). In terms of the types of results, the bulk of traffic across all analyzed pages comes from organic results (96.4%), followed by “People also ask” boxes (2.7%), featured snippets (0.8%), and video carousels (0.1%).

Besides the type of search, we also analyzed the specificity level of keywords, namely whether they can be considered short-tail (formed by one or two terms), mid-tail (formed by three or four terms), or long-tail (formed by more than four terms). The most frequent queries are those formulated using three or more terms to create the keywords (38.4%), although the difference is not excessively large (11.8%) compared to short-tail keywords, which represent 26.6% of the total. Finally, mid-tail keywords account for 34.9%.

If we consider the overall results, the top ten international media outlets with the highest visibility for the keywords, from highest to lowest, are The New York Times, The Washington Post, The Wall Street Journal, AP News, La Vanguardia, El Español, El País, Le Monde, Le Figaro, and El Mundo. Among the top ten, we find four American media outlets leading the ranking, followed by four Spanish and two French media outlets. Figure 3 presents the data of the six countries in the top positions, ordered by their total number of web pages in the top 100 results of the SERP.

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*SEMrush classifies some keywords under more than one category, which is why the sum of the percentages exceeds 100%.*
When analyzing the overall data from these six countries it is clear that the American media outlets dominate. Accordingly, newspapers from the United States position 721 unique web pages on the first page of the SERP (between positions 1 and 10), representing 30.1% of the total pages in the top positions. They are followed by Spanish media outlets (558 unique web pages and 23.3% of the total), Italian media outlets (329 unique web pages and 13.7% of the total), French media outlets (254 unique web pages and 10.6% of the total), British media outlets (227 unique web pages and 9.5% of the total), and finally, German media outlets (190 unique web pages and 7.9% of the total).

The URLs of the retrieved web pages are examined to conduct an initial analysis of the type of content by which each media outlet is ranked. Subdirectories (in most cases, sections of the media outlet) have been obtained, allowing us to see that sections dedicated to science and technology are the ones that capture the bulk of visibility for the analyzed keywords, followed by other sections such as society, economy, and culture. In a few cases, visibility is also achieved through other websites linked to the media outlet, available in a subdirectory or subdomain but of an independent nature. This is the case, for example, with the Andro4all blog contributing 82 URLs to La Vanguardia; Le Monde’s Pixels blog, with 35 URLs; or the media outlets Vandal, El Androide Libre, and Omicron linked to El Español, which contribute 28, 26, and 12 URLs, respectively.

If we analyze the type of keywords used for queries related to the brand names of services based on artificial intelligence technologies, those returning the highest number of keywords and positioned pages for these terms are, from highest to lowest, ChatGPT (22,574 keywords), Midjourney (2,359 keywords), Google Bard (1,013 keywords), Bing Chat (976 keywords), DALL-E (943 keywords), GPT-4 (794 keywords), and GPT-3 (742 keywords). The sum of the three variants of GPT further increases the gap between the visibility of this technology and the rest (24,110 keywords).
Finally, in Figure 4, a map of the distribution by country is presented from the viewpoint of two variables: the number of unique web pages (identified by the size of the mark) and the number of keywords they rank for (identified by the colour intensity).

**Figure 4.** Geographical distribution of the number of unique web pages and the keywords used.

Source: Own elaboration based on Semrush data.

16.19% of the positioned keywords by the analyzed media show search results within the top ten positions of the ranking. In the case of Spain, this figure rises to 25.19%, surpassing other countries such as Italy (22.88%), Germany (15.18%), France (14%), the United Kingdom (13.04%), or the USA (12.88%). Some of the concepts that are most repeated among the positioned keywords within the top ten results for Spanish media outlets, apart from those studied in this research, are “gratis” (6.92%), “chat” (6.3%), “app” (4.43%), “imágenes” (4.19%), “fotos” (2.08%), “preguntas” (1.91%), “noticias” (1.75%), “Elon Musk” (1.63%), “peligros” (1.3%), and “dibujos” (1.26%). This shows a significant interest in the ability of AIs to generate visual content of various kinds (8.13%).

5. Discussion and conclusion

As mentioned in the introduction, there is no doubt about the relevance of SEO for the visibility of websites, especially for content-based sites (Charlton et al., 2008). In the Spanish context, where established newspapers are in decline and pure digital media are gaining audience share (Vara et al., 2023), SEO is essential for these companies to remain relevant as key players in a sector where digital news media achieve the best results among the future readers’ age group (18 to 24 years) (Negredo & Kaufmann, 2021).

The results reveal a clear dominance of American news media in terms of web visibility for queries in English, especially for concepts related to AI, significantly surpassing other countries. Spain leads in Europe, ahead of the other analyzed countries on the continent, including the United Kingdom. While the success of digital news media in these two countries is also partly due to their larger geographical and linguistic communities, the supremacy of American media highlights the influence of digital media in the dissemination of information about AI on a global scale, specifically in the English-speaking context.
Of the most common types of searches, informational searches stand out, which is logical considering the nature of the analyzed websites. This also reflects the significant public interest in 2023 regarding information about AI and its related technologies, with the media being a potential source.

The analysis of URLs reveals the prominence of sections dedicated to the theme of “science and technology” and similar topics, which aligns with the specific focus on AI across the analyzed media. As its use becomes more widespread, new challenges, access barriers, as well as potential problems and social conflicts arising from its use are expected to be covered by the media in sections such as “Culture,” “Thought,” or “Society,” among others.

The study concludes with a review of the defined objectives, while identifying the study’s limitations and future research directions.

Regarding the first objective, the results of this research show an interest from all analyzed media, except one, in news relating to artificial intelligence. The concept of “artificial intelligence” generates the highest traffic, as it is also the subject of the most content.

Concerning the second objective, it is confirmed that the technology most written about and that provided the most visibility to the analyzed media during the study period is ChatGPT. Its open release in November 2022, along with its significant popularity throughout 2023, is reflected in the results, positioning this chatbot as almost a synonym for artificial intelligence in the collective imagination.

Finally, regarding the third objective, among the analyzed European Union countries, Spanish media as a whole generated the most content and also obtained greater visibility for a larger set of keywords. France, Italy, and Germany, in that order, are the next three European countries with media having greater visibility. In Spain, La Vanguardia (30.27%) and El Español (24.59%) account for over half of the visibility achieved by all analyzed Spanish media, followed by El País (21.35%), El Mundo (13.17%), and ABC (10.6%). This is even more pronounced in Germany, where Zeit alone represents 36.54% of the positioned keywords, and in Italy, where Il Corriere della Sera (31.36%) and La Repubblica (36.87%) contribute 68.23% of the results for their country. A similar scenario exists in the US and the UK. In the former, The New York Times (39.67%) and The Washington Post (24.87%) comprise 64.54% of visibility. In the UK, The Guardian (36.08%) and Reuters (28.44%) contribute 64.52%. In terms of overall figures, as discussed previously, American media achieved the highest visibility, with even the two media with the lowest metrics (AP News and USA Today) surpassing all media from the other analyzed countries, except for La Vanguardia, which surpasses both, and El Español and El País, which surpass USA Today but not AP News.

One of the main limitations of the study is that the visibility analysis only provides information about the impressions obtained by the media in Google Search. That is, the number of times they appeared on the Google SERP for specific keywords and their rank in the search results. However, to understand the value of this ranking position and the potential traffic it may have brought to these media is only possible using their respective analytics tools. A detailed study can provide further information about the quality of these visits (bounce rate, interactions, time spent on the page, pages visited per session, among others).

Finally, this work can serve as the basis for future research focused on analyzing the impact of AI on other types of content websites, economic sectors, educational sectors, among others. The scope of the research could also be expanded to other geographical areas or focus on a more detailed or qualitative analysis of the types of content published.

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