

Voice search optimization in digital media: challenges, use and training

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Abstract

In view of the widespread use of virtual voice assistants and/or voice searches on smartphones to find all kinds of information, this article explores voice search optimisation (VSO) and its application in the journalistic sector. To this end, 32 semi-structured interviews were conducted with experts representing different professional profiles in the fields of journalism, search engine optimisation (SEO) and academic research. On the basis of the data, eight semantic categories were created and the experts' perceptions were correlated to identify response patterns. The results confirm the existence of various degrees of convergence and divergence between these three professional profiles in relation to different dimensions of VSO, such as its definition, its techniques, its current and future strategic role in digital media, and its application in journalistic writing. This study confirms that although the use of VSO in digital news media is still in its embryonic stages, it will be useful in the medium and long term to train journalists in basic aspects of voice searches. In addition, internal SEO departments should be prepared to optimise the visibility of news for virtual voice assistants when they become widespread and when the technology companies that develop these assistants define a viable business model.

Keywords

Digital news media; Voice search optimization; VSO; Digital journalism; Web visibility; Search engine optimization; SEO; Voice search; Training.

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1. Introduction

Search engine optimisation (SEO), understood as the set of techniques that help position web content in the top results on *Google* or *Bing* (among other search engines), has become an important business strategy for digital news media to increase their audience (Carlson, 2007). Such search engines help users select the most relevant content (Machill; Beiler; Zenke, 2008) in response to their searches, and it is for this reason, as well as the increase in hyper-competitive internet news, that digital media are highly dependent on SEO (Lopezosa et al., 2020).

In fact, there is a complex relationship between the media and *Google* and other technology companies (Lee; Chyi, 2015), characterized by great ups and downs (Marcos-Recio; Sánchez-Vigil; Olivera-Zaldua, 2015) that have caused conflicts ranging from audience issues and web traffic to financial aspects through accusations of oligopoly among many others (Guallar, 2015). All of this has resulted in the dynamics between both parties conditioning and affecting the journalistic industry and its readers (Barr, 2014). However, the relationship between *Google* and the media can be characterized by the term *frenemies*, since *Google* ensures that its products are also platforms for the media, e.g., *Google News* and *Google Discover*, among others.

This situation has led to a boom in research on web visibility in journalism, with very interesting studies on the application of SEO in digital media, including those by

- Giomelakis and Veglis (2015) and Charlton (2016), which demonstrate that there is considerable room for improvement in the alignment between journalistic routines and SEO routines;
- Dick (2011) and Smyrniaios and Sire (2014), who recognise the need to constantly pursue optimal convergence between the best journalism and the best SEO; and
- Lopezosa et al. (2021) and Pedrosa and De-Morais (2021), which identify practical SEO techniques applied in journalistic writing.

All these studies analyse digital media visibility on digital platforms. However, visibility is constantly evolving, and nowadays users also consume information via other channels, such as voice assistants (also called virtual assistants), physical assistants such as *Alexa* and *Google Home* and others integrated into mobiles, such as *Siri* or *Google Assistant*.

In the case of voice searches, i.e., queries spoken to a virtual assistant that then returns a result, there are a number of academic studies published in the social sciences (Sa, 2016; Shokouhi; Ozertem; Craswell, 2016; Mairesse; Raccuglia; Vitaladevuni, 2016; Hurwitz et al., 2017; Guy, 2018; Lovato; Piper, 2019), several of which include a consideration of journalism (Lochrie et al., 2018; Kischinhevsky, 2019; Jung et al., 2019; Fagundes-Pase et al., 2020; Turow, 2021) but not of visibility, that is, not of voice search optimisation (hereafter VSO). There have also been numerous industry reports and news stories published on the use of voice search technology, both at a general level (Huffman, 2014; Cachón, 2019; *Isidigitaldata*, 2020; *Rabit and Pork*, 2021) and in the context of digital media (Newman, 2018). It is also possible to find technical documentation (Checa, 2020; Makhyan, 2022) with a broad and generalist application, although not directly focused on news. However, to date no academic study has focused on voice search optimisation and its application to digital media.

Likewise, the dynamics of voice-based SEO have not yet been studied by the academy. However, we can find sectoral reports and user guides by companies and specialized media (Bonelli, 2017; Gareth, 2019). In this sense, voice-based SEO is understood as the discipline in charge of optimizing content so that voice assistants such as *Alexa*, *Google Assistant*, *Siri*, and *Cortana*, among others, offer the most accurate results for conversational queries (Codedesign, 2023). Among the recommendations to optimise websites for voice searches are using interrogative keywords, marking the content with the *Schema.org Speakable* scheme (Schema.org, 2018), having a frequently asked questions section, and having a website that loads fast, is compatible with mobile devices, and works for local inquiries, among others (Bonelli, 2017; Gareth, 2019; Codedesign, 2023).

On this premise, and based on the assumptions (1) that the use of voice searches is recognised as growing in line with the consolidation of the market for virtual assistants (Sterling, 2016), and (2) that digital media need to know how to programme their news for voice assistants (Newman, 2018), this study offers an analysis of VSO in digital news media. To this end, we use semi-structured interviews, a methodology that has already been effectively applied to the study of search engine optimisation (Schultheiß; Lewandowski, 2020; Lopezosa et al., 2020; 2021).

The general objective of this study is to carry out a diagnosis of VSO in the journalistic sector to identify the extent of its application in digital media and the challenges involved in implementing voice search optimisation strategies in journalistic writing, both on a strategic business level and on the level of training for journalists and SEO teams integrated into digital media.

On the basis of this main objective, the specific objectives are:

- 1) To explore the opinions of search engine optimisation experts working in digital media, consultancy firms and universities in relation to VSO applied to digital media.
- 2) To determine whether there is a convergence of perceptions among these different professional profiles with respect to the dimensions of VSO applied to digital media.
- 3) To identify the knowledge journalists and internal media web visibility teams should have about VSO and to propose training recommendations in this regard, whether for editorial staff or in university programmes.

2. Material and methods

For this study, 32 semi-structured interviews (Coller, 2000; Valles, 2002; Alves; Díaz-Noci, 2019) were carried out during the first quarter of 2022 with journalists and SEO professionals working for digital media, web visibility experts in the field of consultancy and entrepreneurship, and teachers and researchers whose field of study or teaching is search engine optimisation.

The participants were selected based on a previous design that covered the different professional profiles mentioned above, for which specific data are provided in tables 1 and 2). Secondly, all of them had to have competencies in SEO and work in media, business consultancy, teaching, or as a researcher in the field. Thirdly, in accordance with a series of criteria questions (Valles, 2002), identifying who has the relevant information, is more physically and socially accessible, is more willing to provide the information and is more capable of communicating it accurately. After requesting interviews with the experts identified as indicated above, 32 interviews were carried out (Table 1).

Table 1. Participants in the semi-structured interviews

Journalists/professionals responsible for SEO at media outlets	
Participant	Digital media
Natalia Alaminos	<i>apuntmedia.co.uk</i>
Alexis Apablaza	<i>player8.org</i>
José Luis Cases	<i>rankia.com</i>
Nacho Delgado	<i>brand.com</i>
Edgard Matsuki	<i>boatos.org</i>
Richard Nazarewicz	<i>wsj.com</i>
Víctor Pérez	<i>prensaiberica.es</i>
Alexandra Ptachick	<i>usatoday.com</i>
Ángeles Sánchez	<i>grupojoly.com</i>
José Soto	<i>eleconomista.com.mx</i>
SEO experts in the field of consultancy	
Participant	Company/website
David Ayala	<i>davidayala.com</i>
Emilio Berenguer	<i>interamplify.com</i>
María José Cachón	<i>laikateam.com</i>
John Campbell	<i>wearerabbitandpork.com</i>
Esteve Castells	<i>estevecastells.com</i>
Esther Checa	<i>t2o.com</i>
Emilio García	<i>campoweb.com</i>
Fernando Maciá	<i>Humanlevel.com</i>
Fernando Muñoz	<i>fernando.senormunoz.es</i>
Jordi Ordóñez	<i>jordiob.com</i>
Juan Pérez	<i>agenciaseo.eu</i>
Bruno Ramos	<i>brunoramos.es</i>
Álvaro Rondón	<i>alvarorondon.com</i>
Natzir Turrado	<i>analistaseo.es</i>
Teachers and researchers	
Participant	Institution
Raquel Escandell	<i>University of Alicante</i>
Dimitrios Giomelakis	<i>Aristotle University of Thessaloniki</i>
Carlos Gonzalo Penela	<i>Pompeu Fabra University</i>
Noelia Herrero	<i>Barcelona School of Management</i>
Nic Newman	<i>Reuters Institute</i>
Leyberson Pedrosa	<i>São Paulo State University</i>
María Pérez	<i>Pompeu Fabra University</i>
Andreu Sulé	<i>University of Barcelona</i>

The interviews were conducted by email and/or via audio recording and then transcribed. The results were then coded and analysed using the qualitative data analysis software *Atlas.ti* (version 22), a highly prestigious tool that has been

used for over 30 years (Muhr, 1991) and has become one of the most widely used in the sector (Paulus; Lester, 2015). Specifically, this tool has helped to create categories that have been applied to all dimensions of interview analysis.

Table 2 outlines the design of the professional profiles for the selection of the experts interviewed according to the criteria indicated above (Valles, 2002).

Table 2. Professional profiles

Journalists/professionals responsible for SEO at media outlets	SEO experts in the field of consultancy	University professors teaching SEO subjects
Journalist responsible for audiences and SEO at a leading international online digital news media outlet	External SEO advising digital news media	Lecturer in Digital Information and Documentation at undergraduate level
Technical SEO for an internationally important online business media outlet	Voice Search Optimisation Consultant at a national SEO agency	Lecturer in SEO and Big Data at master's level
Product, engineering and SEO manager for a specialised news website	Founder of an international voice experience agency	Senior Research Associate of a prestigious international research group dedicated to digital news media studies
SEO Manager of a national corporate digital media group	SEO expert for a multinational company	Lecturer in search engines at master's level
SEO for a regional business digital media group	SEO expert for a medium-sized company	Lecturer in advertising and public relations at undergraduate level
SEO manager at a leading online sports media company	SEO consultant with own agency	PhD and researcher in web visibility and digital news media
Head of Digital Content Service and SEO for a regional digital news media outlet.	Independent consultant offering SEO services to companies.	PhD student researching web quality and SEO
Owner of a small digital media outlet who performs basic SEO tasks	Owner of an international SEO agency	Researcher on semantic SEO and structured data
Editor of an international fact-checking digital news media outlet with expertise in web visibility.	SEO entrepreneur of digital projects	Researcher on web visibility and big data
Journalist with extensive knowledge of SEO working for a public media outlet	Independent SEO consultant who also provides training and lectures	PhD and researcher on professional profiling and SEO

The interview questions and their associated categories configured for *Atlas.ti* with the intention of coding the interviews and obtaining response patterns are listed in Table 3.

Table 3. Coding of interviews

Questions/Categories	Objectives/categories
1. Do you know the term 'voice search optimisation'?	(1) Identify whether respondents are familiar with VSO and (2) develop a consensual definition of VSO
2. Do you know or would you recommend any positioning strategies for voice searches?	(1) Identify whether respondents are aware of VSO strategies, and (2) attempt to standardise VSO strategies expressed by respondents to obtain a practical guide for use
3. Do you think voice searches will play a major role for digital news media in the short to medium term?	(1) Determine the degree of importance of VSO in digital media according to the opinions and arguments of the experts interviewed
4. Do you think digital news media adequately apply voice search optimisation strategies?	(1) Reflect expert opinion on the effective implementation of VSO in digital news media
5. Do you think journalists should be aware of aspects of voice search optimisation?	(1) Ascertain whether journalists and digital media SEO teams should have VSO skills in their work, and if so, (2) what VSO skills they should learn

Finally, to develop the training models for efficient VSO competencies focusing on the journalist/editor and media outlet SEO manager profiles, the following process was adopted:

- 1) VSO strategies (question 2) and VSO knowledge areas (question 5) were identified based on the results of the responses.
- 2) The answers were semantically compared across the professional profiles (journalists/professionals responsible for SEO in digital media, SEO experts in the consultancy field and university professors and researchers) to determine the degree of convergence or divergence between them.
- 3) Levels of perceived agreement on VSO knowledge areas resulting from the experts' statements were identified. A high level of perceived agreement was when all three parties (journalism professionals, SEO consultants/experts and university professors) expressed the same ideas, a medium level was when two of the three parties appeared to agree, and a low level was when all three parties expressed different responses.
- 4) Training models were developed by selecting high and medium levels of perceived agreement on VSO strategies, skills, and abilities. Low levels of perceived agreement were discarded.

3. Results

This section outlines the key ideas emerging from the interviews. It begins with an analysis of the degree of consensus among the different professional profiles on each of the survey questions. This is followed by the establishment of categories to summarise the most important ideas, and finally, the proposition of possible training models for VSO competencies focusing on two professional profiles (the journalist/editor profile and the SEO expert profile) based on the level of perceived agreement among the professionals in the scenarios studied.

In general, the term VSO (question 1) is widely known by the experts: 29 of them were aware of the concept, and although for three of them it was a new term, they were aware of the existence of techniques capable of positioning content for voice assistants. In this respect, 29 experts recommended specific VSO techniques (question 2); conversely, two recommended traditional SEO techniques (those applied to rankings in *Google*, *Bing*, etc.) as a process to position content for virtual assistants, and one expert said he did not know of any specific strategy.

Regarding the strategic role of VSO for digital news media (question 3), 23 interviewees considered that it did or would play a significant role in the medium or long term; in contrast, seven experts considered that its role was irrelevant or did not directly affect digital media, while two were unsure of its role or could not give a clear answer.

There was a low level of consensus on the effective application of VSO in digital media (question 4). Specifically, 12 of the interviewees stated that digital media outlets in general were not applying VSO techniques, although ten respondents considered that some digital media outlets were engaging in good VSO practices, five reported that, in general, the number or quality of VSO techniques being developed was low, and the other five did not know whether or not the digital media were currently applying voice search optimisation techniques.

However, 23 interviewees stated that there was a need for VSO in journalistic practices (question 5), although these needs vary, as will be discussed below, depending on the professional profile (journalist/editor or in-house SEO) and on changes in the industry and in news consumption in the short, medium and long term.

Below is an integrative synthesis (connecting the different answers to the same questions) developed using the categories with *Atlas.ti*.

3.1. Voice search and VSO

Just as users type their search query into *Google* in a web browser or mobile app, voice searches involve the same process but using the spoken word instead. It is the search engine's task to select the results using information retrieval techniques, applying relevance algorithms, and of course, the whole process of understanding the users' voice, using natural language processing techniques and translating voice into data. Voice searches could therefore be defined as entities that use the spoken word to query a search engine so that the auditory interface returns a unique, unambiguous answer provided by either a virtual voice assistant (*Alexa* or *Google Home*) or an integrated assistant (*Siri*, *Google Assistant*, *Cortana*, etc.).

“Voice searches could therefore be defined as entities that use the spoken word to query a search engine so that the auditory interface returns a unique, unambiguous answer provided by either a virtual voice assistant or an integrated assistant”

On the other hand, voice search optimisation is a variant of SEO that is defined as the process of semantic and technical optimisation of content from the web so that it can be processed, understood and ranked when users ask virtual voice assistants.

The VSO must ensure that the website's text content is correctly configured to appear as a suggested result when a user searches with voice signals. This incorporates the application of a set of technical and content practices aimed at aligning a website's pages with the search intentions of its potential audience when the audience uses voice rather than a keyboard as an input interface.

VSO also incorporates the process used by publishers to make programmes or audio items easy to find via voice interfaces such as virtual assistants. In short, voice search optimisation is the process of gaining control of voice search results.

3.2. VSO strategies

Some of the interviewees consider it unnecessary to carry out specific actions to position themselves in voice searches and that it is only necessary to apply traditional SEO strategies, as they believe that there is no specific optimisation process for the voice environment for web-based content that has a presence in virtual assistants.

However, most of the responses of the experts interviewed refer to certain strategies additional to or adapted from traditional SEO that can help rank content for voice searches.

General voice search positioning strategies applicable to all types of virtual assistants are outlined below, followed by specific strategies for *Google Assistant* (a virtual assistant mainly active on *Google Home* and *Android* mobile devices).

At a general level, three scenarios are observable in descriptions of techniques for optimising voice searches:

- Strategic scenario: The content needs to be adapted to the way users search by voice, i.e., it is necessary to know what morphology and syntax tend to predominate when queries are made by means of speech. Next, it is necessary to carry out keyword research on these queries and then apply them to the website, as according to the experts consulted, there are notable differences between voice searches and written queries (keywords), since the former use natural language phrases in the form of a question while the latter use single keywords. Finally, tools such as *alsoasked.com* or *answerthepublic.com* can be used to identify key phrases in the form of questions.
- Technical scenario: It is essential to ensure that the metadata (HTML elements containing information about each web page) is adequate, that it is complete, and that the content can be easily read by voice navigators and robots. In addition, a high-quality website needs to be developed in terms of both its mobile version and its loading times and, finally, page results should have excellent user experience and satisfaction values.
- Content scenario: On the website to be positioned, it is advisable to use expressions that are easy to understand with the use of connectors that give rise to concrete explanations. It is also advisable to avoid metaphors that may confuse the interpretation of the text. Additionally, the content must be correctly structured, while answering specific questions since users make queries in the form of questions. To position the questions, it is necessary to use long-tail keywords (long query phrases) in question format, which describe the answer briefly, concisely, and directly in the first paragraph. On the other hand, local content should also be considered, as many voice searches are local (e.g., film premieres in my city; traffic today, etc.). To this end, it is recommended to include specific names of places in prominent spaces on the web page, such as in the title or subtitle.

At a general level, three scenarios are observable in descriptions of techniques for optimising voice searches: Strategic scenario, technical scenario, and content scenario

Other aspects to consider have to do specifically with *Google Assistant*, which tends to read the answer to informational questions that are positioned at position zero (Spencer, 2017). In addition, it can read up to a maximum of 45 - 50 words. To appear in position zero, experts recommend developing content like lists, rankings, or comparisons. Another element that plays a fundamental role in appearing in position zero is the authority of a website's domain and the factors related to what *Google* calls E-A-T, which stands for Expertise, Authoritativeness, and Trustworthiness (Google, 2021).

Moreover, *Google* is working on *Actions*, automatic voice apps derived from web content; *Amazon's* version of this is called *Alexa Skills Kit* (Google, 2022; Amazon, 2022). The types of compatible content it has started with are podcasts, recipes, news, how-to guides, and FAQs. In order to be able to position this type of content for virtual assistants, it is technically advisable to include JSON-LD (data encoding method) structured data fragments, i.e., to mark them semantically with the specific entities of *Schema.org* (an initiative of *Google*, *Bing*, *Yahoo* and *Yandex* that allows web content to be marked semantically so that search engines can interpret it more easily).

It is also recommended to use the schema (metadata) called *Speakable* from the *Schema.org* language for news. This schema, launched in 2018, was created for news publishers to mark the most relevant sections of an article, so that *Google Assistant* can read them aloud (Google, 2018; *Schema.org*, 2018).

3.3. The role of VSO in digital media

Those experts who believe that VSO does or will in the short/medium term play a significant role in digital media say that this is due to the following circumstances: (1) because traffic coming from voice searches is growing; (2) because we are moving towards a reality where we seek to satisfy our needs almost instantaneously, and voice assistants offer that immediacy; (3) because in the medium term, voice assistants will become mainstream; and (4) because new forms of information consumption always tend to add to what already exists.

Conversely, those interviewed who consider that VSO does not play an important role in the digital news media, at least in the short and medium term, agree that this is mainly because for at present there is no clear business opportunity that can be monetised (either for digital media outlets or for the companies that develop this technology), and that the search results offered by voice assistants are concise, making it difficult at this stage to include reproducible in-depth news stories or reports. Added to this is the existence of an obstacle that is slowing down the development of VSO within the journalistic sector: the infrastructure itself, which is in the hands of technology companies. For example, if you ask *Siri* a question, *Apple's Siri* will look for the result in one of its trusted sources. *Apple* compiles this list of trusted sources, so if a media outlet is not on this list, it is not possible for it to appear as a voice search result.

3.4. Implementation of VSO in digital media

It is generally acknowledged that there is currently no clear application of VSO by digital media, but that this will most likely change in the medium/long term.

Optimisation for voice searches is very similar to the usual content writing strategy (question-answer) established prior to introduction of voice search technology, which is why digital media usually have optimised content for voice searches

even when such optimisation is not explicit. The major digital news media outlets are making great efforts to optimise their content from a semantic point of view by marking their content with *Schema.org* language schemas, which can contribute the most to voice search optimisation.

On the other hand, many respondents observe that digital media outlets are working towards developing the necessary skills to become integrated as sources into existing ecosystems (*Apple, Alexa, Google, etc.*). They also identify that digital media companies are currently focusing on work with podcasts or streaming, which is not specifically VSO, or some kind of app in assistants that can recite the news. This is very clear in the strategies of radio stations and their websites, as most radio broadcasters are very interested in voice search technology because they recognise it as key to their future. For example, the *British Broadcasting Corporation (BBC)* and the *American Broadcasting Company (ABC)* are all aware of this, as demonstrated by their strategies to expand their visibility through voice assistants.

3.5. Expertise with VSO among journalists and SEO teams

Some of the experts believe that journalists should create journalistic content and should not focus on voice search optimisation. However, they recognise that SEO teams should be engaged in creating specific content for VSO.

Regarding those who consider that journalists and SEO teams should have specific knowledge of VSO, the levels of perceived agreement among the professionals for the knowledge areas identified are shown in Table 4. The responses suggest that there is an opportunity for digital media outlets to take advantage of the voice search niche as part of their differentiation strategy.

Table 4. Level of perceived agreement among the professionals of the scenarios studied

Knowledge of VSO	Level of perceived agreement		
	High	Medium	Low
Journalists should have a basic understanding of voice search technology.		●	
Journalists should consider how a user searches via voice assistants before creating their news story.	●		
Journalists will have to adapt the wording of news stories to how people make voice searches.		●	
Journalists should be aware of the importance of SEO for today's media outlets.	●		
Journalists should learn how to write headlines for digital publishing that will have an impact on voice searches.	●		
Journalists need to know web technologies and understand the culture of online news consumption.		●	
Journalists should better structure their interviews to take into account the possibility of being listened to via virtual assistants.			●
SEOs will advise journalists on how existing news metadata should be adapted and changed for voice searches.	●		
SEOs will adapt content and headlines to voice searches.		●	
SEOs will adapt the website on a technical level through microformats or new types of content to improve VSO.		●	
SEO departments will help and support editorial staff in order to achieve better results in these searches.		●	

3.6. Training recommendations

Finally, based on the analysis of the interviews and the results obtained, a possible training model has been drawn up in the form of a table (Table 5) that includes the profile of a journalist/editor with SEO skills and the profile of a digital media SEO expert (but not a journalist).

4. Discussion and conclusions

On a general level, this research offers a diagnosis of VSO in the journalistic sector in order to identify the extent of its application in digital media and the challenges involved in its implementation. This represents a new contribution to the research on search engine optimisation in the journalistic sector that has been pursued intensively since 2007 (**Carlson, 2007; Smyrnaio; Rebillard, 2009; Giomelakis; Veglis, 2015; Charlton, 2016; García-Carretero et al., 2016; Pedrosa; De-Morais, 2021**). This area may offer an opportunity for business initiatives with a low opportunity cost, as it does not require special investments.

Research on voice search technology and digital media published to date has highlighted the need to

- work on adapting content to voice interfaces (**Fagundes-Pase et al., 2020**);
- adopt agreements between digital news media outlets and voice assistant developers to work towards updating the provision of these new ways of summarising news (**Kischinhevsky, 2019**);
- be aware of the types of news searches performed by virtual assistants (**Jung et al., 2019**);
- consider how news consumption could shape the news agenda (**Turow, 2021**); and
- promote the use of technologies that allow news to be read aloud for playback by virtual assistants (**Lochrie et al., 2018**).

All these needs have been explored in this research from the point of view of VSO, resulting in a new research approach.

Table 5. Journalist/editor training model and in-house SEO team in digital media

Profile	Subjects	Training in
Journalist	Theoretical orientation to voice searches	Introduction to voice searches
		Types of virtual assistants
		How users are using voice assistants to get information
	User-orientation of voice searches	Identifying news topics based on long-tail keywords
		Adaptation of content to the user's search intention by applying a question-answer structure
	Content-orientation of voice searches	Learning to headline for digital publishing
		Keyword optimisation in headlines
		Use of uncomplicated semantics giving clear and concise answers within the content
		Creation of audio content (podcasting) or summary content tailored to the requirements of voice assistants
		Organisation of content by blocks that provide answers to users' questions
SEO team	Productive routines	Voice-adapted morphology and syntax
		Keyword research tailored to voice searches (usually in question form)
		Ways to optimise metadata
		Ways to optimise responsive websites and loading speed
		Ways to optimise content for local/geographical searches
		Ways to optimise content to appear in position zero
		Ways of optimising EAT factors
		Semantic content tagging taking into account <i>Actions for Google Assistant</i>
		<i>Schema.org Speakable</i> content markup
		JSON-LD

At a specific level, this research offers a multidisciplinary expert view of VSO applied to online media outlets through interviews with Spanish and international professionals, in some cases including sectoral reports (Cachón, 2019; Newman, 2018; *Rabit & Pork*, 2021) and academic studies (Sulé-Duesa, 2015; Giomelakis; Veglis, 2015; Gonzalo-Penela; Codina; Rovira, 2015; Pedrosa; De-Morais, 2021). The expert view expressed here generally tend to have a high degree of convergence, except in relation to the application of VSO in journalistic writing, which has a low level of consensus, possibly because the implementation of VSO in digital media is still in its embryonic stages.

The definition offered by experts of the main dimensions of VSO studied here is in line with the main sources of industry information, such as *Search Engine Journal* (Makhyan, 2022) and *Search Engine Land* (Jones, 2019), in which they explain that optimizing for voice search involves, among other things, answering questions in featured search results, paying attention to local content, and improving adaptability to mobile devices. However, this research broadens that definition by linking it to the process adopted by publishers to make audio elements easier to find via voice interface. On the other hand, in relation to VSO strategies in digital news media and *Schema.org*, there is a previous study of SEO in digital media (Lopezosa *et al.*, 2020) that identifies the importance of VSO, which includes the optimization of technical aspects of semantic markup with *Schema.org*, but does not deal with it in detail. The present study is in line with studies asserting that voice search technology will play an important role in information consumption in general (Cachón, 2019; *Isidigitaldata*, 2020), and news consumption in particular (Newman, 2018), but it offers a new level of precision to the research. Additionally, this study confirms that there is currently no consolidated view on VSO in digital media, although current trends suggest that this will change in the medium term, especially as the use of voice assistants increases.

Limitations

First, there are other interview methods that could have been used, such as ethnographic methods or case studies, which could certainly be utilized in future research. Along these lines, a more immersive body of work to analyze, contextualize, and enrich these findings could be obtained in the future. The idea of future research for our team or others who wish to explore this area is to build a critical perspective on VSO, for which our research could be a good base. The present research could also be a good starting point for future research opportunities regarding issues such as the risk of large media groups entering into commercial agreements with search engines to appear at the top of searches, or even actors who promote misinformation appropriating these techniques to circulate negative or hate speech with political and/or economic motivations.

The second limitation refers to the very technological context of web visibility and the consumption of information through search engines. Although voice assistants have been working for years to become essential devices, for now they have not succeeded. This has allowed for the emergence of new technologies, among them artificial intelligence; more specifically, chatbots such as *ChatGPT* (Edell, 2023), for which both *Google* and *Bing* have opted (Pichai, 2023; Mehdi, 2023). However, there is no evidence at the time of carrying out this study that AI has made fundamental con-

tributions linked to these new recent technological waves, and we believe that in the future it will be necessary to study web visibility from the point of view of conversational AI.

Finally, this article has presented a proposal on what journalists and in-house media web visibility teams should know about VSO, along with training recommendations. This proposal could be useful in several scenarios: for example, as part of the ongoing strategies for training editorial staff, especially in the case of digital media with a perspective focusing more on entrepreneurship and new product creation, particularly given the low opportunity cost. This research complements previous studies on SEO and the possibilities of SEO training both for editorial staff and for students in journalism degree or postgraduate programmes. At the same time, it offers insights for digital media SEO experts who may be considering voice searches for their news content. Overall, this research and other studies published on digital media visibility optimisation strategies show that scholars and practitioners need to be vigilant as the information retrieval algorithms used by search engines such as *Google*, *Bing*, etc., and their platforms are constantly changing. Rather than lamenting these unstable conditions, new entrepreneurs need to be mindful of the opportunities they offer. Media editors need to be constantly monitoring trends and incorporating them at a reasonable pace in order to provide the public with the best services possible. This means naturally embracing the kind of user-centred attitude that more and more media outlets are adopting. This article is a modest attempt to support that endeavour.

5. References

- Alves, Kellyanne; Díaz-Noci, Javier** (2019). "Informatius de televisió i audiència activa: Estudi de cas de TV3-Televisió de Catalunya". *Comunicació*, n. 36, n. 1, pp. 9-29.
<https://doi.org/10.2436/20.3008.01.176>
- Amazon (2022). *Alexa skills kit*.
<https://amzn.to/3KsLmMS>
- Barr, Alistair** (2014). "Google to shut Google News in Spain in response to new law". *The Wall Street Journal*, 10 December.
<https://www.wsj.com/articles/google-shutting-google-news-in-spain-1418265199>
- Bonelli, Sherry** (2017). "How to optimize for voice search". *Search engine land*, May 1.
<https://searchengineland.com/optimize-voice-search-273849>
- Cachón, María-José** (2019). "¡Esto es La Voz!". *Sistrix toolbox*, 27 abril.
<https://es.slideshare.net/sistrixES/esto-es-la-voz-mjcatchon-en-ensaladaseo>
- Carlson, Matt** (2007). "Order versus access: News search engines and the challenge to traditional journalistic roles". *Media, culture & society*, v. 29, n. 6, pp. 1014-1030.
<https://doi.org/10.1177/0163443707084346>
- Charlton, Graham** (2016). "How much do journalists and editors need to know about SEO?". *Search engine watch*, March 15.
<https://bit.ly/1UIOyp5>
- Checa, Esther** (2020). "Qué oportunidad tienen las marcas si quieren optimizar para voz". *Vamos Talegon*, 28 abril.
<https://www.slideshare.net/EstherCheca/que-oportunidad-tienen-las-marcas-si-quieren-optimizar-para-voz-234779052>
- Codedesign (2023). *Voice search optimization. A complete guide in 2023*.
<https://codedesign.org/voice-search-optimization-complete-guide>
- Coller, Xavier** (2000). *Estudio de caso. Colección cuadernos metodológicos*. Madrid: Centro de Investigaciones Sociológicas.
<https://bit.ly/2NjqLPZ>
- Dick, Murray** (2011). "Search engine optimization in UK news production". *Journalism practice*, v. 5, n. 4, pp. 462-477.
<https://doi.org/10.1080/17512786.2010.551020>
- Edell, Patrick** (2023). "How Siri, Alexa and Google Assistant lost the A.I. race". *The New York Times*, 16 March.
<https://www.nytimes.com/2023/03/15/technology/siri-alexa-google-assistant-artificial-intelligence.html>
- Fagundes-Pase, André; Noll, Giselle; Gomes-Da Fontoura, Mariana; Dallegrave, Leticia** (2020). "Who controls the voice? The journalistic use and the informational domain in vocal transactors". *Brazilian journalism research*, v. 16, n. 3.
<https://doi.org/10.25200/BJR.v16n3.2021.1316>
- García-Carretero, Lucía; Codina, Lluís; Díaz-Noci, Javier; Iglesias-García, Mar** (2016). "Herramientas e indicadores SEO: características y aplicación para análisis de cybermedios". *El profesional de la información*, v. 25, n. 3, pp. 497-504.
<https://doi.org/10.3145/epi.2016.may.19>
- Gareth, Brian** (2022). "Voice search: 10 ways to optimize your site for future SEO success". *Search engine journal*, May 16.
<https://www.searchenginejournal.com/voice-search-optimization-seo-webceo/446158>
- Giomelakis, Dimitrios; Veglis, Andreas** (2015). "Investigating search engine optimization factors in media websites. The case of Greece". *Digital journalism*, v. 4, n. 3, pp. 379-400.
<https://doi.org/10.1080/21670811.2015.1046992>

- Gonzalo-Penela, Carlos; Codina, Lluís; Rovira, Cristòfol** (2015). "Recuperación de información centrada en el usuario y SEO: Categorización y determinación de las intenciones de búsqueda en la Web". *Index.Comunicación*, v. 5, n. 3, pp. 19-27. <https://indexcomunicacion.es//index.php/indexcomunicacion/article/view/197>
- Google (2018). *Speakable beta*. <https://bit.ly/3LLOvrg>
- Google (2021). *Search quality rating guidelines*. <https://bit.ly/3LlmdOc>
- Google (2022). *Actions on Google*. <https://bit.ly/3v1Rrcw>
- Guallar, Javier** (2015). "Prensa digital en 2013-2014". *Anuario ThinkEPI*, v. 9, pp. 153-160. <https://doi.org/10.3145/thinkepi.2015.37>
- Guy, Ido** (2018). "The characteristics of voice search: Comparing spoken with typed-in mobile web search queries". *Transactions on information systems*, v. 36, n. 3. <https://doi.org/10.1145/3182163>
- Huffman, Scott** (2014). "OMG! Mobile voice survey reveals teens love to talk". *Google*, October 14. <https://blog.google/products/search/omg-mobile-voice-survey-reveals-teens>
- Isidigitaldata* (2020). *El uso de la tecnología de voz en España*. <https://bit.ly/3jkSjd6>
- Jones, Kristopher** (2019). "How SEOs can master voice search now". *Search engine land*, 22 April. <https://bit.ly/3umAWsw>
- Jung, Hyunhoon; Hwang, Changhoon; Hwang, Gilhwan; Yoonjung, Cindy; Lee, Joonhwan; Suh, Bongwon** (2019). "Tell me more: Understanding user interaction of smart speaker news powered by conversational search". In: *CHI Conference on human factors in computing systems extended abstracts (CHI'19 Extended Abstracts)*, May 4-9, Glasgow, Scotland Uk. ACM, New York, NY, USA. <https://doi.org/10.1145/3290607.3312979>
- Kischinhevsky, Marcelo** (2019). "De las síntesis informativas a los resúmenes para altavoces inteligentes, desafíos al periodismo radiofónico de carácter local". *Estudios sobre el mensaje periodístico*, v. 26, n. 1, pp. 167-175. <https://doi.org/10.5209/esmp.67296>
- Lee, Angela M.; Chyi, Hsiang-Iris** (2015). "The rise of online news aggregators: Consumption and competition". *International journal on media management*, v. 17, n. 1, pp. 3-24. <https://doi.org/10.1080/14241277.2014.997383>
- Lochrie, Mark; De-Neef, Robin; Mills, John; Davenport, Jack** (2018). "Designing immersive audio experiences for news and information in the Internet of things using text-to-speech objects". In: *Proceedings of the 32nd International BCS Human computer interaction conference (HCI)*. <https://www.scienceopen.com/hosted-document?doi=10.14236/ewic/HCI2018.90>
- Lopezosa, Carlos; Codina, Lluís; Díaz-Noci, Javier; Ontalba, José-Antonio** (2020). "SEO and the digital news media: From the workplace to the classroom. [SEO y cibermedios: De la empresa a las aulas]". *Comunicar*, v. 63, pp. 65-75. <https://doi.org/10.3916/C63-2020-06>
- Lopezosa, Carlos; Trillo-Domínguez, Magdalena; Codina, Lluís; Cabrera-Méndez, Marga** (2021). "SEO in the journalistic company: perceptions and key elements for its adoption in writing". *Revista latina de comunicación social*, n. 79, pp. 27-45. <https://www.doi.org/10.4185/RLCS-2020-1487>
- Lovato, Silvia B.; Piper, Anne-Marie** (2019). "Young children and voice search: What we know from human-computer interaction". *Frontiers in psychology*, v. 10, n. 8. <https://doi.org/10.3389/fpsyg.2019.00008>
- Machill, Marcel; Beiler, Markus; Zenke, Martin** (2008). "Search-engine research: A European-American overview and systematization of an interdisciplinary and international research field". *Media, culture & society*, v. 30, n. 5, pp. 591-608. <https://doi.org/10.1177/0163443708094010>
- Mairesse, François; Raccuglia, Paul; Vitaladevuni, Shiv** (2016). "Search-based evaluation from truth transcripts for voice search applications". In: *Proceedings of the 39th International ACM SIGIR conference on research and development in information retrieval*, pp. 985-988. <https://doi.org/10.1145/2911451.2914735>
- Makhyan, Ludwig** (2022). "Voice search optimization at scale: A guide for enterprise marketers". *Search engine journal*, March 24. <https://www.searchenginejournal.com/voice-search-optimization-guide/437467>

- Marcos-Recio, Juan-Carlos; Sánchez-Vigil, Juan-Miguel; Olivera-Zaldua, María** (2015). "Google News y el impacto de la Ley de propiedad intelectual en la prensa: un nuevo amanecer para la información". *Documentación de las ciencias de la información*, v. 38, pp. 67-81.
https://doi.org/10.5209/rev_DCIN.2015.v38.50809
- Mehdi, Yusuf** (2023). "Reinventing search with a new AI-powered *Microsoft Bing* and *Edge*, your copilot for the web". *Official Microsoft blog*, February 7.
<https://blogs.microsoft.com/blog/2023/02/07/reinventing-search-with-a-new-ai-powered-microsoft-bing-and-edge-your-copilot-for-the-web>
- Muhr, Thomas** (1991). "Atlas/ti. A prototype for the support of text interpretation". *Qualitative sociology*, v. 14, n. 4, pp. 349-371.
<https://link.springer.com/article/10.1007/BF00989645>
- Newman, Nic** (2018). *The future of voice and the implications for news*. Digital News Project. Reuters Institute; University of Oxford.
<https://bit.ly/3LOJ1fj>
- Paulus, Trena M.; Lester, Jessica-Nina** (2015). "Atlas.ti for conversation and discourse analysis studies". *International journal of social research methodology*, v. 19, n. 4, pp. 405-428.
<https://doi.org/10.1080/13645579.2015.1021949>
- Pedrosa, Leyberson; De-Morais, Osvando-José** (2021). "Visibilidad web en buscadores. Factores algorítmicos de SEO on page (FAOP) como técnica e práctica periodística". *Estudios sobre el mensaje periodístico*, v. 27, n. 2, pp. 579-591.
<https://doi.org/10.5209/esmp.71291>
- Pichai, Sundar** (2023). "An important next step on our AI journey". *Google. The keyword*, February 6.
<https://blog.google/technology/ai/bard-google-ai-search-updates>
- Rabit & Pork** (2021). *Voice search ranking report*.
<https://bit.ly/38BRynl>
- Sa, Ning** (2016). "Improving query reformulation in voice search system". *CHIIR '16: Proceedings of the 2016 ACM on Conference on human information interaction and retrieval*, pp. 365-367. ISBN: 978 1 4503 3751
<https://doi.org/10.1145/2854946.2854951>
- Schema.org** (2018). *Schema Speakable*.
<https://schema.org/speakable>
- Schultheiß, Sebastian; Lewandowski, Dirk** (2020). "'Outside the industry, nobody knows what we do' SEO as seen by search engine optimizers and content providers". *Journal of documentation*, v. 77, n. 2, pp. 542-557.
<https://doi.org/10.1108/JD-07-2020-0127>
- Shokouhi, Milad; Ozertem, Umut; Craswell, Nick** (2016). "Did you say U2 or *YouTube*?: Inferring implicit transcripts from voice search logs". In: *WWW'16: Proceedings of the 25th international conference on World Wide Web*, pp. 1215-1224. ISBN: 978 1 45034143
<https://doi.org/10.1145/2872427.2882994>
- Smyrnaio, Nikos; Rebillard, Franck** (2009). "L'actualité selon *Google*. L'emprise du principal moteur de recherche sur l'information en ligne". *Communication et langages*, n. 160, pp. 95-109.
<https://doi.org/10.4074/S0336150009002087>
- Smyrnaio, Nikos; Sire, Guillaume** (2014). "The news according to *Google* how does algorithmic infomediación frame the work of French journalists?". In: *JSS-Ecrea 2014 Conference*, Thessaloniki.
<https://bit.ly/33bA5tN>
- Spencer, Stephan** (2017). "How to rank for 'position 0' in 3 simple steps: A featured snippets primer". *Search engine land*, 30 April.
<https://bit.ly/3rwzdiD>
- Sterling, Greg** (2016). "Google says 20 percent of mobile queries are voice searches. Voice search growing as virtual assistant market heats up". *Search engine land*, May 18.
<https://bit.ly/3rbBwY2>
- Sulé-Duesa, Andreu** (2015). "Schema.org, la millora de la visualització dels resultats en els cercadors i molt més". *BiD: textos universitaris de biblioteconomia i documentació*, v. 34.
<https://doi.org/10.1344/BiD2015.34.23>
- Turow, Joseph** (2021). "Journalism and the voice intelligence industry". *Digital journalism*, v. 9, n. 7, pp. 1000-1006.
<https://doi.org/10.1080/21670811.2020.1829979>
- Valles, Miguel S.** (2002). *Entrevistas cualitativas*. Colección cuadernos metodológicos. Madrid: Centro de Investigaciones Sociológicas. ISBN: 978 84 74763423