Map of scientific research on Communication in Spain: study fronts and rankings of authors, publications and institutions

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Abstract

This work presents a current map of scientific research on Communication in Spain, identifying both the research fronts of the publications with the greatest impact over the last three years (2019–2021) and the authors who led such work and their universities of reference. The original methodology applied herein focuses on an analysis of the cited authors. After a careful selection process, we work with a corpus of more than 800 articles, using *Scopus* and the *VOSviewer* software to generate a co-referencing map and throw light on the structure of the Communication field. On the basis of that analysis, we identify nine thematic clusters, with a particular grouping structure, leading authors, and relationships around fields of study such as communication, democracy and power, audiences and media consumption, the media industry, journalistic practice, fact checking and disinformation, journalistic innovation, and SEO journalism. The ranking of cited authors, where Ramón Salaverría and Rasmus K. Nielsen hold equal first position and the Chilean Claudia Mellado is the only woman at the head of a strong group, is put into context by analyzing their scientific production and the normalized impact in Communication of their institutions. The comparative analysis reveals the elite Spanish authors in Communication (Xosé López-García, Ignacio Aguaded, Andreu Casero-Ripollés, Lluís Codina, and Ramón Salaverría) and shows how universities in Madrid maintain their importance in terms of production but that those in Catalunya have the lead in terms of impact. The research is completed with a map of keyword co-occurrence that confirms the barrage of studies around the Covid crisis and the parallel and growing number of hoaxes (fakes). The research confirms the relevance of and opportunity to apply scientometric techniques to the Communication field.

Keywords

Scientific maps; Science maps; Communication research; Journalism; Scientometrics; Rankings; Authors; Researchers; Software; Universities; Scientific excellence; Trends; Lines of investigation; Impact; Data visualization; *VOSviewer*; *Scopus*; Scientific production; Journals; Research groups; Publications; Institutions; Research fronts.

1. Introduction

Neither Communication nor the Social Sciences can ignore the advances being made by scientometry (from network analysis and bibliometric maps to advanced visualization techniques) in other fields of knowledge. Such advances based on the application of methodologies, software, and tools provide objectivity and rigor to studies as well as data to analyze and evaluate the output of researchers, levels of scientific cooperation, the impact of state funding of science, or its impact on the educational system (**Moral-Muñoz** *et al.*, 2020): "Measuring is knowing". We agree with the cited authors in using this quote from **Van-Raan** (2004), an eloquent statement attributed to Onnes, to describe the growing importance of observation and measurement as a foundation for the construction of science, in any area of knowledge today, of any science. In citing, for example, **Asimov** (2010), they remind us that modern science emerged when Nature was dissected by measurement methods, thus showing how both professionals and researchers require a set of theoretical and practical tools to quantify, evaluate, and analyze experimental data.

Perhaps we stand before the Achilles' heel of the Social Sciences: the weakness of and lack of innovation in the scientific method. Authors such as **Salaverría** (2015), **Steensen** (2011), and **García-Avilés** (2021) warn, for example, of the need to innovate in Journalism in terms of both fields of study and research strategies to go beyond surveys, interviews, or case studies.

The update carried out by **Moral-Muñoz**, **Herrera-Viedma**, **Santisteban-Espejo**, and **Cobo** (2020) on the tools available to do bibliometric and scientometric analyses, including data acquisition sources, performance analysis, and visualization tools, well illustrates the opportunities open to researchers in this digital world (**Negroponte**, 2000) that is increasingly being transformed into a tyrannical data-driven society where technological progress marks the advances of science (with the accelerated rollout of artificial intelligence), as well as the most everyday objects as reflected in the Internet of Things.

Just as Data Journalism and fact checking are opening the way to counteract the disinformation and fakes that invade the post-truth era resulting from the ubiquity of the Internet and the explosion of social networks, we believe that relying on scientific methods will help research in Communication by guaranteeing an objective foundation with a strong preference for quantitative analysis. All this must of course be carried out without undermining the subsequent necessary interpretation, critical analysis, and discussion of the data. This is essential in both the journalistic field that we take as an example herein as well as the wider area of Communication and Social Sciences that includes it.

From this perspective, and as a starting point to evaluate the connection between Scientometry and the Communication studies that we propose in this work, we must highlight the growing importance of "bibliometry," using the term coined by **Pritchard** (1969) for the study of scientific publications, considering the outstanding development that this discipline is experiencing in parallel with the dizzying progress of science and the development of platforms and databases. On the one hand, these collect the enormous amount of data indexed in academic journals, books, patents, and proceedings (titles, authors, citations, keywords, institutions, etc.) while providing, on the other, a valuable sample to carry out scientific evaluation research using bibliometric techniques (**Gutiérrez-Salcedo** *et al.*, 2018) that we consider perfectly extrapolable to the Communication field.

> We propose herein a solid approach to the Spanish field of Communication that could be extended to other arenas (European and global), specialties, and areas of knowledge

As the authors state in the above-cited review work, the discipline is undergoing a deep process of modernization and becoming increasingly necessary and crucial as an essential tool to evaluate and analyze the output of researchers (**Ellegaard**; **Wallin**, 2015), collaborations between institutions (**Skute** *et al.*, 2019), the impact of state scientific investment on national R+D+i performance (**Fabregat-Aibar** *et al.*, 2019), and academic quality (**Van-Raan**, 1999).

At the same time, following a journalistic simile, the detailed information collected in databases can be used with the same robustness as a statistical document (a valuable first-hand source) and requires the same skills and competences on the part of the professional who processes the data, applies methods for their correct visualization, and interprets them. In some cases, this results in a news headline, but in others a paper following all the phases of the scientific method (**Codina**, 2021): Introduction, Methods, Results, and Discussion (IMRaD).

Returning to the synthesis offered by **Moral-Muñoz** *et al.* (2020), this can be either from the perspective of "performance analysis" related to the evaluation of different scientific actors (researchers, institutions, countries, etc.) through bibliographic information relating to publications and citations (**Narin**, 1996) or from the perspective of scientific mapping analysis (SMA) that offers a topological and temporal representation of the cognitive and social structure of a certain field of research (**Noyons**, 1999; **Small** *et al.*, 2011).

This therefore corresponds exactly to the two-pronged approach adopted herein: Using free software (*VOSviewer*) with great vizualization power and the ability to load and export information from multiple sources (as detailed in the "Materials and methods" section), we construct a scientific map on research on Communication in Spain to provide a robust and current snapshot of the discipline on the basis of objective data:

- Firstly, we identify the research fronts, areas, and study priorities of Spanish researchers, according to their scientific publications in the main journals in this area worldwide, taking cited authors as the unit of analysis; That is, rather than adopting the classic focus based on research topics (with preconceived information on authors and fields of work), we immerse ourselves in the clusters, collaborations, and affinities established between researchers by dissecting the bibliographic references.
- On the other hand, and as a consequence of this same modus operandi based on a study of co-referenced authors, we establish a ranking of the leading Spanish authors in Communication research by changing from the traditional, quantitative criterion of production to the qualitative one of bibliographic citations. In other words, it is the scientific community itself that places each author in a specific position, depending on how much their work is referred to. In addition, we consider both the number of citations and their relative position within the different clusters, thus adding a qualitative bias to the purely quantitative one provided by the references.
- We complete this approximation by correlating the ranking of the most cited authors with their level of scientific output and the impact of the institutions in which they work on the Communication field (*SCImago*).

From a methodological perspective, the aim of this research is to confirm the true usefulness and possibilities that scientometry, using the new tools and software developed for the evaluation of science, can contribute to the Communication field. This is even more true when considering the complexity resulting from the multidisciplinary nature of the area and its relative youth as a discipline of knowledge. We thus seek a robust approach to the Communication domain that could be extrapolated to other domains. We start with a Spanish map as an exploratory example, but potentially expandable to a European or global domain, while also being able to limit ourselves to more specialized fields such as Journalism or the media system.

2. Research context: scientific mapping with *VOSviewer*

Technology complicates life for us but also facilitates it. This reflection is not trivial. The development of open software and tools is not only accelerating the democratization of science, and of knowledge by extension. It is also allowing researchers to face challenges in all phases of the scientific method without becoming computer engineers, experienced infographers, experts in Data Science, etc.

And it does so, moreover, from a double perspective, by facilitating the use of such tools and by enabling the processing of huge amounts of data. This does not imply that one does not need skills and knowledge in both information retrieval and its processing and interpretation, but rather that we are observing an explosion of Big Data, into which we can delve by exercising some expertise and zooming in. The above-mentioned parallelism (that journalistic and scientific information increasingly share the same challenges) is no different from what occurs in Data Journalism in the discovery of headlines among terabytes of information (where *WikiLeaks* was only the beginning), nor is it far from the emerging concept of the "glocal," that the more global we become, the more essential the local view becomes.

It thus becomes evident that, in a knowledge-based society and after the turning point represented by the Covid pandemic, scientific research plays a central role, as does the requierement for scientific evaluation of its impact and output (**Moed**, 2020). From this perspective, scientometry opens an important avenue of research based on journal articles, as it enables an evaluation that is the most objective and moreover the only one that is feasible on a large scale.

However, this approach has been scarcely exploited in the field of Communication. So much so that the map of research fronts of Spanish researchers constructed herein is the first to delve into this discipline at a national level using this methodology, while also representing the first work in this field using advanced software such as *VOSviewer*. As important precedents focused on the scientific output in Communication of various countries, one should mention the studies carried out by **Trabadela-Robles** *et al.* (2020) and **Moreno-Delgado**, **Gorraiz**, and **Repiso** (2021) analyzing both quantity (the number of papers published) and quality (their scientific impact). While the former uses the *Scopus* database and normalized citations as an impact indicator, the latter uses *WoS* and defines a country impact factor similar to the journal impact factor.

All such studies, including the present one, represent an important advance over traditional bibliometric mapping insofar as they emphasize the visualization of large volumes of data rather than the construction of "simple graphical representations provided by computer programs such as *SPSS* and *Pajek*" and based on no more than 100 elements (**Börner**; **Chen**; **Boyack**, 2003), as were prevelant previously in literature in this field. However, and in accordance with the aforementioned new dynamics of the Information Society and Big Data, the current trend is toward the representation of larger and more complex maps, as observed by **Boyack** *et al.* (2002), **Klavans** and **Boyack** (2006), and **Leydesdorff** (2004). This is also clearly evidenced in the career of and developments by Nees-Jan Van-Eck and Ludo Waltman (*CWTS*, *Leiden University*, the Netherlands), the two creators of the *VOSviewer* software used in the current research: *https://www.vosviewer.com*

VOSviewer is a free, open-source program to build, analyze, and visualize bibliometric networks by using scientific mapping processes, similar to other software such as *Bibexcel*, *CiteSpace*, and *Sci2*, *HistCite* and *CitNetExplorer* for the visualization of citation networks, or in a more basic way, *Pajek* and *Gephi* for the analysis of networks in general (**Limaymanta**, 2020).

In just a decade, the program written by Van-Eck and Waltman has generated more than 2,000 references in *Scopus* and about 1,500 in *Web of Science*, most relating to the software itself from a methodological point of view, but also highli-

ghting bibliometric analyses, applied to various fields of knowledge such as technology and computing, engineering, medicine and health (with the recent emergence of important studies on publications related to Covid), road safety, economy and business, or the environment.

Along with this ability to visualize and handle large amounts of data, a large part of the success of this program has perhaps been due to its user-friendliness (**Van-Eck**; **Waltman**, 2017). In this case, the accessibility that we highlighted above is extended to the entire process: from the flexibility to work with multiple data sources to the construction of the maps and finally their optimal graphical representation (**Van-Eck**; **Waltman**, 2007).

This software (**Van-Eck**; **Waltman**, 2010; 2011; 2017) forms part of the line of work promoted from the field of bibliometry by other authors in this area such as **De-Moya-Anegón** *et al.* (2007), **Leydesdorff** and **Rafols** (2009), **Vargas-Quesada** and **De-Moya-Anegón** (2007), and **White** (2003) to build maps based on graphs using the mapping technique developed by **Kamada** and **Kawai** (1989). Likewise, as stated by the creators of *VOSviewer* (2017), another key precedent for this development was the combination of the Kamada–Kawai technique with the network techniques of pioneers such as **Schvaneveldt** (1990) and **Schvaneveldt** *et al.* (1988). The programs such as *Pajek* (**De-Nooy** *et al.*, 2005), *CiteSpace* (**Chen**, 2006), and *Network Workbench Tool* mentioned above are, in their opinion, some examples of this.

In fact, as can be seen from the scientific literature published on this program, including comparative studies such as that of **Velden** *et al.* (2017), such programs are relatively accessible to any researcher who is minimally familiar with the analysis and evaluation of science. Moreover, as explained herein, they are applicable to multiple fields of knowledge from a quantitative and objective viewpoint, also enabling an exploration of "the structure and evolution of research focus" (**Ding**; **Yang**, 2020). In our case, as detailed in the "Materials and methods" section below, we focus on the Communication domain, concentrating on the output of Spanish researchers over the last three years.

3. Materials and methods

The analysis of the Communication domain that is the object of this research starts from articles indexed in journals in the field that are included in *SCImago Journal & Country Rank* (*SJ&CR*), a platform produced by the *SCImago Group* based on the *Scopus* database (*SCImago*, 2021a, 2021b). *Scopus* by *Elsevier* (**Hane**, 2004; **Pickering**, 2004) is one of the bibliographic databases that indexes the most scientific journals and congresses. In its 17 years of existence, it has been the subject of numerous studies and analyses (**Archambault** *et al.*, 2009; **Leydesdorff** *et al.*, 2010; **De-Moya-Anegón** *et al.*, 2007) and has been used in multiple scientometric studies (**Jacsó**, 2011; **Corera-Álvarez**; **De-Moya-Anegón**, 2009; **Guerrero-Bote**; **De-Moya-Anegón**, 2015).

In *Scopus*, the Social Sciences thematic area, which comprises 23 specific thematic areas (plus miscellaneous areas of the Social Sciences), includes the Communication category, which as its name suggests includes works dedicated to the Communication Sciences. *Scopus* indexed 117 scientific journals/congresses in this category in 2003, but more than 400 in 2018 (an increase of 3.5-fold), indicating the social importance and impact of this discipline. Limiting ourselves to Spanish journals (filtered using the affiliation "institution Spain"), the total number of journals in the Communication category reaches 254 in the consolidated period 2019–2020.

Thus, the scientific map built to identify the main research fronts in the Communication field by Spanish authors (CSET hereinafter) is based on the papers published during this period, although we extend this until October 2021 (the time of data extraction) to provide as current a snapshot as possible.

As the object of study, we propose to retrieve all the publications in the Communication field in the years 2019–2021 with at least one Spanish author. To achieve this, we carried out a meticulous manual selection process to identify the journals indexed in the Communication category and truly exclusive to this area. We thus discarded all hybrid journals and chose to be even more restrictive by selecting a subset of journals whose entire content relates to Communication.

As seen in Table 1, one of the peculiarities of scientific journals in the Communication field is their multidisciplinary character. The vast majority of the 253 journals included in this category in the consolidated period of 2019-2020 (with at least one Spanish author) include research from other related areas such as education, documentation, linguistics, art, or politics. This is the case of the leading journal in terms of output (*Profesional de la información*), which lies far above the others and adopts a hybrid focus between docu-

Table 1. Top 10 scientific journals included in the Communication category in the consolidated period of 2019–2020. Source: *SCImago Research Group*

	Top 10 Communication journals in terms of output	Country	Articles
1	*Profesional de la información*	SPA	287
2	*Estudios sobre el mensaje periodístico*	SPA	175
3	*Revista latina de comunicación social*	SPA	139
4	*Comunicación y sociedad*	SPA	93
5	*Historia y comunicación social*	SPA	79
6	*Comunicar*	SPA	58
7	*Icono14*	SPA	57
8	*Signa*	SPA	53
9	*Revista de comunicación*	SPA	50
10	*Educar*	SPA	49

mentation and communication, or *Comunicar*, *Signa*, and *Educar*, which are highly oriented towards education and pedagogy.

The final selection, based on the information retrieved from *SCImago* and evaluated manually to limit the sample to publications focusing exclusively on the studied discipline, was limited to 29 journals (Table 2), with a total of 32,202 papers indexed in *Scopus*. Among these, we selected those with at least one Spanish author (2,332), restricted by type of document (article, review, and book chapter), leaving 2,283. The final selection limited the analysis to the period indicated (2019–2021). As of 25 October, the total number of documents composing the CSET was 830.

The map of the Communication field was therefore constructed from the 830 selected articles, processing a total of 31,308 referenced authors. For the final visualization, a threshold of five citations was applied (i.e., the minimum of citations an author must have to be included in the map). The final representation was limited to 1,500 of the 1,838 authors reaching this threshold.

To identify the research fronts, we then carried out advanced cross-searches in *Scopus* to identify the most highly cited authors (by manually analyzing the references of the papers in which their research is referred to) as well as their main cited works. One must bear in mind that, despite the growing tendency toward specialization, there are authors with strong research in different fields of study. It is thus key to determine which part of their profile actually justifies their inclusion in the cluster and connection with other authors.

From the methodological point of view, we underline the importance of such co-reference analyses of cited authors. As summarized by **Ding** and **Yang** (2020), such analysis of joint citations from cited journals contributes to the understanding of related scientific journals in a focal area and reflects the importance that researchers attach to a cited article. As suggested in the "Introduction," the use of *VOSviewer* in this work and the choice of the author co-referencing map provides an objective and transparent tool to identify the structure of the Communication domain using objective data while avoiding preconceived ideas in terms of both the area and the authors. Thanks to this map-building process, we can also determine the position and leadership of researchers within the whole structure as well as in their own cluster. As well as presenting the map using the different visualization modes in *VOSviewer*, we finally complete our overview of the area by constructing a keyword co-occurrence map to make a connection with the different clusters of authors based on their research works.

To relate the ranking of cited authors with their output and the normalized impact in Communication of their universities, we analyzed firstly the information recovered from *Scopus* for the studied period and secondly data from *SCImago Research Group* for the consolidated period of 2016-2020.

Table 2. Communication journals with papers with at least one Spanish author published in the period 2019–2021. Hybrid journals not uniquely focusing on the studied area were excluded. Source: *SCImago*.

Journals exclusively focused on Communication (CSET)	
1	*Estudios sobre el mensaje periodístico*
2	*Revista latina de comunicación social*
3	*Comunicación y sociedad*
4	*Icono14*
5	*Revista de comunicación*
6	*Trípodos*
7	*Media and communication*
8	*Journalism practice*
9	*International journal of communication*
10	*Journalism*
11	*Journalism studies*
12	*Studies in communication sciences*
13	*Javnost*
14	*Journal of science communications*
15	*Digital journalism*
16	*Comunicação mídia e consumo*
17	*Journal of international communication*
18	*Estudos em comunicação*
19	*Journal of popular television*
20	*Medijske studije*
21	*Brazilian journalism research*
22	*Communication review*
23	*Communication studies*
24	*Journalism and mass communication quarterly*
25	*Journal of radio and audio media*
26	*Mass communication and society*
27	*Media and jornalismo*
28	*Nordicom review*
29	*Popular communication*

4. Results

The map of authors cited by Spanish researchers in the Communication field reflects the strength and complexity of the professional links established through their scientific collaborations and the networks that they weave both individually and collectively from their groups, as well as the management of different collaborative projects. It is precisely such alliances that allow us to

> The usefulness of and opportunity presented by scientometry (from network analysis and bibliometric maps to visualization techniques) to advance the field of Communication research in an objective and rigorous fashion are confirmed

discover and define the knowledge structure of Spanish studies on Communication around a set of thematically related clusters related to our object of study (CSET).

Looking at the resulting image after the extraction from *Scopus* and its subsequent processing with *VOSviewer*, and using the postulates of network analysis for its interpretation (Fig. 1), the resulting overview for the period 2019–2021 provides a synchronous snapshot reveavling the existence of nine major research fronts in the Communication domain: eight with a high level of connection and a ninth, the smallest of all, located on the periphery and detached from the structure.

In fact, six clusters dominate the network according to their number of nodes (>100), central position in the representation, and size on the map. Another two (clusters 7 and 8) occupy a more basal location, in a deeper and overlapping structure, with a lower density of authors (only 30) but also strong links with the dominant ones. The ninth appears as a hung node.

Taking as a reference the quantitative data referring to each author as well as the number of citations and the strength of their connection in the general structure of the Communication map, Table 3 lists the 25 most highly cited authors identified in the current work. Analyzing their profiles, it is noteworthy that a Spaniard (Ramón Salaverría, a professor at the *Universidad de Navarra*) leads the ranking, that almost one-third of the authors are Hispanic (meriting an ad hoc investigation to study whether there is some endogamy when citing and the ex-

Table 3. Top 25 authors leading research in Communication according to the level of citation of their works in scientific journals. Source: *Scopus*.

| Top 25	Cited author	Number of citations	Strength of connection	Cluster
1	salaverria, r.	171	7,790	cluster 6
2	nielsen, r. k.	150	9,330	cluster 3
3	casero-ripolles, a.	141	6,090	cluster 1
4	jenkins, h.	128	3,766	cluster 2
5	lopez-garcia, x.	125	6,361	cluster 6
6	garcia-aviles, j. a.	113	4,709	cluster 3
7	scolari, c. a.	111	3,325	cluster 2
8	castells, m.	104	3,195	cluster 1
9	newman, n.	99	6,016	cluster 3
10	fletcher, r.	97	6,500	cluster 3
11	deuze, m.	91	4,475	cluster 3
12	masip, p.	85	4,782	cluster 5
13	hallin, d. c.	78	3,701	cluster 3
14	lewis, s. c.	78	4,304	cluster 3
15	singer, j. b.	76	4,478	cluster 3
16	mancini, p.	72	3,534	cluster 1
17	van-dijk, t. a.	70	1,192	cluster 1
18	hermida, a.	68	4,488	cluster 3
19	livingstone, s.	67	2,550	cluster 2
20	mellado, c.	67	3,776	cluster 4
21	domingo, d.	65	3,880	cluster 3
22	mccombs, m.	62	2,154	cluster 1
23	codina, l.	61	2,496	cluster 8
24	kalogeropoulos, a.	61	3,829	cluster 3
25	aguaded, i.	57	1,569	cluster 2
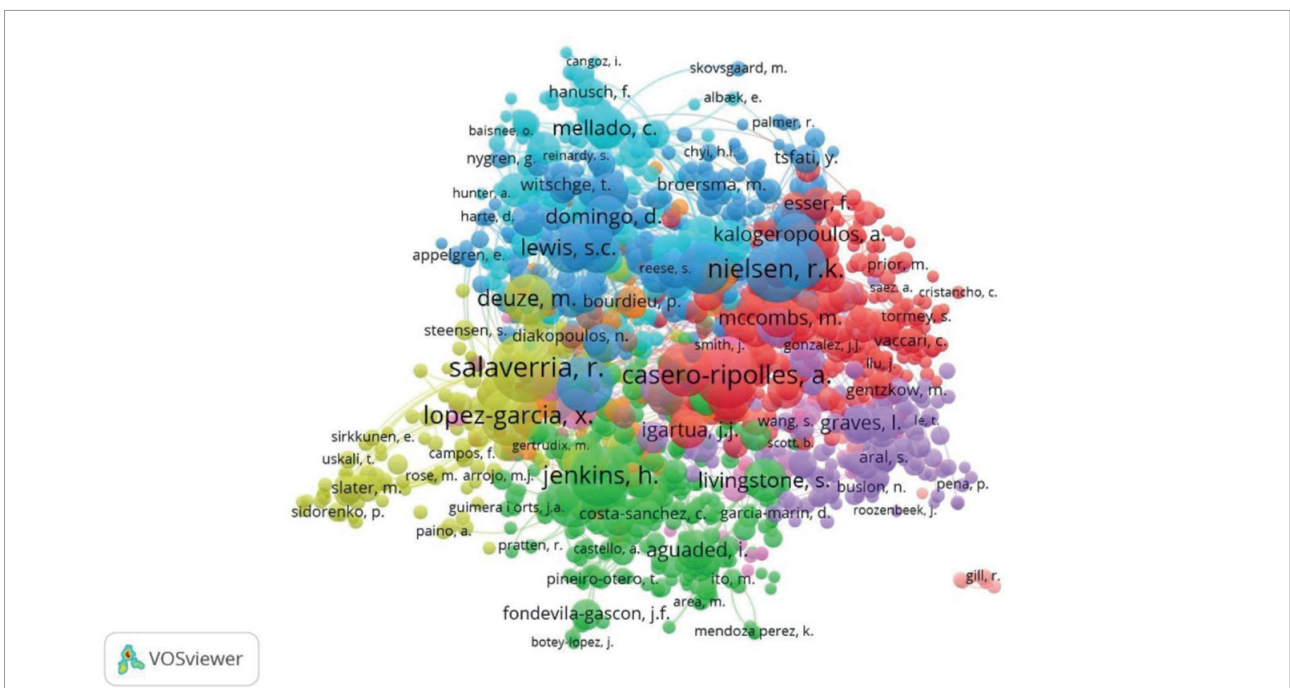
Figure 1. Co-reference map of authors in the Communication domain with at least one Spanish author (2019–2021). Network visualization performed using *VOSviewer* with *Scopus* data.

tent to which language remains a barrier or conditioner), and that there are only two women in the whole list (the director of the *Department of Media and Communications* of the *London School of Economics and Political Science* (LSE) and the Chilean researcher Claudia Mellado), evidencing the glass ceiling that also prevails in this field.

The leading position is actually shared and swapped between Salaverría and Nielsen according to the ranking based on the number of citations received by each author or the strength of their links (the strength of connection on the map), since in this case it is the political scientist and director of the *Reuters Institute for the Study of Journalism* of the *University of Oxford* (Raimus-Kleis Nielsen) who clearly ranks top.

We can also relate the more quantitative approach based on comparing the ranking of cited authors with the output of the researchers in the study sample (the subset of journals exclusively focused on Communication in the period 2019–2021) with the inferred and qualitative one based on the co-referencing map that is the focus of the current work and that takes researchers' own professional citation criteria as an indicator for the assessment.

As seen in Table 4, the author with the greatest output over the entire period (Manuel Goyanes, professor of Journalism at *Universidad Carlos III de Madrid*, with as many as 16 papers in less than three years) does not occupy a prominent position on the cluster map, as we will see below, or even appear in the list of most highly cited authors. The same applies to, for example, Dafne Calvo (*U. de Valladolid*), Jesús Díaz-Campo (*U. Internacional de La Rioja*), Ana-Isabel Rodríguez-Vázquez (*U. de Santiago de Compostela*), and Laura Cervi (*U. Autònoma de Barcelona*).

The most remarkable feature of this comparative analysis, which excludes the most highly cited foreign authors insofar as they do not publish their works in Spanish journals, is the shared leadership in the two rankings occupied by five Spaniards (in order): Xosé López-García (*U. de Santiago de Compostela*), Ignacio Aguaded (*Universidad de Huelva*), Andreu Casero-Ripollés (*U. Jaume I de Castelló*), Lluís Codina (*U. Pompeu Fabra*), and Ramón Salaverría (*U. de Navarra*). One could say that these are the elite Spanish researchers in the Communication field.

Table 4. Top 25 Spanish authors with the highest scientific output in the analyzed period (2019-2021) in the subset of journals focused exclusively on Communication (CSET). Source: *Scopus*.

Top 25	Authors with the highest output	Number of articles
1	Goyanes, M.	16
2	López-García, X.	12
3	Calvo, D.	8
4	Díaz-Campo, J.	8
5	Rodríguez-Vázquez, A. I.	8
6	Cervi, L.	7
7	Masip, P.	7
8	Vázquez-Herrero, J.	7
9	Aguaded, I.	6
10	Carvajal, M.	6
11	Casero-Ripollés, A.	6
12	Mañas-Viniegra, L.	6
13	Suau-Martínez, J.	6
14	Tejedor, S.	6
15	Chaparro-Domínguez, M. Á.	5
16	Codina, L.	5
17	Lloret, J.	5
18	Lopezosa, C.	5
19	Palomo, B.	5
20	Rojas-Torrijos, J. L.	5
21	Salaverría, R.	5
22	Sixto-García, J.	5
23	Ardèvol-Abreu, A.	4
24	Ayerdi, K. M.	4
25	Calderón, C. A.	4

In the context of this snapshot of the current state of research in Communication led by Spanish authors, it is also relevant to focus on the institution where they work, on the one hand, regarding the impact that their own research profile may have on the reputation of their university and, on the other, for the driving force that the institution may exercise based on its commitment to studies in the Communication field.

One can observe this feedback effect in Table 5 as a correlation between the position of the institutions of the authors in the CSET (in this case, we maintain the point of view of the authors' output) with the normalized impact of the institutions in the general category of Communication (including all journals, not only our subset) in the wider period from 2016 to 2020.

Comparing these two snapshots, it is noteworthy that the universities of Madrid (*Complutense*, *Rey Juan Carlos*, and *Carlos III*) maintain their importance in terms of output (the former two even leading) whereas Catalan institutions drop in the ranking (with *Pompeu* moving from second to tenth position, while the Autònoma also drops), being overtaken by *Santiago de Compostela* and the two Andalusian institutions with the strongest tradition in Communication Sciences (*Seville* and *Malaga*).

However, considering the more qualitative focus proposed herein, we cannot ignore the strong leadership of *Pompeu Fabra* in terms of citations (global and by number of documents). As explained below and assessed in the "Conclusions" section, this corresponds directly to the importance of researchers from Catalan universities when considering references to their work in the papers and journals analyzed.

> *VOSviewer* software, which is relatively accessible to any researcher, is effective for scientific mapping of large amounts of information

Table 5. Reference institutions of the authors with the highest output in the Communication field in our study sample (Ndoc), in correlation with the normalized impact of the Communication category in the normalized period of 2016-2020, considering all journals, including hybrid ones. Source: *Scopus* and *SCImago*.

	Institution	Ndoc 2019-2020-2021	Output (2016-2020)	Citations	Citations per document
1	*Universidad Complutense de Madrid*	115	404	695	1.72
2	*Universidad Rey Juan Carlos*	84	252	678	2.69
3	*Universidad de Santiago de Compostela*	56	144	416	2.89
4	*Universidad de Sevilla*	49	221	492	2.23
5	*Universidad de Málaga*	48	183	329	1.80
6	*Universidad Carlos III de Madrid*	46	219	435	1.99
7	*Universidad de Navarra*	46	160	569	3.56
8	*Universitat Autònoma de Barcelona*	41	243	507	2.09
9	*Universidad del País Vasco*	41	176	424	2.41
10	*Universitat Pompeu Fabra*	41	272	853	3.14

4.1. Cluster analysis of the co-reference map

Going fully into the analysis and interpretation of the data, Table 6 presents a diagram with the research fronts identified according to the authors cited in our object of study (CSET), thus indicating the leading authors in each cluster (centroids) and the total number of members of each cluster. This provides an outline of the current thematic structure of Spanish Communication research. Next, we describe each cluster approximately, focusing on the authors.

Table 6. Research fronts identified according to the cited authors

Cluster	Research front	Centroid	Items
Cluster 1	Communication, democracy, and power	Andreu Casero-Ripollés	340
Cluster 2	Media consumption (the role of the audience)	Henry Jenkins	336
Cluster 3	The media industry (reports and predictions)	Rasmus K. Nielsen	250
Cluster 4	Journalistic practice (roles and profession)	Claudia Mellado	157
Cluster 5	Fact checking, fakes, and disinformation	Lucas Graves	149
Cluster 6	Journalistic innovation and new media	Ramón Salaverría	129
Cluster 7	Studies on Communication in Spain (towards robot journalism)	Manuel Martínez Nicolás	37
Cluster 8	Analysis of digital media, SEO journalism, and optimization	Lluís Codina	33
Cluster 9	Post-feminism and cultural studies	Rosalind Gill	11

Cluster 1. Communication, politics, democracy, and power: the role of the media in today's society (Casero-Ripollés and Castells)

The first cluster of the representation, and also the broadest and most transversal, is connected with the history of the media, Journalism, and Communication. This cluster is headed by Andreu Casero-Ripollés, professor of Journalism at *Jaume I de Castelló*, with an important international career at prestigious universities such as *Columbia* and *Westminster* and having a very close relationship with the leaders of other related clusters (Nielsen and Salaverría). Prominent positions in this cluster are occupied by other prominent communication theorists and researchers such as the former minister Manuel Castells (whose key works include *The rise of the network society* and *Comunicación y poder*); Teun Van-Dijk from the Netherlands with his aforementioned critical analyses of discourse, racism, and discrimination; Professor Josep-Lluís Micó-Sanz from the *Universitat Ramon Llull*, who studies the combination of media, ethics, and political–electoral information; the American Maxwell McCombs with his important career in the *News Research Center* of the *American Newspaper Publishers Association* and the *World Association for Public Opinion Research* (whose main cited works include *The news and public opinion: Media effects on civic life* and *Setting the agenda: Mass media and public opinion*); or Professor Andrew Chadwick from London, author of the theory of the hybrid media system (whose most cited work is *The hybrid media system: Politics and power*, together with recent studies on the role of *Facebook*, *Twitter*, and *Instagram* in Trump's strange electoral campaigns).

> The cited authors are rated on the basis of their output and the normalized impact of their universities in the Communication field (using *Scopus* and data from the *SCImago Research Group*)

A large part of the publications in this cluster address the role of the media in today's democracies, the impact of social media at both the media and citizen level, the changing habits of audiences, or growing trends in public opinion such as political activism. Likewise, we observe numerous works related to the value of journalistic information today, the future of the press and newspapers as the driving sector of the media system, the very meaning of the mass media for new generations (from Millennials to Generation Z), and ultimately, the impact of the media and journalism on democracy. These include perspectives ranging from the political (with a substantial presence of studies on electoral campaigns on different media platforms and environments) to economic, psychological, and social aspects.
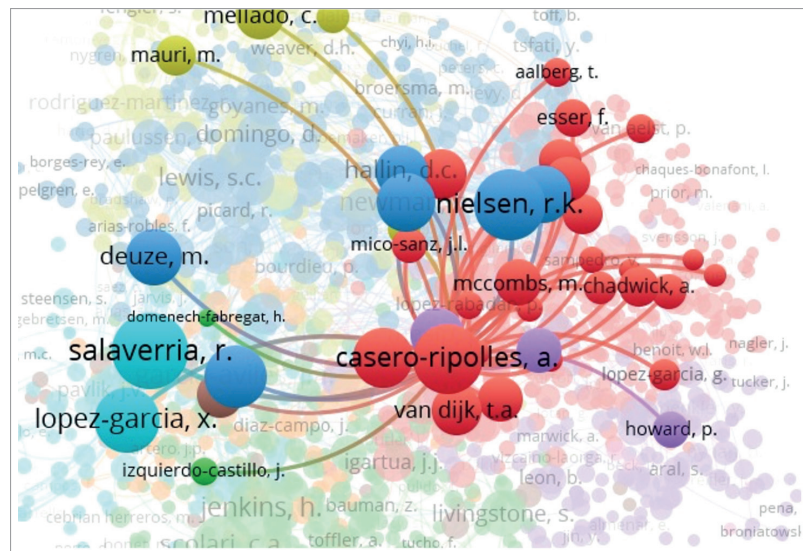

Figure 2. Cluster 1, dominated by Casero-Ripollés, with Castells (to his left, label not shown) and Van-Dijk also having important positions. Visualization performed using *VOSviewer* with *Scopus* data.

The Covid crisis and the related problems of fakes, disinformation, and fact-checking inevitably impact on this cluster based on a sociopolitical approach. However, the magnitude of this challenge is so great that, as shown below, a specific cluster is configured around its study (cluster 5).

Cluster 2. Media consumption: audiences, platforms, and narratives in new transmedia environments (Henry Jenkins, Carlos A. Scolari, and Ignacio Aguaded)

The intense process of digitization which the media are undergoing, in parallel with the dynamics of transformation of the entire economic system today, explains the growing importance of studies of audiences in recent years, both in the field of academic research on Communication considered herein and at a professional level. Technological development, the emergence of new platforms and ways of accessing information, and changes in consumption by citizens explain this prevalence.

This broad cluster configured around the American Henry Jenkins, a key author in studies on media convergence and transmedia narratives, includes works that connect approaches more purely addressing communication and media with other areas such as education, advertising, and public relations, or security–privacy from the perspective of the technological acceleration that has occurred since the start of the millennium. This is the case of analyses of audience behavior, user-generated content, and the very narratives and journalistic formats being developed and adapted to such new supports and platforms. This is accompanied by monitoring and concern regarding the relationship of young people from new generations with the media.

Reference works by Jenkins, a former co-director of *MIT*, such as *Convergence culture: Where old and new media collide* and *Confronting the challenges of participatory culture*, reach thousands of citations, while other works such as *Spreadable media. Creating value and meaning in a networked culture* or *Transmedia storytelling* also stand out.
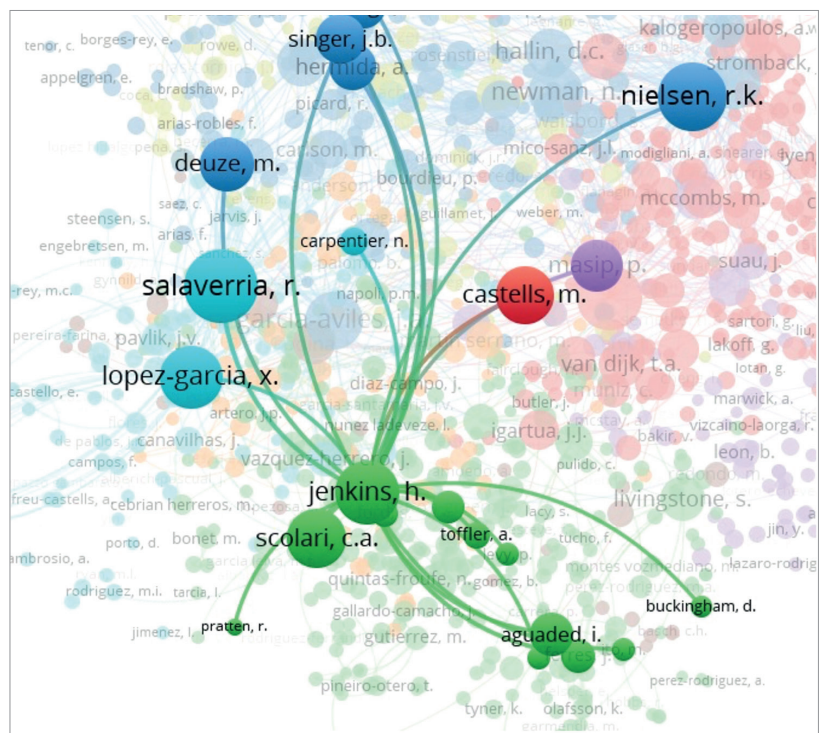

Figure 3. Cluster 2, dominated by Henry Jenkins and Carlos A. Scolari, with a strong presence of Ignacio Aguaded. Visualization performed using *VOSviewer* with *Scopus* data.

Carlos-Alberto Scolari, an Argentine media theorist based in Barcelona who created the concept of "hypermediations," enjoys a leading role in this cluster. However, it is his work on narratives and transmedia journalism that arouses most interest from Spanish researchers. In this transmedia universe, a relevant role is also found for the consultant Robert Pratten from London (with *Getting started with transmedia storytelling* and his studies oriented toward corporate communication), as well as Professors Natalia Quintas-Froufe and Ana González-Neira from the *Universidade da Coruña*, who are more focused on the field of television and fiction.

> Five clusters dominate the network according to their number of component nodes (>100), central position, and size on the map, with Casero-Ripollés, Henry Jenkins, Rasmus K. Nielsen, Claudia Mellado, Lucas Graves, and Ramón Salaverría as centroid authors

Working on new habits and paradigms in audience analysis, the British psychologist Sonia Livingstone (director of the *Department of Media and Communications* at the *London School of Economics*) also stands out in this cluster, as do Alvin Toffler (whose concept of "prosumers" remains an obligatory citation), along with other Spanish researchers such as Professor Joan-Francesc Fondevila-Gascón from *Pompeu* in the field of marketing, advertising, and public relations or Ignacio Aguaded from *Huelva*, editor of the journal *Comunicar and strongly oriented toward the field of educational media.* The same occurs with Professor David Buckingham considering his relevant work on media education, literacy, and learning in contemporary culture (his book *Crecer en la era de los medios electrónicos* is widely cited in Spanish, as are his numerous articles in *Comunicar*).

Cluster 3. Media industry: reporting and predictions (Rasmus K. Nielsen and Nick Newman)

In parallel with the fervor for surveys unleashed in the political field in recent years, mainly because of our technologized society where data occupy an increasingly central role, the media industry is also experiencing an explosion of reports and predictions closely linked to the tremendous uncertainty and transformation resulting from this unstoppable digitization process. This includes the viability of business models, the future of the media themselves, and the trends marking their adaptation, evolution, and disruption.

This field includes researchers-consultants who have managed to achieve a position of leadership and prestige. In-
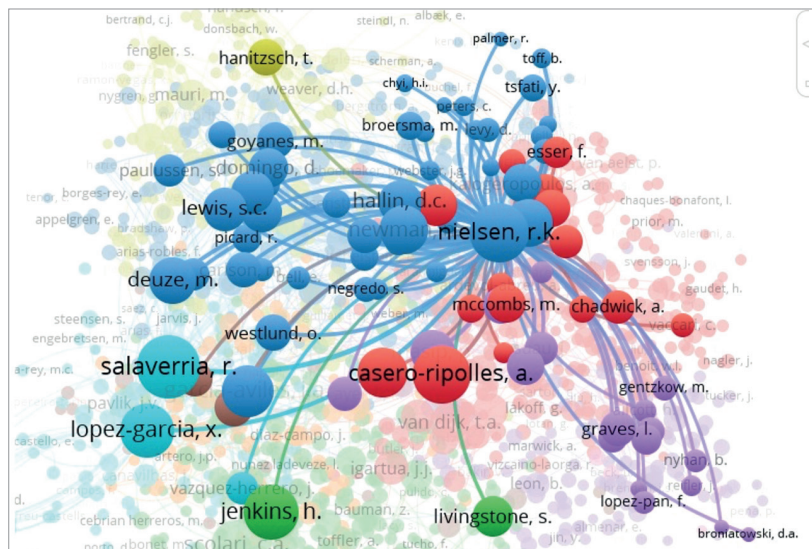

Figure 4. Cluster 3, formed around Nielsen, with the prominent presence of Newman, Fletcher, and Kalogeropoulos (at central nodes next to Nielsen). Visualization performed using *VOSviewer* with *Scopus* data.

deed, not only them but also their entire team have been able to benefit from the drive provided by studies published under the auspices of their institutions. These end up being cited massively, and all of them end up occupying important positions in the co-referencing map analyzed herein. This is the case of the *Digital news report* of the *Reuters Institute for the Study of Journalism,* with the *Oxford* politician Rasmus K. Nielsen occupying the central node, together with Nick Newman, Richard Fletcher, and Antonis Kalogeropoulos (who jointly pen the reports and achieve very high citation levels). The *Digital news project* also acts as a platform for multi- as well as single-author works including outstanding examples such as *The rise of social media and its impact on mainstream journalism by Newman, "I just Google it": Folk theories of distributed discovery* by Nielsen with Benjamin Toff, or his relevant and still very current theory on Watchdog Journalism (*The Nieman watchdog journalism project*) and relevant comparative studies between countries, strongly focused on new media and social networks.

In cluster 3, together with the strong special cluster comprising authors linked to the *Reuters Institute*, one should also highlight the role of Mark Deuze, professor of Media Studies at the *University of Amsterdam*, in digital, citizen, and open journalism (with *The Web and its journalisms: Considering the consequences of different types of newsmedia online* being his most cited work), the veteran Californian author Daniel C. Hallin as a reference in comparative studies of media systems from a political and democratic perspective, or the Spanish researcher Manuel Goyanes (*Universidad Carlos III*) with important papers on new business models and content monetization.

Cluster 4. Practice of journalism: roles and profession (Claudia Mellado)

The Chilean researcher Claudia Mellado, a tenured professor at the *Pontificia Universidad Católica de Valparaíso*, stands out both at the top of the most highly cited authors in the Spanish Communication domain and in the general co-re-

ferencing map. She is also the only woman to head one of the central clusters of the group and heads up the transnational Journalistic role performance project (JRP), with solid international visibility and relevant studies on journalistic practice and the perception of the profession by the professionals themselves.

It is indeed this specialized field around the profession, taking a critical look at its roles and practice, that defines the connection between the most important authors in this cluster. In many cases, such works are published with Mellado as co-author, and mostly exclusively in English in the top international journals in this field. One of the most highly cited solo publications is *Professional roles in news con-*
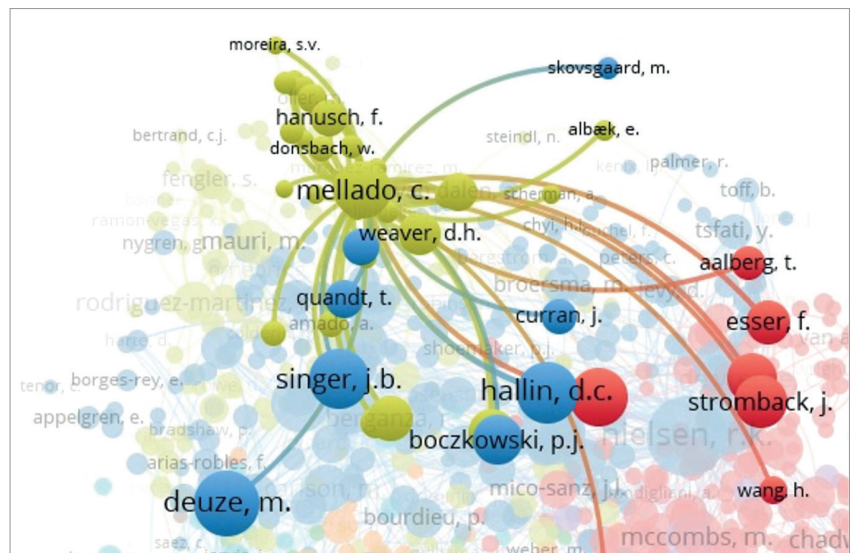

Figure 5. Cluster 4, related to journalistic practice and roles, marked by Claudia Mellado, the only woman to head one of the main clusters in the map. Visualization performed using *VOSviewer* with *Scopus* data.

tent: Six dimensions of journalistic role performance, but other collaborative works include *Mapping journalism cultures across nations: A comparative study of 18 countries* together with the German Thomas Hanitzsch and Austrian Folker Hanusch (who have also published important works from a gender perspective), as well as *Between rhetoric and practice: Explaining the gap between role conception and performance in journalism* with Arjen Van-Dalen, an expert in Political Science and Communication from the *Danish Journalism Center*.

Mellado also often publishes with Deuze and Hallin. As seen in the current representation, these are indeed the main authors connecting clusters 3 and 4, and a substantial fraction of their scientific output adopts a transnational analysis approach. From the Spanish perspective, works by the Madrid-based researcher María-Luisa Humanes (from the *URJC*) are relevant, while the American David H. Weaver occupies a particularly prominent position in this cluster with his works on agenda setting (*Thoughts on agenda setting, framing, and priming* and *New directions in agenda-setting theory and research*) and his book *The global journalist in the 21ˢᵗ century*.

Cluster 5. Fact checking, fakes, and disinformation (Tandoc and Lucas Graves)

As seen more explicitly from the keyword map, the connection between the authors in cluster 5 is clearly determined by the coronavirus crisis insofar as it has heightened the crisis of fakes, clickbait, and disinformation in what was already known as the post-truth age.

This covid–disinformation binomial underlies, for example, the central position on the map of the Catalan professor Pere Masip (who died in 2021), from the *Universitat Ramon Llull*, whose highly cited publications include *News consumption and media coverage during the confinement by Covid-19: Information overload, ideological bias and sensationalism*, while his work on journalistic convergence, "esfera 2.0," and the dynamics of newsroom reorganizations are noteworthy and indeed form the strongest connection with the Salaverría cluster. Regarding the link between these two clusters, one should also mention the role of Fernando López-Pan, from the *Universidad de Navarra*, with joint papers on Covid under the framework of the European project led by Salaverría (*Disinformation in times of pandemic: Typology of hoaxes on Covid-19*).
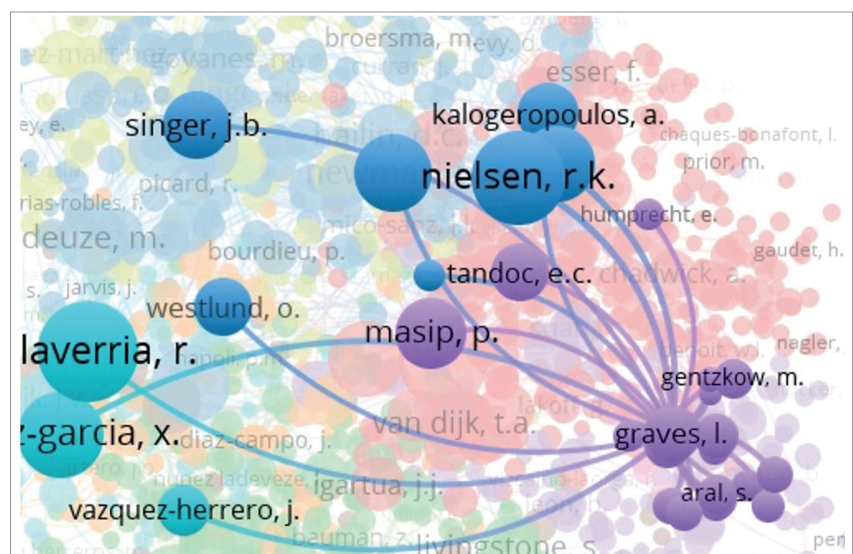

Figure 6. Lucas Graves leads this cluster structured around fakes, disinformation, and fact-checking, being directly connected with the onset of Covid-19 as keywords of recent studies in Communication. Visualization performed using *VOSviewer* with *Scopus* data.

On fake news (also used as a trendy Anglicism but in fact meaning *bulos* in Spanish), one should highlight the role of the *Stanford* economist Matthew Gentzkow with *Social media and fake news in the 2016 election*, as well as the Singaporean researcher Edson C. Tandoc (from *Nanyang Technological University*) with highly cited publications such as *Defining "Fake news": A typology of scholarly definitions* and other striking and impactful

> If we analyze the profile of the 25 most cited authors, it is noteworthy that a Spaniard (Salaverría) leads the ranking, that practically one-third of the authors are Hispanic, but that there are only two women in the whole list

works such as *Journalism is twerking? How web analytics is changing the process of gatekeeping* or, in the field of social networks, *Facebook use, envy, and depression among college students: Is facebooking depressing?*

The Wisconsinite researcher Lucas Graves also occupies a prominent node in this cluster, in this case as a key author on fact-checking with works such as *Boundaries not drawn: Mapping the institutional roots of the global fact-checking movement* or *Anatomy of a fact check: Objective practice and the contested epistemology of fact checking*. This growing interest from academia has been accompanied by substantial professional interest, so much so that the media themselves are setting up specialized verification teams, initially for news but more recently addressing the challenge of audiovisual content. Graves also appears as the main author connecting this cluster to that led by Nielsen, precisely on the basis of their joint works (for example, *"News you don't believe": Audience perspectives on fake news*). In terms of Spanish authors working on fact-checking, López-Pan also stands out with publications such as *The fact checking in Spain*. *Journalistic projects, practices and distinctive features.*

Other relevant publications include those by Claire Wardle, from New York and now at *Harvard University*, on "Information disorder" or "misinformation, disinformation and malinformation," as well as the more technological approach of Sinan Aral, an expert in Data Science and Network Science at *MIT*.

Cluster 6. Journalistic innovation, new media, and immersive journalism (Ramón Salaverría, Xosé López-García, and Mel Slater)

This cluster, led by the researcher Ramón Salaverría from *Navarre* (number 1 in the ranking of cited authors) together with Xosé López-García (from the *Universidad de Santiago de Compostela*) could be labeled as the Digital Journalism cluster, if the dynamics of the sector had not already made the adjective "digital" almost redundant. The author of *Cybermedia. The impact of the Internet on the media in Spain* usually makes statements in this sense.

Together with the cluster on fakes and fact-checking analyzed above, this cluster on the map is that in which the Covid crisis has most directly impacted, from the perspective of disinformation during the pandemic. Transnational studies also show a noteworthy importance, including comparisons between countries, justifying the substantial weight of this cluster in the general map of Spanish Communication research.

The key works by Salaverría include his reviews and analyses of cybermedia, as well as media convergence based on so-called labs (innovation laboratories in the media as a strategy for digital transformation), marking a clear line of research around media and journalistic "innovation." This same type of innovation lies at the center of López-García's career, linking it with the problem of fakes (as in *Technological and communicative innovation to fight misinformation: 135*

experiences for a change of direction and *Communication and coronavirus crisis in Spain. First lessons*).

Another prominent group in this field is that of the American John V. Pavlik with his *Innovation and the future of journalism* or *Journalism and new media*, as well as the well-known and widely cited work of Jeff Jarvis, another journalist, *El fin de los medios de comunicación de masas*.

In this cluster, albeit far from the central group led by Salaverría, it is interesting to observe a small group of authors connected around Professor Mel Slater at the *Universitat de Barcelona*, studying immersive journalism and virtual reality, one of the most recent and challenging developments in current media system. *Frontiers robotics AI* and *Place illusion and plausibility can lead to realistic be-*
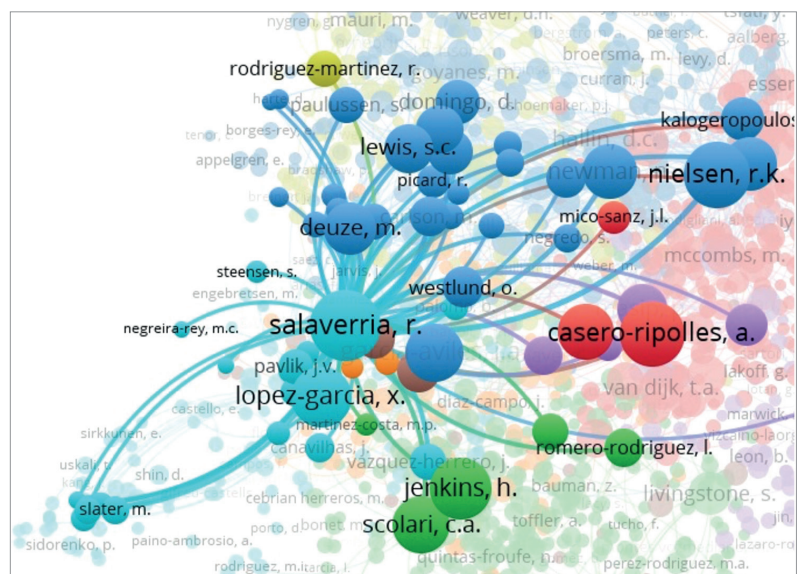

Figure 7. Cluster 6, structured around Ramón Salaverría, the most widely cited author among the analyzed works, with Xosé López-García and Mel Slater almost reaching the same level of leadership. Visualization performed using *VOSviewer* with *Scopus* data.

havior in immersive virtual environments are the most cited works by Slater, along with *Immersive journalism: Immersive virtual reality for the first-person experience of news*, by the journalist and precursor of immersive journalism Nonny de la Peña, one of the most well-known authors in this promising line of innovation and a researcher at the *University of Southern California.*

> We establish a ranking of Spanish authors leading research on Communication, complementing the traditional, quantitative criterion of output with the qualitative aspect of bibliographic citations

Cluster 7. Studies of Communication in Spain: from the traditional framework to computational journalism, algorithms, and robots (Martínez-Nicolás and Anderson)

The characteristics of the object of study itself, which acts as a nexus for the authors in this cluster, determines its own presence on the map: this cluster is scattered throughout the representation, with different small subgroups showing stronger relationships. The axis of this network is Spanish research on Communication itself, including different specializations such as the field of Journalism or the media, being strongly influenced by the impact of technology, as seen with the previous cluster.

The first idea is defined by a prominent group of Spanish authors led by Manuel Martínez-Nicolás at *Rey Juan Carlos*, who has published important reviews on the state of the discipline (*Communication research in Spain, 1998-2007. An analysis of articles published in Spanish communication journals*) and heads up an important group dedicated to this field. Other researchers with an important presence include Juan-Antonio Gaitán-Moya, from *Complutense*, with his methodological studies on research in social communication and his special focus on universities (*Communication studies research within Spanish universities spanning the years 2007 to 2014; A decade of scholarly research on communication in Spain*). This is also the case of Rafael Repiso from the *UNIR* with outstanding works from a bibliometric analysis perspective, Ángel Carrasco-Campos (*Universidad de Valladolid*), and Daniel E. Jones (who died in 2007, linked to *Universitat Ramon Llull*).

A notable feature in this field is the prominent role played by Manuel Martín-Serrano, first professor of the Sociology of Communication and founder of the first department of Communication in a Spanish university (the *Complutense*), who stands out as the centroid of the group if we only consider the number of citations (among which his work *La producción social de la comunicación* stands out) but with hardly any links to other authors (the lowest in the entire list). This unique position detracts from his impact, leaving him outside the groups in this cluster; Rather, it is Martínez-Nicolás who acts as the true centroid in this case.
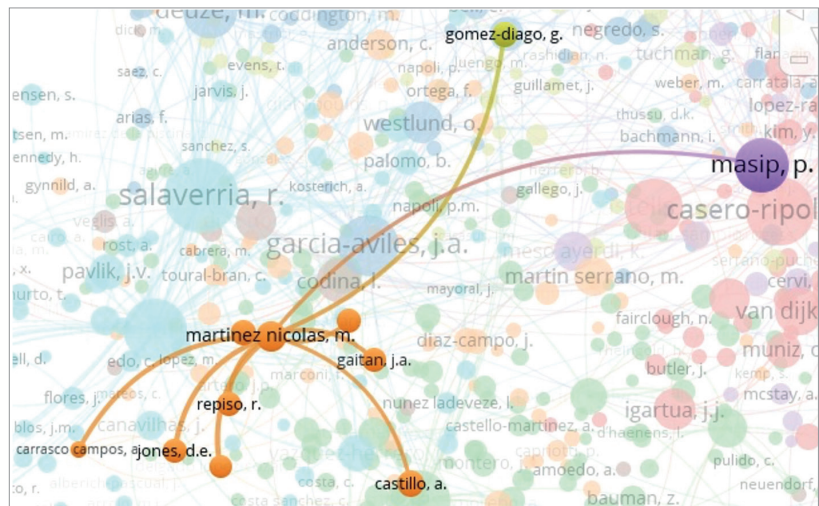

Figure 8. Cluster 7, scattered throughout and underlying the structure of the map; the strongest group is led by Martínez-Nicolás. Visualization performed using *VOSviewer* with *Scopus* data.

From the perspective of the evolution of the studies discussed above as a reflection of the current technological impact, a second subgroup is established with strong connections around the theorist and historian Christopher W. Anderson at *Columbia* (*Towards a sociology of computational and algorithmic journalism*), the American Nicholas Diakopoulos (*Algorithmic accountability: Journalistic investigation of computational power structures*), Konstantin-Nicholas Dörr from Switzerland (*Mapping the field of algorithmic journalism*), and the Australian Terry Flew (*The promise of computational journalism*). On the Spanish side, the Galician researcher Miguel Túñez-López from the *Universidad de Santiago* stands out in this field (*Automated-content generation using news-writing bots and algorithms: Perceptions and attitudes among Spain's journalists*).

Cluster 8. Analysis of digital media, SEO journalism, and optimization (Lluís Codina)

All the analyses of websites and content optimization, at both a technical and journalistic level, aimed at the new rules of the game imposed by the all-powerful search engines (especially *Google*), reflect the new fields opening up both professionally and academically in the media system, having a direct impact on the Communication research field analyzed herein. As commented above regarding the "digital" nature of Journalism, we can also highlight the role placed by algorithms on the media dashboard, related to so-called organic traffic (searches), as a derivative of social networks (first *Facebook* and *Twitter*, then *Twitch* and *TikTok* defining the consumption of more audiovisual content).

Unlike the six large clusters that dominate the structure, in this case we find a more limited group of nodes, in a more underlying position (as for cluster 7). Professor Lluís Codina from *Pompeu Fabra* acts as the centroid leading the in-

vestigation. He is one of the leading Spanish experts in structured journalism, new methodologies of analysis, advanced information retrieval, and strategies for visibility and optimization (*What is new media? The views of 70 Hispanic experts* and *Search engine optimization and online journalism: The SEO-WCP framework* are some of his most widely cited recent works.)

Sharing his leading position in this cluster are his close collaborators Javier Díaz-Noci (*SEO tools and indicators: Characteristics and application to online media analysis*), Pere Freixa (*Interaction and data visualization in structured journalism*), *and Carlos Lopezosa (highly focused on the study and development of SEO journalism)*, also researchers at *Pompeu.* More focused on the architecture of
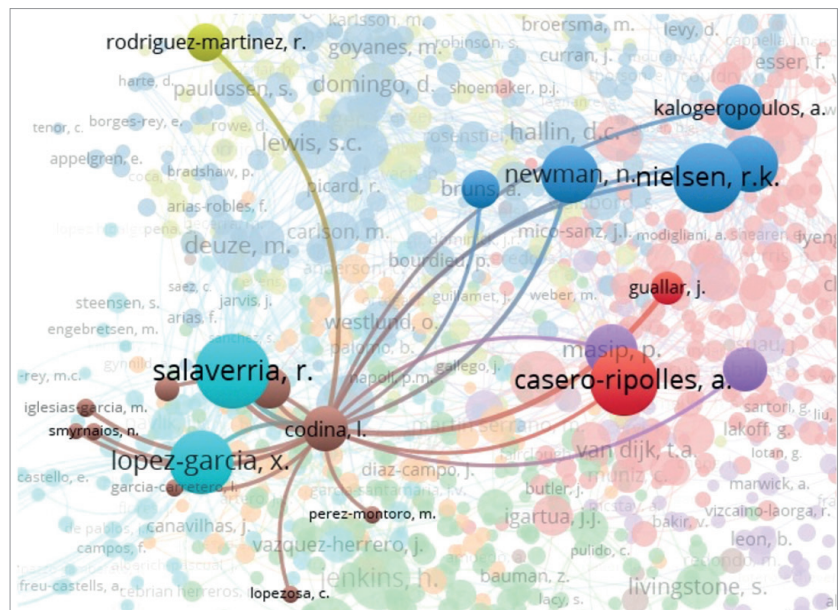

Figure 9. Lluís Codina and Javier Díaz-Noci (hidden under Salaverría) lead cluster 8 around the analysis of websites, positioning, and SEO journalism.
Visualization performed using *VOSviewer* with *Scopus* data.

information and knowledge management, one should also mention Mario Pérez-Montoro, another Catalan researcher but from the *Universitat de Barcelona*, as well as the Frenchman Nikos Smyrnaios from the *Université de Toulouse*, who is highly focused on the role of networks in political communication and electoral campaigns.

Uniquely in this cluster, one can also observe the importance and impact in Spain of the scientific Communication activity of Catalan researchers.

Cluster 9. Post-feminism and cultural studies (Rosalind Gill)

Around the British sociologist and feminist cultural theorist Rosalind Gill, one of the voices with the greatest international impact in gender studies from a media perspective, we find a small cluster with strong links. As pointed out at the start, this is the only cluster to be clearly detached from the others, illustrating both the uniqueness and almost parallel nature of such work with regard to the Communication domain, as well as the strength and growing interest they have acquired for the scientific community in recent years.

It is also striking that this group is connected to two other leading researchers from *Tarragona*, Willem and Tortajada, demonstrating the robustness, strength, and international visibility of Catalan Communication research, as was the case for the previous cluster structured around Codina.

Rosalind Gill, a professor at *King's College London*, is the author of landmark works such as *Gender and the media*, along with other highly cited works such as *Secrecy and silence in the research process: feminist reflections* and *New feminities: postfeminism, neoliberalism and subjectivity* or *Powerful women, vulnerable men and postfeminist masculinity in men's popular fiction*.

The professor and researcher Cilia Willem, from *Rovira i Virgili University* and the main editor of the *Catalan journal of communication*, also has an important position through her work in this field with an educational focus. Iolanda Tortajada, also from *La Rovira i Virgili*, also has a prominent position, addressing trans themes (*Contrapúblicos en YouTube: el caso del colectivo trans*) and with a more audiovisual approach and new audiences and platforms (*Discursos feministes i vídeos de youtuberes: límits i horitzons de la politització jo-cèntrica*).
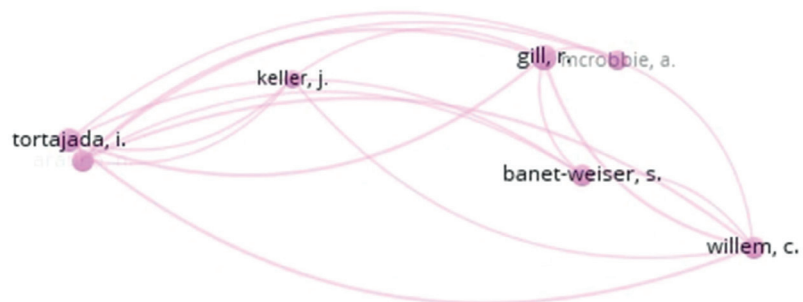

Figure 10. Gill, Tortajada, and Willem, defining the only cluster that is detached from the general structure of the domain. Visualization performed using *VOSviewer* with *Scopus* data.
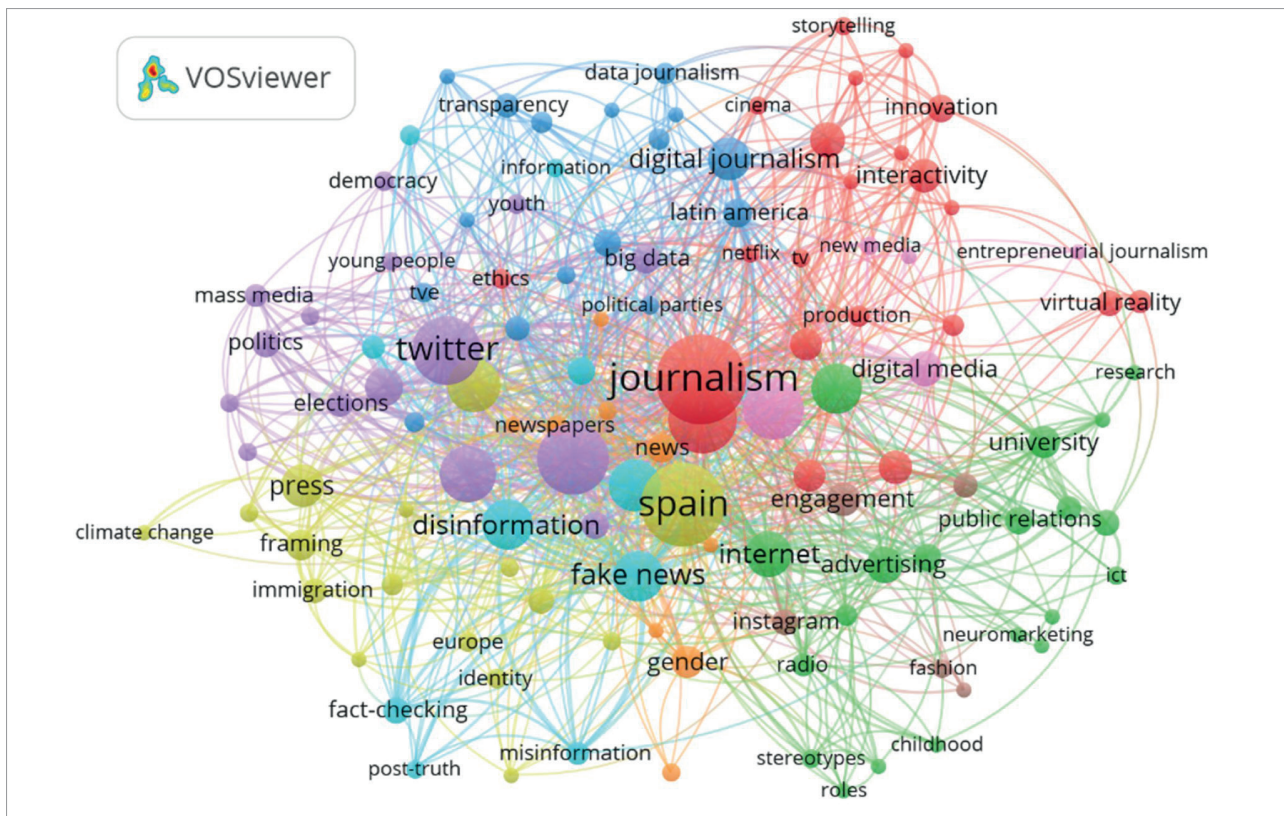
Figure 11. Co-occurrence map of the most used keywords in the evaluated articles (2019–2021). Visualization performed using *VOSviewer* with *Scopus* data.

4.2. Keyword Map Analysis

To complement the approach to the Communication domain described above, crossing these data with an analysis of the keywords collected in the papers provides some important reflections, in terms of both the focus or interest of the works and the concerns of researchers, thereby corroborating the findings in the co-referencing map (Fig. 11).

Firstly, ignoring descriptive terms that are not very relevant to thematic analysis (such as "Spain" or "Journalism"), it is remarkable how "social networks" and "social media" have become the main object of study of researchers, clearly in preference over the more traditional medium (press) and even audiovisual media such as television. It remains to be
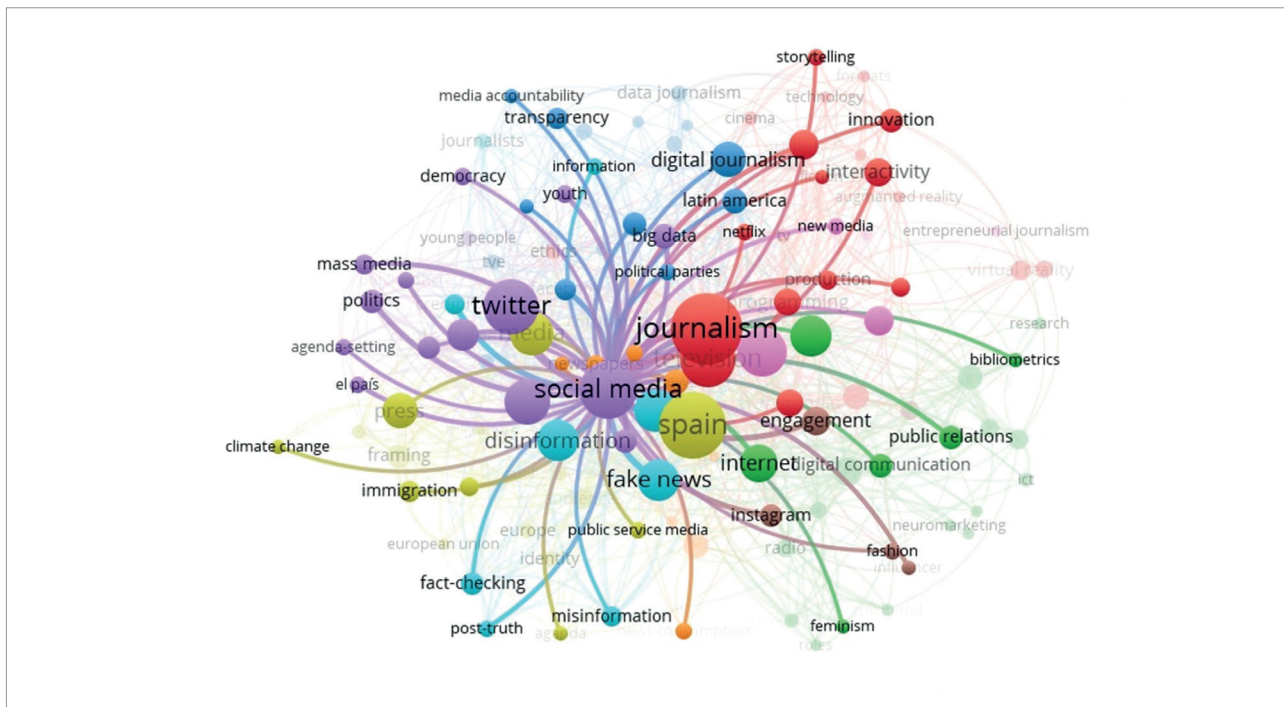

Figure 12. The media and social networks are one of the main objects of study in current Communication research. Visualization performed using *VOSviewer* with *Scopus* data.
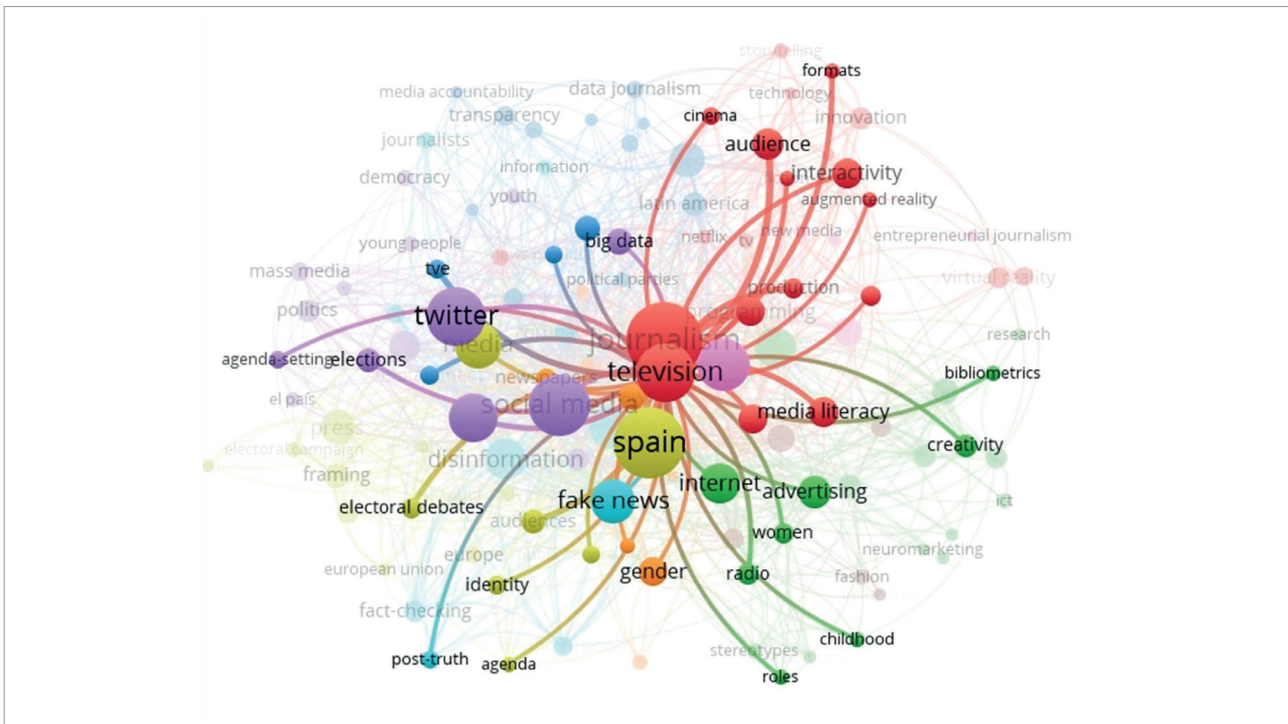
Figure 13. Television remains a central theme of such research, albeit dethroned by interest in social networks such as *Twitter*. Visualization performed using *VOSviewer* with *Scopus* data.

determined whether television retains a prominent position because of powerful online consumption platforms rather than its traditional format (Fig. 12).

Twitter, the microblogging network that is most well established in the media environment, occupies a very high position and lies far away from other spaces such as YouTube and Instagram, evidencing how it was favored in journalistic and political circles in the early stage of the expansion of social networks. Other emerging networks such as *TikTok* or *Twitch* do not appear among the 2,400 keywords selected for the representation, although further longitudinal study of such maps will be required to confirm whether the topics of interest to researchers exhibit a change (Fig. 13).

From a thematic point of view, "Covid-19" (the term "coronavirus" also being very prominent) is already positioned as one of the main research fronts, showing the same strength as "political communication," another traditional field
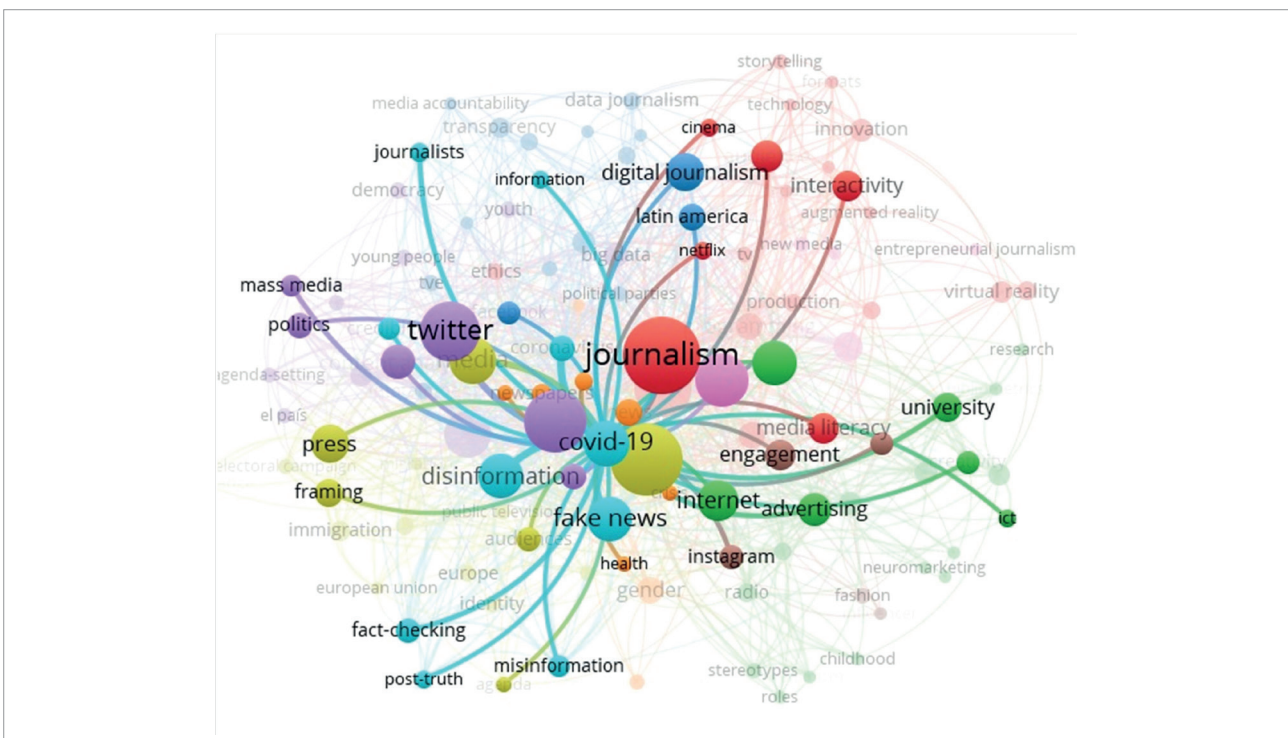

Figure 14. Covid-19/coronavirus has strongly impacted the research work of the most widely cited authors in Communication during the last three years. Visualization performed using *VOSviewer* with *Scopus* data

of research, insofar as it connects with "post-truth," the problems of "fake news" and "disinformation," and "fact-checking" strategies (Fig. 14). This area of interest is directly connected to the existence of a cluster oriented precisely toward this field (cluster 5).

Keywords such as "gender," "feminism," "women," and "stereotypes" appear very prominently and reinforce cluster 9, which is important within the representation albeit detached from its structure. In a field such as media and Journalism, where ethics and deontology are differentiating factors, these concepts are also presented as the axis and background of much of the research (Fig. 15).

Regarding methodological approaches, it is striking that "content analysis" captures interest from researchers, followed by studies of context ("framing"). It is also

Figure 15. Clustering around feminism, gender studies, stereotypes, roles, and childhood. Visualization performed using *VOSviewer* with *Scopus* data.

worth mentioning that *TVE*, *El País*, and *Netflix* are the three media/platforms most widely used as the object of analysis in scientific publications.

Regarding the end focus of the works (Table 7), one can observe noteworthy co-occurrence of keyword sets such as "engagement," "interactivity," and "audience," illustrating the importance of the active role of the public; "fact-checking," "credibility," and "transparency" as a counterpoint to the problem of fakes in the post-truth age; and "big data," "transmedia," "innovation," and "artificial intelligence," showing the development of the media in terms of narratives and formats as technology advances.

5. Discussion and conclusions

From the methodological point of view, we believe that the current work confirms the usefulness and potential of scientometry, from scientific mapping and network analysis to visualization, to define the structure of an area of knowledge, as well as its reference authors, on the basis of objective data while avoiding preconceived ideas and possible prejudices around the different domains. We also consider this line of work and research to be strategic for the future of faculties of Communication, as it incorporates the rigor and scientific processes of data science into the field of Social Sciences. Specifically, this work continues a path begun more than a decade ago at the *Universidad de Granada*, linking the areas of Audiovisual Documentation and Communication (**Trillo-Domínguez**, 2008; **Trillo-Domínguez**; **De-Moya-Anegón**, 2008; **Herrero-Solana**; **Trillo-Domínguez**, 2014) with strong prospects for potential growth in our opinion.

In an empirical way, applied to the Communication domain studied herein, we also believe that work carried out on Spanish research during the last three years reflects an opportunity to apply advanced software packages such as *VOSviewer* for scientific mapping and its subsequent analysis and interpretation. This is due both to the concrete results obtained and to the progress that they represent in terms of data processing and addressing large amounts of information.

Regarding the ranking of the researchers who dominate this map, it is interesting how the comparison between their leadership as cited authors and their level of output reveals the existence of an elite in the Communication field (Xosé López-García, Ignacio Aguaded, Andreu Casero-Ripollés, Lluís Codina, and Ramón Salaverría) who enjoy a reference position with highly consolidated prestige that is decisive for the impact of their own universities. From the perspective of the institutions, we believe it is important to reflect on the important position of Catalan research in Communication, ahead of other centers with greater output such as the universities of Madrid.

Focusing on the concrete analysis carried out on the structure of the Communication domain, we believe that it provides a relevant and current snapshot of the main research fronts (issues) addressed by Spanish authors: from the emergence of Covid to the growing concern about disinformation and fake news; from the confirmation of the rise of social networks as main actors in the media system to the challenge posed by technology (from computational journalism and the transformation of the profession) to the new tyranny of algorithms.
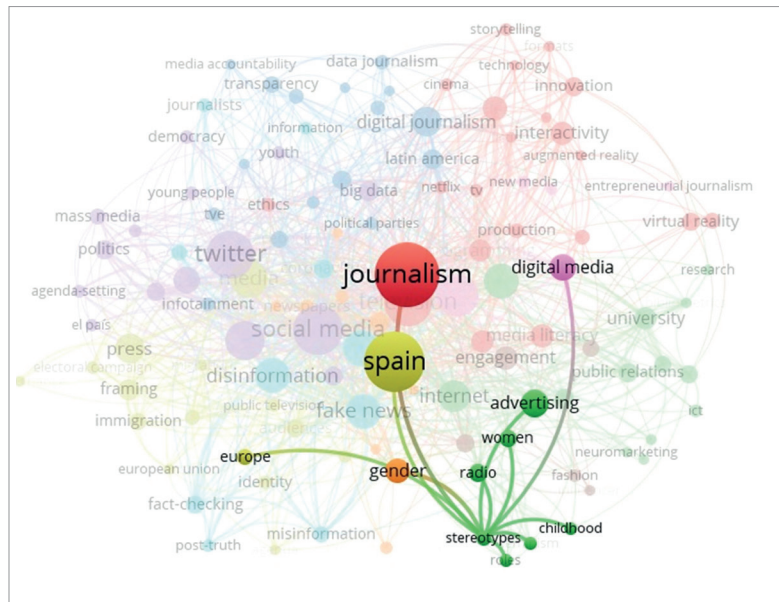
> A communication map is constructed from 830 articles published during the last three years in a subset of journals exclusively on Communication, considering 31,308 cited authors

However, as with political polls, one should not lose sight of the fact that we are dealing with a static snapshot that is thus partial and limited. Therefore, having verified the usefulness of this methodology and software herein, we consider it essential to expand such study via a longitudinal approach to identify the changes in the discipline itself and in its reference authors. In this regard, we believe that this type of study could support and complete the body of work on Communication research carried out in recent years. We agree, for example, with **Martínez-Nicolás** (2020) when he warns that

> "The institutional framework that underpins research in Spanish Communication has changed radically over the last 30 years, affecting the internal structure of the academic community and the characteristics of scientific production in this field." ["*el marco institucional que sustenta la investigación en Comunicación española ha cambiado radicalmente en los últimos 30 años, afectando a la estructura interna de la comunidad académica y las características de la producción científica en este campo*".]

The four factors that, in his opinion, have determined this evolution can be connected to explain the current situation of the discipline revealed herein:

- The increase in the number of universities offering communication studies since the early 1990s.
- The establishment of three different degree programs in Communication.
- The introduction and consolidation of a culture of evaluation of research activity.
- The recognition of Communication as a specific area in the national R+D+i plan.

The longitudinal study proposed above could also be instrumental for assessing some of the issues identified as weaknesses of the discipline herein. This is the case, for example, of the excessive importance of Spanish authors (with an evident tendency toward self-interest) or the limited role of women as research leaders. In this sense, we believe it essential to extend this research with an analysis of the domain at the European level, including a comparison between countries, as well as at the global level to determine the extent to which these are weaknesses of our system or rather dynamics and synergies shared by the international scientific community. In contrast to other areas, there is a very high presence of citations from Spanish authors in the scientific output, although we also consider it necessary to confirm whether this is an anomaly of the Communication domain by completing this research with longitudinal studies, as mentioned above regarding self-citations.

Finally, regarding the specific structure of Spanish research in Communication presented here, we must remember that the discipline has a marked multidisciplinary bias that is difficult to pigeonhole. Indeed, a multi-faceted profile of the authors is a common and quite generalized dynamic detected by analyzing them as well as their cited works. In some cases, this means cultivating close and related lines of research, but in others different paths that could correspond to widely dispersed trajectories. In the field of communication, we believe

Table 7. Top 30 keywords used in the studied scientific publications on Communication

	Keyword	Co-occurrence	Strength of connection
1	spain	68	148
2	social media	54	141
3	journalism	75	128
4	twitter	50	113
5	television	49	94
6	fake news	31	92
7	covid-19	32	86
8	disinformation	30	86
9	social networks	42	80
10	political communication	36	80
11	media	34	68
12	internet	26	51
13	communication	31	47
14	digital journalism	23	46
15	advertising	19	41
16	coronavirus	12	40
17	facebook	10	39
18	audience	17	36
19	programming	15	36
20	press	23	35
21	engagement	16	35
22	latin america	13	35
23	digital media	17	34
24	elections	11	33
25	news	13	32
26	instagram	11	32
27	university	15	31
28	framing	14	30
29	participation	12	30
30	fact-checking	11	30

> The research fronts confirm the rise of social networks as main actors in the media system and the challenge posed by technology (from computational journalism and the transformation of the profession) to the emerging tyranny of algorithms

that the sense of specialization could have an important impact insofar as it differs from other fields such as the pure or applied sciences.

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