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isabel.iolea@gmail.com

Postal address / Dirección postal
Profesional de la información
Apartado 13
24080 León, España
Tel.: +34 - 608 491 521
epi@elprofesionaldelainformacion.com

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Open access: a journey from impossible to probable, but still uncertain

Lluís Anglada; Ernest Abadal

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Lluís Anglada ✉
https://orcid.org/0000-0002-6384-4927

Área de Ciencia Abierta
Consorci de Serveis Universitaris de Catalunya
Carrer del Gran Capità, 2
08034 Barcelona, Spain
lluis.anglada@csuc.cat

Ernest Abadal
https://orcid.org/0000-0002-9151-6437

Universitat de Barcelona
Centre de Recerca en Informació, Comunicació i Cultura
Melcior de Palau, 140
08014 Barcelona, Spain
abadal@ub.edu

Abstract

An overview of the evolution of open access (OA) to scientific publications over the last 20 years is presented. This retrospective look allows us to make two observations that seem to overlap: on the one hand, how close the initial objective seems to be to what initially seemed utopian and, on the other, the unanticipated and solid obstacles that open access has encountered along the way, as well as the unexpected and diverse solutions that are emerging to overcome them. The overall assessment of OA is positive, and it underscores that open access is (or is becoming) possible, that it is good, and that it is necessary. However, this overall positive evolution has come up against two major obstacles that are slowing its progress: the double payments generated by hybrid journals (subscription and article processing charges [APCs]) and the unchecked growth in APCs. In addition, this intensive use of APCs is creating a publishing gap between publishers that charge fees to authors and those that do not, and ultimately, it is causing dissension regarding the (previously shared) strategy toward open access. There are no immediate, one-off solutions to overcome the aforementioned dysfunctions, although three actions that, in the medium term, can remedy them can be mentioned: changing the approach to the evaluation of science, adopting measures to regulate APCs, and promoting alternative publication models. Finally, it should be noted that OA has acted as the vanguard and spearhead of a broader movement: that of open science.

Keywords

Open access; Evolution; Perspective; Future; Obstacles; Models; Economy; Pricing; APCs; Article processing charges; Scientific journals; Hybrid journals; Evaluation of Science; Science communication; Scholarly communication; Open science.

> *"We support the establishment of an online public library that would provide the full contents of the published record of research and scholarly discourse in medicine and the life sciences in a freely accessible, fully searchable, interlinked form. Establishment of this public library would vastly increase the accessibility and utility of the scientific literature, enhance scientific productivity, and catalyze integration of the disparate communities of knowledge and ideas in biomedical sciences."*

1. Open access on the 20th anniversary of its official creation

The text at the head of this article seems as though it were written today, but it was written in the year 2000.
https://plos.org/open-letter
https://en.wikipedia.org/wiki/PLOS

It is part of a mass-distributed email signed by three prestigious scientists –Harold Varmus, Patrick Brown, and Michael Eise– who shortly thereafter founded the *Public Library of Science* (*PLoS*). They declared their intention to contribute articles or reviews only to scientific journals that allowed free access to their content to everyone within no more than six months. The message called for adherence to these principles, and it was endorsed by thousands of scientists from 180 countries.

The letter calling for a *Public Library of Science* can be seen as the genesis of the open access movement. Its triple birth (in Budapest, Bethesda, and Berlin) has been expanded upon on different occasions (**Suber**, 2012; **Abadal**, 2012; **Poynder**, 2019), and there is a broad consensus that this year is its 20th anniversary. See the timeline of the open access movement at:
https://oad.simmons.edu/oadwiki/Timeline

As with any time when reality is seen through the rear-view mirror, everything seems to have followed a predictable course; however, the authors of this article, recipients of the email at that time, certify that they signed it with conviction, but at the same time with incredulity.

The scientific journal landscape had just begun the rapid and painless transition from print to digital (**Anglada**, 2017; **Borrego**, 2017). This came with the introduction of consortial subscriptions or big deals, which significantly increased the accessibility of scientific literature but did not substantially alter two characteristics of scientific communication of the time: the continuous increase in journal fees, and the accessibility restrictions stemming from paid subscription capabilities.

Looking back allows us to make two observations that seem to overlap: the first is how close the initial objective seems, in our view, to what seemed impossibly utopian a little more than twenty years ago. The second is the unanticipated and solid obstacles that open access has encountered along the way, as well as the unexpected and diverse solutions that are emerging to overcome them.

> The big deals did not substantially alter two characteristics of scientific communication at the time: the continuous increase in journal fees and the restrictions on accessibility to the paper versions

We analyze these issues in the sections below.

2. Where are we? A stop on the way to the promised land

Although we may feel ambivalent when it comes to the goals achieved, the positive elements stand out above the rest, and we would like to mention at least three: that open access is (or is becoming) possible, that it is good, and that it is necessary.

It is possible. We might have thought it was just a dream, but we have discovered not only that the number of open scientific articles is very large but also that achieving 100% OA is a global goal set by *Unesco* itself (*Unesco*, 2021). The literature measuring the degree of OA from different countries is rich and varied (**Piwowar**; **Priem**; **Richard**, 2019). While it was found that the final result is highly dependent on the methodology used (**Borrego**, 2021; 2022), despite 20 years of OA, all countries and institutions are still far from having open access to all of their scientific production (**Johnson**; **Watkinson**; **Mabe**, 2018, pp. 134-136). However, some of the results are quite remarkable and show that achieving complete open access is possible, even if it has not been easy. The voices calling for a more demanding and qualitative view of the final objective are proof of how close we are to complete OA (**Bosman**, 2021).

It is good. The misfortune of Covid-19 has proven conclusively what was once just conjecture: that open and immediate access to research results accelerates science –in this case, the obtaining of results that prevent death and disease. In turn, the OA movement has shown many more things, such as institutions' vitality in creating repositories where they collect and provide open access to their academic production, the range of tools that efficiently communicate scientific results, the validity of non-commercial journals, and the great amount of science beyond that included in reference databases (**Martín-Martín** *et al*., 2018).

It is necessary. Thomas Kuhn showed that science advances in a non-linear fashion, creating stable frameworks –paradigms– within which it evolves continuously but also where what he called anomalies accumulate. Anomalies of a paradigm are tolerated until a better (more effective or efficient) alternative is found. The approach that has worked for so long (created under the paradigm of print) has notable inefficiencies –such as constant fee increases, inequalities in access, concentration in the publishing sector, lack of transparency regarding costs, and double payments to hybrid journals (paying to read with a subscription and paying to publish)– that have been accepted as inevitable. However, in today's technological environment, these anomalies are solvable, and solving these anomalies is necessary to improve scientific communication (**Lewis**, 2012).

In any case, we cannot fail to point out that resistance to change does not only stem from inertia; it is often deeply rooted. Constructing the new OA framework or paradigm is possible, but these years of "practice" have shown that achieving what we have so far was not so easy. Along the journey that has led us to where we are today, we have seen that, underlying the journals, there is a web of often interdependent functions (*European Commission*, 2019), and that making a change for the better can lead to disturbances where we least expected them.

Open access is proving to be a complex movement, as, in its midst, diverse and often conflicting strategies are developing. We refer here to the discussions surrounding journals versus repositories (**Lynch**, 2017) or diamond journals versus those for which authors pay a fee (**Herman** *et al.*, 2020), or to the many colors (diamond, bronze, platinum, etc.) that we must add to our palette alongside green and gold to distinguish between types of open access modalities.

> Covid-19 has proven what was once just conjecture: that open and immediate access to research results accelerates science

This complexity obscures the core reasons behind the main obstacles to the full development of open access. These predate open access itself as well as the digitization of journals. Science's importance as an economic engine and source of welfare has been increasing since the Industrial Revolution, which has led to a gradual professionalization of science (**Snyder**, 2021). At the end of the last century, this increase in the value of research led to a vicious cycle in scientific communication: publishing is central to one's career (**Fyfe** *et al.*, 2017), many scientific journals are edited by commercial companies (**Johnson**; **Watkinson**; **Mabe**, 2018, pp. 73-76), subscription prices increase beyond the cost of living, some journals are viewed as the best and publishing in them increases professional prestige, improved library cooperation in terms of joint purchasing and interlibrary loaning reduces revenue from journal subscriptions, etc. It was not by chance that detailed economic studies on scientific journals were published in the first decade of the new century (**Legros** *et al.*, 2006; **King**, 2007; **Houghton** *et al.*, 2009).

In essence, what OA is doing is deconstructing the scientific communication system that was established in print so as to create an alternative model. And in this quest, as in many cases, the economy plays a central role. Thus, financial support for scientific communication today seems to be shifting from pay-per-read to pay-per-publish. The *Finch report* recommended supporting:

> "publication in open access or hybrid journals, funded by APCs,"

as the primary system for publishing research and concluded that, if researchers want their results to be openly available, they must bear the cost of publication –something that readers have traditionally done (**Finch**, 2012). In his blog, **Shieber** (2014) advocated shifting from payments for reading to payment for publishing since, that way, the system had the potential to be a:

> "much more transparent, competitive, and efficient market, which may well lead to overall cost reductions."

Shortly thereafter, the *Max Planck Digital Library* published an influential white paper that stated that:

> "all the indications are that the money already invested in the research publishing system is sufficient to enable a transformation that will be sustainable for the future. There needs to be a shared understanding that the money currently locked in the journal subscription system must be withdrawn and repurposed for open access publishing services" (**Schimmer** *et al.*, 2015).

This idea reinforces that of pay-to-publish and creates the drive to transform subscription agreements into open ("transformative") agreements (**Borrego**; **Anglada**; **Abadal**, 2020). The economic background behind science communication's shift to OA is highlighted by **Poynder** (2019) as follows:

> "…governments have chosen to support OA for financial and economic reasons. For them, OA is grist to the neoliberal mill. That is, they believe greater openness will boost the national and/or regional economy and save money. They assume, for instance, that OA to scholarly papers will make it easier for SMEs to monetise publicly funded research and turn it into profitable products and services to drive the economy."

3. Obstacles to building a new reality

However, this overall positive evolution has come up against two major obstacles that are slowing its progress: the double payments generated by hybrid journals (subscription and APCs) and the unchecked growth in APCs (**Blanchard**; **Thierry**; **Van-der-Graaf**, 2022). Thus, this has led to an increase in the overall cost of scientific communication, as, in addition to the costs of subscribing to journal packages, there is the new expense of publishing in journals that are fully open access owing to APCs (**Johnson**; **Watkinson**; **Mabe**, 2018; **Blanchard**; **Thierry**; **Van-der-Graaf**, 2022). In addition, this intensive use of APCs is creating a publishing divide between publishers that charge fees to authors and those that do not, and ultimately, it is causing dissension regarding the (previously shared) strategy toward open access.

Double payment

"Hybrid" journals, subscription journals that allow articles to be released with the payment of APCs, have been an opportunistic product that commercial publishers have created and leveraged to meet the demands of authors who had to comply with their agencies' open access mandates, and they have been a strategy for them to further increase corporate profit margins. *Springer*, with its "open choice" option, was the first major publisher

> What OA is doing is deconstructing the scientific communication system that was established in print so as to create an alternative model

to provide the option of making articles openly available through the payment of publication costs or APCs. Since then (2012), this publisher and the others that publish hybrid journals claim that APCs lower subscription prices, a point that has been called into question by a part of the academic community that demands more transparency and has launched initiatives such as *Efficiency and standards for article charges* (*ESAC*) or *OpenAPC*:
https://esac-initiative.org
https://openapc.net

> The evolution toward open access has come up against two major obstacles that are slowing its progress: the double payments generated by hybrid journals (subscription and APCs) and the unchecked growth in APCs

Hybrid journals represent a form of double payment that academic libraries (especially university libraries) have denounced from the outset: It is unacceptable that, in addition to their annual journal subscriptions, universities have to cover the APCs that their authors pay to these same journals. These abuses were denounced by library services in several countries (Germany, Sweden, etc.) and led to conflicts and discussions with journal publishers. *Plan S* has also been very critical of these journals and, in fact, requires them to have an open access transition plan by 2024 if the journals want to be "Plan S compliant":
https://www.coalition-s.org

The aforementioned transformative agreements make it possible to change the pay-per-read model to a pay-per-publication model.

Increase in APCs

The cost for an author to publish a journal article can range from €200 to €10,000. According to a study by **Morrison** *et al*. (2022), the average APC per article has increased from USD 904 to USD 1,626 over the last 10 years, an increase well above inflation (an 80% increase compared with an actual inflation of 15%). **Khoo** (2019) also conducted a study on the evolution of APCs in the period 2012-2018 that included 319 journals from four major open access publishers (*BMC*, *Frontiers*, *Hindawi*, and the *MDPI*), revealing increases ranging from 17% (*BMC*) to 220% (*MDPI*).

How can this increase be explained? **Björk** and **Solomon** (2015) already showed that the level of APCs was correlated with the journal's prestige and impact factor. There is high demand from researchers for publication in the group of journals with the highest impact factor since they provide the opportunities for academic advancement that they are seeking. In this sense, the authors (the demand side) are not sensitive to fee increases or the existing range of the journal offering.

Thus, scientific journals are an economic sector that is "inelastic" in terms of price; that is, there is no price correction or adjustment between supply and demand (**Guédon**, 2001; 2014). There are journals that are similar (in terms of thematic focus), but authors want to publish in certain journals (those with a high impact factor), so there are no market mechanisms to regulate fees.

Finally, it has also been confirmed (**Khoo**, 2019) that the number of articles published continues to grow despite the high APCs. There is no relationship between the two variables.

The divide between publishers

This fee increase is creating a notable divide in the publishing world between publishers with APCs and those who are supported by public funding. APC revenues are constant and always rising, whereas public contributions, at best, remain flat (**Butler** *et al.*, 2022).

This divide can be seen at the editorial management level since journals with APCs can hire more staff, and therefore, the editorial processes (management of editing, proofreading, layout, publication, etc.) become faster and more agile.

On the other hand, there are also notable differences in terms of the capabilities of the publishing platforms since journals with APCs have better features available for managing edits, more attractive layouts, and preprint repository capabilities and include complementary metrics for each article (citation count, downloads, and presence on social networks, etc.).

> *Plan S* has been very critical of hybrid journals and requires them to have an OA transition plan by 2024 if the journals want to be "Plan S compliant"

This open divide between publishers has led to various initiatives that seek to strengthen non-commercial publishing platforms. Examples include:

- The *Action Plan for Diamond Open Access* (**Ancion** *et al.*, 2022).
- Latin American publishing consortia such as the scientific journal networks *Redalyc* and *SciELO*:
  https://www.redalyc.org
  https://scielo.org/es

- The more unpretentious, but not insignificant, *RACO*: *https://raco.cat/raco/index.php/es/inicio*
- *Scoap*, which transforms leading particle physics journals into open journals: *https://scoap3.org*

Clearly, the weak point of some non-commercial open access schemes is their economic sustainability, and to address this, the *Global Sustainability Coalition for Open Science Services* (*Scoss*) has emerged; this is a union of major international associations committed to open access, and it raises funds that it then allocates to non-commercial open science projects and, more specifically, to open access to scientific publications:
https://scoss.org/what-is-scoss

Conflict among open access models

The heavy use of APCs has generated a schism of remarkable dimensions within the open access movement. Despite sharing the overall objective –to make all scientific content freely available for free– there is no longer any consensus on how to achieve this objective, and some authors and publishers openly criticize the use of APCs.

> Authors (the demand side) are not sensitive to fee increases or the existing range of the journal offering. Scientific journals are an economic sector that is "inelastic" in terms of price; that is, there is no price correction or adjustment between supply and demand

Thus, at one extreme, we have the main commercial publishers, those that had come from the traditional journal market and have converted to the open access model (*Elsevier*, *Springer*, *Sage*, etc.) and also those that were established in the new model (*PLoS*, *MDPI*, *Frontiers*, *Hindawi*, etc.). They all advocate for a free market when it comes to collecting APCs.

At the other extreme, we have Latin American publishers, producers of diamond journals (**Fuchs**; **Sandoval**, 2013), organized around *AmeliCA*, *Clacso*, *Redalyc*, and *SciELO*:
http://amelica.org
https://www.clacso.org
https://www.redalyc.org
https://www.scielo.org

They are highly critical of the collection of APCs because they believe that the original open access model is being distorted, and because it creates inequality between those who can publish and those who cannot (**Becerril**, 2019; **Aguado**, 2021; **Banzato** *et al.*, 2022). They use a model that relies on cooperation and collaboration without having to use APCs, which, from their point of view, do not serve the interests of science but rather only those of the market (**Babini**, 2019).

In the middle ground, we have the publishing model being shaped by *Plan S* (**Abadal** *et al.*, 2019), which does not prevent scientific journals from collecting APCs but imposes various restrictions, such as:

- Requiring transparency in regard to income
- Requiring discounts and exemptions to be given to authors from certain countries or those who are in entry-level (or late) positions in their academic careers
- Establishing fair costs for charges

This is a model that could be described as fair APC.

4. Some certainties in the road ahead

It seems, therefore, that there are no immediate, one-off solutions to overcome the aforementioned obstacles. Perhaps the first step we should take is to think of OA as just one part of science communication and as just one link in the chain of science. Everything as a whole form a coevolving system, in which one part cannot change if the others do not change as well, and in which any change in one agent leads to changes in others. Change is systemic and impossible to simplify (**Bartling**; **Friesike**, 2014). In any case, three actions can be mentioned that, in the medium term, can remedy the dysfunctions in the workings of open access mentioned above: changing the approach to the evaluation of science, adopting measures to regulate the APCs, and promoting alternative publication models.

Research assessement

Currently, the prevailing system for evaluating publications and authors is based almost exclusively on the journal's impact factor. To be promoted scientifically, authors must publish in the first quartile of the *Journal Citation Reports* (*JCR*). As mentioned previously, APCs have been increasing unchecked because the pressure for authors to publish in journals with impact is incessant and relentless. Therefore, as long as the impact factor remains the key element in this evaluation, fees will continue their upward spiral.

> Journals with APCs can hire more staff, and editorial processes (management of editing, proofreading, layout, publication, etc.) become faster

The public request for changes in the approach to evaluation is now 10 years old. It started with the *San Francisco Declaration* (*DORA*, 2012) and was followed by the Leiden manifesto (**Hicks** *et al.*, 2015) and by other European reports (**Wilsdon**, 2015; *European Commission*, 2017) and state petitions (**Delgado-López-Cózar** *et al.*, 2021; **Ràfols**; **Molas-Gallart**, 2022) that demonstrated the need to modify the criteria for the evaluation of research and publications. These documents are highly critical of the monopoly on evaluating publications that the impact factor has held thus far and suggest, among other measures, evaluating at the article level, broadening the spectrum of measures to be incorporated into each publication (for example, with downloads or presence on social networks, i.e., altmetrics) and also incorporating qualitative points of view.

> The main difficulties when it comes to expanding OA are, on the one hand, the establishment of a new economic model that, taking into account the costs of quality publishing, is globally sustainable, and, on the other hand, the reputational system's lack of adaptation to a new environment that values quality –social impact– over quantity

More recently, there has been a very pronounced push on this issue. More than 350 European university and research institutions concerned about reforming the approach to evaluation have approved the document *Agreement on reforming research assessment*, launched by the *Coalition for Advancing Research Assessment* (*CoARA*, 2022):
https://coara.eu/agreement/the-agreement-full-text

The third commitment in this agreement clearly states that it should:

> "Abandon inappropriate uses in research assessment of journal- and publication-based metrics, in particular inappropriate uses of Journal Impact Factor (JIF) and h-index."

Fee regulation

Introducing some limitation on publication fees is a measure that has not yet been implemented, but it should not be ruled out (**Abadal**; **Nonell**, 2019). In this sense, one could conceive of a system with market prices regulated by research funders or state funding bodies, along the lines of the regulations that exist in the energy or drug markets.

Fee intervention could be carried out by applying maximum charges for the publication of articles, which would be set by the research funding agencies. This is already done in the health sector, which establishes maximum prices for medicines to be funded by the public health system, and also in the regulated gas market, which has maximum fees for reference.

The main argument in support of this proposal is based on the fact that this sector is primarily financed through public funds, which would make it possible to avoid the appeals to the unregulated free market that scientific publishers would make.

In any case, these are changes that will not happen quickly –far from it– because they also involve a change in the evaluation culture of many countries and because they require state intervention to regulate fees. However, it is also clear that, without these reforms, it will be truly difficult to decrease the high demand and, thereby, modify APCs.

Promoting alternative publishing models

Finally, it is important to explore and consolidate other models as alternatives to journals with APCs; among these alternative models, we should highlight peer review repositories, such as *Open Research Europe*:
https://open-research-europe.ec.europa.eu

This is an open access publication platform funded by the *European Commission* and managed by *F1000* that, for the time being, is restricted to authors with funding from the *Horizon 2020*, *Horizon Europe*, and *Euratom* programs.

Two differential characteristics with respect to the prevailing model should be highlighted:

- The authors do not have to bear the publication costs (€780 per article); rather, they are directly financed by the *European Commission* itself, which would resemble diamond journals.
- They do not have an impact factor, nor do they intend to try to obtain one, as they are committed to a responsible use of metrics in evaluations. This does not preclude, however, the inclusion of metrics related to the article, such as citations, downloads, presence on blogs and social networks, etc.

These two characteristics make this new publication platform more similar to the aforementioned diamond journals.

Although it may seem impractical, it is sounder to base the development of open access on principles than on specific models. These, however ingenious and reasoned they may be, end up being overcome by a reality that is more than unpredictable, as can be seen if we look at the scenarios described by **Smith** (2015) or projected by **Van-Barneveld-Biesma** *et al*.

> Scientific communication must be open, yes, but it must also guarantee efficiency (with respect to cost), effectiveness (with respect to the role it fulfills), and equity (with respect to the society that it serves and that funds it)

(2020). Instead, there are three trends that appear to be strong: increased diversity, the promotion of values, and interoperability. The promotion of diversity makes it possible to accommodate and make room in scientific communication for other languages, geographies, and disciplines beyond the dominant ones. Scientific communication is based on systems that respect and promote the values postulated by open science (equity, transparency, cooperation, social impact, etc.). Ultimately, all of this together creates an ecosystem of more or less independent but interoperable entities (i.e., findable, accessible, interoperable, reusable [FAIR]).

> Changing the approach to the evaluation of science, adopting measures to regulate the APCs, and promoting alternative publication models can correct the dysfunctions in the way open access works

5. Open access: a systemic (and optimistic) view

Over the past 20 years, the OA movement has created a favorable environment such that the articles that come out of research can be used in a much more equitable environment than subscription-based access. OA has limitations and imperfections, but it still removes the payment barrier and frees up scientific content for reuse. In turn, and perhaps without being fully aware of it, OA has acted as the vanguard and spearhead of a broader movement: that of open science (**Miedema**, 2022; **Nielsen**, 2012).

OA's consolidation has been in parallel to data's rise to prominence, in general, and specifically in scientific research, and this greater prominence can only be understood today in conjunction with its openness. Open science naturally furthers OA's objectives because it aims to make the results of scientific research the "freely accessible, fully searchable, interlinked form", as called for in the *Public Library of Science* (*PLoS*) charter. Today we would say FAIR.

Some of the challenges related to open science are new, as they apply to very diverse things (data, lab notebooks, software, etc.), but some reflect those found in the process of opening up the scientific literature. OA's main achievements –its acceptance by the scientific community and the recognition of its benefits– have undoubtedly served as leverage for politicians to dare to expand these objectives to the whole of science. Finally, the idea at the core of open science –that science in the service of society cannot be penned in– is the one that influenced OA from the outset:

> "this public library would vastly increase the accessibility and utility of the scientific literature [and] enhance scientific productivity" (**Varmus**; **Brown**; **Eise**, 2000).

The main difficulties when it comes to expanding OA have not been technological; rather, they are, on the one hand, the establishment of a new economic model that, considering the costs of quality publishing, is globally sustainable, and, on the other hand, the reputational system's lack of adaptation to a new environment that values quality –social impact– over quantity (*CoARA*, 2022). This shows that the necessary reform of scientific practice cannot be partial, and it must be systemic. The various analyses of the current research environment point to the profound transformation of all the processes of scientific research, as well as their clear interdependence. In this view of science, scientific communication does not stand alone, and if science is open, scientific content must also be open. If open access has acted as a torchbearer of open science, the development of the latter will facilitate a faster, more extensive, and better development of OA through the expansion of the FAIR concept to all scientific objects, the use of new metrics, and the elimination of barriers that hinder interoperability.

What do we want science to be like? If we want it to be social, collaborative, and reproducible –that is, open– scientific communication must also be so. The driving force making this possible is the idealism that inspired the OA movement at its start, but it must be developed with the pragmatism of the lessons learned during the long journey already undertaken. Some obstacles encountered by OA are not groundless pretenses of the status quo but rather correspond to legitimate elements of what is at stake (reputational capital, the costs of scientific communication, and the need for innovation).

Complete OA will be achieved if it is tied to the challenges and solutions related to open science and if the emphasis is on the ends rather than the means. Scientific communication must be open, yes, but it must also guarantee efficiency (with respect to cost), effectiveness (with respect to the role it fulfills), and equity (with respect to the society that it serves and that funds it).

> OA has acted as the vanguard and spearhead of the broader open science movement

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Digital transparency and political communication

Eva Campos-Domínguez; María Díez-Garrido

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Eva Campos-Domínguez ✉
https://orcid.org/0000-0002-8970-7947

Universidad de Valladolid
Facultad de Filosofía y Letras
Pza. del Campus Universitario
47011 Valladolid, Spain
eva.campos@uva.es

María Díez-Garrido
https://orcid.org/0000-0002-5430-7708

Universidad de Valladolid
Facultad de Filosofía y Letras
Pza. del Campus Universitario
47011 Valladolid, Spain
maria.diez.garrido@uva.es

Abstract

The academic debate on transparency has experienced a boom in recent decades. A review of the scientific literature allows us to identify two key moments in the discussion on digital transparency: the declaration of Barack Obama's *Memorandum on transparency and open government* in 2009 and the *Cambridge Analytica* scandal in 2018. The first was linked to a groundswell of enthusiasm for the concept of government transparency, with the promise that it would boost accountability, eliminate corruption, and promote political efficiency in a crisis of institutional legitimacy. The second altered the digital transparency agenda and catalysed a discussion about the need for technology and social media companies (*Facebook*, *Twitter*, or *Google*) to make transparency commitments because of their role in generating a public conversation and the democratic implications. This paper reviews the idea of digital transparency in the scientific literature framed in the field of political communication and tries to reflect the need for more research on its political, social, and cultural implications.

Keywords

Transparency; Digital transparency; Political communication; Open government; Access to information; Media transparency; Transparency and social networks; Media; Social media.

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1. Introduction

The idea of transparency in the public space has evolved from its origins to widespread adoption in the 20th and 21st centuries (**Gorwa**; **Garton-Ash**, 2020). It is often approached as a complex, deeply political, controversial, problematic, and even ambivalent concept (**Etzioni**, 2016). Although the multiple interrelated currents emerging prior to the 20th century substantially inspired contemporary approaches (**Christensen**; **Cheney**, 2015; **Flyverbom**, 2015), studies on digital or computerised transparency (**Meijer**, 2009) have recovered the current political debate on freedom of expression and democracy within the context of a changing, fragmented and crisis-ridden public space (**Palau-Sampio**; **López-García**, 2022).

From a review of the scientific literature, two key moments emerge that have catalysed the discussion on transparency in the field of political communication over the last twenty years: Barack Obama's (2009) *Memorandum on Transparency and Open Government*:
https://www.archives.gov/files/cui/documents/2009-WH-memo-on-transparency-and-open-government.pdf

> The scientific literature shows insufficient research on digital transparency originating from a citizen's perspective

and the *Cambridge Analytica* scandal following the 2016 United States Presidential Election. Although there have been experiences of political transparency in the Netherlands (**Meijer**, 2015) and Scandinavia, it is assumed that modern political transparency arose in the United States (**Gorwa**; **Garton-Ash**, 2020) when, at the beginning of the 20th century, various politicians publicly stated that transparency was a moral good and an essential requirement for a healthy democratic society (**Hood**; **Heald**, 2006).

Since these two moments (2009 and 2018), less than a decade apart, studies on digital transparency have been shaped by different trends that currently define it as one of the main accountability mechanisms which governments, institutions, the media, and digital platform companies have used to regain public trust.

2. Open government and the rise of digital transparency

When Barack Obama issued the cited *Memorandum* on his first full day in office (2009) –emphasising messages such as "In the face of doubt, openness prevails"– he said he wanted to foster a change of attitude towards government institutions and referred to "a new way of governing" based on openness towards citizens through the use of digital technology and thereby recovering an old idea for a new concept (**Ramírez-Alujas**, 2010).

In this context, transparency was thought of in a restricted sense, and that the disclosure of certain information was not possible (**Albu**; **Flyverbom**, 2016), but it was also associated with the relevance of helping citizens and political leaders in decision-making (**Fun**, 2013). In general, digital transparency is perceived to be a mechanism to restore citizen trust in democratic institutions and governments.

Former President Obama's declaration –which recovered the liberal discourse of transparency as an accountability mechanism to oversee public and governmental functions– was the first milestone to what some authors have called "modern transparency" (**Meijer**, 2009**)** and inspired a flurry of research related to Open Government (**Wirtz**; **Birmeyer**, 2015) focused mainly on the study of government transparency (**Meijer**, 2012; **Meijer**, 2015). The increase in scientific production on digital transparency coincided with an increase in access to information regulations in the European Union, prompting the approval of transparency laws in different countries (**Meijer**, 2015), and serving as a catalyst to the founding of the *Open Government Partnership* (**Cuccinello**; **Porumbescu**; **Grimmelikhuijsen**, 2017).

Most of these studies reflected a phase of enthusiasm for the potential of digital transparency to improve representative democracy, better communication between representatives-citizens and to increase trust in institutions and governments (**Matheus**; **Janssen**, 2020). A large part of these studies analysed the pillars of open government (**Lathrop**; **Ruma**, 2010; **Nam**, 2012; **Grimmelikhuijsen**; **Feeney**, 2017), and explored how the application of digital technology could strengthen the principles of access to information (transparency), increase citizen participation in decision-making and further collaboration with the population (**Criado**; **Rojas-Martín**, 2013).

Years later, the limitations to digital transparency began to emerge, and it was seen that academic interest had been more focused on conceptualising and describing open government than addressing its possible effects and consequences (**Cuccinello**; **Porumbescu**; **Grimmelikhuijsen**, 2017). But, in general, the interpretation deduced from these studies was that transparency improves Western democracies (**Etzioni**, 2018). Another conclusion reached was that with the information gained through access to political information, citizens could better evaluate political measures and decide what party to vote for. This gave rise to **Keane**'s (2009) concept of monitored democracy as a contemporary, alternative, and participatory system based on citizen mechanisms for scrutiny of political representatives and control of information. In this system, transparency and accountability would become the essence of democracy (**Feenstra**, 2016).

In summary, the beginning of the academic debate on digital transparency emerged under the umbrella of initiatives that sought to reduce corruption, increase government efficiency through accountability and, ultimately, promote the legitimacy of government and institutions (**Grimmelikhuijsen** *et al.*, 2013; **Cuccinello**; **Porumbescu**; **Grimmelikhuijsen**, 2017). This occurred simultaneously to when the political class –with Obama as its advocate– made various promises regarding the development of transparency to recover its credibility and the trust of citizens and fostered the public-private partnership of open data. All of this motivated certain authors, who were enthusiastic about the potentials digital transparency promised, to argue that technologies would contribute to a "culture of transparency" in countries without a long history of democratic governance (**Heemsbergen**, 2016), with the aim of legitimising democratic institutions and their representatives

> Journalistic transparency and open journalism have been put forward as a key issue when addressing the lack of credibility some media companies are accused of having

in a politically decisive moment and context. Information transparency has thus become an instrument used by political communication to improve the reviled image of the political class.

3. Digital transparency and the new political communication

Following the enthusiasm that the drive for open government generated in academia, the *Cambridge Analytica* scandal in the 2018 United States Presidential Election reframed the debate on digital transparency; it was agreed that there was a need to refocus transparency to mitigate citizen mistrust in the management of the large technological companies, corporations and social media (**Brown**, 2020). In the digital public space, *Facebook*, *Google* and *Twitter* had proven to be key spaces where political discourse and deliberation could be catalysed on a global scale. Their growing role as a global channel for political communication meant that they were clearly institutions that had democratic implications. From that moment on, studies on digital transparency were developed based on one of three trends.

> Digital transparency has been studied fundamentally as an instrumental concept, ignoring its cultural, political and social dimension

The first was developed by authors who continued to analyse government transparency; they had initially been inspired by the ideology of open government, but now broadened their focus to include different tools for its development (such as social networks, data portals, etc.) (**Ruijer** *et al.*, 2020; **Villodre**; **Reynaers**; **Criado**, 2021; **Simonofski** *et al.*, 2022), and other political actors beyond institutional transparency itself (civil organisations, political parties, lobbies, etc.) (**Díez-Garrido**, 2022; **Dinan**, 2021).

The second was associated with a stream of studies that reopened the debate on mistrust towards "transparent domination", recovering Foucault's panopticon (**Asher-Barnstone**, 2005; **Catlaw**; **Sandberg**, 2014; **Lemke**, 2015) and highlighted the hypocrisy of digital transparency (**Shohl**; **Leonardi**, 2016), under an "imperative of transparency" (**Shudson**, 2015) that has turned transparency into an ideology of the "transparency society" (**Han**, 2015), where information has been positivised and operationalised but in reality "transparency itself is not transparent" (**Han**, 2022).

The third included those studies that suggest there is a need to increase the transparency of large digital corporations (**Rieder**, 2020), because of the relevance they have acquired since the 2016 electoral campaign in the United States, in increasingly sophisticated socio-political and technical systems (**Van-Dijck**; **Poell**; **De-Waal**, 2018). With this, the focus is now on the demand for transparency not only from the public sector, but also from the private sector. As a result, the accountability of these corporations is one of the responses demanded by both institutions and citizen organisations for "contaminating the public sphere with toxic content" (**Tumber**; **Waisbord**, 2021, p. 23). The possible impact of its use has fostered algorithmic transparency, which comprises greater visibility and exposure on how these corporations use algorithms and data to make decisions (**Watson**; **Nations**, 2019). In this sense, **Suzor** *et al.* (2019) note that there has been progress in terms of the transparency of social networks, but that, for it to make sense, it must reach users in a more efficient way and users must have better access to it.

Although the debate on the transparency of organisations was not new and had already been associated with the Corporate Social Responsibility movement that emerged in the 1980s (**Albu**; **Flyverbom**, 2019), it was recovered at this time, and greater transparency was demanded from digital platform corporations in their actions and, especially, in the treatment of users' personal data, ensuring that citizens' information was available to them so that they could protect their interests (**Fung**, 2013; **Gorwa**; **Garton-Ash**, 2020).

Since then, following the multiple scandals plaguing *Facebook* since 2016, academics, policy makers and civil society groups have advocated in public discourse for measures to scrutinise these companies' business activities, casting them as an important potential governance mechanism. Certain authors have pointed out how companies have made efforts to create alliances and partner with academia in an attempt to regain user trust (**King**; **Persily**, 2019), publicly declaring its commitment to transparency as one of the main mechanisms of corporate and socio-political responsibility. But it was found that some of these platforms made increasingly important political decisions in secret (**Gillespie**, 2018).

4. Media and digital transparency

The media are also present in the academic literature and part of the academic debate on digital transparency and political communication. In this area, there are four types of studies on transparency that can be distinguished according to their content.

There are studies that have analysed how the media have made information available to the public, either through editorial processes or though the journalistic actors involved (for example, media ownership, journalist profiles, blogs, and links to sources) (**Karlsson**; **Clerwall**, 2018; **Vu**; **Saldaña**, 2021). In general, media accountability is an area that has not drawn much interest from communication scholars (**Eberwein**; **Fengler**; **Karmasin**, 2019), but journalistic transparency and open journalism (**Sampedro-Blanco**, 2014; **Renedo-Farpón**, 2019) has been put

> Transparency has thus become an instrument used by political communication to improve the reviled image of the political class

forward as a key issue when addressing the lack of credibility some media companies –in Spain (**Jurado**, 2020) and other countries– are accused of having.

Another group of studies has focused on analysing the role of the media in disseminating government transparency (associated with open government) and have been able to contribute to making it more popular and emphasising its benefits (**Roberts**, 2006; **Gorwa**; **Garton-Ash**, 2020). The publication of data in an open format has also led to the proliferation of new narratives based on those publications (**Brolcháin** *et al.*, 2017). In this sense, data journalists usually use transparency portals and open data as sources of information (**Appelgren**; **Salaverría**, 2018). Data journalism also plays a key role in promoting a culture of transparency by making data more understandable (**Rogers**, 2014) as the data in these portals are unprocessed (**Cushion**; **Lewis**; **Callaghan**, 2017).

Other approaches on the possibilities of digital transparency have simultaneously emerged; they have contributed to the belief that transparency takes root with potentially significant social impacts (**Owen**, 2015), advocating an inevitable horizontal and collaborative transparency (**Heemsbergen**, 2016; **Gorwa**; **Garton-Ash**, 2020).

In recent years, and associated with the measures implemented to combat disinformation after the 2018 *Cambridge Analytica* scandals, a new group of studies into transparency and the media has appeared whose guiding principle is to strengthen public control over private companies, mainly social media platforms –translated to a large extent into obligations of transparency– and their intellectual property, production and financing, but which, in countries like Spain or Italy, are conditioned by a growing political parallelism and concentration of the media market. The political actors and the technologies involved are a starting point for thinking about governance objectives within a new network of accountability. National responses in EU countries are mixed, and the *European Commission* has intensified its efforts to combat disinformation and put more pressure on platforms to take action and provide some level of transparency (**Saurwein**; **Spencer-Smith**, 2020).

5. Final thoughts

In summary, digital transparency has been studied fundamentally as an instrumental concept, ignoring its cultural, political and social dimension. In the Window Theory, **Matheus** & **Janssen** (2020) explain that transparency is a glass through which the activity of government organisations can be observed: the interior of the building is visible during the day, but the window does not allow us to see what happens at night unless an artificial light is used at night and may be blurred by weather conditions. The authors use this metaphor to define the complexity and ambiguity of this concept.

Studies on digital transparency matched the academic trends on recent political communication, which initially shifted from technological enthusiasm, almost fetishism, to scepticism, provoked by large technology corporations involvement in the US presidential campaign in 2016 (**Chadwick**, 2019). It could be said that the development of research on digital transparency in the context of political communication has been characterised by phases of euphoria, disappointment, and continuous transformation.

From the initial enthusiasm for digital transparency, with an eminently governmental approach in the early years, transparency passed from having its limits explored to being described as unidirectional, decontextualised and indiscriminate, which generated much confusion about its meaning and purpose (**Meijer**, 2009).

The scientific literature has focused on its analysis from the perspective of political, institutional, technological and media elites, but there is little research originating from the citizen perspective, despite the fact that it is often said that one use of digital transparency could be to restore confidence in institutions. In parallel, these studies show that digital transparency –whether through technological, administrative, or organisational solutions– will not by itself provide an easy solution to the challenges posed by the growing role of platforms in political and social life (**Gorwa**; **Garton-Ash**, 2020). Therefore, more research is needed to explore how platform companies enact and carry out transparency and how this can work in an increasingly controversial landscape.

“More research is needed to explore how platform companies enact and carry out transparency and how this can work in an increasingly controversial landscape”

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Data without reference points: collaborations in communication research in Spain are less international and publications have lower impact

Manuel Goyanes

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Manuel Goyanes
https://orcid.org/0000-0001-8329-0610

Universidad Carlos III de Madrid,
Departamento de Comunicación
Madrid, 133
28903 Getafe (Madrid), Spain
mgoyanes@hum.uc3m.es

Abstract

Although comparisons are unpopular, they help to establish standard frames of reference to assess the situation of individuals, institutions, or countries. In the field of communication, the meta-research has been prolific in examining the current state of its production, but has ignored the need to compare what this research is with respect to what it should be, thus offering descriptions without reference points. During the last decade in Spain, have the co-authorships in communication been international? And perhaps even more importantly, has the published output been top-tier? This study tries to answer these gaps in the literature by comparing communication research in Spain with two broad frames of reference: the set of all sciences and the set of all social sciences. The results show that, when compared with these two macro references, communication research collaborations lack international cooperation and are quite solitary. Similarly, communication research releases fewer publications in the first quartile but more in the second, third, and fourth quartiles. The study suggests that research in terms of international collaboration and level of publication output is below the expected standard and emphasizes the need to establish comparative frameworks to assess and evaluate the state of the field beyond descriptive or headline data (as in this article).

Keywords

Communication research; Types of research collaboration; Impact; Scientific comparison; Scientific evaluation; Scientific publication; *SJR*; *SCImago Journal Rank*; *Scopus*.

1. Introduction and research questions

Human beings tend to evaluate their actions, attitudes, or appearance in relation to other people's actions, attitudes, or appearance. In other words, we do not make evaluations without a reference point and, consequently, we tend to establish self-evaluations by comparing ourselves with others (**Wood**, 1996). In fact, the theory on social comparison (**Festinger**, 1954; **Gerber** *et al.*, 2018) suggests that the selection of the reference point, that is, the target of comparison, allows us to configure two types of evaluations: upward comparisons (**Collins**, 1996; **Brewer**; **Weber**, 1994), in which we select and evaluate ourselves against those we believe to be greater or better off, and downward comparisons (**Wills**, 1981; **Taylor**; **Lobel**, 1989), selecting and comparing ourselves to those we believe to be lesser or worse off. Each of these comparisons consequently triggers different effects on our self-evaluations (**Gibbons**; **Gerrard**, 1989; **Gerber** *et al.*, 2018; **Hu** *et al.*, 2018).

In Spain, for example, we could argue that a male is relatively tall if his height is greater than 182 centimeters, considering that the average height is 176. However, if we make an upward comparison and select the Netherlands as a target, we would say that the Spanish male is *au par* with the average height for the Netherlands (182.5 centimeters). Consequently, we would no longer evaluate him as tall. If we change the Netherlands for Guatemala, the inverse reasoning would be true. Consequently, individuals are not tall or short, but tall or short depending on the target of comparison.

Human beings tend to evaluate their actions, attitudes, or appearance in relation to other people's actions, attitudes, or appearance

Despite the inappropriateness of comparing the height of Dutch and Guatemalans, drawing normative conclusions about the Guatemalans by taking the height of a Dutchman as a benchmark, the truth is that in most Western countries, we establish normative comparisons regardless of the context. Beyond the physical aspect, education is a field that offers opportunities to better understand the implications of out-of-context normative conclusions. For example, in the *PISA* reports (*Programme for International Student Assessment*), where Spain usually performs poorly when compared with Nordic countries (**Cuñat-Roldán**; **Cuñat-Giménez**, 2022), investments in education are not usually considered in the normative explanations of the performance of Spanish students compared with Nordic ones, despite its being one of the main explanatory factors of this gap. The headline is usually that Spain is doing poorly in education, placing the blame on educators and suggesting that they are not doing their job well or, even worse, singling out students for their lack of talent. This case exemplifies that the selection of the target for comparison could blur the evaluations since, in most cases, it is applied to local or regional contexts with different levels of progress, stagnation, or investment.

From the previous argument derives another, perhaps even more interesting: the idea that, when conducting comparisons, the result of the judgment or evaluation should only be normative when the estimate of what can be achieved takes into account what one has, invests, or provides. In this sense, it may be appealing to demand Spanish scholars to achieve certain productivity and impact score, placing them, for example, at the level of the United States, but it would be equally desirable for the Spanish institutions that demand it to also guarantee investments in science similar to those of the United States. Consequently, comparing the productivity and impact of a North-American scientist to a Spanish one is inappropriate –hence the popular saying that "comparisons are the thief of joy." The Spanish researcher should be compared to his Spanish counterpart or to another researcher from a country featuring, for example, a similar investment in science.

In the previous cases, we have seen the comparisons with clear targets (upward or downward) and the difficulties of establishing normative judgments or evaluations regarding what or how we are. However, in many other evaluations, we lack reference points or ideals due to the nature of the phenomenon under study. Consequently, are the individuals or agents involved who must normatively create them through proper theoretical or empirical judgment.

In studies on representativeness, plurality, or diversity, for example, establishing these ideals or benchmarks has been a traditional endeavor (**Lauf**, 2005; **Jagsi** *et al.*, 2008; **Willett**, 2013; **Altman**; **Cohen**, 2021; **Goyanes** *et al.*, 2022). The aim is, or should be, twofold: to denounce the *status quo* and to propose scenarios, laws, or rules that may improve it (**Metz**; **Harzing**, 2012; **Metz** *et al.*, 2016; **Dhanani**; **Jones**, 2017; **Burges**; **Shaw**, 2018; **Goyanes**, 2020a). Particularly, in studies focused on communication research, scholars tend to focus on the following questions: what should the geographic and gender representation of an editorial board in a scientific journal be? What should the proportion of qualitative versus quantitative research be? These questions, which are indeed difficult to solve, are posed without reference points or ideals, being at the intersection of knowledge and domination and, therefore, are configured as approaches to challenge taken for granted knowledge.

Generally speaking, there are three strategies for answering these questions: theoretical reasoning, empirical evidence, and good judgment or common sense. Theoretical reasoning suggests that representation in institutions or bodies of governance should maintain population representativeness. For example, we assume that an ideal gender representation in a scientific committee or board of directors should normatively maintain the gender representation of the population, in this case, Spain. Consequently, any deviation from this proportion, however justified, would normatively indicate a deviation from the ideal, implying a gender bias or imbalance. Given that in most scientific (but also general) institutions or decision-making bodies the representativeness favors men (**Lauf**, 2005; **Jagsi** *et al.*, 2008; **Willett**, 2013; **Altman**; **Cohen**, 2021; **Goyanes** *et al.*, 2022), male dominance is attributed to the structural patriarchal system (**Lincoln**, *et al.*, 2012; **Knobloch-Westerwick** *et al.*, 2013; **Dubois-Shaik**; **Fusulier**, 2017; **Van-der-Lee**; **Ellemers**, 2019; **Madison**; **Fahlman**, 2021). Accordingly, legislatively, policies are developed to remediate this deviation by designing measures such as positive discrimination.

The headline is usually that Spain is doing poorly in education, placing the blame on educators and suggesting that they are not doing their job well or, even worse, singling out students for their lack of talent

> When conducting comparisons, the result of the judgment or evaluation should only be normative when the estimate of what can be achieved considers what one has, invests, or provides

Similarly, to determine the proportion of the two dominant empirical approaches in communication (qualitative and quantitative) in the different journals in the field, it is assumed through good judgment or common sense that both approaches should be well represented. However, establishing normative judgments as to what the ideal or fair proportion should be is challenging because it would be regarded as an illegitimate influence on the individual freedom of both researchers and journals. It is assumed, therefore, that quantitative dominance in the leading journals of the field (**Carrasco-Campos** *et al.*, 2018; **Goyanes** *et al.*, 2018; 2020; **Demeter**; **Goyanes**, 2021) limits knowledge production and hinders the promotion and progress of researchers situated on the margins of the mainstream. Therefore, creating and developing journals specialized in peripheral methodologies, paradigms, or topics that aspire to generate impact in the field is one of the measures to correct this domination.

The evidence-based strategy relates to the promotion of diversity and/or plurality (gender or geographical) as a factor or mechanism to facilitate greater benefits, better knowledge, or a more open and pluralistic worldview (**Baruch**, 2001; **Metz**; **Harzing**, 2012; **Metz** *et al.*, 2016; **Dhanani**; **Jones**, 2017; **Burges**; **Shaw**, 2018). For example, studies on corporate governance have found that companies whose boards feature greater gender and geographic representativeness have higher profits (**Robinson**; **Dechant**, 1997; **Carter** *et al.*, 2003), assuming that the diversity of the constituents, their background, problem-solving skills, attitudes, views, or expectations explain higher performance. Similarly to television talk-shows, in which the representativeness of the different political parties facilitates the contrast of ideas and the decision-making process of the audience, the diversity and plurality in representation facilitates new approaches and ways of seeing and understanding the world, generating positive effects and externalities (**Metz** *et al.*, 2016; **Dhanani**; **Jones**, 2017; **Goyanes**, 2020a).

Focusing on our field, the meta-research in communication has traditionally focused on the study of dominance through the examination of publication patterns (**Carrasco-Campos** *et al.*, 2018; **Goyanes** *et al.*, 2018; **Martínez-Nicolás**, 2020), offering indirect evidence on how to correct or improve the diversity or representativeness of the field. For example, previous research has examined the dominant topics, methodologies, publications, or types of collaboration (**Martínez-Nicolás**; **Carrasco-Campos**, 2018; **Piñeiro-Naval**; **Morais**, 2019; **Gómez-Escalonilla**, 2021; **Segado-Boj** *et al.*, 2021), providing detailed descriptive data on the state of the field. However, surprisingly, such research has neglected the need to create points of reference to evaluate these variables in terms of what is ideal, fair, or expected.

For example, let us imagine that a study shows that 20% of collaborations in the last decade in communication are international and that, in addition, 20% are published in the first quartile of *Scopus*. Are these percentages normatively acceptable? These are, in fact, the questions that the present study aims to cover. Specifically, this study proposes two different macro populations with which to evaluate the situation of communication research in Spain: the set of all sciences and the set of social sciences. Therefore, this study contributes to a better understanding of the normative situation of communication research, pointing out the distance of the types of collaboration and publication with respect to what is expected or ideal. In this context, the present study poses the following research questions:

> RQ1. Are there significant differences among the different types of collaboration in communication in Spain, taking as a reference the values for the set of a) all sciences in Spain and the set of b) social sciences in Spain? In other words, during the last decade, have the set of all sciences, on the one hand, and the set of social sciences on the other, had more or less international, only national, only institutional, or single-authored collaborations than the field of communication?
>
> RQ2. Are there significant differences in the proportion of publications per quartile by the SJR in communication in Spain, taking as a reference the values of the set of a) all sciences in Spain and the set of b) all social sciences in Spain? In other words, during the last decade, have the set of all sciences, on the one hand, and the set of social sciences, on the other, published more or fewer articles in indexed journals within the Q1-Q4 quartiles than the field of communication?

2. Data collection and analysis

Data for this study came from *SciVal*, an academic subscription data platform that works with *Scopus* information. Specifically, this platform provides bibliometric data on the performance and output of academics, institutions, and countries to facilitate the visualization and comparison of scientific patterns. To answer the research questions, the study takes two macro references: the set of all sciences (including the field of communication) and the set of social sciences (including the field of communication). These research fields were selected due to their wide range and comparative adequacy.

The data extraction protocol was similar for both the collaboration (RQ1) and publication (RQ2) types. Specifically, data collection was performed on December, 2022, based on a series of search criteria. Initially, the category of "countries, regions, and groups" was selected, and Spain was typed in the *SciVal* search engine. In order to provide data that reflect the patterns and evolution of collaboration and publication types as extensively as possible, the last decade (2012-2021) was examined, while in the scientific field, the values were iterated and computed according to the search: all fields (all sciences), social sciences, and communication. Finally, the two study variables were selected:

Types of collaboration

SciVal demarcates four types for this variable (Table 1): international collaboration (authors from different countries), national collaboration only (authors from a single country), institutional collaboration only (authors from a single university), and solo authorship (no collaboration).

Published material

For this variable, *SciVal* demarcates four types (Table 2): quartile 1 (Q1), quartile 2 (Q2), quartile 3 (Q3), quartile 4 (Q4).

To compute the two variables, the scientific field is iterated, and consequently, only communication, only social sciences, or all sciences were selected. The percentages and frequencies of each type of collaboration and publication were collected for comparative analysis. To make this comparison, a series of chi-square goodness-of-fit tests were performed, assuming unequal proportions and, therefore, taking as a reference the percentages of the collaboration and publication types for all the sciences and all the social sciences, comparing them with the values collected for communication.

3. Results

Of the 8,595 collaborations in communication in the last decade, 1,776 are international, 1,477 national only, 2,471 institutional only, and 2,871 solo authorships (Table 3)[1]. The chi-square goodness-of-fit test was performed to determine whether the types of collaboration in communication have the same percentages as in the set of a) all sciences. The chi-square goodness-of-fit test indicated that the four collaboration types in communication do not follow a similar distribution as the set of all sciences (χ^2 (3) = 7,012.28, p = .000). The main differences are found in international collaboration, which is lower in communication with respect to the set of all sciences, and in solo authorship, which is higher than in the set of all sciences.

Similarly, the chi-square goodness-of-fit test was performed to determine whether the types of collaboration in communication have similar percentages to those in the set of b) social sciences (Table 4). The chi-square goodness-of-fit test indicated that the four collaboration types do not follow a similar distribution as the set of social sciences (χ^2 (3) =

Table 1. Percentages of collaboration types for communication, all sciences, and all social sciences

	Communication	All sciences	Social sciences
International collaboration	20.70%	46.30%	25.90%
National collaboration only	17.20%	23.70%	16.80%
Institutional collaboration only	28.80%	20.70%	25.10%
Solo authorship	33.40%	9.30%	32.20%

Table 2. Percentages of collaboration types for communication, all sciences, and all social sciences

Quartile	Communication	All sciences	Social sciences
1	19.40%	58.00%	34.80%
2	30.00%	20.60%	24.50%
3	34.30%	14.00%	25.90%
4	16.20%	7.40%	14.80%

Table 3. Observed, expected and residual frequencies for the type of collaboration taking all sciences as reference

	Observed	Expected	Residual
International collaboration	1,776	3,979.5	-2,203.5
National collaboration only	1,477	2,037.0	-560.0
Institutional collaboration only	2,471	1,779.2	691.8
Solo authorship	2,871	799.3	2071.7
Total	8,595		

Table 4. Observed and expected frequencies and residuals for the type of collaboration based on the social sciences

	Observed	Expected	Residual
International collaboration	1,776	2,226.1	-450.1
National collaboration only	1,477	1,444.0	33.0
Institutional collaboration only	2,471	2,157.3	313.7
Solo authorship	2,871	2,767.6	103.4
Total	8,595		

Table 5. Observed, expected and residual frequencies for the type of publication taking as reference all sciences

Quartile	Observed	Expected	Residual
1	1,331	3,969.5	-2,638.5
2	2,056	1,409.9	646.1
3	2,350	958.2	1,391.8
4	1,107	506.5	600.5
Total	6,844		

141.23, p = .000). Again, the main differences are observed in international collaboration, which is lower in communication with respect to the social sciences, and in both institutional collaboration and solo authorship, which are higher in communication than in the social sciences.

Table 6. Observed, expected and residual frequencies for the type of publication taking as reference the social sciences

Quartile	Observed	Expected	Residual
1	1,331	2,381.7	-1,050.7
2	2,056	1,676.8	379.2
3	2,350	1,772.6	577.4
4	1,107	1,012.9	94.1
Total	6,844		

Of the 6,844 publications in communication during the last decade, 1,331 correspond to quartile one, 2,056 to quartile two, 2,350 to quartile three, and 1,107 to quartile four (Table 5). The chi-square goodness-of-fit test indicated that the quartiles of publication in communication do not follow a similar distribution to the set of a) all sciences (χ^2 (3) = 4,783.86, p = .000). The main differences are observed in publications in quartile one, which are lower in communication than in the set of all sciences, and in quartile three, two, and four, which are higher in communication than in the set of all sciences.

Similarly, the chi-square goodness-of-fit test was performed to determine whether the publication quartiles in communication have similar percentages to those in the set of b) the social sciences (Table 6). The chi-square goodness-of-fit test indicated that the publication quartiles in communication do not follow a similar distribution to those in the social sciences (χ^2 (3) = 746.12, p = .000). Again, the main differences are observed in publications in quartile one, which is lower in communication than in social sciences, and (especially) in quartile three, which is higher than in the social sciences.

4. Discussion

The aim of this study was to compare the types of collaboration and publication in communication in Spain during the last decade, taking two macro fields as reference points: the set of all sciences and the set of social sciences. To this end, the frequencies of these two variables were computed from the *SciVal* bibliographic analysis platform, which works with *Scopus* data. All in all, the present study provides four contributions to the meta-research in communication (**Carrasco-Campos** *et al.*, 2018; **Goyanes** *et al.*, 2018; **Martínez-Nicolás**, 2020) that further our understanding of the status and evolution of research in this field.

First, the study theoretically contributes to studies on diversity, representativeness, and meta-research in communication (**Lauf**, 2005; **Knobloch-Westerwick** *et al.*, 2013; **Goyanes** *et al.*, 2022), by proposing reference frameworks through which to establish normative evaluations on the evolution of communication research (**Goyanes**, 2020b). Over the last few years, the meta-research in communication in Spain has made an important quantitative and qualitative advancement, as a result of the structured efforts of this community to understand and evaluate its production (**Caffarel-Serra**, 2018; **Lozano-Ascencio** *et al.*, 2020; **Lozano-Ascencio** *et al.*, 2021; **Gaitán-Moya** *et al.*, 2021; **Carrasco-Campos**; **Saperas**, 2022). However, the analysis of many variables (such as collaboration types, dominant research techniques, or production/impact according to gender) has been developed by examining frequencies and percentages, which triggered self-evaluations without reference points.

This study theoretically reflects on the need to establish these frames of reference through which to self-assess communication research and thus draw normative considerations about its development and status. The study suggests that without these references, previous studies have offered indirect evidence through descriptive data, but were unable to understand the deviations, imbalances, or biases of what the field is with respect to what it should be. This study calls for creating comparisons with target points and encourages future research to create them and establish normative assessments that help to better understand potential biases or inequalities in communication research, with particular emphasis on gender deviations.

Linked to this contribution, the study also proposes a methodological protocol for cases where comparisons are desirable but benchmarks or target references are lacking. In the case of this study, a protocol for extracting data from the *SciVal* was presented. Specifically, in order to evaluate the types of collaboration and publication in communication during the last decade, two macro fields were taken as reference: the set of all sciences and the set of social sciences. The motivation for the selection of these two macro references to extract their values and compare them with the field of communication are their extension, adequacy, and relevance.

Finally, at the empirical level, the study provides two relevant findings to better understand the situation of communication research regarding the types of collaboration and publication in Spain, offering normative evaluations of its status. In particular, the present study provides empirical evidence beyond frequencies and percentages, concluding that, with respect to the set of

> The Spanish researcher should be compared to his Spanish counterpart or to another researcher from a country featuring, for example, a similar investment in science

all sciences and the set of social sciences, communication research has fewer international collaborations and fewer publications in quartile 1. Therefore, normatively, communication research is below the level of its set, which calls for new regulatory or normative frameworks that encourage scholars both to increase their international collaborations and to develop top-tier publications. Establishing international collaboration and first-quartile publications would allow the exchange of knowledge, practices, and experiences as well as a greater recognition and impact of Spanish communication scholars at a global scale.

> The aim is, or should be, twofold: to denounce the *status quo* and to propose scenarios, laws, or rules that may improve it

5. Note

1. The difference between the total frequencies of collaboration types and publication types is due to the way in which *SciVal* counts collaboration types.

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Transparency mechanisms in the media: analysis of Spain and Portugal

Cristina Renedo-Farpón; João Canavilhas; María Díez-Garrido

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Cristina Renedo-Farpón
https://orcid.org/0000-0003-4307-9217

Universidad de Valladolid
Facultad de Filosofía y Letras
Plaza Campus Universitario, s/n
47011 Valladolid, Spain
cristina.renedo@uva.es

João Canavilhas
https://orcid.org/0000-0002-2394-5264

Universidade da Beira Interior
Av. Marques d'Avila e Bolama
6200 001 Covilha, Portugal
jc@ubi.pt

María Díez-Garrido
https://orcid.org/0000-0002-5430-7708

Universidad de Valladolid
Facultad de Filosofía y Letras
Pza. del Campus Universitario
47011 Valladolid, Spain
maria.diez.garrido@uva.es

Abstract

Transparency in the media has become a fundamental pillar within all democratic societies, as a mechanism for reinforcing government regulation (Anderson, 2009) and citizen trust in institutions (Vos and Craft, 2016). Journalism, which has traditionally acted as a watchdog and a check on power, is now in the midst of a credibility crisis, compounded by polarization and the rise of disinformation. For this reason, various studies advocate that media outlets, just like institutions and governments, should use transparency mechanisms that allow them to respond directly or indirectly to society regarding the content they publish, as an exercise of responsibility. This research aims to evaluate media transparency in the Spanish–Portuguese landscape by means of an index that includes variables studied in the theoretical framework and that come from legislative, academic, and professional sources. These variables have been used to measure corporate and financial transparency, transparency in content production, openness to public participation, and the self-regulation mechanisms of ten media outlets in Spain and Portugal. This study concluded that, with only 43% adherence to the transparency variables analyzed, promoting accountability is still a work in progress for media outlets, and it must be stepped up at both the academic and professional levels.

Keywords

Transparency; Accountability; Media opening; Media; Access to information; Transparency mechanisms; Media credibility; Journalistic innovation; Open journalism.

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1. Introduction

Transparency has become a fundamental pillar within democratic societies to ensure the accountability of institutions, which is currently a key element in ensuring good governance (**Cifuentes-Faura**, 2021). Citizens are increasingly aware of the importance of transparency, which they see as one check on government action as well as a way to promote the prevention of and the fight against corruption (**Anderson**, 2009; **Bertot**; **Jaeger**; **Grimes**, 2012; **Attard** *et al*., 2015). Moreover, its implementation is a mechanism that helps restore citizens' trust in institutions (**Cook** *et al*., 2010; **Kim**; **Lee**, 2012; **Slattery**, 2016; **Vos**; **Craft**, 2016), as it increases understanding about the process by which public affairs are created (**Heald**, 2005). Although there is no universal definition that encompasses the concept of transparency, the majority of definitions concern greater access and availability of information (**Cifuentes-Faura**, 2021), which facilitates citizens' review and analysis of public information, as well as the imposition of sanctions if irregularities are detected (**Ugalde**, 2002; **Bovens**, 2005).

This last aspect of transparency is closely related to the checking function exercised by the media, which were already named as the "Fourth Estate" (**Galán-Gamero**, 2014), owing to their role as watchdogs and as shapers of public opinion. This is a role that they were already playing in the eighteenth century in the bourgeois revolutions, when the media's function was tied to the need to establish mechanisms for mediation between the public and its representatives (**Boix**; **López**, 2005), which has remained a part of the historical process up to the present day, situating the media as a source of power, counter-power, and social change (**Castells**, 2008).

However, authors such as **Blesa** (2006) point out that, since the 1980s, the media have been in the midst of a crisis and have undergone a transformation into the "media of power" ["*medios del poder*"]. This crisis is manifested in a lack of public trust (**Nielsen**; **Graves**, 2017; **Nigro**, 2018), further heightened by political elites' consistent accusations (**Mourão** *et al*. 2018; **Van-Duyn**; **Collier** 2019) toward the media, which they label as disinformers, thereby damaging public perception of media credibility (**Masullo** *et al*., 2021).

2. Media transparency in the context of disinformation

Although transparency is important in the fight against disinformation, the problem runs much deeper because a significant part of the population cannot distinguish truthful information from false information (**Nielsen**; **Graves**, 2017). Therefore, some studies (**Canavilhas**; **Jorge**, 2022) point out that, in addition to the regulation of transparency, which is the subject of this study, fact-checking and education are fundamental to counter disinformation processes.

The problem is that the issue of disinformation is still growing (**Amazeen**, 2020) owing to the cyclical crises being experienced by journalism and the process of adapting the industry to the digital scene (**Vázquez-Herrero**; **Vizoso**; **López-García**, 2019). This is not a new problem, but its pattern of spread within society is now much more deeply entrenched and more complex, as is its consequence of eroding public confidence in the media, institutions, and politicians. This leads to a breaking down of political debate, a threat to electoral processes, an increase in polarization, and ultimately, a growing threat to the functioning of democratic societies (**Steensen**, 2019).

We find ourselves in a time when the concept of post-truth is predominant (**Corner**, 2017; **Fowks**, 2018; **Farkas**; **Schou**, 2019; **Peters**; **McLaren**; **Jandrić**, 2020), and in which the mass dissemination of false and misleading content prevails, usually highly emotionally charged and through technological channels (**Rubio-Núñez**, 2018). This situation is far from being a fringe issue and is linked to political elites, think-tanks, the media, citizen movements, and parties (**Bennett**; **Livingston**, 2018), which tends to further break the trust that citizens have in the media (**Aguaded**; **Romero-Rodríguez**, 2015).

Disinformation –in particular, that which is created intentionally to distort reality and contribute false information to the collective discourse (**Coromina**, 2019)– conflicts with journalism that is rooted in fact-checking procedures (**Vu**; **Saldaña**, 2021); however, there is also misinformation, which originates with the media, owing to journalists' lack of fact-checking skills (**Lecheler**; **Kruikemeier**, 2016).

For these reasons, in recent years the widespread use of verification and fact-checking platforms has increased (**Herrero**; **Herrera-Damas**, 2021); they guarantee that journalistic texts are checked against reliable sources, official documents, and credible research results (**Ufarte-Ruiz**; **Peralta-García**; **Murcia-Verdú**, 2018). Although verification has always been a crucial process in the journalistic field, the upsurge in disinformation has led to the emergence of independent media agencies specialized in fact-checking, as well as the formation of specific departments in media outlets with a long track record (**Cherubini**; **Graves**, 2016).

Notable characteristics that define the work of news verification agencies include being able to adapt to changes, especially technological changes; grounding their work in the concept of objectivity; involving citizens in verification processes (**Vizoso**; **Vázquez-Herrero**, 2019); and making transparency one of the primary keys within their work method (**Lotero-Echeverri** *et al*., 2018).

> Numerous authors have pointed to media transparency as a fundamental resource that the media should promote both for the fight against disinformation and as a means to regain public credibility

Governments also play an increasingly important role in the fight against disinformation, which in democratic countries has come to be seen as a matter of national security; thus, in addition to the emergence of self-regulation models from media outlets, there are also proposals for legislation and institutional intervention by the state (**De-Basio**; **Selva**, 2021).

More transparent journalism, which discloses how it is financed, how it builds its agenda, how it is connected to its sources, and how its production routines work, helps the public be prepared to counter disinformation

Numerous authors have pointed to media transparency as a fundamental resource that the media should promote both for the fight against disinformation and as a means to regain public credibility (**Bardoel**; **D'Haenens**, 2012; **Groenhart**; **Bardoel**, 2012; **Karlsson**; **Clerwall**; **Nord**, 2014; **Curry**; **Stroud**, 2012; **Lin**; **Zhang**, 2021; **Vu**; **Saldaña**, 2021). In fact, transparency in relation to journalism is neither a new nor an unexplored concept. **Appelgren** and **Salaverría** (2018) point out that, for decades, classical theories of journalism have advised that one of the guiding principles of reliability in news be providing citizens with as much information as possible.

Due to journalism's social responsibility to society (**Lee**; **Riffe**, 2017), the media should be able to directly or indirectly answer for the quality of the content that they publish as well as for its consequences (**McQuail**, 2003), and moreover, they must do so as an exercise in responsibility (**Moeller** *et al*., 2006). More transparent journalism, which discloses how it is financed, how it builds its agenda, how it is connected to its sources, and how its production routines work, helps the public be prepared to counter disinformation (**Alisson**, 2022).

3. Analysis of the Spanish-Portuguese landscape

Over the years, there have been different initiatives in the media landscape in Spain and Portugal to foster transparency in the media. In Portugal, many of these mechanisms are galvanized by legislation that regulates their activity and requires specific accountability criteria, especially financial and legislative transparency; however, such legislation has not yet been put into practice in Spain. Good practices of self-regulation and initiatives promoted by the media themselves, for example, specialized news verification agencies, have also been observed. At the academic level, different indices have been implemented to measure the level of media transparency, a field that has been researched more in Spanish studies but is still underexplored in Portugal, where studies have focused more on regulation of the sector.

3.1. Media transparency in Spain

In Spain, a significant legislative gap regarding media transparency has existed for years (**López-Cepeda**; **Manfredi**, 2013). At the legislative level, the *General Law on Audiovisual Communication* (*Ley 7/2010*) was adopted in 2010; Article 6 of this law states the right to transparent audiovisual communication. This regulation pertains to transparency regarding the identity of the service provider and companies that are its shareholders, transparency regarding content programming, differentiation between marketing communication and other content, and accessibility and media literacy. However, it does not include any regulation regarding transparency in terms of a media outlet's financing or the production of news content. Subsequently, *Law 19/2013 on transparency, access to public information, and good governance* was passed. Although this regulation is regarded as insufficient (**La-Rosa**; **Sandoval-Martín**, 2016; **Sierra-Rodríguez**, 2020), it represents a step forward in the provision of public information to both citizens and journalists, who can access public data to cross-check and improve the quality of their own information (**Díez-Garrido**; **Campos-Domínguez**, 2018).

However, *Law 19/2013* does not include specific transparency or accountability regulations applicable to the media, with the exception of publicly owned media. It also covers private entities benefiting from public aid or subsidies of more than 100,000 euros or at least 40% of their total annual income, as well as private entities awarded contracts with the public sector. However, these criteria do not cover the majority of privately owned media outlets, which are not legally bound to be accountable to the public.

In the academic field, different studies have analyzed media transparency in the Spanish landscape, some of which have focused on the websites of the major media outlets (**Redondo-García**; **Campos-Domínguez**, 2016) or specifically on the audiovisual media outlets (**Rodríguez-Martínez** *et al*., 2022). These studies highlight the use of classic self-regulation mechanisms and interactive tools that engage users as opposed to tools that promote corporate, financial, and content production transparency in the Spanish media landscape. In addition, various methodological proposals for measurement have been developed (**Campos-Domínguez**; **Redondo-García**, 2015; **Suárez-Villegas** *et al*., 2017; **Mauri-Ríos** *et al*., 2022), which include indicators related to economic and editorial transparency, interactivity, or citizen participation as well as classic self-regulation mechanisms, such as style guides, the reader's ombudsman, press councils, or other internal codes.

In Portugal, many of these mechanisms are galvanized by legislation that regulates their activity and requires specific accountability criteria, especially financial and legislative transparency; however, such legislation has not yet been put into practice in Spain

At the professional level, some media outlets have gone beyond legislative norms and traditional resources for the self-regulation of transparency to implement their own mechanisms aimed at enhancing their accountability, in terms of both financing and content production: these include news verification agencies or tools such as the *Transparency Map* [*Mapa da Transparência*] offered by the newspaper *Público* (**Amorós-García**, 2019). This type of mechanism has not been addressed in most of the academic indices implemented to measure media transparency, and its inclusion could prove to be enriching, as it provides new forms of accountability related to the current state of disinformation.

The *Transparent Journalism Tool* (*TJ Tool*), launched by the newspaper *Público* with funding from the *Google News Initiative*, is one such example. It serves as a tool to fight disinformation. This undertaking, which has already been analyzed by various authors in studies on the media accountability (**Terol-Bolinches**; **Alonso-López**, 2020; **Jurado**; **Delgado**; **Ortigosa**, 2020), provides eight editorial transparency indicators (sources, support documents, context, date and place where a piece was written, author, editorial line, and transparency policy) which are used to assign a percentage value according to compliance to these indicators. Moreover, the tool has been developed open source so that it can be used by other media outlets. Information about the tool is available through the website *www.periodismotransparente.es* and on the website of the Spanish media outlet *Público* through a logo located at the top of each article.

Another example is the news verification agencies affiliated with the *International Fact-checking Network* (*IFCN*) –in Spain, these are *Newtral*, *Maldita*, and *EFE Verifica*. This network, which brings together verification projects from all over the world, obliges its members to comply with transparency criteria (**Rodríguez-Pérez**, 2020), both in the sources used for verification and in the working methodology, as well as in terms of the financing, organization, and constitution of the media agencies.

3.2. Media transparency in Portugal

In Portugal, media freedom has been included in the constitution since the 1976 version, the first after the Carnation Revolution, in which art. 38 guarantees freedom of the press (**Carvalho**; **Cardoso**; **Figueiredo**, 2003). Years later, in the constitutional revision of 1982, concerns about independent journalism took the form of an entity, the *Conselho de Comunicação Social* (*CCS*), whose operation would be regulated by *Law 23/83* of September 6 of that year. However, the 1989 constitutional revision later created an independent agency called the *Alta Autoridade para a Comunicação Social* (*AACS*), whose regulation was published in *Law 15/90* of June 30 of that year. This more autonomous and independent entity saw its powers strengthened, in a model very similar to that of the entity that succeeded it, the *Entidade Reguladora para a Comunicação Social* (*ERC*), created by *Law 43/98* of August 6, 1998.
https://www.erc.pt

This legislation was amended twice (*Law 18-A/22* of July 18 and *Law 33/2003* of August 22), and its fourth version, *Law 53/2005* of November 8, is currently in force.

The *ERC* is a legal entity under public law, responsible for the regulation of the media sector. This independent entity is accountable only to the Portuguese Parliament, the second most important sovereign body in the country. Its mission is to supervise the entire media sector, including newspapers, magazines, radio and television, online information, and news agencies. This includes the registration of all media outlets; the evaluation of complaints from institutions, companies, and citizens; and the verification of compliance with legislation or other regulations in force in the media sector.

Within this legislation, point 1 of Article 3 (Transparency of ownership and management) of the *Law on transparency of ownership, management, and financing of media* (*Law 78/2015* of July 29) refers to the obligation of media outlets to communicate to the *ERC* who the holding entities/companies are, the composition of their governing bodies, and the names of those responsible for the editorial direction and supervision of the content. This information must be updated whenever there are changes. Article 5 (Transparency of the principal means of financing) obliges the media to disclose the principal financial flows using organized accounting. The *Law* (Article 6) also establishes that this information provided by the media must be public.

There are two other entities on the field of competition:

- The *Autoridade da Concorrência* (*AdC*): which seeks to ensure the functioning of the market economy and, in this respect, intervenes in the media landscape, its positive opinion being necessary when purchasing of media groups
  https://www.concorrencia.pt
- The *Autoridade Nacional de Comunicações* (*ICP-Anacom*): which regulates, supervises, and monitors the communications market so that it functions properly. Its connection with the media sector is indirect, since its activities include the management of radio frequencies and computer networks.
  https://www.anacom.pt

For all of these reasons, it can be said that Portuguese legislation on transparency is abundant and very elaborate in terms of media ownership, financial flows, the identification of each media outlet, those responsible for the content, and the editorial line followed.

In academic terms, scientific production on media transparency in Portugal is relatively scarce, focusing on issues related to the regulation of the sector (**Costa-e-Silva**; **Fidalgo**; **Sousa**, 2011; **Camponez**, 2011; **Cádima**; **Martins**; **Silva**, 2016). It is in these works where indirect references to transparency appear, specifically when talking about self-regulation and co-regulation, analyzing the ethics and deontology of journalism but also some mechanisms provided for in the legislation, such as the statutes governing the newsroom (**Fidalgo**, 2009; **Miranda**; **Camponez**, 2022).

The main objective of this research is to evaluate the level of media transparency in the Spanish–Portuguese landscape

At the professional level, some Portuguese media outlets have sought to bolster compliance with transparency standards with two mechanisms of their own:

- One is style guides because "transparency obligations begin with the establishment and disclosure of the rules by which we are governed" ["*as nossas obrigações de transparência começam pelo estabelecimento e divulgação das regras por que nos regemos*"] (*Público*, 2005, p. 8).
- The other mechanism is the reader's ombudsman, which seeks to answer questions related to content, journalists' performance, or the organization, contributing to a more transparent and participatory dynamic (**Gomes**, 2019), whether the media outlets are public or private.

4. Objectives and hypotheses

The main objective of this research is to evaluate the level of media transparency in the Spanish–Portuguese landscape. To carry out an in-depth evaluation, the following specific objectives are proposed:

O1: To analyze media transparency initiatives in Spain and Portugal at the professional, legislative, and academic levels.

O2: To create an index that includes the variables studied for its implementation.

O3: To apply the proposed transparency index to the major media outlets in Spain and Portugal to make a first approach to their media transparency.

Regarding the application of media transparency, the research sets forth two primary hypotheses:

H1: The media, especially privately owned media, do not tend to apply transparency mechanisms unless required to do so by external legislation (legislative or professional).

H2: In general, the media only share basic resources that offer users and readers data on their ownership, financing, or content methodology but do not go deeper through mechanisms that provide more sophisticated levels of transparency.

5. Methodology

The Spanish-Portuguese landscape was the object of study, since both countries fall within the polarized pluralism model proposed by **Hallin** and **Mancini** (2004). They are also countries whose historical and political features converge, especially since the 1970s, with the end of their totalitarian regimes, since both are part of the third democratic wave. It is also interesting to analyze their geographical characteristics and their place within the circle of democratic countries in Mediterranean Europe, alongside Italy and Greece. The analysis and comparison of these two countries is also interesting because, despite their geographic and cultural proximity, they exhibit differences in media regulation and legislation. Their analysis will also serve as a starting point for further study and comparison with other countries with different models and media landscapes.

Table 1. Media outlets analyzed

Media outlet	Country	Type	Web
Antena 3	Spain	Television	*https://www.antena3.com*
Cadena SER	Spain	Radio	*https://cadenaser.com*
El Español	Spain	Digital native	*https://www.elespanol.com*
Observador	Portugal	Digital native	*https://observador.pt*
El País	Spain	Printed newspaper	*https://elpais.com*
Público	Portugal	Printed newspaper	*https://www.publico.pt*
RTP	Portugal	Public media outlet	*https://www.rtp.pt*
RTVE	Spain	Public media outlet	*https://www.rtve.es*
SIC	Portugal	Television	*https://sic.pt*
TSF	Portugal	Radio	*https://www.tsf.pt*

To measure the level of media transparency in these two countries, their major media outlets were selected. The sample included one media outlet of each type (radio, printed press, native digital press, television, and publicly owned media), with the aim of identifying possible differences in transparency depending on the type of media. The selection was made on the basis of audience data from the major media measurement companies in both countries:

- the *Asociación para la Investigación de Medios de Comunicación* (*https://www.aimc.es*) and *OJDInteractiva* (*https://www.ojdinteractiva.es*) in Spain; and
- the *Comissão de Análise de Estudos de Meios* (*https://www.caem.pt*) and the
- *Associação Portuguesa para o Controlo de Tiragem e Circulação* in Portugal (*https://www.apct.pt*).

The analysis and tracking of the indicators were carried out using the public websites of the following media outlets, opening subscriptions with the media outlet where required.

To develop the transparency indicators applied to the above sample, various relevant professional and academic studies were considered (**Bardoel**; **D'Haenens**, 2004; **Groenhart**; **Bardoel**, 2012; **López-Cepeda**; **Manfredi**, 2013; **Campos-Domínguez**; **Redondo-García**, 2015; **Martín-Cavanna**; **Herrero-Beaumont**, 2019; **Mauri-Ríos** *et al.*, 2022; **Christofoletti**, 2022). Most of these proposals concurred in including transparency mechanisms related to four categories: corporate and financial transparency, transparency in content production, openness to public participation, and a media outlet's self-regulation. Therefore, this research made an updated selection of variables corresponding to each of these four areas.

Table 2: Transparency variables analyzed

Variable type	Coding applied
Corporate and financial transparency:	
Corporate information	(0 no; 1 yes)
Identification of the legal form of the media outlet	(0 no; 1 yes)
Publication of holders and beneficiaries of the media outlet's capital	(0 no; 1 yes)
Identification of editorial managers	(0 no; 1 yes)
Publication of financing sources	(0 no; 1 partial; 2 yes)
Organizational structure of the media outlet	(0 no; 1 yes)
Personal biographies of the main editorial managers	(0 no; 1 yes)
Openness to public participation	
Simple contact	(0 no; 1 yes)
Comments	(0 no; 1 subscribers only; 2 yes)
Evaluation of content	(0 no; 1 subscribers only; 2 yes)
Correction of news	(0 no; 1 subscribers only; 2 yes)
Delivery of content	(0 no; 1 subscribers only; 2 yes)
Social networks	(0 no; 1 yes)
Other	(0 no; 1 yes)
Transparency in content production	
News source	(0 no; 1 yes)
Support documents	(0 no; 1 yes)
Context	(0 no; 1 yes)
Place where a piece was written	(0 no; 1 yes)
Date of publication	(0 no; 1 yes)
Content corrections or modifications	(0 no; 1 yes)
Editorial line	(0 no; 1 yes)
Other	(0 no; 1 yes)
Self-regulation mechanisms	
Reader or audience advocate	(0 no; 1 yes)
Style guide	(0 no; 1 yes)
Journalists' blogs	(0 no; 1 yes)
Other	(0 no; 1 yes)

Source: Authors' own creation based on the cited literature

In addition, these indicators were supplemented by mechanisms registered in the legislative media regulation of Spain (*General Law 7/2010 of Audiovisual Communication*) and Portugal, referring to transparency in media ownership (*Regulation No. 835/2020*, *Circular No. 5988/2020 of April 9, 2020*, *Law No. 78/2015* of July 29, and *Regulation No. 348/2016*).

Also, indicators collected from invaluable professional experience in the Spanish-Portuguese landscape were included, such as the *Transparency Map* from the newspaper *Público* (**Alonso-López; Terlo-Bolinches**, 2021) or the regulations of the *International Fact Checking Network* (*IFCN*), which governs the news verification agencies in Spain and Portugal and defines transparency as one of the major key points within its working method (**Lotero-Echeveri** *et al.*, 2018).

With these baselines, the sample was coded, analyzing the presence or absence of the indicators presented in Table 2. The inclusion of these professional and legislative indicators is considered to represent a revision of the previously proposed media transparency indices, allowing them to be updated to the current context of media crisis and disinformation.

Coding was performed by two coders during May 2022, and a joint review was performed during June to ensure reliability.

As seen in Table 2, for some of the items, an intermediate score was attributed depending on whether the information was presented in full or in part or whether the mechanisms were available to the entire public or only to subscribers of the media, since it was believed that access to information was not equal in all cases. In total, a maximum score of 32 points could be achieved in the transparency indices.

6. Results

The results obtained show that, overall, the media analyzed did not meet the transparency indicators applied to them, with a total score of less than 44.06% compliance. Although it is true that four of them had at least 50% of the indicators, only one surpassed the 65% mark, so the degree of transparency, even of those that exceeded the average score, was still far below an ideal level of openness to the public.

Figure 1. Financial section of *RTVE*'s transparency portal.
Source: *https://www.rtve.es*

In regard to the types of indicators, the media outlets' corporate and financial transparency was the category in which the second most variables were observed (55%), only below the category of transparency in content production. The publication of information regarding the legal form of the media outlet was the only variable observed for all the media outlets analyzed. This was followed by the variable for the publication of the media outlet's structure, which was public for all the websites analyzed except those of the Spanish media outlets *Antena 3* and *Cadena Ser*, and then the variable regarding publication of the media outlet's editorial managers, which was absent only in *El País*, *Antena 3*, and *Cadena Ser*.

It is worth noting that only four of the ten media outlets analyzed had a corporate information page, which provides data "About us" or about the history of the media outlet. *El Español* and *RTVE* in Spain and *Público* and *RTP* in Portugal were the only two media outlets in each country to disclose this information.

In addition, not all of the media outlets have accountability mechanisms related to their sources of financing. Considerable inconsistencies were observed, with media outlets that did not publish any data at all regarding their financing (*El País*, *Antena 3*, *Cadena Ser*, *El Español*, *TFS*, and *Observador*); others that shared their accounts but only partially (only the main advertisers), such as *Público* or *SIC*; and others that did so in a comprehensive and detailed manner. *RTVE* (Figure 1) and *RTP*, the two publicly owned media outlets analyzed in Spain and Portugal, respectively, fall into the third group. Both media outlets had specific transparency portals on which they not only shared detailed and complete information about their financing but also included public procurement data and related announcements, corporate information, budgets, and suppliers.

Finally, the publication of the biographies of the editorial team was the corporate and financial transparency variable observed the least. Only *RTVE* in Spain and *Público* and *RTP* in Portugal make the biographical data of the main members of the editorial team public, which may help the public understand their role at the media outlet or identify possible conflicts of interest.

As mentioned above, transparency in content production was the category observed most in the analyzed media (56.25%), although there was great deal of inconsistency with respect to the variables analyzed in this category. Some, such as transparency in news sources, the inclusion of supporting documents, or the date of publication of the news item, were present in all media outlets. Context, such as links to other related content or documents, through which additional information related to a news item could be sought, was also observed in all the media outlets except *RTP*, whose news items, published mainly in audiovisual format, included hardly any textual information in which links to other related content or documents could be provided.

However, the rest of the variables analyzed in this category were absent in all or most of the media outlets analyzed. For example, only two media outlets, *El País* and *Cadena SER*, which belong to the same publishing group, disclosed on their websites the place where the news item was written.

In regard to corrections, *Público* was the only media outlet that offered mechanisms to show the reader what modifications had been made to some content since its publication. Some media outlets, such as *RTVE*, did show a date of revision on the news item, but since no further information was included, it was decided that this information did not provide sufficient

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INÍCIO / SOBRE

Política de correção

O Observador norteia a sua cobertura jornalística pelos princípios da exigência e do rigor. Mas isso não significa que nunca são cometidos erros. Por estarmos conscientes de que esse é um risco real, por muito que procuremos evitá-lo, também entendemos que devemos ser rápidos e absolutamente transparentes na forma como admitimos perante os nossos leitores onde falhámos — e como corrigimos o erro.

Correção de dados factuais

Sempre que um texto contenha erros factuais, o Observador prioriza a sua correção. E, no momento em que é feita a correção do artigo original, os leitores são informados da alteração introduzida — independentemente de a falha ter sido detetada pelo Observador ou ter sido sinalizada por um leitor. Deve ser colocada uma nota no final no artigo que dê conta do conteúdo alterado e refira também a hora a que essa alteração foi feita.

Figure 2. Corrections policy of *Observador*.
Source: *https://www.observador.pt*

data regarding the possible content changes that could have been made to the news item. It was also observed that none of the media outlets specified the editorial line regarding the publication of their content.

When analyzing other mechanisms related to transparency in content production, three media outlets offered resources that were not covered in the previous variables.

Whenever the newspaper *Público* publishes news concerning the *Sonae* (*Sociedade Nacional de Estratificados*) group, in the content it mentions the fact that the company owns *Público*, thus showing corporate transparency within the editorial content itself.

El País has a section called Erratum [“*Fe de Errores*”], in which it publishes content errors related to false or inaccurate information, misspelled names, erroneous figures, or incorrect graphical information, such as captions with incorrect data. In addition, in news stories related to Covid-19 produced during the pandemic, this same media outlet occasionally included references to the methodology used to create the content, especially that which related to data.

Finally, *Observador* has a specific Error Correction Policy [*Política de Correção de Errores*] section (Figure 2), which describes its rules regarding data correction, the clarification of information, updates, or the deletion of content. It also reports corrections and updates through its social networks, and it includes a contact so that readers can send their own news corrections to the media outlet.

The section of content analysis relating to the media outlets’ openness to the public was one of the least complied with (35.54%); moreover, depending on the variable, this compliance was very inconsistent, with some having very high compliance and others very low. Thus, all the media outlets analyzed made it easy for users to contact them and also had social networks available.

However, there was not the same level of uniformity when it came to other aspects of user participation. Five media outlets did allow comments (*El País*, *Cadena SER*, *El Español*, *Público*, *TFS*, and *Observador*), and it was observed that *Público* had different levels of comments according to participation and the rules they offer through their website. On the other hand, only the Portuguese radio station *TFS* offered this option to all users, whereas the rest only permitted subscribers (*El País* and *El Español*) or registered users (*Cadena SER*, *Público,* and *Observador*) to comment. With respect to the evaluation of content, none of the media outlets provided the option.

This content analysis also measured potential contributions from the users to the media outlets, in terms of both possible corrections and the sending of various content. Both issues were of little interest to the media outlets, and only two Portuguese media outlets offered any error correction mechanism. The first, *Público*, offers users the option to “Suggest an edit” [“*Sugerir correção*”] (Figure 3) at the end of each news item, which sometimes leads to changes that indicate the time of revision and, sometimes, the content modified. The second, *Observador*, included in each news item a contact to whom corrections or “a hint” [“*Proponha uma correção, sugira uma pista”*] could be sent, which was considered a sufficient way for users to send both error corrections and various content that could be of interest to the media outlet.

> Some media outlets have gone beyond legislative norms and traditional resources for the self-regulation of transparency to implement their own mechanisms aimed at enhancing their accountability

Figure 3. *Público*'s option to suggest edits to content.
Source: *https://www.publico.pt*

The analyzed media also had other tools for participation that were considered of interest to this research. The newspapers *El País* and *Público* has a letter to the editor service, to which users can send letters of different kinds that, after being reviewed, may be published in the newspaper.

RTVE stands out with its *The Great Consultation* [*La gran consulta*] tool, a campaign to find out the opinion of the Spanish public regarding public radio and television. First, a team traveled throughout Spain to gather the evaluation of the public. Second, there were several sections of the website (Figure 4) with surveys on content covering different topics, such as sports, music, or equality.

In turn, *El Español* has a blog section open to subscribers, as well as a space for participation which has various debates on current affairs that users can comment on. For example, on May 23, 2022, *El Español* opened a debate on whether the King Emeritus should explain himself as requested by the Spanish Government during his visit to Spain:
https://www.elespanol.com/participacion/20220523/debate-cree-rey-emerito-deberia-explicaciones-gobierno/674682604_0.html

The Portuguese newspaper *Público* had an instant messaging section called "Chat with *Público*" ["*Conversar com Público*"]. *Observador* also had an interesting chat function. In addition, the latter has "Community Standards" ["*Normas comunitárias*"] in which respect, civility, and the media outlet's specific rules of participation were mentioned, which they considered necessary for it to be a "transparent" ["*transparente*"] space.

The last section of the content analysis was self-regulation, in which compliance was the lowest (35%). In this regard, only four media outlets (*El País, RTVE, Público,* and *RTP*), two of which are public, had a reader or audience ombudsman system.

Figure 4. Surveys from *RTVE*'s *The Great Consultation*.
Source: *https://www.rtve.es*

RTP had one for the viewer and one for the listener.

Only two long-established Spanish media outlets, *RTVE* and *El País*, and the Portuguese media outlet *Público* made a style guide available to the public. Likewise, only *El País* had a section just for talking about the media outlet itself, called *El País, that we do* [*El País que hacemos*].

In regard to other aspects related to self-regulation, *El País* has a code of ethics, *RTVE* has a self-regulation code, and the Portuguese media outlets *Público*, *RTP*, *SIC*, and *Observador* published an editorial statute, which is mandatory under Portuguese law. In the case of *TSF*, this page exists (*https://www.tsf.pt/estatuto-editorial.html*), but it has no content.

It is worth mentioning the Portuguese public media company *RTP*, which also made several regulatory documents available, such as a corruption risk prevention plan, a code of ethics, a sustainability report, a gender equality report, and bylaws, among others.

In short, only two of the four categories analyzed in the variables meet the mark when it comes to their compliance (corporate and financial transparency and transparency in content production), and this with percentages of compliance very close to half. Both openness to the public and self-regulation are below 50%, with very similar percentages.

Table 3. Percentage of compliance for the analyzed variables

Type of indicators	Percentage of compliance
Content production	56.25%
Corporate and financial transparency	55.00%
Public openness	35.54%
Self-regulation	35.00%
Total average	44.06%

Table 4: Percentage of compliance by media outlet

Media outlet	Country	Percentage of total compliance
Público	Portugal	65,63%
RTVE	España	56,30%
Observador	Portugal	56,30%
El País	España	50,00%
RTP	Portugal	46,90%
SIC	Portugal	40,60%
El Español	España	37,50%
TFS	Portugal	37,50%
Cadena SER	España	28,10%
Antena 3	España	21,90%

Regarding the individual compliance of the different media outlets, only four of the ten media outlets analyzed exceeded 50% compliance with the variables (*RTVE* and *El País* in Spain and *Público* and *Observador* in Portugal). In addition, only *Público* exceeded 60% (with 65.63% compliance), making it the media outlet with the highest score, followed by the publicly owned Spanish media outlet *RTVE* (56.3%). *Antena 3* is the media outlet with the lowest percentage (21.9%).

7. Conclusions and discussion

This research, whose objective was to evaluate media transparency in the Spanish-Portuguese landscape through an index that included variables applied at the legislative, academic, and professional levels, has allowed us to determine that transparency is still a work in progress for journalism and the media.

Regarding O1, which analyzed media transparency initiatives in Spain and Portugal, it was found that the latter country stands out for having more legislation that addresses the regulation of media activity with respect to transparency, especially financial and legislative transparency, compared with Spain, where there is hardly any legislative regulation in this regard. However, at the academic level, the Spanish system has developed a greater number of studies proposing indices to measure the level of media transparency than has the Portuguese, which is more focused on studying the regulation of the sector in general.

Studying the transparency initiatives allowed us to achieve O2 of the research –to create a new index that included new professional and legislative variables– thus performing a revision of other indices proposed at the academic level (**Bardoel**; **D'Haenens**, 2004; **Groenhart**; **Bardoel**, 2012; **López-Cepeda**; **Manfredi**, 2013; **Campos-Domínguez**; **Redondo-García**, 2015; **Martín-Cavanna**; **Herrero-Beaumont**, 2019; **Mauri-Ríos** *et al*., 2022), which did not consider these types of variables.

With respect to O3, which was aimed at applying the proposed index in an exploratory analysis of Spanish and Portuguese media outlets, in general, no significant differences were detected between Spanish and Portuguese media outlets, despite the fact that Portugal has broader legislation regarding media transparency and accountability and that, in Spain, the current model of legislation is insufficient (**López-Cepeda**; **Manfredi**, 2013). However, it is true that, in the case of corporate and financial transparency, to which the Portuguese legislation makes most reference, the Portuguese media outlets score slightly higher than the Spanish ones.

Overall, no notable differences between the different types of media outlets (the press, radio, television, and digital) were observed. However, it could be concluded that corporate and financial transparency was slightly higher for publicly owned media, in both Spain and

> The degree of transparency, even of those that exceeded the average score, was still far below an ideal level of openness to the public

Portugal, than the rest of the media –something that was predicted in the study by **Campos-Domínguez** and **Redondo-García** (2015) and that of **López-Cepeda** and **Manfredi** (2013); this shows that the trend continues to be the same. These public media had their own transparency portals and mechanisms that were much more comprehensive, in addition to other types of regulatory documents that the rest of the media analyzed did not have. This serves to reinforce H1, in which it was stated that the media outlets, especially privately owned ones, do not tend to apply transparency mechanisms unless there is a regulation that requires them to do so.

> It is worth noting that only four of the ten media outlets analyzed had a corporate information page

Corporate and financial transparency was the category that had the highest percentage of compliance, whereas self-regulation was the opposite, despite the fact that these mechanisms are more traditional and mentioned the most in academic studies on accountability for journalists and the fact that they are very widespread in professional associations, especially in the Spanish landscape (**Rodríguez-Martínez** *et al*., 2022).

In addition, H2 stated that media outlets, in general, only share basic resources when it comes to transparency. This was confirmed by the fact that the more complex indicators (such as publishing the team's biography; showing corrections to the news; disclosing the place where a piece was written; allowing the evaluation, correction, or submission of content; or the use of other resources not included in the index) were observed in hardly any of the media outlets. The Portuguese media outlet *Público* turned out to be the most comprehensive and came closest to the ideal model of transparency.

This study is presented as an exploratory study of the Spanish-Portuguese landscape, which provides transversal mechanisms (legislative, professional, and academic) to measure media transparency, but it also presents challenges and lines of research to be studied.

It should be noted that, among the limitations of this study, there is the possibility that some mechanisms were not recorded because they were not identified by the coders. However, we believe that, if the mechanism is so well hidden that it could not be located through an in-depth analysis of the website and search engine crawling, it is not sufficiently accessible to be considered an optimal transparency tool.

Among the challenges ahead, it is worth highlighting the extension of the study to more media outlets, as well as the application of the research to other media landscapes that may be more advanced in terms of media transparency. In addition, we recommend a revision of the transparency index by weighting the different variables, studying which are more important in the context of the media crisis and the disinformation we are experiencing. It would also be interesting to evaluate the effectiveness of external regulations, such as legislative regulations or those of other agencies, in making media outlets more transparent, since, even beyond this study, it has been found that self-regulatory mechanisms are the least used. A deeper dive into the relationship between media ownership and media transparency would also be of interest. In this study, we have been able to determine that public media outlets are more open, especially when it comes to corporate and financial transparency, and it would be interesting to extend the study by making a comparison with other countries. Finally, it would be relevant to study the public's use of these transparency mechanisms to verify whether their application has an impact on aspects such as increasing public confidence in the media or fighting disinformation.

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A comparison of public disclosure in archives and libraries using *TransPa_BA*

Ana R. Pacios; Sara Martínez-Cardama

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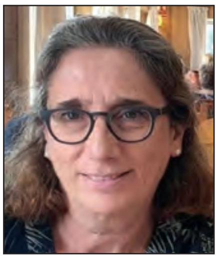

Ana R. Pacios ✉
https://orcid.org/0000-0003-2887-882X

Universidad Carlos III de Madrid
Departamento de Biblioteconomía y Documentación
Madrid, 126-128
28903 Getafe (Madrid), Spain
areyes@bib.uc3m.es

Sara Martínez-Cardama
https://orcid.org/0000-0001-7035-5884

Universidad Carlos III de Madrid
Departamento de Biblioteconomía y Documentación
Madrid, 126-128
28903 Getafe (Madrid), Spain
smarti1@bib.uc3m.es

Abstract

Transparency has drawn considerable international attention as an umbrella term covering issues relating to the struggle against corruption, the design of more open and participatory government and institutional, corporate, and social agent accountability. It is likewise associated with open data and guaranteed access to public information. However, transparency also has a second important dimension, viz. public disclosure, whereby institutions are required to furnish citizens with public information in their interest. Assessment of both dimensions of transparency poses problems and difficulties. The present article discusses the results of applying the *TransPa_BA* tool to assess public disclosure in 202 archives and libraries (information units) under the aegis of different government bodies. This tool proposes a series of indicators to measure active disclosure by public libraries and archives in keeping with the provisions of Spanish *Act 19/2013 of 9 December on Transparency, Access to Public Information and Good Governance*. The indicators and their respective parameters (content, form, reusability, accessibility, dating and updating/validity) establish general outlines enabling these institutions to enhance their transparency by furnishing not only society in general, but also their stakeholders, with information regarding their activities and performance. Accessibility of active public disclosure-related documents was found to be wanting in all but university libraries. As a collective learning tool for information unit managers, *TransPa_BA* can be used to monitor and gradually improve transparency in libraries and archives.

Keywords

Active disclosure; Public disclosure; Methodologies; Evaluation; Transparency; Transparency assessment; Libraries; Archives; Web; *TransPa_BA*.

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1. Introduction

Conceptually speaking, transparency is multidimensional. Beyond its condition as a 'buzzword' commonly found in contemporary political strategy and discourse, in today's rhetoric the word has acquired quasi-ideological overtones (**Han**, 2015; **Valdovinos**, 2018). It tends to be conceived as a moral value in democratic societies and as a 'critical ingredient for efficient and well-functioning economic and political markets' (**Cucciniello**; **Nasi**; **Valotti**, 2012, p. 2451).

Burke (2016) tried to classify research on the definition of transparency under three main headings:

- the openness of governmental decision-making and procedures, known as open government (**Obama**, 2009; **Bannister**; **Connolly**, 2012);
- the implementation of practices and philosophies that guarantee the openness of information in the public interest such as the open data movement (**O'Hara**, 2012; **Mayernik**, 2017); and
- the use of such mechanisms in institutional accountability reports and to enhance the efficiency of resource use (**Leão-Lyrio**; **Lunkes**; **Taliani**, 2018).

Kosack and **Fung** (2014) identified a conceptual dichotomy in transparency:

- on the one hand, movements for the approval of laws that guarantee freedom of information (FOI) in connection with more general interests for the development of an informed citizenry; and
- on the other, trends that, practically speaking, are much broader than the concept 'citizens' right to know', which are aligned with specific results or the detection of interference and obstacles to implementation.

Active disclosure is one of the practical dimensions of transparency. It refers to information that must be openly accessible in institution's websites, obviating the need to lodge any specific request. In Spain *Act 19/2013 of 9 December on Transparency, access to public information and good governance* (hereafter *Ltapigg*) (*España*, 2013), it is deemed an obligation to enhance and reinforce governmental and public body transparency. It consequently differs from freedom of information, which guarantees citizens' legal right to request such information.

For authors such as **Villeneuve** (2014, p. 557), active disclosure entails 'the pro-active, open and unobstructed communication of the concepts and tools set in place to promote or to achieve transparency, underscoring the inherent rights and obligations of administrations and citizens alike'. In his words, it is the 'transparency of transparency (ToT)'. It is an element less studied and assessed by researchers but indispensable to ensure that public institutions guarantee citizens efficacy and efficiency in the exercise of their duties.

One of the most prominent points stressed by **Villeneuve** (2014) is the conviction that neither transparency laws nor the tools developed in their wake need necessarily be transparent.

Transparency is conceived as the

> 'incremental flow of timely and reliable economic, social and political information accessible to all pertinent actors' (**Kauffman**; **Kraay**, 2002, as quoted in **Villoria**, 2014).

In the public sphere such information should enable those making or participating in or constituting the object of the respective decisions to assess the institutions providing it and form a rational, soundly supported opinion (**Villoria**, 2014, p. 87). Transparency so understood may fuel improvement in service quality and efficiency (**Cunill-Grau**, 2006, pp. 24, 27). Furthermore, transparent communication may encourage change or improvement.

One of the approaches of choice to attain greater transparency is the proactive disclosure of information and documents (**Villeneuve**, 2014). Providing such data voluntarily where not legally mandated implies a specific conviction and commitment on the part of the institution or organisation, attesting to its credibility. Such institutions would thus acknowledge stakeholders' right to be informed (**Fontrodona**; **Muller**, 2020, pp. 12-13). **Pasquier** and **Villeneuve** (2007) claim that such proactive attitudes may ensure transparency effectively and fairly inexpensively, favouring not only document dissemination but the process by which such materials are generated.

Websites have been put forward as the most effective dissemination tools for the exercise of active disclosure. The disclosure of public information through government websites has been frequently assessed since the turn of the century (**Holzer**; **Kim**, 2005; **Armstrong**, 2011; **Tavares**; **Da-Cruz**, 2020; **Pina**; **Torres**; **Royo**, 2007).

The object of such research has often been governmental institutions and local, regional or national public administrations. Active disclosure by libraries and archives, however, the object of the present study, has seldom been evaluated. Academic and professional literature normally stresses their role in 'facilitating transparency' rather than as institutions responsible for disseminating institutional, organisational, planning, legal, economic, budgetary and statistical information of their own, as mandated in Sections 5, 6 and 7 of the *Ltapigg*, to which bodies with a specific legal personality are subject.

Ordinarily, the emphasis is on such entities' role in enhancing the accessibility of the information actively disclosed by the institutions to which they render their services, particularly in the case of archives (**Rizkyantha**, 2017). That view is defended by **De-Andrés-Díaz** (2018), who contended the existence of a relationship between archives and the attainment of the transparency incumbent upon public administrations as a mechanism to empower the citizenry. In a nutshell, the literature normally deems archives as guarantors of institutional transparency (**Capellades-Riera**, 2019; **Aguilera-Murguía**, 2019). The heading to the entry on the *Andalusian Government*'s *Regional Ministry of Culture and Historic Heritage* website, composed by **Melero** (2013), alludes clearly to that particular:

> 'What is transparency? Without archives, transparency is demagoguery'.

Libraries and archives, institutions benefitting from public funding, provide public services of utmost importance. That public status and national interest are endorsed by Spain's 1978 *Constitution* (section 149.1.28) and 1985 *Act on Spanish historic heritage*. They must consequently abide by the *Ltapigg* in terms of the transparent reporting of their activity.

> Libraries and archives seldom group this information under a single link or page containing all active disclosure-related documents

Active disclosure by libraries and archives in the form of information on their websites has been linked to accountability and improved efficiency. That relationship has been discussed by **Sturges** and **Crnogorac** (2012), **Burke** (2016) and **Pacios** (2016), the latter two of which also propose assessment indicators for public and university libraries, respectively. The same type of documents, such as annual reports, plans and budgets, may be associated with different transparency indicators.

Today's digital technologies make it perfectly viable for libraries and archives to upload information stored on physical media to their websites in accessible and reusable formats. That practice provides stakeholders with information and enables them to generate their own products, put forward supplementary proposals and furnish other data. The information involved may be accessible from a number of pathways on the institution's own website (preferably on a page devoted to transparency) or on others: the statistics provided by the Spanish *Ministry of Culture* on national public libraries would be one example of the latter.

2. Transparency assessment methodologies

Although transparency discourse has been adopted as one of the values inspiring public administration and governance today (**Piotrowski**, 2010), research has failed to produce tools able to adequately assess success and compare implementation of the concept. On the whole the instruments forthcoming are imprecise and scantly aligned with the perspective of stakeholders or interested citizens (**Da-Cruz** *et al*., 2015; **Bertot** *et al*., 2010). Some authors have deemed such assessment to be vague and based on experts' subjective data (**Hollyer**; **Rosendorff**; **Vreeland**, 2014).

Williams (2014) contended that in transnational studies transparency assessment methodologies have been obstructed by a lack of consensus on the meaning of the concept and the issues arising around the choice of indicators. To date, the initial stage in transparency assessment has consisted in reviewing the laws guaranteeing its implementation (known as *Freedom of information laws* or *Foils*) and other types of democratic institutions, normally supplemented with the analysis of economic data. That endeavour led to the development of the most widely known transparency assessment indices, such as Transparency International's CPI (corruption perception index), multi-dimensional measurements that merge a number of data sources with expert assessments. Nonetheless, no single indicator devoid of subjective elements such as 'perception' and able to exhaustively measure corruption or transparency has yet been forthcoming. Authors such as **Meijer**, **Hart** and **Worthy** (2018) reinforced that broadly accepted view of assessment by disregarding univocal assessment tools in favour of more complex interpretational approaches adapted to a number of political contexts. The complexity of assessing compliance with transparency standards was identified by **Michener**, **Coelho** and **Michener** (2021) in their analysis of 265 transparency audits performed over 15 years in Latin American countries. They observed compliance with so-called 'active' transparency, i.e., website-based disclosure, to be higher than with the response to citizens' direct requests for transparency. Another element that hinders the adoption of uniform assessment methodologies is the communicational dimension of transparency itself, understood as the measure of particulars such as encouraging greater trust or participation (**Auger**, 2014). Added to that is a third type of parameters found in the literature (so-called critical transparency studies) such as the veracity or plurality of the information provided, whose heavily subjective component entails an exhaustive review of new perspectives on transparency as a socio-cultural entity (**Alloa**; **Thomä**, 2018).

Bearing such nuances in mind, in her assessment **Auger** (2014) identified two types of transparency: organisational and communicational, the measurement of some of whose elements would require target audience participation or valuation of trust in institutions. That notwithstanding, the author defined the communicational sphere to include the perspective of transparency directly related to active disclosure as addressed in this article: the provision of full and relevant information.

Active disclosure is essential to assessing how institutions represent their transparency. In 2006, **Islam** contended that a relationship can be found between enhanced disclosure of information and improved governance. Although it may be simpler to assess active disclosure (thanks to the larger amounts of quantitative information available) than other forms of transparency, that exercise entails significant dilemmas. **Michener**, **Coelho** and **Michener** (2021) found the definition of indicators based on binary measurements (absence or presence of a certain type of information, for instance) or the use of scaled scoring for certain parameters to be controversial.

Such problems in assessing transparency have been observed to be common in all the regions analysed, Spain among them. Assessment proposals in place for Spain are also based on common indicators that weigh the information published, normally on institutional websites.

The proposals in that regard that began to appear in Spain in 2008, i.e., prior to the enactment of the 2013 *Ltapigg*, tended to replicate the indices set out by *Transparency International Spain* (**Ros-Medina**, 2018, p. 47). *Compromiso y Transparencia*, today *Fundación Haz*, published the first report on the transparency of Spanish foundations in 2009. In 2016 the *Council for Transparency and Good Governance* and the *State Agency on Assessment of Public Policy and Service Quality* (Spanish acronym *Aeval*) developed the *Metodología de evaluación y seguimiento de la transparencia en la actividad pública* (*Methodology for assessing and monitoring transparency in public action*, abbreviated as *Mesta*), the Spanish State's first official methodology focusing on compliance with the active transparency obligations set out in the *Ltapigg* (*Aeval*, 2016). Its improvement on prior assessment systems lay in the introduction of variables assessed in terms of the information published. The results of its application to the foremost State bodies were made public in 2017 (**Arizmendi-Gutiérrez**, 2017). Further to the regional legislation on transparency and the experience acquired in applying *Mesta*, the method was modified and adapted, leading to versions such as the *Metodología del índice de transparencia de Canarias* (*Canary Islands transparency index method*, *ITCanarias*) developed by the regional *Commission on Transparency and Access to Public Information*. Despite the limitations in and room for improving on this methodology and the scant number of times it has been applied, **Ros-Medina** (2020) acknowledged it to constitute a useful improvement and hold ample potential for evolution and growth.

> The relationship between transparency and quality attests to the huge impact that transparency and accountability have on today's model for the provision of public services and to the conviction that 'quality' is incomprehensible if not governed by the principle of transparency

Other methods have been forthcoming in the form of civil society audits of governmental transparency with a view to social utility. One example is to be found in Infoparticipa, which deploys 'information and communication quality criteria that would enable governments to constitute sources of transparent information favouring citizen participation' (**Molina-Rodríguez-Navas**; **Simelio-Solà**; **Corcoy-Rius**, 2017, p. 825). The results of the respective assessments can be gleaned from the Infoparticipa map, which also enables anyone interested in participating in the process to contact the method's managers to express their opinion.

TransPa_BA, a tool geared to libraries and archives, was created in an effort to broaden and improve on the assessment of active disclosure by public cultural institutions.
https://www.uc3m.es/investigacion/en/transpa_ba/herramienta

It is designed to enable managers to progressively and voluntarily self-diagnose performance in that regard (**Pacios**; **Vianello**; **De-la-Mano**, 2020). It includes a bank of transparency-related information indicators drawn from *Mesta* whose number varies depending on the type of information unit: 20 for public libraries, 21 for university libraries and 22 for archives (Table 1). The indicators are grouped under eight headings: 1. Purpose of the service and objectives pursued; 2. Governing bodies and operating regulations; 3. Service offering; 4. Documents / collections; 5. Staff; 6. Results; 7. Financial information; and 8. Collaboration/cooperation. Area 4 is the only one in which the indicators vary depending on type of information unit. Its single common item is the review of the document/collection management policy or programme. The indicators defined under all the other areas are the same for libraries and archives.

Seeking to avoid absolute binary values (yes/no, published/not published), *TransPa_BA* envisages a series of parameters with which to judge information transparency, including: content, form, reusability, accessibility, dating and updating/validity (**Pacios**; **Vianello**; **De-la-Mano**, 2020). The inference is that the characteristics of the information and compliance therewith are nearly as important as the information itself. With a view to suitably defining each indicator, including qualitative assessment based on the perception of transparency, the tool's developers asked Spanish library and archive managers to assess each as well as the respective areas (**Pacios**; **Núñez**; **Ramos-Simón**, 2021). The outcome was a more personalised tool adapted to the viewpoints of the professionals that head the services to be assessed, from which decontextualised items indicative of formal assessment only were removed.

Four versions of *TransPa_BA* were established, one per type of institution or service: public libraries, historic archives, university libraries and university archives. The intention was to adapt the method to the features of the transparency demanded of each information unit. Active disclosure indicators and parameters are scored on a 100-point scale that provides the information unit seeking to improve its performance with a general idea of its present status. Application of the approach to different types of archives and libraries has led to the identification of their strong and weak points, as well as areas for improvement to be borne in mind to raise their scores (**Pacios**; **Martínez-Cardama**; **Moro-Cabero**, 2021; **Pacios**; **García-López**; **Morales-García**, 2021; **Pacios**; **Pérez-Pulido**; **Vianello**, 2022 and **Pacios** *et al.,* 2022).

The design of *TransPa_BA* and in particular the choice of the informational parameters to be used ruled out any that could entail subjectivity, such as the clarity/understandability of the language describing active disclosure (**Pacios**; **Vianello**; **De-la-Mano**, 2020). Objective assessment of clarity was deemed to have to require input from the information targets (library and archive users rather than the managers of such institutions or tool users who may have participated in drafting the respective items). Account was also taken of **Parodi**'s (2011) contention that the understandability of written texts is a multi-dimensional macroprocess where different types of information, relationships, processes and subprocesses converge, while also involving other significant elements such as certain kinds of explicit or implicit information or each individual's needs in connection with context-mandated demands. The combined effect of such particulars is that the assessment of written text clarity/understandability calls for specific tools as well as mindfulness of the profiles of the citizens for which the content is intended. It is consequently a parameter whose assessment necessitates specific treatment outside the scope of the present study but which will be broached in future. The automatic analysis of text clarity using natural language processing and machine learning techniques is an alternative that cannot be ruled out.

> Differences and similarities in the presence/absence of some of the indicators are closely related to how statistical information is sourced

This paper compares the results of compliance with active disclosure requirements by 202 national public libraries, provincial historic archives and university libraries and archives. The three research questions addressed were as follows.

RQ1. Does the *TransPa_BA* assessment tool identify active disclosure likenesses and differences between libraries and archives?

RQ2. Where can under-compliance with active disclosure standards be identified and which areas should libraries and archives focus on?

RQ3. Is *TransPa_BA* a valid tool and can it be reused by the professional community to enhance active disclosure?

3. Methodology

The comparison of active disclosure discussed hereunder drew from the results of applying *TransPa_BA* to a population of 202 information units, broken down as follows:

- 53 historic archives (AH)
- 53 state public libraries (BPE)
- 50 university libraries (BU)
- 46 university archives (AU).

Their respective websites were reviewed to identify and assess active disclosure-related information at different times in 2020 and 2021: (BPE, December 2019 to February 2020; AH, February and March 2021; BU, May and June 2021; AU, September and October 2021).

The information gathered was uploaded into the tool in the form of an Excel spreadsheet with the informational obligations defining active disclosure (as indicators) as drawn from *Ltapigg* Chapter II, sections 6, 7, and 8. It was supplemented with instructions on how to appraise the six parameters defining the informational parameters (content, form, reusability, accessibility, dating and updating/validity) deemed to merit consideration.

The scores for each ranged from 0 to 10 with two exceptions, dating and updating/validity, where the scale ran from 0 to 5. The highest score for a given indicator was consequently 50 points. Location, meaning the place on the site where the information was found and on which its visibility largely depended, was also assessed. Ten points were awarded when the library's or archive's website contained a section or page specifically devoted to transparency.

The parameters scored under each indicator were assessed on the grounds explained below.

Content. This parameter constitutes the 'document', understood as defined in *Act 18/2015 of 9 July on the reuse of public sector information* (*España*, 2015) as 'all information regardless of medium (physical or digital) and format (graphic, audio or video)', and therefore includes the most finely itemised or '"rawest" data'. Just two scores were awarded, i.e., the absence (0) or presence (10) of the parameter.

Form. This parameter appraises how information is accessed. It was deemed 'direct' when the content was found on the home page or through a link carrying users to the content itself: for instance, references to annual reports or strategic plans that included the link to the specific document with no further searching needed. It was deemed 'indirect' when the link directed users to another website bearing the information, which then had to be actively searched to find the text at issue.

Reusability. Given the variety of opinions and around weighting criteria for open data put forward since the **Berners-Lee** (2006) proposal, just two scores (0 or 10) rather than a more detailed breakdown are envisaged in this parameter. Consequently, a score of 10 was awarded for structured formats (xls, csv, xml), i.e., those requiring no extra techniques or effort for document reuse, and 0 for all others.

Accessibility. This parameter measures the number of clicks required to reach information on the indicator. The values awarded ranged from 10 (for three or fewer) to 0 (for more than 12) and proportionally in between.

Dating. This parameter addresses the need for any information or document published to be duly dated to enable users to determine the time lapsing since it was generated. Where a date was provided the score awarded was 5 and 0 otherwise.

Updating/validity. The year 2019 is defined as the expiration date. It was not applied to all the available information, however, for some of indicators proposed, such as user charters or strategic plans, need not be updated yearly. In such cases assessment was based on the currency of the information, i.e., whether it was valid on the date the site was visited. The same criterion was applied to all information units: where the respective document was updated in 2019 or later, the indicator scored 5 and 0 otherwise.

After all the indices had been obtained for each library or archive, the outcomes were compared to identify best practice as well as any missing indicators to establish future areas for improvement.

4. Results and discussion

The results of *TransPa_BA* assessment of the information and best practice for active disclosure identified are discussed below parameter by parameter. The scores awarded to each archive and library analysed are available in the results section on:
https://www.uc3m.es/research/transpa_ba

4.1. Location

Libraries and archives seldom group this information under a single link or page containing all active disclosure-related documents. In this study only one institution was found to do so, although two others published other indicator-related information on their transparency sites.

The *University of Zaragoza* library, the sole unit that provided a specific site containing all the pertinent information, epitomised best practice (Figure 1). In the interim between the review and its write-up, however, transparency portals were uploaded by *University of Seville* (*US*) and *Complutense University of Madrid* (*UCM*), an indication of the beneficial effect of studies such as this and their contribution to improving institutional transparency.

In the past some libraries had a single page listing a number of transparency indicators such as strategic plans, annual reports and similar (**Rey-Martín** *et al*., 2020, p. 5). Other examples of interest were also identified, such as the *Guadalajara Public Library* (Figure 2). Information accessibility was observed to be less than ideal, however, for users must open the 'Standards of use' section to find the place that links to the *Ministry of Culture*'s page where the library's statistics are listed. This same issue was consistently observed in many other information units.

Of all the archives analysed, the *University of Almería*'s was found to be the most compliant in this regard. Its site contains a page titled 'Transparency and quality' with documents such as user charters, monitoring reports and satisfaction surveys, all of which help measure the quality of its service.

The relationship between transparency and quality attests to the huge impact that transparency and accountability have on today's model for the provision of public services (**Joshi**, 2013) and to the conviction that 'quality' is incomprehensible if not governed by the principle of transparency. Assignment of the respective competencies to the same area, department or service in different institutions (a circumstance observed in the *Regional Governments of Madrid*, *Andalusia* and *Extremadura*, the *Complutense University of Madrid* and the *University of Almería*, to name a few) stands as evidence of that interconnection. A similar situation can be observed in the case of certain types of management documents such as 'user charters' (e.g., the *Spanish Senate* services charter).

4.2. Content

This parameter evaluated the existence or otherwise of the indicator itself on the archive's or library's website. Judging by absolute number of indicators, university libraries, with 604 documents or information items, were by far the units most firmly committed to transparency. That is particularly significant in the case of university libraries, for as services under the aegis of each institution they would not initially be required by law to make this information publicly accessible. Rather, pursuant to section 2 of the *Act*, responsibility for website-based disclosure would be incumbent upon the parent university. The inference is that transparency should constitute a proactive attitude contributing both to public service management and the community it serves.

Public libraries totalled a much smaller number of items, 285, university archives 259 and historic archives 229. Table 1 lists the percentage of documents or information items per indicator found on the four types of information units' websites.

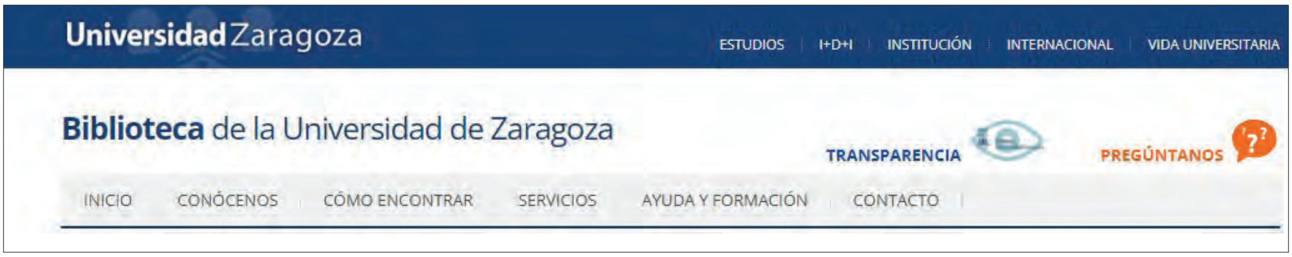

Figure 1. *University of Zaragoza* transparency portal.
https://biblioteca.unizar.es/conocenos/transparencia

Figure 2. *Public Library of Guadalajara* transparency section on the page specifying its standards of use.
https://www.bibliotecaspublicas.es/guadalajara/conocenos/normas-de-uso.html

Table 1. Percentage of documents or information items associated with active disclosure indicators located in each type of information unit (AHP = provincial historic archives, BPE = state public libraries; AU = university archives; BU = university libraries; NA = not applicable).

INDICATORS	AHP (n=53) %	BPE (n=53) %	AU (n=46) %	BU (n=50) %
1.1. Definition of mission	43.40	73.58	50.00	92.00
1.2. Strategic plan	0.00	7.55	6.52	48.00
2.1. Identity of library’s management board members	0.00	0.00	17.39	22.00
2.2. Regulations	1.89	41.51	60.87	90.00
2.3. Specific regulations on service provision	37.74	94.34	67.39	92.00
2.4. Code of ethics, values or good practice	1.89	13.21	19.57	54.00
3.1. User charter	35.85	39.62	36.96	80.00
4.1. Collection/documents management policy or programme	7.55	0.00	19.57	26.00
4.2. Document classification chart (only Archives)	92.45	NA	65.22	NA
4.2. Institutional open access policy (only University libraries)	NA	NA	NA	58.00
4.3. Conservation calendar (only Archives)	16.98	NA	34.78	NA
5.1. Organisational chart	1.89	0.00	10.87	46.00
5.2. Staff directory	18.87	56.60	71.74	86.00
6.1. Management indicators (scoreboard)	11.32	3.77	4.35	50.00
6.2. User satisfaction surveys	9.43	5.66	2.17	56.00
6.3. Annual report or report of activities	20.75	7.55	21.74	70.00
6.4. Distinctions, prizes, certifications	0.00	1.89	10.87	46.00
6.5. Statistics	64.15	54.72	19.57	78.00
7.1. Budget implemented	1.89	41.51	4.35	64.00
7.2. Tenders, contracts and bidding	0.00	0.00	0.00	2.00
7.3. Subsidies and assistance awarded	0.00	0.00	0.00	14.00
8.1. Partnering networks, task forces, commissions	66.04	96.23	36.96	92.00
8.2. Agreements	0.00	0.00	2.17	42.00
Average	19.64	26.89	25.59	57.52

A number of likenesses among the units were identified in connection with the eight areas envisaged, weighted by the number of indicators in each area. Area 8 (Collaboration and cooperation), for instance, was the one most often mentioned by both historic archives and national public libraries (under item 8.1, the indicator informing about the networks and working groups with which they partner, data commonly provided as well by university libraries). One typical example can be found in the public libraries in Andalusia, which describe such partnering under the title 'Cooperation'. Area 7 (Economic information), in turn, was the one with the scantiest information in all the units assessed, even though university libraries repeatedly referred to the budget, particularly in their annual reports. The low score was due to the paucity of information furnished on tendering and subsidies. Tendering would not normally be specified on university libraries' and archives' but on the contracting party's, i.e., the parent institutions', websites. That notwithstanding, furnishing such data on each individual unit's site would prove useful to other information professionals organising a similar tender for goods or services. Awardee identity would also be helpful as guidance in similar processes.

Disclosure of documents would provide citizens with specifics on the actual operation of these entities, the success or otherwise of their activities, the measures adopted and service provision efficacy and efficiency

The indicators most frequently found in each type of unit are shown in red in Table 1: the purpose of the service and its objectives (mission), its governing bodies and operating regulations (service rules and regulations), document and collection management (classification chart in archives), staff (directory), results (statistics) and partnering networks and working groups.

Such differences and similarities in the presence/absence of some of the indicators are closely related to how statistical information is sourced. Spanish national public and public university libraries are in possession of statistics that track their development and operation and provide citizens with detailed information on those items. The *Ministry of Culture and Sport*'s portal includes a publicly accessible page titled '*Panorámica*' (overview) that contains all manner of statistics on the 53 national public libraries. Many libraries carry links to that page on their own sites. A similarly openly accessible page on the *Red de Bibliotecas Universitarias* (*Rebiun*) portal provides statistics on public university libraries.

Although under the aegis of the same *Ministry of Culture*, provincial historic archives differ from libraries in that the information is not broken down pursuant to the same criteria. Rather where such data exist, they must be sought region-by-region. The information furnished on the *Ministry*'s site under the title '*Estadística de archivos*' (archive statistics) is confined to its annual reports, the latest published referring to target year 2016. The data provided on deposits, documentary collections, services, activities and staff are pooled for all state archives and those run by the *Ministry of Defence*. That notable weak point in the statistics reported by historic archives was also identified in an earlier study (**Pérez-Santana**, 2018).

University archives, affiliated with the *Spanish University Archivist Conference* (Spanish acronym, *ACU*), a section of the *Conference of Spanish Vice-Chancellors* (*CRUE*), are similarly wanting in this respect, with no database comparable to *Rebiun*'s for university libraries.

In line with the preceding but with no intention of generalising, a series of indicators where the units analysed should improve more intensely are identified below.

The provincial historic archives, characterised by a paucity of indicators, are the information units in greatest need of improvement. They scored zero in six indicators (i.e., all except the classification chart, participation in networks and statistics), even in one as essential as the strategic plan. The next lowest score was observed for university archives. Issues were encountered for these units around visibility, denomination and institutional aegis, as signified earlier by **Pacios**, **Torreiro-Rodríguez** and **Moro-Cabero** (2019). Nonetheless, merit is due to other particulars such as the inclusion of directories or service rules and regulations as well as classification charts.

National public libraries earned the minimum score in five items, which surprisingly included the disclosure of information on collection management programmes. Whilst all items were found on university library websites taken as a whole, indicators such as contracts, subsidies and collection management policy or programmes were less generally present. That notwithstanding, budgetary data were accessible in the form of a link to the *Rebiun* statistics page.

As a general comment, information units would do well to devote greater effort to active disclosure on their sites through key elements for service management, transparency and assessment such as: plans, regulations, annual reports, statistics and satisfaction surveys. Disclosure of such documents would provide citizens with specifics on the actual operation of these entities, the success or otherwise of their activities, the measures adopted and service provision efficacy and efficiency.

4.3. Form

Based on the items covered by this parameter, namely the position of information and how it is reached, direct prevailed over indirect access in all four types of information units analysed. Units were deemed to provide indirect access when one indicator was found within another rather than in a section of its own: for instance, where their mission was set out in a user charter or strategic plan, or their budget in an annual report.

Historic archives were the information units with the largest share of documents whose access called for additional searching on their sites, pages or documents (43.23%). The next highest percentage of indirectly accessible indicators was found for public libraries (35.78%), followed by university libraries (27.81%) and university archives (16.6%).

Figure 3. *Ávila Public Library* website with the (barely visible) 'B' icon at the upper right, from which statistics on libraries in Castilla y León can be accessed.
https://bibliotecas.jcyl.es/web/es/bibliotecaavila/biblioteca-publica-avila.html

4.4. Reusability

This parameter flagged a weak point in all the units analysed and a future line of work to be undertaken in connection with active disclosure. Analysis revealed that information reusability is not envisaged. This failing was observed earlier (**Ramos-Simón**; **Pacios**, 2021) with respect to national public university sites as well as the portals set up by provincial historic archives, which are under the aegis of the *Ministry of Culture*. That circumstance was observed despite the stipulation in *Ltapigg* chapter II, section 5.4, to the effect that 'the information subject to transparency obligations shall be published on the respective electronic portals or websites in a manner that is clear, structured and understandable for those concerned, and preferably in reusable formats'.

The formats of choice on the websites of the information units analysed were PDF and HTML. Their non-reusability is an indication of an unenthusiastic or non-existent pursuit of transparency. According to **Camacho** (2016),

> 'PDF is to transparency as stipple paint is to painting',

meaning that it is less than ideal given how difficult it is to edit, particularly in the open-access version of the application. The author suggested supplementing PDF documents with analogous files in reusable formats such as XML, CSV, XLS or DOC. Albeit exceptionally, some libraries and archives do envisage the reuse of the information published. That is normally contingent upon the existence of a link on the unit's site to another containing statistics such as *Rebiun*'s or a regional department of culture's from which specific data on a library or archive can be downloaded in formats such as XLS or CSV. One example is to be found in the statistics furnished by the historic archives in Castilla y León, which can be downloaded in such formats from the '*Actividades y recursos*' (activities and resources) tab on the banner at the top of their sites, which affords access to another denominated '*Datos abiertos de archivos*' (archives' open data). Similarly, a link on most of the Andalusian historic archives' websites, '*El archivo en cifras*' (archive facts and figures) carries users to a page containing the statistics on archives posted by the *Regional Department of Culture and Heritage* in XLS format. Such information may at times be scantly visible and equivocally located. A case in point is the 'B' icon used by public libraries in the Castilla y León region (Figure 3) which provides access to a link titled '*Datos estadísticos*' (statistical data). The page then opened contains a link to another with a link to the regional statistics yearbook that carries data on libraries, archives and museums in XLS format. The pathway to such information from each library's website is notoriously convoluted, although in a context of such narrow reusability of institutional information, the efforts of certain regional cultural bodies to enhance transparency and reusability should not be undervalued.

Several university libraries, such as *University Carlos III de Madrid* (*UC3M*), *University Pablo de Olvide* (*UPO*) and *University of Cádiz* (*UCA*), also use this system to furnish access to their statistics in reusable formats through links to the respective *Rebiun* page. The *University of Valladolid* (*UVA*) library data can be downloaded in CSV from a similar page on the *Rebiun* site, while the *Complutense University of Madrid* (*UCM*) library also provides data and indicators in reusable formats.

Similarly, the libraries under the aegis of *University of Jaén* (*UJaen*) and *Polythechnical University of Catalonia* (*UPC*) publish some indicators in reusable formats, including satisfaction surveys, classification charts and the conservation timetable.

4.5. Accessibility

This parameter scored highly in all the indicators located, for most of the information was accessible within three clicks. Such good results down to the large percentage of documents meeting that criterion in all types of information units: university archives (98.47%), provincial historic archives (96.07%), national public libraries (92.98%) and university libraries (74.66%). Nonetheless, a few university library documents were found to require six and even up to nine clicks (107, nine; 33, eight; 4, seven; and 4, six) to reach the information sought. In most cases the data involved were located in repositories such as annual reports. Failure to group all the information in the same place, such as a transparency page, detracted from accessibility, as it translated into a larger number of steps needed to find documents.

> "The formats of choice on the websites of the information units analysed were PDF and HTML. Their non-reusability is an indication of an unenthusiastic or non-existent pursuit of transparency"

4.6. Dating

This is an essential element, for all documents and information available should be dated to enable users to know when they were formulated. It should constitute standard practice, particularly among professionals engaging in information management. University libraries were observed to be the units to most consistently comply with that criterion, with 84.6% of the items bearing a date. At the opposite end of the scale, public libraries were the ones with the highest percentage of undated documents (55.09%). Among the archives, they are the university ones with the highest number of dated documents (61.78%), while the historic ones have just over half (53.28%).

4.7. Updating/Validity

The expiration date established under this parameter was 2019, although obviously the validity of certain documents such as strategic plans and user charters was determined on the grounds of the implementation dates and legal stipulations, respectively. On a number of occasions the institution itself specified when a given document was to be reviewed and updated. On the whole the findings attested to the lack of importance accorded this parameter. That not all documents need be updated yearly was borne in mind when assessing items such as regulations generated in the target or subsequent years, for instance.

With 52.48% of their items current, especially their statistics and annual reports, university libraries were found to be most attentive to dates. University archives ranked second, with 25.87%, and historic archives (24.45%). Very low percentages were observed for public libraries (20%), i.e., only 57 of 285 of the BPE documents were up-to-date, denoting considerable room for improvement in this regard.

4.8. Active disclosure index

TransPa_BA also delivers an overall score for active disclosure based on a 100-point scale. Its application to the four types of information units studied identified the best performers in this regard, i.e., the ones with the highest scores. The respective values also denoted differences in connection with the presence or otherwise of active disclosure-related indicators on their websites. The three institutions scoring highest under each category of information unit are listed in Table 2.

The *TransPa_BA* tool computed a global active disclosure index for each library or archive. The respective scores for the parameters under each indicator were summed to establish definitive transparency indices for the 53 provincial historic archives (**Pacios**; **García-López**; **Morales-García**, 2021), 53 national public libraries (**Pacios**; **García-López**; **Morales-García**, 2021), 46 historic archives (**Pacios**; **Martínez-Cardama**; **Moro-Cabero**, 2021), and 50 university libraries (**Pacios**; **Pérez-Pulido**; **Vianello**, 2022).

The highest active disclosure index values are given in Table 2. They were earned by university libraries (*University of Zaragoza - Unizar* with 68.97 points and 20 indicators), followed by a national public library (*Toledo* with 47.82 points and 13 indicators), university archives (*Unizar* with 45.88 points and 14 indicators) and a historic archive (*Murcia* with 31.19 points and nine indicators). Generally speaking, with the exception of university libraries, the indices (over a total possible of 100) were low, particularly for archives, where some parameters such as reusability, dating and updating/validity were awarded scores of 0. Although as a rule a larger number of indicators was associated with a higher transparency index, in this study different active disclosure indices were found for a given number of indicators, inasmuch as the appraisal entailed assessing not only the indicator but its respective parameters. An example of that circumstance can be seen in the *Almería* and *Granada* historic archives, both of which had seven indicators but different active disclosure indices (Table 2).

Table 2. Highest active disclosure indices (IPA) in Spanish libraries and archives

	IPA	No. of indicators
University libraries (BU)		
U. of Zaragoza	68.97	20
U. of Barcelona	66.40	19
U. of Sevilla	64.69	17
State public libraries (BPE)		
Toledo	47.82	13
Valladolid	31.49	9
Cáceres	31.22	8
University archives (AU)		
U. of Zaragoza	45.88	14
U. of Navarra	43.28	13
U. of Valladolid	42.74	10
Provincial historic archives (AHP)		
Murcia	31.19	9
Almería	27.09	7
Granada	26.76	7

The higher transparency indices obtained by university libraries may be associated with greater budgetary decision-making and management independence, which favours more direct accountability and greater transparency. The findings also showed, however, that active disclosure is an attitude that influences the decision to make information accessible. That was observed in pages pertaining to archives and libraries managed by the same regional authority which therefore used the same structure or template but nonetheless posted substantially different information whose validity also varied (such as in *Andalusian Provincial Historic Archives*).

Further to the present findings, good practice need not necessarily be equated to the most commonly repeated indicators, for other exceptional or unique examples were identified that merit mention.

In the institutions analysed, overall best practice was observed in university libraries. They were by far the institutions most finely attuned to an active disclosure culture. Their websites contain documents and information such as user charters, strategic plans and annual reports, all of great interest to stakeholders seeking data on institutions' commitments, future plans and results. The consistency in publishing annual reports year after year is indicative of an ingrained habit (**Pacios**; **Serna**, 2019). Reporting comprehensive information on staff also denotes interest in favouring communication with users. Mention is likewise in order here of exceptional and unique findings, such as the very thorough scorecards on the *University of Jaén* (*Ujaen*), *University of Zaragoza* (*Unizar*), and *Universitat Pompeu Fabra* (*UPF*) websites or links to university contracting portals, such as provided by the *University of Zaragoza* library.

The above findings answer two of the research questions (RQ) posed.

The *TransPa_BA* tool proved able to detect bias in the active disclosure practised by the documentary institutions analysed (*RQ1*). It also revealed likenesses and differences between the two main types of institutions analysed: libraries and archives, with the former observed to be more active. The public disclosure indices found were low, however, due both to the absence of certain indicators and the failure to address specific parameters such as dating or reusability. With some exceptions among university libraries in particular, poor content organisation on the websites of the institutions analysed proved to be an obstacle to transparency assessment, for the respective information was not set out on a single page or section but masked in or scattered over several.

The study likewise revealed differences in terms of the type of content furnished depending on the type of cultural institution. Archives, for instance, frequently use documents such as the classification chart to describe how their collections are organised. That differs from library practice, geared more toward service features, with a focus on operating rules and regulations. University archives also handle the latter otherwise, further supporting the deterministic nature of institutional aegis and immersion in transparency culture. In that regard, the institutions under the aegis of universities perform notoriously better than those affiliated with the *Ministry of Culture and Sport*. University archives are nonetheless urged to emulate the good transparency practice that university libraries began to apply even prior to enactment of transparency legislation (**Pacios**, 2003).

Likenesses among all four types of institutions analysed were also observed, such as the definition of their respective missions (area 1). Other items also, although somewhat less, frequently covered in all the institutions analysed included service operating rules, participation in networks and working groups and statistics.

The analysis of these likenesses detected shortfalls in active disclosure, thereby responding to RQ2. Research conducted to date has led to the identification of a pool of basic indicators drawn from the *Ltapigg*, chapter II, that can be recommended to substantially improve active disclosure and that should be borne in mind by archives and libraries newly committing to transparency. They essentially describe past, present and future institutional management, giving the citizenry an account of their operation in he form of the following documents.

- Operating rules, imperative for citizens to know how to proceed to access the services offered.
- Directory and organisational chart, identifying management and staff. Both constitute publicity for the information professionals involved. -Libraries and archives should provide contact details for the professionals in their employ, while their organisational charts should depict their overall structure and departmental or unit inter-relationships. Although the paucity of professionals in archives might be thought to favour dispensing with this element, good practice was observed in some units, such as in *Madrid's Historic Protocol Archive*.
- Strategic plan, essential for citizens seeking information on an institution's priorities and lines of action. It should cover mission, values and objectives to be reached in a specific timeframe, but was observed to constitute standard practice in university library websites only. The respective information should also address plan compliance with its objectives as measured by the indicators defined.
- Annual reports, another management and accountability document essential to a description of the information unit's activities in the target year. Such reports should carry details of all the institution's activities and respective statistics. They contribute to transparency substantially, as they describe the institution's performance in the target year, highlighting its projects and describing its routine operation through statistics, budgetary data and similar.
- Agreements concluded, specifying contracting parties, purpose, term and obligations contracted.
- Subsidies and aid, specifying amount, purpose and beneficiaries.
- User charters, a key document that sets out institutional commitments, quality standards and measurement indicators. As such information should be up-to-date, the general recommendation is to address parameters such as dating and updating/validity. Although no mention whatsoever is made of these factors in the *Ltapigg*, they indisputably form an integral part of public service compliance and quality measurement and are consequently associated with plans, programmes and their assessment. Hence their inclusion in Spanish governmental transparency portals.

On the whole, budgetary and financial information is underreported by all four types of institutions (with the exception of university libraries concerning budgets) and missing altogether in archives, as noted in earlier studies (**Pacios**; **Martínez-Cardama**, 2021). Disclosure of such information is recommended for it provides a measure of effective budgetary management and provides for inter-institutional comparison. A further indicator to be borne in mind is tendering, useful to determine prices and compare the efficiency of unit management.

> All documents and information available should be dated to enable users to know when they were formulated. It should constitute standard practice, particularly among professionals engaging in information management

In response to RQ3, the findings show that *TransPa_BA* is a valid tool, reusable by part of the professional community. Its application by unit managers favours the establishment of a general model for improving on active disclosure, identifying areas where most effort is required. *TransPa_BA*, pursuant to *Ltapigg* stipulations, is based solely on the information publicly available on websites: only the information visible there is assessed. In-house use of the tool may therefore identify an institution's internal documents whose public disclosure is deemed useful. One limitation, referred to assessing indicator content, is that mechanisms have not been established to evaluate the thoroughness of all such items. Strategic plans constitute a prominent example: with their mere existence the information unit is awarded the highest score for content, irrespective of plan quality or extent of implementation. Future research may be geared to defining scales with intermediate values to score each indicator on the grounds of actual content.

5. Conclusions and recommendations

Active disclosure assessment is one of the mainstays of transparency assessment. *TransPa_BA*, like other active disclosure indices, synthesises the quantity and quality of information uploaded on websites in the form of a single final score. In addition to its inherent academic value, it is useful for driving improvement in the information published on library and archive websites, with an impact on various stakeholders (library/archive users and staff). Its implementation indisputably 'contributes to strengthening the institution, ensuring its sustainability and generating societal trust', as noted by some specialists (**Barrio**; **Martín-Cavanna**; **Martínez**, 2019, p. 48). It likewise contributes to the sustainable development goals, SDG 16 in particular, one of whose targets is to 'develop effective, accountable and transparent institutions at all levels' (*Ifla* 2021).

When applied to the 202 libraries and archives reviewed, *TransPa_BA* detected shortfalls in active disclosure in terms of both the indicators and their respective parameters. The low active disclosure scores observed in all units except university libraries are indicative of less than optimal reporting, even though indicators were addressed in some cases, for parameters such as updating/validity, dating and reusability were found to be wanting. Libraries and archives are urged to review the information parameters provided to enhance citizens' belief and trust in such institutions. The failure to realise that any and all documents uploaded onto library or archive websites should be dated and reusable is somewhat surprising in information professionals. Where information is furnished in reusable format it serves as a model, enabling other institutions to formulate similar products and modify content as necessary, with a concomitant savings in time and resources. Paradoxically, even when available, reusable information tends to be posted either separately from the data furnished by libraries and archives directly or positioned on pages or sections with convoluted access pathways. Such practice is difficult to understand in cultural institutions. Adoption of a common policy on the reusability of such their information by the national or regional governments to which some of these entities are accountable would be wholly desirable, although the effort deployed by some regional cultural bodies in favour of transparency and reusability must not be undervalued.

The use of *TransPa_BA* has revealed shortfalls in active disclosure, particularly in the case of historic archives which have prioritised digitation of their collections (**Capellades-Riera**, 2019), imperative to ensuring access to and dissemination of their acquis as well as for institutional transparency. That does not excuse them, however, from neglecting their own transparency as cultural entities. Information was observed to be more openly available in libraries than in archives as a rule. Moreover, the information on the institutions under the aegis of the national government is treated differently by the Ministry in ways that facilitate disclosure more by public libraries than archives. The former model should also be applied to provincial historic archives.

The future will tell if *TransPa_BA* becomes a distinctive reference for determining the information to be uploaded by libraries and archives onto their websites. To date the analyses of such institutions' active disclosure practices conducted with the tool have had a visible effect. The development of new transparency portals by some university libraries, such as *University of Seville* and *Complutense University of Madrid*, that previously had none attests to the transfer of research findings to Spanish library and archive professional practice. Ideally, the active disclosure indices for the information units analysed here should be verified in a few years' time to determine whether the

> The higher transparency indices obtained by university libraries may be associated with greater budgetary decision-making and management independence, which favours more direct accountability and greater transparency.

tool has led to improvements. In the interim, it can be used by institutions to monitor their performance if they wish, inasmuch as the four versions (one for each type of information unit) are available on the project website: *https://www.uc3m.es/investigacion/TransPa_BA*

> With some exceptions among university libraries in particular, poor content organisation on the websites of the institutions analysed proved to be an obstacle to transparency assessment, for the respective information was not set out on a single page or section but masked in or scattered over several

TransPa_BA is designed as a modifiable open-access tool, for the aim is to incorporate professionals' suggestions along with any updates introduced in the *Metodología de la Evaluación de la Transparencia* (*Mesta*) by the *Transparency and Good Governance Council*. The use of *TransPa_BA* to determine active disclosure indices for information published by libraries and archives is therefore intended to be a collective learning mechanism and the tool itself an incentive for ongoing improvement.

Reiterating an earlier observation, research has shown active disclosure to be a question of attitude toward publicly accessible information, for differences have been observed in the type of information uploaded to library or archive websites patterned to one and the same model.

Irrespective of the institution to which an information unit renders its services, heading one calls for management and leadership acumen. That in turn is associated with a series of duties above and beyond document and information management, including organisational obligations such as planning, assessment, marketing and communication. Performance of those tasks goes hand-in-hand with the generation of a series of documents. Some, associated with organisational, economic, budgetary and statistical information (stipulated by the *Ltapigg* as mandatory content on institutional websites) must be made publicly available to afford citizens comprehensive knowledge of libraries' and archives' priorities and the resources at hand to meet them. Transparency and accountability should consequently be attitudes assumed by their leaders and managers.

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Implementation of the transparency laws in Catalonia

Manuel Villoria; Agustí Cerrillo-Martínez; Juli Ponce-Solé

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Manuel Villoria ✉
https://orcid.org/0000-0002-1055-1995

Universidad Rey Juan Carlos
Facultad de Ciencias Jurídicas y Políticas
Campus de Vicálvaro
Paseo de los Artilleros, s/n
28032 Madrid, Spain
manuel.villoria@urjc.es

Agustí Cerrillo-Martínez
https://orcid.org/0000-0002-1577-4194

Universitat Oberta de Catalunya
Avda. Tibidabo, 39
08035 Barcelona, Spain
acerrillo@uoc.edu

Juli Ponce-Solé
https://orcid.org/0000-0002-1977-5063

Universitat de Barcelona
Avenida Diagonal, 684
08034 Barcelona, Spain
jponce@ub.edu

Abstract

Despite theoretical forecasts that have linked transparency policies with improvements in the fight against corruption, increased trust in institutions, and the development of quality in governments, several empirical studies have shown that this connection is not so simple. For it to happen, regulations of sufficient quality must be embedded in a holistic policy of good governance and adequately implemented. The transparency policy cannot generate the desired impacts if it is not implemented in the first place. The transparency policy of the governments of Catalonia does not seem to have had the desired effects, despite being of sufficient quality and being formally inserted in a holistic framework of good governance. The hypothesis this article attempts to test is the weakness of the implementation of *Act 19/2014* as the cause of the non-existent or piecemeal outcomes. An exhaustive evaluation of the law's implementation was conducted to test the hypothesis, with five series of surveys in five years (2015–2020) sent to more than 1,000 entities bound by the law, a review of transparency portals, a quality analysis of resolutions on the right of access, a quality analysis of citizens' charters and codes of conduct, the use of the mystery shopper technique, and in-depth interviews with public decision-makers. The analysis results do not guarantee that the relative failure in impact is due to weak implementation of the law. However, it also cannot be ruled out that failure to implement some aspects of the rule influences its lack of effectiveness.

Keywords

Transparency; Implementation; *Ex post* evaluation; Policy impact; Good governance; Right to good administration; Right of access; Better regulation; Ethics codes; Lobbies; Catalonia; Spain.

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1. Introduction

When analyzing the transformations in public administrations since the end of the 20th century, one of the most remarkable phenomena is the concern for promoting transparency in public activity. The regulatory foundations of this phenomenon can already be found at the heart of the model of representative democracy (**Manin**, 1997). But it is, above all, the development of the institutionalist approach to understanding how the State operates (**North**, 2010; **Acemoglu**; **Robinson**, 2012; **March**; **Olsen**, 1989) that has opened the doors to a whole set of international initiatives (for example, *World Bank*, 1997) that have emphasized creating rules of play which, by controlling political power, encourage it to serve the interests of society. Among these, those related to transparency and accountability stand out (**Bovens**; **Goodin**; **Schillemans**, 2014), which, together with the development of new information and communication technologies, make it possible to create a new paradigm of public action known as "open government" (**Lathrop**; **Ruma**, 2010; **Campos-Domínguez**; **Coroján**, 2013; **Cruz-Rubio**, 2015).

In this context, policies that promote transparency in the public sector have so far had three types of ultimate goals: to reduce corruption, to reduce disaffection with the consequent promotion of institutional trust (**Adserà**; **Boix**; **Payne**, 2003; **Bastida**; **Benito**, 2007; **Benito**; **Bastida**, 2009; **Brunetti**; **Weder**, 2003; **Cucciniello**; **Porumbescu**; **Grimmelikhuijsen**, 2017; **Cerrillo-Martínez**, 2011; **Hood**, 2010; **Hood**; **Heald**, 2006; **Lederman**; **Loayza**; **Soares**, 2001; **Meijer**, 2013; **Rose-Ackerman**, 2016), and, lastly, to foster government effectiveness, with the consequent economic development (**Bellver**; **Kauffman**, 2005; **Green**; **Porter**, 1984; **Meijer**, 2013; **Ortiz-Escobar**; **Ordóñez-Beltrán**, 2019; **Prat**, 2006; **Roberts**, 2015; **Ruvalcaba-Gómez**, 2019; **Stiglitz**, 2002).

Overall empirical evidence shows that progress towards these objectives has been modest so far (**Bauhr**; **Grimes**, 2014; **Grimmelikhuijsen**; **Piotrowski**; **Van-Ryzin**, 2020). It seems that the tendency to connect transparency with corruption and control of government dysfunctions has caused more mistrust than legitimacy (**Pozen**, 2019). Moreover, the relationship between trust and transparency is quite complex and non-linear (**Piotrowski**; **Van-Ryzin**, 2007). In general, measuring the impacts of transparency has shown that success requires:

1. Good regulation. This regulation is necessary but not sufficient to achieve positive impacts. For example, in 2011, *Access Info* developed a quality ranking for global transparency laws. According to 2019 data, with 128 countries evaluated, the top three countries were: Afghanistan, Mexico, and Serbia. Denmark was in 105th place. It seems obvious, once again, that society is not changed by decree, as **Crozier** (1984) preached.

2. Regulation must be embedded in a holistic strategy of good governance. Transparency must be inserted into broader policies that connect it with accountability, governmental integrity, citizen participation and collaboration, impartiality and legality, and good regulation and administration.

3. If it is possible to design a transparency policy that is properly included in good governance policies, the key to subsequent success is implementation. An unimplemented or poorly implemented policy cannot generate positive impacts (**Sabatier**; **Mazmanian**, 1980; **Hill**; **Hupe**, 2002). Proper implementation of these policies is key to success. It could be said that a good standard, inserted into holistic strategies and properly implemented, creates the conditions necessary for transparency to have a positive impact.

4. Nevertheless, even if all these steps are successfully taken, a transparency policy may not succeed in the short to medium term in the presence of conditions that hinder the connection between policy and positive change. There are always exogenous conditions to good governance policies that can either hinder or facilitate success. Thus, success is hindered:

- when the starting point is at a high level of corruption, since, when new scandals come to light thanks to transparency, more mistrust is generated;
- when the starting point is at a high level of institutional mistrust that can be reproduced with any scandal that arises;
- when there are perceived levels of high inefficiency in the public sector, especially when associated with public service cut strategies; or, lastly,
- when administrations are located in an environment of political instability that prevents them from working strategically.

All these exogenous conditions, in addition, most likely affect the previous phases, especially the implementation phase, thereby generating veto points and distortions on the system that hinder change. The institutionalist approach in political science, in its historical variants, does an excellent job explaining this difficulty of overcoming the paths of dependence and of foreseeing the unwanted effects on the administrative system (**Pierson**; **Skocpol**, 2001; **Steinmo**; **Thelen**; **Longstreth**, 1992).

That being said, the ultimate goal of this research is to validate, through a specific case study, this theory of success and failure in transparency policies. However, as this is a very ambitious goal, this paper focuses on an aspect of the theory that has usually been placed on the back burner. The paper will analyze the importance of implementing the transparency policy. In this case, its implementation in an "Autonomous Community" of Spain. The chosen autonomous community is Catalonia. There are three reasons why it was selected:

Firstly, the rule of origin is one of the most advanced among those developed in Spain, and, above all, it is the one that has a more ambitious holistic dimension.

Secondly, despite this, no relevant impacts have been observed, at least so far.

Thirdly, its levels of implementation have been highly influenced by factors of exceptional political instability.

In short, the research question to ask is:

> How has the transparency policy been implemented in the governments of Catalonia?

The hypothesis on which this paper is based is that one of the reasons for the relative failure to achieve impacts –such as reducing corruption, reducing disaffection, or fostering government effectiveness– so far, lies in the fact that the application of *Act 19/2014, of December 29, on transparency, access to public information, and good governance*, remains weak (*España*, 2013). As already noted, it is true that there are other reasons that explain the relative failure to obtain the desired impacts. Nevertheless, this research focuses on this variable considered so key: implementation.

The study of the implementation phase measures, to a large extent, the "effectiveness" of the policy, that is, the outputs –direct, objective and measurable products (**Mungiu-Pippidi**; **Dadašov**, 2016)– generated in the short and medium-term because without them there can be no positive final impacts. *Act 19/2014* establishes a whole set of legal obligations to public authorities and what is measured is to what extent those obligations of the law are being fulfilled and, in some cases, how this is being done. The authors believe that it is necessary to distinguish between the efficacy, efficiency, and effectiveness of a policy, especially a policy that is developed in the long term (**Dye**, 2013) and produces effects at different times and from different perspectives. In these dimensions, a transparency policy is:

- "effective" if it delivers what it proposes in the expected timeframe, such as transparency portals, reusable data, or adequate training;
- "efficient" if the cost of implementation and maintenance is lower than the financial return, for example, in reduction of fraud and embezzlement or in waste avoided with *red flags*;
- "successful" if it ultimately has the desired impacts, reduces the number of corrupt transactions and the scope of profits in each transaction, or boosts trust in the public authorities or the quality of services (**Villoria**, 2021).

In short, the content of this article is essentially descriptive, although it could be placed within the theoretical framework of the impact assessment of transparency policies, in particular, the importance of achieving efficacy to obtain the desired success.

From here, the methodology created to evaluate the implementation of the *Act* will be explained; additionally, the assumption that there is a relative failure in its impact will also be explained. Subsequently, data will be provided and used to demonstrate that more than seven years after its approval, the *Act* has had weak application in practice, although there are some parties that implement better than others. The paper closes with some conclusions that will help us better understand the lessons learned from the case of Catalonia and, after identifying the limitations of the study, pinpoint some possible avenues for further research.

2. Methodology

Right from its very first year of approval, 2015, the implementation of *Act 19/2014* was under evaluation. This is because the *Act* itself did not establish a grace period to begin the evaluation, as is commonly the case with other laws in neighboring countries. The *Act* entrusted the *Síndic de Greuges*, the Catalonian ombudsman, with the annual evaluation of the implementation since its approval. The authors of this text were responsible for designing the evaluation model and for all analyses prior to the evaluation's publication. Clearly, the first assessment faced many difficulties and yielded low or inconsistent response rates to many of the survey questions. This is especially true when the new local governments that emerged from the May 2015 elections were formed in July of that year and were, understandably, not prepared to prioritize this task. Since then, annual assessments of the implementation and enforcement of the *Act* have yielded a survey response rate of more than 90% for the vast majority of questions. Consequently, the *Act*'s *ex-post* evaluation spans six years.

The evaluation's design distinguished between the evaluation of active advertising and the right of access to the evaluation from the *Act*'s other obligations. For active advertising, it was initially decided that the evaluation should include an analysis of the transparency or related portals of all the entities bound by the *Act* in order to verify that all the items required by the standard were included; it was also necessary to verify that the information was updated, clear, and intelligible, that reusable formats were utilized, and that the portal was structured and had content search elements. Each annual evaluation examined more than 2,400 portals, spread out across administrations, dependent bodies and entities, and private subjects. The first assessment excluded municipalities with fewer than 500 inhabitants. For entities dependent upon regional administrations and private entities, trade unions and business organizations, political parties, etc., a representative sample was chosen. This evaluation was carried out by the *Fundació Carles Pi i Sunyer*.

To assess compliance with the right of access, in addition to a questionnaire, as shown below, applications were made as anonymous citizens. The methodology of the *mystery shopper* or observer participation consists of placing the analyst in the same situation in which the user or recipient of a public service can be found. In this case, a person requests access to public information from public administrations in order to measure compliance with the provisions of *Act 19/2014*. The person then proceeds to measure whether there is a response, its timeframe, and its quality. The quality control included aspects such as the channel through which the request was collected, the notification of receipt of the request, the response to imprecise requests, the reasons for the refusal, if any, the deadlines, and whether or not the response was free of charge. The data requested sought to capture typical demands of a control model aimed at preventing corruption and promoting integrity. For each type of entity, four questions were asked and randomly sent to the entities that made up the sample. The first year, they were sent to 132 entities. The sample was later expanded to 731 in 2020. In addition to the questionnaires and the mystery shopper test, it was decided to use another assessment tool. Thus, a decision was made to conduct a quality analysis of the resolutions on access that had been resolved by the *Catalonian Government* and local entities. These resolutions, selected at random, are those that would be published by these entities in their transparency portals. The quality of these resolutions was evaluated using a methodology developed specifically for the evaluation, which sought to be consistent with national and international good administration standards.

For the rest of the information required, it was decided that a set of questionnaires should be prepared containing all the *Act*'s requirements and that the entities bound by the *Act* (more than 1,000) should be asked to answer the questions added to the aforementioned questionnaires. The questionnaires were prepared in such a way that the questions were comprehensible, despite trying to stick to the act's strict wording, and ensuring that the grouping of questions was consistent with the different elements of which the standard is composed. An attempt was made to create questions that could be answered with a simple yes or no, but in many cases, it was important to know the number of procedures or resolutions and, lastly, in other cases, the questionnaire sought a documentary accreditation of the answers given. All of this resulted in complex and rather extensive questionnaires that were significantly revised and simplified in successive editions.

Lastly, for each annual report, a series of interviews were conducted with subjects of special relevance with respect to implementation of the act. In total, twenty-five in-depth interviews were conducted. To check all these data in detail and to be able to analyze them in depth, the links to the original documents are included in the note 1, section 5 of this article.[1]

3. Key assessment results

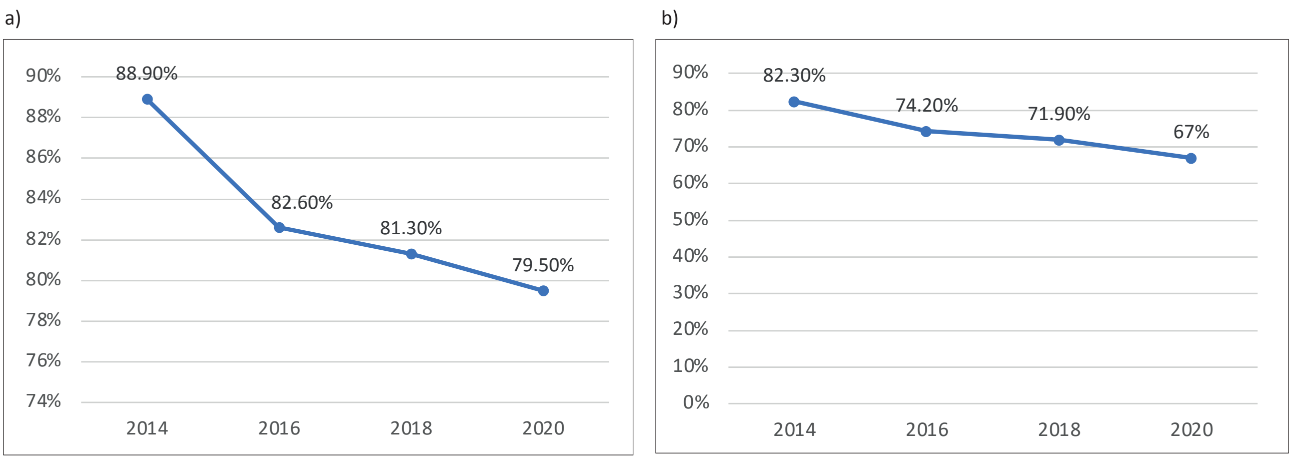
3.1. Impact problems

Before presenting the data on implementation, it is important to first reflect on the existing impact problems. The policy's relative temporary failure has already been noted, and this strong statement should be supported by hard data. In any case, it is important to highlight that transparency policies are long-term policies, the impacts of which cannot be evaluated immediately, nor, most likely, even in the six year-period that this study covers. Nevertheless, what is, indeed, a fact is that there is no success to speak of right now. To demonstrate this lack of successful impact, this paper will provide some data that attempt to measure the three types of impact desired.

First, it looks at data on the perception of corruption. Next, data on confidence in the institutions. Lastly, data on the perceived quality of government. These data are for Catalonia as a whole, as they do not exist at the disaggregated municipal level. However, considering that the *Government of Catalonia* (*Generalitat de Catalunya* in Catalan language) is, in general, the entity with the greatest and best implementation of the *Act*, as will be demonstrated, if, as a whole, its impact data are not positive, it is highly unlikely they would be positive where implementation is low or very low.

Data on the perception of corruption

To analyze this evolution, the successive surveys conducted by the *Anti-Fraud Office* of Catalonia on a representative sample of citizens from 2014 to 2020 will be used (see Graphs 1 and 2).

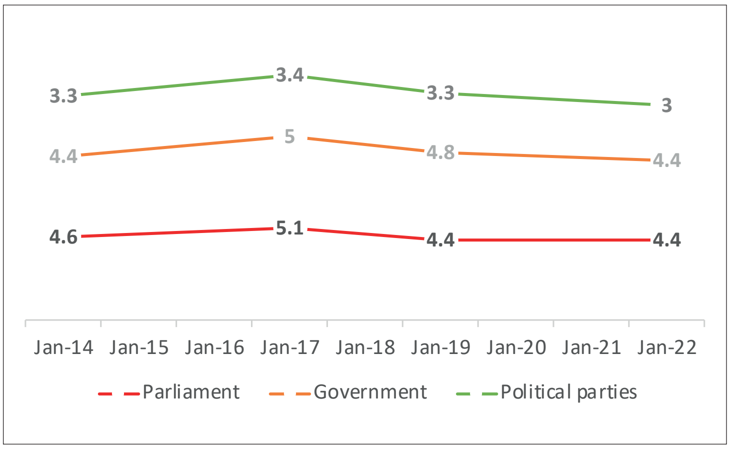


Graphs 1 and 2. Evolution of the perception of corruption in Catalonia.
a) "In Catalonia there is a lot or quite a lot of corruption"
b) "Corruption in Catalonia is a very or quite serious problem"
Source: Corruption perception barometers. *Anti-Fraud Office of Catalonia*.

The data show a reduction in the perception of corruption over the years since *Act 19/2014* took effect, which, at first glance, contradicts the previous statement that there was no impact. In any case, the fact that almost 80% of respondents still believe that corruption is a serious or very serious problem conveys the persistence of this belief.

Data on confidence in the institutions

Next is an analysis of the data on confidence in the institutions, obtained from the *Centre d'Estudis d'Opinió* of Catalonia. Graph 3 shows how at no point in time do any of the institutions receive clearly positive scores (out of 10) and how, as a whole, seven years after the *Act* was passed, their scores are lower than their initial ones in 2014. The initial lack of confidence has not been overcome.



Graph 3. *Political opinion barometer of Catalonia. Scores received by the Catalan institutions (out of 19).*
Source: *Centre d'Estudis d'Opinió - Baròmetre d'opinió política de Catalunya*.

Data on the perceived quality of government

Lastly, insofar as government quality data is concerned, the *European Quality of Government Index* –developed for the European Union by the *Quality of Government Institute* of the *University of Gothenburg* will be used.
https://ec.europa.eu/regional_policy/information-sources/maps/quality-of-government_en

The *European quality of government index* (*EQI*) compiles the average of citizens' perceptions and experiences of corruption, quality, and impartiality of three essential public services –health, education, and police– in their region of residence. Other areas of public administration, such as immigration, customs, or national security, are intentionally not assessed because they are handled at the national or even supra-national level. By focusing on these three services, the researchers ask respondents to rate their public services on three concepts related to good governance: the quality, impartiality, and level of corruption of these services. To do this, they develop a battery of questions. In addition, they include two more questions in the index: one on the impartiality of the regional elections and the other on the strength and efficacy of the region's media in denouncing corruption.

Table 1 shows the evolution of the quality of *Government in Catalonia* from 2010 to 2021. The Spanish average is marked by the arrow that crosses the rankings. The reality is that these data do not show that the policies of transparency and good governance have had the desired impact on the quality of public services in Catalonia. Rather, there seems to be a deterioration in the quality of government in recent years. This deterioration is not common in Spain, and it gives rise

Table 1. Quality trends in regional governments over time
Source: **Charron**; **Lapuente**; **Bauhr**, 2021, p. 18.

to an increasing disparity between autonomous communities. Of course, this deterioration is not due to good governance policies themselves. Rather, by not being properly implemented, as this paper aims to test, these policies have not managed to stop the deterioration that exogenous phenomena have produced on citizen perception.

> When analyzing the transformations in public administrations since the end of the 20th century, one of the most remarkable phenomena is the concern for promoting transparency in public activity

After an overall analysis, it can be confirmed that the transparency and good governance policy has, for the most part, so far, failed to generate positive impacts in the sense that the anticipated impacts of reducing disaffection and promoting government effectiveness have not been achieved. Only the perception of corruption has improved, a fact that is very sensitive to the existence or lack thereof of scandals during the period of measurement. Since there have been no new relevant scandals, this perception has declined. In any case, one can assume that the implementation of various instruments derived from the act has also contributed to lowering of existing expectations of corruption.

3.2. Active transparency

The assessment of compliance with the obligations of active transparency has been complex; as previously indicated, more than 2,400 portals were examined each year. Overall, the level of compliance has been quite high in the general aspects of active information from the outset. For this, the portal created by the *Open Administration Consortium of Catalonia* (*AOC*) and made available to interested entities has been fundamental. Naturally, since 2015, there has been a close to 90% compliance rate with the obligations by the *Government of Catalonia*, as well as in the large municipalities. One reason is that the autonomous community and the large municipalities were already participating in the competition which generated the transparency indices that *Transparency International-Spain* launched starting in 2008 for the municipalities and in 2010 for the autonomous communities. The information that was already being systematically published, such as that on procurement, was simply incorporated into the portals. However, new information, which required extra effort and the creation of new data that could then be incorporated, was not always included. Even today, in 2022, for these advanced compliance bodies, the content pending publication is the same as that which has already appeared in previous reports (citizen's charters, public service evaluations, and anonymized responses to citizen queries). Publication of citizen proposals and suggestions and anonymized responses in citizen queries are very low. The main reason is not that they do not want to publish them, but that the previous obligations that would lead to the preparation of these documents have not been fulfilled. In general, all this leads us to highlight the clear correlation between the fulfillment of obligations, with their inclusion in the portals, and the size of the administration or entity. Smaller administrations with fewer resources find it more difficult to meet all the active transparency requirements. This is particularly true when some of the transparency demands made of them cannot be met because the relevant reforms have not taken place, or the instruments required in the *Act* have not been introduced. Therefore, when some shortcomings are already observed in the large administrations, it can be predicted that in the small ones the shortcomings usually become failures.

Logically, providing aggregated data from 2,400 portals requires overgeneralization. However, it is possible to affirm that, save for a few exceptions, there is no information in a reusable format or which allows the citizen to interact. A large portion of the published data does not yet allow the public to print, export, or search information using minimally sophisticated parameters. What is worrying has been to see how the differences in compliance have widened over time, so a kind of double track of compliance has been consolidated: some of the entities bound by the *Act* are approaching full compliance in terms of content and others are stuck in limited compliance that does not make substantial progress (*Síndic de Greuges*, 2022, p. 17). This stagnation is seen in small municipalities, but also in the instrumental entities of the Administration, especially at the local level. It is true that the instrumental entities, in many cases, are very small and with very little personnel, which makes it difficult to comply with these obligations, but this does not reduce the responsibility of the parent administrations that should help them to comply with the *Act*. At the same time, there are instrumental entities that are extremely large, especially in the *Government of Catalonia*, in areas essential for citizen well-being (such as health, social services, transportation...) that should improve their level of compliance with the active transparency obligations, one of the essential aspects of *Act 19/2014*. Altogether, consortia and commonwealths (*mancomunidades*) accumulate the most deficits in compliance.

As previously stated, the portal created by the *Open Administration Consortium of Catalonia* (*AOC*) has been key to facilitating the implementation of the act, and, as a platform shared by many entities, it generates a common content structure, based on the standard's requirements, thereby making it easier for citizens to locate active transparency content. Even so, it is not used in a fully widespread fashion, which leads to a plethora of platforms that confuse users. Moreover, some municipalities use the electronic office as a transparency portal, which prevents citizens from locating essential information.

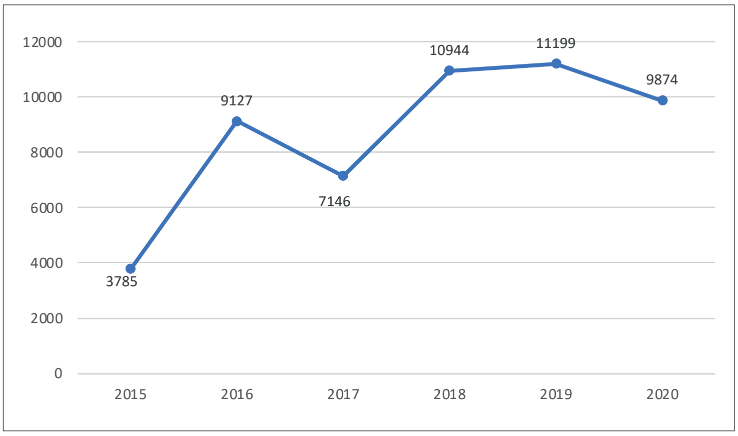
To conclude this section, it is important to highlight the weaknesses that we view as most important in this area. In general, the information that would allow greater control of clientelistic activities or conflicts of interest is the weakest. As mentioned in the report of the *Síndic de Greuges* (2022, p. 19), in all population categories, the absence of information on lobby groups related to municipal public offices is noteworthy. This shortfall responds to the fact that most of the entities do not have their own register of lobby groups nor has the use of the registry of lobby groups of Catalonia or the publication of the agenda of municipal public offices become widespread at the local level, so it is not possible to determine the relationships of influence in the municipal area across the board. Another example is the publication of declarations of assets or interests. The declarations of assets of elected officials, from 2018 to 2021, in municipalities with 5,000 to 20,000 inhabitants, have gone from 50% to 66%. In those with 500 to 5,000 inhabitants they have gone from 16% to 30%, and in those with less than 500 from 12% to 16%. Regarding ethical codes, from 2018 to 2021, in municipalities with 5,000 to 20,000 inhabitants, they have gone from being published in 18.5% of cases to being published in 56%, in municipalities with 500 to 5,000 inhabitants from 19% to 33%, and in municipalities with less than 500 from 10% to 23%. And in statistical data on public procurement, only 7% of municipalities with less than 20,000 inhabitants comply with this obligation.

3.3. The right of access

Access to information is the transparency mechanism that allows anyone to ask the public administration to provide any information in its possession, without the need to prove any interest. Access to information is regulated in our legislation as a subjective right, the exercise of which is formalized and which offers guarantees both in the administrative field – through the complaint process before an independent guarantee body (for example, the *Council for Transparency and Good Governance* at the state level or the *Commission for the Guarantee of the Right of Access to Public Information*, in the case of Catalonia)– (*Catalunya*, 2014, art. 18) as well as in the judicial arena.

Access to information is, in turn, the mechanism for guaranteeing the principle of transparency insofar as it allows citizens to be aware of all information that has not previously been proactively disseminated by the public administrations themselves. Access to public information has been consolidated since the entry into force of *Act 19/2014*. In this regard, there is evidence of an increase in the number of requests for access to information received by the Catalonian public administrations since they began the application of the transparency standard (see Graph 4). This is clear from reading the data extracted from the questionnaire prepared by the *Síndic de Greuges*. In fact, in 2016, the first year in which the *Act* was fully applied, 9,127 requests for access to information were submitted. Despite the fact that in 2017, the number of requests submitted decreased by 21.7% (7,146), the following year (2018), requests for access to information amounted to 10,944. Subsequently, applications rose again to 11,199 in 2019, decreasing in 2020 by 11.8% (9,874).

However, these variations have not been homogeneous in all public entities. In this regard, it is important to remember that 85% of the total requests registered in 2020 correspond to local entities and 13.1% to the *Government of Catalonia*. It should also be considered that, in general, local entities with a larger population receive more requests for access to information than smaller ones (29.5% for entities with more than 50,000 inhabitants compared to 1.6% for entities with less than 500 inhabitants). In any case, this situation is not linear, since there are medium-sized municipalities (with 5,000 to 20,000 inhabitants), which receive more requests for access to information (24.8%) than large municipalities



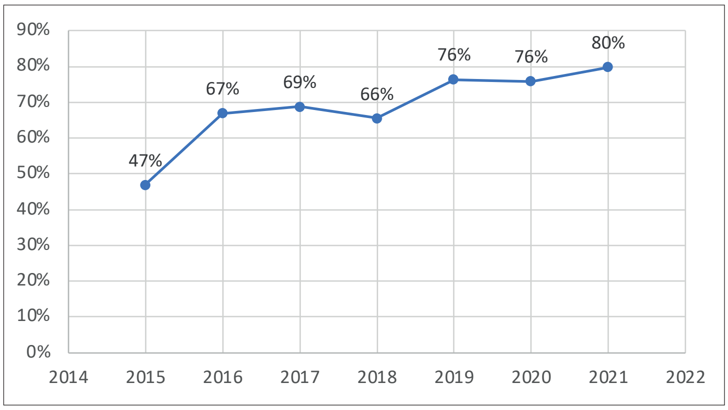
Graph 4. Variation in the number of requests for access to information.
Source: *Síndic de Greuges* (2017-2021).

Table 2. Number of requests for access to information per inhabitant

	Requests received 2019	**Requests per 1,000 inhabitants 2019**
Andalusia	7,245	1.09
Navarre	315	0.61
Aragon	459	0.43
Extremadura	357	0.41
Balearic Islands	322	0.35
Galicia	746	0.33
Asturias	279	0.32
La Rioja	81	0.32
Murcia	293	0.25
Catalonia	1,286	0.21
Castile-La Mancha	296	0.18
Castile and Leon	337	0.17
Cantabria	74	0.15
Canary Islands	181	0.10
Basque Country	179	0.10
Valencian Community	360	0.09
Community of Madrid	nd	

Source: *Síndic de Greuges* (2022)

(with 20,000 to 50,000 inhabitants, with 12.7% of the total requests). It is also surprising that 35.06% of public entities in Catalonia did not receive any request for access to information. These were mostly entities with less than 500 inhabitants (52.85%). In fact, as the population group increases, the number of entities that did not receive any requests for access to information decreases significantly (4.35% in the case of municipalities with more than 50,000 inhabitants).



Graph 5. Variation in the number of mystery shopper test responses.
Source: *Síndic de Greuges* (2022).

In addition, we can see that, although there have been a greater number of requests for access to information, Catalonia (0.21) is below the average among the autonomous communities (0.32), with a lower number of requests per 1,000 inhabitants, as can be seen in Table 2.

Most likely, the above can be explained by the fact that the current regulation of the right of access has different limitations that can hinder the exercise of the right and its fulfillment by public administrations and, ultimately, the effectiveness of this transparency mechanism (**Cerrillo-Martínez**, 2020). First and foremost, the basic legislation has been very demanding in terms of anticipating the requirements that must be met in the requests (for example, the requirement to use a means to establish the identity of the requestor, which has been translated, in practice, into the requirement to use an electronic signature) and the steps that must be part of the procedure in order for it to be processed (for example, making a period of fifteen days available to third parties whose rights or interests may be affected to file claims). This has made it difficult to exercise the right of access, as well for said right to be processed by public administration. In fact, through the mystery shopper test, a process of deformalization of the resolution of requests for access to public information has been observed. Indeed, 36% of requests for access to information have been resolved by providing the information (e.g., by e-mail) without a formal resolution or communication. Although in 2020 there was a decrease in cases without resolution as compared to the previous year (when they accounted for 45% of the cases), it continues to be a sign of the need to reduce red tape.

Secondly, the time it takes to access information is extremely long. Indeed, as can be seen from the current legislation, the deadline for resolving requests for access to information is one month. This period may be extended by up to 30 days to provide the information in the format requested. This period is far from the shorter resolution periods envisaged in other neighboring countries, where requests for access to information are resolved much more quickly (for example, in Portugal it is 10 days, in Finland, Poland, and the Czech Republic it is 15 days, and in the United Kingdom and Slovenia it is 20 days, while in France and Italy it is also one month, according to data provided by **Fernández-Ramos** and **Pérez Monguió**, 2020). In any case, it cannot be ignored that, in 2022, only 66.8% of the requests made by the mystery shopper were resolved within the established period, although 46% of them were resolved in half of the expected one-month period.

Thirdly, the number of requests for access to information that are resolved is relatively low. At least, this is what the data obtained through the mystery shopper test indicate. They show that one out of every five requests for access to information do not receive a response from public administrations. Although the situation has been improving year after year –as can be seen from Graph 5– these numbers may be an indication of the unwillingness of some public administrations to respond to requests for access to public information or of the difficulties some of them face in doing so.

Fourthly, on a negative note, the number of public administrations that have adopted regulations to implement the provisions of the legislation and of entities that have equipped themselves with units to process requests for access to public information is low. Along these lines, the data obtained reveal that, in 2021, only 3.28% of the entities bound by the *Act* had an approved procedure for processing the right of access to public information. The same data showed that only in 7.35% of the cases analyzed had a unit been established to handle requests for access to information. In particular, the local authorities with the largest population reported having created such a unit (47.83% among those with more than 50,000 inhabitants and 36.36% among those with 20,001 to 50,000 inhabitants).

Taken together, one can conclude that the implementation of the right of access also has a dual track, where some entities progress and others remain stagnant. In addition, the right of access generates positive impacts when citizens get involved and make demands, whereas it remains a mere formality when there is no call for shared transparency.

> The evaluation's design distinguished between the evaluation of active transparency and the right of access to the evaluation from the law's other obligations

3.4. Transparency of lobbying

The regulation of lobby groups is a key piece of any regulation of transparency, good governance, and good administration (**Bernadí-Gil**; **Cerrillo-Martínez**, 2017; **Ponce-Solé**, 2019a). Along these lines, one of the novelties that led to *Act 19/2014*, of December 29, was the approval for the first time in Spain of a regulation of lobby group activity. The main purpose of this regulation is to guarantee the transparency of lobby group activity in the development of their influence on public administrations, such that it is possible to know who the recipients of influence are, as well as the beneficiaries of it thereof. In *Act 19/2014*, of December 29, lobby group transparency is guaranteed through two mechanisms:

- the registration of lobby groups in a public register; and
- the publication of lobby group activity, mainly through the dissemination of the agendas of the senior officials with whom they meet[2].

Despite the novelty of this rule at the time, it has been found, in practice, that it has not been sufficient to achieve adequate lobbying transparency. Over these years, it has been observed that there are some problems derived from the rule itself which, in the absence of comparative references, included some provisions which, in practice, have been difficult to interpret (for example, the definition of lobby groups or of the influence activities that must be transparent), to comply with (for example, the creation of a registry of lobby groups in each public administration)[3] or to enforce (for example, the sanctions system) (**Bernadí-Gil**; **Cerrillo-Martínez**, 2017; **Cerrillo-Martínez**, 2019).

Likewise, there are other aspects that were not clearly included by *Act 19/2014*, the regulation of which would significantly increase the transparency of lobby group activities (for example, standardizing the regulatory footprint) (**Ponce-Solé**, 2019a, p. 156).

All of the above must be assessed while also taking into account that the application of the regulation of lobby groups is complex and takes time to bear fruit (**Bernadí-Gil**; **Cerrillo-Martínez**, 2017) and recognizing

> "the difficulties inherent to implementing a regulation of lobbying activity that has no precedent in our country" (*Síndic de Greuges*, 2017, p. 27).

However, beyond these difficulties stemming from the regulations themselves, the limitations that have existed in practice when implementing the provisions of the transparency legislation cannot be ignored. In fact, according to the data collected for the evaluation of *Act 19/2014* of December 29, despite the great number of meetings Catalonian public administrations held with lobby groups (in 2020, there were 6,619), only 22 entities published the contacts maintained on their transparency portal and 29 checked whether the lobby group with which the meeting was held was registered in the register of lobby groups. These graphs are more striking considering that 70.96% of the registered meetings were held by senior officials and managers of the Administration of the *Government of Catalonia*; this fact demonstrates how the implementation of the control of lobbying system defined under *Act 19/2014* in Catalonian public administrations, as a whole, is low.

Moreover, it is necessary to highlight how, in the case of the *Government of Catalonia* administration, beyond the entry into force of *Act 19/2014*, the decisive element for compliance with the publication of agendas was the adoption of *Agreement Gov/82/2016*, of June 21, which approves the *Code of conduct of senior officials and managers* of the *Government of Catalonia* administration and of its public sector entities, as well as other measures related to transparency, lobby groups, and public ethics. This agreement includes a protocol of action applicable to the relations of *Government of Catalonia* administration senior officials and managers and its public sector with lobby groups which stipulates, among other aspects, that

> "senior officials and managers can maintain contact with a lobby group if its inclusion in the register of lobby groups has been verified."

The protocol also states that

> "before holding meetings or carrying out joint activities with lobby groups, senior officials and managers must verify that the lobby groups in question are listed in the register of lobby groups and, in the event that they are not, remind those who represent them of the obligation to request this registration whenever they want to act as a lobby group."

Lastly, senior officials and managers are expected to incorporate their contacts with lobby groups into their official agendas. Another issue that will be left for future analysis is the quality of the information incorporated in the records, which is very low, since it provides only basic information, making it difficult to determine in detail the content of the meetings.

3.5. On good governance and good administration

At least from a formal perspective, the text of the Catalonian act is one of the most advanced on these issues in Spain, both at the state level –where *Act 19/2013* (*España*, 2013) only contains a reference to principles of good governance but no specific instrument for its effectiveness– as well as at the regional (Autonomous Community) level. Title V of *Act 19/2014* is entitled, precisely, "Good governance" and includes several chapters: Chapter I, entitled "Code of conduct for senior officials," Chapter II, "Right to good administration and quality public services," and chapter III, dedicated to "Improvement of regulatory quality." Despite specifically referring to the right to good administration in Chapter II of Title V (right provided for in art. 30 of the *Statute of autonomy of Catalonia*, as well as in art. 41 of the *Charter of Fundamental rights of the European Union*) (**Ponce-Solé**, 2019b), ultimately, good administration is only mentioned in the name of the *Act*. It is true, in any case, that the boundaries between the concepts of good governance, good government, quality of government (with the whole debate that goes along with it; see **Rothstein**; **Teorell**, 2008; **Agnafors**, 2013), and the aforementioned good administration are not yet too clear, which explains, for example, the confusing concept included in art. 2d of the *Act*, which mixes good governance and good administration.

3.5.1. Codes of conduct for senior officials

This section provides a brief analysis of compliance by the entities bound by the *Act* with the duties associated with promoting integrity in the public service sector and, in particular, those relating to the *Code of conduct and ethical clauses in tenders and grants*. Article 55.3 of *Act 19/2014* establishes that

> "the Government, local authorities and other public bodies and institutions included in article 3.1 must draw up a code of conduct for their senior officials that specifies and develops the principles of action referred to in paragraph 1, establishes additional ones, where appropriate, and determines the consequences of failing to comply with them, without prejudice to the sanctions system established under this *Act*."

The evaluation have consisted, first and foremost, of knowing whether the entities have approved a code of ethics (see Table 3).

Then, for those who answered in the affirmative, which barely reaches 25%, it has been requested that a link be sent where the code can be analyzed. Lastly, criteria have been established to assess the quality of the code. Specifically, the minimum established contents of the *Code* is shown in Table 4.

Table 3. Approved codes of ethics

Entities bound by the *Act*:	**Yes**	**No**	**Entities**
Administration of the *Government of Catalonia*	1		1
Municipalities with more than 50,000 inhabitants	15	8	23
Municipalities with 20,001 to 50,000 inhabitants	29	15	44
Municipalities with 5,001 to 20,000 inhabitants	50	94	144
Municipalities with 500 to 5,000 inhabitants	88	315	403
Municipalities with less than 500 inhabitants	36	297	333
Area councils (*Consells comarcals*)	19	21	40
Provincial governments	4		4
Supra-municipal entities and regulatory or control entities	8	1	9
Universities	1	6	7
Overall total	250	758	1,008

Source: *Síndic de Greuges*

Table 4. Minimum code contents

1. Establishment of ethical principles and rules of conduct consistent with the provisions of *Act 19/2014*, of December 29.
2. Development of at least the following aspects: - Publication of the agenda. - Definition of conflicts of interest and criteria for their regulation. - Guarantees of impartiality while in office. For example, the prohibition against accepting gifts, or protocols in case of holding shares in companies that contract with the administration.
3. Existence of an explicit system of adherence to the code.
4. Creation of an ethics committee that responds to requests for clarification and monitors compliance.
5. Existence of mechanisms for reporting breaches of the code with protections for the whistleblower.
6. Existence of a sanctions system for non-compliance.

Source: *Síndic de Greuges*

In 2017, all the codes sent (161) were analyzed to test their quality. Subsequently, in 2018 and 2019, a fairly large sample was analyzed. Overall, it can be said that, of the 250 approved up to 2020, 56% met the quality conditions defined in the study. However, 44% still did not comply with them. It is important to note that there will be a substantial increase in the coming years, as the *Catalonian public service code of ethics* has been approved, as well as two codes of conduct at the local level (*Code of conduct for senior officials of local authorities*, prepared by the *Network of Transparent Governments of Catalonia* in March 2017, and the *Code of conduct and good governance for elected representatives and public officials of local governments and their institutional public sector entities*, prepared by the *Federation of Municipalities of Catalonia*). In short, copying the corresponding code will be relatively simple. It is another matter to ensure its implementation.

Compliance with Section 2 of Article 55 has been even less successful. Article 55.2 of *Act 19/2014* establishes that

> "the administrations and bodies included in the scope of application of this *Act* must include, in the specifications of contractual clauses and in terms of grant programs or aid, the ethical principles and rules of conduct to which contractors and beneficiaries must adapt their activity, and they must determine the effects of a possible breach of these principles."

To facilitate compliance, *Agreement Gov/85/2016*, of June 28, was passed, which

> "approves the model of regulatory bases of the procedures for issuing grants by competitive tendering, processed by the *Government of Catalonia* administration and its public sector."

After this approval, it can be said that, in 2020, almost 90% of the *Government of Catalonia* grant programs and approximately 72% of the tenders met this obligation. However, in the rest of the entities, the data are much smaller (see Tables 5 and 6).

Table 5. Grant programs with ethical principles

How many grant programs have included ethical principles and rules of conduct in the basis for the programs?	Average	Sum of grants
Municipalities with more than 50,000 inhabitants	63%	368
Municipalities with 20,001 to 50,000 inhabitants	19%	151
Municipalities with 5,001 to 20,000 inhabitants	37%	475
Municipalities with 500 to 5,000 inhabitants	35%	213
Municipalities with less than 500 inhabitants	17%	25
Area councils (*Consells Comarcals*)	30%	48
Provincial governments	64%	76
Supra-municipal entities and regulatory or control entities	84%	16
Universities	12%	34

Source: *Síndic de Greuges*

Table 6. Calls for tenders with ethical principles

How many calls for tenders have included ethical principles and rules of conduct in the basis for the calls?	Average	Total
Municipalities with more than 50,000 inhabitants	91.6%	3,502
Municipalities with 20,001 to 50,000 inhabitants	59.0%	830
Municipalities with 5,001 to 20,000 inhabitants	48.0%	1,053
Municipalities with 500 to 5,000 inhabitants	40.0%	1,364
Municipalities with less than 500 inhabitants	22.0%	114
Area councils (*Consells Comarcals*)	49.0%	361
Provincial governments	95.0%	471
Supra-municipal entities and regulatory or control entities	100%	418
Universities	55.7%	390

Source: *Síndic de Greuges*

In any case, to analyze the impacts of these rules, especially on the perception of corruption, it would also be important to consider the approval on January 15, 2020 of the *Government of Catalonia*'s "*Estratègia de lluita contra la corrupció i d'enfortiment de la integritat pública*" [Strategy to combat corruption and strengthen public integrity]. This ambitious strategy had 25 actions and 89 sub-actions that also included measures in the areas of integrity. Their implementation was completed in January 2022.[4] After fulfilling a significant part of its objectives, it has been left, for now, without continuity.

3.5.2. Citizen's charters and good administration

Insofar as citizen's charters are concerned, a well-known technique of good public management first promoted in the United Kingdom in the 1990s (**Deakin**, 2009), as stated in *Opinion of the Spanish Council of State 219/96*, they make it possible

> "to implement the principle of information for citizens and of publication of administrative action by achieving greater transparency in administrative action, with the consequent increases in the oversight thereof and citizen

> participation, as well as an improvement in the efficacy and quality of the provision of services."

Catalonian *Act* requires the mandatory approval of these charters, which must set specific standards of good administration (art. 59 of the *Act*). In addition, these charters become mandatory for the entity that approves them and regulatory in nature, so they cannot be modified by administrative resolution, only by new regulation. This normative character has been modified by *Act 5/2020*, in the new wording of art. 59 of *Act 19/2014*, which seeks to make its regulatory regime more flexible.

The evaluations carried out in this area identify two distinct levels of compliance. At the regional level, the approval of citizen's charters is surprisingly low, while, at the local level, many more citizen's charters have been approved, without, however, rigorously complying with the legal requirements, especially with respect to quality (Table 7).

It is important to note that one of the most laborious tasks of the evaluation has been to analyze the quality of the charters approved so far. To this end, parameters have been established with which to study each charter and give it a score of 0 to 10 (Table 8).

From this analysis, which involves a study of more than 350 charters, it can be highlighted that:

Table 7. Approved citizen's charters

	2016	2017	2018	2020
Government of Catalonia	2	3	0	0
Municipalities with more than 50,000 inhabitants	128	153	267	
Municipalities with 20,001 to 50,000 inhabitants	43	47	125	
Municipalities with 5,001 to 20,000 inhabitants	39	2	42	
Municipalities with 500 to 5,000 inhabitants	88	172	16	
Municipalities with less than 500 inhabitants			25	
Area councils (*Consells comarcals*)	1	1	3	
Provincial governments	1	0	1	
Regulatory entities	0	9	7	
Universities	88	242	90	
Public entities				
Total				24[5]

Source: *Síndic de Greuges*

Table 8. Contents of citizen's charters under evaluation

1. The organization and way of managing the service
2. Identification of those responsible for management
3. The minimum service standards, broken down where appropriate by categories of services
4. The indicators for evaluating implementation
5. Access terms and conditions
6. Tools for evaluating implementation
7. User rights and duties
8. The applicable economic regime, noting any applicable public fees and public
9. Available complaint channels
10. The channels through which users may obtain information and guidance regarding the service

Source: *Síndic de Greuges*

- In general terms (for statistical detail, go to the complete reports referred to in note 1), there is not usually full compliance with the minimum legal requirements, save for exceptions that demonstrate good practice.
- The charters rarely include reference to the fact that, according to the *Act*, they are of a regulatory nature and that the content of the citizen's charters is binding on the Administration and users and can be invoked as a remedy or claim.
- On some occasions, the charter does include a clause exempting the Administration from financial liability for non-compliance with the standards, which would be inappropriate and illegal.
- There is often a reference to tax ordinances on the cost of the service, making it difficult for citizens to understand.
- A common practice has been to simply create catalogs of services, presenting the services provided but without setting required standards. The historical lack of tradition in setting standards of good governance required by citizens largely explains these results.

As for the obligation established in the *Act* on the evaluation of the quality of public services, an aspect closely linked with the previous one, the different analyses conducted show –based on the surveys carried out year after year– a clear lack of structuring of a system, adapted to the provisions of the *Act*, for evaluating public service users' level of satisfaction as well as a failure to comply with the obligation to publish the results of the satisfaction surveys in the transparency portal.

> After an overall analysis, it can be confirmed that the transparency and good governance policy has, for the most part, so far, failed to generate positive impacts in the sense that the anticipated impacts of reducing disaffection and promoting government effectiveness have not been achieved

3.5.3. Improving regulatory quality, good governance, and good administration

With regard to regulatory quality, of note is the vast number of existing rules and the importance of simplifying them. At the beginning of July 2022, when this paper was drafted, the *Legal portal of Catalonia* had 996 laws, 7,682 decrees, and 17,924 orders in force, although in the latter two cases, the nomenclature does not guarantee that these are actually authentic legal norms. This well-known regulatory proliferation is also evidenced by the successive evaluation reports on the *Act* carried out since 2015. In this field, the analysis of the regulatory quality improvement (*better regulation*, in the language of the European Union), a key element of good governance and good administration, has also made it possible to distinguish here –as in the field of citizen's charters, but conversely, as will later be shown– between two very different levels of compliance with Catalonian *Act*.

On the one hand, the autonomous government, where the *Government of Catalonia* has a specific unit that has been incorporated into the Department of the Presidency, which has been offering support for more than a decade to the other departments of the *Government of Catalonia*, and where the *ex-ante* evaluation, expressed in the development of regulatory impact assessments, as required by Catalonian *Act*, in connection with the law relating to the procedure for preparing regulations, *Act 26/2010* are well established. In any case, the *ex-post* evaluations have shortcomings, and this is an area in which the legislation is vaguer and development, in practice, has been non-existent.

Table 9. Approved standards with a regulatory impact assessment

	2016	2017	2018	2020
Government of Catalonia	138	160	180	162
Municipalities with more than 50,000 inhabitants	46	96	66	40
Municipalities with 20,001 to 50,000 inhabitants	80	26	84	10
Municipalities with 5,001 to 20,000 inhabitants	nd	21	39	39
Municipalities with 500 to 5,000 inhabitants	nd	318	109	47
Municipalities with less than 500 inhabitants	nd[6]			10
Area councils (*Consells comarcals*)		11	13	2
Provincial governments		1	1	0
Supra-municipal entities		0	1	0

Source: *Síndic de Greuges*

On the other hand, there is the municipal level, an area where regulatory quality is very poor, and where *ex-ante* evaluations are quite scarce, not to mention *ex-post* evaluations, which are completely non-existent (see Table 9). The reasons for this difference likely lie in the absence of specific local units dedicated to better regulation and in the lack of public management culture in this area, as well as of staff trained in the regulatory improvement toolbox. The conclusions drawn from the evaluations of the *Act* have emphasized the important role that the supra-municipal levels should play in supporting the performance of these evaluations, which has yet to occur.

Table 10. Sanctioning proceedings initiated for non-compliance with *Act 19/2014*

	2016	2017	2018	2020
Municipalities with more than 50,000 inhabitants	0	2	0	0
Municipalities with 20,001 to 50,000 inhabitants	0	0	2	0
Municipalities with 5,001 to 20,000 inhabitants	0	0	2	6
Municipalities with 500 to 5,000 inhabitants	12	0	1	3
Municipalities with less than 500 inhabitants				0
Government of Catalonia	0	0	0	0
Area councils (*Consells comarcals*)	0	0	0	0
Provincial governments	0	0	0	0
Supra-municipal entities	0	0	1	0
Universities	0	0	0	0
Total	12	2	6	9

Source: *Síndic de Greuges*

3.6. On the sanctions system

In addition to the internal controls of each entity, *Act 19/2014* stipulates that the *Síndic de Greuges*, the *Court of Auditors*, and the *Anti-Fraud Office of Catalonia* must ensure compliance with the *Act*. To ensure compliance, *Act 19/2014* provides for a complete sanctions system that includes an extensive list of violations in terms of transparency, access to public information, good governance, and open government. In this area, the *Act* also determines responsibility for the commission of the offenses established under the *Act* and defines the sanctioning procedure, specifying the competent bodies to order its initiation,

Table 11. Number of sanctions imposed for non-compliance with *Act 19/2014*

	2016	2017	2018	2020
Municipalities with more than 50,000 inhabitants	0	2	6	0
Municipalities with 20,001 to 50,000 inhabitants	0	0	0	0
Municipalities with 5,001 to 20,000 inhabitants	0	0	0	2
Municipalities with 500 to 5,000 inhabitants	0	0	7	10
Municipalities with less than 500 inhabitants			3	0
Government of Catalonia	0	0	0	0
Area councils (*Consells comarcals*)	0	0	0	0
Provincial governments	0	0	0	0
Supra-municipal entities	0	0	0	0
Universities	0	0	0	0
Total	0	2	16	12

Source: *Síndic de Greuges*

guide it, and resolve it. One of the best examples of the weak implementation of some of the standard's commitments is precisely that of the sanctions system. The sanctions system was one of the most innovative aspects of the regulation as compared to the state regulation, which essentially fails to impose sanctions for breaches of the transparency obligations. Nevertheless, in general, after six years, it can be said that the sanctions system remains practically unused (see Table 10).

Table 12. Number of complaints of non-compliance with *Act 19/2014*

	2016	2017	2018	2020
Municipalities with more than 50,000 inhabitants	0	17	19	18
Municipalities with 20,001 to 50,000 inhabitants	0	13	8	5
Municipalities with 5,001 to 20,000 inhabitants	10	9	12	13
Municipalities with 500 to 5,000 inhabitants	8	33	16	14
Municipalities with less than 500 inhabitants				0
Government of Catalonia	0	2	1	0
Area councils (*Consells comarcals*)	0	0	0	1
Provincial governments	0	0	0	0
Supra-municipal entities				0
Universities	0	1	3	0
Other entities	0	0	1	
Total	18	75	60	51

Source: *Síndic de Greuges*

As an example of the low interest in developing sanction systems, it is worth noting, as far as compliance with Article 89.2 of *Act 19/2014* is concerned, the continuous delays in the establishment of the chartered sanctioning body provided for by *Act*. All of this leads to the fact that the number of sanctions ultimately imposed for breaches of the *Act* is practically zero (Table 11).

Perhaps, this certain feeling of impunity and uselessness when it comes to reporting breaches of compliance could explain why no headway has been made with complaints and why they have even backtracked, year after year, since 2017 (see Table 12).

4. Discussion and conclusions

After conducting an exhaustive analysis of the degree of compliance with *Act 19/2014* over a five-year period (no assessment was conducted in 2019), the conclusion is that the initial hypothesis did not fully come true. The data indicate that the application of this *Act* by the *Government of Catalonia* (save for a few exceptions, such as the approval and publication of citizen's charters) and larger municipalities is acceptable. Clearly, there is room for much improvement, especially with respect to ex officio investigation –or through complaints– of breaches and to the implementation of sanctions in cases that prove to be true. Nevertheless, for such a complex and demanding law with so many cultural innovations made to the traditional legalistic bureaucracy, the progress made with respect to transparency gives it a passing grade, and there is no clear failure in implementation.

Another matter entirely is implementation in the smaller municipalities and in the instrumental entities, where there is a tremendous potential for improvement and, six years after the *Act*'s approval, there is a certain lack of effective application, especially in relation to obligations that are not channeled through the services and instruments provided by the *Open Administration Consortium of Catalonia*. On the other hand, there appear to be significant problems in the implementation of the mechanisms of good governance and good administration provided for by the *Act*. Implementation in this area is proceeding very slowly and appears to be encountering a culture of governance and administration that has historically paid little attention to institutional quality issues. This explains why the regulatory development carried out under the *Act*, for example, has not included any regulation of the crucial aspects of good governance and good administration (*Decree 8/2021*, of February 9).

In any case, it is important to highlight that the majority of the Catalonian population has witnessed some improvements in institutional quality, from the development of active transparency to the regulation of lobby groups and the approval of codes of ethics. However, this has not prevented the distrust of institutions from being preserved and even increasing, the perception of the quality of government from falling to unheard-of levels, and approximately 80% of the population from considering corruption to be a fairly or very serious problem in Catalonia. All this leads to a new hypothesis for future research: although the transparency law is of acceptable quality and is sufficiently implemented in its specific elements of transparency, a lack of attention to the application of specific instruments of good governance and good administration can prevent it from having the appropriate impact. Additionally, there is the importance of exogenous phenomena, which generate polarization and break basic consensus in society, and which would prevent, even with more demanding implementation, the foreseeable impacts from fully manifesting.

This article has its limitations, as it has focused on a specific element of the theory initially outlined and has provided an essentially descriptive development of the application of *Act 19/2014*. More in-depth studies that address the causes of successes and failures of the existing implementation will help to provide a more complete picture. However, the authors believe that, for the first time in the literature on public transparency in Spain, a study of policy implementation with a strong empirical basis and comprehensive development has been provided.

5. Notes

1. The documents with the data can be found at the following links:

2021: *https://www.sindic.cat/ca/page.asp?id=609*

2019: *https://www.sindic.cat/ca/page.asp?id=497*

2018: *https://www.sindic.cat/ca/page.asp?id=479*

2017: *https://www.sindic.cat/ca/page.asp?id=451*

2016: *https://www.sindic.cat/ca/page.asp?id=358*

2. According to data provided by the *Registry of lobby groups of Catalonia*, 3,819 lobby groups were registered in December 2020.

3. In order to respond to this problem, *Executive Order 1/2017* of February 14 was adopted to create and regulate the *Registry of lobby groups in Catalonia*.

4. See the final report at:
https://governobert.gencat.cat/web/.content/01_Que_es/09_Estrategia_integritat/docs/informe_final_estrategia_2022.pdf

5. In 2020, after analyzing all the charters sent by public entities, it was found that there were only 24 that met all the conditions. We did not include this question for.

6. The data provided were clearly erroneous in that first year of evaluation. When specifically asking local public administrations about standards subject to regulatory *ex-ante* impact assessments, it seems they provided the total number of approved standards, without consideration for what was asked. Once the questionnaire was nuanced and strengthened in subsequent editions, the number of responses dropped sharply.

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María-Pilar Paricio-Esteban; María Puchalt-López; María P. García-Alcober; Blanca Nicasio-Varea

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María-Pilar Paricio-Esteban ✉
https://orcid.org/0000-0002-8831-9352

Universidad Cardenal Herrera-CEU
Observatorio de Gobernanza, Transparencia y RSC
Luis Vives, 1
46115 Alfara del Patriarca (Valencia), Spain
pparicio@uchceu.es

María Puchalt-López
https://orcid.org/0000-0002-4098-736X

Universidad Cardenal Herrera-CEU
Observatorio de Gobernanza, Transparencia y RSC
Luis Vives, 1
46115 Alfara del Patriarca (Valencia), Spain
maria.puchalt@uchceu.es

María P. García-Alcober
https://orcid.org/0000-0001-5342-3320

Universidad Cardenal Herrera-CEU
Observatorio de Gobernanza, Transparencia y RSC
Luis Vives, 1
46115 Alfara del Patriarca (Valencia), Spain
maria.garcia3@uchceu.es

Blanca Nicasio-Varea
https://orcid.org/0000-0002-6210-242X

Universidad Cardenal Herrera-CEU
Observatorio de Gobernanza, Transparencia y RSC
Luis Vives, 1
46115 Alfara del Patriarca (Valencia), Spain
blanca.nicasio@uchceu.es

Abstract

In modern democratic states, citizen participation is promoted through representative channels. In recent years, at the different institutional and political levels in Spain, some classic parameters of democracy have been called into question, such as citizen representation, deliberation, and the responsibility of the rulers towards the citizens. This crisis coincides with a decline in bipartisanship in Spain and the appearance of new parties. Some of this parties championed the regeneration of democracy, committing themselves to encouraging transparency and citizen participation in public management. As local entities are the institutions closest to citizens, both transparency and participation become key elements to comply with these parameters, providing the technologies of information and communication (ICT) with new tools such as websites and portals, which can contribute to strengthening them. This research aims to analyze the use of these channels to promote transparency and citizen participation, by the municipalities of 4 autonomous communities (Catalonia, the Community of Madrid, the Valencian Community, and the Region of Murcia), placing special emphasis on how the left-right axes and old-new parties could influence, along with the population size of the municipalities. The method used consists of a categorical content analysis, based on the *Infoparticipa Map* indicators and two linear regression models using ordinary least squares. The results and conclusions of the study show that the size of the population and the autonomous community are determining factors in the transparency indices. In addition, the political formations aligned to the left of the ideological spectrum, together with some of the new parties, influence the greater transparency and participation of the websites of the municipalities governed by them.

Keywords

Municipal communication; Transparency; Citizen participation; *InfoParticipa Map*; Political parties; Ideology; Autonomous communities; Representative democracy; New political parties; Webs; Websites.

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1. Introduction

In recent years, the wave of indignation (**Gutiérrez-Rubí**, 2014) about the Spanish State's inability to deal with the economic crisis that began in 2008, and the successive cases of corruption, led citizens to demand other ways of doing politics and shaping the common will, empowering transparency and a participatory democracy to act as a counterweight (**Garrido-López**, 2021).

In this sense, citizens have been disappointed with representative institutions (**Sartori**, 1999), and a feeling of alienation and distrust towards politics has spread (**Lorente-Fontaneda**; **Sánchez-Vítores**, 2018) because decisions about public affairs are not being made (**Schumpeter**, 1962).

Representative political participation is carried out using political parties as key elements of democracy, but the public's opinion of political parties has deteriorated considerably in recent years (**Torcal-Loriente**, 2008; **Lobera-Serrano**; **Ferrándiz-Magaña**, 2013), reopening the debate on new ways for citizens to participate in collective decisions.

The representation crisis coincided with a moment of decline for the two-party system in Spain and the emergence of new parties that, in some cases, championed the regeneration of democracy by committing themselves to encouraging transparency and citizen participation in governance.

Since the end of the 20th century, and especially in the 21st century, a more participatory environment has been fostered in public administration, partly due to the progress made by ICTs and the promotion of new forms of governance (*European Commission*, 2001).

The proximity of local entities leads to a greater capacity of their governments to generate trust relationships with citizens (**Paricio-Esteban** *et al.*, 2020), where transparency is a key element that contributes, in turn, to achieving a more informed and active citizenship, enhancing participatory processes. ICTs have provided new tools such as the municipal website and transparency portals, which, according to **Campillo-Alhama** and **Martínez-Sala** (2017), can contribute to the management of public policies based on governance, transparency, and citizen participation.

1.1. Transparency as a response to the crisis of political representation

Citizens' distrust of political parties and governments has increased in recent years, as evidenced by successive opinion surveys by the *Center for Sociological Research* (*CIS*), as well as *Eurobarometers*. Thus, according to the *Pre-electoral Barometer of the General Elections* published in October 2019 (*CIS*, 2019), problems related to politicians in general, parties, and politics were the second issue that most concerned Spaniards. In this line, the *Eurobarometer* (*Comisión Europea*, 2021) showed that 90% of Spaniards distrust political parties and 75% distrust the government and also would not give the local administration a passing grade.

The crisis of political representation is a topic widely addressed by the scientific literature, being not only a problem of trust, as Villoria indicates,

> "given that distrust towards political power is necessary and positive for democracy, because it leads us to demand transparency to hinder the abuse of power" ["*dado que la desconfianza frente al poder político es necesaria y positiva para la democracia, porque nos lleva a demandar transparencia para dificultar el abuso de poder*"] (**Villoria**, 2018, p. 17),

but also of lack of interest that, as **Mair** (2008) points out, results in the citizens' feeling of indifference when it comes to the field of politics.

In Spain, there are two phenomena that represent a turning point:

- the 15M movement or the *indignados* movement revealed the breakdown of some of the political instruments that had taken shape during the Spanish Democratic Transition such as: the role of the parties, the role of civil society, and, especially, the idea of participation, "which never came to involve a substantial part of the public" ["*que nunca llegó a implicar a una parte sustancial de la ciudadanía*"] (**Monge-Lasierra**, 2021, p. 13); and
- the holding of the 2015 general elections that sparked "an implosion of the party system" ["*una implosión del sistema de partidos*"] (**Giménez-Glück**, 2019, p. 23).

Its most immediate effect was the entry of new political parties into the institutions (**Lobera-Serrano**; **Rogero-García**, 2017). *Podemos* and *Ciudadanos*, with almost 35% of the votes (**Orriols**; **Cordero**, 2016), entered the institutional sphere with a differential approach rooted in the regeneration of democracy. These new parties demanded greater transparency and participation to address disaffection, which forced the traditional parties to adopt strategies to adapt to the new demands (**Rodríguez-Teruel** *et al.*, 2010).

Podemos proposed the creation of Citizens' Councils in different sectoral and cross-sectional areas in all of the autonomous communities, the creation of a Petitions Commission, and the implementation of new digital tools for citizen participation. In turn, *Ciudadanos* proposed reforming the *Law on political parties* to guarantee greater internal democracy and more transparency and the *Law* on the people's legislative initiative so as to facilitate this type of procedure, as well as to encourage citizen participation at the local level.

From there, according to **Villoria** (2018), the third generation of deontological values of public service –which incorporates democratic elements such as participation, collaboration, accountability, and transparency– was established. All of this could be directed at recovering the revolutionary idea of the mid-eighteenth century, according to which representative institutions are based on the idea that "the people should govern themselves" ["*el pueblo debía gobernarse a sí mismo*"] (**Przeworski**, 2010, p. 33), taking an active part in decision-making, in an informed way (**Kosack**; **Fung**, 2014). This fact would be tied to the promotion of institutions that encourage the public to innovate and produce public goods (**Acemoglu**; **Johnson**; **Robinson**, 2005).

As a result, as **Maravall** (2013) points out, an increase in transparency and participation was expected, not only in the political parties' platforms but also in their actions and communication so as to fulfill their campaign promises. Thus, it should be a goal for institutions and parties to implement structural instruments (**Bauhr**; **Grimes**, 2014) in the area of transparency and participation.

Nevertheless, Díez-Garrido, Campos-Domínguez, and Calvo-Miguel conclude that all political parties tout transparency in their election platforms, but there is, with the exception of *Podemos*,

> "a significant dissonance with what they show on their digital platforms" ["*una importante disonancia con lo que demuestran en sus plataformas digitales*"] (**Díez-Garrido**; **Campos-Domínguez**; **Calvo**, 2019, p. 44).

In this line, **Meca-Valles**, **Guzmán-Raja**, and **Guzmán-Raja** (2021) reveal a low level of transparency on most of the political parties' websites.

Overcoming the representation crisis involves a rapprochement with citizens and the restoration of areas of interaction (**Mair**, 2008). This is only possible through greater transparency and participation in the political and institutional sphere, since administrations that tout it are considered to be efficient and better quality (**Hood**; **Heald**, 2006; **Calvo-Gutiérrez**, 2013; **Villoria**, 2018; **Barredo-Ibáñez** *et al.*, 2022). In addition, transparency and participation are key tools for representation and accountability (**Bauhr**; **Grimes**, 2014), which lie at the heart of the public's concerns (**Ignazi**, 2021).

Moreover, transparency and participation are an act of communication (**Frank**; **Oztoprak**, 2015). One of the essential principles of representative democracy is freedom of public opinion, and to achieve this, it is necessary for the media and citizens to have access to public and political information (**Manin**, 1997) to reduce information asymmetries (**Bauhr**; **Grimes**, 2014), which can certainly be enhanced with proper use of ICT (**Bertot**; **Jaeger**; **Grimes**, 2012).

1.2. Municipal communication, transparency, and participation: *Infoparticipa Map*

At the municipal level, there are different precedents focused on transparency and accountability through websites and transparency and citizen participation portals, driven by *Law 19/2013 on Transparency, access to information, and good governance* and the autonomous and local legislations that have followed it.

Catalonia was one of the first to create regulations on transparency (*Law 19/2014 on Transparency, access to public information, and good governance*). This regulation was recently complemented with *Decree 8/2021 on Transparency and the right of access to public information*, aimed at a more homogeneous, effective, and comprehensive implementation of the *Law* by establishing monitoring mechanisms (*Interdepartmental Commission on Transparency and Open Government* and the *Directive Unit of the Administration of the Government regarding transparency*).

In turn, Murcia also soon proposed a regulation on transparency and participation (*Law 12/2014 on Transparency and citizen participation*), creating an interdepartmental commission for the planning, coordination, and approval of the *Law* and an *Office of Transparency and Citizen Participation* for its implementation. In addition, it included a disciplinary and sanctioning system.

The Community of Valencia's first regulation was in 2015 (*Law of Transparency, good governance, and citizen participation*). More recently, *Law 1/2022 on Transparency and good governance* has been passed, partially repealing the previous law, guaranteeing transparency (in regards to both active publicity and right of access), regulating the *Valencian Transparency Council* and the system of guarantees and responsibilities for noncompliance with the law, establishing mechanisms for monitoring and sanctioning.

The Community of Madrid, in turn, has a more recent regulation (*Law 10/2019 on Transparency and citizen participation*) that establishes a mechanism that allows the *Transparency and Participation Council* to function independently. It also includes a system of violations and penalties.

One of the longest-running lines of research is the *Infoparticipa Map*, which has its own system for evaluating public information applied to municipal communication, originating prior to *Law 19/2013*. This methodology defines indicators for evaluating municipal websites (**Molina-Rodríguez-Navas**; **Simelio-Solà**; **Corcoy-Rius**, 2017; **Corcoy-Rius**, 2018; **Carrascosa-Puertas**; **Simelio-Solà**, 2019), broken into two groups (transparency and participation). Those municipalities that comply with more than 90% of the indicators receive the Infoparticipa seal each year (Table 1).

Table 1. The evolution of *Infoparticipa* seals

Years / Autonomous communities	2013	2014	2015	2016	2017	2018	2019	2020
Catalonia	36	67	61	77	92	98	113	121
Community of Madrid	-	-	-	-	-	9	5	6
Community of Valencia	-	-	-	-	-	4	7	9
Region of Murcia	-	-	-	4	6	6	8	9

Previous studies that applied this methodology reveal that, even with an improvement in institutional communication, there is still room for improvement (**Fernández-Falero** *et al.*, 2017; **Bruno-Carlos**; **Alonso-Romero**, 2020; **Beltrán-Orenes**; **Rodríguez-Mateos**, 2021), in terms of both transparency (**Moreno-Sardà**; **Molina-Rodríguez-Navas**; **Simelio-Solà**, 2017) and participation (**Paricio-Esteban** *et al.*, 2020).

Previous studies have focused on individual autonomous communities, not providing comparative results or addressing the parties' possible influence in the local public sphere when it comes to promoting transparency and participation on online channels, thereby giving this study distinctive insight.

2. Objectives, hypotheses, and methodology

This study arises from the following question: Does the type of governing political party influence transparency and participation through municipal websites? To answer this question, this paper aims to analyze different Spanish autonomous communities' municipalities' use of these channels to promote transparency and citizen participation, with a special emphasis on the influence of the old party-new party and left-right axes on these results.

In this sense, the study raises two starting hypotheses, following the review of previous studies that relate greater transparency and participation to parties located on the left of the political spectrum (**Guillamón**; **Bastida**; **Benito**, 2011; **García-Sánchez**; **Frías-Aceituno**; **Rodríguez-Domínguez**, 2013; **Tejedo-Romero**; **Ferraz-Esteves-Araujo**, 2018), and studies that link them to new parties (**Martín-Cavanna**; **Martisi**, 2018). In turn, **García-Santamaría** and **Martín-Matallana** (2017) and **Díez-Garrido**, **Campos-Domínguez**, and **Calvo** (2019) stress the idea that there is no particular political party that in itself is more transparent.

> H1: It is assumed that there are differences in terms of transparency and participation on municipal websites and transparency portals depending on the governing political party according to its ideology (left/right).
>
> H2: It is assumed that the municipal websites of towns governed by new parties whose founding principles are based on the regeneration of democracy and a commitment to transparency and greater citizen participation will have higher levels of transparency and participation.

The general objectives of the research are:

1. To determine the degree of transparency and participation of municipal websites and portals paying particular attention to the communities under study.
2. To determine the possible influence of the governing political party on the transparency and participation of municipal websites and portals considering two axes: right-left and new party-old party.
3. To observe whether there are differences among the autonomous communities analyzed in terms of the transparency and participation of municipal websites according to the right-left and new political party-old political party axes.
4. To determine whether population size affects the transparency and participation of the municipal websites of the communities analyzed.

2.1. Research corpus

The research universe was made up of Spanish municipal websites, selecting a sample of four autonomous communities in Spain that are diverse in terms of the following criteria:

- Population density. The autonomous communities with the highest population density are the Balearic Islands, the Canary Islands, Catalonia, the Community of Valencia, Madrid, Murcia, and the Basque Country (*INE*, 2021). Of these, only the following participated in the *Infoparticipa Map* during the period under analysis: Catalonia, Valencia, Madrid, and Murcia.

- Out of all of the municipalities in these communities, those with more than 10,000 inhabitants were selected on the basis of previous studies (**Moreno-Sardà**; **Molina-Rodríguez-Navas**; **Simelio-Solà**, 2017; **Paricio-Esteban** *et al.*, 2020) that indicate that, below that population, the lack of resources can influence website management.
- Furthermore, in relation to the research objectives, only localities governed by a political party have been selected.

The research corpus is made up of 221 municipalities, and as shown in Table 2, the map of political parties is made up of national and regional parties.

Table 2. Selected political parties

Catalonia (108 municipalities)	**Community of Valencia** (39 municipalities)	**Community of Madrid** (45 municipalities)	**Region of Murcia** (29 municipalities)
Partido Popular	*Partido Popular*	*Partido Popular*	*Partido Popular*
PSOE	*PSOE*	*PSOE*	*PSOE*
Ciudadanos	*Ciudadanos*	*Ciudadanos*	*Ciudadanos*
Unidas Podemos	*Unidas Podemos*	*Unidas Podemos*	*Unidas Podemos*
Izquierda Unida	*Izquierda Unida*	*Izquierda Unida*	*Izquierda Unida*
ERC	*Compromís*		
Junts x Cat			

Note: *PSOE*: *Partido Socialista Obrero Español.*
ERC: *Esquerra Republicana de Catalunya.*
Junts x Cat: *Junts per Catalunya.*

2.2. Methodology

Regarding objectives 1 and 2, we applied the methodology of the *Infoparticipa Map* (2020), divided into two groups: transparency and participation (see Annex). Data collection was carried out by different members of the Infoparticipa team, and to monitor the homogeneity of criteria, we used the guidelines published on the *Universitat Autònoma de Barcelona* website, where spot checks are carried out.

A categorical content analysis (**Bardin**, 1986) was carried out, designing a codebook differentiating five variables:

- Overall compliance (48 indicators)
- Overall compliance in regard to transparency (indicators 1-34) with particular attention to indicators 3, 4, 5, 6, 7, and 8
- Overall compliance in regard to participation (indicators 35-48)
- Overall compliance in regard to political parties according to left-right axis as shown in Table 3 (48 indicators and specific analysis of indicators 3, 4, 5, 6, 7, and 8)
- Overall compliance in regard to political parties according to old-new axis as indicated in Table 4 (48 indicators and specific analysis of indicators 3, 4, 5, 6, 7, and 8)

Table 3. The different political parties' location along the right-left axis according to the population surveyed by the *CIS*

Party	**Average**	**Standard deviation**	***N***
PSOE	4.0	1.6	3,903
Partido Popular	7.8	1.3	3,959
Podemos	2.4	1.4	3,825
Izquierda Unida	2.3	1.3	3,750
Ciudadanos	6.7	1.7	3,676
ERC (in Cataluña)	3.0	1.6	579
Junts per Cat (in Cataluña)	5.4	2.0	547
Compromís (in the Community of Valencia)	2.7	1.6	325

Source: *Post-electoral barometer for general elections 2019* (*CIS*, 2019).

When establishing a classification of the new and old parties, a distinction was made between national and regional parties (Table 4).

Table 4. Classification of political parties in Spain according to old-new axis with reference bibliography

Older parties Spain	**New parties Spain**	**Source**
PSOE	*Podemos*	**Calle-Collado** (2016) **Rama-Caamaño** (2016) **Rama-Caamaño**; **Reynaers** (2019)
Partido Popular	*Ciudadanos*	
Izquierda Unida	*Vox*	
Old parties within autonomous communities (CCAA)	**New parties within autonomous communities (CCAA)**	**Source**
ERC	*En Comú Podem*	**Barberà**; **Barrio**; **Rodríguez** (2009) **Martín-Cubas** *et al.* (2017) **Colomer** (2018) **Fernández-Castaño**; **González-Torrecillas**; **García-Moreno** (2018) **López-Díaz** (2021)
	Compromís	
	Junts per Cat	
	Candidatura d'Unitat Popular (*CUP*)	

With respect to objectives 2, 3, and 4, a statistical treatment of data was carried out. To analyze the influence of political party, autonomous community, and population size on transparency and participation, we used the ordinary least-squares (OLS) linear regression method and considered the "percentage of compliance" as the dependent variable. This variable was calculated according to the total percentage of indicators with which the municipalities complied.

> The proximity of local entities leads to a greater capacity of their governments to generate trust relationships with citizens where transparency is a key element

Two different models were designed. In model A, the independent variables are new, right, and population; in model B, the "autonomous community" effect was taken into account, as well. For this, a dummy variable was used for each community, taking Catalonia as a reference. The description of the independent variables, common to both models, is as follows:

The variable "new" ["*nuevo*"] is a dummy variable that has a value of 1 if the political party is considered newly created and 0 if it is considered old (Table 4).

- The variable "right" ["*derecha*"] is a continuous variable that indicates the perception that citizens have of whether the governing party is ideologically more right-wing or less right-wing (value between 1 and 10, with being closer to 10 being considered the more right-wing); this was obtained from the CIS barometer from December 2019 (Table 3).
- Regarding the variable "population" ["*población*"], the number of inhabitants in the municipality in the year *Infoparticipa Map* collected the data has been taken into account. Table 5 presents the descriptive statistics for the variables mentioned.

Table 5. Descriptive statistics of the variables

	N	Minimum	Maximum	Average	Standard deviation
Percentage	221	8.33	100	59.66	27.43
New	221	0	1	0,19	0.39
Right	221	2,3	7.8	4.71	1.76
Population	221	10,039	3,266,126	69,307.35	252,376,83
DCCAAC (Catalonia)	221	0	1	0.49	0.501
DCCAACV (Community of Valencia)	221	0	1	0.18	0.382
DCCAAMU (Murcia)	221	0	1	0.13	0.338
DCCAAMA (Community of Madrid)	221	0	1	0.20	0.404

The models used, in which Y (dependent variable) is the percentage of compliance, are outlined below:

- Model A: $Y = \beta_0 + \beta_1 NEW + \beta_2 RIGHT + \beta_3 POPULATION + \varepsilon$
- Model B: $Y = \beta_0 + \beta_1 NEW + \beta_2 RIGHT + \beta_3 POPULATION + \beta_4 DCCAACV + \beta_5 DCCAAMU + \beta_6 DCCAAMA + \varepsilon$

Before estimating the regressions, collinearity tests were performed on the variables to determine whether there might be a correlation problem between them, but no correlation was found.

As pointed out by **Cea-D'Ancona** (2002), the tolerance statistic, whose values are between 0 and 1, would indicate a multicollinearity problem if the value were close to 0.2. The test results show that the independent variables lack such a problem; the same is true for the variance inflation factor, which would indicate that there is a problem for values greater than 5.

Table 6. Collinearity test

Coefficients			
Model		Collinearity statistics	
		Tolerance	Variance inflation factor
1	(Constant)		
	New	0.887	1.127
	Right	0.730	1.369
	Population	0.978	1.022
	DCCAACV	0.790	1.266
	DCCAAMU	0.755	1.325
	DCCAAMA	0.633	1.580

3. Results

3.1. Overall results of overall compliance with transparency and participation indicators of the websites and portals of the four communities studied

First, the overall compliance results for all the autonomous communities are presented. Regarding compliance with the 48 indicators analyzed, 59.72% showed compliance of more than 50%, while 32.12% were between 75% and 100% (Figure 1).

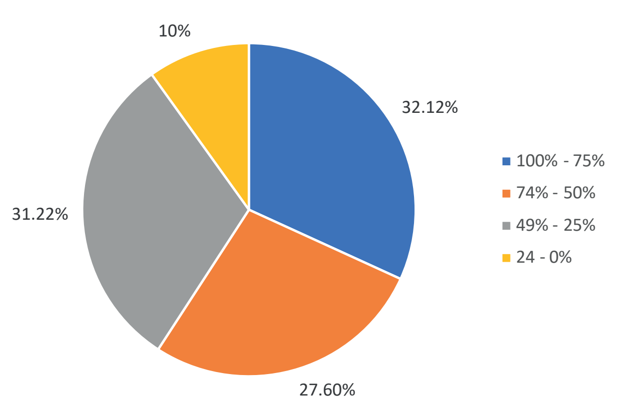

Figure 1. Overall transparency compliance

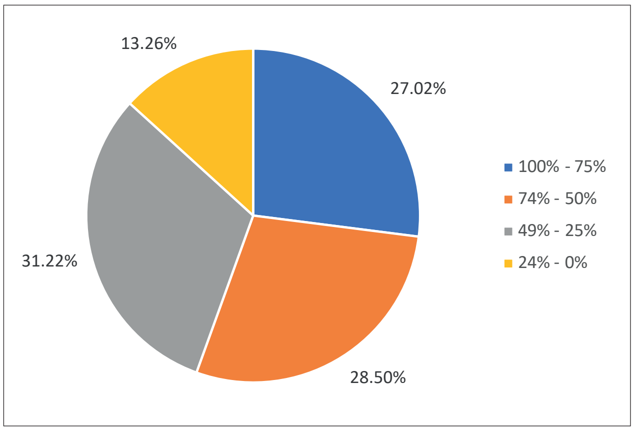

Figure 2. Overall participation compliance

Regarding the transparency indicators (from 1 to 34), 63.92% of the municipal websites had compliance of over 50%, while 35.41% were between 75% and 100%.

Regarding the indicators related to the transparency of public offices linked to political parties (3, 4, 5, 6, 7, and 8), compliance of 60.38% was observed. When analyzing the indicators related to the government team, 78.39% of the municipal websites published the name, photo, and party (indicator 3), while 52.25% presented biographies (indicator 4).

Regarding the opposition, 73.87% of the websites published the name, photo, and party (indicator 5), while 45.49% presented biographies (indicator 6). Only 35.74% published the elected officials' salaries (indicator 7) on their websites. In addition, the statements of activities and assets of elected officials (indicator 8) appeared on 40% of the websites.

Finally, regarding the participation indicators (from 35 to 48), the municipalities that complied with more than 50% of the indicators represented 55.53%, with 27.02% above 75%.

Regarding the general compliance with the transparency and participation indicators according to autonomous community, in Catalonia, 84.08% of the municipalities had a compliance rate of over 50%, while 52.77% exceeded 75%. In the Community of Valencia, 35% of the municipalities had a compliance rate of over 50%, while only 5% exceeded 75%. In the Community of Madrid, 46.67% of the municipalities had a compliance rate of over 50%, while 15.55% exceeded 75%. Finally, in the Region of Murcia, 45.81% of the municipalities had a compliance rate of over 50%, while 17.24% exceeded 75%.

The main results for the group of transparency indicators are presented below by autonomous community. In Catalonia, 78.62% of the municipal websites showed compliance above 50%: 52.77% had compliance above 75%, and 26.85%, between 50% and 74%. A total of 19.44% registered compliance between 49% and 25%, and there was only one municipality (Sant Adrià de Besòs) below 24%.

In the Community of Valencia, the Community of Madrid, and the Region of Murcia, the majority of municipal websites had below 50% compliance. Thus, in the Community of Valencia, 5.12% complied with 75% to 100%, and 30.76% complied with between 50% and 74%. Of the towns, 56.41% were in the range between 49% and 25%, and there were only two municipalities below 24% (Alginet and Benissa).

In the Community of Madrid, 35.5% of the populations were between 49% and 25%, and 17.77% were below 24%. Of the websites,

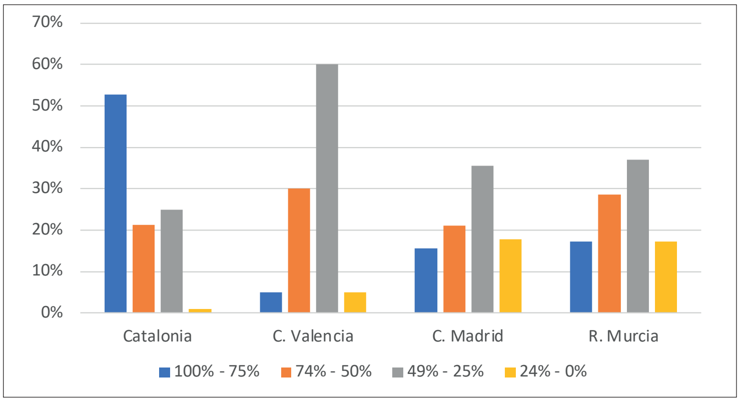

Figure 3. Compliance on municipal websites according to autonomous community

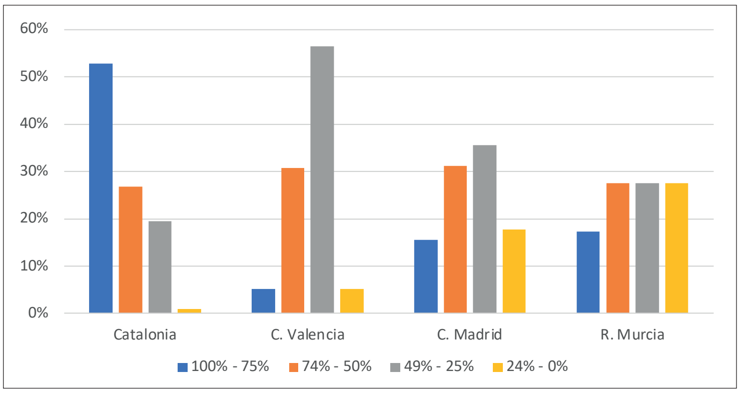

Figure 4. Compliance with transparency indicators according to autonomous community

15.55% complied with 75% to 100%, and 31.1%, between 50% and 74%. Finally, in the Region of Murcia, 17.24% complied with 75% to 100% of the indicators, 27.58% of which were between 50% and 74%. Of the populations, 27.58% were in the range between 49% and 25%, and 27.58% were below 24%.

With regard to participation, in Catalonia, 79.56% of the sites had greater than 50% compliance: 55.56% of municipal sites were between 75% and 100%, 24% between 50% and 74%, and 19.44% between 49% and 25%, while there was only one municipality (Sant Adrià de Besòs) below 24%.

In the rest of the communities, the majority recorded compliance of less than 50%. In the Community of Valencia, 5.12% of the municipal websites complied with 75-100% and 30.76% complied with between 50% and 74%. Of the towns, 61.53% were in the range between 49% and 25%, and 2.58% were below 24%. In the Community of Madrid and the Region of Murcia, the percentages of compliance with transparency were the same.

3.2. Compliance with transparency and participation indicators by governing party according to the right-left axis in the communities as a whole

First, the results of the parties associated with the right of the axis are presented.

In the case of municipalities governed by *Partido Popular*, the percentage of websites that passed (49%) and failed (51%) in terms of transparency and participation is similar. Only three municipalities had a degree of compliance between 75% and 100% (Majadahonda and Pozuelo de Alarcón in the Community of Madrid and Caravaca de la Cruz in the Region of Murcia), and 6 below 24% (Arroyomolinos, Colmenar, San Agustín del Guadalaix, and Valdemorillo in the Community of Madrid, Benissa in the Community of Valencia, and Ceutí in the Region of Murcia).

The majority of the towns in which *Ciudadanos* was the governing party failed when it came to transparency and participation (80%). Only one municipality (Valdemoro in the Community of Madrid) was between 50% and 74%.

In contrast to these data, 87.5% of the municipalities governed by *Junts per Catalunya* passed when it came to transparency and participation, with more than half of them scoring between 75% and 100%. Only three municipalities registered compliance between 25% and 49% (Santa Coloma de Farners, Tordera, and Valls in Catalonia).

The results of the municipalities governed by parties linked to the left of the axis are presented below. Of the towns governed by PSOE, 62% passed when it came to transparency and participation (31 municipalities between 75% and 100% and 30 between 50% and 74%). A total of 38% failed (25 between 25% and 49% and 12 below 24%).

Similar data were found in the municipalities governed by the *ERC*, where 65.7% complied with more than 50% of the indicators (15 between 75% and 100% and 8 between 50% and 74%). Only 12 municipalities were between 25% and 49%.

In the case of *Compromís*, 40% of the websites complied with more than 75% of the indicators, whereas 60% were below 49%.

The towns governed by *En Comú* mostly passed when it came to transparency and participation (77.7%), with 4 municipalities between 75% and 100% and 3 between 50% and 74%. Only 2 municipalities were between 25% and 49% (Pallejà and Santa Perpètua de Mogoda).

Finally, the municipalities governed by *Izquierda Unida* recorded compliance of less than 49%.

Below are the results of the analysis focused on indicators 3, 4, 5, 6, 7, and 8 related to the transparency of the government team and the opposition, according to the ideology of the governing party (right-left axis).

Starting with the parties on the right of the political spectrum, 77.27% of the total number of municipalities governed by *Partido Popular*

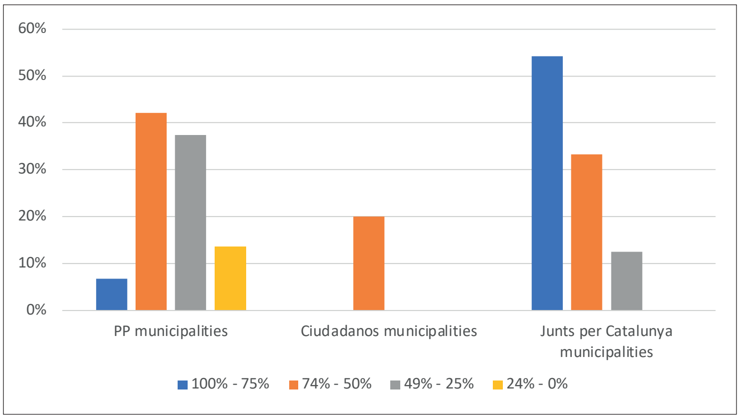

Figure 5. Compliance in websites of municipalities governed by parties located on the right of the axis

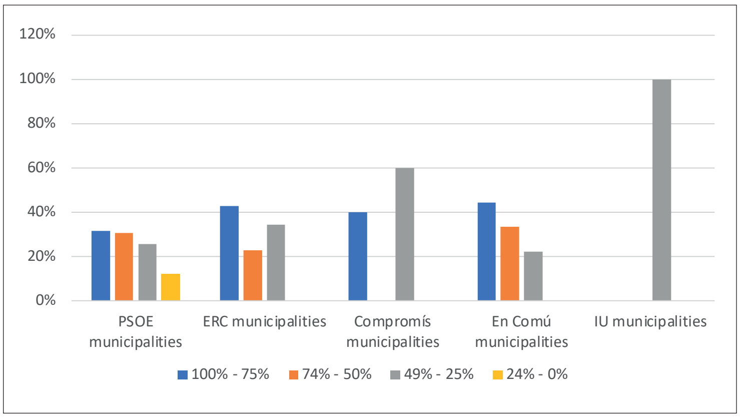

Figure 6. Compliance in websites of municipalities governed by parties located on the right of the axis

(44 municipalities) complied with indicator 3. Regarding indicator 4, the level of compliance dropped to 40.9%. In total, 65.9% complied with indicator 5, and compliance with indicator 6 reduced to 43.18%. Only 13.63% of the websites complied with indicator 7, and 27.27% with indicator 8.

> Most of the municipalities approve in transparency and participation

A total of 40% of the municipalities governed by *Ciudadanos* (5) complied with indicator 3. Regarding indicator 4, the level of compliance dropped to 20%. With respect to indicator 5, 60% were compliant, and for indicators 6 and 7, compliance reduced to 20%. Finally, with regard to indicator 8, 40% have published these statements.

Meanwhile, of the total number of municipalities governed by *Junts per Catalunya* (24 municipalities), 95.83% complied with indicator 3. Regarding indicator 4, the level of compliance dropped to 79.16%. Of the municipalities, 95.83% complied with indicator 5, 75% with indicator 6, and 50% with indicator 7. Finally, with respect to indicator 8, 62.5% were in compliance.

Continuing with the parties on the left, in relation to PSOE (98), 26% of the websites complied with indicator 3, and indicator 4 reached 52%. A total of 69.38% complied with indicator 5, and 39.79% with 6. Finally, indicators 7 and 8 were published by 41.8%.

Of the total number of municipalities governed by the *ERC* (35), 85.71% complied with indicator 3, 54.28% with indicator 4, 88.57% with indicator 5, and 48.57% with indicator 6. Only 34.28% complied with indicator 7. Finally, with regard to indicator 8, 65% had published these statements.

In the towns governed by *Compromís* (4), 50% complied with indicator 3, and 25% with indicator 4. In total, 50% of the countries complied with indicator 5, indicator 6 was half that (25%), 60% complied with indicator 7, and 50% complied with indicator 8.

In turn, all the municipalities governed by *En Comú* (9) complied with indicator 3, 66.66% with indicator 4, and 88.88% with indicator 5; indicators 6 and 7 were reduced to 66.66%. Finally, 55.55% had published indicator 8.

All towns governed by *Izquierda Unida* (2) complied with indicator 3. In relation to indicators 4 and 5, the level was 50%. None of them complied with indicators 6, 7, and 8.

3.3. Compliance with transparency and participation indicators by governing party according to the old party-new party axis in the communities studied as a whole

In localities governed by old parties (*Partido Popular*, *PSOE*, *Izquierda Unida*, and *ERC*), the average compliance with transparency and participation indicators was 44.17%. However, differences can be observed: Whereas, in the municipalities governed by PSOE and the *ERC*, most of the websites registered compliance above 50% (62% and 65.7%, respectively), only 49% registered compliance in those governed by *Partido Popular*, and none of those governed by *Izquierda Unida* did.

Table 7. Compliance of websites of municipalities governed by old parties with transparency and participation indicators

Levels of compliance	Percentage of *Partido Popular* municipalities	Percentage of *PSOE* municipalities	Percentage of *Izquierda Unida* municipalities	Percentage of *ERC* municipalities
100% to 50%	49	62	0	65.7
49% to 0%	51	38	100	34.3

In the towns governed by the new parties (*Ciudadanos*, *Junts per Catalunya*, *Compromís*, and *En Comú*), the average compliance rate was 71.8%. However, differences were also found: More than half of the towns governed by *Junts per Catalunya* and *En Comú* registered compliance levels above 50% (87.5% and 77.77%, respectively) on their websites, compared with *Ciudadanos* and *Compromís*, where the majority were below that.

Table 8. Compliance of websites of municipalities governed by new parties with transparency and participation indicators

Levels of compliance	Percentage of *Ciudadanos* municipalities	Percentage of *Junts per Catalunya* municipalities	Percentage of *Compromís* municipalities	Percentage of *En Comú* municipalities
100% to 50%	20	87,50	40	77.77
49% to 0%	80	12,50	60	22.23

Finally, we present the results centered exclusively around indicators 3, 4, 5, 6, 7, and 8 according to the old party-new party axis.

Beginning with the results related to the indicators on the governing team (3 and 4), with respect to the old parties (*Partido Popular*, *PSOE*, *Izquierda Unida*, and *ERC*), the average compliance with indicator 3 on the municipal websites was 72.24% (it was below 30% only in municipalities governed by *PSOE*). With respect to indicator 4, the average compliance rate was 49.29% (with only *Partido Popular* below 50%).

Regarding the indicators related to the information about the opposition (indicators 5 and 6), the average compliance with indicator 5 was 68.46%, that of indicator 6 was 32.88% (0% on the websites of the municipalities governed by *Izquierda Unida*), and that of indicator 7 was 32.4%.

Finally, in relation to indicator 8 (declaration of assets of government and the opposition), the average stood at 33.7% (only *ERC* passed, and the case of *Izquierda Unida* sticks out with 0% compliance).

Table 9. Compliance on municipal websites with indicators 3, 4, 5, 6, 7 and 8 when it comes to the old parties (in percentage)

Political parties	*Partido Popular*	*PSOE*	*Izquierda Unida*	*ERC*
Indicator 3	77.27	26.00	100	85.71
Indicator 4	40.90	52.00	50	54.28
Indicator 5	65.90	69.38	50	88.75
Indicator 6	43.18	48.57	0	48.57
Indicator 7	13.63	34.28	0	34.28
Indicator 8	27.27	65.71	0	65.71

In turn, in the towns governed by the new parties (*Ciudadanos*, *Junts per Catalunya*, *Compromís*, and *En Comú*), the average compliance with indicator 3 was 71.45% (only the websites of the municipalities governed by *Ciudadanos* had a compliance of less than 50%). With respect to indicator 4, the average compliance rate was 47.7% (municipalities governed by *Ciudadanos* and *Compromís* were below 25%, whereas *Junts per Catalunya* and *En Comú* exceeded 50%).

Regarding the indicators related to information about the opposition (indicators 5 and 6), the average compliance with indicator 5 was 73.67% (all parties above 50%), and that of indicator 6 was 46.65% (municipalities governed by *Ciudadanos* and *Compromís* had compliance below 25%, whereas *Junts per Catalunya* and *En Comú* had compliance above 50%).

With regard to indicator 7 on information on elected officials' salaries, 51.6% of the websites of municipalities governed by these political parties did comply with this indicator, the most noteworthy being the municipalities governed by *Ciudadanos*, where only 20% of the websites published this information.

Finally, in relation to indicator 8 (declaration of assets of the government and the opposition), the average stood at 52% (only municipal websites in towns governed by *Ciudadanos* failed).

Table 10. Compliance on municipal websites with indicators 3, 4, 5, 6, 7, and 8 when it comes to the new parties (in percentage)

Political parties	*Ciudadanos*	*JuntsXCat*	*Compromís*	*En Comú*
Indicator 3	40	95.83	50	100
Indicator 4	20	79.16	25	66.66
Indicator 5	60	95.83	50	88.88
Indicator 6	20	75.00	25	66.66
Indicator 7	20	50.00	60	66.66
Indicator 8	40	62.50	50	55.55

3.4. Results of the influence of the profile of the mayors, the population of the municipality, and the autonomous community on transparency and municipal participation

The results of the two regressions performed (model A and B) are detailed below. As can be seen, two of the independent variables are related to political party (new and right). Although one might assume that the mayors of different municipalities behave differently, even though they belong to the same political party, an Anova test of differences in variances was performed to see how similar behavior was within each party.

Table 11. Anova test results

Anova					
Percentage					
	Sum of squares	Df	Root mean square	F	Sig.
Between groups	20,745.065	7	2,963.581	4.357	0.000
Within groups	144,884.453	213	680.209		
Total	165,629.518	220			

According to the test result, the differences between the various political parties were significantly greater than the differences within each party, indicating that mayors belonging to the same party will have similar behavior.

In contrast, the results of regression models A and B (Table 12) were quite different if the effect of the autonomous community is taken into account.

As can be seen in Table 12, in model A, where no distinction is made between autonomous communities, all the variables were significant, although the "new" variable was significant only at a 95% confidence level. This significance would imply that, if the municipality is governed by a new party, a party considered more left-wing (the coefficient *ß* of the "right" variable is negative), the larger the municipality, the higher the percentage of compliance.

In model B, the variables for the autonomous communities of Valencia, Murcia, and Madrid were introduced, and Catalonia was taken as a reference, demonstrating that the variables related to political parties are no longer significant. However, the size of the municipality continues to be a variable that explains the highest percentage of compliance. With respect to the three autonomous communities, the results were significant and had negative coefficients, that is, the Catalan municipalities had a higher percentage of compliance. If, moreover, the increase in R^2 in model B is considered, the municipality's being located in Catalonia was more determinant for the percentage of compliance.

The goodness-of-fit measures for models A and B are presented below.

Table 12. Linear regression analysis (OLS) of overall compliance level

	Model A *β p*	Model B *β p*
Constant	**	**
New	0.157 *	0.002 ns
Right	–0.223 **	0.042 ns
Population	0.202 **	0.231 **
DCCAACV		–0.436 **
DCCAAMU		–0.323 **
DCCAAMA		–0.484 **
Adjusted *R* squared	10.1%	31.4%

** = $p < 0.01$; * = $p < 0.05$; ns = nonsignificant

Table 13. Goodness of fit for model A

R	R^2	Adjusted R^2	Standard error estimate	Statistics of change	
				Change in R^2	Change in *F*
0.336	0.113	0.101	26.019367560483620	0.113	9.216

Anova					
Model	**Sum of squares**	**df**	**Root mean square**	***F***	**Sig.**
Regression	18,718.893	3	6,239.631	9.216	0.000
Residue	146,910.625	217	677.007		
Total	165,629.518	220			

Table 14. Goodness of fit for model B

R	R^2	Adjusted R^2	Standard error estimate	Statistics of change				
				Change in R^2	Change in *F*	df1	df2	Sig. Change in *F*
0.577	0.333	0.314	22.724316	0.333	17.790	6	214	0.000

Anova					
Model	**Sum of squares**	**df**	**Root mean square**	***F***	**Sig.**
Regression	55,121.078	6	9,186.846	17.790	0.000
Residue	110,508.440	214	516.395		
Total	165,629.518	220			

Regarding goodness of fit, the significance associated with the *F* ratio was less than 0.05 in both models, which implies that the prediction of the dependent variable was not due to chance but rather that the estimated regression was statistically significant, as indicated by **Cea-D'Ancona** (2002).

4. Discussion and conclusions

The main conclusions of the research conducted are presented below. Regarding objective 1, to determine the degree of transparency and participation of municipal websites, we conclude that the majority of them passed when it came to transparency and participation, in line with previous studies –such as **Cabezuelo-Lorenzo**, **Rey-García**, and **Tapia-Frade** (2016), focused on municipalities of Castilla y León that had more than 10,000 inhabitants; **Martínez-Rolán**, **Piñeiro-Otero**, and **Baamonde-Silva** (2016) in Galician municipalities of more than 30,000; and **Herrero-Gutiérrez** and **Ruano-López** (2017) on the Community of Madrid in towns of more than 20,000– in which positive results with room for improvement are observed.

On the other hand, this contradicts studies such as those of **Ruano-López** *et al.* (2016), **Manfredi-Sánchez** *et al.* (2016), and **Fernández-Falero** *et al.* (2017) that analyze the municipalities of the Balearic Islands, Castilla La Mancha, and Extremadura and the Community of Valencia, respectively; in these, it is concluded that the majority present significant deficits in terms of transparency and participation.

> There is greater transparency and participation in the websites of the municipalities governed by the new parties, but not in all the municipalities

It is worth noting the lack of information from municipal elected officials regarding the publication of their statements of activities and assets. In addition, differences were found in relation to the degree of transparency of the government and the opposition, with the opposition being lower (biographies in particular).

It was observed that there was higher compliance with transparency indicators compared with participation indicators –contrasting with the study by **Paricio-Esteban** *et al.* (2020)– not taking advantage of websites' role in encouraging local participation (**Rodríguez-Breijo**; **Vadillo-Bengoa**; **Álvarez-Nobell**, 2015; **Jiménez**, 2017).

In terms of autonomous communities, the descriptive analysis showed unequal compliance, with most of the municipal websites, with the exception of Catalonia, failing and with the lowest compliance being in the Community of Valencia. For Catalonia, its longer track record, having its own autonomous legislation since 2014, could have played a role. This was not so in the Region of Murcia and, particularly, in the Community of Valencia (legislation was passed in 2014 and 2015, respectively).

In relation to objective 2, to determine the possible influence of the governing party on the transparency and participation of municipal websites, it was inferred that compliance with the indicators was greater on the left of the axis (the websites of most of the municipalities governed by *PSOE*, *ERC*, and *En Comú* passed) compared with the municipalities governed by parties ideologically to the right (only those led by *Junts per Catalunya* passed).

With regard to the statistical analysis, the results of model A also allowed us to conclude that transparency is determined by a party being located on the left of the ideological axis. This conclusion is in line with previous studies such as that of **Guillamón**, **Bastida**, and **Benito**, (2011) in which it was evidenced that populations with progressive governments are more transparent, contradicting other studies such as that of **García-Santamaría** and **Martín-Matallana** (2017), which emphasized that there are no differences between the most traditional parties and the new ones.

Considering the old party-new party axis, we can see that, although the average overall compliance on the websites of the municipalities governed by the new parties was higher, there were differences in those of the old ones (most of the municipalities governed by *PSOE* and *ERC* passed, compared with *Partido Popular*, where 51% failed, and *Izquierda Unida*, which all failed).

Regarding the statistical analysis, the results of model A also allowed us to conclude that the greater transparency and participation of municipal websites was influenced by the new parties

However, an important finding from the content analysis is that not all municipalities led by new political parties show the greater transparency and participation that they demanded to address public disaffection. This aspect would align with recent studies (**Díez-Garrido**; **Campos-Domínguez**; **Calvo**, 2019; **Meca-Valles**; **Guzmán-Raja**; **Guzmán-Raja**, 2021) regarding transparency on the websites of political parties that conclude that there is a significant dissonance between what they show on their digital platforms and their election platforms' promotion of transparency.

In particular, this fact illustrates a contradiction in parties such as *Ciudadanos*, which, according to **Orriols** and **Cordero** (2016), entered the institutional sphere with a differential approach rooted in the promotion of transparency and participation in decision-making, an approach which was replicated by *Compromís* (**Abellán-López**; **Pardo-Beneyto**, 2018).

With respect to transparency regarding public representatives in the government and the opposition, there were no major differences when it came to ideological axis and the old party-new party axis, with most of the parties coinciding in offering more information about the governing elected officials as opposed to the opposition (all of the old parties failed as did two new ones: *Ciudadanos* and *Compromís*).

A noteworthy finding is the coincidence in the lack of transparency in disclosing statements about assets among all of the national parties regardless of their ideology, with the websites of the regional parties being more transparent.

With regard to objective 3, to observe whether there are differences between the various profiles of autonomous communities, the descriptive analysis showed unequal compliance by autonomous community, with most of the websites analyzed failing. With respect to the statistical analysis, model B concluded that, by introducing the differentiation by autonomous community, the influence of the right-left and old party-new party axes disappeared. In this model, it was evident that the determinant for the transparency and participation of municipal websites was the town being in Catalonia (the longer history with respect to the *Infoparticipa Map* could play a part), in line with previous studies (**Rebolledo**; **Zamora-Medina**; **Rodríguez-Virgili**, 2017; **Curto-Rodríguez**, 2020).

In relation to objective 4, in which it was asked whether the size of the municipality has an influence, from the statistical analysis performed, in both model A and B, we conclude that the population is a determinant for the level of transparency on municipal websites, in line with previous studies (**Moreno-Sardà**; **Molina-Rodríguez-Navas**; **Simelio-Solà**, 2017; **Paricio-Esteban**; **Bruno-Carlos**; **Aznar**, 2021). This aspect seems logical since larger municipalities may have more resources at their disposal.

Based on the research findings, we continue on to validate hypothesis 1, which assumed that there would be differences in transparency and participation in municipal websites depending on the governing party according to its ideology. This would also validate the second hypothesis, in which it was assumed that there would be higher levels of transparency and participation on the websites of the towns governed by the new parties, with the exception of *Ciudadanos* and *Compromís*, where a contradiction with their founding principles was seen.

One limitation of the study is that municipalities governed in coalition were not included in the research corpus owing to the difficulty of establishing comparisons between parties in these towns. Another would be the inability to make a comparison of all the political parties in the autonomous communities.

The methodology used can be extrapolated to research in other autonomous communities, which could provide a more complete map of Spain as a whole.

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Annex. Indicators of transparency and participation

Indicators	Description
Indicator 1	Information about the mayor/mayoress: name and surname, photo and political party
Indicator 2	Basic information about the mayor: biography/cv
Indicator 3	Basic information on government representatives: name and surname, photo and political party
Indicator 4	Basic information on government representatives: biography/cv
Indicator 5	Basic information about the opposition: name and surname, photo and political party
Indicator 6	Basic information about the opposition: biography/cv
Indicator 7	Publication of remuneration of elected officials (government and opposition)
Indicator 8	Publication of declarations of activities and assets of elected officials (government and opposition)
Indicator 9	Publication of the mayor's institutional agenda
Indicator 10	Publication of contact details of members of the government (email, social networks, telephone)
Indicator 11	Publication of contact details of the opposition (email, social networks, telephone)
Indicator 12	Information on the composition of the governing bodies: plenary session, governing board and/or information commissions
Indicator 13	Information on the powers and work schedule of these bodies
Indicator 14	Publication of the complete political organization chart of the current mandate
Indicator 15	Publication of calls for municipal plenary sessions with the agendas
Indicator 16	Publication of the minutes of the Municipal Plenary
Indicator 17	Publication of the agreements of the Governing Board and/or the full minutes when the Governing Board acts on behalf of the plenary
Indicator 18	Publication of the Government Plan (acquired commitments)
Indicator 19	Publication of municipal regulations
indicator 20	Publication of urban regulations (land planning and land use)
Indicator 21	Publication of the Budget of the City Council for the current year and of the autonomous bodies and dependent entities
Indicator 22	Publication of information on the quarterly execution of the budget for the current year
Indicator 23	Publication of budget modifications made
indicator 24	Publication of information on compliance with budgetary stability and financial sustainability objectives and/or level of indebtedness?
indicator 25	Publication of the liquidation of the budgets of previous years and/or the general account
Indicator 26	Publication of the list of jobs and the remuneration of the workforce according to the categories
Indicator 27	Publication of the list and remuneration of management personnel, positions of trust and/or advisors to political groups, where appropriate, their duties and their CV
Indicator 28	Publication of the job offers of the city council, the development of public tenders and the results
Indicator 29	Publication of the general inventory of the town hall's assets
indicator 30	Publication of all formalized contracts (major and minor)
Indicator 31	Publication of the average period of payment to suppliers
Indicator 32	Publication of the grants awarded, calls and resolutions
Indicator 33	Publication of the agreements signed, specifying the parties, their purpose and the economic obligations that derive
Indicator 34	Publication of the cost and characteristics of institutional advertising campaigns in the media, advertisements, as well as agreements and/or signed agreements
Indicator 35	Publication of press releases on the day-to-day actions of members of the government related to management
Indicator 36	Publication of press releases on the actions of the opposition and/or political groups related to the control of government management
Indicator 37	Publication of journalistic information on the development of the plenary session
Indicator 38	Information about the history of the municipality
Indicator 39	Information on the situation of the municipality: municipal area, registered population, social diversity, economic and cultural activities
indicator 40	Agenda of municipal and citizen activities
Indicator 41	Publication of the contact with the person responsible for Press, Information and/or Communication of the Institution
indicator 42	Information on the Citizen Participation Regulation
Indicator 43	Directory of entities and associations of the municipality and/or the registry of interest groups
Indicator 44	Instruments for consultation and/or participation on current issues of local interest
indicator 45	Results of consultations and/or participation on current issues of local interest
Indicator 46	Charter of Services and commitments to the public
Indicator 47	Instruments to assess the services and to submit complaints or suggestions about their operation
Indicator 48	Results of the management of the evaluation of the services, of the complaints or suggestions presented

Fuente: *Mapa Infoparticipa* (2020)

Inflaming public debate: a methodology to determine origin and characteristics of hate speech about sexual and gender diversity on *Twitter*

Sergio Arce-García; María-Isabel Menéndez-Menéndez

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Sergio Arce-García
https://orcid.org/0000-0003-0578-9787

Universidad Internacional de La Rioja
Escuela Superior de Ingeniería y Tecnología (ESIT)
Avda. de la Paz, 137
26006 Logroño, Spain
sergio.arce@unir.net

María-Isabel Menéndez-Menéndez
https://orcid.org/0000-0001-7373-6885
Universidad de Burgos
Facultad de Humanidades y Comunicación
Paseo de los Comendadores, s/n
09001 Burgos, Spain
mimenendez@ubu.es

Abstract

This article is focused on the reproduction of ideologically charged messages whose origins or interests remain hidden from public opinion. There is an urgent need for transparency regarding polarised debates that deform, impede or distort the critical approach that any society should be able to construct concerning issues of great social interest, especially on social media platforms and networks. Research has shown that hostility has colonised digital communication through misogynist, homophobic, transphobic or xenophobic messages, among others, and that, for the most part, these are not spontaneous or individual interactions. In the virtual space, there are forces that, although invisible outside it, construct narratives, generate disinformation and feed generally regressive ideological approaches. Thus, in the name of transparency and social justice, there is an urgent need to investigate these types of messages, as well as their possible destabilising interests at a time of special presence and reputation of discourses such as the feminist one, which is currently experiencing a significant reactionary response. This paper investigates the origin and characteristics of the conversation on the social network *Twitter* concerning gender and sexual identities. To this end, we studied a significant sample of tweets (>1 million) related to women's rights, the LGBTIQ+ collective and trans people, for a full year. Computerised methodologies by means of machine learning techniques, natural language processing (NLP), determination of bots, geolocation, and the application of network theories were used to carry out the study. The results include the highly interrelated presence of groups without clear referents, as well as the existence of what appear to be coordinated networks aimed at causing harm and provoking confrontation.

Keywords

Hate speech; Misogyny; Social media; Social networks; Social networks analysis; Transphobia; Feminism; LGBTIQ+; Gender diversity; Sexual diversity; Transgender; Transsexuality; Transgender; *Twitter*.

1. Introduction

The Internet today is the public square, the place where debate, community and reputation are built. However, the third decade of the twenty-first century is characterised by the presence in the public discourse of ideas that are openly problematic because of their misogynistic, xenophobic, transphobic or homophobic profile. Virtual environments have become the frame of reference for many people, but they have also become generators of dependencies from which human weaknesses are exploited (**Moravčíková**, 2022). Likewise, hate speech has colonised digital platforms and social media and, according to some studies, can act as a mechanism for the propagation of hate crimes by enabling the dissemination of extreme views (**Muller**; **Schwarz**, 2021). In this context, research has demonstrated the persistence of messages as an enabler of influence in an ecosystem where the effect of silencing dissenting views is also important (**Neubaum**, 2022), as well as perceived contingency and its relationship to interactivity (**Jiang**, 2022; **Lew**; **Stohl**, 2022).

With regard to gender issues, the Internet continues to be a space of inequality for women and girls as well as for minority and/or minoritised groups, such as the LGBTIQ+ (lesbian, gay, bisexual, trans, intersex, queer and + for all those not represented by the above terms) community or, following **Fraser**'s term, "subaltern counterpublics" (1990, p. 67). These gender gaps, crossed by **Crenshaw's** (1989) concept of intersectionality, include online harm, an effect far removed from the widespread idea that interprets the digital world as a playful and communicative space with no more impact than the sharing of images or videos (**Berners-Lee**, 2021).

The interest of this article lies in the need to reveal the reproduction of messages with a strong ideological charge whose origins or interests remain hidden from public opinion. It is relevant to do so because a large part of the public believes that participation in social networks is only spontaneous and/or inconsequential. On social media platforms and networks in particular, there is an urgent need for transparency about polarised debates that distort or impede the critical approach that any society should be able to construct on issues of great social interest. Increasingly, citizens are demanding this transparency from political action and the media, but these demands have less of a chance in the world of social platforms and networks, which, on the other hand, remain in private hands, operating with hardly any governmental controls. It is the networks themselves that decide which discourses are acceptable and which are not, without offering the framework of freedom of opinion on which their existence is presupposed. The literature has already demonstrated their contribution to disinformation or the dissemination of content that collides with democratic principles (**Acosta-Quiroz**; **Iglesias-Osores**, 2020; **Alonso-González**, 2019; **Llorca-Asensi**; **Fabregat-Cabrera**; **Ruiz-Callado**, 2021; **Rodríguez-Fernández**, 2019).

Digital networks and platforms are not only a space for entertainment. They are now a space for political and social militancy as well as a place to satisfy information needs, especially when they affect major issues (**Casero-Ripollés**, 2016; **Jiang**, 2022; **Pérez-Zúñiga**; **Camacho-Castillo**; **Arroyo-Cervantes**, 2014; **Sánchez-Duarte**, 2016; **Vite-Hernández**; **Cornelio-Lander**; **Suárez-Ovando**, 2020). They have also proved useful for feminist action in what has been called hashtag feminism, with examples such as #MeToo and #NiUnaMenos (**Dixon**, 2014). In this ecosystem, it is necessary to provide transparency by visibilising the nature of some ideological proposals that are disseminated on social networks, proposals that contribute to the climate of tension, the proliferation of strongly polarised ideas and the dissemination of potentially harmful messages. The investigation of these variables allows us to discover the existence of forces in the virtual space that, invisible outside it, construct narratives, generate disinformation and feed generally regressive ideological approaches (**Berners-Lee**, 2021; **Frischlich**, 2022; **Pérez-Curiel**; **Rúas-Araújo**; **Rivas-de-Roca**, 2022).

Thus, this text seeks to determine the origin and characteristics of the conversation on the social network *Twitter* about gender and sexual identities, aspects on which there is hardly any literature, and none in Spanish. In particular, and although there are already works on hate speech related to LGBTIQ+ groups as well as others interested in misogyny, no research has been found specifically interested in aggressive and/or hate speech, on *Twitter* and in Spanish, among and towards trans people and feminist groups. To this end, an analysis of a significant sample of tweets (over a million, collected over a year) will be carried out to shed light on the origin and possible ideological interest of certain messages that are polarising public opinion in an unprecedented way concerning issues such as women's rights, the LGBTIQ+ collective and trans people. Both the methodology and the results can open up future lines of research for other investigations that either wish to delve deeper into the same object of study or can replicate the methodology in the analysis of a different social problem. There is a surprising scarcity of empirical work on the debate that is covered in this article, despite its prevalence and even its repercussions outside the networks themselves, including in the mass media.

According to **Arcila-Calderón**, **Blanco-Herrero** and **Valdez-Apolo** (2020), the social network *Twitter* was chosen because of its capacity to viralise content quickly, its popularity and its speed of communication, although it is not a medium that represents all citizens. It should also be borne in mind that this platform offers

> "an open register of feelings and opinions about issues of all kinds, including hate speech or other signs of rejection that are expressed freely and without the barriers that are often present in offline spaces" (**Arcila-Calderón**; **Blanco-Herrero**; **Valdez-Apolo**, 2020, p. 23).

In Spain, the *Tuitosfera* is one of the main actors in the channelling of public opinion in the virtual space and the main generator of populist disinformation, building identity communities based on the generation of hashtags that generate both resonance chambers and the very agile organisation of mobilisation actions (**Llorca-Asensi**; **Fabregat-Cabrera**; **Ruiz-Callado**, 2021, p. 129; **Rodríguez-Fernández**, 2021).

2. Theoretical framework and context

2.1. Hate speech and gender on the Internet

It has been documented that, since the early days of the Internet, interaction in virtual spaces has been characterised by violent practices, even when it involves irrelevant topics (**Noblía**, 2015, p. 16). This online participation is deeply damaged by the existence of trolls, campaigns organised for spurious purposes and the influence of systems interested in favouring climates of opinion, such as bot farms, cyberlobbies or the proliferation of influencers who become opinion leaders even when their posts have no veracity whatsoever (**Sánchez-Carballido**, 2008, p. 72). All these practices distort conversations and therefore public opinion, which is exposed to hostile discourses of varying intensity, highly polarised discourses and conspiracy theories (**Frischlich**, 2022; **Neubaum**, 2022).

Hate speech does not enjoy a unanimous definition, mainly because its social meaning is not the same as its legal meaning, but also because it is a concept with a high degree of subjectivity. **Cabo-Isasi** and **García-Juanatey** (2016) explain that the concept has been generalised to refer to a non-homogeneous set of manifestations ranging from threats to the expression of anger, including incitement and apology for terrorism. In any case, it is a practice that is directly contrary to freedom of expression and is usually related to racist, xenophobic, sexist and anti-minority offences. The literature has identified these discourses with fascist groups, extreme right-wing politics or ultras groups (**Cabo-Isasi**; **García-Juanatey**, 2016, p. 9). From this terminological difficulty stems the proposal to define its manifestations in social networks as dangerous speech, understanding that it is a speech based on ideological hatred and likely to generate violence (**Amores** *et al.*, 2021).

In the case of conversations related to the feminist movement or agenda, academic research has recognised the multiplication of anti-feminist reactions (**Alabao**, 2021; **Etura-Hernández**; **Gutiérrez-Sanz**; **Martín-Jiménez**, 2017; **Gutiérrez-Almazor**; **Pando-Canteli**; **Congosto**, 2020), at a time when feminist activism has entered into competition "for discursive space in social networks" (**Núñez-Puente**; **Fernández-Romero**, 2019, p. 386). The advances in rights and opportunities that women have been gaining

> "have often been counteracted by reactive movements, not necessarily explicit, which have become obstacles to further progress" (**Menéndez-Menéndez**; **Amigot-Leache**; **Iturbide-Rodrigo**, 2021, p. 10).

Feminism, as well as trans, homosexual, queer or intersex groups, among others, have been targets established by Breitbart in the American alt-right as "leftist" and "elite" excesses, which must be attacked within their "culture wars" as a way to achieve a future political change in society (**Davis**, 2019). This strategy of using culture as a battlefield to change politics was put into practice by Steve Bannon, owner of *Breitbart News*, through his other company, *Cambridge Analytica*, in the social networks, participating in numerous campaigns in various countries around the world, the best known being his participation in Brexit in the United Kingdom and the election of Donald Trump in the United States (**Wylie**, 2020).

Following **Granovetter**'s (1973) sociological theory of the strength of weak links, social relationships of low intensity and greater social distance are very effective in distributing information. This would have a strong influence on already formed groups, where it would not be necessary to convince a whole group, but only a few users would introduce such messages to the rest. The use of account connections with small links to members of a group can be decisive, a fact that is well known and used in political marketing campaigns on social networks (**Ribera**, 2014).

In places such as *Twitter*, the

> "symbolic resistance of certain social sectors to the advance of feminism" (**Villar-Aguilés**; **Pecourt-García**, 2021, p. 34)

is reinforced through

> "corrective attitudes that show the struggle to construct the true narrative" (**Menéndez-Menéndez** *et al.*, 2021, p. 15).

This violence is not random or casual, but obeys some specific patterns that have increased, especially on social networks such as *Twitter* (**Piñeiro-Otero**; **Martínez-Rolán**, 2021, p. 3).

Online abuse, according to the *World Wide Web Foundation* (**Berners-Lee**, 2021), particularly affects women, who are on the receiving end of a wave of attacks that reveal worrying coordination in executing these attacks and result in self-censorship to avoid harm. The *Foundation*'s research also shows that the moderation of content on networks and platforms does not take into account their experiences and needs, especially if they belong to marginalised communities. Concepts such as misogyny and sexism are often not used to moderate discourse, tolerating in practice abuses against women activists and leaders. In July 2021, at the *Generation Equality Forum* in Paris, the CEOs of *Facebook*, *Google*, *TikTok* and *Twitter* were encouraged to put in place measures to address abuse against women on their platforms as it is estimated that around 45% of

> It is a continuous discourse where hatred (mainly associated with disgust), polarisation and associations of ideas are introduced and embedded in society, even if they are false or minority ideas

women have experienced violence online, with abuse particularly severe for women of colour, LGBTIQ+ women and women from other marginalised communities.

In terms of diversity, the growing visibility of the LGBTIQ+ collective does not guarantee positive treatment in networks that have been marked by the denial of "what is different". **Olveira-Araujo** (2022) explains that we are currently witnessing unprecedented visibility of the trans collective, partly due to the

> "hegemony of the queer perspective [which] has favoured, among others, the analysis of transsexuality through inclusive concepts such as trans(gender)"

in a commitment to the joint analysis of different facts of sexual diversity, which, however, "potentially induces biases" (**Olveira-Araujo**, 2022, p. 3). The author refers to the fact that the concept of "transgender" (as well as "trans", sometimes followed by an asterisk) experienced a rapid evolution in the nineties of the twentieth century in the Anglo-Saxon sphere, but is still "under construction" (**Stryker**, 2017, p. 27). Its original meaning evolved into the current one, an umbrella term that encompasses "all forms of non-normative gender expression and identity" (**Stryker**, 2017, p. 206), referring to the "diversity of people who fall outside the standards" (**Serano**, 2020, p. 11). However, in the Spanish state, it experiences "a more politicised use" (**Platero**, 2017, p. 9), and even as an umbrella term it is problematic because it "drowns out the voices" of transgender people in particular (**Serano**, 2020, p. 408). For Serano, the term is politically useful but too vague to expose the diversity of identities and experiences it supposedly encompasses (**Serano**, 2020, p. 46).

In any case, anti-gender campaigns coincide in criticising what has been called "gender ideology" (**Mulió**, 2020, p. 198) and are usually aimed at combating same-sex marriage or affective-sex education in schools (**Carratalá**, 2021, p. 76). The discourse in social networks constructs a narrative of self-victimisation that problematises the advances of the LGBTIQ+ collective in terms of indoctrination of children, curtailment of rights and discrimination of majorities (**Carratalá**, 2021, p. 90). **Carratalá** points out a not insignificant issue: messages that avoid expressly defamatory rhetoric are disseminated online, despite their profoundly homophobic content. As a discursive novelty, **Alabao** points out that the concept of "gender ideology" has served to link diverse struggles and

> "has shown itself to be a powerful social mobiliser, a good activator of the *moral panics* of cultural conservatism" (**Alabao**, 2021, p. 400).

The attacks on feminism and feminists are neither isolated nor spontaneous. They are related to

> "a current of networked misogyny connected to an international anti-feminist and anti-gender movement driven through organisations and political parties of extreme right-wing ideology in charge of spreading and amplifying this type of attacks" (**Villar-Aguilés**; **Pecourt-García**, 2021, p. 43).

The democratisation of opinion that was predicted by online platforms has shifted to a space that, instead of amplifying gender equality and diversity, has become the public square from which to elaborate messages that harm women and marginalised and/or minoritised communities.

2.2. Feminism and identity politics after *#MeToo*

As already discussed, feminism has acquired an undeniable presence and reputation since 2017, with the *#MeToo* phenomenon crystallising the demands for justice that had begun in 2015 with

> "huge mobilisations of women that took over cities in different corners of the planet" (**Gil**, 2020, p. 289).

March 8th, 2018 would lead to what has been called the violet explosion when a women's strike for work and care had an undeniable global impact (**Varela**, 2019). The success would be repeated in the 2019 event.

March 8th, 2020, however, can be established as the formal beginning of the reactive response. In Spain, conservative political parties applied themselves to blaming the feminist movement for the crisis of the Covid-19 pandemic, making visible the unease at the advance of feminism that was already detectable in social networks and even in mainstream media (**Alabao**, 2021, p. 414). Resistance in the digital environment had shot up precisely because feminist activism had increased significantly, revealing the misogynistic nature of digital culture (**Villar-Aguilés**; **Pecourt-García**, 2021, p. 33).

At the same time, social networks will polarise a series of issues that had recently been causing conflict in the feminist movement and were already the subject of some debate in the academy. The feminist agenda has always been diverse and, at times, has experienced splits between theoretical and activist positions whose focus or priority was not the same. Issues such as prostitution, third-party gestation or even termination of pregnancy have not been problematised in the same way within feminism itself. The new focus of tension will be produced by the collision of theoretical and practical points of view, as well as strategic objectives presented by the feminist agenda in dialogue/dispute with that of trans activism and transfeminism. For different authors, a proposal on "risking the subject of feminism", in an event at the *Popular University of Podemos* in 2018, would trigger the conflict (**Reguero**, 2020, p. 233; **Romero**, 2020, p. 19). From that moment on, the debates between the trans movement and the feminist movement with more presence and belligerence in the social sphere would be articulated around "'whether trans women are women' or whether 'sex work is work'" (**Alabao**, 2020, p. 131). From a philosophical and political point of view, the debate "shifts from equality to diversity" (**Miyares**, 2021, p. 184).

The fact is that, until 2018, the participation of trans women in feminism had been the norm, including in the Spanish state, where it was: "well received, in general, although not appropriately" (**Platero**, 2020, p. 44), giving rise to "transfeminism" and the inclusion of trans men (**Alabao**, 2020, p. 147; **Missé**, 2021, p. 149). However, from the aforementioned climate of confrontation would emerge the accusation of transphobia, synthesised in the use of the term TERF (acronym for *trans exclusionary radical feminists*). Some authors point out that "TERF is a minority position within feminism", although "it is having great social and political influence" (**Mulió**, 2020, p. 198).

The term appears strongly in social networks, specifically *Twitter*: "I didn't know what a TERF was [...] until I came to *Twitter*" (**Ayuso**, 2020, p. 219), although it was not new. **Stryker** (2017, p. 295) locates its origin in the United States and in 2008, when the blogger *TigTog* coined it to describe, neutrally, positions that did not contemplate the participation of trans women in activist groups. It was therefore originally used as a way of defining those who considered transgender people to be part of the feminist movement and those who did not. Today it has become a disqualification, an insult (irrespective of radical feminist affiliation) and even a hate speech that is exercised against people who are considered transgendered (**Miyares**, 2021). The *Real Academia Española* (*RAE*), in a tweet published on April 14th, 2021, defined "terfa(s)" as a derogatory expression.

The trans movement denounces the transgendered discourse that inhabits social networks, identifying some feminists in particular (especially those most closely linked to the *Socialist Party* or the *PSC* and also second-wave feminist academics) as the source of the conversations (**Duval**, 2021, p. 83; **Platero**, 2020, p. 43). In this sense, feminists with a historical presence in Spain, both in political and academic action, are refusing to be "displaced" by new perspectives and protagonists (**Platero**, 2020, p. 63; **Reguero**, 2020, p. 240). Some texts lament the fact that these positions are incorporated into discrimination and "indirectly fertilise and legitimise it" (**Alabao**, 2020, p. 130). In this conflict, it is important to contemplate the difference in approaches between the two parties that share the government (Socialist Party and Podemos), an issue that would favour the presence of feminism in the political agenda but also a discussion about hegemony (**Duval**, 2021, p. 259; **Reguero**, 2020, p. 238).

Miquel Missé, a trans author, refers to these debates and recognises that

> "feminism is more open than ever to listen to the proposals of trans activism"

but, paradoxically,

> "trans activism is more hostile than ever to feminism" (**Missé**, 2018, p. 155).

In this context, very marked by identity politics, the term "transphobia" appears to discredit anyone who thinks differently:

> "When someone says something that is outside the pattern of what can be said on the trans issue, they are directly branded transphobic" (**Missé**, 2018, p. 154).

Thus, critical thinking is seen as an attack on human rights, so the possibility of expressing an opinion is disallowed: the accusation of transphobia closes the debate (**Errasti**; **López**, 2022, p. 19), becoming a stigma (**Soto**, 2021, p. 13). **Julia Serano**, in the same vein, argues that

> "most of the transphobia I have had to face as a trans woman could be described as misogyny" (**Serano**, 2020, p. 21),

hence she proposes that the union between the feminist and trans movements should focus on the struggle against the devaluation of women and femininity (**Serano**, 2020, p. 355).

2.3. Research objectives and hypotheses

To address hostile discourse on *Twitter*, an analysis of conversations around sexual and gender diversity was carried out using a mixed methodology to interpret interactions related to women, feminism and trans activism. A one-year time frame was used, allowing for a meaningful sample to be collected from March 2nd, 2020, given that, as noted in the previous section, March 8th, 2020 had previously been identified as the beginning of the reactive response to egalitarian discourse.

Firstly, we sought a general objective:

> (O1), characterised by determining the existence of hostile or hate speech in *Twitter* conversations about the object of study, based on an initial hypothesis that hostility would manifest itself through interactions with a significant sexist and/or misogynist component. In addition to finding out about this incidence, the secondary objectives were:
>
> (O2) to identify the most frequently used offensive terms and their characteristics from the point of view of the level of hatred, the associated emotions and the positive-negative polarity;
>
> (O3) to investigate the origin of these messages to try to illuminate organised interests along the lines of populist disinformation, the involvement of systems to favour climates of opinion and/or the discussion about hegemony in the feminist movement;
>
> (O4) to observe the possible existence of organised anti-gender campaigns;
>
> (O5) to analyse the conflict between feminism and the trans movement to elucidate whether the accusations raised by both movements against the other are sustainable;

(O6) to determine the role of concepts such as "terf" in the public sphere.

To this end, the following starting hypotheses are established:

(H1) There is a widespread polarised and hateful discourse in the debate on the social network *Twitter* between trans and feminist groups; and

(H2) It is estimated that the debate is partly artificially provoked and promoted to generate conflict.

This is research with methodologies that are hardly applied at present in the field of social sciences, and even less so in the Spanish language in the whole of Latin America. Their novelty also implies that they are development methods and that on the one hand they need to evolve, but at the same time they already allow for the analysis of volumes of data that would be unmanageable from a manual point of view.

3. Methodology

The analysis of large amounts of messages, such as those extracted from social networks, is a task almost impossible to tackle without the help of new technologies, the use of machine learning techniques, natural language processing (NLP) and the application of network theories. Studies such as **Mangold** and **Scharkow** (2022) have already looked at methods for measuring audience polarisation. The use of computerised tools for use in social science has started to develop in academia, business and elections, which allow large amounts of data to be analysed in an objective way, such as sentiment analysis (**Arcila-Calderón** *et al.*, 2017). Taking advantage of these techniques, this research takes as a reference the debate on the social network *Twitter* around and between the groups identified as "trans", "terf" and "feminists".

The sample was collected using the *RTweet* library (**Kearney**, 2019) in *R*, through connection with the *Twitter* application programming interface (API) in its version 1.1. For this purpose, all messages (including retweets and replies) were collected that fulfilled the query "trans OR terf AND mujer" in Spanish at a global level, therefore including the word "mujer" and one of the following: "trans" or "terf". The choice of these words stems from the main debate between the different collectives, located in the definition of what it is to be a woman to define a trans person and the corresponding derogatory attack of the word "terf" towards certain feminist sectors. No further words were added as AND filters to collect the maximum volume of messages around this phenomenon.

The collection period was a full year, between March 2nd, 2020 and March 1st, 2021, reaching a total of 1,079,998 tweets. As *Twitter*'s API version 1.1 only allows for the collection of the last seven days, tweets were collected for a full year, week by week, and all of them were finally merged into a single data set. From this corpus, the following processes were carried out, aimed at achieving the objectives of this research:

- Network analysis applied to the area of communication (**Barabási**, 2016), using *Gephi* software version 0.9.4. With this program, it was possible to develop the assignment of each account to a group or cluster and its area of influence (**Chen** *et al.*, 2020) using the Louvain algorithm (**Blondel** *et al.*, 2008) on the retweets made. The graphical representation of the network was based on the algorithm of **Hu** (2006), designed for networks with around, or more than, one million nodes (accounts) analysed.
- Study and quantification of sentiment or polarity (positive-negative), as well as basic emotions through natural language processing (NLP). For this purpose, the lexicon of the *National Research Council of Canada* (*NRC*) in its version 0.92 in Spanish with more than 14,000 words (**Mohammad**; **Turney**, 2010, 2013) was used through *R* and with the help of the *Syuzhet* library (**Jockers**, 2017). In this way, positive and negative values of polarity and emotions are associated with each message by the words it contains, enhanced or diminished by those around it (**Swati**; **Pranali**; **Pragati**, 2015). The basic emotions described by **Plutchik** (1980) and later **Ekman** (2003) are also labelled and quantified, and are as follows: disgust, anticipation, fear, joy, sadness, surprise and confidence applied to each tweet's discourse (**Sauter** *et al.*, 2010). Levels higher than 3 in any emotion or polarity can be considered significant (**Fitzgerald**, 2017).
- Analysis and quantification of hate using PLN techniques, analogous to the previous point, but this time using the *Hurtlex* lexicon in its 2018 Spanish version with about 5,000 associated words (**Bassignana**; **Basile**; **Patti**, 2018). The presence of words from the hate lexicon will give a level of presence value, which will be enhanced by the words around them. As in the previous point, the values detected with a value of 3 or more will be considered as clear hate, thus avoiding the inclusion of ironic or everyday use of some words in the messages.

  The *Hurtlex* lexicon, according to its authors, has had good detection results in Spanish and is used for its use by machine learning; they are words that have been categorised as hate speech by people, and the algorithm used, *Syuzhet*. It is a methodology similar to, but different from, *Naive Bayes* algorithms, in which hateful phrases are identified, and it is machine learning that searches for the words and relationships between them as a way of training and learning to then be applied to new phrases, as used by **Arcila-Calderón** *et al.* (2021) in Spanish. While there are methodological advances in multilingual dictionaries (**Maier** *et al.*, 2022), hate detection in Spanish is still in its infancy and needs further development.
- Probabilistic determination of bot behaviour through **Kearney**'s (2018) *Tweetbotornot* algorithm. Based on the nature, history and behaviour of each account, a percentage of the probability of being a bot is determined. This method uses the analysis of biography, followers, friends, activity, mentions, photos, location and the last 100 messages issued,

among others, to determine the probability of bot behaviour. Its probability of success, according to the author, is 93.53% for classifying bots and 95.32% for non-bots. This algorithm is considered among the best and most widely used in social sciences (**Martini** *et al.*, 2021).

- Text mining study using a word cloud and dendrogram between the words with the highest presence in the discourse with the highest hate load (levels above a value of 4 according to the analysis and quantification of hate). The aim is to show graphically not only the most frequently used words, but also their relationship. In the dendrogram, a new cluster analysis was carried out to determine the top ten word groups using the *k-means* algorithm. To determine their fit, Dunn's index is calculated, with the highest values being the most desirable (**Gil-Pascual**, 2021). In the analysis, words that do not contribute meaning (stopwords) and symbols (such as #) or punctuation marks have been eliminated.
- Analysis of the statistical relationship between variables employing Pearson correlation in *R*, in this case hate, concerning both the situation in the network and its probability of being a bot or the emotions and feelings they give off.
- A regression tree study, using machine learning techniques, allows the behaviour of a variable to be predicted (**Lantz**, 2019). The variables of the previous point are used, but considering hate as a dependent variable of the others, which would be independent. For this purpose, the *CART* algorithm (**Breiman** *et al.*, 1984) is used through the rpart package in *R*:
https://cran.r-project.org/web/packages/rpart/index.html

  The reliability of the prediction is assessed through the correlation between actual and predicted values, in addition to the mean absolute error (MAE).
- Parallel to the main message collection in a geolocated manner in the last analysis period, each of the more than 70 countries identified by **Bradshaw**, **Bailey** and **Howard** (2021) as issuers of disinformation on social networks. The search was conducted by entering longitude, latitude and radius of influence coordinates in the query. This technique has a global average reliability of 77.84%, exceeding 90% in some Western countries due to the quality of their network (**Van-der-Veen** *et al.*, 2015).

Hate and bot probability data are represented by box plots, which designate the median value of the value in the middle, while a box representing the first quartile is at the bottom and the third quartile at the top. An asterisk represents the median value, while above and below there is a line representing a value 1.5 above or below the interquartile value, while single dots express statistical outliers.

4. Results

After collecting data between March 2nd, 2020 and March 1st, 2021, a full year, with a total of 1,079,998 tweets, each message was assigned to a group by clustering through the retweets issued. This process resulted in the formation of 5,060 clusters (cluster numbers are offered among all detected clusters), with a modularity value of 0.770, a fairly good assignment value for social sciences. Among all these clusters, the research focused on the top 12 clusters, which account for 72.47% of the total number of messages, with a total of 782,722 tweets, which can be seen in Table 1 and are represented in Figure 1.

Table 1. Top 12 groups detected

Group no.	Trend	Percentage of traffic generated from RT
958	*Queer group*: although varied, especially with origins in Spain and with a lot of attack on feminism for its supposed definition of women.	11.99%
131	*LGBTi Mexico*: support group for transgender people in the country.	10.57%
1163	*Trans group*: trans advocacy group and attack on feminism or authors like JK Rowling.	10.07%
593	*Argentina group*: similar group to Mexico, but from Argentina.	8.63%
577	*Trans* (with numerous accounts suspended or deleted after a random tasting and among the accounts with the highest own-vector value): group attacking feminism and figures such as JK Rowling.	7.29%
464	*Trans group*: support and advocacy group for the definition of women without lacking certain aspects.	6.75%
91	*Trans PSOE*: group supporting the Spanish political party's policies on trans issues.	5.73%
0	*Feminists*: a group that wants to make it clear that they are not attacking the trans group.	5.52%
45	*LGBTi activists*: fight for LGBT rights and support for transgender people.	4.56%
1,717	*Far-right* and suspended accounts (after random tasting and top accounts by highest own-vector value): attack on feminist groups using trans discourse.	3.24%
680	*Latin Influencers*: follower groups of influencers from various Latin American countries, especially Central America, who mainly support attacks on feminism through displacement of trans people.	2.97%
1,429	*Far-right*: attack on feminism and trans groups.	2.68%

The selection among the 12 main clusters yields a total of 146,163 direct messages and 636,559 retweets (RTs). The use of the algorithm for detecting and quantifying hate among these messages determines a total absence in only 8,043 messages (1.03%), with a mean value of 2.73 intensity, a median of 2.00 and a maximum intensity of 32. The presence of hate can be detected in all the groups, but it is particularly present in some of them, namely 593, 577, 464 and 45, supposedly trans groups but without major influencers, and the presence of numerous accounts that have subsequently been suspended. The origin of the accounts is mainly Spanish, although there are important groups from Argentina and Mexico, which are concentrated in their clusters, and to a lesser extent from Colombia, Chile, Venezuela and Peru.

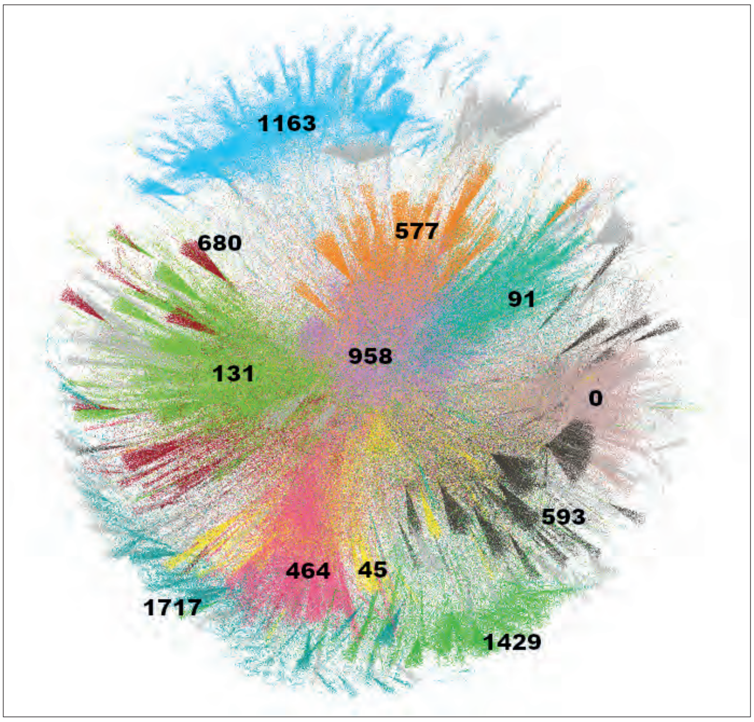

Figure 1. Network relationship graph

It can be seen in the graph that many of the groups are interconnected with each other, closely intermingled around the main group, 958, the group led by queer influencers. The most distant groups would be group 1163, the trans group, and groups 1429 and 1717, which are situated around far-right political users. This is a circular network structure around a group that is the backbone of the messages and where no separate groups can be seen, except for the most distant ones mentioned above. Thus, from the central queer group onwards, almost all the groups intermingle with each other, with no well-defined groups and no clear opposing influencers. This interrelated structure in most of the groups defines a degree of interconnectedness that does not correlate with the degree of hatred studied in the rest of the article, which should theoretically be represented in more differentiated groups.

Although the average and median hate presence are appreciable and almost 99% of the messages have some hate component, as can be seen in Figure 2, to avoid problems of double-meaning, ironic or commonly employed uses, the study will focus on the analysis of hate messages that are located in the third quartile, which is located in hate values with a value of 4 or higher. This subsample represents a total of 204,700 messages, with 29,985 direct messages and 174,715 RTs. The 29,985 direct messages with the highest hate values were posted by 13,160 accounts, mainly created between 2019 and 2020 and to a lesser extent 2011, of which 9,405 (71.47%) were found to have been deleted by the user or suspended for violating *Twitter*'s rules in February 2022, with a small portion protected as inactive.

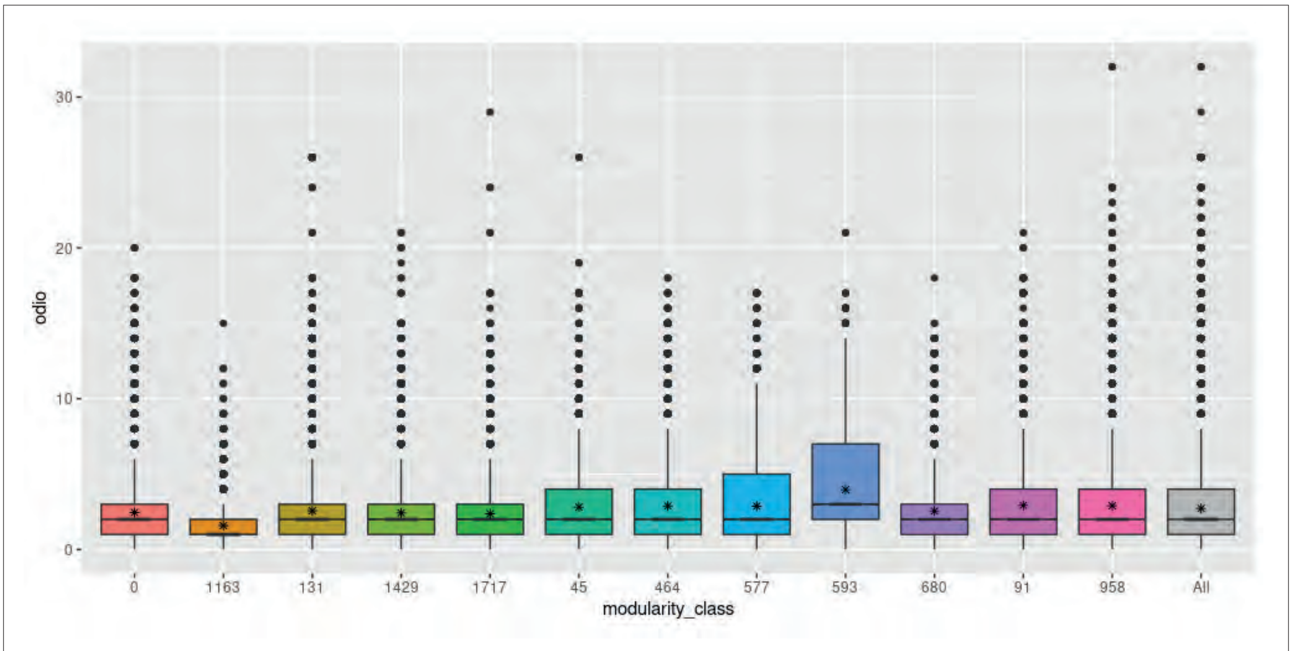

Figure 2. Presence of hate by each main cluster

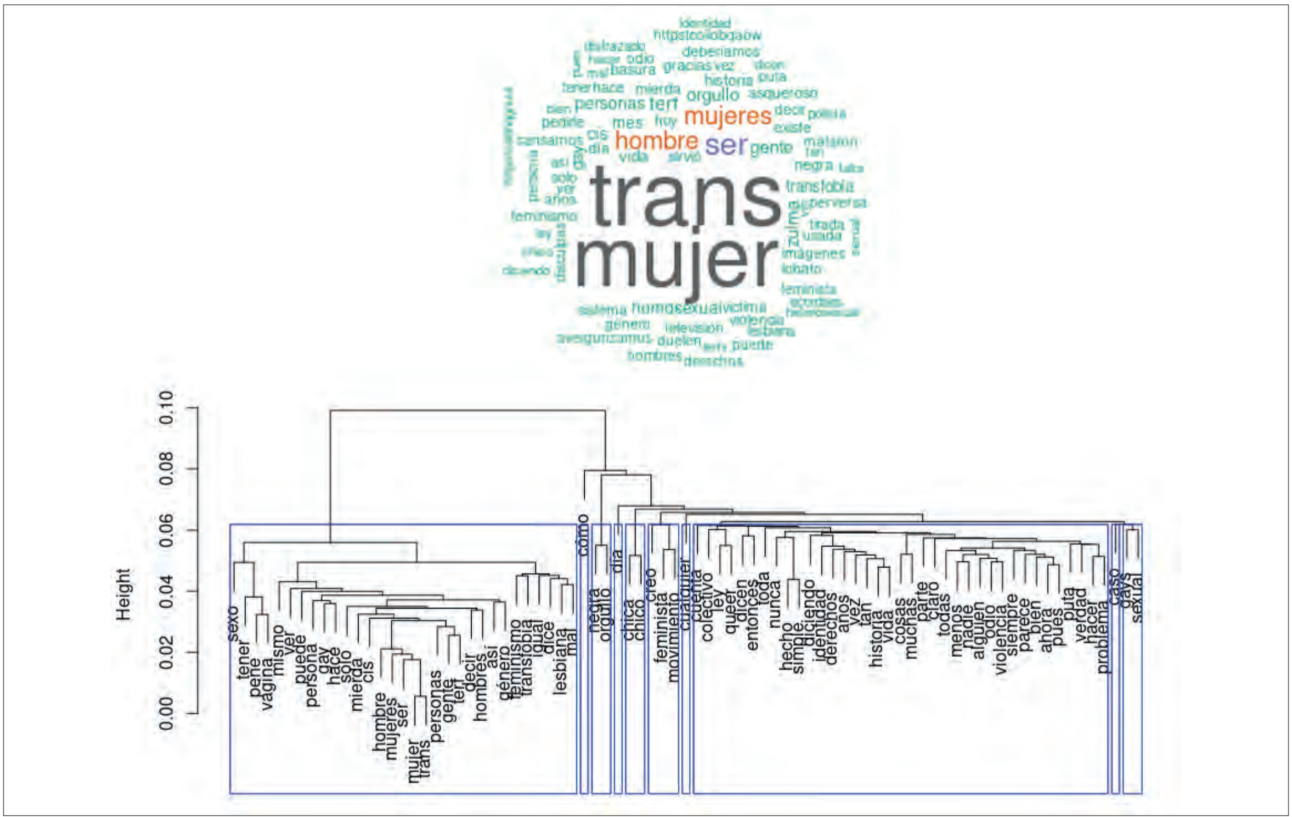

Figure 3. Word cloud and dendrogram separated by clusters of the main words used among the most hateful messages detected

From this subsample, the main words most frequently used were determined by text mining through a representation of a cloud, as well as a dendrogram with the main topics dealt with among the messages with the highest level of hate (Figure 3). As specified in the methodology section, the messages containing the highest level of hate (level 3 and above) were determined. The dendrogram study presents a good fit for social sciences, with a Dunn index value of 0.559 (as a percentage of one), which means that the themes have been well detected according to the process carried out.

It can be seen how the most frequently used words, references to the relationship between feminism, trans, women, pride, rights and various insults, can be identified. The dendrogram shows more precisely the main associations between hate messages. Thus, on the left in the first cluster, one can see the theme that associates feminism and transphobia by the definition of what is said to be female and male according to their sexual organs. There is also another important cluster around the *Queer group* defending their rights in the face of hatred and violence. There are no differences in messages or debates depending on each country, but they are limited to general facts about the group and debates about specific events, such as those produced in response to statements about women and menstruation by the writer JK Rowling in June 2020, after which she was accused of being a "radical feminist who excludes trans people" (*EFE*, 2020).

Correspondence analysis on selected words gives clear association results (together with the percentage of occurrence in terms of the number of times it is linked above 0.10):

- feminism: radical (0.18), subject (0.15), chicxs (0.13), liberal (0.13), women (0.13), colonial (0.12), Marxist (0.12), negrar (0.12), pirado (0.12), political (0.12), putísimo (0.12), transfeminism (0.12), transmisogynist (0.12), victimizo (0.12), lesbophobic (0.11), movement (0.11), chirrian (0.11), dogma (0.10), sect (0.10), exclusionary (0.10).
- feminist: radical (0.21), movement (0.20), nigga (0.15), accompanied (0.15), berf (0.15), qualified (0.15), dominecabra (0.15), elected (0.15), shit (0.15), bird (0.15), pedoliteral (0.15).
- trans: cis (0.19), women (0.19), men (0.17), antidepressants (0.14), boy (0.11), autogynephilia (0.10), questioned (0.10), spanking (0.10), transforms (0.10).
- terf: radical (0.20), feminist (0.18), empowering (0.16), shit (0.16), applauded (0.15), corporately (0.15), descendants (0.15), people (0.15), townies (0.15), wards (0.15), transphobia (0.15), exclusionary (0.14), cisheteras (0.13), people (0.13), speech (0.11), fastidia (0.11), movement (0.11), putito (0.11), supuestoantifa (0.11), transfobas (0.11).
- female: male (0.27), kindness (0.17), lesbian (0.14), black (0.13), personified (0.13), cis (0.12), penis (0.12), cock (0.12), desperate (0.11), vagina (0.10).
- queer: theory (0.48), carnation (0.20), creed (0.20), equivaldrá (0.20), feminismoradical (0.20), implantation (0.20), injerencista (0.20), inquisitorial (0.20), ladinos (0.20), negationism (0.20), pergeñado (0.20), servilismo (0.20), populismo (0.18).

The appearance of words linked between the associated words may be for two reasons: the speed of writing in this type of social network, or the possibility of creating words *specifically* to identify and conceptualise a type of association. The very common presence of some of them would give rise to the second reasoning, with the formation of words such as "feminismoradical", "supuestoantifa", "pedoliteral" and "dominecabra". In this way, a series of vocabulary created for the association of certain ideas would be established.

> All of the above exposes an international discourse, sustained over time, which is neither isolated nor spontaneous

The most hateful tweets detected are, by way of example, those described in Table 2.

Table 2. Messages with the highest hate load detected

Text	Favourites	RT No.	Cluster	Probability of bot
A trans person with data, with their own experiences, etc... says something. TERF's answer: KILL YOURSELF. YOU ARE DUMB. YOU ARE NOT RIGHT CUIR DE MIERDA. FUCK YOU. YOU ARE AN IDIOT. I can tell you have a lot of weighty arguments.	1	0	958	3.96%
@dyJulieh This shit is so ridiculous you don't even know what to say anymore. Now it's all about being black, trans, poor, ugly, feminazi woman, gay. What a BITCH to what level of stupidity this trashy progre agenda is taking us. (the account @dyJulieh no longer exists)	0	0	1,717	44.10%
There is a very simple method to know if the humour is acceptable or not. Ask yourself where the joke is funny, if the answer is "that it's black, female, gay, bi, trans, dumb etc..." the joke is not acceptable. You can also think about whether it attacks an oppressed group, but I don't think you'll get it.... https://t.co/w7A2YWqqzq	0	0	958	81.27%
I thought so too, how fucking ashamed I am now. We owe a lot of our rights to a trans hiv+ woman of African descent. So to make you dumb and discriminate just because you think you're "less gay" is fucked up. Heteronormative gays don't know how to fuck FACT https://t.co/o0pQxPEkqg	505		131	6.73%
@uwuk1ra @satogarca Did you know that trans women have brains shaped in a similar way to biological women? But that's up your ass, you're just a fucking idiot. (@uwuk1ra is suspended for non-compliance with rules, @satogarca no longer exists)	0	0	131	72.36%
@guirimadri @abixquertg @DieBatsuDie We are indeed from the animal kingdom, but treating a human being like a wild animal and giving that classification, especially if you are going to touch the heartstrings of a trans person because of the shit that you are, seems to me to be a fault. I'm a biology student by the way. (@abixquertg no longer exists)	0	0	958	13.52%
It's also anti-transphobia day, and what a fucking nerve to say "this asshole" to a trans woman who is just showing her support for the movement. I've had it up to here with your transphobic, retrograde exclusionary bullshit. https://t.co/otYORArzPY	5		131	73.96%
Man: Miss, you are very beautiful. Woman: FUCKING BITCHY, DISGRACEFUL, MYSOGINIST HARASSER, FUCKING RAPIST!!!! Gay/Trans: Ay perra k culote te cargas y esas pinches chichotas, te pasas maldita, te odio! mmm!!!! *Woman: Ay amiga jiji gracias, eres bien linda!		1	1,717	0.2%
@cxsmic__girl @_AlexClockwork @__erosgarcia @Dalma2206 THEN YOU WILL ASK FOR RESPECT,TRUTH,FUCKING FUCKING TERFS,YOU ARE ESKORIA.YOU TRANS?.YOUR FUCKING MOTHER,FUCKING NUTS.YOU KNOW WHAT YOU ARE GOING TO FACE,AS LONG AS YOU KEEP GIVING X ASS WITH TRANS.NAZIS DAIS ASKO,BUT THERE IS NOT SOMETHING THAT IS MORE ASKO K A FUCKING RETARDED TERF. 👊😠😡	0	0	91	36.92%
How sad to see gays, who enjoy rights and some freedom thanks to trans people who have fought for them in previous years, throwing them under the bus and even questioning who is a man or a woman because of their genitals or something as silly as menstruation, rubbish.		0	593	4.36%

The messages, a significant number of which have hate associated with them, that are collected both among the text mining analyses and among those with the highest intensity of hatred come to expose a clear message against feminism, which is accused of being intransigent and of limiting the definition of a woman. Thus, it is classified as a sect and various insults, especially linked to the derogatory term "terf" (*trans exclusionary radical feminists*). In contrast, the term "trans" is associated with the terms "cis", "women" and "men" and the need for antidepressants. A very visceral discourse is thus expressed, full of hate, but where local debates are not appreciated, but between groups regardless of where they are located. It is noteworthy that many accounts that participate or are challenged in the messages have been deleted by users or suspended one year later for violating the rules of the social network *Twitter*.

Although hate is intense in almost all the groups detected, a very high percentage of bot probability is detected, especially in certain clusters, as shown in Figure 3. There is no statistical correspondence between the position of the account in the network, although there is some correspondence with the emotional discourse of these accounts. Thus, the Pearson correlation values between

> Many accounts, months later, have been deleted or suspended for violating the social network's rules

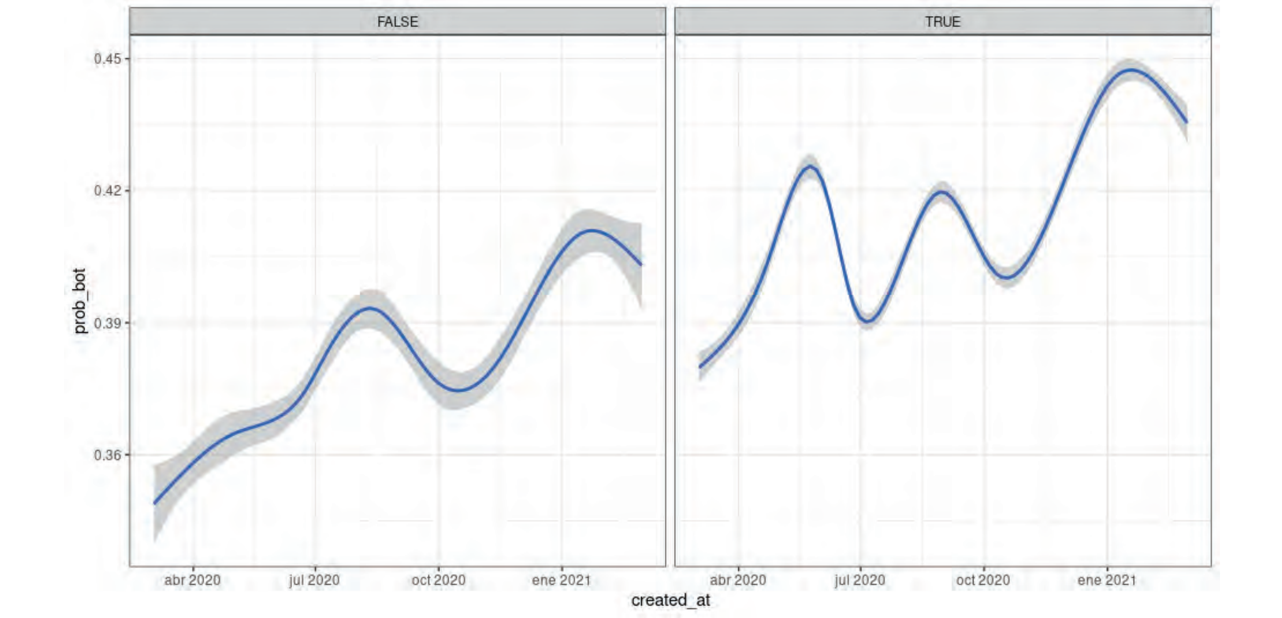

Figure 4. Average probability of being bot over time for accounts that direct messages (False) and those that RT (True)

the level of hatred and other variables of nature and position in the network are completely negligible: -0.016 Bot probability, 0.0002 Favourite, -0.081 RT, 0.152 intermediation centrality, -0.008 with eigenvector, -0.003 with degree and -0.005 with closeness centrality.

Therefore, hate is not directly related to being an influencer and having a larger following, being retweeted more, being favourited more or being a bot. As can also be seen in Table 2, the tweets characterised by the algorithm show messages with a lot of hate regardless of their percentage of bot likelihood, the number of favourites or RTs. For this reason, it cannot be characterised as bots that generate hate, but rather as a user profile that may or may not be closely linked to their influencers (proximity centrality), are the backbone of a network (intermediation) or are influencers of their network (own vector).

According to Figure 4, it can be seen how throughout the year analysed, the accounts that make RTs distribute hate, regardless of their intensity, are more prevalent than the accounts that launch their messages. This corroborates what **Williams** (2021) said, where bots do not create hate, but “inflate” it. The fact that, as mentioned above, there is no correlation between bot probability and intensity also confirms **Vidgen** (2021): the accounts do not exhibit high intensities in their discourse so as not to be easily detected and to remain on the network for much longer. This aspect, in which bots would be in charge of disseminating the messages of others, rather than generating them, would link with what **Keller** (2019) exposed in social networks during the South Korean elections or the Covid-19 pandemic in Spain (**Arce-García**; **Said-Hung**; **Mottareale-Calvanese**, 2022).

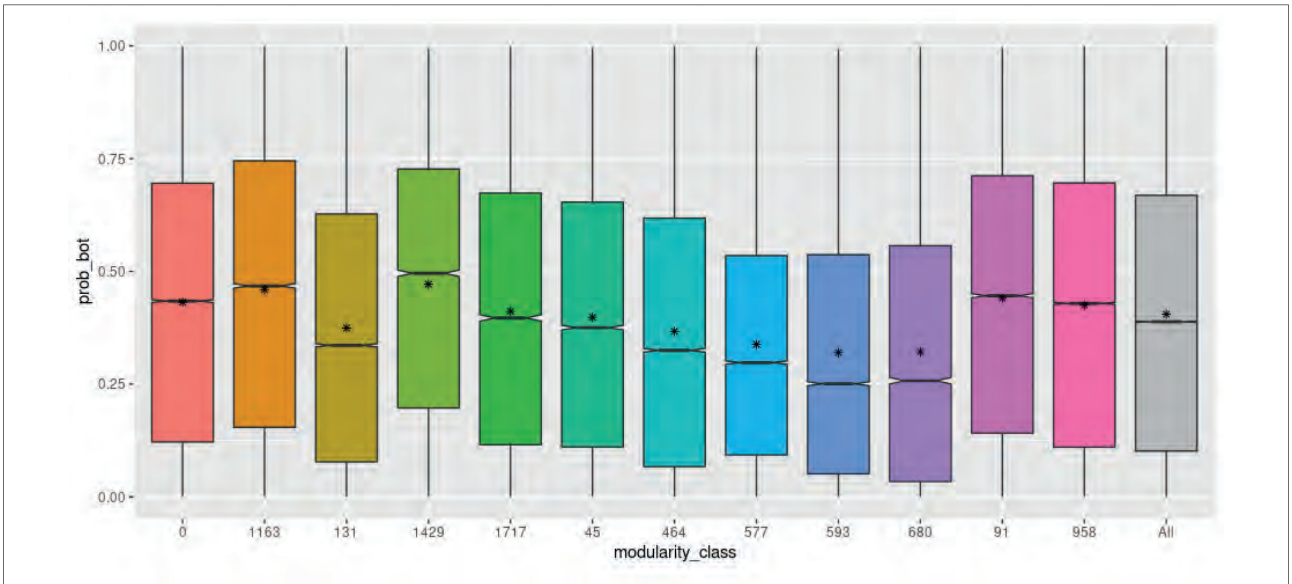

Figure 5. Probability distribution of bots presence in each cluster

The presence of bots according to the cluster or group initially identified, as shown in Figure 5, generally shows an average behaviour, in many cases close to 50%, with several groups in the third quartile reaching a 75% possibility of being bots. This would demonstrate the artificiality of many of the accounts involved, especially in some of the trans and far-right groups.

This could be explained through two possible interpretations: the presence of users who go it alone and have an intense and highly polarised discourse, and/or the use of troll-like accounts designed to establish controversy, set various issues on the agenda-setting or run disinformation and polemic campaigns with the help of confrontations between "false flag" groups (*Russian Bot*, 2022), i.e. accounts posing as opposing groups.

On the other hand, in regard to the basic emotions and feelings or polarity, hatred shows a slight statistical correspondence with sadness and, above all, with disgust or aversion. Thus the Pearson correlations are -0.273 with polarity or vector, 0.068 with confidence, 0.080 with joy, 0.086 with anticipation or rational thinking, 0.097 with surprise, 0.192 with fear, 0.244 with anger, 0.284 with sadness and 0.405 with disgust or aversion. Therefore, it can be seen that the emotions, in this case, that most lead to hatred come mainly from disgust and sadness.

The establishment of a predictive regression tree on the case concerning all messages with detected hate, shown in Figure 6 (the boxes above show the average level of hate intensity and below the number of messages and what it represents over the total), corroborates the main source of hate through disgust or aversion and fear, which reaches its highest values when the feeling of disgust is greater than 2 and fear is equal to or greater than 2. The main weight of hatred comes from disgust at 50%, with 13% for negative polarity and 12% for fear, with all other emotions falling below 10% in importance. Therefore, a mixture of medium to high levels of disgust and fear are those that generate the most hate content. Hate messages that intermingle with sadness have lower values of intensity. The correlation between the predicted and the actual value is 0.498 and the MAE is 1.24, so an acceptably good prediction of the algorithm can be estimated.

According to **Plutchik**'s (1980) wheel of basic emotions, hatred is the increase in intensity of the basic emotion of aversion or disgust, but it can also be achieved from "dyads" (combinations) of other basic emotions, such as sadness and anger or mixtures of fear with anger or sadness. For combinations of emotions, the further apart they are in the wheel (disgust and fear are three steps apart, or tertiary dyads, according to their author), the more difficult they are to maintain over time. Hatred, moreover, activates a secondary behaviour, rejection. For this reason, hatred generated from disgust would be more intense and enduring over time than hatred generated from a combination of other emotions. In the case analysed, hatred is primarily based on disgust or aversion, accompanied by high levels of fear.

For the last collection period, from 25/01/2021 to 01/03/2021, 83,986 messages were obtained, but a parallel collection was also carried out for certain countries specified in the methodology section through geolocation. It was thus possible to obtain the location of 33,795 messages (40.24% of the total), and it was possible to determine that, although it was a conversation in Spanish, the distribution was worldwide. It was thus possible to determine that in that period, of the geolocated messages, 40.21% came from Spain, 15.86% from the United States, 8.26% from Mexico, 6.76% from Colombia, 6.11% from Brazil, 5.66% from Venezuela, 4.27% from the Philippines, 3.83% from Argentina, 2.99% from Russia (Moscow area), 2.93% from Turkey, 0.65% from the Dominican Republic, 0.43% from England (London area), 0.35% from Bolivia, 0.31% from Italy (Rome area), 0.24% from Thailand and 0.23% from Albania. The remaining countries have lower percentages. There are therefore several non-Spanish-speaking countries with non-negligible percentages in the conversation, in which recent studies characterise propaganda and disinformation industries directed, among others, towards Spain from other countries (**Arce-García**; **Said-Hung**; **Mottareale-Calvanese**, 2022).

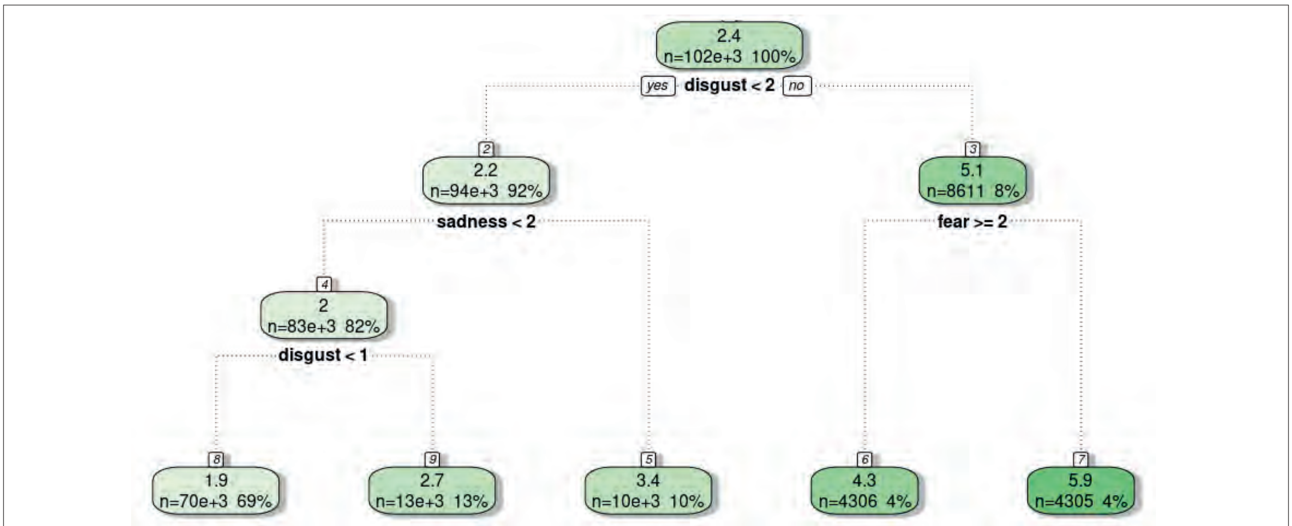

Figure 6. Regression tree on emotions regarding hate speech

5. Conclusions

A year-long analysis of the social network *Twitter* around the conversation between different groups, mainly feminists and transgender people, shows a large debate with a high hate component. Even if one follows the clear formation of groups through cluster analysis, in the face of such a polarising topic one should see a separation of well-marked bubble filters (**Pariser**, 2011), but in many cases there is a great lack of definition between different groups and no marked differences and separations as shown in Figure 1, in contrast to other highly polarised cases. Nevertheless, the high levels of polarity and hatred demonstrate the first hypothesis put forward in this paper between trans and feminist groups.

The network detected, in addition to being highly interrelated, does not have clear referents or major influencers. There are only a few groups far removed from the rest, one with trans issues and two with far-right tendencies, although they still have extensive relations and interconnections with the other clusters. There is a large amount of hate speech in all the groups detected, although the extreme level is much scarcer, with a broad attack on feminism, which is accused of being radical and exclusionary, associated with the term "terf", as opposed to a trans group that suffers (it needs antidepressants), coinciding with the story of self-victimisation as outlined by **Carratalá** (2021, p. 90). There is a very clear profile of word association over the course of a whole year, so these are ideas and discourses maintained over time, as well as created words such as "feminismoradical" or "pedoliteral". Similarly, there is an attempt to equate feminism with the exclusionary term "terf", a derogatory word that, although a minority, is widely used in networks (**Ayuso**, 2020, p. 219).

Other data could suggest that the debate is artificial: many accounts have been deleted or suspended months later for violating the rules of the social network. Similarly, bot-like behaviour was detected in many of the groups, although no significant statistical relationship was found between a greater probability of being a bot and greater dissemination of hate or negative feelings. A greater bot presence was observed among those accounts, which could be a typical troll-type behaviour accompanied by bots of support in a possible false flag campaign. The fact that the bots are especially dedicated to disseminating hate rather than establishing their messages would fit with the studies by **Keller** (2019), which point to organised strategies for disseminating disinformation campaigns or attacks on certain groups typical of the technique known as *astroturfing*.

The presence of far-right groups and the number of allegedly trans accounts suspended or deleted around the debates would contribute to this idea of contaminating the debate of the rest of the clusters. Likewise, the existence of not inconsiderable percentages from various countries, some known for their disinformation industries, of non-native Spanish speakers adds to the suspicion. Therefore, everything points to the idea of a debate that is being fed and fomented by groups that present strategies that have already been studied and cited.

The determination of which emotions mark hate, in this case, comes primarily from disgust or aversion, coupled primarily with fear. As **Wylie** (2020) argues, provoking hatred, especially based on disgust or aversion, is the main component for introducing non-rational thinking that is sustained over time as opposed to that generated solely by fear.

All of the above exposes an international discourse, maintained over time, which is neither isolated nor spontaneous (this study covers the entire Spanish-speaking world in Spanish for one year), as **Villar-Aguilés** and **Pecourt-García** (2021, p. 43) also explain, which attempts to introduce a series of associations of ideas through accounts of little relevance on the network, taking advantage of the sociological theory of **Granovetter** (1973). This theory suggests that it is not necessary to influence all users, but only a few, who will then transfer their new ideas to the rest of the group. The fact that 20% of the messages of the 12 main groups emit intense hate messages is a significant percentage that could end up influencing the entire network. This phenomenon has been contemplated in other academic research (**Alabao**, 2021; **Etura-Hernández**; **Gutiérrez-Sanz**; **Martín-Jiménez**, 2017; **Gutiérrez-Almazor**; **Pando-Canteli**; **Congosto**, 2020), but it could equally fit within the "culture war" towards, among others, the feminist collective as **Davis** (2019) exposed, confirming the second hypothesis put forward.

We could therefore speak of the presence of fairly intense signs of an unnatural structure or movements in social networks attacking feminism, aimed at provoking confrontations between different groups, just when trans authors recognise that when feminism is more open, the environment is more hostile (**Missé**, 2019, p. 155). It is a continuous discourse in which hate is introduced (mainly associated with disgust, which is the basic emotion that makes it last longer in time and intensity), and associations of ideas that are inserted into society, even if they are false or minority ones. The fact that hatred is basically generated from the basic emotion itself, disgust, and therefore generates rejection, ensures that this hatred survives and is not eliminated, as it displaces rational thought. This research also serves to show the scheme of possible influences on society through social networks by provoking confrontation and spreading hatred between groups.

With all these data and confirmation of the two hypotheses put forward, it should be noted that there is a strong polarisation that provokes attacks between trans and feminist groups, in which groups of a very suspicious nature can be seen (use of bot accounts, suspended or deleted accounts, relations with outside groups and

> Attempts are made to equate feminism with the exclusionary term "terf", a derogatory word that, although a minority word, is widely used in networks

not inconsiderable origins from non-Spanish-speaking countries), with methodologies seen in other organised campaigns. The use of these techniques would come to define an environment in which the aim is to generate feelings of hatred that last over time, since repetitive discourse and the provocation of strong basic emotions generate the main basis of social hatred, which is currently seen with the new currents of study in social networks of gaslighting (**Shane**; **Willaert**; **Tuters**, 2022). According to this theory, the generation of strong basic emotions in communication causes the recipients to manipulate and raise doubts about their perception of reality.

> There are several non-Spanish-speaking countries with not insignificant percentages in the conversation

The possible use of the propaganda and disinformation industry, supported by profiles and origins known to be suspicious, would be doing its job to provoke disaffection and mistrust towards trans and feminist groups, exposing them as opponents and disseminators of hate, as they would be the victims of the attack. The use of bots mainly for rebroadcasting and other behaviour deepens the suspicion of the presence of this type of industry, which is very difficult to detect.

The generation of hatred, raising doubts and high polarisation makes society see both groups as conflictive, generating hatred and contempt, especially the feminist group as intransigent and exclusive. All of this would then suggest a possible long-running campaign, in which feminism is seen as an unattractive element in the face of a displacement of the Overton window, that is, the range of ideas that public opinion assumes as acceptable (**Williams**, 2021).

The limitations of this work come mainly from how hate is detected, since it is a very new methodology in Spanish based on one of the first existing lexicons in this language, *Hurtlex*, which has been validated. Its main drawback is the lack of intensity rating among the lexicons separately, but an algorithm has been used that does take into account the conjunction of several words together to increase or decrease their level, in addition to its success in Spanish according to the authors of the lexicon used. There are several projects in Spain to make training samples using neural network methods, but none of them have been completed to date. Similarly, the emotional lexicons used are almost non-existent in Latin languages, which, although they have lower reliability than in English (over 80%), are at least 70% (**Mohammad**, 2016). The sample is considered reliable as it covers a full year of collection.

The presence of texts that may have a double or ironic meaning is also a problem for these methodologies, but given the volume of messages analysed, it is believed that the overall results are not altered, or only minimally so. In future lines, it is proposed to study in greater depth the scheme of attack and confrontation provoked in social networks, not only in this area but also in other areas of society where an attempt could be made to change public opinion in the medium term.

> This phenomenon could be seen as part of the "culture war" against, among others, the feminist collective

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From disinformation to fact-checking: How Ibero-American fact-checkers on *Twitter* combat fake news

María-Isabel Míguez-González; Xabier Martínez-Rolán; Silvia García-Mirón

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María-Isabel Míguez-González ✉
https://orcid.org/0000-0002-0580-8493

Universidade de Vigo
Facultad de Ciencias Sociales y de la Comunicación
Campus A Xunqueira, s/n
36005 Pontevedra, Spain
mabelm@uvigo.es

Xabier Martínez-Rolán
https://orcid.org/0000-0002-7631-2292

Universidade de Vigo
Facultad de Ciencias Sociales y de la Comunicación
Campus A Xunqueira, s/n
36005 Pontevedra, Spain
xabier.rolan@uvigo.es

Silvia García-Mirón
https://orcid.org/0000-0001-8951-6051

Universidade de Vigo
Facultad de Ciencias Sociales y de la Comunicación
Campus A Xunqueira, s/n
36005 Pontevedra, Spain
silviamiron@uvigo.es

Abstract

In recent years, the disinformation phenomenon, brought about by the ease with which fake news and hoaxes spread on social networks, has grown considerably. *Twitter*, especially, is a network that from the outset has been closely linked to news processes that are widely used by journalists. It has become a highly efficient means of spreading disinformation owing to its immediacy and capacity to spread contents. The microblogging network has attracted the attention of researchers and is a suitable subject matter for analysing how fact-checkers communicate as agents who nurture digital literacy in the general public to help them spot disinformation. The aim of this research is to characterise the use of *Twitter* by Ibero-American fact-checkers and to determine to what extent their posting habits influence interaction. To do so, the trending and timing for posts, the type of contents and resources used by each fact-checker and the interactions created on all levels are analysed. This research stated that Ibero-American fact-checkers throughout 2021 were highly active on *Twitter*. This was closely linked to the crises related to Covid-19. Communications from these organisations have helped to spread and reinforce their fact-checking and digital literacy mission, even though their performance is no more efficient in terms of the scope and impact of their work. The results show that boosting posts of reactive tweets, adjusting posting time to the *Twitter* dynamics and increasing the use of resources such as images and mentions are useful strategies for promoting interaction.

Keywords

Twitter; Fact-checking; Fact-checkers; Ibero-America; Latin-America; Spain; Portugal; Disinformation; Digital literacy; Media literacy; Transparency; Interaction; Engagement.

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1. Introduction

In recent years, the disinformation phenomenon caused by the easy spread of fake news and hoaxes on social networks, has grown immensely. International studies on activity on social media (*We are social*; *Hootsuite*, 2020; **Newman** *et al.*, 2020) reflect a concern about the problem of online disinformation and the suspicion users have about the content received by these means. **Guallar** et *al*. (2020) identified social networks as the main channel for disseminating hoaxes. The *European Commission* (2018) also linked the implementation of digital media to disinformation and called for online news transparency to be strengthened and media literacy improved.

Bernal-Treviño and **Clarés-Gavilán** (2019) mention two factors which increase exposure to inaccurate information, involuntary mistakes or deliberate deception.

- The first of these is the capacity users have to create and spread their own contents, which lack professional supervision and, hence, may be deceitful. By way of example, the study results from **Pérez-Curiel** and **Velasco-Molpeceres** (2020) on the posts about the *Process* (trial for Catalan independence leaders) on *Twitter* confirmed there was a link between authorship of fake news and private accounts. However, this type of contents may be perceived as valuable information by recipients. In fact, 56% of the interviewees in the *Digital 2021: Global Overview Report* (*We are social*; *Hootsuite*, 2021) stated that they used social media, with a high amount of user-generated content, to keep themselves informed. This percentage swings between 48% of individuals who are 55 years of age or over and 66% of 18-24 years ones, but this figure is high for any age group.
- The second factor concerns searching for clickbait (**Bernal-Treviño**; **Clarés-Gavilán**, 2019). The algorithms that select the posts shown to users are designed to prioritise contents that can easily be consumed and with great potential for going viral. Among these, long and sophisticated news items are rarely found. Although social networks such as *Facebook* or *Twitter* have taken measures to provide greater visibility to official news and have implemented strategies for minimising the spread of fake news, identifying them, labelling them, and penalising them (**Ardèvol-Abreu**; **Delponti**; **Rodríguez-Wangüemert**, 2020; **Salaverría** *et al*., 2020), a great deal of content whose truthfulness is questionable still manage to circumvent these filters.

The information obtained on social networks is not only consumed, but shared, too, regardless of whether it is true or not. **Ardèvol-Abreu**, **Delponti** and **Rodríguez-Wangüemert** (2020) detected both unintentional and intentional behaviour when fake news was spread on social networks. Consuming, creating, and sharing fake news and hoaxes, albeit unintentionally, helps disinformation spread. Just as set out by Del-Fresno-García,

> "however obvious the patterns are for how information disorders operate, it is still very hard to tell the difference between true and fake news" (**Del-Fresno-García**, 2019, p. 8).

One factor that has contributed to this process is the substantial amount of people who lack digital literacy. People born before the surge in digital media and social platforms have been exposed to tools that they have received no training on, and they have not been warned about the potential dangers of consuming content from these sources. Even literacy among digital natives is scarce, since there is not enough schooling on how to interpret new technologies (**Civila**; **Romero-Rodríguez**; **Aguaded**, 2020). This has led to the ideal conditions for creating a disinformed and vulnerable society.

1.1. Fact-checking actions

One example of the initiatives for combating disinformation are fact-checking actions taken in response to the request from the *European Commission* (2018) to improve media literacy. They are also an example of media competence tackling disinformation (**Portugal**; **Aguaded**, 2020). In the words of Lotero-Echeverri, Romero-Rodríguez and Pérez-Rodríguez, it means

> "media literacy for users and journalists is nurtured, by showing them a simple and replicable method for verifying information published in the media and on the social networks, prior to sharing them" (**Lotero-Echeverri**; **Romero-Rodríguez**; **Pérez-Rodríguez** (2018, p. 313).

Therefore, fact-checking initiatives from not only the media, but also from other types of companies and third sector institutions aim to debunk fake news and hoaxes, and help them identify them. In this way, disinformation and fact-checking act as opposing forces in the news (**Jiang**; **Wilson**, 2018).

Fact-checkers also respond to the premise of reinforcing transparency (*European Commission*, 2018), on clarifying the truthfulness or false nature of discourse spread in the public domain by means of different media. In order to fulfil this mission, these institutions must first demonstrate their own transparency. This is one of the fundamental attributes, which, according to **Singer** (2019), adds value to fact-checkers in the media. In fact, transparency in the checking process increases the usefulness and reliability of the services fact-checkers provide (**Brandtzaeg** *et al*., 2016).

In order to ensure excellence in fact-checking initiatives, in 2015 the *Poynter Institute* created the *International Fact-checking Network* (*IFCN*). Transparency of sources, funding, organisation and methodology is one of the requirements that fact-checkers must fulfil in order to participate in this network, according to the principles code (*Poynter*, 2021). Research by **Humpretch** (2020) shows that belonging to this institution ensures there are the highest standards in transparency.

Apart from meeting these standards, different studies have attempted to corroborate the usefulness of the work by fact-checkers, whose results vary. Some research cast doubt on the usefulness of fact-checking initiatives, proposing they have a limited impact on spreading rumours (**Margolin**; **Hannak**; **Weber**, 2018). Also, some even suggest they may help fake news go more viral than the rebuttal (**Pérez-Curiel**; **Velasco-Molpeceres**, 2020). Likewise, different experts assert these checks have little effect on the most polarised audiences (**Herrero**; **Herrera-Damas**, 2021).

However, some recent studies show encouraging results. Research from **Zhang** *et al*. (2021) and **Lee**, **Kim** and **Lee** (2022) on vaccines showed including fact-checking labels for disinformation helped create more positive attitudes to vaccines or to dispel myths about them. Experiments by **Chung** and **Kim** (2021) corroborated these results and also proposed that posting false news along with its rebuttal cancelled out the effect that the social network metrics had on sharing intention: without any fact-checking, the highest metrics created there was a greater inclination to share fake news, but when they were refuted, this effect was lost. Likewise, the experiment by **Hameleers** (2020) showed that carrying out digital literacy initiatives were more effective when combined with fact-checking than without it.

Therefore, the work of fact-checkers does help combat disinformation and how they communicate has become an interesting subject matter for research. If they communicate successfully, it is more likely that their checks will be spread adequately and will help to stem hoaxes and fake news, thus promoting greater transparency in the news world.

1.2. Use of *Twitter* as a tool for fact-checkers to disseminate their work

One of the communicative channels fact-checkers most use, apart from their own websites and *Facebook*, is *Twitter*. Of the 104 fact-checking initiatives registered by the *IFCN* in December 2020, 75% have an active account on this social network, as opposed to 72.1% that have a *Facebook* page (**Dafonte-Gómez**; **Míguez-González**; **Ramahí-García**, 2022).

Twitter has 397 million users in the world and ranks a modest sixteenth place on the list of the most used social networks and messaging services. This is a far cry from the over 2000 million uses for the leading platforms worldwide: *Facebook* and *YouTube*. However, if the Chinese market is excluded, *Twitter* takes fourth place in the favourite networks for users, behind *WhatsApp*, *Facebook,* and *Instagram*, but ahead of rising platforms such as *TikTok* (*We are social* and *Hootsuite*, 2021). Moreover, from the outset, *Twitter* has always been closely linked to news processes. **Carrera-Álvarez** *et al*. (2012) identified it as the network used most by journalists. This trend has been maintained over time, and **Coddington**, **Molyneux** and **Lawrence** (2014) concluded it was a suitable network for fact-checking. Likewise, some studies showed that people tended to be swifter at sharing fake news on *Twitter* than on other platforms, especially when they concerned politics (**Vargo**; **Guo**; **Amazeen**, 2017; **Vosoughi**; **Roy**; **Aral**, 2018).

Therefore, *Twitter* is an interesting topic for analysing how fact-checkers communicate as agents who combat disinformation. In fact, some studies on the effect or impact of fact-checking are based on *Twitter* (**Margolin**; **Hannak**; **Weber**, 2018; **Lee**; **Kim**; **Lee**, 2022). In Ibero-America, there is also research that covers the use of this network by one or several fact-checkers in different geographical locations, whether this be from a more generic approximation (**Magallón-Rosa**, 2018) or by analysing specific situations such as

- the "Procés" (**Pérez-Curiel**; **Velasco-Molpeceres**, 2021);
- Covid-19 (**Conde-Vázquez**; **Fontenla-Pedreira**; **Pereira-López**, 2020; **Ramon-Vegas**; **Mauri-Ríos**; **Rodríguez-Martínez**, 2020; **Ceron**; **De-Lima-Santos**; **Quiles**, 2021);
- the elections (**Magallón-Rosa**, 2019);
- the Russian invasion of the Ukraine (**Morejón-Llamas**; **Martín-Ramallal**; **Micaletto-Belda**, 2022).

Apart from providing a quantitative description of fact-checking initiatives, most of these studies delve into the strategies used to refute rumours, the types of checks carried out and the topics they cover. Others focus on the degree of engagement reached and the resources used for improving interaction (**Ramon-Vegas**; **Mauri-Ríos**; **Rodríguez-Martínez**, 2020; **Morejón-Llamas**; **Martín-Ramallal**; **Micaletto-Belda**, 2022).

The aim of this study is to broaden this research to encompass the whole of Ibero-America and a greater number of fact-checkers. It also seeks to gain an overall perspective more focused on the activity of the fact-checkers themselves and their repercussion rather than on the topics they cover.

> Ibero-American fact-checkers published between three and 62 tweets per day in 2021

1.3. Objectives

The aim of this research is to characterise the use of *Twitter* by Ibero-American fact-checkers in 2021 and to determine to what extent their posting habits influence interaction. For this purpose, the following specific objectives were set:

- To show the trending and timing for Ibero-American fact-checkers on *Twitter*.
- To analyse interactions on all levels (likes, retweets, replies and quotes).
- To explore the type of content posts and the resources used by each fact-checker and within the total sample.
- To identify the possible influence of the variables analysed in the interactions.

2. Methodology

The sample was made up of 18 fact-checkers in Ibero-America that on 17th January 2022 had either been verified by the *IFCN* or were in the process of being checked and had an active account on *Twitter* (Table 1). With the tool *4CAT* (**Peeters**; **Hagen**, 2022) a database was obtained with all the tweets posted by the 18 institutions in 2021. For each one, in a similar vein to that in previous studies (**Magallón-Rosa**, 2018, **Morejón-Llamas**; **Martín-Ramallal**; **Micaletto-Belda**, 2022), information was downloaded for the following variables: transmitter, date and time of posting, full text, language of post, type of post (proactive, retweet, citation or response), source of post, resources used (hashtags, links, images and mentions) and interaction data (likes, retweets, responses and citations).

Table 1. List of fact-checkers included in the sample

Fact-checker	Country	Language	State (17/01/2022)	*Twitter*	Number of tweets
AFP Checamos	Brazil	Portuguese	Verified	*https://twitter.com/AFPChecamos*	2,016
AFP Factual	Uruguay	Spanish	Verified	*https://twitter.com/AFPFactual*	2,512
Agência Lupa	Brazil	Portuguese	Verified	*https://twitter.com/agencialupa*	3,782
Aos Fatos	Brazil	Portuguese	Verified	*https://twitter.com/AosFatos*	2,216
Bolivia Verifica	Bolivia	Spanish	In process	*https://twitter.com/BoliviaVerif1ca*	2,128
Chequeado	Argentina	Spanish	Verified	*https://twitter.com/Chequeado*	4,745
Colombia Check	Colombia	Spanish	Verified	*https://twitter.com/colcheck*	4,261
Cotejo.Info	Venezuela	Spanish	Verified	*https://twitter.com/CotejoInfo*	7,621
Ecuador Chequea	Ecuador	Spanish	Verified	*https://twitter.com/EcuadorChequea*	1,551
EFE Verifica	Spain	Spanish	Verified	*https://twitter.com/EFEVerifica*	2,402
El Sabueso (*Animal Político*)	Mexico	Spanish	In process	*https://twitter.com/ElSabuesoAP*	4,119
Fast Check CL	Chile	Spanish	Verified	*https://twitter.com/FastCheckCL*	2,044
Mala Espina Check	Chile	Spanish	Verified	*https://twitter.com/MalaEspinaCheck*	3,210
Maldito Bulo (*Maldita.es*)	Spain	Spanish	Verified	*https://twitter.com/MalditoBulo*	9,448
Newtral	Spain	Spanish	Verified	*https://twitter.com/Newtral*	22,844
Polígrafo	Portugal	Portuguese	Verified	*https://twitter.com/Polígrafo*	2,336
Verificador de La República	Peru	Spanish	Verified	*https://twitter.com/VerificadorLR*	1,371
Verificat	Spain	Catalan	In process	*https://twitter.com/veri_fi_cat*	1,253

The application used to download data does not yield any information on the number of followers at the time each tweet was posted, so it was not possible to establish an interaction ratio per follower, nor to assess the trend in the size of the communities. To make up for this shortcoming, the number of followers for each fact-checker on 13/02/2022 was considered; this figure was not reliable for establishing the ratio mentioned, because it did not take into account what was trending in the community. However, fact-checkers could be grouped into large categories according to the amount of followers (>100.000 followers, between 50,000 and 100,000 followers and <50,000 followers) and their interaction could be evaluated according to the category they belonged to.

Moreover, in order to detect possible differences between the tweet topics with most interaction and those in the sample as a whole, an analysis was carried out of the key words related to topical aspects or content deemed significant by researchers. Key words were selected from a preliminary analysis of a random set of tweets, in which researchers inductively detected the most common terms the fact-checkers used to refer to various topics or contents, as well as specific formulas that some resorted to to determine whether a content was true or false (e.g. "NoComaCuento") (Table 2). Topics were selected on the basis of identifying topics frequently dealt with by the fact-checkers according to previous studies (**Bernal-Triviño**; **Clarés-Gavilán**, 2019; **Blanco-Alfonso**; **Chaparro-Domínguez**; **Repiso**, 2021; **Ceron**; **De-Lima-Santos**; **Quiles**, 2021; **Dafonte-Gómez**; **Baamonde-Silva**, 2020; **García-Vivero**; **López**, 2021; **Humprecht**, 2019; **Magallón-Rosa**, 2018; **Salaverría** *et al*., 2020).

Table 2. Keywords identified for analysis

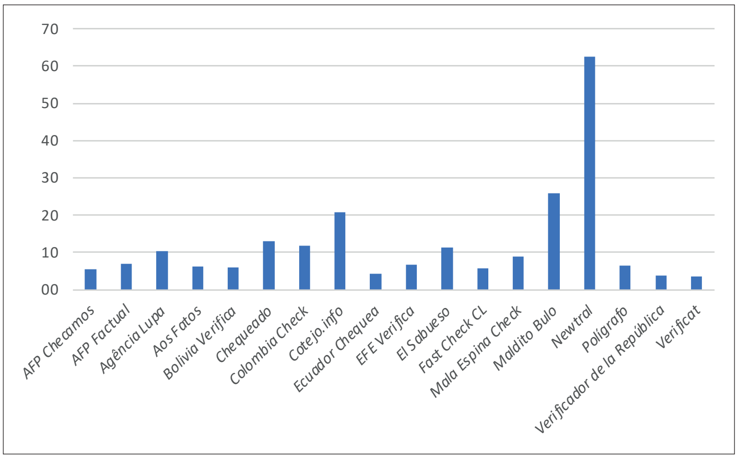
Truthfulness or falseness identifiers	*Bulo, cuestionable, desinformación, engañoso/a, exagerado/a, fake, falsedad, falso/a, farsa, impreciso/a mentira, "nocomacuento".* *"Biencompartido", cierto/a, "infodelabuena", verdad*
Topic identifiers	*Coronavirus, covid, negacionismo, pandemia, SARS, vacuna.* *Comicios, debate, elecciones, electoral.* *Ley, política/o.* *Aborto, hombre, feminazi, feminismo, feminista, gay, género, género fluido, lesbiana, LGTBI, machismo, machista, mujer, no binario, sexismo, sexista, trans (transgénero, transexual), violencia machista* (specifically). *Inmigrante, inmigración, migratorio/a.* *Calentamiento global, cambio climático, clima, contaminación, medio amiente, negacionismo, negacionista, polución, sostenibilidad.*

The term search was carried out in the three languages in the sample (Spanish, Portuguese, and Catalan), considering any possible variations and correcting any duplicated results. The search was first applied to all posts in the sample and, subsequently, to a selection of 5% of the posts with the greatest amount of weighed interactions (hereinafter ViP) for each fact-checker. This indicator (ViP) weighs the standard interactions on *Twitter* (like, reply, retweet and quote) according to a value allocated to their weight. The simplest interaction, marking a tweet as favourite or "like" received one point; sharing content received 5 points; responding to the tweet itself received 10 points and a cited tweet was equivalent to the sum of a response and a tweet or 15 points. Although the ViP was put forward by the authors, this metric is in keeping with the standards on how *Twitter* is typically used (**Boyd**; **Golder**; **Lotan**, 2010; **Comarella** *et al*., 2012) and with the values used by *Facebook*, as revealed by *The Wall Street Journal* (**Hagey**; **Horwitz**, 2021), which refers to the weight for each interaction in terms of their level of implication or proactivity.

3. Results

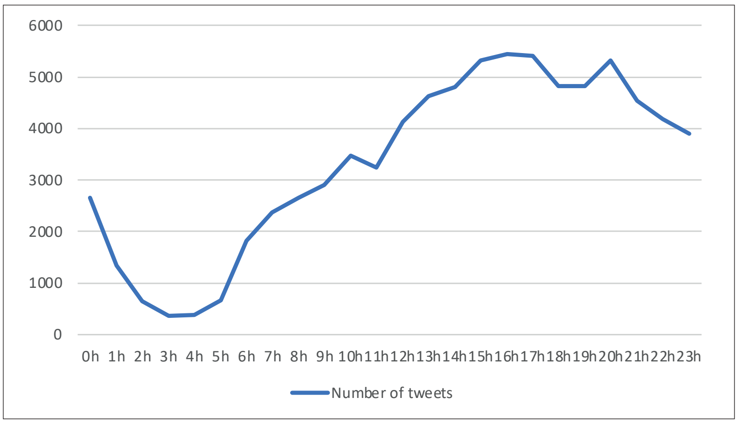
3.1. Posting patterns and tweet features

Among the 18 fact-checkers analysed, there were a total of 79,859 tweets in 2021. This came to an average of 4,437 each and a median of 2,457. This showed an average of 12.2 posts/day and 369.7 posts/month each. However, there was a great deal of variation in their rate of postings: *Newtral* was striking with an average of 62.6 tweets per day, followed by *Maldito Bulo*, with 25.9 posts/day, and *Cotejo.Info*, with 20.9. All the fact-checkers reached a minimum number of three posts per day (Graph 1).



Graph 1. Average number of daily posts from the fact-checkers

Four fact-checkers were Spanish (22% of the total), three Brazilian (16.66%), two Chilean and the rest were from other Ibero-American countries: Argentina, Portugal, Venezuela, Colombia, Bolivia, Mexico, Uruguay, Peru and Ecuador. 72.2% of them posted in Spanish, as opposed to 22.2% in Portuguese; incidentally, Catalan was added for *Verificat*. As for the number of posts, two Spanish fact-checkers took the first two places (*Newtral* and *Maldito Bulo*), followed by Venezuela (*Cotejo.Info*), Argentina (*Chequeado*) and Colombia (*Colombia Check*), all of whom posted in Spanish. In terms of the total amount of posts, Spanish accounted for 85.47% (partly, due to the number of Spanish fact-checkers in the sample, as well as their amount of posts), Portuguese for 12.96% and Catalan, 1.56%.



Graph 2. Trend in postings from fact-checkers throughout the day

For several months, no significant fluctuations were observed in the rate of posting, although there was a slight rise in July, August and September. January and February were the months with least activity. These trends did not apply for a few fact-checkers. For instance, *Chequeado*, was most active in the month of November; *Polígrafo*, was striking in December; *Mala Espina Check* in August; *Aos Fatos* in June; *Bolivia Verifica* in October; *Verificat* in November and February; and *El Sabueso*, yielded some of its main data in the months when there was lower activity in global trends (Table 3).

Table 3. Annual trend in posts from Ibero-American fact-checkers

Fact-checker	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AFP Checamos	113	92	107	91	102	258	298	177	153	213	181	231
AFP Factual	197	202	236	247	224	228	194	186	178	219	215	186
Agência Lupa	438	154	488	401	425	327	291	240	251	222	302	243
Aos Fatos	138	114	151	155	242	262	220	229	245	216	83	161
Bolivia Verifica	150	167	238	171	170	133	165	175	213	240	160	146
Chequeado	218	264	379	366	435	432	418	374	464	450	530	415
Colombia Check	132	282	312	369	376	365	493	427	469	456	354	226
Cotejo.Info	487	582	804	776	701	838	911	679	459	467	471	446
Ecuador Chequea	38	52	34	62	117	148	187	216	143	211	210	133
EFE Verifica	145	148	182	204	255	231	266	209	173	184	197	208
El Sabueso	428	408	429	468	400	290	294	272	291	291	291	257
Fast Check CL	177	233	198	202	248	157	160	220	100	105	134	110
Mala Espina Check	102	121	246	207	223	172	310	438	383	338	361	309
Maldito Bulo	838	737	868	636	518	774	1114	731	1157	804	697	574
Newtral	1,702	1,641	1,857	1,829	1,944	1,894	2,240	2,122	2,063	1,884	1,790	1,878
Polígrafo	175	146	170	159	158	157	145	134	212	255	292	333
Verificador de La República	122	130	132	132	147	139	115	100	92	97	85	80
Verificat	85	160	79	72	81	90	81	65	128	115	180	117
Total	5,685	5,633	6,910	6,547	6,766	6,895	7,902	6,994	7,174	6,767	6,533	6,053

The preferred times for the fact-checkers for disseminating their contents was between 3pm and 5pm with a new peak in posting at 8pm (Graph 2). No significant differences were seen in the function the fact-checkers had.

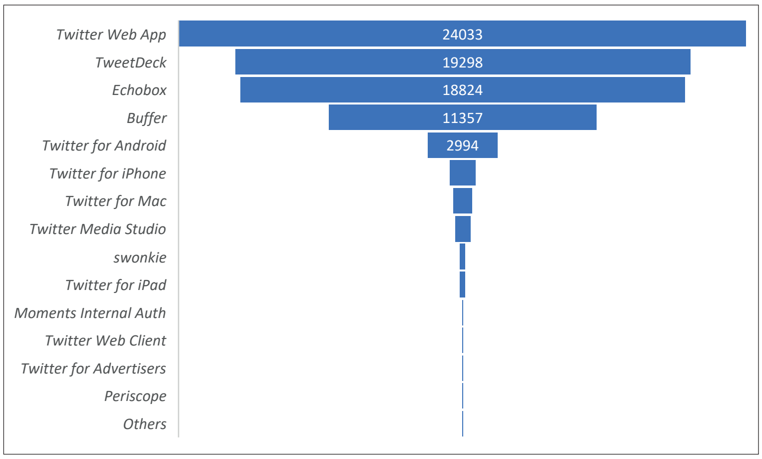
As for the source of the post, it is remarkable that seven applications accumulated over 95% of the posts made. 62% of the tweets were programmed (*Tweetdeck*, *Echobox* and *Buffer*) and 30% were posted directly on *Twitter* (Graph 3).

According to the type of post, total figures show 75.5% of proactive posts, 13.4% of responses, 10.3% of retweets and 0.7% of citations. This trend was mostly maintained for the fact-checkers, albeit with a few exceptions: *Maldito Bulo* mainly focused its posts on retweets (68.1%) and *Aos Fatos*, on responses (62.9%), followed by proactive posts (34.9%) (Table 4).

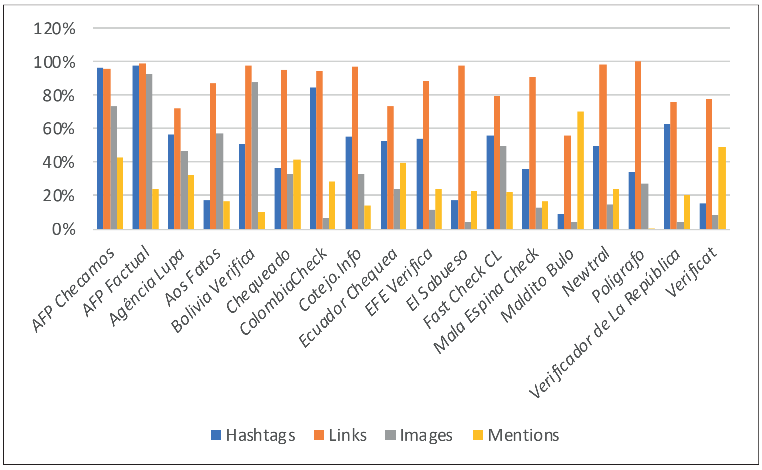
Table 4. Types of posts

Fact-checker	Reactive tweets			Proactive tweets
	Retweets	Citations	Responses	
AFP Checamos	0.0%	1.4%	39.1%	59.5%
AFP Factual	0.4%	0.3%	6.1%	93.2%
Agência Lupa	1.3%	1.3%	75.8%	21.5%
Aos Fatos	1.5%	0.8%	62.9%	34.9%
Bolivia Verifica	0.7%	0.9%	4.9%	93.5%
Chequeado	0.4%	0.1%	16.3%	83.3%
Colombia Check	1.0%	0.5%	8.1%	90.4%
Cotejo.Info	1.8%	0.8%	2.0%	95.3%
Ecuador Chequea	19.3%	0.9%	15.3%	64.5%
EFE Verifica	15.0%	2.4%	0.4%	82.3%
El Sabueso	0.8%	0.1%	3.4%	95.7%
Fast Check CL	8.1%	2.1%	20.1%	69.8%
Mala Espina Check	0.1%	0.0%	0.3%	99.6%
Maldito Bulo	5.0%	1.5%	10.3%	83.2%
Newtral	68.1%	0.1%	1.8%	30.0%
Polígrafo	1.5%	0.2%	9.5%	88.8%
Verificador de La República	3.1%	3.7%	24.8%	68.5%
Verificat	10.4%	4.5%	25.3%	59.8%
Total	10.3%	0.7%	13.4%	75.5%

The analysis of the resources used by the fact-checkers (Graph 4) indicated there were a high amount of links: 89% of posts included an url; this percentage reached 100% with the fact-checker *Polígrafo* and 99% for *AFP Factual*. 46% of the tweets contain hashtags, with figures surpassing 80% for several fact-checkers (*Colombia Check*, *AFP Factual* and *AFP Checamos*). In 25% there were images whose use rose with *AFP Factual*, *Bolivia Verifica*, *AFP Checamos*, *Aos Fatos* and *Fast Check CL*, all of which had images in over 50% of their tweets. Moreover, 28% of the tweets contained mentions, positioned above the average for the use of this fact-checking element such as *Maldito Bulo* (70%), *Verificat* (49%), *AFP Checamos* (43%), *Chequeado* (41%), *Ecuador Chequea* (40%) and *Agência Lupa* (32%).



Graph 3. Number of tweets according to the source of the post



Graph 4. Use of resources in posts: hashtags, links, images and mentions

3.2. Interaction analysis

The average number of retweets per post was slight (8.4), except for any specific fact-checker such as *Fast Check CL*, which reached 48.2 retweets per post.

Interaction by means of responses was also low (average of 1.9 responses per tweet), which placed practically all fact-checkers (88.88%) below 3.6. The highest figures were for likes, with an average of 16.5 likes per tweet, with far higher numbers for *Aos Fatos* (112.2 likes/tweet), *Fast Check CL* (70.9 likes/tweet) and *AFP Checamos* (44.3 likes/tweet). Lastly, just 22.22% had over 2 citations per tweet (Table 5). On an interaction basis, most striking were *Aos Fatos* (Brazil), which had over 100,000 followers, and *Cotejo.Info* (Venezuela), with under 50,000 followers. They represented the fact-checkers in the sample with the greatest and least interaction, respectively. In any event, the estimated amount from the community did not seem to be a determining factor in the average amount of interactions per tweet obtained for each fact-checker.

Table 5. Average amount of interactions per tweet for each fact-checker

Fact-checker community*	Fact-checker*	Retweets	Responses	Likes	Citations
Over 100,000 followers	*Chequeado*	10.6	3.6	25.1	2.0
	Maldito Bulo	9.9	0.4	4.6	0.4
	Aos Fatos	25.8	11.4	112.2	4.4
	Newtral	3.6	1.4	7.8	0.7
	Agência Lupa	6.8	3.5	27.8	1.5
50,000 to 100,000 followers	*Colombia Check*	18.6	1.5	32.0	1.3
	El Sabueso	10.7	1.2	21.8	0.8
	Fast Check CL	48.2	2.7	70.9	2.5
Less than 50,000 followers	*AFP Factual*	18.5	2.6	26.9	2.2
	Polígrafo	1.1	1.5	3.9	0.7
	Mala Espina Check	5.7	0.5	6.6	0.3
	AFP Checamos	11.3	10.4	44.3	3.3
	Ecuador Chequea	3.7	1.0	2.8	0.5
	Verificat	2.4	0.4	3.3	0.3
	EFE Verifica	8.3	0.9	7.2	0.7
	Bolivia Verifica	3.5	0.7	7.0	0.7
	Cotejo.Info	0.7	0	0.4	0
	Verificador de La República	7.7	1.8	15.5	0.3

*Fact-checkers categorised by number of followers on 02/13/2022

The analysis of interaction in terms of the posting time yields interesting results. The average for likes and retweets, responses and citations was highest for the tweets that were posted between three and five o´clock in the morning.

Table 6. Average amount of interactions per tweet by posting time

Hour	Average likes	Average retweets	Average responses	Average citations
0	21.74	10.89	2.50	1.05
1	38.67	18.64	2.73	1.50
2	37.17	23.57	2.23	1.59
3	64.81	36.66	2.87	2.02
4	71.62	38.69	3.47	1.99
5	10.67	8.93	0.90	0.42
6	4.85	6.34	0.74	0.35
7	5.16	6.45	0.96	0.40
8	5.75	6.10	1.08	0.60
9	4.70	4.24	0.83	0.41
10	6.91	5.93	1.47	0.69
11	7.78	5.95	1.36	0.73
12	14.80	6.47	1.48	0.78
13	12.00	7.14	1.35	0.84
14	13.22	7.05	1.73	0.99
15	20.71	8.94	2.10	1.19
16	16.69	9.39	2.20	0.99
17	17.79	8.13	2.30	1.06
18	19.94	9.50	2.45	1.24
19	20.85	8.30	2.65	1.20
20	20.43	8.95	1.85	0.95
21	18.19	8.01	1.95	1.24
22	20.41	9.41	1.71	1.00
23	19.61	7.79	2.34	1.16

Bearing in mind the main sources of posting, it can be seen that posting directly from the website yielded better interaction results than by using programming tools, except for the average number of retweets. The tweets sent from an *iPhone* are those which generated most interaction (Table 7).

Table 7. Average number of tweets according to the source of the post

Source	% tweets	Average likes	Average retweets	Average responses	Average citations
Buffer	14.22	19.51	10.19	1.91	1.27
Echobox	23.57	7.90	3.67	1.39	0.65
Moments Internal Auth	0.08	0.09	0.02	0.06	0.00
Periscope	0.04	2.93	1.86	0.71	0.25
swonkie	0.33	3.64	1.27	1.61	0.60
TweetDeck	24.17	15.66	8.78	1.57	0.96
Twitter for Advertisers	0.04	5.14	2.79	0.24	0.55
Twitter for Android	3.75	4.83	14.62	0.40	0.29
Twitter for iPad	0.33	4.77	8.71	0.22	0.19
Twitter for iPhone	1.43	21.94	20.74	1.34	1.23
Twitter for Mac	1.04	14.69	8.08	1.32	0.50
Twitter Media Studio	0.83	12.75	5.73	1.16	0.68
Twitter Web App	30.09	24.19	9.92	2.73	1.20
Twitter Web Client	0.05	21.11	8.92	1.46	1.00

A reactive tweet is the one that is posted in response to another tweet, to express an opinion or sentiment about it, in the form of a reply, retweet, or quoted tweet

A proactive tweet is the one that is posted in a planned way and for a specific purpose, rather than as a reply to another previous tweet

Regarding the possible influence of the type of tweet in the interaction, the responses to tweets from other users were those which reached a higher average for likes, while retweets were those, which, in turn, were those most retweeted, and responses, were those which obtained the highest amount of responses. The proactive tweets were just striking in terms of the average amount of citations received (Table 8).

Table 8. Average number of tweets according to the type of post

Average/ type of post	Retweets	Citations	Responses	Proactive tweets
Favourites	No data	16.83	21.83	17.81
Retweets	13.67	5.67	4.82	8.39
Responses	No data	0.90	2.83	1.96
Citations	No data	0.31	0.57	1.18

Moreover, we can see that interaction from the posts which used the resources analysed was higher than those which did not. That was true in all cases for the likes and quotes (Table 9).

Table 9. Average number of interactions per tweet according to the resources used

Average	Hashtags		Links		Images		Mentions	
	yes	no	yes	no	yes	no	yes	no
Retweets	9.50	7.55	8,02	11.81	10.72	7.69	11.60	7.10
Replies	2.22	1.56	1.97	1.07	3.24	1.41	1.80	1.90
Likes	19.35	14.10	17.45	8.97	28.15	12.67	17.20	16.20
Citations	1.16	0.81	1.06	0.23	1.76	0.71	0.99	0.96

As for retweets, the only exception to this was the use of URLs, with a lower average number of retweets for the posts which included URLs than for those which did not. As for responses, the tweets with mentions had an average which was a tenth lower than those which did not include them. The difference between the average for likes between tweets with images and those which did not have them was especially remarkable.

Figure 1 shows three examples of successful tweets from fact-checkers in the sample. All of them have links and images depicting the topic, the most valuable resource for creating interaction. The tweet from *Fast Check CL* adds two hashtags and that from *Aos Fatos* directly mentions the user it refers to. It should be added that for *AFP Checamos* and *Aos Fatos* contents programming tools were used which helped reach a broader audience and created more interactions.

Figure 1. Examples of successful tweets.
Sources: *AFP Checamos* (2021), *Fast Check CL* (2021) and *Aos Fatos* (2021).

3.3. Discourse analysis of the tweets with the highest amount of weighed interaction (ViP) in terms of the total sample

The correlation between the presence of key words in the sample as a whole and the tweets with the greatest ViP was very high (r=0.953). That is, there were no differences between those with most interactions from the sample as a whole in the use of terms which indicated truth and falsehood or key words for the topics analysed. However, there was a slightly higher percentage of key words in the tweets with the highest ViP than for the sample as a whole in all groups of indicators. That was the same for all the words analysed, albeit to a different extent.

The difference surpassed 1% for indicators of falsehood and for "Covid", while it only reached 0.31% for the truthfulness indicators and was practically non-existent for "climate change". The set of words for falseness in 3 languages ("*falsidad / falsidade / falsedat / fals / false / falsa*") represented 0.55% more on calculating the words from the posts with the highest ViP than in the sample as a whole; with the words for "vaccine" ("*vaccine/vacina*") the difference came to 0.43%

and for the word "covid", 0.38% (Table 10). These differences in percentage may seem insignificant. However, it must be remembered that the total number of words from the sample (23,537,941) and from the posts with most interaction (123,269), which the percentages are based on, include a far higher amount of terms with no semantic value (determinants, articles, conjunctions, prepositions...) than key words. This reduced the percentage of the latter in the sample.

Table 10. Presence of key words (% of the total number of words)

	All tweets	**Tweets with highest ViP**
Falseness identifiers	0.093%	1.160%
Truthfulness identifiers	0.031%	0.344%
COVID topic identifiers	0.138%	1.145%
Electoral topic identifiers	0.019%	0.267%
Gender topic identifiers	0.023%	0.312%
Climate change topic identifiers	0.003%	0.023%

4. Discussion and conclusions

The Ibero-American fact-checkers in this study showed highly variable activity on *Twitter*. All reached an average of over three posts per day, a figure which fulfilled the standards recommended by various experts who mention there should be at least three tweets per day and ideally five (*Websa100*, 2021; **Skaff**, n.d.). Some fact-checkers, such as *Newtral*, were remarkable for having a very high rate of posting, but in terms of interaction, they failed to make the most of this intense activity; this was in keeping with the average data for engagement on *Twitter* (*Twitter Engagement Report 2018*, 2019).

The difference in their rate of posting in terms of months means no pattern can be established, nor can any circumstance be determined which may have influenced the timing of the posts. The fact-checkers concentrated their tweets in the afternoons and evenings; however, paradoxically, the data show tweets posted in the early morning were those which had the most interaction. These results were surprising, since the latest report by *Sproutsocial* (**Keutelian**, 13 April 2022) indicated that the best time to post on *Twitter* is at nine o´clock in the morning, although any time between 8:00am and 1pm is good. With the changes *Twitter* made in 2015, it was its own algorithm that determined the potential each tweet had to appear in the followers´ chronological timeline, rather than the so-called reverse chronological feed. In this respect, the tweets posted at unusual times may have some influence on the algorithm and probability of appearing on the wall of more users, thereby creating more interactions.

As for the post source, although posting directly from the website creates more likes, replies and quotes, the fact-checkers preferred to use programming tools which made their work easier. Above all they opted for *Tweetdeck*, probably because it is free and user-friendly, although *Buffer* gives better interaction results, owing to the adjustments the tool itself makes to post the tweet at a time when there is a larger audience from the community for that account.

In terms of the type of post, a high percentage of tweets sent by the Ibero-American fact-checkers were proactive. Assuming their main functions were to enable recipients to see verified contents and help them become digitally literate, then, logically, they strived to spread their own content in terms of these two points. Also, there are studies of other sectors which endorse the assertion that their own contents are those which obtain the most engagement (**Fernández-Gómez**; **Martín-Quevedo**, 2018). However, the results from the Ibero-American fact-checkers showed a lower ability to generate likes, retweets and replies from proactive tweets than with reactive ones; these results were in keeping with those provided by **Gamir-Ríos** *et al*. (2022), which associated the predominance of tweets with their own content, one-way communication, and little interaction with other users. Even so, to qualify this, the proactive tweets did show a greater capacity to generate citations, and although this was the least frequent interaction, it was also the most valuable.

Moreover, they typically added links to their posts, although there were hashtags for under half their posts and images and mentions in only a quarter. However, according to the data obtained from the analysis, the use of hashtags, links, images, and mentions seems to have a positive effect on interaction. These results concur with those from other research which stress the influence of one or several of these resources in interaction (**Xu**; **Yang**, 2012; **Enge**, 2014; **Zhang**; **Peng**, 2015; **Lahuerta-Otero**; **Cordero-Gutiérrez**, 2016). Therefore, it is more probable that users interact with tweets which include interesting or popular links (**Toraman** *et al*., 2021) and which help round off information (**Lahuerta-Otero**; **Cordero-Gutiérrez**; **De-la-Prieta-Pintado**, 2018); mentions help to spark conversation by enabling these users to react to a message (**Lahuerta-Otero**; **Cordero-Gutiérrez**; **De-la-Prieta-Pintado**, 2018); the hashtags provide a context which helps information to be processed more easily (**Gul** *et al*., 2016); and images received 89% more likes and 150% more retweets (**Díaz-Soloaga**, 2018). From this point of view, one good course of action the fact-checkers could take would be to increase their use of these resources, especially images, given that only 25% of the tweets used them and their performance with any type of interaction was high (**Cooper**, 2013).

> 62% of the tweets were published through programming tools such as *Tweetdeck*, *Echobox* and *Buffer*

According to some recent studies, with hashtags this positive relationship cannot be applied generally. **Lahuerta-Otero**, **Cordero-Gutiérrez** and **De-la-Prieta-Pintado** (2018) proposed that they have a negative influence on how popular the tweets are when transmitters are high-involvement brands. **Toraman** *et al*. (2021) state that including hashtags had little influence on obtaining likes and responses probably owing to unpopular hashtags and hashtag hijacking (hashtags which are used for a purpose other than that originally envisaged). Similar data has arisen from the study on engagement from the *Twitter engagement report 2018* (2019), where average engagement with tweets with hashtags, after an analysis of 700 million tweets, was far lower than that for emojis, citing other users or even when none of these three were included in the content.

> Almost 90% of the tweets include links, half use hashtags and a quarter incorporate images or mentions

However, these factors do not seem to have any influence when it comes to Ibero-American fact-checkers, for those which use hashtags do report positive results, especially for obtaining favourites, so increasing their use is also recommended.

From an analysis of key words, generally speaking, it cannot be deduced that the most common topics in fact-checking are represented in the posts with more interaction than in the rest. However, the words linked to Covid and indicators of falsehood are slightly more abundant in the posts with the most interaction. However, a more comprehensive analysis would be needed from a discourse point of view to confirm that rebuttals receive more reactions than positive verifications or that some topics predominate over others when users interact.

In short, with this research, Ibero-American fact-checkers were seen to be highly active on *Twitter* throughout 2021. This helped to spread and reinforce their fact-checking and digital literacy by means of their websites. However, they must carry out some changes to the way they operate to improve their performance: Boosting posts of reactive tweets, adapting the time they send tweets to the dynamics of the social network and making greater use of resources such as images or mentions could be useful strategies for increasing interaction. Lastly, one limitation of this study is that it is impossible to reliably determine the potential influence of different content and topics on interaction. However, this, in turn, may provide new material for future research.

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Innovation, digitization, and disinformation management in European regional television stations in the *Circom* network

Talia Rodríguez-Martelo; José Rúas-Araújo; Isaac Maroto-González

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Talia Rodríguez-Martelo ✉
https://orcid.org/0000-0002-7633-0394

Universidade de Vigo
Facultad de Ciencias Sociales y de la Comunicación
Campus da Xunqueira, s/n
36005 Pontevedra, Spain
talia.rodriguez@uvigo.es

José Rúas-Araújo
https://orcid.org/0000-0002-1922-9644

Universidade de Vigo
Facultade de Ciencias Sociais e da Comunicación
Campus da Xunqueira, s/n
36005 Pontevedra, Spain
joseruas@uvigo.es

Isaac Maroto-González
https://orcid.org/0000-0003-1269-6773

Universidad de Santiago de Compostela
Facultade de Ciencias da Comunicación
Campus Norte, Av. de Castelao, s/n
15782 Santiago de Compostela, Spain
isaac.maroto.gonzalez@usc.es

Abstract

The *European Association of Regional Television* (*Circom*) is an umbrella organization of regional broadcasters in Europe, currently composed of a total of 43 broadcasters from 29 countries. These public service media play a decisive role in information reality owing to their proximity, the cultural development of their communities, and the emotional bond they have with their audiences. This research analyzes the relationship between European regional media, innovation, and digitization processes and the fight against disinformation in the current media context through interviews with *Circom* network managers. In turn, the resulting sample has been compared with the models of Hallin and Mancini (2004), demonstrating that this classification is not significant in terms of innovation and digitization approaches but is decisive in the analysis of disinformation and the strategies used by the media in each country. Innovation, digitization processes, and business structure have conceptualization problems in solving the pressure that today's convergent environment exerts on linear television. After analyzing the results, it becomes clear that there is a pressing need to renew and redefine professional profiles, adapt content to different formats, and conquer young audiences, although there is no agreement on the best way to face these challenges.

Keywords

Circom; Television; European regional media; Audiovisual; Disinformation; Innovation; Digitization; Professional profiles; Information; Audiences; Proximity; Local; VoD; Platforms.

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1. Introduction

The current media context is determined by changes in audiovisual consumption, the demand for new audiences, and the pressure exerted by video on demand (VoD) platforms on linear television in its various forms of access, such as subscription video on demand (SVoD) and transaction video on demand (TVoD) (**D'Arma**; **Raats**; **Steemers**, 2021). The media, in general and linear television in particular, are subject to innovation and digitization processes that allow them to maintain a relevant position among their audiences, ensure the generational replacement of their audiences, and enjoy a significant presence on social networks that bring together the most important parts of audiovisual consumption on the mobile screen (**Navarro-Robles**; **Vázquez-Barrio**, 2020).

In this context, several contemporary phenomena determine the process of evolution to which traditional media are subject: obligatory digitization, adaptation of their content to a multiformat environment, and the loss of the TV event in favor of disaggregated consumption. Digital native media play with an advantage in this new market structuring, but even so, the professional profiles in demand are not clear in the current employment landscape (**Negreira-Rey**; **López-García**; **Vázquez-Herrero**, 2020). Thus, on the one hand there is a change in information processing, and on the other hand, technological innovation that requires multidisciplinary training (**Marqués-Pascual**; **Sintes-Olivella**, 2020), in a new reality in which there are also threats such as content saturation, content trivialization, or misinformation (**Herrero-Curiel**; **Planells-de-la-Maza**, 2020).

Disinformation and the proliferation of fake news have become global problems, affecting the stability of Western democracies and the trust of citizens in their representatives and public institutions, and in this sense, the work of verification journalism becomes fundamental in regard to its accountability to society, which in turn is related to trust in state power (**Rodríguez-Pérez**, 2020).

The phenomenon of fake news has been extensively studied by academia in recent years, in both the European and Ibero-American spheres and especially in the wake of Covid-19 (**Sánchez-Duarte**; **Magallón-Rosa**, 2019; **Ufarte-Ruiz**; **Anzera**; **Murcia-Verdú**, 2020; **Pérez-Dasilva**; **Meso-Ayerdi**; **Mendiguren-Galdospín**, 2020; **Salaverría** *et al*., 2020; **Guallar** *et al.*, 2020; **Villa-Gracia**; **Cerdán-Martínez**, 2020) and the so-called global infodemics (**García-Marín**, 2020).

An infodemics spreads like a virus resistant to truth and leads to an infocracy in which information is used as a weapon and as part of the "information regime." This information regime is a new form of government that replaces discourse with the "rationality" of data (dataism) through algorithms and machine learning that mimic arguments and that is exercised over people trapped in the information of a digital prison (**Han**, 2022) under the guise of freedom, where truth and veracity succumb to the new era of digital post-democracy.

The perception of so-called Generation Z is that social networks and web spaces are where most fake news is distributed, despite the fact that, curiously, it is these same media that they consume massively, and in which –at the same time and paradoxically– they place less trust (**Pérez-Escoda**; **Pedrero-Esteban**, 2021). Social networks such as *TikTok*, which initially emerged as a mass consumption platform for teenagers and on which ephemeral and visual communication prevails, now bring together a multitude of actors, media, and journalists, confirming the great potential of this network to combat misinformation, as well (**Sidorenko-Bautista**; **Alonso-López**; **Giacomelli**, 2021).

The rise and impact of disinformation through social networks are already inescapably part of the fourth wave of digital democracy (**Ireton**; **Posetti**, 2018), whose the most notable milestones in shaping public opinion are the intensive use of artificial intelligence and Big Data, the search for engagement with audiences, and the validation of lies as a political strategy, with a combination of hyperlocal and supranational elements (**García-Orosa**, 2021). Consequently, disinformation causes an alteration and manipulation of public space and democratic dialog, including pseudo-media and web content that mimic the format of traditional media through narratives that alter reality, which though they have been present since the beginning of public life, have never before had the resources to achieve large-scale repercussions (**Palau-Sampio**; **Carratalá**, 2022).

> Verification has become a main task in the news room of media corporations

This leads to a responsibility of public media and their commitment both to a citizenry who may feel defenseless in the midst of this scenario because they are not able to distinguish real statements from false ones that use deception to hide their true nature (**Kušen**; **Strembeck**, 2020; **Wölker**; **Powell**, 2021; **García-Orosa**, 2021), and to providing the means, techniques, and tools necessary to combat disinformation available, including media literacy to citizens, and to which the European Union attaches increasing importance (**Sádaba**; **Salaverría**, 2022).

1.1. Innovation, digitization, and the fight against disinformation in the EU and on European regional TV stations

Today, the media are facing the challenge of adapting to a changing context within media convergence. Thus, the obligatory innovation processes that have been occurring recently take on special relevance in regional media owing to their limited capacity when compared with global media, but which are essential in the development of the communities in which they operate. These processes of innovation and digitization have interpretations both in the introduction of technological innovations and in the changes as to how content is produced, consumed, and presented. The incorporation of new communicational agents, such as international VoD platforms and social networks, drags European public service media (PSM) toward a process of platformization that forces them to integrate structural changes into their production and dissemination processes to attract digital audiences (**Bonini**; **Túñez-López**; **Barrientos**, 2021; **Duffy**; **Poell**; **Nieborg**, 2019).

In recent years, several initiatives have emerged within the EU in the fight against disinformation, focused on the defense of geostrategic security and the maintenance of democratic guarantees in the interest of protecting the electoral processes of Member States against ever-present interference and cyberattacks from other countries, as well as on the promotion of media literacy. Among these initiatives (*European Commission*, 2020), the following deserve mention (**Rúas-Araújo**; **Rodríguez-Martelo**; **Máiz-Bar**, 2021):

- the launch of the *EastStratCom Team* under the *European External Action Service* (*EEAS*) in 2015 and the subsequent creation of the *EU vs. Disinfo* (*EUvsDisinfo*, 2018) platform, a project focused on detecting and responding to disinformation campaigns from Russia (*European Commission*, 2016);
- the "Joint declaration on freedom of expression, fake news, disinformation, and propaganda," established within the *Organization for Security and Cooperation in Europe* (*OSCE*) and the *United Nations* (*UN*) and in line with the objectives set out by the *European Network and Information Security Agency* (*Enisa*); and a series of recommendations "in defense of free and fair European elections," raised at their meeting in Salzburg one year before the European elections in May 2019 (*European Commission*, 2018, document 637).

Other actions also of note were

- the launch of a *European Union Action Plan against Disinformation*;
- the promulgation and dissemination of European codes of good practice and advice against disinformation at the initiative of the *European Parliament* (2019; 2020a; 2020b) and the *Council of Europe* (**Chapman**; **Oerman**, 2020); and
- the creation, within the *European Commission*, of a group of experts on disinformation (**De-Cock-Bunin**, 2018).

Institutional initiatives are complemented by the creation of the *European Digital Media Observatory* (*EDMO*), which brings together university researchers and opinion leaders with the aim of limiting disinformation in the EU and protecting the democratic integrity of electoral processes (**Ramón-Reyero**; **Gil-Martín**, 2021).
https://edmo.eu

Likewise, the *EDMO* also includes *Iberifier*, a digital media observatory in Spain and Portugal that is a research and fact-checking project coordinated by the *University of Navarra* and made up of a dozen universities, five verification organizations and news agencies, and six multidisciplinary research centers.

In addition, from the point of view of promoting digital literacy, it should be noted that the verification exercise is not limited only to the media, since nongovernmental organizations (NGOs) have been equally active in promoting digital verification owing to the importance it has for human rights (**Redondo**, 2018), just as it is also necessary to highlight the role of schools and universities as key points for the recovery of trust in the media (**Nigro**, 2018).

In a similar vein, the *Council of Europe*, through the aforementioned *EastStratcom* platform, has a total of 400 volunteers who produce weekly bulletins on fake news, as does *Fiskkit*, a civil platform that promotes online dialog.

Likewise, both the *EDMO* and the *European Commission's Expert Group on Fake News and Online Disinformation* state the promotion of media literacy as one of their main objectives, which includes the creation of a public portal for this purpose, as well as the promotion of research projects related to disinformation on a European scale (**Sádaba**; **Salaverría**, 2022).

Meanwhile, television channels and social networks also face the continuous need to evolve and innovate in the fight against fake information (**Túñez-López**; **Fieiras-Ceide**; **Vaz-Álvarez**, 2021), taking into account the great conceptual complexity in the study and analysis of images in the current context of disinformation (**Marzal-Felici**, 2021), in which hoaxes and fake news increasingly use audiovisual materials to support their messages of deception, pointing to the importance of the audiovisual fact-checker's role (**Rodríguez-Serrano**; **Soler-Campillo**; **Marzal-Felici**, 2021).

The presence and combination of text, images, and audio as well as the manipulation of still and moving images has more media reach and thus causes greater interaction on social networks (**Brennen** *et al*., 2020). This, in turn, is generating another offshoot in the fight for the imposition of digital storytelling through the use of artificial intelligence (AI) and the training and development of detection algorithms and machine learning programs, especially in the wake of Covid-19 (**Sun**, 2019; **Bullock** *et al*., 2020) and the manipulation of images and videos through deepfakes to intensify deception (**Miller**, 2020; **Gómez-de-Ágreda**; **Feijóo**; **Salazar-García**, 2021).

In the case of the so-called public service media (PSM), the use of AI offers new opportunities in all its facets (**Fieiras-Ceide**; **Vaz-Álvarez**; **Túñez-López**, 2022), with some public broadcasters, such as the *BBC*, *Deutsche Welle*, and *SRG-SSR* (Switzerland), having already worked with linguistic technologies based on speech recognition, automatic translation, and content generation in recent electoral processes. Similarly, *Full Fact* (UK) and *Décodex* (France) are two AI-based verification projects that include fake video detection, as is the *Fandango* project that is funded by European projects (**Rodríguez-Martelo**, 2021).

Finally, it is worth mentioning the *Um Olhar Europeu* project, launched by the Portuguese *RTP*, which involves 10 European public radio and television companies (*RTBF* of Belgium, *YLE* of Finland, *France Televisions* of France, *BR/ARD* of Germany, *RTE* of Ireland, *RAI* of Italy, *RTVE* of Spain, *SWI* of Switzerland, *ART* of France and Germany, and the aforementioned *RTP*) and uses the *Eurovision News Monitoring Tool*, also promoted by the *EBU* (**Canavilhas**, 2022).

1.2. Truthfulness as a public value in local television stations

During the last few years in Northern and Southern Europe, different studies have highlighted attempts to discredit public media with the objective of eroding the perception of PSM (**Sehl**; **Simon**; **Schroeder**, 2020; **Schulze**, 2020). When PSM are subjected to state control by conservatism, as in the case of Hungary or Poland, selective political exposure is evident, which enhances polarization in society (**Bos**; **Kruikemeier**; **De-Vreese**, 2016), causing a democratic backlash in these countries (**Surowiec**; **Kania-Lundholm**; **Winiarska-Brodowska**, 2020) and turning public media into sources of disinformation (**Dragomir**, 2019).

Truthfulness as an element of public value is evidenced in different ways depending on the economic and political context of each country. In the PSM of Southern Europe, for example, *RTVE*, citizens' perception of the value of the media is linked to the truthfulness, accuracy, and independence of the news together with their commitment to public service (**Campos-Rueda**; **Goyanes**, 2022).

On the contrary, in Northern Europe, public broadcasters such as the Flemish *VRT* are under close scrutiny by their stakeholders regarding public media's role in addressing the problem of disinformation. In this way, the media is held directly responsible, as part of its public service function, for finding a solution to the problems arising from the dissemination of false information, which generates a high level of pressure as to what is expected of them (**Van-den-Bulck**; **Raats**, 2022).

In addition, PSM have attracted increasing academic interest in recent years in the face of digital transformations, which force them to rethink their content production strategies (**Lestón-Huerta**; **Goyanes**; **Mazza**, 2021).

The actions of public media in the fight against disinformation encounter internal obstacles arising from the political and cultural contexts in their own governance that affect their independence and funding (**D'Arma**; **Raats**; **Steemers**, 2021). These materialize in the capacity for the development of effective tools to fight disinformation.

Another difficulty encountered by PSM in their fight against disinformation is related to the convergent integration established between public media and private social networking platforms (*EBU*, 2021). This public-private relationship generates a dilemma between the need to disseminate content to all audiences and the participation in social networks, which turns out to be the main channel for the dissemination of fake news (**Horowitz** *et al*., 2022).

The public value of truthfulness from which independence, and ultimately, reputation emanate offers the opportunity to build trust and credibility (**Karppinen**; **Moe**, 2016) with local public media and thereby develop and strengthen the public value of PSM vis-à-vis advertising-dependent private media while improving the democratic quality of the country. In addition, truthfulness in regional media is linked to the dialog with their audiences and the emotional bonding implied by local media.

2. Methodology

The objective of this research is to study the innovation processes and management of disinformation in European regional television media, defining the sample on the basis of the *Circom* network member broadcasters. Through this approach, and after a review of the current literature on innovative processes and verification, an exploratory study with a qualitative approach was chosen.

To carry out the research, a series of semistructured interviews with open and dichotomous questions were conducted with professionals in managerial positions in different European regional media. The interviews were conducted by two interviewers on May 26-27 of 2022, held during *Circom*'s *38th Annual Conference 2022* in Galway, Ireland. The conference's collaboration made it possible to speed up the process by scheduling appointments in advance with the attending executives, and a schedule was drawn up in morning and afternoon sessions, during which 18 interviews were conducted.

The selection of the theoretical, non-probabilistic, and convenience sample (**Denzin**; **Lincoln**, 2005) was made from an available sample of 43 channels from 29 countries, all of them European regional television media from the *Circom* network, which resulted in a final sample of 18 broadcasters interviewed from a total of 15 countries.

The panel of experts, their corresponding broadcasters, and the resulting countries were as follows:

- Werner Erics, *ORF*, Austria (national coordinator).
- Alexander Pletser, *RTBF*, Belgium (national coordinator).
- Gordana Skaljac Narancic, *HRT*, Croatia (national coordinator).
- Jyri Kataja-Rahko, *YLE*, Finland (national coordinator).
- Jean-Marc Dubois, *FTV*, France (President, *Circom* network).
- Françoise Erb, *FTV*, France (Secretary General, *Circom*).
- Aline Montaner, *France 3*, France (regional coordinator for Auvergne-Rhône-Alpes).
- Frank Böhm, *HR*, *RBB*, Germany (national coordinator).
- Micaela Panella, *RAI*, Italy (national coordinator).
- Ildiko Komaromi, *MTVA*, Hungary (national coordinator).
- Klaas Geert Bakker, *RTV Oost*, The Netherlands (national coordinator).
- Eivind Undrum Jacobsen, *NRK*, Norway (national coordinator).
- Maja Smiljanic, *RTV*, Serbia (national coordinator).
- Marta Gajdosikova, *RTVS*, Slovakia (national coordinator).
- Zoran Medved, *RTVSLO*, Slovenia (national coordinator).
- Andoni Aldekoa, *EITB*, Spain (national coordinator).
- Josefin Ziegler, *SVT*, Sweden (national coordinator).
- Xaime Arias, *RTVG*, Spain (director of social projection).

The semistructured interviews allowed for the collection of relevant qualitative information. Open-ended questions were combined with dichotomous questions to set the context and collect certain numerical data. This strategy was considered the most suitable to take advantage of the know-how of each interviewee given their professional profile, as well as to establish a series of variables in the responses, which were coded on the basis of a content analysis according to the most commonly repeated terms and structures in each thematic area for the extrapolation of trends (**Krippendorf**, 1990).

The interviews conducted consisted of two distinct blocks of content. Following the script and the closed/dichotomous questions allowed for equivalent results that maintained unity and coherence among all the interviews to obtain a relevant and analyzable panel of experts.

Table 1. Interview script of the selected panel of experts

Questionnaire script	
Block I. Innovation and digitization processes	1. How is your channel adapting to the demands of new audiences and digitization processes?
	2. How does linear TV handle the pressure of subscription video on demand (SVoD)?
	3. Does your media company have a specific department dedicated to innovation?
	4. If yes, how many people does it have?
	5. What kind of professionals or new profiles are required in this department?
	6. What processes or strategies are being developed in the innovation department?
Block II. Disinformation and verification	7. What are the main strategies in the fight against disinformation on your channel?
	8. What fact-checking systems or strategies do you use in your channel? Are the verification tools you use proprietary or third party?
	9. What resources have you used to build your fake news verification or detection mechanisms/platforms? Have you used external agents/companies/collaboration to develop these tools?

The general objective (GO) of the research and the specific objectives (SO) are as follows:

> GO. To classify and analyze the similarities and differences in the process of adaptation to the digital environment that the European regional television stations belonging to the *Circom* network utilize and to review the sample according to the models and comparative media systems of **Hallin** and **Mancini** (2004):
>
> > SO1. To analyze the processes of innovation, digitization, and adaptation to the demands of new audiences in European regional television stations.

SO2. To understand the organization and structure of newsrooms in their adaptation to the digital environment.

SO3. To analyze the strategies for action in the management of disinformation.

In accordance with the main objective and according to the classification of models by **Hallin** and **Mancini** (2004), the list of countries and channel managers interviewed corresponded to: the Mediterranean or Polarized Pluralist model and the Northern European or Democratic Corporatist model (see Table 2).

Table 2. **Hallin** and **Mancini**'s (2004) classification and list of countries and media interviewed

	Mediterranean/ polarized pluralist model	Northern European /democratic corporatist model	Liberal model	Other media interviewed in the European context
Hallin and Mancini models	France (*FTV*, *France 3*)	Austria (*ORF*)	United Kingdom	Slovenia (*RTVSLO*)
	Spain (*EITB*, *RTVG*)	Belgium (*RTBF*)	Ireland	Croatia (*HRT*)
	Italy (*RAI*)	Sweden (*SVT*)	United States	Hungary (*MTVA*)
	Portugal	Finland (*YLE*)	Canada	Serbia (*RTV*)
	Greece	Germany (*HR*, *RBB*)		Slovakia (*RTVS*)
		The Netherlands (*RTV Oost*)		
		Norway (*NRK*)		
		Denmark		
		Switzerland		

Note. The green highlighted boxes contain the countries in which one or more of their regional broadcasters were interviewed.

3. Management of innovation and the digitization process in the *Circom* network European regional media

The situation of public service media (PSM) is determined by a series of difficulties stemming from aging audiences and their general decline (**Gesto-Louro**; **Campos-Freire**, 2020), the pressure of international SVoD platforms on linear television (**Izquierdo-Castillo**; **Latorre-Lázaro**, 2022), and the need for the digitization of content for dissemination through the web and social networks.

In this context, European regional public media have special relevance owing to the public services they provide in a local environment that serves multi-profile audiences. Their mission and positioning require a review of and an adaptation to the demands of new audiences in a stage of media convergence (**Túñez-López**; **Campos-Freire**; **Rodríguez-Castro**, 2021).

Table 3. Main ideas concerning innovation and digitization obtained during the interviews

Radio-television	Main ideas expressed regarding innovation management and the digitization process
France TV (France)	It is not strategic, for the moment linear TV prevails in regional media.
France 3 (France)	The digitization process is focused on making multimedia content.
France TV General (France)	It is a continuous process, although in the public media the audience is much larger and the pace is slow.
EITB (Spain)	Sociological studies have been increased, and the focus has been on content creation.
RTVG (Spain)	A big data system has been implemented to learn about viewers' habits, and a system of alliances to introduce content on VoD and IPTV platforms.
RAI (Italy)	The first concern of regional media is the digital environment and the adaptation of content.
ORF (Austria)	The key is to appeal to new audiences with products and services that interest them, such as events, e-games, music contests, etc.
RTBF (Belgium)	The processes of innovation and digitization have brought about a structural change.
SVT (Sweden)	Local newsrooms produce for online and national newsrooms are focused on linear TV, so innovation is not a determining factor in regional media.
YLE (Finland)	The innovation process has been addressed by shifting resources to the platforms.
HR, *RBB* (Germany)	The main strategy in the area of innovation is focused on the development of a proprietary VoD platform. This process has taken 2 years.
RTV (The Netherlands)	TV content on *YouTube* has to be prioritized. Linear television is unimportant in the current format.
NRK (Norway)	Innovation and digitization processes respond to the need to develop a new media ecosystem.
RTVS (Slovakia)	Innovation and digitization processes are oriented toward the development of the web.
RTVSLO (Slovenia)	The main strategy in the area of innovation is focused on the development of a proprietary VoD platform.
RTS (Serbia)	We need to move television content to social media and *YouTube*.
HRT (Croatia)	The main innovation strategy is oriented toward generating a multimedia environment.
MTVA (Hungary)	DK/NA

Source: interview results.

> New professional profiles demanded by media companies must be multifaceted

In the approach to the processes of innovation and digitization, each of the media interviewed has provided different points of view. However, given their role as regional public media, there is a general coincidence in the answers that demonstrates the lack of economic resources to deal with these processes and the dependence on an audience with an older age profile. Within this generality, each medium opts for different solutions to face the pressure exerted by SVoD platforms on linear television.

Most of the managers interviewed (13 out of 18), indicated that their channel has a specific innovation department, which in some cases is cross-sectional in relation to other departments, such as content or information technology (IT), or are departments that are recognized as innovation departments, though their main task remains focused on digitization and not innovation (called "new media departments" or similar nomenclatures). Likewise, four of the broadcasters in the sample do not have a department of this type.

Most regional broadcasters agree that linear regional television continues to maintain a status of necessity owing to the profile of their audiences and the nature of their public and local services, but the reality of media convergence and new consumption formulas are imposing themselves on traditional logic and development.

In general terms, there are three different approaches to the strategy followed in the area of innovation: the development of video on demand (VoD) platforms or proprietary multimedia environments (*YLE* in Finland, *HR* and *RBB* in Germany, *NRK* in Norway, *RTVS* in Slovakia, *RTVSLO* in Slovenia, and *HRT* in Croatia), the adaptation of content for different media and formats focused on the web and social networks (*France 3* from France, *EITB* from Spain, *RAI* from Italy, *ORF* from Austria, *RTV* from the Netherlands, and *RTS* from Serbia), and lastly, the consideration of these processes as secondary due to their slowness and the prevalence of linear television among their current audiences (*France TV* from France and *SVT* from Sweden).

The media that are focused on building their own platforms understand that this is the formula that allows them to move between current audiences and new demands without losing the essence of linear television. This idea is directly related to the approach of content adaptation. As *France 3* states:

> "[...] 10 years ago, journalists worked on news for the television format, today they must adapt the information for other formats. The pressure comes, above all, from social media"

This opinion, shared by more interviewees, is key to understanding the pressure exerted by the constant presence of and updating required by social networks, which is the point of connection with new audiences. In the case of *ORF* (Austria), for example, the need for content to be not only adapted but also attractive to new audiences is recognized. This involves being open to new trends such as e-games or the transposition from TV event to successful programs such as music competition reality shows to social networks. According to *NRK* (Norway), at this point it is crucial to build a new logic for formats that responds to current audiovisual consumption formulas.

Interestingly, *RTVG* (Spain) is working on a two-pronged approach, developing its own over the top (OTT) service and using innovation to get to know its users better, while ensuring young audiences access its own content by introducing them to already consolidated platforms.

However, many of the interviewees emphasize that the pressure of VoD platforms or digital environments is not considered a problem at the regional level, as it covers other needs. Although evolution is something strategic, in the national media it is a matter of greater relevance. Although the aging of audiences and their general decline are significant effects for linear television, it is also true that the regional media fulfill other functions at informational, cultural, linguistic, and emotional levels in the connection they have with their communities.

4. Organization and structure of newsrooms in their adaptation to the digital environment

As was pointed out in the theoretical framework and in the results already presented, the current media environment calls for necessary changes, such as the adaptation of information to new formats from social networks. This new reality has brought with it changes in the way of producing content that, inevitably, entail a revision of the necessary skills the professional working in media needs, with a dichotomy between multifunctionality and specialization (**Salaverría**; **Martínez-Costa**, 2021).

Starting from this premise, once the question of whether to have an innovation department has been resolved, the definition of the department and the number of employees offers very different answers: from very large teams of more than 30 people (*RTSLO*, Slovenia), to smaller ones of between 2 and 4 professionals. In other cases, the exact number of people occupying these positions is not known and they are identified with other interdisciplinary positions such as community managers (*France 3*, France) or technical or computer engineers (*SVT*, Sweden).

Consequently, it is clear from these answers that structural change, although not already implemented or in progress, will be crucial in the future due to the demands of dynamics and the form of content production, which is changing according to the standards of what linear television demands. In this sense, all the interviewees agreed that the generalized demand is for young professional profiles whose skills in the digital environment, knowledge of trends and language in social networks, and ability to adapt classic content to these formats are more important and relevant than their previous work experience.

> Media of *Circom* network see it as necessary and strategic to develop innovation processes in the context of digitization

One of the most interesting processes has been the approach of *RTBF* in Belgium, which, although it does not currently have a proper innovation department, understood the need for structural change at the time and worked for two years with an innovation area until the necessary changes were implemented. In addition, while in the past the newsroom sections were focused on the media (TV, radio, web, etc.), today the organization works on the basis of content with multidisciplinary professional profiles.

In spite of these needs conveyed by most of the managers interviewed, there is also a drawback pointed out by several of the respondents, namely the lack of unity or definition in this demand for new professional profiles –no one is clear about what training they should have, whether only digital skills are important or editorial skills as well, or if these new incorporations should aim at more specific knowledge such as data journalism, work with artificial intelligence, or have a deep understanding of the algorithmic reality of each network or platform. This is where the conflict between required knowledge, ability for specialization or multifunctionality, and the youth of the professionals who are considered suitable for these innovation and digitization departments becomes apparent.

5. Disinformation management

One of the areas that has most concerned the media and governments in recent years is the management of disinformation. Moreover, since the Covid-19 health crisis, this information scourge has increased exponentially. If it was already an affront to democratic systems owing to the massive circulation on social networks, the recent pandemic has increased the vulnerability of the people, given the proliferation of false information in a field as delicate as that of health (**Brennen** *et al*., 2020; **Fontenla-Pedreira**; **Rodríguez-Martelo**, 2021; **Costa-Sánchez**; **López-García**, 2020).

The problem of disinformation being something of special relevance in the public media as well as being related to the areas of innovation and digitization has led to the outline of the second block of interviews conducted, which were focused on the policies, resources, and strategies for verification and the fight against fake news as applied in each European regional media consulted.

Just as in the management of innovation, there are no differences in digitization processes nor in the configuration of new newsrooms that lead to a division according to the models of **Hallin** and **Mancini** (2004). In the case of disinformation management, it is relevant to note this division as key regarding the impact of disinformation in the media.

This issue acquires great relevance and concern in the Mediterranean or polarized pluralist model as seen through the media interviewed from France, Spain, and Italy. Though it is identified as an active problem, it also has different approaches. In the case of the Northern European or democratic corporatist model, which includes the countries of Austria, Belgium, Sweden, Norway, Finland, Germany, and The Netherlands, it is not considered a relevant problem since the control over it is constant and strategic. This is due to there being a cause–effect relationship defined by the low circulation of disinformation combined with a comprehensive and rigorous approach to eradicating the problem through various initiatives.

An issue shared by the media and countries interviewed is the lack of resources and the low incidence of this phenomenon at the regional level, so much so that only three of them (16%) have a specific department for the detection of disinformation and verification. However, the question of the level at which disinformation has the most effect is contradictory, since the consistency in the answers does indeed show that it is at the regional level, and when the issue becomes more developed, many media point out that much of the false information that reaches the national level is generated in local or regional environments and that this has a cross-disciplinary nature.

By pooling the responses of all the media consulted, three fundamental ideas in the fight against disinformation (contrast of information, literacy, and development of proprietary tools) and two general issues in the approach to verification strategies (journalistic work and collaboration with third parties as verification initiatives) were identified together in the strategic approach to the problem.

Table 4. Main anti-disinformation and fact-checking strategies adopted by the *Circom* network European regional media

Main strategies adopted to combat disinformation	Verification of information: Public denouncement, consultation of original source, and collaboration with the audience.
	Training and media literacy.
	Development of proprietary tools.
Verification strategies	Assumed as something intrinsic to journalistic work without a specific strategy for the current reality.
	Collaboration and joint financing of verifiers for common use.

Source: interview results.

In the countries associated with the Northern European model, the results show that great importance is attached to media literacy and training for the general population as a fundamental pillar in the fight against disinformation. Verification is approached via joint initiatives financed by several media for the common use of verified information, as is seen particularly in the cases of Norway, Sweden, or Belgium, for example, with initiatives such as *Faky* or *Faktisk*, verification tools co-financed by several media and/or institutions and available to citizens as well.

On the other hand, in the countries associated with the Mediterranean model, no specific strategies are identified. The interviewees recognized the urgency of applying containment procedures, but there is a dependence on the national media (*France 3* and *France TV*, France), as well as neither having established a systematization of the process (*EITB* or *RTVG*, Spain) nor proposing a committed approach based on collaboration with third parties, universities, and professionals (*RAI*, Italy).

Beyond the countries classified by **Hallin** and **Mancini** (2004), similar responses were obtained from the PSM in Slovenia, Croatia, Serbia, Slovakia, and Hungary regarding these two aspects. *HRT* (Croatia), *RTS* (Serbia), and *RTVS* (Slovakia) did not comment on the existence of an action policy beyond journalistic work in which contrasting sources are considered inherent to the profession. Hungary did not take a position or answer any questions regarding disinformation. The case of *RTVSLO* (Slovenia) is of interest, as the government has developed a program to tackle disinformation jointly with the media, and their concern lies in how false information is able to disrupt the media agenda.

6. Conclusions

The *Circom* network, which brings together European regional media, is an object of study of great interest, as it represents local linear television, establishing partnerships and networking in local areas where its presence is key in the development of culture, language, and public services for their respective communities.

The research objectives address this situation and the different trends in the public media's future (GO) that are under increasing pressure from international VoD platforms and digital ecosystems (SO1, SO2), as well as their strategy in the management of the global problem that is disinformation (SO3). These issues are related to the media's ability to adapt to a changing, digital environment that is constantly bidding for the attention of young audiences without affecting current audiences with an older age range.

The professionals interviewed, who are representatives of the media and have a managerial or highly professional profile, agreed on the need to establish innovation and digitization processes as a priority in the mandatory updating of radio and television, but when it comes to defining specific issues, the results are very different and there is no consistency nor clear definition of these concepts.

In some cases, the organization chart of an audiovisual company is understood as a structural change, while in others it is understood as a process of adapting content to new formats and media that seek multimedia and multitarget presence. In addition, for some media, the fundamental issue lies in meeting the demands of new audiences and their consumption habits.

The analysis proposed in SO1 has revealed the diversity of strategies and beliefs regarding the ideal approach in the current context, which can be summarized in two issues: the creation of proprietary platforms as a means to compete with SVoDs, and the adaptation of content to different formats to ensure a presence on social networks and attention to new demands.

In this regard, the internal structure of the newsrooms is experiencing two main difficulties: the lack of resources at the regional level and the need to overhaul professional profiles with young and multidisciplinary talents.

However, the ideas stated by the interviewees regarding SO2 are in contradiction with the realities of the profession. The incorporation of young workers moves in a dichotomy between the specific knowledge required to meet current demands and the ambivalence required in the digital and journalistic environment. The generational replacement of the workforce is proposed as a solution to the pressure of platforms and social networks on linear television, but there is no agreement as to what is required of these new professionals.

Lastly, as a conclusion of SO3 –the management of disinformation– most of the interviewees resent the fact that there are not enough resources to manage it at the regional level and that the issue of false information becomes a problem when its effects rise to the national or international level. The ability of disinformation to bend the media and political agenda generates concern, so it is essential to link these media with their audiences.

Finally, it is concluded that the results obtained concerning innovation management and digitization processes (GO) do not show significant differences between countries, according to the classification of **Hallin** and **Mancini** (2004), but this pattern does intervene when dealing with disinformation, which has a different importance and focus according to the Mediterranean model (high interference and lack of specific systematized strategies) and the Northern European model (low circulation, literacy, and well-established verification systems).

The results obtained from these interviews leave many questions open for discussion, such as the restructuring approach of linear television and the role played by regional media in this process. This is an opportunity to continue with avenues of research regarding the *Circom* network and how its members deal with change in the current media paradigm.

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Facing the challenges of metaverse: a systematic literature review from Social Sciences and Marketing and Communication

Verónica Crespo-Pereira; Eva Sánchez-Amboage; Matías Membiela-Pollán

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Verónica Crespo-Pereira
https://orcid.org/0000-0001-7373-7204

Universidade da Coruña
Facultad de Economía y Empresa
Campus de Elviña, s/n
15071 A Coruña, Spain
veronica.crespo@udc.es

Eva Sánchez-Amboage
https://orcid.org/0000-0001-9058-2937

Universidade da Coruña
Facultad de Economía y Empresa
Campus de Elviña, s/n
15071 A Coruña, Spain
eva.sanchez.amboage@udc.es

Matías Membiela-Pollán
https://orcid.org/0000-0003-1657-2815

Universidade da Coruña
Facultad de Economía y Empresa
Campus de Elviña, s/n
15071 A Coruña, Spain
matias.membiela@udc.es

Abstract

The metaverse is the conjunction and optimization of the possibilities of the Internet and technology at their best. It is a consequence of the development and evolution of digital society. Technological innovation, fundamentally oriented toward virtual reality, augmented reality, and mixed realities, contributes significantly to the creation of a solid foundation on which to build an entire universe of virtual worlds. This is a universe that, in turn, requires the creation of backbone content for narratives that attract and retain users by capturing their attention to promote a specific ecosystem that transfers the activities of the real world to a virtual one, either projected or recreated. This research is based on a systematic review of 402 articles and a qualitative analysis of 125 publications indexed in *Scopus*. It examines the trends in technology, application, and methodology pertaining to the metaverse in the social sciences field, namely marketing and communication and neuroscience, areas that contribute to the understanding of the social dimension of the metaverse phenomenon. Although there is abundant academic literature on the metaverse in computer science, this is not the case in the aforementioned disciplines. Given that the metaverse is destined to become the next Internet revolution, there is a race among countries and brands to position themselves within it, which is expected to intensify in the coming years. The metaverse can contribute to a wide variety of applications of a social nature, which is why it is a highly competitive tool for nations, companies, and academia, as well as the public and private media. The results indicate a technological transformation proposing a future that includes neuro-technologies based on brain–computer interfaces and the metaverse as the setting. This will occur alongside the solidification of the virtual ecosystem thanks to the emergence of digital natives and Gen Z, as well as the convergence of many different technologies and immersive and participatory content, in which the consumer is the provider, owner, and beneficiary.

Keywords

Metaverse; Social Sciences; Marketing; Extended reality; Innovation; Social value; Neuromarketing; Neuroscience; Mixed reality; Augmented reality; Virtual worlds; Brands; Business; Mass media; Systematic review.

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1. Introduction

The metaverse is expected to be the next Internet revolution (**Harley**, 2022). Moreover, it is said that it will produce greater changes than those resulting from the emergence of the Internet. The metaverse is a space considered to be a "new plane of existence", a cyberspace free of monopolistic and governmental interests, (**Knox**, 2022) but with the related dangers (**Brownsword**, 2021; **Corballis**; **Soar**, 2022; **Dear**, 2022). Various voices indicate that the metaverse will have a great impact on the world we know, due to its capacity to create offshore economies; generate virtual states; compel a new type of geopolitical and military competence; and establish sovereign organizations apart from nations, resulting in new ideologies that will represent a revolution in the current *statu quo* (**Corballis**; **Soar**, 2022; **Dear**, 2022).

It is believed that the boom of the metaverse will have such an impact that the very economy in its realm will eventually exceed that generated outside it. Major technologies are investing important amounts of money in creating metaverse spaces, where the physical and virtual worlds blend together (**Riva**; **Wiederhold**, 2022). It is estimated that their platforms will contribute a market value of more than 1 trillion dollars over the next few years (**Lee**; **Kim**, 2022). In 2021, a key year for this phenomenon, *Google Trends* indicated an exponential increase in the interest in the term, coinciding with the public listing of *Roblox* on the stock market, the announcement of the creation of a metaverse by *Nvidia*, and the rebranding of *Facebook* as *Meta* (**Kim**, 2022; **Ning** *et al.*, 2021; **Rospigliosi**, 2022). Those companies that ignore its power, as in the case of marketplace, could suffer the same fate as those who ignored the power of the world wide web (**Dear**, 2022).

Younger generations, more interested in experiences and the possession of virtual rather than physical objects, promote the virtues of the metaverse (**Petit** *et al.*, 2022a). Nowadays, one out of every three people in the world is a gamer, which is to say, a large part of the population is already used to investing their time actively interacting with screens (**Márquez**, 2015). The video game industry is worth more than the film and music industries together (**Dear**, 2022). It is estimated that by 2026, 25% of the world's population will devote at least one hour per day to the metaverse for digital activities, purchases, social interaction, and entertainment (**Johnson**, 2022). The appearance of the metaverse will modify consumer behavior and policy-making. It is therefore necessary to study these changes (**Petit** *et al.*, 2022), just like it was in the past with the emerging graph of the Internet user.

Initially, the limitations of the technology and the cost required to operate in what we know as the metaverse made it necessary to restrict its use to simulations used in professional applications (in medicine, aviation, the military, etc.). Its current accessibility is favoring the mass experience (**Huggett**, 2020) and resulting in new phenomena and lines of research that are generating academic interest. The metaverse is at the center of the debate, even encouraging the appearance of pioneering journals dedicated to it, such as the *Journal of metaverse*, founded in November 2021.

There is a certain research baggage surrounding the metaverse, principally in relation to Computational and Computer Engineering, as seen below. A large part of the studies on the phenomenon are conceived of from a technological perspective; however, it should be emphasized that the metaverse has a very relevant social component (**Park**; **Kim**, 2022) that must also be analyzed. There are two large areas that will enable us to assess the value of the metaverse from the social domain, understood as individuals/consumers: the Social Sciences, where we find Marketing, and the Neurosciences. The first area supplies knowledge about the commercial application of the metaverse and the profile of the new consumers. At the same time, Neuroscience and Neuromarketing will allow for the creation of contents and efficient experien-

> Younger generations, more interested in the experiences and the possession of virtual objects than physical ones, promote the virtues of the metaverse. The appearance of the metaverse will modify consumer behavior and policy-making. It is therefore necessary to study these changes

ces and the better understanding of the human being in relation to the cognitive and emotional processes that determine human/consumer behaviors.

The current article analyzes the academic bibliography that exists on the metaverse, and at the same time, it synthesizes the main thematic approaches and current trends in the fields of the Social Sciences and Neuroscience. The objective is to show a better comprehension of the metaverse phenomenon in this regard.

2. Methodology

This study used the systematic literature review method as a strategy to search for, evaluate and synthesize the evidence from research on the metaverse phenomenon. This methodological focus facilitates a quantitative approach to the study objective; meanwhile, the so-called qualitative review offers an interpretative view of the phenomenon being analyzed (**Grant**; **Booth**, 2009). In our case, both perspectives will be applied. The review method was carried out in three phases, which are outlined below.

Phase 1. Planning the review and sample design

The heuristic stage consisted of designing the search strategy, based on the following selection criteria and guidelines.

Table 1. Heuristic phase: search parameters

Search resource	*Scopus* database. Previous bibliographic works on the metaverse have already been published in the *Web of Science* and *Scopus* (**Ning** *et al.*, 2021) databases, as well as in the bibliometric analysis of VR in the *WoS* (**Liu** *et al.*, 2022). The article has opted to use the *Scopus* database, as it is the first database to publish articles about the metaverse (1995). The first publication on the metaverse appears in the *Web of Science* in 1998 (**Ning** *et al.*, 2021).
Individual search term	Metaverse
Language	English
Search strategy	Title, abstract and keywords
Time period	January 1, 1995 to July 20, 2022
Type of document	Does not apply
Filter by discipline	Does not apply

Although based on the technique used, it is common to apply inclusion and exclusion criteria that filter the results, the very nature of the research questions that are indicated below has prevented this. The aforementioned search resulted in 402 articles. This documentary corpus made it possible to answer the following questions:

RQ1. How many studies are there about the metaverse in the *Scopus* database and how have they evolved over time?

RQ2. Which thematic areas have the largest volume of publications on the metaverse?

Given the interest that emerges from delving deeper into the social value of the metaverse, a qualitative approach was applied in the second stage. The results were filtered according to the set of inclusion and exclusion criteria described below. The results were filtered by discipline, in such a way that those articles were selected in *Scopus* that were published within the following areas of knowledge: Social Sciences; Business; Management and Accounting; Economics; Econometrics and Finance (n=146). In this work, we refer to this selection as the Social Sciences block. Bibliographic data were then downloaded for processing with the *Rayyan* software, used to identify articles based on the reading of their title and abstract, in order to select those that would later be analyzed in depth, i.e., examining the entire text. Articles were selected that: 1) approached the topic of the metaverse in relation to the Social Sciences, and in particular, marketing, 2) were written in English and 3) were in available in open access version. On the other hand, excluded were: articles in Chinese and German (languages found in the search, along with English); articles with restricted access; articles that included the word metaverse (in the abstract or keywords), but were not related to the subject of study, as it was seen that that some of the articles use the term without addressing it in the body of the text; and those entries corresponding to calls for papers.

The full text was analyzed for a total of 89 articles. The purpose of this approach was to consider the metaverse phenomenon from a conceptual and technological perspective, as well as to determine the trends and shortcomings with regard to its research in the field of the Social Sciences and Marketing. This second part of the research seeks to answer the following questions:

RQ3. How is the metaverse defined and what technologies belong to its universe?

RQ4. How has research into the metaverse evolved from the perspective of the Social Sciences?

RQ5. What topics and applications stand out in the field of the Social Sciences?

Finally, in order to determine the relationship between the metaverse and Neuroscience, the same process was conducted that was explained above. The discipline filter was applied in *Scopus* for Psychology, Medicine, the Decision Sciences, and the Neurosciences. This step allowed us to obtain a total of 68 publications. The articles were then screened in *Rayyan* according to:

- the availability of the article;
- the use of the English language; and
- the topic: the relationship between the metaverse and Neuroscience.

Excluded from the corpus were those articles that were found in the previous search in the Social Sciences, and which therefore overlapped, as well as the calls for papers. Once the articles were selected, we proceeded to give a full reading to a total of 36 articles.

The questions that guided this search are the following:

RQ6. What is the role of Neuroscience in the metaverse?

RQ7. What are the trending topics in research on the metaverse?

Phase 2. Conducting the study

The hermeneutic phase consisted of the collection and analysis of the documents. This took place in July 2022. As previously mentioned, the *Rayyan* software was used for the systematic review, since it allowed the data to be processed in a rigorous and transparent manner. This tool makes it possible to eliminate duplicate articles and those that are not of interest to the researchers and to categorize the documents.

The sum total of the articles found in *Scopus* was 403; after eliminating the duplicates, our base was 402 unique articles. The articles were then filtered and screened according to the above-mentioned guidelines and the results were extracted. As a complement to this, the *VOSviewer* software was used, which provided data of a quantitative nature and facilitated the display of information. For the qualitative processing of the selected articles, an analytical matrix of the contents was created based on our own categorization, which considered the definition of the metaverse, the origin of the metaverse, types of metaverses and applications. To complement the interpretation of the data, information recovered from the websites was accessed that was identifiable in the bibliographic references (n=5).

Phase 3. Report on the results

This phase consisted of the generation of the report and the interpretation of the results obtained. As previously stated, the present work has both a quantitative (RQ1, RQ2, RQ4) and a qualitative (RQ3, RQ5, RQ6, RQ7) approach.

3. Results

3.1. Metaverse: definition and characteristics

RQ3. How is the metaverse defined and what technologies belong to its universe?

The term metaverse first appeared in 1992 in the science fiction novel *Snow crash* by Neal Stephenson, in which its characters become avatars and work in a virtual reality environment (**Kelly**, 2018; **Kim**, 2021; **Kye** *et al.*, 2021; **Lee**; **Kim**, 2022). The term metaverse consists of the prefix “meta-” (meaning beyond) and “-verse”, (which comes from universe) (**Dionisio**; **Burns**; **Gilbert**, 2013; **Kye** *et al.*, 2021). Even though the aforementioned work has become the historic reference, other narrative works (**Dionisio**; **Burns**; **Gilbert**, 2013), television series and films (**Murray**, 2020) have also laid the foundation for its construction.

There is no consensus regarding the conceptual approach to the metaverse, given the complexity of the phenomenon (**Guo**; **Gao**, 2022; **Smart**; **Cascio**; **Paffendorf**, 2007) and the many different technologies available (**Ning** *et al.*, 2021; **Rauschnabel** *et al.*, 2022a). Clarification of the concept and technology is therefore necessary (**Dincelli**; **Yayla**, 2022).

First, the metaverse cannot be considered to be a single space, but rather multiple metaverses. Accordingly, even a single universe can be made up of different metaverses (**Abeles**, 2007; **Papagiannidis**; **Bourlakis**; **Li**, 2008; **Smart**; **Cascio**; **Paffendorf**, 2007). It should be pointed out that, accord to the study, scholars preferentially use the singular term “metaverse” (n=334) as opposed to the plural “metaverses” (n=33), without the singular term implying the conception of the metaverse as a single entity (Graph 1).

Ever since Neal Stephenson shaped the metaverse from the perspective of immersive 3D worlds, its conception has evolved over time by virtue of a more complex and expansive notion in the form of an interconnected network of virtual worlds (**Dionisio**; **Burns**; **Gilbert**, 2013), which are characterized as being infinite, self-supporting, interoperable, decentralized, persistent and in real time (**Khan** *et al.*, 2022). This is true to the extent that it is commonly observed that contemporary definitions tend towards a confluence of technologies (e.g., immersive, 3D technologies) in shared virtual worlds (Table 2).

There is no consensus regarding the conceptual approach to the metaverse, given the complexity of the phenomenon. Contemporary definitions tend towards a confluence of technologies in shared virtual worlds

Table 2. Definitions of the metaverse

Authors	Definition	Features							
		Avatar	3D	Virtual world	Virtual reality	Augmented reality	Mixed reality	Artificial intelligence	Immersion/subject interaction
(**Smart**; **Cascio**; **Paffendor**, 2007)	The metaverse is the convergence of 1) virtually improved physical reality and 2) physically persistent virtual space. It is a blending of both that at the same time allows users to experience it as either one.				X				
(**Leenes**, 2008)	The metaverse is a 3D computer-generated environment where players move as avatars.	X	X						
(**Lee** *et al.*, 2011)	Metaverse "services" is a collective term for services such as augmented reality, life recording, the mirror world, and the virtual world.			X		X			
(**Owens** *et al.*, 2011)	The metaverses are three-dimensional immersive virtual worlds (VW) where people interact with each other and with their environment, using the metaphor of the real world, but without its physical limitations.		X	X					X
(**Tomonori**; **Thawonmas**, 2011)	The metaverse is a 3D virtual world in which users can act freely, for instance by visiting museums or chatting with others, for their own purposes.		X	X					X
(**Vernaza**; **Armuelles**; **Ruiz**, 2012)	The metaverse is a virtual world where people can share and interact with one another, as if they were in the real world.			X					X
(**Dionisio**; **Burns**; **Gilbert**, 2013)	The metaverse refers to a three-dimensional digital environment that is totally immersive, unlike the more inclusive concept of cyberspace, which reflects the entire shared online space in all the dimensions of representation.		X						X
(**Ning** *et al.*, 2021)	The metaverse is the continuous digital space-time parallel of real human society.			X					
(**Kim**, 2021)	It is a persistent interoperated network of shared virtual environments where people can synchronously interact through their avatars with other agents and objects.	X		X					X
(**Di-Pietro**;**Cresci**, 2021)	A metaverse is a combination of persistent 3D virtual spaces that are both multi-user and shared, which are interwoven with the physical world and blend in with it to create a unified, perpetual virtual universe.			X	X				X
(**Jeon**, 2021)	The metaverse is a 3D virtual world with collapsed reality and virtual limits, together with technological developments, such as virtual reality and augmented reality (…); the metaverse refers to a universe beyond the physical world.		X	X	X	X			
(**Akour** *et al.*, 2022)	A world that has virtually improved the physical reality and space.			X					
(**Skalidi**; **Muller**; **Fournier**, 2022)	The metaverse is a three-dimensional (3D) digital environment where AR/VR and artificial intelligence (AI) serve as basic visual providers and where people can have social, financial, and other forms of interactions, using personalized digital avatars that imitate real life experiences.	X	X		X	X		X	
(**Lee**; **Park**; **Lee**, 2022)	A new world of digital means.			X					
(**Khan** *et al.*, 2022)	The metaverse is a three-dimensional virtual reality environment where users can interact with digital elements and with each other in an immersive environment.		X		X				X
(**Lee**; **Hwang**, 2022)	Emergent technology acts as a fully executed digital world.			X					X
(**Vidal-Tomás**, 2022)	The metaverse is defined as a shared and immersive virtual world where users are allowed to participate in different activities, represented by avatars.	X		X					X
(**Guo**; **Gao**, 2022)	The metaverse is building a virtual world that is mapped and independent of the real world in cyberspace, making use of the greater maturity of various digital technologies, such as virtual reality (VR), augmented reality (AR), big data and 5G.			X	X	X			
(**Kim**, 2022)	The main idea of the metaverse is to create a three-dimensional (3D) virtual space that appears and feels similar to the real world, with the help of special portable devices, and to allow many people to interact with it.		X	X					

Authors	Definition	Features							
		Avatar	3D	Virtual world	Virtual reality	Augmented reality	Mixed reality	Artificial intelligence	Immersion/subject interaction
(**Lee**; **Kim**, 2022)	The metaverse refers to the immersive, permanent, and mixed-reality world where people/people and people/objects can synchronously interact, cooperate and live within the limitation of time and space, using avatars and devices, platforms and infrastructures that support the immersion.	X					X		X
(**Park**; **Kim**, 2022)	The metaverse is a world combining the transcendence of meta and universe; it refers to a three-dimensional virtual world where avatars participate in cultural, social, economic, and political activities. It is widely used in the sense of a virtual world based on daily life, where both the real and the unreal coexist.	X	X	X					
(**Riva**; **Wiederhold**, 2022)	The primary characteristic of the metaverse is the blending of the virtual and the physical world.			X					

3.2. Metaverse technologies

The metaverse phenomenon consists of three elements*:* hardware, software, and contents (**Park**; **Kim**, 2022). In short, it is made up by the technology and the narrative. Technology is an essential part of the metaverse; in fact, a large part of the definitions (Table 1) point to technology as the central element to explain the phenomenon.

The metaverse is a “parallel universe” (**Lv** *et al.*, 2022) that uses many different technologies. The existence of terms like augmented reality (AR), virtual reality (VR), mixed reality (MR) and Web 3.0 complicate the comprehension of the phenomenon for both professionals and scholars (**Rauschnabel** *et al.*, 2022b; **Riar** *et al.*, 2022), and thus technological clarification is necessary (**Dincelli**; **Yayla**, 2022).

The emergence of the Web 3.0 opens the door to a more advanced version of the metaverse (**Smart** *et al.*, 2007; **Au**, 2005; **Boulos** *et al.*, 2008). The available virtual reality technology represents a step up in quality in terms of the level of presence and immersion that were achieved in the 3D proto-metaverses of the Web 2.0 (**Cagnina**; **Poian**, 2008; **Tasa**; **Görgülü**, 2010). *Second Life*, created in 2003, is a virtual 3D world where users can create, connect, and chat with others using voice and text in a PC-screen environment (**Lee**; **Kim**, 2022; **Sánchez-Mendiola**, 2022). There is a long tradition of their study in several different disciplines. The metaverse is a concept that has repeatedly been linked to *Second Life* in the academic research from 2005 until today (2022). This platform constitutes a sort of pioneering metaverse, (**Bourlakis**; **Papagiannidis**; **Li**, 2009; **Lee**; **Kim**, 2022; **Smart** *et al.*, 2007) which initially enjoyed relative popularity, only to see its success dampened over the years as the result of the limitations and obstacles of the time, such as 3D graphic support, problems with servers and staffing cuts (**Lee**; **Kim**, 2022), and the emergence of the social networks, which were simpler to use. However, recent statistics confirm signs of its recovery, thanks to the boom of the phenomenon of the metaverse (**Voyager**, 2021).

Current technologies allow the metaverse to create and evolve. There are several factors behind its current upsurge:

- the development of deep learning technology and virtual reality devices (**Lee**; **Kim**, 2022);
- the 5G boom and improved 3D technology (**Lee**; **Kim**, 2022; **Suh**; **Ahn**, 2022);
- the boom and influence of generation Z, digital natives, on consumption patterns (**Suh**; **Ahn**, 2022);
- the need to keep in touch face to face and teach classes as the result of the COVID-19 pandemic (**Guo**; **Gao**, 2022; **Kim**, 2022; **Lee**; **Kim**, 2022; **Suh**; **Ahn**, 2022);
- the ubiquity of mobile devices and changes in the types of content that facilitate access to the metaverse anytime, anywhere (**Suh**; **Ahn**, 2022);
- the existence of metaverse currency, cryptocurrency, and the possibility of trading with virtual goods through the use to non-fungible tokens (NFTs) and cryptocurrencies. Each metaverse has its own set of currencies (**Khan** *et al.*, 2022; **Lee**; **Kim**, 2022).

Today, the overcoming of technological limitations in relation to immersion, 3D and interactivity are guiding the launching of the metaverse in its social and commercial aspects and in the form of leisure platforms that are well known by young people, and which have great commercial potential (*Epic Games*, *Decentraland*, *Roblox*, etc.) (**Ning** *et al.*, 2021; **Rospigliosi**, 2022).

When many people think of the metaverse, they imagine immersive virtual reality experiences (**Gadalla**; **Keeking**; **Abosag**, 2013; **Rospigliosi**, 2022; **Smart** *et al.*, 2007) and massively multiplayer online role-playing games (mmporpg) (**Knox**, 2022; **Shin**, 2022), such as *Ready Player One* and *Roblox* (**Hollensen**; **Kotler**; **Opresnik**, in press; **Han**; **Heo**; **You**, 2021; **Rospigliosi**, 2022). There is little doubt that large technology companies have invested heavily in the construction of metaverses for leisure purposes. In 2016 alone, the investment by VR startups was 2.3 billion dollars (*Caict* 2017, cited by **Dincelli** and **Yayla**, 2022). It thus does not seem unreasonable to believe that their application is destined exclusively for leisure and entertainment purposes, despite the great possibilities that it has for commercial, educational, and social development (**Au**, 2005; **Smart** *et al.*, 2007). Such is the current potential of the metaverse that companies like *Meta* (previously *Facebook*) are already modifying their business model, focusing on hardware and software development to make their metaverse, *Horizon World* and *Horizon Workroom*, accessible to the general public at an affordable price and to make it applicable to the professional world (**Kraus** *et al.*, 2022).

> Large technology companies have invested heavily in the construction of metaverses for leisure purposes, despite the great possibilities that it has for commercial, educational and social development

The metaverse is synonymous with user immersivity, and thus virtual reality technology has traditionally been associated with the metaverse (**Kye** *et al.*, 2021). Virtual worlds strive to create an alternative reality, one that is different from the real world in which individuals are immersed. Proprietary technology is available for this immersivity in the form of virtual reality glasses, headsets, or HMDs (*head-mounted display*) (**Rauschnabel** *et al.*, 2022b). They provide a level of presence and immersion that is on a whole different level, thanks to the technology that permits the rendering of high-quality images and the freedom of movement in the virtual environment (**Dincelli**; **Yayla**, 2022). Their technological capacity is such that the frontier between the real and virtual world is blurred (**Murray**, 2020).

Augmented reality (AR), in turn, is an extended reality that strives to superimpose virtual information on the real world (**Rauschnabel** *et al.*, 2022b; **Riar** *et al.*, 2022). A large number and variety of devices exist for augmented reality, and they require both ubiquitous hardware, as in the case of smartphones, and specialized hardware, such as that used for retinal control screens, voice commands, eye-tracking, etc., which facilitate control over the human-computer interface or brain-computer interface (BCI) (**Lee**; **Kim**, 2022; **Park**; **Kim**, 2022; **Rauschnabel** *et al.*, 2022b; **Riar** *et al.*, 2022).

As can be inferred from the above, the physical environment, as part of the user experience, is one of the keys (together with the technology) to conceptualize AR and VR. Augmented reality (or AR) is conceived as an extended or augmented reality, while the VR is understood as a substitute or simulated reality that seeks the immersion of the individual in virtual worlds (**Rauschnabel** *et al.*, 2022b; **Riar** *et al.*, 2022). Mixed reality, in turn, integrates both augmented reality and virtual reality. Specifically, the technology allows objects created by AR to offer individuals an experience in a 3D environment through an immersive experience in the virtual environment (**Tayal**; **Rajagopal**; **Mahajan**, 2022). In addition to the dimensions of augmentation/simulation, there are two other types of user experiences in the world of the Internet: an 'external' and an 'intimate' approach. The intimate approach focuses on the privacy of the subject's actions, as opposed to the external approach, where the subject's actions are shared with the world (**Lee** *et al.*, 2011).

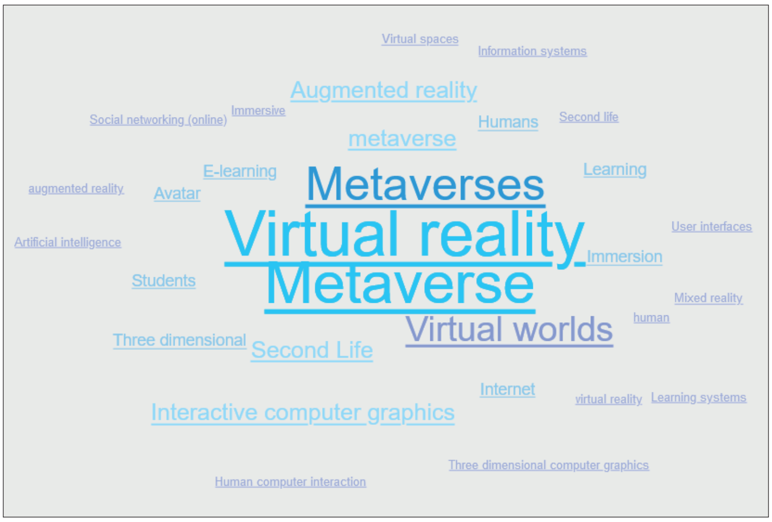
Pioneering research suggests that there are four types of metaverse that offer a very broad vision of the phenomenon, based on the combination of four dimensions (**Smart** *et al.*, 2007). This typology of metaverse is proving to be recurring and accepted in accordance with the literature review (**Bolger**, 2021; **Boulos**; **Burden**, 2007; **Cheng** *et al.*, 2022; **Choi**; **Kim**, 2017; **Márquez-Díaz**, 2020; **Guo**; **Gao**, 2022; **Jeon**, 2021; 2021; **Kim**, 2021; **Kye** *et al.*, 2021; **Lee** *et al.*, 2022; **Lee** *et al.*, 2011; **Lee**; **Kim**, 2022; **Mendiola**, 2022; **Suh**; **Ahn**, 2022) (Table 3).

Table 3. Metaverse typology

	Definition	**Features**	**Examples**
Augmented reality	Augmented reality (AR) is the superposition of digital information on the real world (or even a virtual world). It uses location-based technologies and networks that process and superimpose the information.	Augmented and external technology. Creation of an intelligent environment using location-based technology and networks. It uses front display screens or head-up displays (HUD), which provide information relevant to the context through a mobile screen (such as a smartphone screen or a car navigation device).	*Pokémon Go*
Life-logging	Technology that captures, saves, and shares everyday information about people.	Augmented and external technology. Recording of information about objects and people.	*Facebook*, *Instagram*, *Apple Watch*, *Samsung Health*, *Nike Plus*.
Mirror worlds	They are virtual models that try to reflect the real world as it is, but integrating and providing information from the external environment. These are digital representations of our world.	Simulation and intimate technology. Virtual maps and modeling using GPS technology.	*Google Earth*, *Google Maps*, *Naver Maps*, *Airbnb*, *Microsoft Virtual Earth 3D*, military systems.
Virtual reality	A virtual world by means of digital representations of any space, either imaginary or real.	Simulation and intimate technology. Activities based on the interaction between avatars that reflect the user's self. It uses virtual reality glasses.	Multiplayer online games. *Second Life*, *Minecraft*, *Roblox*, *Zepeto*.

Source: adapted from **Boulos** and **Burden** (2007), **Kye** *et al.* (2021), and **Smart** *et al.*(2007)

There is an important presence of the virtual reality and virtual worlds terms in our sample (Graph 1). A large portion of the studies about the metaverse revolve around VR and AR technologies. The metaverse is the Internet in VR and AR (**Guo**; **Gao**, 2022; **Park**; **Kim**, 2022; **Rauschnabel** *et al.*, 2022b; **Werner** *et al.*, 2022; **Ilyina** *et al.*, 2022). The metaverse relies on the combination and technological integration of VR, AR, and MR (mixed reality) in fulfilling its purpose of offering a complete interactive and immersive virtual world (**Ning** *et al.*, 2021). In the quest for mixed realities, the implementation of different devices that exploit the senses is central to the user's experience (**Tayal**; **Rajagopal**; **Mahajan**, 2022).



Graph 1. Word cloud of all the articles analyzed (n=402)

The metaverse joins together different elements of VR, AR, *life-logging,* and *mirror window*. These technologies overlap each other (**Huggett**, 2020). Examples are the existence of a mirror world map in a virtual world, or the use of AR devices in a virtual world, or the user life-logging in a mirror or virtual world (**Smart** *et al.*, 2007). Along these lines, we can see AR-HMD technology used in the field of training, manufacturing, and medical applications (**Cheng** *et al.*, 2022). The private and commercial sectors also make a combined use of the networking possibilities under the idea of the metaverse. This is the case of *Meta* and the use of the *Oculus Quest 2* (VR), which allows an avatar to represent us in a virtual world, where we can interact with others (**Lee**; **Kim**, 2022), and which would complement the experience with augmented reality (*CNET Highlights*, 2022). *Meta*, in cooperation with *Ray Ban*, already markets smart glasses that have multiple AR functions and in which the social networks are very much present.

3.3. Content

As mentioned earlier, the metaverse consists of three elements*:* hardware, software, and content (**Park**; **Kim**, 2022). The metaverse requires social engagement for its success. The content is provided by the organizations through storytelling, the objective of which is a more complete immersive experience, for which many different technological devices will be developed that accent the senses and emotions (**Tayal**; **Rajagopal**; **Mahajan**, 2022). Users will participate in the metaverse through avatars, as virtual representations of themselves. It is interesting to point out that several studies have dealt with the relationship between the physical properties of the avatars and the effects on their behavior and that of others (**Murray**, 2020). Users are key for the future of the metaverse, as they are active subjects in this space (**Park**; **Kim**, 2022). Parallel to the metaverse applications, the contents must be provided with formulas for interaction with the users (**Tayal**; **Rajagopal**; **Mahajan**, 2022). Users must be required to participate in the metaverse through the generation of personal proposals, in other words, through what is known as User Generated Content (UGC).

Metaverse platforms recognize that success depends on the users' innovation and participation in the platforms; this has led to the growth of open, accessible, and collaborative virtual platforms where the content creator obtains more control in starting businesses in which to offer products and services and to promote transactions (**Zhou**; **Lenders**; **Cong**, 2018). If the Web 1.0 connected us online and the Web 2.0 created an online community, then the Web 3.0 connects us in a virtual world belonging to/that is the property of the community (**Lee**; **Kim**, 2022; **Vidal-Tomás**, 2022).

Even though it is still in an early stage, virtual societies today are aimed at obtaining self-sufficiency and the promotion of trade and transactions as a formula to involve individuals in the virtual world. In this sense, the current legislation surrounding the metaverse is worthy of consideration. Property in the virtual world differs from that in real life, as property in the virtual world is inseparable from the platform. Currently, studies indicate that this interdependence is understood to be problematic for entrepreneurs, since the business model in the virtual world seems to favor the interests of platforms and jeopardizes the sustainability of the system itself, which is based on the centrality of the user (**Zhou**; **Lenders**; **Cong**, 2018).

The metaverse requires social engagement for its success. The content is provided by the organizations through storytelling, the objective of which is a more complete immersive experience, for which many different technological devices will be developed that accent the senses and emotions

4. Evolution of research on the metaverse

RQ1. How many studies are there in the *Scopus* database about the metaverse and how have they evolved over time?

RQ2. Which thematic areas have the largest volume of publications on the metaverse?

Ning *et al.* (2021) believe that the research on the metaverse has taken place in four stages:

- the embryonic phase (from the first publication in 1995 until 2007);
- the first boom (from 2008 to 2013);
- the declining stage when a decrease in publications occurs (from 2014 to 2019);
- the development stage, after 2021, when a large increase in research occurs, thanks to the development of the AI and blockchain technologies.

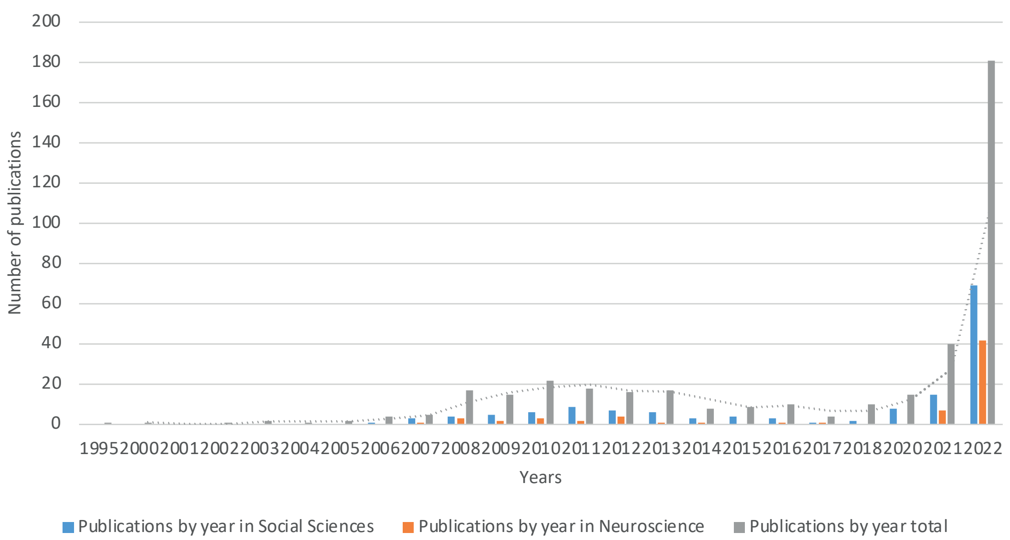
The metaverse and VR are considered the next major breakthrough for the Internet (**Harley**, 2022), and so it is logical that the main disciplines to address this phenomenon are primarily in the field of Computer Science and Engineering (Table 4). The review carried out allows us to confirm that during the period 1995-2000, the first articles are published in *Scopus* that consider the creation of languages for virtual reality and metaverses from the field of Mathematics and Computer Science. These early studies on the metaverse are focused primarily on the *Second Life* platform during the period between 2006 and 2020. This is followed by a boom, and then by a declining stage and, finally, a stage of great development, along the same lines as the proposal by **Ning** *et al.* (2021). This was also true for publications in the fields of Social Sciences and Neuroscience (Graph 2). However, due to the meager volume of articles on the metaverse in *Scopus* to date (n=402), this could be considered an embryonic stage in the research on the metaverse. Academic studies have only just begun, and there is a considerable amount of empirical work to be done (**Lee**; **Kim**, 2022), especially in the Social Sciences and the Neurosciences.

Table 4. Publications by area of knowledge

Areas of knowledge	Publications	Percentage
Computer Science	264	65.5
Engineering	115	28.5
Social Sciences	88	21.8
Mathematics	58	14.3
Business, Management and Accounting	42	10.4
Arts and Humanities	38	9.4
Decision Sciences	29	7.1
Physics and Astronomy	25	6.2
Psychology	23	5.7
Material Science	19	4.7
Medicine	16	3.9
Economics, Econometrics, Finance	14	3.4
Environmental Science	12	2.9
Energy	10	2.4
…		
Neuroscience	4	0.9

Source: *Scopus*, July 2022

The year 2022 saw exponential growth in the number of academic studies on the metaverse phenomenon from multiple areas of knowledge. Just midway into the present year, already a total of 181 documents have been indexed; this means that nearly 50% of all of the publications since 1995 have been concentrated in just the first six months of 2022 (Graph 2).



Graph 2. Evolution of the publications by area and year.
Source: *Scopus*, July 2022

The metaverse is present in all of the *Scopus* disciplines. It is interesting to note here that part of the research points to the construction of the metaverse in its many facets: economic, political, economic policy, social, educational, and commercial, etc. (**Knox**, 2022). It is even seen in the Environmental Sciences. The Social Sciences, Business, Administration and Accounting and Arts and Humanities make up the second block of disciplines with the most publications on the metaverse; meanwhile, trailing in the list are the Neurosciences, Medicine, Psychology, and the Decision Sciences (Table 4). However, the term metaverse has begun to spill over into publications on biomedicine in 2020 and 2021 in *PubMed* (**Huh**, 2022).

Some works analyze the relationship of the metaverse with governmental, economic, educational, and business policies. The metaverse is a state matter for countries such as the United States, China, Japan, South Korea, and the United Arab Emirates, and one they have been working on for decades (**Ning** *et al.*, 2021).

The metaverse also forms part of China's geopolitical strategy. In 2006, China had already turned its attention to virtual reality in the report *Development plan outline for medium and long-term science and technology development* (2006-2020) (**Dionisio**; **Burns**; **Gilbert**, 2013). There is an interest in this country to match its technological level with that of the United States, and different agents are involved in this effort. By the end of 2021, around 1600 companies had requested 11,000 trademarks with the Chinese word for metaverse (*Yuan Yuzhou*). Companies like *Tencent*, *Baidu* and *Alibaba* invest large sums of money in their development, so that they are already very well positioned to play a relevant role. Even so, and due to its own idiosyncrasies, China will follow a path that is predictably different in terms of the regulation or control over platforms, as compared to the West (**Knox**, 2022).

South Korea, whose government undertook the *Metaverse industrialization policy* (2022), understands that the metaverse constitutes an opportunity to improve national industrial competitiveness, while the challenge of building an entire ecosystem around areas such as tourism, culture, and arts; education, health, mass media, content creation, manufacturing and government are considered (**Kim**; **Lee**, 2022). The country already incorporates the metaverse in educational policies for primary and secondary school students (**Ning** *et al.*, 2021), and not just in higher education. This is proposed as a strategic tool to solve national problems, for example, in relation to teleworking and reducing the population pressure in megacities (**Choi**, 2022), social relations (**Jeon**, 2021), education and even the surgical training of its professionals (**Koo**, 2021; **Lee**; **Hwang**, 2022).

As early as 2007, Japan was already contemplating that the metaverse would be a technological priority for the 2025 horizon, while in 2008, the *National Academy of Engineering* (*NAE*) of the United States saw virtual reality as one of the 14 great challenges for the 21st century (**Dionisio**; **Burns**; **Gilbert**, 2013). The United Arab Emirates (UAE) also champions technological transformation, as the result of its capacity to contribute to the national economy and promote the investment. The *Virtual Assets Regulatory Authority* (*VARA*) of Dubai, in the UAE, became the first state institution to enter the metaverse, establishing its headquarters in the virtual world (*Swissinfo.ch*, 2022).

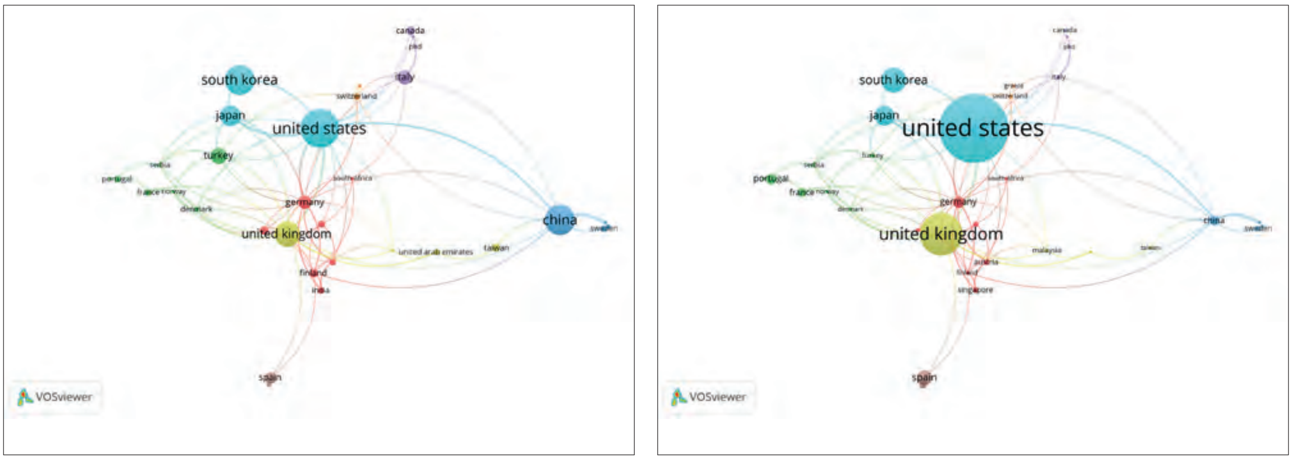
Our analysis points to the United States, China, South Korea, United Kingdom, and Japan as the top 5 countries with the greatest number of documents published in *Scopus*. This indicates a close link between the power conferred on the metaverse as a competitive tool and the research action for all the aforementioned countries, except for UAE, which does not make it into the top 10. The area of Computer Science and Engineering accumulates the greatest volume of publications, followed by the Social Sciences and Business. There are still not many results in the field of Neuroscience reflected in the *Scopus* multidisciplinary database (Table 5).

Table 5. Volume of publications by country, area of knowledge and citations

Countries	Total number of published documents	Citations	Documents on Social Sciences, Business, etc.		Documents on Neuroscience, Psychology, etc.		Documents on Computer Sciences and Engineering	
			n	Citations	n	Citations	n	Citations
United States	72	572	26	26	12	12	53	528
China	50	36	8	8	8	8	43	33
South Korea	50	139	16	16	7	7	33	113
United Kingdom	40	290	23	23	8	8	21	165
Japan	30	101	7	7	5	5	30	101
Turkey	21	13	7	7	2		19	13
Italy	18	9	10	10	5	5	13	5
Germany	16	45	6	6	4	4	8	34
Spain	13	66	6	6	1	1	11	66
Finland	9	6	4	3	2	2	4	3

Note: It is possible that several articles are found under different areas of knowledge, hence the total number of publications does not coincide with the sum of the areas. On the other hand, here the areas of Scopus that are of interest to the article are alluded to, excluding those that are not pertinent.
Source: *Scopus*, July 2022

a) b)



Graph 3. Volume of publications by countries (a) *vs.* cumulative volume of citations (b). The United States is the country with the highest production and the most cited one. The size of the circles reveals the number of documents published (a) and the volume of citations accumulated by country (b). The proximity or distance between the circles denotes the degree of relationship between countries by co-authorship (a) and by citation (b). The colors identify the clusters that link countries.
Source: Graph produced with *VOSviewer*.

5. Metaverse and applications in Social Sciences

RQ4. How has research into the metaverse evolved from the perspective of the Social Sciences?

RQ5. What topics and applications stand out in the field of the Social Sciences?

The studies that were found consider many different metaverse applications in their broadest sense (VR, AR, etc.). Many articles allude to their application in relation to gaming, entertainment, training, marketing, tourism, fashion, manufacturing, retail trade, supermarkets (**Rauschnabel** *et al.*, 2022b), management and organization (**Dincelli**; **Yayla**, 2022), smart cities, remote offices and virtual meetings, psychotherapy, economics, and social aspects (**Ning** *et al.*, 2021).

Applying the Social Sciences filter, the journals with the largest number of works published on the metaverse are those related to the fields of computing, technology, psychology, and human behavior (Table 6).

Table 6. Journals with the largest number of publications under the keyword metaverse

Journal	Documents	Citations
Sustainability	5	7
Lecture notes in business information	4	0
Technological forecasting and social change	3	84
Computers in human behavior	3	5
Cyberpsychology, behavior, and social networking	3	3
Journal of educational evaluation for health professions	3	9
Smart innovation, systems and technologies	3	15

Source: *Scopus*, July 2022

There are many different disciplines that deal with the metaverse from the social perspective: Economics and Business, Psychology, Marketing and Advertising, studies in specific industries (e.g., music) (**Bourlakis**; **Papagiannidis**; **Li**, 2009), Religion (**Jun**, 2020; **Leone**, 2011), Theater (**Chen**; **Yao**, 2021; **Baía-Reis**; **Ashmore**, 2022) and Law (**Falchuk**; **Loeb**; **Neff**, 2018; **Leenes**, 2008). However, research on the possibilities of the metaverse as an educational tool predominates in *Scopus*.

5.1. Education

Of the articles filtered by disciplines in the Social Sciences, a total of 46 articles fit into the thematic category #learning, #teaching #students; 19 in the Business category, and 14 under the umbrella of Marketing. Virtual worlds have the capacity for education and training (Table 7). However, it appears that the VR applications for education are limited (**Dincelli**; **Yayla**, 2022). The interest in these studies lies in the creation of training programs in environments that are safe, accessible, and affordable, and which would be impossible in real life. Military and emergency applications stand out, as do industrial and maintenance applications; medical and surgical training applications and the educational applications in various disciplines (**Dincelli**; **Yayla**, 2022; **Koo**, 2021). The focus of these studies also seems to indicate the effectiveness of these technologies in learning, which in the area of the physical health, is focused on improving physical and cognitive performance and pain management.

> The metaverse is a state matter for countries such as the United States, China, Japan, South Korea and the United Arab Emirates, and one they have been working on for decades

Table 7. Articles by topic

Education	Articles	Marketing	Articles	Business	Articles
#Learning	36	#Marketing	9	#Business	14
#Students	28	#Brand	5	#Business model	1
#Teaching	19	#Advertising	2	#E-commerce	3
		#Positioning	1	#Fashion	2
				#Luxury	1
				#Tourism	2
Total articles (eliminating duplications)	46		14		19

Fuente: *Scopus*, julio de 2022

The metaverse as an active educational tool is analyzed from the perspective of gamification (**Park**; **Min**; **Kim**, 2021), classroom education (university, primary school, etc.) (**Makransky**; **Mayer**, 2022; **Sofianidis**, 2022), cognitive value (**Pigultong**, 2022) and oral health education, and it considers those with neurological problems (autism) and intellectual disabilities (**Lee** *et al.*, 2022). The monetization of education is another of the scenarios contemplated with regard to the virtues of the metaverse (**Knox**, 2022).

5.2. Marketing, business, and communication

Just as the metaverse will revolutionize the Internet, it will have a similar effect on Marketing and Communication. According to Hollensen, Kotler and Opresnik, the metaverse is intended to be the new marketing platform for brands, thanks to its potential to promote them and open up new formulas of communication among humans (**Hollensen**; **Kotler**; **Opresnik**, 2022). We must not forget that part of the content the metaverse offers is linked to economic activity, given that it creates and ecosystem that transfers it to a virtual level (**Park**; **Kim**, 2022).

An ever-increasing body of articles focuses on Marketing and Business. Private enterprise already has a history of investing in technologies, devices and brands that position them within the market (**Rauschnabel** *et al.*, 2022b). The use of different technologies is commonplace in museums: AR with smartphones, interactive kiosks, and VR (**Dincelli**; **Yayla**, 2022). However, research on the possibilities of the metaverse/VR in tourism is few and far between. Only one article is found that matches the discipline criterion (Social Sciences) and that seeks to understand how VR increases the intention to visit the destination (**Lee**, 2022), while the use of the metaverse in museums takes place almost entirely in the areas of Computer Science and Engineering (**Ando**; **Thawonmas**; **Rinaldo**, 2013; **Choi**; **Kim**, 2017; **Lee** *et al.*, 2022; **Thawonmas**; **Fukumoto**, 2011; **Thawonmas**; **Kato**, 2011; **Thawonmas**; **Shuda**, 2011).

In retail, the hedonistic perspective plays a greater role than utilitarian aspects (**Dincelli**; **Yayla**, 2022). The world of fashion is a sector that is expected to have a great capacity for consumption in the metaverse (*Morgan Stanley*; *PwC US*; *BEA*; *US Census Bureau*; *NCES*, 2022). Following the appearance of *Second Life*, companies like *Adidas* and *American Apparel* have joined it for marketing purposes (creating events, branding, etc.) (**Bourlakis**; **Papagiannidis**; **Li**, 2009). In the advanced version of the metaverse, it is common to see the creation of virtual shops, such as *Gucci*'s store in *Roblox*, and their use on the social platform *VR Chat*, as well as the sale of NFTs in *Decentraland* (**Dear**, 2022; **Han**; **Heo**; **You**, 2021; **Kim**, 2021; **Ning** *et al.*, 2021). Nonetheless, our sample only found three items for fashion and luxury items in the field of the Social Sciences (**Ayiter**, 2010; **Guo**; **Hou**, 2022; **Joy** *et al.*, 2022). Once again, fashion and cosmetics are mainly considered by other disciplines (**Lee**; **Kwon**, 2022; **Oh**; **Nah**, 2021). Furthermore, their consideration in the Social Sciences is not central, and it is limited to including examples of cases of companies that make use of the metaverse.

There is much to study in terms of designing services and what determines quality in the metaverse (**Gadalla**; **Keeking**; **Abosag**, 2013) , from the design of the atmosphere of virtual shops for greater commercial efficiency (**Hassouneh**; **Brengman**, 2015); to factors of influence in virtual online shopping worlds (**Lee** *et al.*, 2011). With this in mind, scholars offer a new terminology in reference to the phenomenon of the metaverse in relation to Marketing, its strategies and objectives, with proposals such as Augmented Reality Marketing or AR Marketing (**Rauschnabel** *et al.*, 2022a).

A total of 18 articles included the keyword *communication* in their abstract. However, it is necessary to mention that their use is also common in other disciplines, such us Engineering or Education, and therefore they distance themselves from the area of the mass media. It is also common to find references to the fact that the metaverse imposes challenges related to the communication process. The possibilities that the metaverse provides in relation to the reconfiguration of business models are not subject to analysis in the media context. The mass media are considered (n=2) and serve simply to illustrate in a very superficial manner the advances that the latter has made as compared to television as a persuasive and preterit medium, or to discuss virtues of immersive journalism in storytelling (**Vázquez-Herrero**; **Sirkkunen**, 2022). In spite of the pre-

> Metaverse is intended to be the new marketing platform for brands, thanks to its potential to promote them and open up new formulas of communication among humans

ponderance of storytelling and content in the creation of metaverse worlds, no articles have been found that consider the role of the mass media, either public or private, in this new scenario.

6. Neuroscience and the metaverse

RQ6. What is the role of Neuroscience in the metaverse?

RQ7. What are the trending topics in research on the metaverse?

The mass media and social networks are platforms with the capacity to influence the attitudes and behaviors of individuals, that is to say, they have a persuasive capacity. The metaverse proposes a substantial change related to the modulation of the cognitive and emotional processes of human beings. "The metaverse works like our mind," as they say. It has the potential to create alternative realities, induce basic and complex emotions and even to replace emotions with others. This takes us to a new level in terms of understanding the effect of virtual environments on the human brain (**Riva**; **Wiederhold**, 2022).

Neuroscience, which has paved the way for the interest in the comprehension of emotions, attention and memory in the entertainment industry, advertising, marketing, and the mass media, is not indifferent with regard to its potential in virtual environments, such as that proposed by the metaverse. However, there is little research on the impact of these affective states experienced in immersive virtual environments (**Mandolfo**; **Baisi**; **Lamberti**, 2022).

VR offers a great methodological opportunity, opening up a range of possibilities with regard to innovation in both techniques and metrics (**Dincelli**; **Yayla**, 2022). Biometric and physiological identification techniques could be extended from virtual reality and include gaze analysis, voice recognition and facial recognition (**Egliston**; **Carter**, 2021). The way is paved for adopting biometric sensors on headsets and peripheral devices: Electrocardiography (ECG), Electrodermal Activity (EDA), Electroencephalography (EEG), Electromyography (EMG), Electrogastrography (EGG), Electro-oculography (EOG), Respiration rate (RR) and Temperature (TMP) (**Angelini** *et al.*, 2022; **Dincelli**; **Yayla**, 2022; **Guo**; **Gao**, 2022).

The future of the metaverse is associated with technological innovation and the obvious adoption of the same by the general public. The development of accessories is aimed at boosting the user's senses and emotions, and so companies have begun to invest in the sense of touch through a skin, the *ReSkin*, created by *Carnegie Mellon University* and *Meta*, and to acquire various technologies: an *EMG Wristband*, by *Meta*, for hand movements; *Meta Gloves* by *Oculus*, which increase the sensory sensation; and the *Meta* bodysuit, by the Indian company *Holosuit*, for a complete sensory experience (**Park**; **Kim**, 2022; **Tayal**; **Rajagopal**; **Mahajan**, 2022). According to *Meta*, the next advance with regard to the metaverse is, among other things, the use of mixed reality, displays, haptic devices, hand tracking, eye tracking, graphic sensors, avatars, perception sciences and artificial intelligence (*CNET Highlights*, 2022).

Contemporary technology is leaning towards the use of the capacities of the human mind without their physical limitations. The next big step in technological transformation comes from Neuroscience and Computer Engineering in the form of technologies aimed at the brain-computer interface. The brain-computer interface encodes and decodes the brain's signals in the process and sends orders to the devices. Current technological developments allow for the interaction of the mind with technological devices in order to circumvent the physical barriers of humans beings. Classic Neuroscience technology, such as EEGs, is now used to speed up the development of BCI (**Ning** *et al.*, 2021; **Park**; **Kim**, 2022); this, combined with the metaverse as a metaverse scenario could give way to new lines of research that would be very interesting in order to understand the cognitive processes of human beings. This type of technologies is being developed by university laboratories and by private laboratories, such as in the case of the *Neuralink*, belonging to Elon Musk (**Lee**; **Kim**, 2022; **Park**; **Kim**, 2022; **Rauschnabel** *et al.*, 2022b; **Riar** *et al.*, 2022).

6.1. Human functions and VR

The convergence of the disciplines of Neuroscience and Computer Engineering provide continuous feedback for one another. Among the studies on HCI (human-computer interfaces), there is also growing interest in emotions and VR (**Dozio** *et al.*, 2022). HCI studies are focused on 1) the equivalence of primary human functions (cognition, emotion, physical movements, senses) in VR and physical reality and 2) the effect of VR on these functions (**Dincelli**; **Yayla**, 2022; **Riva**; **Wiederhold**, 2022).

The study on VR includes physical movement and facial expressions, given their relevance for the human cognition. The interaction with virtual characters or the level of realism of the faces is critical to understanding the communication between machines and humans (**Dincelli**; **Yayla**, 2022). **Riva** and **Wiederhold** (2022) offer a literary review regarding the effect that the metaverse has on our cognitive and emotional processes, based on multidisciplinary studies in the Computational Sciences and Neuroscience.

The collection of psycho-physiological data in real time provides information about the user's level of attention, concentration, stress, engagement and emotions that will make it possible to design effective VR applications (**Dincelli**; **Yayla**, 2022). These can also be used to improve social skills in persons with autism disorder (**Lee** *et al.*, 2022). There is a long tradition and a vast number of articles that deal with the use of physiological measurement in VR, mainly related to therapy, entertainment, training and simulation (**Angelini** *et al.*, 2022).

The manipulation of the senses and emotions will have effects on behavior (**Mandolfo** *et al.*, 2022). This is of interest for their potential application in various industries that employ sensory information, which can also be personalized (**Dincelli**; **Yayla**, 2022). Emotions and senses can affect attitudes, decision-making and attention. Studies have examined decision-making based on multiple stimuli in the metaverse (**Petit** *et al.*, 2022). VR must boost the emotional state of the individuals in order to provide high levels of presence; these high levels of presence, in turn, generate emotional involvement in VR. As we have previously seen, there is growing interest in integrating the senses into the VR experience through the use of auditory modalities; haptic interfaces for touch; movement and balance; auditory feedback for hearing; visual signals for sight; odor feedback for the senses of taste and smell; and usability, as they all affect the sensation of presence in VR.

The platforms can modify all types of visual and semantic aspects, as well as dynamic and interactive elements to produce certain emotions (**Dozio** *et al.*, 2022). There are many different mechanisms to boost user interest and engagement in the virtual environment, with personalization being a relevant factor. The use of avatars, peripheral devices and the manipulation of the virtual environment may affect the emotions and senses. Virtual agents and avatars may influence the emotions of individuals and increase the feeling of confidence and satisfaction (**Dincelli**; **Yayla**, 2022). There is still a great deal of research to be done on the enrichment of the emotional experience in the metaverse (**Angelini** *et al.*, 2022).

This study has detected a small number of articles in *Scopus* when using the search equation 'Neuroscience' AND 'metaverse' (n=2). Even though Computer Science and Engineering are the fields that most use the keyword metaverse, from a neuroscientific perspective, the articles on emotion, attention and cognition are written from an approach that addresses 'virtual worlds' and/or 'virtual reality', and thus would fall outside the studied sample (**Marín-Morales** *et al.*, 2018; **McCall** *et al.*, 2016; **Petukhov** *et al.*, 2020; **Pfeiffer** *et al.*, 2020; **Rockstroh**; **Blum**; Göritz, 2019; **Van-der-Ham** *et al.*, 2019).

6.2. Ethics and privacy

While the technology of physiological signals could improve future metaverse applications (**Angelini** *et al.*, 2022), alarms have sounded pertaining to privacy issues (**Egliston**; **Carter**, 2021). Contemporary virtual reality systems, including the most popular headsets offered by Oculus, or life-logging platforms like *Nike Plus*, have the capacity to track personally identifying biometric of users through wearable devices (**Egliston**; **Carter**, 2021; **Kye** *et al.*, 2021). Technology companies seek to acquire data concerning online and emotional behavior through biometric information that can be obtained by the various gadgets (**Knox**, 2022). Similarly, the technological innovation represented by neurotechnologies and BCIs opens up an ethical debate on mental privacy and the so-called neurorights, as well as neurosecurity. Once the current limitations have been circumvented, neurotechnologies, and in particular BCIs, could emerge in the consumer market. Future research may consider, in parallel to the development of the metaverse, the ethical and legal aspects that are represented by these advances (**Park**; **Kim**, 2022). Along these lines, the metaverse is called upon to become the setting for progress made in neurotechnology, and thus there remains a lot of unexplored territory to cover in the years ahead.

7. Conclusions

The metaverse is called upon to revolutionize the world as we know it. It is understood as a virtual world that is parallel to real life, which employs multiple technologies in order to provide immersion for users. However, the metaverse is not synonymous with virtual reality. It would be inappropriate to base its definition solely on hardware. It is necessary to discuss metaverses as a group of interconnected networks in which the user is central, and both the different technologies and the contents created for the platforms and the users themselves are necessary to build and maintain the ecosystem.

Nations are racing to position and prepare themselves for its adoption by the general public. Its capacity to generate a new type of *statu quo* must be kept in mind, and so countries will spend years analyzing the possibilities that are offered. Companies will also be affected by this new scenario. The metaverse promotes an ecosystem that transfers the economic activity to the virtual plane. Its emergence will modify consumer behavior and decision-making, as occurred with the emergence of the Internet. Nations, academia, companies and the mass media are called upon to reconfigure themselves in light of the possibilities of this technological future. To do this, it is necessary to advance in the knowledge and the implementation of innovative policies that do not lose sight of the social value of the technology and ethics.

Currently, research on the metaverse is mainly centered on the Computer Sciences and Engineering, and the platform *Second Life*. Due to the small number of articles on the metaverse in *Scopus*, it is possible to consider the research to be in its embryonic stage, especially in the fields of the Social Sciences, Marketing, Communication and Neurosciences. Academic studies have just begun and there is a lot of empirical work that lies ahead.

Once the limitations have been overcome for its advancement, research in the aforementioned fields will prove valuable in terms of allowing the adoption of technological innovations, efficient educational formulas, alternatives for consumption and new spaces for the knowledge and understanding of human beings. The results point to a technological transformation that posits a future with neurotechnology based on brain-computer interfaces and the metaverse as a possible scenario.

> Technological innovation represented by neurotechnologies and brain-computer interfaces (BCIs) opens up an ethical debate on mental privacy and the so-called neurorights, as well as neurosecurity

It should be pointed out that among the limitations of the study is the *Scopus* database itself, which despite being multidisciplinary, could have a bias in terms of publications in the field of Neuroscience, due to the existence of other specialized databases. However, the studies analyzed indicate that the use of the term metaverse, in the field of biomedicine, and specifically in PubMed, has expanded between 2020 and 2021 (**Huh**, 2022), and thus we can infer that the data provided in our research are in agreement with the evolution of this phenomenon in other databases.

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Women in the documentary industry: Continuing inequality in the streaming age

Jessica Izquierdo-Castillo; Emma Torres-Romay

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Jessica Izquierdo-Castillo
https://orcid.org/0000-0002-5037-1040
Universitat Jaume I
Facultat de Ciències Humanes i Socials
Depto. de Ciències de la Comunicació
Av. Vicente Sos Baynat, s/n
12071 Castellón de la Plana, Spain
jizquier@uji.es

Emma Torres-Romay
https://orcid.org/0000-0002-8938-0243
Universidade de Vigo
Fac. de Ciencias Sociais e da Comunicación
Depto. de Com. Audiovisual e Publicidade
Campus A Xunqueira, s/n
36005 Pontevedra, Spain
emmatr@uvigo.es

Abstract

Assessing women's role in the audiovisual industry provides us with negative data regarding the number of women in the industry, which are also confirmed when factors such as their prominence or leadership in these audiovisual projects are considered. A quantitative and qualitative analysis was thus undertaken based on the need to examine this problem in depth to determine what is happening in the documentary or nonfiction genre, which has exhibited significant growth thanks to the demand for content from subscription video-on-demand (SVoD) streaming platforms. This research analyzes data on the number, prominence, and leadership of women through a review of the 35 Spanish productions in this genre that were produced and/or distributed exclusively on the three leading platforms in Spain between 2016 and 2021. Accordingly, the 2,099 jobs created by these productions have been evaluated, providing data on the occupations and level of responsibility that women had. The research findings confirm the overall data. In addition, they allow us to determine why, although the documentary genre has been associated with greater opportunities for women, this has not held true within the streaming market, where this genre has achieved a greater impact. This underrepresentation of women is especially prominent in the area of leadership.

Keywords

Women; Female professionals; Media industry; Documentary; Non-fiction; Platforms; OTT; Over-the-top platforms; Streaming; Equality; Inequalities; Gender; Gender gap; Glass ceiling; Pay gap; Gender; Structural gender inequalities; Leadership; Production.

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1. Introduction: women in the SVoD documentary industry

The audiovisual industry has systemic and long-standing structural gender inequalities. Women account for 40.3% of the total number of people working in media-related cultural activities (television, radio, film, and video) in Spain, according to the *Yearbook of Cultural Statistics* of the *Ministerio de Cultura y Deporte* (2021). Their number varies depending on the sector and area of expertise. The film industry, for example, exhibits greater inequality than television, and fiction provides fewer opportunities for women than documentaries (**Cuenca**, 2022).

The documentary genre seems to be gaining popularity in the configuration of media offerings. According to the *Catalogue of Spanish Cinema*, between 2015 and 2020, there were 730 feature-length documentaries.
https://www.culturaydeporte.gob.es/cultura/areas/cine/mc/catalogodecine/descargas-catalogo/2021.html

However, only 6% of public funding from the *Spanish Film and Audiovisual Arts Institute* (*ICAA*) and regional funds was allocated to the production of documentaries. For this reason, in 2020, professionals from the documentary sector identified some fundamental issues: a lack of exposure and transparency regarding access to public aid, insufficient promotion, and the unresolved issue of international co-productions (*Pro-docs*, 2021).

We now shift our attention from documentary film to the television documentary, our object of study. The educational documentaries broadcast on generalist television in the past decade already seemed to have presented new programmatic opportunities (**Aparicio**, 2013), but the possibilities seem to have gone through the roof with subscription video-on-demand (SVoD) streaming platforms.

> The audiovisual industry has systemic and long-standing structural gender inequalities

Streaming platforms have programming strategies (**Izquierdo-Castillo**; **Latorre-Lázaro**, 2022) that have given documentaries status within the audiovisual landscape. Moreover, they do so by becoming leading producers of the genre (**Iordache**; **Raats**; **Mombaerts**, 2022). These platforms' international catalogs incorporate a sizable group of documentary films and series. Based on the observation of these catalogs and their evolution, the number of documentary productions has increased tenfold in three years (2018-2021) in Spain alone, coinciding with the consolidation of the streaming content distribution system. Some of the international titles, such as *Making a murderer* (by Moira Deimos and Laura Ricciardi, 2015) have been significant draws when it comes to obtaining subscriptions (**Rowley**, 2016). The true-crime subgenre, in particular, is one of the most profitable for streaming platforms (**Warmedal**, 2018).

As a genre, the documentary is constantly evolving. The modes identified by **Nichols** (2001) –expository, poetic, reflective, observational, participatory, and performative– are each intertwined in their own way with narrative and stylistic devices. Documentaries create new relationships with other disciplines (**Catalá**, 2011), and there is debate about its evolution towards maturity and even towards its disappearance as a "differentiated cinematic form" ["*forma cinematográfica diferenciada*"] (**Catalá**; **Cerdán**, 2007). In the 21st century, documentaries draw from the hybridization of neotelevision (**Eco**, 1986). Gradually, the soberness of the documentary has mixed with a search for empathy and audience participation (**Borum**, 2020). Its adaptation to the streaming universe uses film and television formats, adopts higher standards of technical quality, and relies on journalistic processes that provide new recognition (**Buozis**, 2017); in addition, it leverages the persuasive capacity associated with the authenticity of documentaries (**Nichols**, 1997). The documentary filmmaker becomes a "creative storyteller of nonfiction" ["*narrador creativo de no ficción*"] (**Borum**; **Conrad-Pérez**; **Bello**, 2022) and is able to establish a years-long relationship with the story's protagonists to achieve a unique type of transparency in front of the camera, as in, for example, *The Staircase* (by Jean-Xavier de Lestrade, 2018). In addition, they use techniques focused on longitudinal narratives that show audiences the complex realities of systems and subcultures through specific stories. This happens, for example, in the above cited *Making a murderer*, in which the story of Steven Avery is used to expose a complex American police and judicial system, which is singled out as corrupt (**Bruzzi**, 2016). Hence, a serialized format is used for the documentary (**Horeck**, 2019), which encourages binge watching.

All of this raises the question of whether the streaming distribution system is changing the formula of the traditional documentary genre, complicating the already complex landscape of cinematic genres (**González**; **Gutiérrez**, 2013). It is necessary to carry out targeted studies on the eventual outcome proposed by this new programming strategy to examine, first, this new documentary genre and, second, its narrative and commercial potential.

This study investigates whether the documentary genre's proliferation brought about by SVoD platforms improves women's situation in the audiovisual industry. Two starting observations are taken into consideration. First, up to this point, documentary film has been a genre that has provided greater access and opportunities for women than fiction genres (**Cuenca**, 2022; **Simone**, 2021). Moreover, the documentaries produced by the SVoD platforms more closely resemble narratives and television shows, and they use a more journalistic approach, although they are higher quality in terms of form and esthetics (**Buozis**, 2017; **Romero-Domínguez**, 2020).

2. Objectives, assumptions, and methodology

The main objective of this work is to study the impact of the consolidation of international platforms and their production policies on the number and status of women in the Spanish audiovisual industry. The secondary objectives are to analyze the number of women in documentary production on the basis of different areas of expertise, to study the degree of responsibility they hold when it comes to films or series, and to observe their distribution by categories within each area of expertise.

> The options for women varies depending on the sector and area of expertise. The film industry, for example, exhibits greater inequality than television, and fiction provides fewer opportunities for women than documentaries

The starting hypotheses established indicate that, despite the boom in documentary production on SVoD platforms, women remain in the minority compared with men, mirroring the systemic and structural inequalities present in the rest of the audiovisual industry. Based on this core idea, we delve into the elements of analysis and the features of the documentary genre, establishing a concrete research model.

This is an analysis of the role of women in industry, which differs from other proposals in regard to gender representations and roles in audiovisual content (**Torres-Romay**; **Izquierdo-Castillo**, 2002); taking studies such as that of **Izquierdo-Castillo** and **Latorre-Lázaro** (2021) as references, our proposal goes farther than simply identifying the women in productions, assessing their specializations and leadership, as indicated in the objectives. In general, the number of women involved in production processes remains lower than that of men (**Cuenca**, 2022), and the cited study provides similar results for documentaries. Still, the documentary industry shows signs of improvement, perhaps owing to policies on equality (**Ruiz-Guzmán**, 2018), the very evolution of the cohort of professionals in the sector, or, indeed, the momentum of women asserting their role in this field (**Pérez-Nieto**, 2021, p. 111). The first hypothesis, therefore, concerns the lower number of women in overall data.

The second element that we must take into account is the idea that women's prominence is limited in fields of expertise biased by gender criteria (**Coronado**, 2022). There are feminized and masculinized positions on the production staff (**Cuenca**, 2022, p. 7), showing that the gender gap still exists, and this holds true with documentaries, as well (**Gómez**, 2022).

To these two hypotheses, we add a third related to the issue of female leadership. In this case, it has been asserted that there is a glass ceiling in the documentary production field (**Arranz**, 2010). Again, we must recognize that this reality is widespread across the different types of audiovisual genres, with studies on some of these, such as animation (**Yébenes**, 2022) or cinema (**Marquès**; **Sánchez**, 2020), confirming this reality. The reduced number of women in audiovisual management positions has consequences for the aforementioned productions as well as for distribution platforms (**Marín-Lladó**; **Cervi**; **Alcolea**, 2022).

To address our objectives and hypotheses, we use a quantitative methodology. The sample includes all Spanish documentaries produced and/or distributed exclusively by *Netflix*, *HBO*, and *Amazon Prime Video* (*APV*) from 2016 to 2021, inclusive (*N* = 35) (Annex 2). The total number of jobs performed (*N* = 2,099) was obtained from the list of employees identified in the productions' credits. The study focuses on the crew working behind the camera; therefore, it does not include those who appear on screen (the cast, protagonists, and interviewees). They are the subject of another part of our research project because they have their own results specific to them. Areas of expertise and professional categories are identified on the basis of the proposal of **Izquierdo-Castillo** and **Latorre-Lázaro** (2021, p. 870), which in turn was based on **Simelio** and **Forga** (2014). This research has included roles in each of the categories and fields to tailor it to the reality and needs of the sample analyzed (Annex 1).

3. Women's presence in documentary creation

As indicated above, documentaries are an area in which women have typically found better opportunities. In Europe, 19% of directors of fiction and 29% of documentary directors are women (**Simone**, 2021). In Spain, only 18% of directors of fiction are women, whereas, for documentaries, the percentage has worsened from 29% (**Cuenca**, 2021) to 22% (**Cuenca**, 2022). As this demonstrates, the situation is far from equal, with men still accounting for 69% of all documentary workers and with most departments being masculinized (**Cuenca**, 2022). However, women also have slightly more opportunities in areas such as script writing, production, and special effects (**Simone**, 2021; **Cuenca**, 2022).

Therefore, despite its limitations, documentary film has been established as a small space for creative freedom (**Araüna**; **Quílez**, 2020) and production for women. Since this genre has lower budgets, fewer players choose to invest, and it is less economically attractive to men (**French**, 2019), who have more opportunities to work on larger projects. In fact, in Spain, documentaries receive only 6% of public aid for films (*Pro-Docs*, 2021).

Historically, the market potential for documentaries has been limited, and it is usually distributed through small and specialized releases. Such work's lack of visibility is shared by female filmmakers, who must pay this price for the apparent creative opportunity (**Selva**, 2005, p. 65). Moreover, the genre has not been very prominent in television. Documentaries and feature reporting have made up barely 1% of European programming (**Plana**; **Prado**, 2014), and in Spain, they have been relegated to public programming in slots with poor viewership (**Latorre-Lázaro**; **Doménech-Fabregat**, 2020). Many of these documentaries no longer have had cinematic influence; rather, they have been more typical of what **Corner** (2002) described as the post-documentary, that is, serialized pieces that are more confrontational than informative (**Paz**; **Martínez**; **Mayagoitia**, 2020).

In the same way, documentaries in the streaming market also move away from the cinematic. They are mainly serialized products that, unlike television documentaries, have high production value and quality (**Binns**, 2018), with bigger budgets, better technical and image quality, and narrative formulas typically used in television fiction (the use of cliffhangers between episodes, character definition, character arc development, etc.). The treatment and approach of many of the stories is based in journalism, but with marked creative ownership (**Borum**; **Conrad-Pérez**; **Bello**, 2022) and the goal of active audience participation (**Borum**, 2020).

The educational documentaries broadcast on generalist television in the past decade already seemed to have presented new programmatic opportunities, but the possibilities seem to have gone through the roof with subscription video-on-demand (SVoD) streaming platforms

Accordingly, if we look at the journalistic field, women also experience unequal environments within job and professional structures. In Europe, only 23% of news items carry a woman's signature (21% in Spain), compared with 41% with a male signature. For photographic images, the figure stands at a modest 15% (21% in Spain), which contrasts again with 43% for men (*European Journalism Observatory*, 2018). In the sector's job structure, the figures are more positive. According to the *Press Association of Madrid* (*Asociación de la Prensa de Madrid*, 2021, p. 8), there is an equal number of women and men working in journalism. In addition, their representation is similar across different types of media, though men are more likely to be found in print media and agencies (31.7%) compared with women (26.1%). There is a disparity within digital media (23.7% men and 28.1% women). However, this gap is closing in audiovisual media: 32.9% of all female journalists work in this field (31.7% of men), the majority of whom have expertise related to editing (17.4%; *Madrid Press Association*, 2021, p. 13).

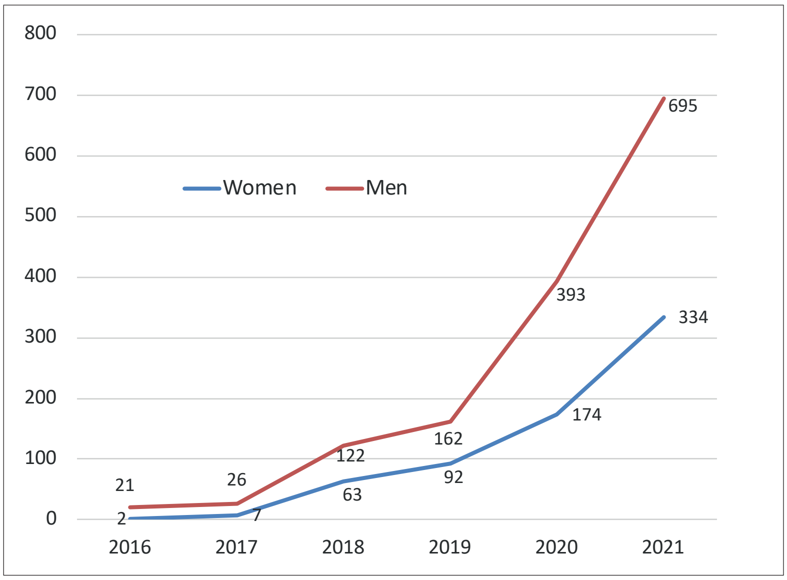
In television, the benchmark data are those published by *Spanish Radio Television* (*RTVE*) in its *Memory of Public Service* [*Memoria de servicio público*] (*Radiotelevisión Española*, 2021). Their structure approaches gender parity, as 41.5% are women. However, it is not without inequalities. The gender pay gap is widening (increasing to 6.3% in 2021 from 5.1% the previous year). Moreover, as the age range increases, the situation of women worsens. Although there is parity within the group of employees aged 20-39 years (48.7% women and 49.2% men), the percentages decrease for women 40 years of age and older, and for the 50-59-year-old age bracket, the percentage of women falls to 37.9%, whereas the percentage of men rises to 62.1%. In addition, as is becoming the norm, women are also in a minority in positions of responsibility, at 35.3%.

In the streaming sector, there are virtually no studies analyzing the status of women in the industry, with the exception of the work of **Izquierdo-Castillo** and **Latorre-Lázaro** (2021). In their research, the authors demonstrated that, of the total number of jobs in SVoD platform productions, 37.7% were held by women. In documentaries, this figure was 33.3%, though, at the time, the sample of documentaries was still meager, with only 5 titles released as of the beginning of 2020. The research herein includes the productions released in 2020 and 2021, together totaling 35.

4. Analysis of results

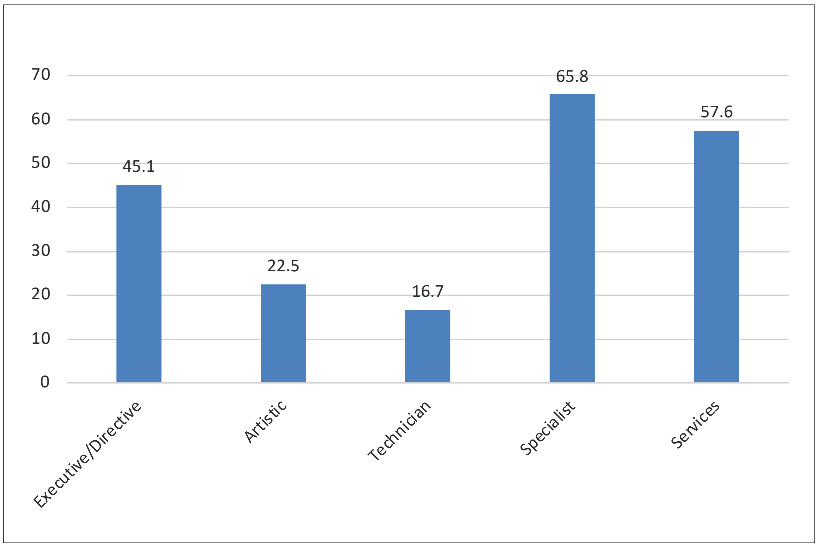
Taking into account the data obtained in our research in the period from 2016 to 2021, we have found that the existence of a greater number of men on the staff of the documentary productions broadcast on the streaming platforms analyzed was confirmed. Of the final number of 2,099 professionals working on the 35 documentaries analyzed, only 32.3% were women. This figure is similar to that provided by the *Association of Women Filmmakers and Audiovisual Media* (*CIMA*), **Cuenca** (2022), which indicated that only 32% of professionals in the film sector are women, down from a total of 40.3% of women working in the audiovisual cultural industries (*Ministerio de Cultura y Deporte*, 2021).

Viewed chronologically, an increase in the figures has been observed (Graph 1), but this was in parallel to the resumption of audiovisual activity after the hiatus due to the pandemic in 2020. As we can see, the increase in women (160) is lower than that of men (302); however, in percentage terms, women have achieved greater growth (92% versus 77%).



Graph 1. Evolution of the number of professionals in documentary productions by gender (2016-2021)

In accordance with our initial hypotheses, the next element to be evaluated is related to the distribution of roles in audiovisual production. Looking at the five main career areas involved in an audiovisual production –executive/management, creative, specialist, technical, and services– according to the data shown in Graph 2, there are more women than men in the "specialist" area (which includes, among other things, the areas of makeup, hairdressing, and wardrobe; 65.8%) and "services" area (generic roles not exclusive to audiovisual production, such as catering, transportation, legal assistance, etc.; 57.6%). The percentage of women in the "executive/management" category (45.1%) for areas of expertise related to production and directing tasks is also noteworthy (Annex 1).



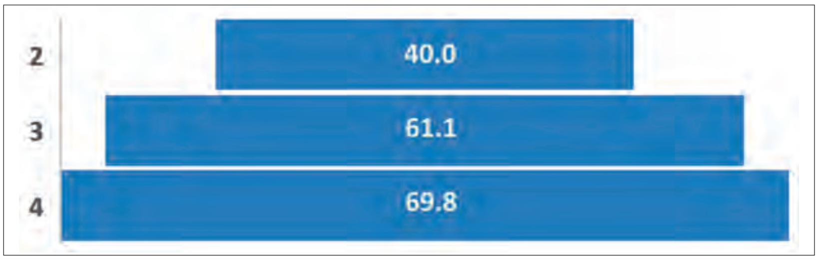
Graph 2. Percentage of women versus men in the audiovisual industry (documentary) by area of expertise, 2016-2021 (%) (*n* variable by category)

To evaluate the data above, we have considered how to categorize these areas by levels of position held (Annex 1). This classification allows us to analyze the data obtained from the number of women in positions of greater responsibility. As the first distinctive feature, we begin with the fact that the area related to "services," in which women predominantly work, has minimal or no hierarchy, as they are providing support through generic roles. Women account for 57.6% in this area (Graph 2). This area supports the various areas of production, with practically no responsibility for the work itself.

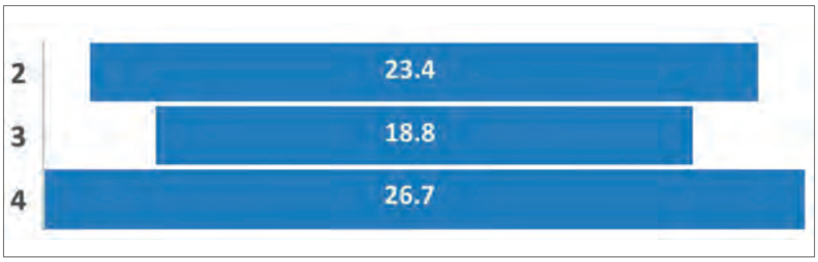
Similarly, the "technical" area has only two levels, differentiating between entry-level positions (4) and specific positions of responsibility (3) related to directing, supervision, or management of some technical functions (cameras, electrical, special effects, sound, design, etc.). Regardless of this lack of hierarchy, it was confirmed to be a clearly masculinized field. Women accounted for 16.1% at the entry level and 20.2% at the managerial level in this area. These figures reflect the lower-ranking position of women in areas such as sound, in which there were only 3 women in leadership positions in management and sound design, as opposed to 21 men.

In the "specialists" area, we found a greater division of labor, in this case, on three levels, but this is undoubtedly the area in which we find the most examples of "feminized" professions: hairdressing, makeup, and wardrobe as well as writing, documentary filmmaking, and research (Graph 3). The 69.8% of women who have entry-level specialist positions in the documentary productions analyzed is the highest number of women versus men of all of the fields and levels analyzed. Despite being feminized areas, looking at the highest level (level 2), men were once again in the majority when it came to management and coordination in areas such as research or writing (Graph 3).

Upon extended the analysis to the perspective of recognition for the creation of audiovisual products, we found fewer references to women in the "creative" and "executive/management" areas. The directors, screenwriters, producers, and cinematographers in these areas are typically the most well-known figures associated with audiovisual works –something that holds true for nonfiction productions. The low representation of women in the "creative" field was a negative piece of data in our object of study, although the analysis by level of responsibility in this area does not exactly follow the pattern in other areas (Graph 4). In this case, the number of women was inconsistent in terms of the levels of responsibility, with the second level (art direction, cine-

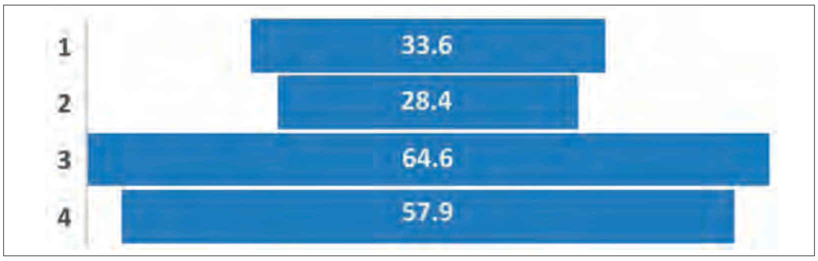


Graph 3. Percentage of women versus men in the "specialists" area (%) (*n* = 102)/levels of responsibility according to Annex 1



Graph 4. Percentage of women versus men in the "creative" area (%) (*n* = 103)/levels of responsibility according to Annex 1

matographer, original music, post-production, coordination of shooting, editing, etc.) having the lowest figures; after the entry level in the "technical" area, these were the most negative results in the study for women. The low proportion of female screenwriters (only 14 out of a total of 52) was particularly striking. The total absence of women in cinematography, where 50 jobs were recorded, all of which were occupied by men, was particularly revealing.



Graph 5. Percentage of women versus men in the "executive/management" area (%) (*n* = 245)/ levels of responsibility according to Annex 1

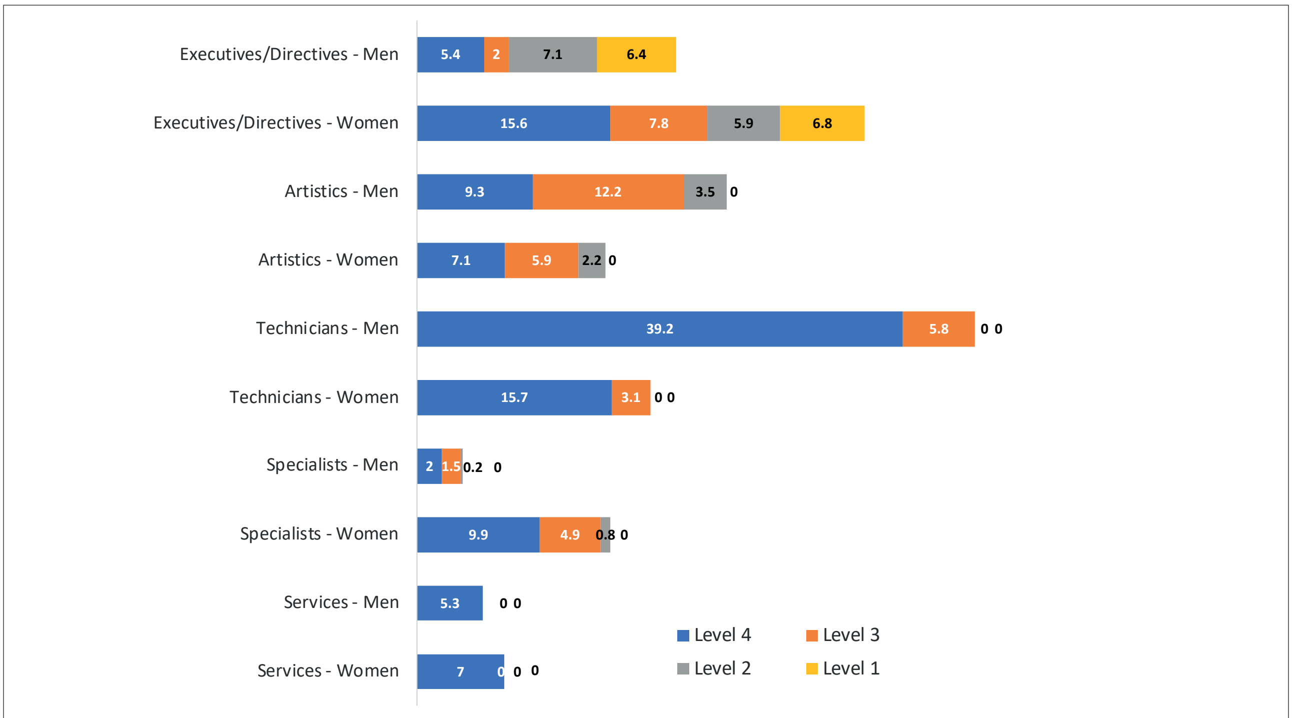
We must pay special attention to the "executive/management" area because of its importance in terms of the visibility it brings to professionals in the field, but, above all, because of its implications in terms of the leadership skills of the professionals who work in the various levels. In this regard, the data were once again very revealing, since, despite the fact that the overall figures (Graph 1) indicated significant female representation (45.1% of the total, *n* = 680), their position among the leadership of the productions was in the minority: at the highest level of responsibility for a production, we found that only 33.6% were women compared with 72.4% men (Graph 5). Evidence of this notable inequality was reflected in the credits, where only 7 women's names appeared next to the role of director as opposed to 33 men's names.

We found, therefore, that most women work at levels 3 and 4, in work related to production coordination, project coordination, and production assistantships.

In addition to women's relative position with respect to men, the results have provided us with significant data on the distribution of both men and women within the sector. It is evident that most of the jobs are at the lower levels of categorization, since audiovisual creation is organized under degrees of coordination. Even so, it was observed that women had a more pronounced pyramidal distribution than men (Graph 6), specifically at the levels of greatest responsibility for the creation of a production, the "creative" (Graph 4) and "executive/management" (Graph 5) areas.

In the "executive/management" area, women had a clear pyramidal distribution, such that the majority of women worked at the lowest level of specialization. Their number decreased moving up the scale. However, men's structure was rectangular, and their distribution within the specialty was more evenly distributed among the different levels. In fact, in this category, more men worked at level 1 than at level 4. The same trend was observed in the "creative" area. Between levels 2 and 3, the pyramidal structure that women had became an inverted pyramidal shape for men.

All of this shows that it is more difficult for women to reach the higher levels in the categories. If we also consider the peculiarities of streaming documentaries –similar to television shows but with a journalistic base– we find that, in recent years, the genre does not seem to have allowed women to develop roles distinct from their typical roles in the audiovisual industry.



Graph 6. Distribution of women and men in the industry by area and level of responsibility in documentary productions (%) (women *n* = 680; men *n* = 1,419)

5. Conclusions

The results presented confirm the formulated hypotheses. The propagation of gender inequality is consolidated in the streaming market, in which documentaries attain an audiovisual quality and a significant business projection for the genre, but the data regarding women's participation and professional evolution do not improve. The documentary genre has traditionally been a space in which women have greater creativity and professional expansion –albeit in the minority– as indicated by data related to their greater involvement in the production process in Europe (**Simone**, 2021) and in Spain (**Cuenca**, 2022), and as female audiovisual creators in Spain have directly stated (**Scholz** *et al.*, 2021). However, this reality does not hold true in the streaming market, where the genre is moving away from cinematic production structures in favor of a journalistic approach and a serialized narrative more typical of television fiction. This can be seen in the chart of production companies from which the analyzed sample was created (Annex 2), many of which are leaders in the production of serialized fiction and news programs (*Mediapro*, *Cuarzo*, *El Terrat*, *Mediaset*, *Bambú*, *Buendía Estudios*, and *Newtral*). In this production context, women find it difficult to find opportunities in the documentary genre and, in particular, in roles with greater responsibility for the work. This limits women's opportunities for leadership in all areas of expertise, and how difficult it is to find them in positions of greater artistic and productive weight is highly significant –evidence that the glass ceiling still exists. Therefore, a job-based problem regarding the gender gap is on the table. In other words, there are problems in gaining access to certain jobs and responsibilities.

In the documentaries produced for international platforms, the gender gap still exists, with feminized and masculinized areas and positions. From this perspective, the gender gap could have a social rather than an occupational origin, linked to stereotypes and conditioning factors when it comes to developing professional careers. This makes it impossible to consider the total number of women working in streaming documentaries (45.1%) a positive figure in terms of equal opportunities and prominence, since their presence is limited to fields and responsibilities biased by gender criteria.

Therefore, the challenge we have identified lies not so much in the presence of women –though the data are still not entirely positive– but rather in women's assumption of responsibility and leadership. Bringing about such improvements is based in educational and training issues, but also in female producers' management policies and in the genuine pursuit of female creative discourse. These can become a differentiating factor in a context in which content creation is highly necessary and in which stories based in reality are front and center in the audiovisual offering.

Streaming platforms have programming strategies that have given documentaries status within the audiovisual landscape. Moreover, they do so by becoming leading producers of the genre

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7. Annexes

Annex 1. Areas of expertise in audiovisual production and the established levels of responsibility and roles

Area	Level	Roles
Executive/ management	1	Producer, production director, co-production, executive producer, production management director, showrunner
	2	Associate producer, production manager, direction/implementation, production design
	3	Script supervision, physical production director, line producer, marketing producer, production coordination, project coordination, location producer, contract manager (post-production, etc.)
	4	Assistance and assistant director, production assistants and secretary, scripts, stage manager, controller, administration, payroll, accounting/finance, fixer
Creative	2	Screenwriting, script coordination, creation, development
	3	Art direction, cinematography, original music (main composition), post-production coordination/supervision/directing, coordination of shooting, chief editor, editing, filmmaker
	4	Casting, extras, location, photography (still photo), editing (assistant), music, design, art, decorating (swing gang, property manager, property assistant), props, (artistic) producer, post-production, narration, additional music, musicians
Specialists	2	Research director, editorial coordination, delegated services director, editorial director
	3	*Head of hair and makeup, wardrobe supervision, costume designer, journalists/editors, coordination of delegated services, prop makers*
	4	Hair and make-up, wardrobe, specialists (acting), documentary filmmaker/archive/research
Technical	3	Director of operations, visual effects (VFX) supervisor, technical manager, sound manager/director/supervisor, supervision/coordination of sound post-production/editing, sound mixing, camera and electrical manager, technical director, casting director, actor's assistant, digital imaging technician, chief machinist, gaffer, strategic consultation, creative director (technical)
	4	Casting, cameras and electrical, special effects, visual effects, credits, graphics/graphic design, subtitling, data wrangler, direction of data management, production, key grip best boy, logger, color correction, sound design, sound postproduction, dialogue editing, boom operator, sound technician, foley, mixing assistant
Services	4	Chauffeur, translation, IT, cleaning, catering, deliveries, legal, insurance, consulting, communication, app designer, linguist, voice coach, color correction, distribution

Source: Based on **Izquierdo-Castillo** and **Latorre-Lázaro** (2021)

Annex 2. Sample of documentaries analyzed

Title	Over-the-top platform	Director(s)	Year	Production
¿Dónde está Marta?	*Netflix*	Paula Cons	2021	*Cuarzo Producciones, Netflix España*
Amaia, una vuelta al sol	*APV*	Marc Pujolar	2020	*Vampire Films, Universal Music Spain*
Carolina Marín. Puedo porque pienso que puedo	*APV*	Jorge Laplace, Anaís Berdié	2020	*Buendía Estudios*
Dolores: la verdad sobre el caso Wanninkhof	*HBO*	Noemí Redondo	2021	*HBO, HBOMax*
Dos Cataluñas	*Netflix*	Álvaro Longoria y Gerardo Olivares	2018	*Netflix España*
El caso Alcàsser	*Netflix*	Elías León	2019	*Bambú Producciones, Netflix España*
El caso Wanninkhof-Carabantes	*Netflix*	Tania Balló	2021	*Brutal Media, Netflix España*
El desafío: ETA	*APV*	Hugo Stuven	2020	*Amazon Studios, Cuerdos de Atar*
El estado contra Pablo Ibar	*HBO*	Olmo Figueredo-González Quevedo	2020	*La Claqueta PC, La Cruda Realidad, Irusoin*
El pionero	*HBO*	Enric Bach	2017	*HBO España, HBO, JWProductions*
El principito es Omar Montes	*APV*	Lorena Correa, Jacobo Eireos	2021	*Mediaset España, Unicorn Content, Beta Spain*
Examen de conciencia	*Netflix*	Albert Solé	2019	*Zeta Cinema, Minimal Films*
Fernando	*APV*	Jaume García y Arnau Monràs	2020	*Amazon Prime Video, Amazon Studios, Mediaproduccion S.L.U.*
Fernando Torres. El último símbolo	*APV*	Laura Alvea, José F. Ortuño	2020	*Buendía Estudios*
G.E.O. Más allá del límite	*APV*	David Miralles	2021	*Buendía Estudios*

Title	Over-the-top platform	Director(s)	Year	Production
La casa de papel. De Tokio a Berlín	*Netflix*	Luis Alfaro y Javier Gómez Santander	2021	*Netflix**
La casa de papel. El fenómeno	*Netflix*	Pablo Lejarreta y Luis Alfaro	2020	*Netflix España*
La creación de Malinche	*Netflix*	Marta Hermida	2021	*Nadie es perfecto PC S.L., La creación de Malinche, La Película A.I.E.*
La familia	*APV*	Luis Mora	2021	*Mediaset España, Federación Española de Baloncesto*
La leyenda de Sergio Ramos	*APV*	José Rueda	2021	*Amazon Prime Video*
La línea. La sombra del narco	*Netflix*	Pep Mora	2020	*Mediaset. Cuerdos de atar*
Los documentales del¡HOLA!	*APV*	Raúl García	2021	*¡Hola! TV.*
Muerte en León	*HBO*	Justin Webster	2016	*JW Productions, Movistar+*
Muerte en León: caso cerrado	*HBO*	Justin Webster	2019	*HBO España*
Nevenka	*Netflix*	Maribel Sánchez-Maroto	2021	*Newtral*
Otra forma de entender la vida	*APV*	Javier Jiménez Vaquerizo	2021	*Atleti Studios, TBS*
Pau Gasol. Lo importante es el viaje	*APV*	Oriol Bosch	2021	*Slam RTG Features, Think 450 NBPA, Amazon Prime Video*
Rafa Nadal Academy	*APV*	Marc Pons	2021	*Amazon Prime Video*
RCD Mallorca. From Paradise	*APV*	Albert Salas, Franc Subías	2021	*RCD Mallorca*
Sainz. Vivir para competir	*APV*	Alejandro Pita	2021	*TBS, Red Bull Media House*
Seve	*APV*	Hugo Stuven	2021	*Par Producciones SL*
Six dreams	*APV*	Justin Webster, David Cabrera y Jordi Call	2018	*Amazon Prime Video, Amazon Studios, Mediapro*
Six dreams II. Back to Win	*APV*	Justin Webster, David Cabrera y Jordi Call	2020	*Mediapro, JWProductions*
Sudáfrica, 10 años después de nuestra estrella	*APV*	José Larraza	2020	*Real Federación Española de Fútbol*
Vitals. Una historia humana	*HBO*	Félix Colomer	2021	*El Terrat, Forest Film Studios*

Source: Based on data from *Netflix*, *Amazon Prime Video*, *HBOMax* and *www.filmaffinity.com*
*Distributor. No production company indicated.

Activity of universities in social networks. Correlations of rankings, students, followers and interactions

Marc Pérez-Bonaventura; Carolina Rodríguez-Llorente

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Marc Pérez-Bonaventura ✉
https://orcid.org/0000-0002-6986-1197

Universitat Politècnica de Catalunya
Av. Diagonal, 647
08028 Barcelona, Spain
marcperezbonaventura@gmail.com

Carolina Rodríguez-Llorente
https://orcid.org/0000-0002-2894-5271

Universidade da Coruña
Facultade de Ciencias da Educación
Campus Elviña, s/n
15071 A Coruña, Spain
carolina.rodriguez.llorente@udc.es

Abstract

The Internet and social networks are widely used by students. For higher education, which operates in a highly competitive environment, marketing is a fundamental tool for universities to distinguish themselves and attract new students. Social networks are one of the best options for influencing university choice. The objective of this study is to analyze the relationship between some indicators related to universities and their use of and results on social networks. We carried out quantitative correlational research to study the number of students and ranking position as university indicators as well as the number of followers, posts, and interactions (likes, comments, and shares) weekly and per post on *Facebook*, *Instagram*, *Twitter*, and *YouTube*. Data were collected from 83 Spanish universities over 14 weeks in 2021. Correlation analysis showed that the number of students is closely related to the number of followers and interactions, although to varying degrees. The position of a university in the rankings exhibited a particularly significant correlation with their number of followers on almost all the networks. In addition, the higher the university in the ranking, the higher the number of interactions per post that it obtained on *Facebook* and *Twitter*. It was also found that universities with more followers had more interactions (likes, comments, and shares) with their posts. Finally, the number of posts was found to be positively related to the interactions per week but not to the interactions per post. This study has identified some significant relationships between the characteristics of all Spanish universities and their performance on four social networks, which may help universities become better at acting and communicating on them.

Keywords

Communication; Communication 2.0; Education; Higher education; Universities; Marketing; Digital marketing; Rankings; Students; Followers; Interactions; Social networks; Social media; *Facebook*; *Instagram*; *Twitter*; *YouTube*; Spain.

1. Introduction

Every year in Spain, thousands of students finish their post-compulsory secondary education studies and take university entrance exams [*Evaluación para el Acceso a la Universidad* (*EvAU*) or *Evaluación del Bachillerato para el Acceso a la Universidad* (*EBAU*)] to continue on to more specialized and professionally focused studies. As there are a wide variety of higher-education institutions and study programs, universities use various marketing tools to influence the choices made by their prospective students (**Farinloye** *et al.*, 2020; **Fayos** *et al.*, 2011).

The *American Marketing Association* (*AMA*, 2017) defines marketing as the activity, group of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, partners, and society at large. To meet the needs of these stakeholders, the marketing mix variables, the "4 Ps" –product, price, place, and promotion (or communication)– are used (**Perreault**; **McCarthy**, 2002). Promotion/communication in particular is an important element of the marketing mix that can be implemented through a variety of channels according to the strategy chosen. The current rise of the Internet and Web 2.0 makes them the correct scenario in this context.

Marketing in higher-education institutions began to be studied in the United States and the United Kingdom in the 1980s (**Hemsley-Brown**; **Oplatka***,* 2006), paying particular attention to its effect on consumer decision-making (**Chininga** *et al.*, 2019). Currently, the Internet has become one of the main sources for searching for and obtaining information, specifically for the generations of digital natives who commonly enter university (**Flores-Alarcia**; **Del-Arco-Braco**, 2013). In this digital environment, social networks have established themselves as the platforms where information can be obtained more quickly, making them a powerful marketing tool for higher-education institutions to attract new students (**Constantinides**; **Lorenzo-Romero**; **Alarcón-del-Amo**, 2013).

For this purpose, numerous Spanish universities maintain active profiles on various social networks, such as *Facebook*, *Twitter*, and *YouTube* (**Zarco**; **Del-Barrio-García**; **Cordón**, 2016). However, it seems that Spanish higher-education institutions have had difficulties in adapting to the digital 2.0 environment (**Paniagua-Rojano**; **Gómez-Calderón**; **Fernández-Sande**, 2012) and may use social networks to varying degrees. Against this backdrop, a study has been designed with the aim of analyzing the relationship between indicators related to higher-education institutions in Spain and these institutions' results on some of the social networks available.

2. State of affairs

2.1. Marketing and universities on the web 2.0

University marketing practices have developed in response to the growing competition among institutions and the demands of social agents (**Doña-Toledo**; **Luque-Martínez**, 2017). Specifically, Spanish universities' implementation of communication was the result of the creation of communication offices at the universities between the 1980s and 1990s. Their prevalence in the institutions increased considerably in the 1990s, owing mainly to the appearance of new private universities but also to the design of new marketing techniques that helped disseminate and position the institutional image (**Parejo-Cuéllar**, 2015).

In a context marked by the importance of internationalization and research, a large number of institutions, and difficulties in obtaining funding, universities have been forced to seek new ways to promote themselves, finding in marketing a vital tool for communicating their services to the public (**Doña-Toledo**; **Luque-Martínez**, 2017). Beyond education, which is a fundamental and intangible service, universities offer a variety of even more important, ancillary services such as extracurricular activities, libraries, or international mobility (**Fayos** *et al.*, 2011). A suitable marketing strategy that promotes all of these services would be very useful for increasing the institution's appeal over others for those interested in accessing higher education.

The target audience for such marketing carried out by universities and their admissions offices is formed of prospective students, primarily those finishing post-compulsory secondary education, as from the many options, they must choose the institution that best suits their educational needs and career goals (**Lewison**; **Hawes**, 2007). Studies have shown that, among the marketing strategies that these entities can employ for this purpose, the Internet proves to be very powerful for attracting students to institutions that use it appropriately (**Hemsley-Brown**; **Oplatka**, 2006).

However, it seems that there was some delay in Spanish universities' adaptation to Web 2.0. and, more specifically, to social networks, wasting a great deal of its potential (**Reina-Estévez**; **Fernández-Castillo**; **Noguer-Jiménez**, 2012). One of the main reasons for this was that they used unsuitable, poorly developed digital marketing strategies without an effective community (**Paniagua-Rojano**; **Gómez-Calderón**; **Fernández-Sande**, 2012). However, more and more national higher-education institutions have corporate profiles on social networks, and the number of networks on which they are active is increasing, as well (**Blázquez**; **Rodríguez**; **Teijeiro**, 2020; **Zarco**; **Del-Barrio-García**; **Cordón**, 2016).

Academia and the research world have benefited from the advent of 2.0 technologies and social networks in another way. Thanks to networks, it is now possible to report scientific studies and disseminate them farther than the traditional form of dissemination through

> Universities' marketing focuses primarily on influencing their prospective students' choice of institution

scientific journals, which allows them to reach a wider audience (**Torres-Salinas**; **Delgado-López-Cózar**, 2009). Networks specifically used for scientific dissemination are called scientific digital social networks, among which *ResearchGate* and *Academia.edu* are the most widely used in Spain (**Campos-Freire**; **Rúas-Araújo**, 2016). However, in Spain, use of them by university researchers remains not very prevalent and has a long way to go (**González-Díaz**; **Iglesias-García**; **Codina**, 2015).

Moreover, the Web 2.0 has become an effective alternative to traditional modes of marketing, primarily because it allows companies to gain a foothold in the everyday lives of consumers, including the youngest ones (**Fondevila-Gascón**; **Carreras-Alcalde**; **Del-Olmo-Arriaga**, 2012; **Martínez-Costa** *et al*., 2019; **Santana**; **Franco**; **Hernández**, 2014). Statistics show that, in Spain, 87% of Internet users aged 16-65 years use social networks (*IAB*, 2020). If we focus on the percentage of young people who use the Internet regularly, this rises to 93.6%, with social network engagement being one of the main reasons for Internet use (*Fundación Telefónica*, 2020). Considering these data, it is logical to view social networks as a powerful space for implementing marketing strategies specifically aimed at younger generations.

Information obtained from social networks is observed to have a strong influence on consumer decision-making, partly because it connects emotionally with consumers (**Blázquez**; **Rodríguez**; **Teijeiro**, 2020; **Stephen**, 2016). A university can use social networks to influence interested people's perception of and attitudes toward the institution, thereby encouraging them to choose it (**Santana**; **Franco**; **Hernández**, 2014).

Social media also influences customer loyalty and satisfaction and extends organizations' reach (**Brandão**; **Faria**; **Gadekar**, 2019). As a result, through the use of social networks, universities can keep students happy with their decision throughout their studies and, at the same time, reach different sectors of society.

2.2. Social networks and universities

As mentioned above, social networks are an important digital marketing tool, having a great influence on young people when they are choosing their future university (**Constantinides**; **Lorenzo-Romero**; **Alarcón-del-Amo**, 2013). By facilitating a twofold presence of institutions, the use of these networks increases the visibility of those who use them compared with those that do not, while enabling interaction with users at the same time (**Blázquez**; **Rodríguez**; **Teijeiro**, 2020).

Their target audience essentially consists of the younger generations of digital natives, that is, young people who have grown up in a world where technology and Internet-connected devices are an integral part of life and thus show a greater capacity for learning and adaptability to virtual environments (**Prensky**, 2001). In this sense, the use of social networks has been found to be beneficial for universities when it comes to increasing student enrollment (**Doña-Toledo**; **Luque-Martínez**, 2017).

In general, universities around the world use social networks to increase their visibility and communicate their educational offerings in an increasingly competitive environment (**Amaral**; **Santos**, 2020; **Kimmons**; **Veletsianos**; **Woodward**, 2017; **Rodríguez-Fernández**; **Sánchez-Amboage**; **Martínez-Fernández**, 2018). In Europe and North America, *Facebook* and *Twitter* are used the most, followed by *YouTube* and *Instagram* (**Motta**; **Barbosa**, 2018). However, some research has observed differences in higher-education institutions' performance on social networks depending on institutional characteristics; For example, it seems that higher-education institutions with a higher volume of students tend to be more active on networks such as *Facebook* or *LinkedIn* in terms of posting content and engagement, whereas universities with fewer students achieve greater visibility on the Internet (**Amaral**; **Santos**, 2020). In addition, prestige or quality is an important factor for increasing the number of followers, since it appears that those with the best positions in university rankings have, for example, more followers on *Facebook* (**Lund**, 2019).

Furthermore, disparities have been found in terms of universities' use of their social network accounts. This is the case with posting frequency and the number of posts, which seem to show no relationship with the number of followers or the degree to which users interact with the content (**Lund**, 2019). Meanwhile, likes of posted information drive engagement with posts, but not proportionally; that is, institutions that post more frequently have fewer overall interactions with each post compared with those that share less content (**Peruta**; **Shields**, 2017). Finally, even if universities do not have many followers on their networks, their performance on these networks can be considered to be satisfactory if users interact with the content by liking, commenting, or sharing the posted material (**Blázquez**; **Rodríguez**; **Teijeiro**, 2020).

Although some studies have analyzed the characteristics of universities and their performance on social networks in Spain (**Blázquez**; **Rodríguez**; **Teijeiro**, 2020; **Paniagua-Rojano**; **Gómez-Calderón**, 2012; **Simón-Onieva**, 2014; **Reina-Estévez**; **Fernández-Castillo**; **Noguer-Jiménez**, 2012; **Zarco**; **Del-Barrio-García**; **Cordón**, 2016), these factors have not been analyzed for all institutions across the board or for more than two social networks at once. Given that higher-education institutions' success on social networks may vary according to their characteristics, research analyzing this relationship at the national level could help identify those variables pertinent to universities' presence on social networks.

> A significant correlation was found between the size of the institution's student body and its number of followers

3. Objectives, research questions, and hypotheses

Starting from the question of whether there is a relationship between the indicators related to Spanish universities and their use of and performance on social networks, the objectives of this study are:

(1) To explore the relationships existing between university indicators (number of students and position in rankings) as well as their use of social networks and the results they obtain on them (number of posts as well as the numbers of followers and user reactions), and

(2) To analyze the relationships between the variables related to universities on the networks (numbers of followers, posts, and interactions received by the university on social networks).

The starting hypotheses indicate that there could be a positive correlation between the number of students attending an institution and their use of social networks and their performance; that is, the greater the number of students, the greater the number of followers, posts, and interactions. When it comes to the position of a university in rankings, we expected that, the better an institution's reputation, the better its results on social networks.

In regard to the second objective, we expect that there will be a positive relationship between the number of followers and the number of reactions to posts on all social networks; in turn, there will be a positive relationship between the number of posts and the number of followers, weekly interactions, and reactions per post.

4. Methodology

A correlational, observational, and analytical research design was adopted for this study.

4.1. Population and sample

Data were collected from the total population, that is, from 83 Spanish universities. The institutions were selected using the inclusion criteria that appeared in the state report "Facts and Figures of the Spanish University System. Publication 2020–21" (*Ministerio de Universidades*, 2021a) and that were academically active. Of the higher-education institutions included, 60% were public (n = 50) while 40% were private (n = 33). The focus of the analysis was to study these universities' official profiles on social networks.

When mentioning social networks in Spain, *Facebook* springs to mind first, followed by *Instagram*, *Twitter*, *WhatsApp*, and *YouTube* (in that order) (*IAB*, 2020). Therefore, this article studies the universities' profiles on these social networks, with the exception of *WhatsApp*, as most universities do not yet use this network to communicate with the public.

4.2. Variables

The number of students enrolled in each university, the university's position in the rankings, their number of followers, and the number of posts they made per week on four social networks (*Facebook*, *Instagram*, *Twitter*, and *YouTube*) were used as university indicators:

- Number of students: The number of students studying to obtain university degrees at each institution was obtained from secondary information sources, specifically from the statistics and reports on Spanish universities (*Ministerio de Universidades*, 2021b; 2022).
- Position in university rankings: This information was obtained from a secondary source of information, in this case the *Ranking of Synthetic Indicators of Spanish Universities* of the *BBVA Foundation* and the *Valencian Institute for Economic Research* (**Pérez**; **Aldás**, 2018). This ranking of national universities is one of the most complete and up-to-date available, as in addition to scientific production, it assesses the quality of teaching, research, and innovation (**Zarco**; **Del-Barrio-García**; **Cordón**, 2016).
- Number of followers on the universities' social networks: This variable was identified by this study itself by observing the public information on the higher-education institutions' official accounts on each of the mentioned social networks. Thus, the numbers of *Facebook*, *Instagram*, and *Twitter* followers and *YouTube* subscribers were quantified (**DeVries**; **Gensler**; **Leeflang**, 2012). These data were collected once a week for 14 weeks.
- Number of posts: As in the previous case, these data were derived from research and observed weekly over a period of 14 weeks. In this case, the numbers of *Facebook* and *Instagram* posts, *Twitter* tweets, and *YouTube* videos from each university (**Simón-Onieva**, 2014) in the last seven days were recorded.

Regarding the dependent variables, we used the number of followers and the number of posts (both described above) as well as the number of interactions with these posts on the four studied social networks. All of these variables were obtained through primary information sources through this research. The authors collected these data from the universities' official profiles on the aforementioned networks:

- Number of user reactions in the form of likes: The number of likes of each post, tweet, and video from the university was recorded for each social network they used and for each week (**Ashley**; **Tuten**, 2014).
- Number of user reactions in the form of comments: In this case, the comments left by users (on *Facebook*, *Instagram*, and *YouTube*) per post and per week were studied.
- Number of user reactions in the form of shares: The number of times posts were shared (on *Facebook* and *Twitter*) per post and per week was recorded.

Interactions (likes, comments, and shares) were measured per post to prevent the number of posts from distorting these measurements, because one of the initial assumptions is that this variable could affect a university's results on the networks (**Peruta**; **Shields**, 2017).

4.3. Procedure

Data collection was carried out for 14 consecutive weeks. This period of time, from April to July 2021, which corresponds to the end of the academic year in Spanish high schools, was chosen because it is presumably a time during which the institutions' marketing activity is focused.

Their purpose is to attract students finishing their post-compulsory secondary education studies so that they choose to register and later enroll at their institutions. More specifically, university entrance exams and pre-enrollment for undergraduate studies begin during June and end in July, although in the months leading up to this, students are already beginning to form ideas regarding their options and preferences.

Under these assumptions, the information used in this study was collected between March 29 and July 4, 2021. The procedure adopted consisted of collecting the values for the variables for the 83 universities from their official profiles on the four selected social networks. The values of the variables for the institutions' performance on these social networks were obtained through the authors' direct observation of the universities' official accounts every seven days. In this way, the posts made and the likes, comments, and shares received in the seven days preceding were counted, and the number of followers on the final day was recorded, because, as this is a cumulative value, it cannot be added up. The data used are public data from the universities' profiles on networks and were extracted following **Palmer** (2013), **Simón-Onieva** (2017), and **Zarco**, **Del-Barrio-García**, and **Cordón** (2016).

4.4. Data analysis

IBM SPSS version 27 statistical software was used to analyze the information collected. A correlational analysis of the four independent variables or university indicators and the set of dependent variables or the institutions' results on their social networks was carried out. The Pearson correlation coefficient was used to study these relationships.

The correlations studied are presented below in Table 1.

Table 1. Correlations studied between independent and dependent variables

	Indicator/independent variable	Dependent variable
Objective 1	Number of students	Number of followers
		Number of posts
		Number of reactions per post
	Position in ranking	Number of followers
		Number of posts
		Number of reactions per post
Objective 2	Number of followers	Number of reactions per post
	Number of posts	Number of followers
		Number of reactions per week
		Number of reactions per post

5. Results

5.1. Correlation between number of students and university performance on social networks

Table 2. Pearson correlations between the number of students and the universities' results on social networks

	Facebook	*Instagram*	*Twitter*	*YouTube*
Number of followers	0.513**	0.514**	0.707**	0.240*
Number of posts	0.120	0.080	0.096	0.068
Number of likes per post	0.344**	0.218	0.429**	0.242*
Number of comments per post	0.759**	0.014	-	0.293*
Number of shares per post	0.398**	-	0.531**	-

Note: ***p* < 0.01; **p* < 0.05

The results presented in Table 2 reveal a significant correlation between the size of the universities' student body and their number of followers on *Twitter* ($r = 0.707$) and a moderate correlation in the case of the number of followers for *Facebook* ($r = 0.513$) and *Instagram* ($r = 0.514$). On *YouTube*, the correlation with the number of subscribers was significant but weak ($r = 0.240$).

When the number of weekly posts on the universities' social networks was taken as a dependent variable, the data did not reveal any significant correlation with the number of students. This result suggests that the number of posts an institution makes depends on the communication department of the university itself but is not affected by the number of students.

With regard to the number of likes per post, there was a moderate correlation for *Twitter* ($r = 0.429$) and a significant albeit weaker correlation for *Facebook* ($r = 0.344$) and *YouTube* ($r = 0.242$). For *Instagram*, there was also a positive correlation, but it did not reach significance. Note that, in the correlation between the numbers of students and likes on

Instagram, the Universidad de Navarra was an exception, as it was an extreme case that distorted the rest, having only 8,858 students but achieving an average of 1,223.52 likes per post.

Finally, some correlations were observed regarding the number of comments or shares per post. Between the number of comments and the number of students, a significant positive correlation was found for *Facebook* (r = 0.759) and a weaker one for *YouTube* (r = 0.293). Regarding the number of times posts were shared on *Twitter* and *Facebook*, a moderate positive correlation was found for *Twitter* (r = 0.531) and a weak positive correlation for *Facebook* (r = 0.398).

5.2. Correlation between university ranking and their performance on social networks

Table 3. Pearson correlations between university position in the rankings and their results on social networks

	Facebook	*Instagram*	*Twitter*	*YouTube*
Number of followers	0.397**	0.415**	0.700**	0.177
Number of posts	0.016	0.101	0.117	0.115
Number of likes per post	0.466**	0.168	0.504**	0.101
Number of comments per post	0.507**	-0.065	-	-0.043
Number of shares per post	0.370**	-	0.558**	-

Note: **$p < 0.01$; *$p < 0.05$

In studying the Pearson correlation between the position in the university rankings and the university's number of followers on social networks, Table 3 reveals that there was a moderate correlation between the first variable and the number of followers on *Facebook* (r = 0.397) and *Instagram* (r = 0.415). The correlation was strong with *Twitter* followers (r = 0.700). However, in the case of *YouTube* subscribers, the correlation was not significant.

When analyzing the relationship between the position in university rankings and the weekly number of posts, no significant correlation was observed on any of the social networks studied.

Finally, when user interaction was taken as the dependent variable, the following results were found: A moderate correlation was found between ranking position and the number of likes on *Facebook* (r = 0.466) and *Twitter* (r = 0.504), whereas for *Instagram* and *YouTube*, no significant correlation was found between this independent variable and the number of likes received.

Upon analyzing the interactions on networks through comments and shares, the results showed a moderate correlation between the position in the university rankings and the number of comments on *Facebook* (r = 0.507) but not *Instagram* or *YouTube*. Finally, looking at the number of shares per post, there was a positive correlation for *Facebook* (r = 0.370) and a somewhat stronger correlation with the number of retweets on *Twitter* (r = 0.558).

5.3. Correlation between number of followers and university performance on social networks

Table 4. Pearson correlations between the number of followers and a university's results on social networks

	Facebook	*Instagram*	*Twitter*	*YouTube*
Number of likes per post	0.490**	0.598**	0.585**	0.283*
Number of comments per post	0.573**	0.026	–	0.289*
Number of shares per post	0.318**	–	0.618**	–

Note: **$p < 0.01$; *$p < 0.05$

The relationship between the number of followers that universities had on social networks and the number of user reactions to their posts was also studied, revealing positive results (Table 4). Regarding the number of likes, the relationship between the number of followers on social networks and the reactions per post presented a strong positive correlation in the case of *Instagram* (r = 0.598) and *Twitter* (r = 0.585). For *Facebook*, this correlation was moderate (r = 0.490), whereas for *YouTube*, it was weak (r = 0.283).

When reactions were measured through comments and shares per post, it was found that there was a moderate positive correlation between the number of followers and the number of comments for *Facebook* (r = 0.573), whereas this correlation was tenuous for *YouTube* (r = 289). A strong correlation with the number of shares per post for *Twitter* (r = 0.618) as well as a weak correlation for *Facebook* (r = 0.318) were also observed.

5.4. Correlation between number of posts and university performance on social networks

In this section, we analyze the correlations between the variables that indicate Spanish universities' results on the social networks studied. First, there seems to be no significant correlation between university institutions' weekly number of posts on the networks and their number of followers on *Facebook* and *Instagram* (Table 5). In the case of *Twitter*, there was a significant but weak positive correlation (r = 0.237) between these two variables. However, for *YouTube*, a moderate positive correlation (r = 0.528) was found between the number of followers universities had on the social network and the weekly number of video posts.

Table 5. Pearson correlations between number of posts and number of followers

	Facebook	*Instagram*	*Twitter*	*YouTube*
Number of followers	0.067	–0.021	0.237*	0.528**

Note: $^{**}p < 0.01$; $^{*}p < 0.05$

In terms of interactions with posts, a distinction was made between weekly or per-post reactions. Correlations between the number of posts made by universities and weekly reactions measured in likes were moderate and positive for *Twitter* (r = 0.464) and significant, albeit somewhat weaker, for *Facebook* (r = 0.382), *Instagram* (r = 0.354), and *YouTube* (r = 0.275) (Table 6).

With respect to reactions in the form of comments and shares, the relationship was also significant, but the results were tenuous when it came to comments for *Facebook* (r = 0.227) and *YouTube* (r = 0.282). However, regarding the number of times posts were shared each week, a moderate positive correlation was demonstrated for *Facebook* (r = 508) as well as for *Twitter* with retweets (r = 498).

Table 6. Pearson correlations between the number of posts and reactions per week

	Facebook	*Instagram*	*Twitter*	*YouTube*
Number of likes	0.382**	0.354**	0.464**	0.275*
Number of comments	0.227*	0.009	–	0.282*
Number of shares	0.508**	–	0.498**	–

Note: $^{**}p < 0.01$; $^{*}p < 0.05$

In the analysis of interactions per post (Table 7), in terms of reactions through likes, a trend at odds with that found per week was observed. It appears that, while weekly likes showed a positive correlation with respect to posts, correlations are negative for likes per post, albeit very weakly. Thus, the relationship between the number of posts and the number of reactions per post is negative but does not reach statistical significance for any of the four social networks.

Regarding reactions measured in comments and shares per post, a pattern similar to that described above was observed, with negative albeit not significant correlations observed for all the studied networks.

Table 7. Pearson correlations between number of posts and reactions per post

	Facebook	*Instagram*	*Twitter*	*YouTube*
Number of likes per post	–0.132	–0.232	–0.195	–0.115
Number of comments per post	–0.121	–0.045	–	–0.162
Number of shares per post	–0.047	–	–0.184	–

Note: $^{**}p < 0.01$; $^{*}p < 0.05$

6. Discussion and conclusions

This work focused on studying the correlations of university variables related to their use of and results on social networks. Specifically, the relationships established between the number of students at a Spanish university and the university's position in the ranking with the number of followers, posts, and reactions on four social networks (*Facebook*, *Instagram*, *Twitter*, and *YouTube*) were explored. The correlations between the number of followers and posts with the interactions obtained by higher-education institutions on each of these social networks (weekly and per post) were also analyzed.

First, a positive and significant relationship was found between the number of students at the institution and their followers on all social networks. That is, the greater the number of students, the larger the community of followers of those universities are on the different networks. A positive correlation was also found between the size of the institution's student body and the interactions (likes, comments, and shares) they received on these social networks, with the exception of *Instagram*. Thus, it can be confirmed that the size of the university would influence its results on social networks (**Zarco**; **Del-Barrio-García**; **Cordón**, 2016), while corroborating the findings of **Amaral** and **Santos** (2020) regarding the correlation between the size of higher-education institutions and the activity and interactions they obtain on their social networks. It is worth highlighting that not finding a significant correlation between the number of students and reactions for *Instagram* could be due to private universities' intensive use of this social network (**Alcolea-Parra**; **Rodríguez-Barba**; **Núñez-Fernández**, 2020) and the smaller number of students they have in comparison with public universities. However, there seemed to be no relationship between the number of students and the number of posts on any of the social networks studied. Therefore, the number of posts depends more on the characteristics and composition of the university's communication office than on the number of students it has.

Second, when the institution's position in the rankings was taken as an independent variable, a positive correlation with the number of followers was observed for all of the social networks analyzed, except *YouTube*. Thus, already observed in other research, the better the university's position in the rankings, the greater its number of followers on the networks (**Brech** *et al.*, 2017). Possibly, the status of certain institutions allows them to obtain a large number of followers more easily than others that are less well known (**Zhu**, 2019). In addition, the university's position in the rankings correlated positively with the interactions obtained by posts in terms of likes, comments, and shares on *Facebook* and *Twitter*, but this was not the case on *Instagram* and *YouTube*. For these two networks, there were other factors that had a closer relationship with the reactions obtained. Regarding *Instagram*, one explanation could be the distortion of correlations caused by the extreme values of some universities in terms of likes and comments. For *YouTube*, this could be influenced by the higher cost of creating content on this network, as well as the amount of resources allocated to their management (**Martínez-González**; **Santamaría-Llanera**, 2017).

> There was a positive correlation between position in the university rankings and the interactions received on *Facebook* and *Twitter*

Third, the relationship between a university's number of followers and its results on social networks was studied. A positive correlation was found between this variable and the number of user reactions to a university's posts for all of the social networks studied, with the exception of comments in the case of *Instagram*. On the basis of these results, it is corroborated that universities that have more followers on social networks generate more interactions with the content they post (**Alonso-García**; **Alonso-García**, 2014). In addition, the positive relationship between followers and shares on *Twitter* (retweets) already observed by **Palmer** (2013) as well as the relationship between the number of *Facebook* followers and the interactions obtained by universities (**Brech** *et al.*, 2017) are also confirmed. **Paniagua-Rojano**, **Gómez-Calderón** and **Fernández-Sande** (2012) concluded that those universities with more followers on networks were not necessarily those that obtained more user reactions. However, the results presented here differ by finding a considerable correlation between followers and reactions on networks.

Finally, we analyzed whether there was a positive correlation between the number of posts and the universities' results on social networks. On the one hand, posting more content on networks such as *Twitter* or *YouTube* was related to the number of followers that universities had on these social networks, but such a relationship was not found for *Facebook* or *Instagram*. Consequently, the relationship between these variables did not hold true for some social networks (**Simón-Onieva**, 2014). On the other hand, relationships were found between the number of posts and the interactions received on the networks. Focusing on weekly reactions, a positive correlation could be observed when it came to user interactions via likes, comments, and shares on *Facebook*, *Instagram*, *Twitter*, and *YouTube*, the exception being comments on *Instagram*. In contrast, when reactions per post were considered, no significant correlations were observed and, moreover, they showed negative values. In other words, if universities post more, it appears that they obtain more overall weekly interactions, but the interaction for each post decreased or was not affected. Therefore, it is possible that increasing posting frequency does not affect user interaction (**Simón-Onieva**, 2014) when interaction per post is analyzed. These results could support the argument that qualitative aspects of a post play an important role in user interaction and engagement (**Lund**, 2019), and therefore, this is what universities should focus on.

This study has sought to overcome the limitations of previous research in this field by carrying out an exhaustive analysis of Spanish universities' use of social networks, covering all national higher-education institutions. In addition, the study covered four social networks and was carried out over 14 weeks, differentiating it from research conducted to date and promoting a better understanding of the phenomenon studied.

In terms of limitations, this study has a quantitative approach, and it would be useful to supplement it with a qualitative approach. In this sense, the analysis of the interactions that universities' posts receive could be expanded by studying the content of their posts using a qualitative approach. It would also be of interest to add the variable of the number of new student enrollments that universities obtain to study possible causal relationships. In addition, it would be relevant to study the origin of the differences in the results obtained for *Instagram* compared with the other social networks. Finally, a complementary and comparative analysis of the differences in user interactions according to the type of content that universities post on social networks (e.g., outreach, audiovisual elements, etc.) could be carried out.

This study has provided evidence regarding the relationship between indicators of Spanish universities, such as the number of students and a university's position in the rankings, and their performance on the social networks they use, confirming the relationship between some of the variables connected to their results on social networks, albeit with some variation among them. However, in the future, the impact of other factors, such as the number of years an institution has existed and the leadership or the characteristics of the communication office, on this relationship could be studied.

In conclusion, it was confirmed that the number of students at a university is an influential variable when it comes to the university's results on social networks, showing a positive relationship with the number of followers on all social networks and with the interactions they obtain on *Facebook*, *Twitter*, and *YouTube*. It was also observed that position in the university rankings was related to the number of followers for all of the social networks studied, except *YouTube*. Likewise, the correlation between this variable and interactions held true for *Facebook* and *Twitter*, but not *Instagram* and *YouTube*. The other important variable related to the results on social networks was the number of followers that universities had on these networks. Those universities with

> The relationship between the number of followers on social networks and the reactions per post presented a positive correlation

a larger community of followers were observed to achieve more interactions on all the studied social networks. Posts demonstrated a positive relationship when studied by weekly interaction achieved for all the networks, but not when studied per post. Therefore, posting more generates more overall weekly interaction, but reactions per post do not increase. Finally, the number of posts was not related to the number of followers that universities had on *Facebook* and *Instagram*, even though it was related for *YouTube* and, to a lesser extent, for *Twitter*.

> There was no significant correlation between university institutions' weekly number of posts on the networks and their number of followers

The current trend shows that social media use continues to grow in the context of higher-education institutions throughout Spain and is becoming an increasingly important resource for university communication and marketing. Accordingly, it is vital to identify the relationships presented here to improve universities' communication strategies, as well as their impact on social networks. The research presented herein describes a methodology that could be used to monitor and analyze educational institutions' social networks now or in future studies, making a contribution to study design in this field that could even be applied to the business world.

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Adaptation of the *Irscom* social profitability indicator to the context of community radio in Colombia

Lidia Peralta-García; Lara Espinar-Medina; Manuel Chaparro-Escudero; Melba-Patricia Quijano-Triana

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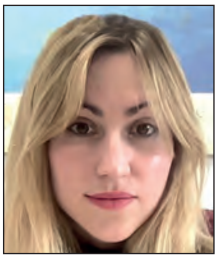
Lidia Peralta-García ✉
https://orcid.org/0000-0003-2934-0108

Universidad de Granada
Fac. de Comunicación y Documentación
Dpto. de Comunicación Audiovisual
Campus de La Cartuja
18011 Granada, Spain
lidia.peralta@ugr.es



Lara Espinar-Medina
https://orcid.org/0000-0003-2822-3663

Universidad de Málaga
Facultad de Ciencias de la Comunicación
Departamento de Periodismo
Campus de Teatinos
León Tolstoi, s/n. 29010 Málaga, Spain
espinarmedina@gmail.com

Manuel Chaparro-Escudero
https://orcid.org/0000-0002-5914-2973

Universidad de Málaga
Facultad de Ciencias de la Comunicación
Departamento de Periodismo
Campus de Teatinos
León Tolstoi, s/n. 29010 Málaga, Spain
mch@uma.es

Melba-Patricia Quijano-Triana
https://orcid.org/0000-0001-7686-2967

Ministerio de Cultura
Calle 11 No. 5-16
111771 Bogotá, Colombia
mquijano@mincultura.gov.co

Abstract

The main objective of this research action is to highlight the process of adaptation, validation, and administration of the *Indicator of social profitability in communication* (*Irscom*, *Indicador de rentabilidad social en comunicación*) for the community and indigenous radio sector of Colombia, a country with over 700 community radio stations nationwide, and the first in Latin America/Abya Yala to legalize them. The *Irscom*, a registered trademark, was created by the *LabCom-Andalucía* group of the *University of Malaga* in 2012. Employing six categories and 33 variables, it reflects the working practice and dynamics of radio stations to achieve their objectives, awarding points subject to weightings and criteria linked to pertinence. A compendium of quantitative (questionnaire, weighting, and rankings) and qualitative methods (focus groups and semi-structured interviews) were applied in its development and administration. The sample for this pilot project (from the *Ministry of Culture of Colombia*, the *Faculty of Communications of the University Minuto de Dios*, Bogotá, and *LabComAndalucía*) consisted of 11 community radio stations, an indigenous community radio station declared to be of public interest, and four community radio networks within the country. The results confirmed that *Irscom* is an organic tool that, without substantial modifications to the original framework, and although designed for Spain, can be adapted to other international contexts so that different broadcasters may appreciate their strengths and weaknesses. It contributes to holistic reflection on the social profitability of these media within their broadcasting areas. In the short term, *Irscom* may be extended to other community radio stations in the country. In the medium term, this indicator can help the community and the indigenous sound sector to improve their social profitability and validate their activities with government and institutional agencies to defend their important work of social cohesion and the need for solid sources of financing. It can also contribute to better collective organization by joining interests, with the awarding of the *Irscom* seal of quality as an endorsement of its implementation and improvements.

Keywords

Irscom; *Indicator of social profitability in communication*; Radio; Community radios; Indigenous radio stations; Afro-radio stations; Sound sector; Communication for the common good; Indicators; Research-action; Citizen radio stations; Proximity communication; Public radio stations; Colombia.

1. Theoretical–methodological background

The global impact of the not-for-profit community radio sector has been felt throughout various countries and lands for over five decades, employing different terminologies and a variety of approaches. There are some early models that date back to the 1940s and the early 1950s in Colombia (Sutatenza) and Bolivia (mining community radios). Terms such as radio schools (**Gutiérrez-Riaño**, 1957), alternative media (**Atton**, 2001), free radio (**Prado**, 1983), associated broadcasters (**Cheval**, 2007), citizens radio (**Rodríguez**, 2001), indigenous radio (**Chan-Concha**, 2000), radical radio (**Downing**, 2001), and the third sector radio (**Chaparro-Escudero**, 2005) demonstrate the terminological diversity with which they are known or have been known over time. On this point, **Peppino-Barale** (2010) completed one of the most important studies of this varied typology. Over and above the differentiating aspects, all these typologies have a series of characteristics that infuses each one with idiosyncratic aspects and a reason to be. They are, in general, self-managed and not-for-profit projects that offer local programming close to the community, which promote social participation and show a marked public-service nature, as well as being converted into agents for democratization (**Lewis**; **Mitchell**, 2014, p. 253).

This investigation is an approach to the study of community radio in Colombia, where community communications media and processes are of great social transcendence. This striking extension of community radio-processes (**Unriza-Puin**, 2016) and the legal framework available to them have meant that different ministerial departments have steadily been working to study the sector from perspectives that give it greater visibility, promote it, improve its working conditions, and increase the quality of the broadcasting available to society, among other aspects. Hence, under those circumstances, the *Ministry of Culture of Colombia*, through the *Directorate of Audiovisual, Film and Interactive Media*, expressed interest in the *Indicador de rentabilidad social en comunicación* (*Irscom*) [Indicator of social profitability in communication]. This tool, with a registered trademark, was created by the *LabComAndalucía* group of *University of Malaga* in 2012. It seeks a response to the value that communication-information should have for the public, beyond mere economic profitability for a radio station. *Irscom* has been applied (to local public radio) in the Autonomous Regions of Andalusia, Murcia, and Castilla-La Mancha. At present, its adaptation and replication are underway for generalist networks of private radios that broadcast in France, Portugal, and Colombia. Specific studies have also been conducted in the case of community radio in Andalusia (**El-Mohammadiane-Tarbift**; **Espinar-Medina**, 2019), as well as both public and private generalist television channels (**Espinar-Medina**; **López-Gómez**; **Peralta-García**, 2023).

The *Irscom* tool builds a picture of the functioning and the internal dynamics of radio stations under six categories of analysis:

- management,
- social capital,
- interface with the locality,
- interface with the people,
- programming,
- exploitation of digital technologies, and infrastructures.

These six categories are in turn subdivided into 33 variables. Formatted as a questionnaire that can be answered in person or over the telephone, the tool is generally administered to managers of the radio stations, whose responses have to be validated through the submission of supporting documentation or evidence. The information collected in that way must be visible and up to date on the radio station website so that the public can access it, as the web is the principal source of verification. After a weighting process based on criteria of belonging and importance, *Irscom* generates numerical results in graphic form on how each radio station fares in relation to the different variables of the study. This presentation of results means that the radio station can easily observe both the strengths and the weaknesses that, in the former case, help it to identify good practice, and in the latter case, facilitate work on improvements. Applied in a general way across the sector, it builds up an overall view and comparative approximations. On the basis of this consideration, it is turned into a guide of working recommendations that can in turn be adopted by the media in its different fields and management models: community, public, and commercial. The principal objective of the indicator is to contribute to visualizing social profitability and raising awareness of the need for support that might range from the Public Administration to the economic sustainability of resources that play an essential role in the construction of good citizenship and public empowerment, and that incentivize good practice within the audiovisual media industry.

1.1. The concept of social profitability

It is worth remarking on the concept of "social profitability" at this point, which constitutes the principal theoretical framework underpinning the present study. In this case, social profitability goes beyond the economist-centered view of community radio; it inquires into its capacity to be effective within the locality, in terms of social responsibility, making use of a shared resource, electromagnetic radio waves. The profitability of the radio must therefore have an effect on social benefits. This concept must not be confused with the concept of "sustainability", which only impacts on the financing mechanisms, in an attempt to define the way in which the radios can support themselves from an economic point of view. However, an optimal indicator of social profitability can impact on economic sustainability. Neither social profitability, nor sustainability have to be understood under the concept of "development" when this is converted into a synonym of the speculative economic-centered model, which has only served to deepen social inequality and inequity, favoring oligopolies advancing a single argumentative line on development (**Rocha-Torres**, 2016, p. 59; **Escobar**, 2007; **Escobar**; **Chaparro-Escudero**, 2020; **Chaparro-Escudero**, 2009; 2015).

We assume that social profitability is the road towards achieving a non-developmentalist-centered evolution of communication, a profitability that contributes to the common good, to positive social, cultural, and political attitudes towards the communications media that leads to their sustainability. Social profitability, as *Irscom* envisages it, is understood as ethical, participative, and transparent practice in the management of radio, sufficient human resources that are diverse, differentiated, and participative, an effective interface with the locality, quality programming, that is close at hand and varied, effective use of digital technologies, and sufficient equipment and premises for the activities to unfold. This operative framework is connected with what has been called "communication of commonness", a radical insistence on decoupling both the value of change that pins a mercantile value to the space and the place, and the ownership of the means of production of symbolic contents, characteristics of mass-media practice, and daily social interactions molded by neoliberal reasoning (**Cerbino-Arturoi**, 2018, p. 117). The conceptualization of social profitability might therefore be associated with a process of horizontal management reinforced through networks of exchange, with contents that promote social and political participation (**Carpentier**; **Scifo**, 2010), with collective groups that self-manage their own activities (**McQuail**; **Van-Cuilenburg**, 1983), and media that construct democratic links with their social and geographical environment strengthened by networks of exchange (**Chaparro-Escudero**, 2012).

We add our voice to the criticism of the obsolete idea of persisting with communication for development (that is deterministic, functionalistic, and that commercializes life). As **Torrico-Villanueva** (2013) said: "we need a communication to leave development behind", we also understand that the message is the land and that the land is dignified and reconquered through the practice of the common good and community administration of common goods, among which is communication and its technologies, as a part of a reparative, decolonialized, fertile "circular communication", which collectively creates, restores, and nourishes the land (**De-Andrés-Del-Campo**; **Chaparro-Escudero**, 2022).

1.2. Objectives and methodology

From this proposal, the principal objective of the research-action reported in this paper is to explain the adaptation and validation process of *Irscom* for its evaluation of the community radio sector in Colombia. The first country of Abya Yala to apply it with a scientific methodology. The specific objectives point to three investigative questions:

- What sort of adaptations will the tool require to evaluate its role as influencer in harmony with the context?
- Up to what point has *Irscom* been recognized and validated as a useful tool among community and indigenous radio broadcasters in Colombia and why?
- What benefits could the sector obtain from widespread application of the indicator.

Our starting hypothesis was an assumption that *Irscom* is an organic tool capable of being adapted to other international socio-cultural contexts without varying the constructivist strategy of the initial rankings and weightings, but incorporating specific variables to reflect the realities of each country, as is to be demonstrated.

The methodology used to adapt *Irscom Spain* to the Colombian context and for its validation was based on a research-action process in which the community and indigenous radio stations analyzed and defined the indicators of social profitability in relation to their contexts and needs, sharing items of information that –over the three days of workshops and six previous online working sessions– were used to contextualize the variables that the indicator suggested according to the original model. Communication in this methodology, as is well illustrated in the book by **Rocha-Torres** (2016), *La investigación-acción participativa* [Participatory action research], is understood as a collective construction of sense and meaning. It implies that communication is constructed from inter-subjectivity, dialogue, and interactivity. It develops as a process of collective construction and not only as an expressive action. As the author said:

> "Participatory action research […] is assumed to be dialogical, problematizing, procedural, and under continuous construction" (**Rocha-Torres**, 2016, p. 58).

The methodological design begins with the need for collective construction linked to communication for social transformation and it combines both the quantitative focus, –arising from the administration of *Irscom* and its weighted results– and the qualitative focus -unfolding from focal groups and semi-structured interviews. This last approach was fundamental for the need to visibilize the design of a flexible and participative working method, to account for and to interpret the coordination between communities-radios and the reciprocal links between social organization and the production modes of radio-related content (**Miles**; **Huberman**, 1994), questions that are well reflected in the final design of *Irscom Colombian Communities* (*Irscom CC*).

Given that a process of adaptation is an implicit part of the present research-action, due to the existence of different social-media and cultural contexts, the following paragraphs are intended to offer contextual information that will lead to a better comparison between evolving processes and the social impact of community radios in Spain and Colombia, while highlighting the principal studies from the review of the literature.

2. Community radios in Colombia and in Spain: a comparative view

Community radio stations have followed particular paths in the different socio-cultural contexts in which they have been developing and despite sharing common characteristics, they also offer unique features. If in Latin America/Abya Yala, they were turned into centres of radio communication during and because of the struggles of communities of peasants, workers students, miners, women, indigenous people, and people of African descendancy (**Cerbino-Arturoi**, 2018, p. 126), in Europe they went hand in hand with political revindications for democratization initially against public monopolies, and subsequently through artistic and cultural expression (**Lewis**; **Both**, 1992; **Chaparro-Escudero**, 1996).

Thus, they were initially considered as a tool in Colombia for developmentalist propaganda, driven by *Usaid* (*United States Agency for International Development*), the *World Bank*, and other instances of international cooperation. Following the educational achievements of the historic *Radio Sutatenza* (1947), the community radios within Colombia received State subsidies. Andina radio was turned into a focal point for the improvement of agricultural and livestock production, health, and education through the model of radio schools (**Beltrán-Salmón**, 2015). The idea of community radio as radios rooted in the community, which broadcast social demands, paying special attention to the needs of impoverished social classes, has persisted up until our days. Struggles, in some way, against the ideals of wellbeing that are sold as generic in developed society, when in reality development practices are excluding and deepening the inequality gap. In Colombia, radio has also been attributed the capability to strengthen democracy with the promotion of venues for public participation, especially since the signing of the *Final Peace Agreement* between the national Government and the *Frente de Liberación Revolucionario Colombiano-Ejército del Pueblo* (*FARC-EP*) [*Revolutionary Armed Forces of Colombia-People's Army*] (**Zúñiga**; **Grattan**, 2017).

In quantitative terms, the community radio sector also presents disparity from one land to another, as in the comparative case between Spain and Colombia with which we are concerned. While no more than one hundred community radios with no permits are counted on the Spanish map of radio broadcasters, this type encompasses over 700, in Colombia, with their licenses assigned, according to the geo-referencing portal on radio broadcasting services in Colombia[1] on the *MinTic* (*Ministry of Information and Communication Technologies*) website. Nevertheless, this data can be compared with information on radio stations with active broadcasts and in operation, as according to the study of *Cartografías de la Información de la Fundación para la Libertad de Prensa* (*FLIP*) [*Cartographs of Information of the Press Freedom Foundation*] the country had 658 community radios in 2010; falling to 626 in the year 2020 (*FLIP*, 2020). Despite both the quantitative and qualitative variations between the level of social impact of one country or another, one region or another, or one municipal council or another, they represent an alternative to private commercial media concentrated in oligopolistic structures (**Chaparro-Escudero**, 1997; 1998; 2002; 2015).

The differentiating features affect other areas. Thus, in Spain, the *General law on audiovisual communication 7/2010* implied an inflexion point in the recognition of community radio and its legal consolidation. But, as **Díaz-Muriana** and **Meda-González** pointed out (2014), despite the legal requirements, this law developed no specific regulations, nor assigned radio frequency bands that might have permitted the concession of new licenses. Neither does this basic commitment exist in the new *Law on audiovisual communication*, approved in 2022, which maintains the same situation of uncertainty (**Chaparro-Escudero**; **Espinar-Medina**; **López-Gómez**, 2022). The legal framework for the operation of community radio in Spain is still unregulated. Even though the right to broadcast is recognized, the radio stations have no other option but to broadcast on band lengths with no administrative authorization, leaving them liable to fines and closures. The situation in Spain is very different from other European countries such as France, Great Britain, Ireland, Norway, Denmark, and the Netherlands; and the same may be said of others within Latin America, such as Argentina, Uruguay, Bolivia, Venezuela, Ecuador, and even Colombia itself (**Chaparro-Escudero**; **Escorcia-López**, 2014) where the sector is fully regulated in law.

In the case of Colombia, it is the *Ministry of Information and Communication Technologies* (*MinTIC*) that grants the licenses and exercises control and supervision over the community radios. The capacity of community radio to promote public expression and peaceful co-existence is recognized in the regulations, so as to facilitate the exercise of the right to information and communication, to drive pluralist participation in matters of public interest, and for the recognition of cultural diversity, among others. It all has the purpose of contributing to the enlargement of democracy and the construction of "human development" within the country (2008) (*MinTIC*, 2015).

The vitality that covers the sector, unlike the Spanish scenario, has been reinforced in a recent Draft Law that seeks to "democratize" the radio system, strengthening community media. This initiative that was presented by *Congressional Members of the Historic Pact for Colombia* –in the coalition of the President Gustavo Petro–pursued the "progressive re-assignation of the radio spectrum" occupied by AM, FM, and television broadcasters, in order to assign bandwidths to community radio, until they occupied 33.3% of all frequency bands. In turn, they would receive support through, on the one hand, an existing fund (*Fontic*), financed with a new tax imposed on audiovisual Internet streaming services (10% of their total income) such as *Netflix*, *HBO*, *Max*, and others (*Observacom*, 2022).

In relation with the use of advertising (revenue) –colloquially known as "*la pauta*" [the norm]"– there are also differences, it being such a sensitive topic as much as a question of not-for-profit radios that nevertheless seek a form of sustainability that governments hardly favor. In the case of Spain, the community radios, up until the approval of *General Law 13/2022 on Audiovisual Communication* (*España*, 2022), were unable to advertise any type of publicity. With the new law, they can broadcast commercial advertisements from the local area and institutional campaigns. Advertising was contemplated at the start in Colombia, although its scope was restricted: and it was not without its conflicts and contradictions.[2] As Fajardo-Rojas *et al*. pointed out, attracting advertising for self-financing has on occasions led to the demise of the communicative project, in other words, its mission, converting the community radio into a radio with wide frequency bands transmitting music at the service of the recording industry, in the style of commercial radio, and sending out messages that are in contradiction with their principles and values (**Fajardo-Rojas** *et al*., 2010, p. 32). Nevertheless, the new Draft Law that seeks the amendment of *Law 1341 of 2009* and of *Law 1978 of 2019*, states that a relevant part of institutional advertising expenditure be allocated to community and alternative media –whether it is radio, press, television, or any other digital channel–, obliging the State to assign 33.3% of all advertising revenue to them.

The community radios in Colombia also cover the distinct populational focus of Afro-Colombian and indigenous communities by responding to the cultural and linguistic variety of the country. The process of assigning licenses to community radios with a distinct ethnic focus began for the first time in 2009. The communities that finished the process and had their channels up and running were therefore able to join the 624 community radios already in existence in that country.

There are moreover processes and means of communication related to radio that are well-recognized at national and international levels, such as those of the indigenous Wayúu, Nasa, and Misak peoples. Likewise, the development of public policies in Colombia within this sector, especially referring to community-indigenous communication, are an example at a continental level, thanks to the actions that have been developed in the country to strengthen them. Especially on the basis of such milestones as the:

- Declaration in 2010 of the *First Continental Summit of Indigenous Communication of Abya Yala* held at Cauca,
- the celebration of the *International Year of Indigenous Communication* (2012), and
- the launch of the *Primera Asamblea de Comunicación Indígena de los Pueblos Originarios de Colombia* (*Acoic*) [*First Assembly of Indigenous Communication of People Originating from Colombia*] in that same year, in the indigenous reserve of Muellamués, municipality of Guachucal, department of Nariño.[3]

Investigations such as the work of González-Tanco have centered on indigenous organizations within the country, their spaces and their communication processes. The construction of their communication system has been analyzed through specific aspects such as identity and empowerment to "liberate the word" (**González-Tanco**, 2016) or the "*minga*" of thought[4] as a methodology for the collective construction of knowledge within the framework of *buen vivir* (good living) and eco-social discourses (**González-Tanco**, 2018). **Salazar-Torres** (2016) understands that communication is structured around political-cultural processes linked to mobilizing actions of a symbolic, territorial, family-related, and political-organizational nature.

3. The state of the art

The study of community radios both in Spain and in Colombia is a consolidated tradition. One of the pioneering Spanish studies was the book *Radio pública local* (**Chaparro-Escudero**, 1998). Although it refers to community appropriations managed through municipal radio stations and the right of access as a model of public management, it places the emphasis on community radios, the right to local communication, democratic duty, and the need for the radio stations to be governed by actions that guarantee their transparency, establishing comparisons between alternative-alterative models within Europe. Account is also taken of how the first free radios that appeared in Spain at the end of the seventies were transformed into public radio stations as from around 1979, turning to the local administrations for a legal protection and in an open attitude of confrontation with the State government, which in this way saw the birth of municipal radio. Public collectives that wished to set up independent radio stations turned to municipal legislation in search of legal support. As is said in the text:

> "In Spain, the so-called free radio played a merely testimonial role; among other things, because while these radios enjoyed the sympathy and support of a social and an economic majority wishing to see an end to the situation of anarchic monopoly in France and in Italy, only a particular socio-cultural segment of the population in Spain provided the radio stations with resolute support, but it was of little weight" (**Chaparro-Escudero**, 1998, p. 35).

This situation may be explained because private commercial radio, unlike in Europe, already co-existed in Spain, although the informative monopoly belonged to the public radio of the dictatorship up until 1978. In Europe, there have been calls for an end to public monopolies, in the interests of both private commercial radio stations and not-for-profit associations.

The experiences related in *Radiotelevisión pública local y alternativa* [*Public, local and alternative radio-television*] (**Chaparro-Escudero**, 1997) also constituted an interesting viewpoint on this incipient panorama in Spain, which has gradually been consolidated over time, not always as successfully as expected. Recent reviews of interest have been **Díaz-Muriana** and **Meda-González** (2014); **Ramos-Martín**, **Morais** and **Barranquero-Carretero** (2018).

In the Colombian scenario, there are in turn numerous publications and much interest within the sector. It is all highlighted in such studies as "*Para entender la radio comunitaria hoy* [*Understanding community radio today*]" (**Gómez-Mejía**; **Quintero-Velásquez**, 2001), where the principal milestones in the legalization process of the community radio in Colombia go back as far as the *McBride report* (**McBride**, 1993). The authors reviewed the conceptual lines that guided the designers and institutional managers of this broadcasting service –grounded in the notions of communication, culture, and development that were advanced in the seminal papers of **Martín-Barbero** (1981) and **García-Canclini** (1995). As these authors affirmed:

> "communication was understood as a powerful instrument to strengthen social organization and the achievement of improvements to the quality of life within traditionally marginalized sectors" (**Gómez-Mejía**; **Quintero-Velásquez**, 2001, p. 143).

Pereira-González (2001, p. 113) contributed to a definition of the experiences of local community radio and television as forms of public expression in Colombia. The author pointed out that the majority of community radios in 2001 were still in a process of consolidation as true local and community communication projects with strong links to social and cultural projects that were true expressions of grassroots citizenship.

In 2009, the report of Cadavid-Bringe and Moreno-Martínez, "*Qualitative evaluation of the radio: audiences for peace in the Magdalena Medio province of Colombia*" proposed the evaluation and analysis of stories and drawings to inquire into the imagination and mentality of people with regard to moments, memories, events or experiences that were related with the community radios of their municipalities. To do so, they systematized and evaluated the work of the *Aredmag* network, setting down information on the role it had played in the processes that *Aredmag*, according to the *Rockefeller Foundation*, referred to as social change. However, their purpose was to demonstrate that the community radio acted as a mediator in conflicts and strife within Magdalena Medio (**Cadavid-Bringe**; **Moreno-Martínez**, 2009, p. 282).[5] In reality, the social change proposed by RF, has only existed since the perspective of developmentalist economics, but beyond that hardly minor conceptual controversy, the observation on the important role of participation as a factor in individual and collective empowerment in decision-making for the common good is worth noting.

Likewise, from a qualitative perspective, **Osses-Rivera** (2020) and his research team at the *Universidad Central* (Bogotá) proposed a model for the study of radio reception on the basis of three characteristics:

- adaptability, in other words, it can be implemented by any radio in accordance with its context, long-term aims, and particular practices;
- sustainability, or that it can be converted into a process that is integrated in the management of radio in a periodic way; relying on its capabilities and resources; and
- scalability, so that it may be replicated.

The sample, which entailed working with five community radios, led to the production of some multimedia flashcards for the use of radio stations interested in knowing their audience and its needs.

In turn, **Uribe-Jongbloed** and **Peña-Sarmiento** (2009, p. 365) made evident the problems of indigenous radio in relation to the scarcity of linguistic frameworks for the prioritization of their autochthonous languages, so as to give greater exposure to the language in its programming. A debate was proposed on the way in which the programs for the promotion of minority cultures and languages in Colombia were designed and set up, also throwing some light on good practice:

> "The case of San Andrés radios reflects how the radio can be converted into an obvious vehicle of linguistic identity for one population, and how this identity can even overcome the lack of a more appropriate space, and the quality of the technical teams" (**Uribe-Jongbloed**; **Peña-Sarmiento**, 2009, p. 365).

It is worth recalling in relation to the investigation into the administration of *Irscom* to the radio channels, that transparent accounting practice has for decades been considered as the distinctive seal of government (**Bovens**, 2010; **Day**; **Klein**, 1997). In the case of journalism businesses, transparent accounting is a widely defended idea to offer and to support a public service, regardless of whether the company is governmental, social, or private (**Bertrand**, 2000; **McQuail**, 2003; **Bardoel**; **D'Haenens**, 2004). The number of investigations for the definition of indicators has greatly increased over the past decade, with a predominance in its administration to radio stations and television channels (**Chaparro-Escudero**; **Olmedo-Salar**; **Gabilondo-García del Barco**, 2016; **Valencia-Bermúdez**; **Campos-Freire**, 2016; **Fernández-Lombao**, 2018; **Sánchez-Hernández**; **Chaparro-Escudero**, 2019; **El-Mohammadiane-Tarbift**; **Espinar-Medina**, 2019); as well as the digital domain (**Rodríguez-Martínez**; **Codina**; **Pedraza-Jiménez**, 2012; **Galletero-Campos**; **Saiz-Echezarreta**, 2018; **Romero-Rodríguez**; **De-Casas-Moreno**; **Torres-Toukomidis**, 2016; **Peralta-García**; **Sanz-Hernando**; **Álvarez-Peralta**, 2022a; 2022b). Other variants of interest are the indicators used for studying the dynamics and the management of internal and external communication that is at the heart of not-for-profit associations and within the scope of eco-social transitions (**Peralta-García**; **Chaparro-Escudero**; **Espinar-Medina**, 2021). Reflecting on the principal studies of indicators shows evidence of a disparity of analysis with no standardized items, although there are indeed common denominators.[6]

4. Administration and functional operation of *Irscom*

Irscom reflects the internal dynamics and functioning of a radio station through quantitative and qualitative values, awarding points subject to weightings and membership criteria. In total, it contains 33 items evaluated with a points system (max. 120 points) distributed into the different areas (management, social capital, people/locality interface, programming, exploitation of digital technologies and infrastructure). The weighting establishes that sufficiency must at least be reached above the minimum values in three areas to obtain a positive outcome (Tables 1 and 2), the most relevant in points being management and programming. The quantitative weight of the categories is unequal, because good programming is, for example, thought more important than good infrastructural support. It is estimated in that way because, the idea that the infrastructure is able to have some influence on radio journalism is, in practice, not credible, as may be observed in the field work, where radio stations with many technical resources lack interesting programs and radios with weaker technical infrastructure offer better programming. Creativity and ingenuity have been decisive elements when resolving technical mishaps, as well as a high levels of participation and social capital, another of the well-valued and decisive aspects for the final result. The same happens with Internet activity and presence; although this digitalization gains more importance, we are looking at radio stations that transmit through the radio-wave spectrum and the ethernet should therefore be complementary. The contrary might imply ceding a bandwidth frequency that cost so much to achieve in compliance with the law on communication. These arguments were debated at length with the radio stations themselves in participative processes.

Table 1. *Irscom* points system by categories

Category	Maximum value	Minimum value
Management	25	15
Social capital	26	15
Interface, People-locality	10	6
Programming	40	26
Internet activity	7	5
Infrastructure	12	7
Total	120	74

Source: **Chaparro-Escudero**; **Olmedo-Salar**; **Gabilondo-García-del-Barco**, 2016.

Table 2. *Irscom* points system

Maximum	High	Medium	Low	Very low
100-120	90-99	74-89	60-73	0-56

Source: **Chaparro-Escudero**; **Olmedo-Salar**; **Gabilondo-García-del-Barco**, 2016.

The "management" section defines the transparency of the radio it publishes. A radio is transparent if it publishes, preferably through electronic channels (web), its economic balance sheet, the annual reports, minutes of meetings, and the plurality of its advisory bodies and sponsors. The information must always be accessible to any one person. The second of the sections, "social capital", lists the number of people working at the radio station –with special attention given to women and vulnerable groups–, public participation in the management and the creation of content, as well as the work of mobilizing communities to which the radio station is committed, to attract listeners to media activity. A radio with high participation implies significant reinforcement and value in the face of possible pressures for editorial staff. In turn, the "interface People-locality" measures the relation with other radios for collaboration in networks of contents, exchange of information and practice. The fourth category is the "programming", the different items of which value diversity of content, the weight of informative channels and press releases prepared by organizations and civil society. "Internet presence or activity" reflects the functioning of the radio website, if streaming enables data merging, downloadable podcast content and interaction across virtual social media. Finally, the technical infrastructure is evaluated and the availability of spaces to perform their daily work, as well as for the organization of meetings and training activities.

The application of *Irscom* entails the following phases:

Data collection

A questionnaire was administered for data collection consisting of 33 questions with closed answers (Table 3). The questionnaire can be answered in printed format (in person or through a telephone conversation by the field work operative) or online, through a *Google Forms* document. We recommended the printed format, because the personal conversation permits information and qualitative nuances to be collected, of great utility when contextualizing the framework in which the activities of the community radios are developed. The questionnaire respondents had to be knowledgeable of the daily functioning of the radio station.

Weighting of the data

As has been explained, the six fields under analysis are not assigned the same weight in the final *Irscom* points system. The equilibrium that is established is through the weighting of different fields, so that good practice in some of them will yield optimal points, despite serious failings within other areas.

The 33 questions that composed the questionnaire underwent a weighting process, in other words, assignation of points as a function of the importance attached to each response. This process of weighting can be done manually, with a simple process of summing, or with the help of the *Excel* template that is available in the *Irscom* installation package (user instructions, questionnaire, explanatory table of each questionnaire item, an explanatory rubric of the points system, Excel template for data merging and graphic presentations. See Table 4 for an example of the *Irscom* installation package).[7]

Table 3. *Irscom* questionnaire (only one category example is shown). Source: *Irscom*

PROGRAMMING		
18.- Local reporting organized? ☐ Daily ☐ Weekly ☐ Occasionally ☐ Not prepared	19.- How many hours of local content do they broadcast a week (including the time for local news)? ☐ 0-to-5 ☐ 6-to-8 ☐ 9-to-12 ☐ 13-to-15 ☐ 16-to-19 ☐ 20-or-over	20.- Typology of programs/short formats that the radio station broadcast a week (including the time for local news)? P SF ☐ ☐ Current affairs ☐ ☐ Agriculture, livestock, and fishing ☐ ☐ Art and culture ☐ ☐ Conflict and victims ☐ ☐ Sexual diversity ☐ ☐ Scientific dissemination, ancestral/traditional knowledge. ☐ ☐ Dramatization (radio-theatre, radio story-telling, others) ☐ ☐ Ecology and environment ☐ ☐ Economy ☐ ☐ Educational ☐ ☐ Sports ☐ ☐ Human Rights ☐ ☐ Gender ☐ ☐ Collective Memory and History ☐ ☐ Infancy and youth ☐ ☐ Interculturality ☐ ☐ Musical ☐ ☐ Health and traditional medicine ☐ ☐ Others ________
21.- They have programs exclusively for local music ☐ Yes ☐ No	22.- Is your radio station broadcasting programs from some other radio network? Does your radio station contribute its own programmes to a radio network? ☐ Yes, it does ☐ Yes, it does ☐ No, it doesn´t ☐ No, it doesn´t	
23.- They do street radio, making social, cultural and current affairs programs and covering current affairs and events. ☐ Yes ☐ No	24.- Is there any content in local or autochthonous language? ☐ Yes ☐ No	
25.- Does your station have programmes focusing on differential focuses. In case of an afirmative response, select the approaches represented in its programming.		
☐ Yes ☐ No	Women _____ Indigenous _____ NARP _____ Rrom _____ LGTBIQ+ Community _____ People living with disability_____ Others _______	

All pathways lead to the same outcome. The person doing the field work has to do nothing other than apply the *Irscom* weighting that can be set to default settings in our instruction *pack*. Each question has a maximum attainable number of points and each chosen response has a different number of points awarded in accordance with the pertinence of the response to what is asked, or simply whether or not the information is facilitated. The radio station must also report a source with which to verify the declarations they issue. The maximum grade that can be reached is 120 points and minimum for a pass is 74 points. The *Irscom* tables of final gradings are the following: maximum: 100-120; high: 90-99; pass: 74-89; low: 60-73; very low: 0-59 (Table 2).

Irscom also offers a range of maximums and minimums for each category (see Tables 1 and 2). Setting independent points systems by category means that both the weak and strong points of the radio station may be observed. For example: a radio can have a very high total *Irscom* grading, but can obtain a low grade under social capital, which indicates that it should focus on improving that specific field.

Table 4. Explanatory table of *Irscom* points system (only one category example is shown). Source: *Irscom*

CATEGORY OF ANALYSES	QUESTIONNAIRE	SCORE	VERIFICATION SOURCES	EXPLANATORY RUBRIC
MANAGEMENT Maximum score: 25 Minimum score: 15	1.- Does it have a style manual that is publicly accessible? - Yes - No	MAXIMUM: 7 points - Yes = 7 - No = 0	The style manual of the radio: bring it with you or say where it can be consulted.	A legally constituted community radio broadcaster is presumed to be in possession of the Founding Charter, registered at the Chamber of Commerce. In addition, it is obliged to present financial statements and management reports. It is all publicly registered in the ESAL (Registro de Entidades Sin Ánimo de Lucro) (Registry of Not-for-Profit Organizations)
	2.- Does it issue an annual report and publicly accessible accounts? - Yes - No	MAXIMUM: 8 points - Yes = 8 - No = 0	Annual reports and accounts, contributing the most recent information or where they may be consulted.	It is not sufficient for the report to exist to obtain the maximum score, it must also be publicly accessible, with a view to the transparent management of the radio. The score is 0, if there is no access to this document.
	3.- Is there a publicly accessible active Programming Committee? - No - Yes, 1-3 groups - Yes, 4-6 groups - Yes, 7-9 groups - Yes, 10 or over From these groups, to which of the following social sectors do they belong?:	MAXIMUM: 5 points - No = 0 - 1-3 = 1 - 4-6 = 2 - 7-9 = 3 - 10 or more = 4 - Plus diversity = +1	Composition of the Programming Committee: list of constituent people and groups. The source of verification can be: a) act of Constitution, b) periodic minutes of meetings.	Whether the Programming Committee or advisory council is constituted by a range of people with commitments towards radio and not exclusively by the people in executive positions. The composition of the meeting must likewise be public, represent various sectors, and be accessible for its consultation.
	4.- Does it have ongoing agreements with local associations? With how many? - None - 1-2 - 3-5 - 6 or more	MAXIMUM: 3 points - None = 0 - 1-2 = 1 - 3-5 = 2 - 6 or more= 3	Agreements signed. If this is not possible, at least the names of the associations of the territory with which said agreements are signed	Collaboration agreements with cultural or other associations are an indicator that this station is linked to the territory. In order for this indicator to receive a score, those agreements or agreements signed with other instances must be in force. The greater the number of current agreements, the higher the score. Here you can include meeting minutes where there is a record of the station's participation in various local/regional planning/development scenarios

Table 5. Background data on *Irscom* (templates of only some categories and radio stations are shown). Source: *Irscom*

CATEGORY	NUM	QUESTIONNAIRE	RESPONSE	POINTS	RADIO PAYUMAT		ORIENTE ESTÉREO		VOKARIBE	
	1	Does it have a style manual that is publicly accessible?	Yes	7						
			No	0	0		7		7	
	2	Is there annual information on activities and are the accounts publicly accessible?	Yes	7						
			No	0	0		7		7	
	3	Is there a Programming Committee open to the public?	No	0						
			1-mar	1						
			4-jun	2						
			7-sept	3						
			10 or more	4						
			PLUS DIV.	1						
			PLUS DIV.	1	5		6		6	
	4	Are there ongoing collaborative agreements with local associations? How many?	None	0						
			1-feb	1						
			3-may	2						
MANAGEMENT			6 or more	3	3		3		3	
Max.25	5	Are the public encouraged to participate in and to involve themselves in radio?	Yes	2						
Min.15			No	0	2	10	2	25	2	25

Data merging

Data merging implies merging in a single document all the points awarded in each of the six categories, with their corresponding summations and weightings, yielding a final valuation (maximum, high, average/pass, low, very low). This, once again, can be done manually, in a *Word* document, or in *Excel* that is shared as part of the installation package. "*Irscom* data merging", depicted in Table 5.

5. Implementation and validation of *Irscom Colombia Comunitarias* (*Irscom CC*)

The *Irscom* indicator for community radio in Spain underwent a three-phase process of adaptation and validation: review of data and adaptation of matrix, selection of radio station sample, and validation of the procedure with the participating radios:

Review of data and adaptation of matrix

The initial process of review and adaption of the indicator took place at the capital in Bogota with the participation of the *University of Malaga* as the designer of the tool, the *Directorate of Audiovisuals, Cinema and Interactive Media* of the *Ministry of Culture of Colombia* (*Sound Narratives Dpt.*) and the *Universidad Uniminuto*. Six meetings, each of two hours, were conducted online: the management teams of the two community radios and the *Aredmag* network having attended the last session. An agenda was prepared in each session. Each one of the variables was debated for its adaptation to the Colombian context.

Selection of radio station sample

Selection of radios to constitute the control matrix group. Key to the research-action methodology was the participation of a group of 12 radio stations (11 community and one indigenous) and four networks of community radios, which had been selected by the *Ministry of Culture*, constituting, an *a priori* quality reference. The working meeting adapted the format of the test and training workshop that was held in Bucaramanga (Colombia) from 9-11 May, 2022. The function of the radios was to respond to the *Irscom* questionnaire, observe whether its variables were context appropriate or whether some error or redundancy was detected. The function of the radio networks was to familiarize themselves with the methodology to become the front line that might then introduce the *Irscom* indicator to the set of all associated sta-

Table 6. Participant radio stations at the *Irscom-Colombia* validation workshop

Representation by area	Name of Radio Station	Municipality - Department	Network	Implementation team
Indigenous-ethnic	*Radio Payumat* (indigenous radio station) *Oriente Estéreo* (community radio with Afro-descendancy approach)	Santander de Quilichao (Cauca) Cali (Cauca Valley)		*Uniminuto* *Mincultura*
Capital city	*La Esquina Radio* *Vokaribe* *Brújula Stéreo*	Medellín (Antioquia) Barranquilla (Atlantic) Bucaramanga (Santander)		*Uniminuto* *Mincultura*
Municipalities (group 1)	*Mogotes Stereo* *Charalá Estéreo* *Guadalupe Sereo* *Los Andes Stereo*	Mogotes (Santander) Charalá (Santander) Guadalupe (Santander) Málaga (Santander)	*Resander*	*LabCOMandalucía* *Resander*
Municipalities (group 2)	*San Vicente Stereo* *Brisa FM* *Impacto Stereo*	San Vicente de Chucurí (Santander) La Merced (Caldas) Villa del Rosario (North Santander)	*Radar* *Asocmecom* *Aredmag*[*]	*LabCOMandalucía* *Radar*

**Resander* (*Red Cooperativa de Medios de Comunicación de Santander*);
Radar (*Red de Radios de Norte de Santander*);
Asocmecom (*Red de Medios Ciudadanos de Caldas*);
Aredmag (*Asociación Red de Emisoras Comunitarias del Magdalena Medio*).

tions. It was likewise ensured in the selection that all the different areas of the locality where community-radio worked or had coverage were represented, as detailed in Table 6.[8] .

Validation of the procedure

Validation of the tool: application of the *Irscom* questionnaire and implementation of focus group for results validation and perceptions of the tool. Given that four working groups were formed with different teams as part of the process of administering the questionnaire, a style guide and an explanatory table for each of the questions were prepared, with the objective of ensuring that each team would apply the same criteria when explaining the gist of the questions. Moreover, each radio station was asked to verify its responses through the delivery of documents or other types of online material, something that had previously been requested at the meeting. The following materials were among those needed for verification:

Image 1. Administration of the *Irscom* questionnaire.
Source: authors, with express permission.

- the style manual (or statutes);
- the annual report and accounts;
- members of the Programming Committee (or advisory council);
- signed agreements of collaboration with organizations in the territory;
- documentation relating to the number of people employed;
- the programme time-table (a very useful item and source of verification);
- specific names of the networks to which they belong;
- collectives with which they collaborate;
- eaflets;
- photographs and podcast links.

The questionnaire was administered by the research and working groups that are detailed in Table 6. All the teams registered the sound of both processes. The questionnaires, that were manually administered, were scanned and the recordings were transcribed, for filing and data verification. The process of administering the *Irscom* questionnaire with one of the working groups is shown in Image 1.

6. Results

6.1. Adaptation of *Irscom* to the context of Colombian community and indigenous radio

1) The adaptations introduced were mainly terminological and contextual, but never affected the essence and operativity of the tool. In the first case, changing the title "statutes" that *Irscom* uses in Spanish for "style manual" which remains a different title of the same charter of obligations and rights which the radio legally enjoys in the case of Colombia. In the same way, the "advisory council" in Spain was understood as the "Program Committee"; the communications media with which they collaborate were given the name of media partnerships and the "*pauta*" [norm] was the term used to refer to broadcasting advertising.

2) In relation with the Programme Committee (advisory council), not only was the need noted to include whether or not one existed, as it was a requisite, but also the number of members that constitute it and how many social areas they represent, in order in this way to note the social groupings that recommend or impact upon the type of programming and the functions of the radio station. In this sense, *Irscom* adopted the typology of sectors that can form part of the Program Committee established by the *Ministerio de Tecnologías de la Información y las Comunicaciones*.[9]

3) The need was noted among the contextual adaptions to introduce variables, which were used under different categories, so that the indicator took into account the set of radios with a focus on NARP [acronym in Spanish for Black, Afro-Colombian, Raizal, and Palenquero peoples] sectors of the population, as well the community radios and the public interest assigned to indigenous communities. The latter are governed in Colombia by a different statue, as the indigenous communities are considered to be of public interest.

4) Two questions that related to public participation were repositioned, because they appeared reiterative, as they had been included under another only very slightly different field.

5) A topic for debate in the organization of the focal group was its inclusion or otherwise in the *Irscom* indicator of a variable that reflected how the radio was financed. It was therefore highlighted that while the community radios in Spain are unable to broadcast advertising, it is a fundamental source of revenue for their survival in Colombia. However, it was noted that a positive evaluation of the management and social capital sections in both countries was linked with optimal financing instruments with no need to resort to channeling effort into attracting advertising as the sole resource. What is more, this fact was observed as an inconvenience, because it concentrated great effort that was not directed at other more creative activities and of benefit to programming.

The experience demonstrated that the most successful radios in Colombia, such as *Radio Esquina*, have maintained themselves on the margin of the advertising “*pauta*” and have concentrated their efforts on the development and presentation of projects to public competitions. The director Milton S. Álvarez expressed it as follows:

> “we have a project design team that is in a continuous search for grants and competitions on offer from the *Ministry of Culture*, the Mayor’s Office and Government, as well as different prizes. It all requires an effort because on average one application out of every ten presented is successful, yet it is all worth doing. It has meant that we have maintained a radio with 16 people on the staff with only five minutes of “*pauta*” a day, something which fully distinguishes us from the commercial radios” (2022).

6.2. In relation with the validation, utility and perception of *Irscom*

6.2.1. The radio stations are reflected in the *Irscom*-generated results

In the first place, the radio stations held a common understanding that *Irscom* was a tool that generates a visual “X-ray”, in the form of a grid plot and tables, of strengths and weaknesses. In this sense, Aidis Magaly Angulo, representative of *Oriente Estéreo* (Cali), a radio with an Afro-Colombian ethnic focus, fully identified with the *Irscom*-generated results in relation with all variables. Thus, in this case, the category of human capital and talent rose to very high levels, as it was a radio that a group of eight women were coordinating, obtaining numerous extra points, because parity is considered in many categories. However, the administration of *Irscom* at this radio highlighted two fundamental shortcomings:

- very limited human resources, and
- the inexistence of stable employment contracts associated with the work of paid personnel.

Effectively, the two women with the longest service life at the radio station worked in a voluntary capacity, like the rest of the staff, having to rely on other paid activities to earn a living. Aidis Magaly commented that these results left her with a feeling of “tastelessness”, because she could see her failings reflected, despite the immense effort spent on keeping the radio afloat.

On the other hand, the indigenous *Radio Payumat* scored highly in the equipment category, contributing to the improvement of its indicator. The reason was that the Colombian state, having recognized indigenous radios as communications media of public interest, has assigned funds for equipping these radio station projects with technical equipment, at high funding-levels over the last four years. This policy of support and accompaniment in communication policies has yet to happen in the case of the varied scope of Afro-Colombian radio stations.

Vokaribe Radio (Barranquilla), a radio speaking for the Colombian Caribbean coast, had the lowest number of points for infrastructure. This situation was explainable for Milton Patiño, a member of the radio station coordinating team, because *Vokaribe Radio* was created by a religious community that offered the project a very small space, only for studying radio. The interesting thing was to see that the radio station had never analyzed this fact in terms of a weakness or problematic situation. The absence of space to conduct other activities was detected following the administration of *Irscom*.

In turn, *La Brújula*, a radio station located in Bucaramanga (Santander) had few points under social capital, in other words, ways to involve oneself, and collectives and associations in the radio project. César Hernández, representative of this radio station, understood that it was more difficult to create that close link with the radio in urban contexts. Quite unlike the explanation of Mabel Quinto from the Nasa peoples of North Cauca and representative of the indigenous *Radio* Payumat, who highlighted the importance of the “*mingas*” or collective work within the indigenous community as a method of interfacing with the community. She laid out a notable feature of radio in the following terms:

> “When the community is going to organize a minga, as communicators we’re not only going to do the interview, but we work with the community on the minga; if we’re to cook, if it’s weeding, loading wood, we’ll be there; and at the end, when we are on a break, a sharing moment, then we do the interview. So, we have the immediate feeling of being part of our community and we are not simply going to ‘gather material’; neither do we do radio over a distance; we’re not calling out from the radio booth asking people to inform us about what they’ve been doing. I mean, we’re alive, involved and we report” (Mabel Quinto, *Radio Payumat*).

Leonardo Amaya, of *San Vicente Stéreo*, a community city radio, saw through the indicator the need to include people from Afro-Colombian and indigenous communities, thereby improving integration and public participation that is evaluated under the categories of social capital, programming, and differential diversity.

Charalá Estéreo is directed by Camila Manrique, a young women who is proud to qualify it as a country radio. Camila starts each day of its programming at four in the morning, because its principal audience, the community of *campesinos* or rural peasant laborers from the locality of the same name listen to it as they go to work the land. *Charalá Estéreo*, however, had a low grade for interface with the locality-people, due to the fact that the programming is solely her own work in the company of a small work team. It was a detected weakness that they had not taken into account, to which a solution was necessary. She expressed it like this:

> “It is curious, but I thought that we had a very complete program, and *Irscom* has made me aware of the importance of broadcasting the programs of other radio stations or other networks; from other places. We also lack scientific dissemination, speaking about sport, gender, interculturality, the conflict and the victims” (Camila Manrique, *Charalá Estéreo*).

Once administered, *Irscom* awakened great interest and curiosity among the radio stations, knowing the details of those radios that had remained in higher positions. One example, *La Esquina Radio*, was the only radio to have 16 people on its staff with employment contracts, among which five were for LGTBIQ+ people, another was for Afro-Colombian groups, another for more indigenous ones, and another for people living with disabilities, receiving good grades for this necessary integrative focus. On the other hand, the programming is not only rich and diverse, but it motivates the interface people-locality. For one participant in the coordinating team of the radio station, Milton S. Álvarez:

> "…it is not enough to make radio programs; you have to work on the processes and the projects with the communities and with the collectives, it is from them that the radio programs arise and that is how we keep in contact with the local area" (Milton S. Álvarez, *La Esquina Radio*).

This radio also has a team, as mentioned earlier, in a process of constant creation of projects, searching for grants and project funding, with which they maintain part of the staff. They also carry out annual planning, reviewing questions such as the vision and the mission, and involving the Program Committee in all the decisions over changes and reforms. *La Esquina Radio* has not been "set up" to compete with the commercial radios of Medellín and no commercial music such as reggaeton is on their programme list. The quality of its programs, local information, and the fact of "making a community" means that the confidence of the audience has been won over and it is today a reference, not only for Medellín, but for all community radio stations.

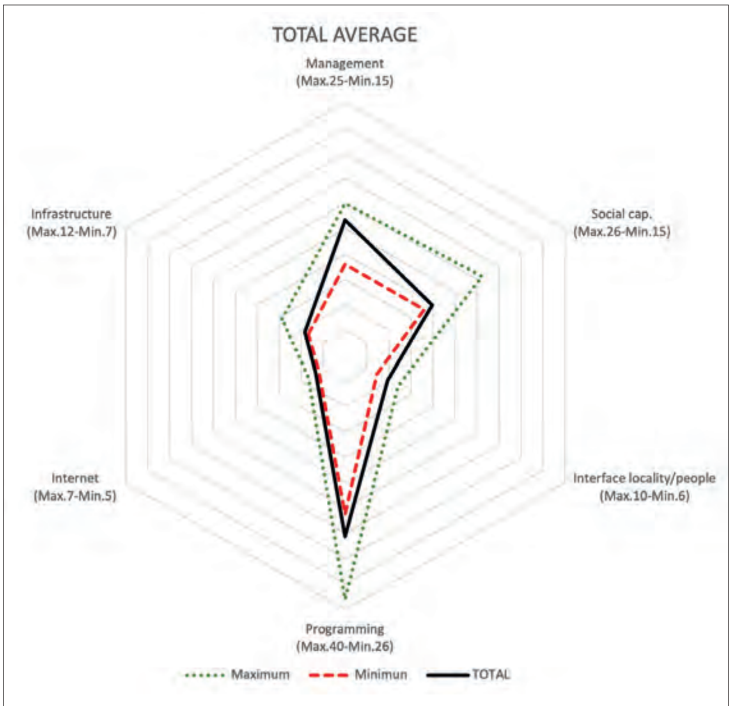
6.2.2. Initial misgivings over the external evaluation

One topic of interest that occurred with the implementation of the different methods was the misgivings of the radio stations over feeling "evaluated" by a questionnaire, especially in relation with other radio stations from the same province or belonging to the same network of radio stations, due to comparative grievance. This appreciation is reasonable, but work on communicating that *Irscom* is not a punitive, fiscal, or evaluative tool continues. Rather than an evaluation, *Irscom* shows the need for self-criticism and honesty when answering the questionnaire, so that it can be fully valid. Insistence was placed on the idea that today it is a weakness, tomorrow it might be turned into a strength and if the responses are not honest, then the indicator will be less accurate, and that documental sources of validation should be produced to verify the data. In this sense, the radio stations acknowledged the qualitative step taken to address the administration of *Irscom*.

6.3. The potential of *Irscom* as tool for participative reflection and the achievement of improvements

6.3.1. Positive results that confirm the hypothesis of the 'mirror' radios

Altogether, the 12 radio stations achieved quite high values in each category, concordant with the fact of having been selected as quality references, because the final objective was to reflect the validation of the tool by the radio stations and not so much in an internal evaluation of each station. In other words, to validate the common denominator between radio stations with good service records and to verify the margins for improvement. Both Table 7 and Graph 1 illustrate the global results obtained in different formats. As may be seen, only one radio, *Radio Mogotes*, was below the threshold of 75, the lowest grading for a radio to be ranked in a quality position. *Radio Esquina* and *Oriente Estéreo* were consolidated as quality references, reaching 104 and 103 points, respectively, out of the total of 120. As shown in Graph 1, the dashed line of green points (the external) ideal to be reached; the dashed red line (the internal), the minimum to "pass"; and the uninterrupted black line (the middle one), the values achieved", the lower results were associated with social capital and infrastructure/equipment.



Graph 1. Average results of administering *Irscom* to the control group of community and indigenous radio stations within Colombia

Table 7. Global results (by categories) of administering *Irscom* to the control group of community and indigenous radio stations in Colombia

	Ethnic		Capital city			Municipal comunities						
	Payumat	*Oriente*	*Vokaribe*	*Brújula*	*Esquina*	*Charalá*	*Los Andes*	*Guada-lupe*	*Mogotes*	*San Vicente*	*Brisa*	*Impact*
Management	10	25	25	24	25	23	25	22	23	17	24	24
Social capital	14	25	19	14	22	17	15	12	7	15	17	21
Interface locality-people	10	8	10	10	10	5	10	6	4	6	9	9
Programming	40	37	31	25	36	23	26	23	21	31	31	32
Internet activity	6	7	7	4	7	7	7	4	2	2	7	7
Infrastructure	12	5	3	11	3	12	11	9	5	9	9	3
Total	92	107	95	88	103	87	94	76	62	80	97	96

Note. Red and blue cells indicate values below the minimum and maximum valuation, respectively.

6.3.2. Principal future strengthening actions

Irscom highlighted the need for almost all the radio stations to continue strengthening the processes of social collective involvement in the community radio projects, because this factor arises as one of the identifying traits of these radio stations. In this sense, many radio stations had noted the challenge implied in this activity. Some radios were following interesting pathways. Thus, *Brisa FM* managed to capture the loyalty of its listeners and audience, awarding them a loyal listener ID card, promoted through games, raffles, and even discounts at local commercial outlets. One of its youth-focused programs is associated with ludic-physical and educational activities leading to the award of points, once having surmounted the challenges that the radio programming faced.

6.3.3. Participation in networks of exchange as a strength

The *Irscom* analysis also revealed evidence of the need to strengthen the proactive role of the radio networks when calling for greater involvement of associated radio stations. Normally the radios receive these scarce few and rather unvaried programs, due to weak input on the part of their associates**.** In addition, few radios were associated with international networks of community radio stations such as *Asociación Mundial de Radios Comunitarias* (*Amarc*) [*Association Mundiale des Radiodiffuseurs Communautaires*] and *Asociación Latinoamericana de Educación Radiofónica* (*ALER*) [*Latin American Association for Radio Broadcasting Education*]. Membership of the regional or national networks predominated, but in many of these examples they were found in a state of lethargy, without promoting meetings or interfaces, so that their potential to share quality programming or training/recruitment programs is underused. On the one hand, the organization of the sector into proactive networks could attach a greater weight to the sector when self-organizing in a collective way, as if it had been done, for example, in the cultural sector of industry, achieving greater recognition, institutional support, and public impact. An illustrative example is the existence of various film and community video festivals in various geographical regions of the country.[10]

6.3.4. Labor stability against an excess of volunteerism

One of the great challenges made apparent following the administration of *Irscom* was the need to consolidate the sector on the basis of contracting stable personnel, in their different modalities. Many of these radios are still found in the hands of a volunteer, unpaid workforce, something that turns them into a very vulnerable sector, because the people in charge perform their duties out of a "love for radio", but have to combine it with other activities and paid work. The idea that the not-for-profit community radio has to forgo the payment of salaries is a false idea, as the voluntary work of those who are in front, normally leads to weakened media outlets, subjected to a continuous crisis of identity.

6.4. The potential of *Irscom CC* and the future benefits drawn from its administration

Once the *Irscom* survey results had been validated, a post-validation phase ensued consisting of a draft plan of action to guide the actions channeled towards making *Irscom* known in Colombia. To do so, it was agreed to:

- Apply the indicator of changes as agreed with the steering committee.
- Make the indicator available to the highest possible number of radio stations in the land of Colombia, taking as a reference the different networks of community radio that exist in the country in the case of the community radios, and extend the invitation to attend the *Comisión Nacional de Comunicación de Los Pueblos Indígenas* (*Concip*) [*National Indigenous Organization of Colombia*]. The report on the pilot project will be presented to the *Network of University Radios*, a process of national organization that involves 74 university radios that represent 57 universities, both private and public, located in 20 capital cities and 12 municipalities.
- Granting the *Irscom* seal of quality (registered trademark), on the part of the research groups responsible for the representation of their universities. The seal of quality seeks to be recognized by official bodies when adopting criteria in processes of economic incentives, approval of projects and public tenders, among others. In fact, among the

suggestions that the sound narrative department of the *Ministry of Culture* reviewed, was that the process could be understood as a reference for coordination to the sound sector (community, university, and indigenous) and could encourage the review and up-dating of document *Conpes 3506* for the inclusion of *Irscom CC* in plans and programs leading to the strengthening of the sound sector.

- Promoting the administration of *Irscom* through the radio station networks. The presence of community radio at the workshop had the objective of imparting training in the *Irscom* methodology, so as to facilitate its replication at associate radio stations. The *Aredmag* network committed itself to administering *Irscom* to eight radio stations with which it has links within the framework of the project financed by the private energy generation and distribution firm, *Isagen*. The *Aredmag* work team, under the accompaniment of the *Minister of Culture*, sent the information gathered and all the verifiable sources to the research group (Andalusia-Colombia), responsible for validating the information and awarding the final points. The experience showed the need to clarify some protocols, so that they were not left to free interpretation and to avoid confusion during the data-collection process.
- Present the results at a national event, with the participation of such organizations as *Unesco*, *FLIP*, *FNPI*, *FES Colombia*, *Amarc*, academies, representatives of community radio networks, and radio stations participating in the pilot project, with a view to consolidating the coverage of *Irscom CC*.

7. Discussion and conclusions

The ease of administration and simplicity with data interpretation of the *Irscom **Colombia Comunitarias*** (*Irscom CC*) tool has been demonstrated. In the particular case of Colombia, numerous manuals have been promoted by various institutions to offer practical tools in the management and the running of community radio. Among them, *La radio comunitaria, una empresa social sustentable: herramientas para la gestión* [*Community radio, a sustainable social firm: management tools*] (**Fajardo-Rojas** *et al*, 2010), promoted by the *Ministry of Technologies of Information and Communications*, the *Ministry of Culture*, and *Vive Digital*. This manual offers a list of measurement indicators on the functioning of the radio stations. However, the total quantity of proposed variables –with 65 items in total– turn it into a tool that is hardly aligned towards implementation.[11] On the other hand, the high level of specification required in some variables means that they are certainly very dense when seeking evidence that validates the responses. For example, the radio stations were asked to measure their audience "participation" in response to the following questions:

- number of listener calls/month;
- guests/by month of programming;
- sources consulted by month;
- volunteers by month linked to the radio broadcast program;
- new programs/year included in the programming;
- associated communication collectives/year of programming of the radio station;
- programs evaluated/year;
- social sector communications received/month;
- acknowledgment calls from audiences received/month.

The indicators required agility and criteria in the selection of the elements of analysis to facilitate the study, periodic reevaluation and the comparisons between the resources that are analyzed. The opinion of the radio stations and participant networks was very favorable for *Irscom CC*.

An unavoidable reference is found in various reports of the *National Programme for the Development of Communication* at *Unesco*. On the one hand, "Indicators for Media Development: framework to evaluate the development of social communication measures" (*Unesco*, 2008); on the other, "Quality indicators in the public radio stations: contemporary evaluation" (**Bucci**; **Chiaretti**; **Fiorini**, 2012). Both stress the need to lobby for indicator-based management that proposes transparent practice and quality programming.[12] Their weak spot is that they represent a catalogue of measures that should be met, but with no weighted criteria between the most important and basic and those of lesser volume (or not so decisive), in such a way that complying with more than 50% of the criteria is not in itself necessarily a reflection of good practice. The weighted points system of *Irscom* is, on the contrary, thought out to evaluate the balanced performance of the resources in different areas, in the concrete contexts in which such processes are framed.

In this sense, the *Irscom* indicator has benefitted from the experience of the process of adaptation in a country where emphasis must necessarily be placed on the communication processes to understand the complexity of an intervention of social utility and where the collaborative work with teams of investigation, institutions and the radio stations across the land has proved fundamental. One contribution of a community radio is often its emphasis on interculturality. It involves processes that are advanced and supported among ethnic minorities (first peoples, Afro-descendancy) and social groups (women, rural land workers,...). The need to include these variables that emphasize and refer to both the ethnic and the cultural uniqueness of the land, means unprecedented considerations without affecting the common criteria with which they can continue drawing comparisons.

It has been demonstrated that *Irscom* is an organic tool that may be adapted to geographic and cultural contexts that are different from those in which it was created, confirming our working hypothesis. Colombia represents the first country in

Latin America/Abya Yala in which scientific methodology has been implemented. It credits the great potential of *Irscom* for continued administration throughout other lands and contexts on an international scale.

Both in Spain and in Colombia, there is a tendency within the political and business imaginary to relate economic profitability with the success or the failure of a project, without attending to funding opportunities or economic support and incentives, for people exercising the right to communication according to the criteria of social profitability. In this debate, it is of interest to recall that *Irscom* awards a quality seal and is a registered trademark in Spain, in reference to public policies, as its definition has been written into *Ley 10/2018, de 9 de octubre, Audiovisual de Andalucía* [*Act 20/2018, of 9th October, Andalusia Audiovisual*], in the following terms:

> "These indicators evaluate good practice on the basis of certain basic vectors, such as management, transparency, social capital, interface with locality/people, labor relations, gender equality, programming, public participation in contents and management, radio literacy, Internet presence, and infrastructures, among others" (*Andalucía*, 2018, art. 3.1c).

Also contemplated in *Irscom* is article 19c on the growth of the audiovisual sector when it recommends

> "the inclusion of the social profitability indicators of the audiovisual communication as criteria for the concession of incentives in these services" (*Andalucía*, 2018).

Likewise, the indicators of social profitability have also been considered in the *LGCA 13/2022* (art.151.1d) for evaluating the functioning of the audiovisual media and the concession of grants.

Irscom has been perceived by the community and indigenous radio stations participating in the mirror sample as a tool for self-reflection and self-criticism, with a capacity to show strengths and weaknesses, thereby revealing paths towards improvement. The implementation of *Irscom* has been considered as a stimulus to rework a radio station, at an individual level, with no punitive intention, except self-awareness. Open publication of the *Irscom* results contribute to public conscientization of the listeners, which contributes to more critical consumption and demands for social profitability in relation to common goods.

On the one hand, there are arguments to assume that the implementation of *Irscom* at a national scale might mobilize all community radios to organize themselves as a sector, exploiting their strengths and working together for the improvement of shortcomings, with one representative voice. These actions would grant the sector a higher level of dialogue when defending its rights and needs. Finally, it is worth noting that its numerical results greatly ease comparisons between radio stations in a learner-friendly way, thereby incorporating the best of each experience for the general benefit.

8. Notes

1. *Ministry of Information Technologies and Communications* (2022)
https://www.mintic.gov.co/portal/maparadio/631/w3-channel.html

2. Advertising cannot exceed 15 minutes per hour of programming

3. The meeting had the participation of delegations from the villages of: Pastos, Quillasingas, Ingas, Emberas, Nasa, Awá, Kokonucos, Misak, Cofan, Salibas, Huitotos, and Eperara Siaperara, among others.
https://www.servindi.org/actualidad/73820

4. The "Minga" is an ancestral practice that has transcended frontiers and temporary spaces, positioning itself as a political and social reference and constituting itself as a useful, practical, and credible tool for stimulating community work and the values immersed in the experience (**Obando-Obando**, 2015).

5. Role of community radios in consolidating the peace process in Colombia:
https://www.javeriana.edu.co/unesco/humanidadesDigitales/ponencias/IV_24.html

6. Among others, some of the research groups that worked on the indicators: *LabComAndalucía* (*Universidad de Málaga*), directed by Manuel Chaparro-Escudero; *Journalism and Communications Laboratory for Plural Citizenship* of the *Universitat Autònoma de Barcelona*, directed by Amparo Moreno; *Grupo Novos Medios* of the *Universidade de Santiago de Compostela*, led by Francisco Campos-Freire and Miguel Túñez-López; *Gisocom* of the *Universidad de Castilla-La Mancha*, directed by Ana-María López-Cepeda, who has adopted the *UMA Irscom* model.

7. People interested in accessing the whole methodological pack can contact the research team *LabComandalucía* (*Universidad de Málaga*):
http://www.labcomandalucia.uma.es

8. Four of the radios invited in the first instance were unable to attend the event for reasons connected with regional idiosyncrasies and the complex political and situational dynamics that were reverberating across the country with the presidential elections held on 29 May 2022 at the door. There were four radio stations (*Playamar Estéreo*, *Tayrona Estéreo*, *Teurama Estéreo* and *Santa Rosa Estéreo*) that were affected by the situation of unemployment (or armed rebellion), a sort of siege mentality promoted by the *Bacrim* (criminal drug-trafficking gangs), mainly the one called the *Gulf Clan*, that subdue the population, without letting them leave their land. It even took place after the extradition on

Wednesday, 4 of May, 2022, to the USA of Dairo Antonio Úsuga, alias 'Otoniel', godfather of the Gulf Clan, at the behest of the Colombian government. This set of radios were replaced by another three. In the case of *Radio Payumat*; its director Dora Muñoz, could not attend due to the assassination some days before of her partner, an indigenous leader, by paramilitary forces.

9. Agricultural, culture, science and technology, telecommunications, human rights and humanitarian international Law, community development and voluntary work, state education, ecological and environmental, economy and employment, education, emergencies and disasters, gender, social infrastructure and housing, road infrastructure, cooperative, citizenship participation, recreation and sport, health and nutrition, basic cleanliness, public services, transport, tourism, older adults, people living with a disability, pensioners, youth and young children, displaced people and special treatment for social and marginalized or minority groups such as: sex workers, inmates, homeless, drug addicts, and alcoholics.

10. Among which: *National festival of cinema and video* of *District Community of Aguablanca* at Cali and the *International alternative and community festival ojo al sancocho* in Bogota, Colombia

11. In this proposal the indicators are divided into the following categories:
- from the production of the feelings (pertinence, coherence, participation, planning, contents);
- from esthetic viewpoints (radio formats, technical quality, radio broadcasting language, continuous dialogue, permanent relations with other social actors, generation of opinions, mobilizing the public);
- in terms of sustainability (mission-oriented, organizational, and financial).

12. These indicators are centered on transparency, cultural diversity, offer of platforms, journalism in the public sector, independence, public nature of funding, degree of audience satisfaction, language innovation, and technical standards, among other variables

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Data journalism in Spain and Austria: features, organizational structure, limitations, and future perspectives

Alba Córdoba-Cabús; **Brigitte Huber**; **Pedro Farias-Batlle**

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Alba Córdoba-Cabús ✉
https://orcid.org/0000-0002-3519-0583

Universidad de Málaga
Departamento de Periodismo
León Tolstoi, s/n
29071 Málaga, Spain
albacordoba@uma.es

Brigitte Huber
https://orcid.org/0000-0002-9070-4962

IU International University of Applied Sciences, Munich, Germany
University of Vienna, Austria
brigitte.huber1@iu.org
brigitte.huber@univie.ac.at

Pedro Farias-Batlle
https://orcid.org/0000-0002-9634-5198

Universidad de Málaga
Departamento de Periodismo
León Tolstoi, s/n
29071 Málaga, Spain
farias@uma.es

Abstract

This paper makes an important contribution to comparative research by examining data journalism in Spain and Austria. This paper examines the practice of data journalism from a triple perspective: (a) the common features of day-to-day work, (b) the organizational structure and the role of the teams in newsrooms, and (c) the obstacles to and the future of data-driven reporting. Results from content analysis of data-driven news stories in *El país* and *Der standard* (*N* = 136) show differences and similarities in the covered topics, sources, narrative style, visualizations, interactive functions, and levels of transparency. Interestingly, only 36.8% of the analyzed news stories correspond to the normative expectations of transparency by incorporating both sources and methodological details. While the Spanish newspaper shows significantly higher levels of transparency compared with the Austrian newspaper, both newspapers perform very similarly when it comes to providing access to raw data, which was the case in only every fifth news story analyzed. Findings from focused interviews with the heads of data journalism teams deliver interesting insights into specific challenges that each news outlet is facing when creating day-to-day data-driven news stories. This research confirms the relevance that data journalism has achieved in countries such as Spain and demonstrates the effort of journalists in countries without access to information and transparency laws to create data-driven stories.

Keywords

Data journalism; Digital journalism; Sources; Data visualization; Transparency; Interactivity; Journalists; Journalistic profession; Digital media; Newspapers; *El país*; *Der standard*; Spain; Austria.

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1. Introduction

Journalism has always relied on data to inform, report, combine sources, or contextualize. However, the connection of digitalization and datafication paved the way for a new era for information professionals (**Mayer-Schönberger**; **Cukier**, 2013). Those changes led to "journalism's quantitative turn" (**Coddington**, 2015), and it reinforced professional profiles such as the data journalist with an "increased focus on measurement, outcomes assessment" (**Anderson**, 2015, p. 363).

The first reference to the term "data journalism" was made more than 15 years ago, when **Holovaty** (2006) mentioned the need to work with spreadsheets to collate the information they gathered. This specialization illustrated how the media environment was changing and how data represented and influenced society (**Van-Dijck**, 2014; **Porlezza**, 2019). **Arrese** (2022) insists that the essence of data journalism comes from economic journalism, especially because of its purpose: to reduce uncertainty and guide decision-making. Despite identifying successive initiatives, the term began to become popular, especially from 2010 onward with *Wikileaks* and Tim Berners-Lee's statements, in which he assured that the future of journalism lay in data analysis (**Howard**, 2014; **Uskali**; **Kuuti**, 2015). The same year, *The economist* published a special issue called *Data, data everywhere*, in which it compared data with oil, as one of the most valuable resources (**Toonders**, 2014). At first glance, there are no significant differences between data journalism and other previous disciplines such as precision journalism and computer-assisted journalism. However, the main distinction lies in the big data context faced by the journalist and the needs arising from it (**Gray**; **Bounegru**; **Chambers**, 2012; **Sandoval-Martín**; **La-Rosa**, 2018; **De-Lima-Santos**; **Mesquita**, 2021).

Data-driven journalism practice and the corresponding academic literature have grown significantly since 2013 (**Ausserhofer** *et al*., 2017; **Zamith**, 2019; **Heravi**; **Lorenz**, 2020). The vast majority of papers are limited to specific geographical areas, thus offering a segmented view. Although there has been a major increase in academic attention on underrepresented regions (e.g., **Mustvairo**; **Bebawi**; **Borges-Rey**, 2020; **Pereira**; **Mastrella**, 2022; **Camaj**; **Martin**; **Lanosga**, 2022; **Kashyap**; **Mishra**; **Bhaskaran**, 2022), research has mainly focused on countries with a long tradition in data journalism (**Appelgren**; **Lindén**; **Van-Dalen**, 2020; **De-Lima-Santos**; **Schapals**; **Bruns**, 2020) such as the United Kingdom (e.g., **Knight**, 2015; **Borges-Rey**, 2016; **Arias-Robles**; **López-López**, 2020; **Tong**, 2021) and the United States (e.g., **Parasie**; **Darigal**, 2012; **Fink**; **Anderson**, 2015; **Zamith**, 2019). For this reason, **Fink** and **Anderson** (2015), **Splendore** *et al.* (2016), **Cheruiyot**, **Baack** and **Ferrer-Conill** (2019), and **Wright**, **Zamith**, and **Bebawi** (2019) advocate for cross-national comparative studies to provide in-depth understanding of the development of this specialization and to explore the nuances of the phenomenon.

A comparison between Spain and Austria seems particularly suitable for this purpose: both are democratic societies with well-developed media systems. Little specific research on Spanish data journalism has been published, and moreover especially focused on specific topics such as politics, without delving into the features of day-to-day data stories and professional routines (**Rojas-Torrijos**; **Rivera-Hernández**, 2016; **Teruel-Rodríguez**; **Blanco-Castilla**, 2016; **Córdoba-Cabús**, 2018; **Córdoba-Cabús**; **García-Borrego**; **López-Martín**, 2020; **Rubio-Jordán**, 2021; **Arias-Robles**; **Carvajal**, 2022). Likewise, there are no studies related to Austrian data journalism, so this paper aims to address this research need and provide findings to mitigate this gap.

According to the categorization established by **Hallin** and **Mancini** (2004), Spain belongs to the polarized pluralist model and Austria to the democratic corporatist model. Nevertheless, data show how these countries converge in terms of a high concentration of media owners, the decline of newspaper circulation, and the restrictions on access to data due to limitations from legislation (**Figl**, 2017; **Salaverría**; **Gómez-Baveiredo**, 2017; **Grünangerl**; **Trappel**; **Tomaz**, 2021). **Albarrán** (2009) and **Ohlsson** (2015) already introduced the idea of the hybridization of models and the European trend toward homogenization.

The core objective of this study is to explore data journalism practice in Austria and Spain. More specifically, this study aims to (1) assess the content of data journalism in Spain and Austria by analyzing data-driven news stories in the Spanish newspaper *El país* and the Austrian newspaper *Der standard* and (2) explore work routines as well as the obstacles to and future scenarios of data-driven reporting by interviewing the heads of data journalism of these news outlets.

1.1. Data journalism and access to information

Data journalism is a relatively young field, so achieving an exhaustive definition is rather challenging. In the literature, several attempts to define data journalism can be identified. **Howard** (2014, p. 4), for instance, considered data journalism to be a process associated with data science that encompasses "gathering, cleaning, organizing, analysing, visualizing, and publishing data to support the creation of acts of journalism." Meanwhile, **Veglis** and **Bratsas** (2017, p. 111) specified that data journalists engage in the process of

> "writing articles based on the information and embedding visualizations… in the articles that help readers to understand the significant of the story or allow them to pinpoint data that relate to them."

Heravi (2018, p. 3) stated that data journalism consists of

> "finding stories in data –stories that are of interest to the public– and presenting these stories in the most appropriate manner for public use and reuse."

Following Coddington's definition, herein, we understand data journalism to be the result of a convergence between different knowledge areas and practices, i.e., as a

> Empirical studies have shown that data-driven news stories strongly rely on government and institutional sources

> "hybrid form [of journalism] that encompasses statistical analysis, computer science, visualization and web design, and reporting" (**Coddington**, 2015, p. 335).

Three common components can be discerned in all of these: the exploration of databases, the proccessing of data, and the communication of results.

Focusing on the features of data journalism projects, empirical studies have shown that data-driven news stories strongly rely on government and institutional sources (**Karlsson**, 2010; **Parasie**; **Darigal**, 2012; **Knight**, 2015; **De-Maeyer** *et al.*, 2015; **Cushion**; **Lewis**; **Callaghan**, 2017; **Loosen**; **Reimer**; **Schmidt**, 2017; **Tandoc**; **Oh**, 2017; **Lowrey**; **Hou**, 2018; **Stalph**, 2018; **Young**; **Hermida**; **Fulda**, 2018; **Appelgren**, 2018; **Hyder**; **Nahid**, 2019; **Zamith**, 2019; **Zhang**; **Feng**, 2019; **Córdoba-Cabús**, 2020; **Rubio-Jordán**, 2021). The main purpose of data-driven stories is to inform and present data through narration and visualization (**Loosen**; **Reimer**; **Schmidt**, 2017; **Ojo**; **Heravi**, 2018; **Young**; **Hermida**; **Fulda**, 2018; **Córdoba-Cabús**, 2020; **Rubio-Jordán**, 2021). The author-driven style is the most common narrative structure applied (**Loosen**; **Reimer**; **Schmidt**, 2017; **Ojo**; **Heravi**, 2018). Regarding transparency, prior research has found that data stories only rarely show transparency elements such as access to the raw data (**Lowrey**; **Hou**, 2018; **Young**; **Hermida**; **Fulda**, 2018; **Stalph**, 2018; **Zhang**; **Feng**, 2019; **Zamith**, 2019; **Porlezza**; **Splendore**, 2019; **Córdoba-Cabús**; **García-Borrego**, 2021; **Chaparro-Domínguez**; **Díaz-Campo**, 2021). Although the findings in terms of visualization in data-driven projects are mixed, static figures and limited use of interactive functions seem common (**Loosen**; **Reimer**; **Schmidt**, 2017; **Tandoc**; **Oh**, 2017; **Young**; **Hermida**; **Fulda**, 2018; **Appelgren**, 2018; **Stalph**, 2018; **Ojo**; **Heravi**, 2018; **Appelgren**, 2018; **Córdoba-Cabús**; **García-Borrego**, 2020).

The development of data journalism depends heavily on the context in which it emerges. The establishment of transparency and access-to-information laws encourages the emergence of data-driven projects (**Parasie**; **Darigal**, 2012; **Appelgren**; **Nygren**, 2014; **Uskali**; **Kuutti**, 2015; **De-Maeyer** *et al.*, 2015; **Tabary**; **Provost**; **Trottier**, 2016; **Appelgren**; **Salaverría**, 2018; **Sandoval-Martín**; **La-Rosa**, 2018; **Porlezza**; **Splendore**, 2019; **Tong**; **Zuo**, 2021; **Camaj**; **Martin**; **Lanosga**, 2022; **Kashyap**; **Mishra**; **Bhaskaran**, 2022; **Tong**, 2022). Hence, the most well-developed and successful data journalism is found in countries with laws that ensure compliance with these principles (**Howard**, 2014; **Cortés-del-Álamo**; **Luengo**; **Elías**, 2018).

In the European Union, regulations regarding access to public documents were adopted in 2001, but the implementation of these regulations differs by country (**Appelgren**; **Salaverría**, 2018). Thereafter, the *European Commission* adopted the public sector information directive in 2003 (*Directive 2003/98/EC*), which encouraged the reuse of public data and enabled access in digital format.

In Spain, the law on transparency, access to public information, and good governance was approved in 2013, and work is currently underway to draft the corresponding regulation together with civil society. However, this law is not in line with *European Court of Human Right*'s jurisprudence, and it lacks control mechanisms to ensure compliance (**Sánchez-Calero**; **Mancinas-Chávez**, 2017; **Appelgren**; **Salaverría**, 2018). In Austria, the constitution guarantees freedom of information, but there is no specific law regulating transparency. *The European Convention on Human Rights* guarantees access to information, but the Austrian constitution limits this right by requiring that institutions apply discretion (**Figl**, 2017; **Grünangerl**; **Trappel**; **Tomaz**, 2021). This may explain why Austria was at the bottom of the global right to information ranking in 2022, with 33 points out of 150 (*RTI*, 2022). In this regard, it is considered to be one of the weakest countries in the world. Meanwhile, Spain scored 73 out of 150 points.

In Austria, data journalists "are still a rare species" (**Figl**, 2017, p. 5). Until a few years ago, data journalism was only practiced in small newsrooms such as *Dossier*, the public broadcaster *ORF*, and the national newspaper *Der standard*. Officially, in 2021, the *Austrian Press Agency* (*APA*) set up the "*Data + Graphics*" team, which brings together experts in data, infographics, design, and web developers. This is expected to provide visibility and value to the discipline. The first examples of data journalism in Spain emerged within organizations such as *Fundación Civio* or *Medialab-Prado* in 2011. *El confidencial* was the first media outlet to set up a data journalism team in 2013. However, the main generalist newspaper in Spain (*El país*) did not publish data journalism stories until 2017, while the public broadcaster (*RTVE*) set up their data team in 2019. Research focused on Spain shows a progressive upward trend in data journalism. However, except for digital-native media such as *El confidencial*, Spanish newspapers did not commit to data journalism beyond specific projects until 2015. The health pandemic associated with the coronavirus highlighted the relevance of data journalism, as well as the rise of stories based on figures in Spain (**Córdoba-Cabús**; **García-Borrego**; **López-Martín**, 2020; **Costa-Sánchez**; **López-García**, 2020; **Sanahuja**; **López**, 2021).

To explore data journalism content and practices in Spain and Austria, we formulated the following broad research questions:

> The establishment of transparency and access-to-information laws encourages the emergence of data-driven projects

RQ1. What are the common features of data-driven news stories published in *El país* and *Der standard*?

RQ1a. What are the narrative features of day-to-day data journalism published in *El país* and *Der standard*?

RQ1b. What is the level of transparency of data journalism stories in *El país* and *Der standard*?

RQ1c. What kind of visualizations do data journalism articles in *El país* and *Der standard* include?

RQ2. How has data journalism developed in *El país* and *Der standard*?

RQ3. How do data journalists of *El país* and *Der standard* see the future of data journalism?

2. Methods

To answer these research questions, we combined quantitative and qualitative methods. First, we conducted a quantitative content analysis of data-driven news stories published in *El país* (Spain) and *Der standard* (Austria) to provide an overview of how data are used in news stories from these news outlets (N =136). Second, we employed interviews with two members of the data journalism teams of *El país* (Spain) and *Der standard* (Austria) to better understand the process of how journalists select and create news stories using data-driven techniques.

2.1. Content analysis

The quantitative content analysis focused on exploring the full content of data-driven news stories published online from 1 January to 30 June 2021, in the newspapers *El país* (Spain) and *Der standard* (Austria) (N = 136). Content analysis as a methodological tool enables one to understand the structure of stories as well as their basic components and operation (**Igartua**, 2006). These two newspapers were selected because they are the national newspapers most trusted by the population –48% and 69%, respectively– according to the *Digital news report* (*Reuters Institute*, 2021). They both have a data team in their newsroom and the highest online reach (21% and 20%, respectively) in the last year (*Reuters Institute*, 2021). We created a codebook consisting of formal categories (medium, date of publication, headline, section, and link) and categories that aimed to capture the content of data-driven news stories. Specifically, the proposed categories can be grouped into three dimensions: story features, data, and visualizations (Table 1).

Table 1. List of categories

Story features	
Topic	Politics; society; economy and business; health, science, and environment; education; sport; culture and art; entertainment; other
Number of personal sources	
Personal sources	No personal sources; government or public institutions; academics and experts; entrepreneurs; civil society; culture, art, and sports; ordinary people; other
Attribution	On the record, on background, off the record
Narrative style	Author-driven, reader-driven, hybrid
Type of story	By just the facts, data-driven news stories, analysis and background, deep investigations
Temporal dimension	Past, present, future
Focus	What, why, how
Purpose	Inform, persuade, entertain, explain, unknown, other
Way of communicating	Visualize, narrate, socialize, humanize, personalize, utilize
Data	
Number of data sources	
Data sources	No data sources; government or public institutions; private corporations; other organizations such as NGOs, research institutes, universitites, etc; own sources; leaks; other
Attribution	On the record, on background, off the record
Transparency level	No mention of the source of the information and the dataset; mentions the source but not the dataset; no mention of the source, but information about the data is mentioned; mentions the source and information about the data
Data access	No, yes
Methodology	No, yes
Visualizations	
Number of visualizations	
Type	Tables and lists, static graphs, interactive graphs, maps, visual resources, animations, infographics, other
Interactivity	No, yes
Interactive functions	No interactive functions, inspect, connect, select, filter, summarize, reconfigure, narrate, play, personalize, other

https://elpais.com

https://www.derstandard.at

The variables examined in the first dimension are specified below.

Topics

Based on different categorizations proposed by **Loosen**, **Reimer**, and **Schmidt** (2017), **Tandoc** and **Oh** (2017), and **Stalph** (2018), the following list of topics was created: (1) politics; (2) society; (3) economics and business; (4) health, science, and environment; (5) education; (6) sports; (7) culture and art; and (8) entertainment.

Sources

Building on prior research (**Knight**, 2015; **Loosen**; **Reimer**; **Schmidt**, 2017), we encoded the types of sources used in the analyzed news stories. We coded the number of included personal sources, the types of sources, and the attribution.

Narrative style

It was coded as follows: (a) explanatory or author-driven style, that is, a heavy message load and reduced interactivity; (b) exploratory or reader-driven style, that is, no specific order and free interaction; and (c) hybrid, that is, a combination (**Segel**; **Heer**, 2010).

Type of story

Building on the conceptualization of **Rogers** (2014) and based on the type of data and the methods employed, we distinguished between the following types of data journalism projects: (1) by just the facts (includes public data and produces a visualization), (2) data-driven news stories (refers to issues that are in the public eye and reveals the numbers behind the news), (3) analysis and background (explains the facts behind the news by providing a thorough analysis and detailed information), and (4) deep investigations (in-depth research on large datasets).

Temporal dimension, focus, purpose, way of communicating

Both the time and focus dimensions were delimited according to criteria from **Davenport** (2014). In line with **Gray**, **Bounegru**, and **Chambers** (2012), we selected the purpose of the story, while the way in which data were communicated was determined by using the classification from **Bradshaw** (2011): visualize, narrate, socialize, humanize, personalize, and utilize.

Data

Focusing on the data dimension, we also analyzed the number, the type, and the attribution of data sources (**Knight**, 2015; **Loosen**; **Reimer**; **Schmidt**, 2017). Moreover, the level of transparency in terms of access to raw data and incorporation of methodological details was also assessed (**Hayes**; **Singer**; **Ceppos**, 2007; **Karlsson**, 2010; **Parasie**; **Darigal**, 2012; **Tandoc**; **Oh**, 2017; **Young**; **Hermida**; **Fulda**, 2018; **Stalph**, 2018; **Lowrey**; **Hou**, 2018; **Zamith**, 2019; **Zang**; **Feng**, 2019).

Visualizations

Finally, building on **Córdoba-Cabús** and **García-Borrego** (2020), we coded the type of visualization as the third dimension of Table 1: (1) tables and lists, (2) static graphs, (3) interactive graphs, (4) maps with or without interactivity, (5) visual resources, (6) animations, and (7) infographics. In so doing, we also examined the actions that the audience can conduct with the visualizations, i.e., the interactivity (**Schulmeister**, 2003; **Yi**; **Ah-Kang**; **Stasko**, 2007; **Boy**, **Detiene**; **Fekete**, 2015).

Intracoder reliability

One coder coded all the news stories. To calculate the intracoder reliability, 10% of the material was coded by the same coder again 10 weeks after the first coding. Intracoder reliability scores ranged from .93 to 1 (Holsti)/.84 to 1 (Krippendorff's alpha).

> Austria was at the bottom of the global right to information ranking in 2022, with 33 points out of 150. Spain scored 73 points

2.2. Data analysis

Data were analyzed using *SPSS* (*version 25.0*). The nonparametric Mann-Whitney *U* test for two independent samples was used to analyze quantitative variables (the number of personal and data sources and visualizations). This decision was made on the basis of the sample size and the nonsatisfaction of normality (as determined by the Kolmogorov-Smirnov test). A chi-squared test (χ^2) was applied for all other variables to identify significant differences between the Spanish newspaper *El país* and the Austrian newspaper *Der standard*. Yates' continuity correction ($\chi_y^{\ 2}$) was applied when there was only one degree of freedom. If statistical significance was detected ($p \leq 0.05$), we calculated the effect size (ES) and analyzed the standardized residuals. For both, the confidence level was set at 95%.

2.3. Interviews

We conducted focused interviews with members of the data journalism teams of *El país* and *Der standard*. This technique is considered the most suitable approach to deal with innovations in this area (**Arias-Robles**; **López-López**, 2020), and it enabled us to explore the position of each media outlet. The interviewees were located and contacted through *Twitter* and corporative email. Owing to the explorative nature of this study, we talked to only one journalist per newsroom. On the basis of relevance criteria and availability, we interviewed Daniele Grasso, Coordinator of the Data Journalism Unit at *El país*, and Michael Matzenberger, Head of Data Journalism / Interactive, at *Der standard.* The interviews, lasting between 60 and 75 minutes, were conducted online via *Google Meet* between October and December 2021. The conversations were recorded and manually transcribed. A questionnaire comprising 16 questions was used, organized into three thematic areas related to the research questions: (a) the organizational structure of data teams and the common features of day-to-day data-driven stories; (b) quality data journalism, access to information, and profitability; and (c) the current status and future developments of data-driven reporting.

3. Results

3.1. Features of data-driven stories

The results of the content analysis reveal the differences between and similarities of the data journalism practices in Spain and Austria. In total, 136 data-driven stories were published during the period examined: 99 in *El país* (72.8%) and 37 in *Der standard* (27.2%). On average, the names of two journalists were mentioned per news story (ME=2; standard deviation [SD]=1.84).

In the total sample analyzed, health, science, and environment was the dominant topic (36.8%). In this context, stories that examined data about the coronavirus pandemic were especially common (Table 2). The results highlighted the significant differences between the two newspapers analyzed (ES=0.443). While *El país* published more data-driven news stories about politics (36.4%), in *Der standard*, business (24.3%) and social issues (18.3%) were the most frequently covered topics.

Next, we analyzed which sources were incorporated in data-driven news stories. The nonparametric Mann-Whitney *U* test (U = 2.49, p < 0.001) showed that the use of personal sources was significantly higher in the Austrian newspaper ($ME_{Der\ standard}$ = 2; SD = 2.22; $ME_{El\ país}$ = 0; SD = 2.64). *Der standard* used academic (24.3%) and business sources (24.3%) in preference over government and institutional sources (16.2%), civil society and personal testimonies of ordinary people (both 10.8%) or cultural, artistic, and sports personalities (5.4%). *El país* also relied mostly on statements by experts (20.2%), followed by civil society (12.1%), institutions (7.1%), business (5.1%), and individual testimonies (4%). The application of the Yates correction revealed that the difference between the media outlets lies in the use of quotes from business people ($\chi_y^{\ 2}[1, 136] = 8.848$; p < 0.01; ES = 0.282).

Then, we considered the narrative style of the data-driven stories. The results presented in Table 3 reveal that, while in the Spanish newspaper *El país* the hybrid style (i.e., a combination of an exploratory and explanatory approach) was the most common type, in the Austrian newspaper *Der standard* the explanatory style (i.e., guiding readers through the article instead of letting them explore) was dominant (56.8%).

Table 2. Topics of the analyzed news stories

Topic	*El país*	*Der standard*	Total
Politics	36.4%	2.7%	27.2%
Society	7.1%	18.3%	10.3%
Economy and business	8.1%	24.3%	12.5%
Health, science, and environment	38.4%	32.4%	36.8%
Education	-	-	-
Sports	8.1%	13.5%	9.6%
Culture and arts	-	-	-
Entertainment	1.0%	-	0.7%
Other	1.0%	8.1%	2.9%

Note: N = 136; $\chi^2[6, 136] = 26.654$; p < 0.001

Table 3. Narrative styles used in the data-driven news stories analyzed

Narrative style	*El país*	*Der standard*	Total
Explanatory	34.3%	56.8%	40.4%
Exploratory	2.0%	–	1.5%
Hybrid	63.6%	43.2%	58.1%

Note: N = 136; $\chi^2[2, 136] = 6.441$; p < 0.05

When looking at the types of data journalism project that were reported (Table 4), *El país* and *Der standard* both focused on publishing data-based news stories (54.5% and 51.4%, respectively). They dealt with issues that were in the public eye and revealed the figures behind the latest news. At the same time, articles with exhaustive analysis and background were frequent (38.4% and 48.6%, respectively).

Table 4. Types of data journalism projects reported in the analyzed news stories

Type of story	*El país*	*Der standard*	Total
By just the facts	6.1%	–	4.4%
Data-based news stories	54.5%	51.4%	53.7%
Analysis and background	38.4%	48.6%	41.2%
Deep investigations	1.0%	–	0.7%

Note: N = 136; $\chi^2[3, 136] = 5.163$; n.s.

The most common timeframe used in the analyzed news stories was the present (94.1%; Table 5). A total of 69.1% of the news stories used data from the past. Less frequent were projects that include predictive analytics or references to the future (16.2%). Given this predominance of the present, the focus was explaining what happened. To a lesser extent, these articles incorporated the underlying factors that caused the result (56.6%) and how to address the issue (7.4%). *Der standard* published significantly more stories that focused on the "why" (75.7%) compared with *El país* (49.5%; $\chi_y^2[1, 136] = 6.488$; $p < 0.01$). The main purpose of these data-driven stories was to inform (100%) and, to a lesser degree, also to explain the background (68.4%). In this regard, *El país* and *Der standard* did not differ significantly.

Table 5. Timeframe used in the analyzed news stories. Note: N = 136

Time	*El país*	*Der standard*	Total	χ^2 test with Yates correction
Past	65.7%	78.4%	69.1%	$\chi_y^2[1, 136] = 1.490$, n.s.
Present	93.9%	94.6%	94.1%	$\chi_y^2[1, 136] = 0.000$, n.s.
Future	18.2%	10.8%	16.2%	$\chi_y^2[1, 136] = 0.604$, n.s.

The same applied to the communication style. As shown in Table 6, both newspapers used narration (98.5%) and visualization (98.5%) very often. The Spanish newspaper published visualizations in all its publications –only two news stories were not accompanied by text. On the other hand, the Austrian outlet displayed two pieces in purely textual form. Only 11% of the projects explained how the figures affected citizens, while 5.1% turned the data into personal stories.

Table 6. Overview of different ways of communicating in the analyzed news stories. Note: N = 136

Way of communicating	*El país*	*Der standard*	Total	χ^2 test with Yates correction
Narrate	98.0%	100%	98.5%	$\chi_y^2[1, 136] = 0.005$, n.s.
Visualize	100%	94.6%	98.5%	$\chi_y^2[1, 136] = 2.341$, n.s.
Socialize	–	–	–	–
Humanize	4.0%	8.1%	5.1%	$\chi_y^2[1, 136] = 0.270$, n.s.
Personalize	13.1%	5.4%	11.0%	$\chi_y^2[1, 136] = 0.946$, n.s.
Utilize	–	–	–	–

In both newspapers, the projects contained data from two different sources on average ($M_{total} = 2.74$; SD = 2.42; $M_{El\ país} = 2.98$; SD = 2.75; $M_{Der\ standard} = 2.19$; SD = 1.28). Table 7 provides an overview of the coded data sources. The main sources of the figures were governments or official institutions (72.1%), a long way above private companies (36.8%), organizations such as NGO*s*, and research centers or universities (32.4%), and those compiled by the newsroom itself (8.8%). It is in this last element where a significant difference between newspapers could be identified (Table 7). In 18.9% of cases, *Der standard* included numerical information collected by the members of the team through surveys, while in *El país* this was the case in 5.1% of the news stories analyzed (ES = 0.218). The attribution to these sources was mostly direct (96% and 100%, respectively).

Table 7. Overview of data sources of the figures displayed in the analyzed news stories. Note: N = 136

Data source	*El país*	*Der standard*	Total	χ^2 test with Yates correction
Public	74.7%	64.9%	72.1%	$\chi_y^2[1, 136] = 0.862$, n.s.
Private	41.4%	24.3%	36.8%	$\chi_y^2[1, 136] = 2.688$, n.s.
Organizations	32.3%	32.4%	32.4%	$\chi_y^2[1, 136] = 0.000$, n.s.
Own sources	5.1%	18.9%	8.8%	$\chi_y^2[1, 136] = 4.831$, $p < 0.05$
Leaks	–	–	–	–
Other	–	2.7%	0.7%	$\chi_y^2[1, 136] = 0.264$, n.s.

In general, it was possible to identify the sources in an appropriate way –directly or indirectly– but more than half of all the news stories analyzed did not provide additional information about the dataset (61%). This prevented us from determining how the figures were structured and what their features were. Only 36.8% corresponded to the normative expectations of transparency, as they incorporated both references to the origin of the figures and methodological details about the dataset. The findings presented in Table 8 indicate that *El país* showed significantly higher levels of transparency (43.3%) than *Der standard* (18.9%). The chi-squared contrast statistic –for the level of transparency– and the adjustment made by Yates' continuity correction –for the methodology– showed the distinct nature of *El país* with a greater commitment to transparency in its publications (Table 8). However, when it comes to providing access to raw data, both newspapers provided access in only around 20% of all analyzed news stories (*El país,* 20.2% ; *Der standard,* 27%; χ_y^2 [1, 136] = 0.387, n.s.).

Table 8. Transparency in the analyzed news stories

Level of transparency	*El país*	*Der standard*	Total
No, source – no, methodology	3.0%	–	2.2%
Yes, source – no, methodology	53.5%	81.1%	61.0%
Yes, source – yes, methodology	43.3%	18.9%	36.8%

Note: N = 136; $\chi^2[2, 136] = 8.873$; $p < 0.01$

Moreover, we analyzed the types of visualizations applied in the data-driven stories. *El país* (ME = 4; SD = 9.47) included more visualizations compared with *Der standard* (ME = 2; SD = 1.99; U = 751.000, $p < 0.05$). The findings presented in Table 9 reveal that the two newspapers also differed in the types of visualization used in the news stories analyzed. While, in *El país*, interactive graphs (50.5%) were the most common type, *Der standard* preferred static graphs (48.6%).

Table 9. Type of visualizations used in the analyzed news stories. Note: N = 136

Type of visualization	*El país*	*Der standard*	Total	χ^2 test with Yates correction
Tables and lists	45.5%	10.8%	36.0%	$\chi_y^2[1, 136] = 12.562$, $p < 0.001$
Static graphs	38.4%	48.6%	41.2%	$\chi_y^2[1, 136] = 0.786$, n.s.
Interactive graphs	50.5%	24.3%	43.4%	$\chi_y^2[1, 136] = 6.488$, $p < 0.01$
Maps	30.3%	18.9%	27.2%	$\chi_y^2[1, 136] = 1.235$, n.s.
Graphic resources	2.0%	–	1.5%	$\chi_y^2[1, 136] = 0.005$, n.s.
Animation	3.0%	2.7%	2.9%	$\chi_y^2[1, 136] = 0.000$, n.s.
Infographics	13.1%	27.0%	16.9%	$\chi_y^2[1, 136] = 2.778$, n.s.
Other	1.0%	–	0.7%	$\chi_y^2[1, 136] = 0.000$, n.s.

Finally, we investigated which interactive functions were used by the two newspapers. The findings presented in Table 10 show that the most common functions were to inspect (51.5%), select (26.5%), and filter (23.5%).

Table 10. Interactive functions included in the analyzed news stories. Note: N = 136

Interactive functions	*El país*	*Der standard*	Total	χ^2 test with Yates correction
Inspect	57.6%	35.1%	51.5%	$\chi_y^2[1, 136] = 4.569$, $p < 0.05$
Connect	2.0%	–	1.5%	$\chi_y^2[1, 136] = 0.005$, n.s.
Select	25.3%	29.7%	26.5%	$\chi_y^2[1, 136] = 0.095$, n.s.
Filter	28.3%	10.8%	23.5%	$\chi_y^2[1, 136] = 3.650$, n.s.
Summarize	12.2%	5.4%	10.4%	$\chi_y^2[1, 136] = 0.716$, n.s.
Reconfigure	1.0%	–	0.7%	$\chi_y^2[1, 136] = 0.000$, n.s.
Narrate	2.0%	8.1%	3.7%	$\chi_y^2[1, 136] = 1.362$, n.s.
Play	1.0%	2.7%	1.5%	$\chi_y^2[1, 136] = 0.000$, n.s.

Following these insights into the content of the news stories analyzed, below we present the findings from the interviews with the journalists from *El país* and *Der standard.*

3.2. Organization of the teams and creation of data-driven stories

The *El país* data team is formed of three journalists with different profiles, integrated into the "Visual Narratives" group, which is made up of around ten people, including figures such as designers and developers. This team plays a cross-functional role in the newsroom, and they usually work together in all steps. The *Der standard* data unit has a similar structure, with four members with well-defined profiles. However, only the head of the team has a permanent full-time contract, which makes it difficult to create pieces on a continuous basis. As at *El país*, it has a transversal role, but there is a clear division of tasks, especially regarding technical functions such as programming, analysis, or interaction. Although the production process of data-driven stories is not standardized, both the Spanish and Austrian newspapers include four key steps:

(1) Choice and conception of the project, which consists of focusing on the topic, searching for sources of information, and previous research.

(2) Analysis of the dataset, which is the most extensive stage because the framework is established here; this includes cleaning up the figures and asking the right questions about the data.

(3) Fitting and checking the results, which refers to seeking advice and cross-checking the analysis with experts in the field.

(4) Publication, which involves selecting the suitable tool and visualizations to communicate the results.

> The coronavirus health pandemic highlighted the relevance of data journalism, as well as the rise of stories based on figures in Spain

The team spirit at the Spanish media outlet is very similar to at the Austrian one. Nevertheless, the main difference is the allocation of tasks during the production process. While in *Der standard* each member is responsible for a part of the story and these are combined at the end, at *El país* all the decisions are jointly made. *El país* devotes at least five days to publishing a data-driven story. Daniele Grasso noted,

> "We try not to tread on the daily journalism because data analysis requires time and that does not fit in with the speed of publication of a newspaper. From the beginning, we made it clear to our bosses: if they want good work, it cannot be done in one day. That does not mean that we are not able to produce articles in a morning as we have done with Covid or election results."

The *Der standard* data team ensure that they can offer immediacy because they mostly depend on other sections. To a lesser extent –especially when they propose their own topics– they publish stories with a longer production process.

For *El país,* the main obstacles to data journalism practice are the formats in which the public institutions publish their data –hindering their reuse– and the lack of availability of certain figures. In Austria, there are even greater problems. In addition to immediacy, there are also limitations related to access to information. Marzenberger explained,

> "We definitely have a real problem in Austria. The Covid pandemic showed that authorities hide data and ignore our enquiries. Even some available and anonymized data is restrained under the cloak of privacy. On top of that we have to add endless bureaucracy to get access to public databases, which makes our work more difficult and makes it not worthwhile to spend time requesting data."

3.3. Quality data journalism, access to information, and profitability

El país maintains that quality data journalism work should be interesting, useful, and transparent. Grasso stated that

> "there are no elements that determine the quality of a project; the main objective pursued by its publication is what makes it a good piece."

However, he insisted on the importance of incorporating how data is collected and how these conclusions have been reached to provide solvency to the article. In the same vein, *Der standard* also states that a good data story must comply with journalistic principles, and its quality will be determined by the news value of the information.

Both the Spanish and the Austrian newspapers agree that data journalism is more well-recognized and developed in countries with effective access-to-information laws. Although the Spanish legislation has its shortcomings, the lack of guidelines in terms of access to information in Austria makes data journalism practices more difficult.

> "[In Spain] The transparency council should have more power. It should not be an agency that only urges on paper, but it should enforce the law. That could mean a leap in quality and to duck out once questioned by the citizen would be impossible for the institutions," Grasso said.

Michael Matzenberger explained that

> "some opposition parties and civil activists have been fighting for years to bring a transparency law on track, yet we do not know if and to what extent it will become true."

The *El país* journalist asserted that their readers are interested in data journalism based on reading time and the online reach of their publications. This has been demonstrated with the current subscription model of this media outlet, too. He also stated that this specialization "is profitable" because it helps to add differentiation from the competition and allows them to build different and varied stories. The same is true for *Der standard*, which claimed that data-driven stories published during the pandemic are the most visited pages in their history and that these works have demonstrated the need for reliable data to make decisions. However, the team members do not feel sufficiently valued in their own newsroom.

> Data journalism is more well-recognized and developed in countries with effective access-to-information laws

> "Our colleagues come to us to improve their stories, but they do not see us as indispensable. It would not really matter if our team broke away," Matzenberger stated.

3.4. Insights into the state and the future of data journalism

Daniele Grasso confirmed the exponential rise of data journalism in Spain in recent years.

> "It is a type of journalism that has proved to be very useful. So useful that people think of it as good journalism and not as something specific." (Grasso)

Despite this rise, Grasso stated that Spanish data journalism suffers from a lack of recognition for two fundamental reasons: (1) the incipient origin of this specialization in the media outlets, having emerged in 2013, and (2) the late appearance of data journalism in the principal generalist newspaper and in the national public media. In Austria, data journalism is still underrepresented. Although the *Der standard* data team is formed of only four people, Michael Matzenberger argued that they are one of the largest data teams in the country. The Austrian journalist pointed to executive and management positions and the poor recognition of the potential of data journalism as the main reasons for this situation in Austria. This results in a lack of funding and resources to address data-driven stories.

The scant presence of deep investigations during the period under review reveals the pressure for immediacy and a lack of time to deal with other issues

In this sense, the journalists at both *El país* and *Der standard* predicted that data journalism will develop constantly. Grasso forecasted that the "data journalism" label will be diluted and treated as an intrinsic part of journalism.

> "Using graphs and maps in works based on hundreds of thousands of data will become so common that there will be no need to include the data journalism label," said Grasso.

Meanwhile, according to Matzenberger, data journalism will continue to evolve. Unfortunately, unless the situation is reversed, Austria will remain at lower levels in this aspect, not in terms of education –journalism training for data work at university or schools– but on the professional side.

4. Discussion and conclusions

The aim of this study was to explore data-driven journalism in terms of the content of news stories and journalistic practices and routines. The results of this study present strong connections with previous work, but this study allows us to delve deeper into the state of data journalism in underexplored countries such as Spain and Austria. The findings from the content analysis and interviews reflect the disparity of contexts in which data journalism is carried out, the common features, the organizational structure, the limitations, and the prospects for the specialization in these countries.

The analysis reveals a general profile of the works published in *Der standard* and *El país* and highlights the similarities of and differences between these two newspapers (RQ1). Health, science, and environment is the prevailing topic. This confirms that this topic is a determining issue corresponding to the time of publication. They coincide in giving more space to articles about the coronavirus pandemic, but differ in offering space to politics –which is more represented in *El país*– and to economy or social issues –which is more represented in *Der standard*. These differences reflect the transversality of the tool, which is adaptable to any thematic area (RQ1a).

Although adding personal sources is uncommon in day-to-day data journalism, it is more frequent at the Austrian outlet. In regard to incorporating, the vast majority opt for experts in a field to complete the information. As regards narrative style, *Der standard* chose an explanatory structure (**Loosen**; **Reimer**; **Schmidt**, 2017; **Ojo**; **Heravi**, 2018), while *El país* preferred to combine explanatory and exploratory styles with some freedom for interaction (**Córdoba-Cabús**; **García-Borrego**; **López-Martín**, 2020).

The projects are almost entirely data-driven stories whose main goal is to inform and to explain what happens. The scant presence of deep investigations during the period under review reveals the pressure for immediacy and a lack of time to deal with other issues. The most common way of communicating numerical information is to combine narrative and visualization (**Loosen**; **Reimer**; **Schmidt**, 2017; **Ojo**; **Heravi**, 2018; **Young**; **Hermida**; **Fulda**, 2018; **Córdoba-Cabús**, 2020; **Rubio-Jordán**, 2021). Data journalism articles can be displayed through a variety of forms. However, it has been demonstrated that visualization plays a key role in this discipline.

The analyzed data-driven stories incorporated two data sources on average, and they mainly relied on government sources, which is in line with previous research from other countries (**Parasie**; **Darigal**, 2012; **Knight**, 2015; **De-Maeyer** *et al.*, 2015; **Cushion**; **Lewis**; **Callaghan**, 2017; **Loosen**; **Reimer**; **Schmidt**, 2017; **Stalph**, 2018; **Young**; **Hermida**; **Fulda**, 2018; **Appelgren**, 2018; **Hyder**; **Nahid**, 2019). The problems regarding access to public information in Austria are reflected in the use of the news outlets' own sources. Unlike *El país*, *Der standard* relied more on its own surveys and experiments to produce its own data for its news stories. This strategy allowed it to overcome the opacity of the Austrian administration.

Although transparency is considered to be a fundamental element in data journalism stories, this characteristic is scarce in day-to-day articles according to previous studies (**Lowrey**; **Hou**, 2018; **Young**; **Hermida**; **Fulda**, 2018; **Stalph**, 2018; **Zhang**; **Feng**, 2019; **Zamith**, 2019; **Córdoba-Cabús**; **García-Borrego**, 2021). While the vast majority of articles cite sources directly, linking to datasets and adding a methodological section remains rare. **Zamith** (2019, p. 15) stated that

> "journalists may not prioritize leading readers to source material when attempting to meet deadlines during their day-to-day work or actively resist ceding too much autonomy through over-sharing."

Data journalism articles can be displayed through a variety of forms. However, it has been demonstrated that visualization plays a key role in this discipline

In this sense, *El país* differs from *Der standard*. The Spanish outlet meets the idealized form of transparency on more occasions (RQ1b). This may be due to the lack of resources, time, and knowledge to provide such openness (**Córdoba-Cabús**; **García-Borrego**, 2021) or, as mentioned by **Porlezza** and **Splendore** (2019, p. 1246), "because of the fear of free-riding by the competitors," which could involve copying or replicating their work.

The projects increasingly employ perceived interactivity, which gave the audience a sense of control, while the author actually retained full control

The strategy in terms of visualizations and interactivity also differs (RQ1c). While *El país* added interactive graphs, *Der standard* opted for static graphs. Despite these divergences, the findings reinforce the idea of reduced interactivity (**Loosen**; **Reimer**; **Schmidt**, 2017; **Young**; **Hermida**; **Fulda**, 2018; **Stalph**, 2018; **Ojo**; **Heravi**, 2018; **Appelgren**, 2018; **Córdoba-Cabús**; **García-Borrego**, 2020). This decrease in interactivity is closely aligned with the addition of simpler and more basic interactive features in visualizations, such as exploration. As pointed out by **Appelgren** (2018),

> "The illusion of interactivity thus replaces real interactivity."

The projects increasingly employ perceived interactivity, which gave the audience a sense of control, while the author actually retained full control.

The interviews confirmed that the context strongly conditions how data journalism is carried out (**Appelgren**; **Nygren**, 2014; **Appelgren**; **Salaverría**, 2018; **Sandoval-Martín**; **La-Rosa**, 2018; **Porlezza**; **Splendore**, 2019). On the one hand, the incipient status of data journalism in Austria is mainly due to the lack of guidelines in terms of access to information (RQ2). Moreover, there is an absence of awareness of their value, which implies a lack of recognition even within their own newspaper. As **Tong** (2022, p. 2795) stated,

> "Data journalists' expertise, together with the increasing internal recognition and their compelling data stories, helps them establish cultural authority."

On the other hand, at *El país*, the working schedule is respected and data journalism is used as a feature to differentiate it from the competition. The articles produced during the analyzed period reveal the difference in this regard (99 news stories published in *El país* and 37 in *Der standard*). The situation of Austrian data journalism is more similar to that in Arab countries (**Lewis**; **Nashmi**, 2019; **Mutsvairo**; **Bebawi**; **Borges-Rey**, 2020) than to that in European countries. Austrian data journalists face all the obstacles mentioned in the scientific literature, both internal –within the newsrooms– and external –related to the context (**Appelgren**; **Lindén**; **Van-Dalen**, 2019; **Kashyap**; **Bhaskaran**; **Mishra**, 2020).

The data teams –based on the number of workers– and the production process of a data journalism story are similar in *El país* and *Der standard*. Although the inverted pyramid proposed by **Bradshaw** (2011) is called into question (**Albert-Trinidad**, 2020), these findings show that data-driven articles are produced according to these phases. The differences lie in the organizational structure of the data teams and in the contractual relationships with each company. Data journalists in *El país* work together in all steps and have permanent full-time contracts. However, a division of tasks prevails in *Der standard*, and the members of the data journalism team are hired part-time.

The perceptions about the future of data journalism are in line with **Stalph** and **Borges-Rey** (2018) and **Ëkström** and **Westlund** (2019): Data will become an inherent part of journalism, and it will be essential to all journalistic publications (RQ3). Journalists at both *El país* and *Der standard* believe that data journalism will grow and evolve. Nevertheless, obstacles in Austria are expected to continue to limit the practice of data journalism.

This study is not free of limitations. First, our sample for the content analysis was limited. We were only able to analyze one newspaper per country. Hence, future studies should extend such analysis to other newspapers that practice data journalism in different countries. In addition, it would be interesting to analyze changes over time and to deepen our understanding of the impact of data journalism on society.

Notwithstanding these limitations, this study was able to deliver important initial insights into day-to-day data journalism content and work routines in Spain and Austria. The practice of data journalism in Austria and Spain mainly differs because of the context in which it is carried out. This research confirms the relevance that this specialization is currently acquiring in countries such as Spain and demonstrates the challenges that journalists face in countries without access to information and transparency laws to build good stories with data.

Journalists face challenges to build good stories with data in countries without access to information and transparency laws

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Monetization of digital newspapers: Experimentation with brand extension and buying influence

Luis Sangil; Francisco Campos-Freire; Francisco J. Pérez-Latre

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Luis Sangil ✉
https://orcid.org/0000-0002-7387-9277

Universidad de Navarra
Facultad de Comunicación
Campus Universitario
31009 Pamplona, Spain
luis.sangil@gmail.com

Francisco Campos-Freire
https://orcid.org/0000-0003-1831-1838

Universidad de Santiago de Compostela
Facultad de Ciencias de la Comunicación
Campus Norte, Av. de Castelao, s/n
15782 Santiago de Compostela, Spain
francisco.campos@usc.es

Francisco J. Pérez-Latre
https://orcid.org/0000-0002-9844-3496

Universidad de Navarra
Facultad de Comunicación
Campus Universitario
31009 Pamplona, Spain
perezlatre@unav.es

Abstract

With digitization, journalistic companies tested out different ways of creating value through the capabilities that technology provides. Online newspapers applied the experience they had with their print versions to brand extensions, aiming to build revenue models that went beyond the classic models for advertising and charging for content. Their goal was to leverage brand value by expanding their name to a new product. This study focuses on *Unidad Editorial*, which undertook various initiatives testing the power of the digital brand *elmundo.es* and expanding the boundaries of the business. We use information obtained from 23 semistructured in-depth interviews with executives from the early days of their online business to the present, providing a comprehensive picture. *Elmundo.es*'s experimentation with brand extensions and other non-advertising revenue sources helps us understand digital media's shift towards charging for content –which the Covid-19 pandemic provided a favorable environment for– in their search for alternatives to compensate for the decline in advertising revenue. New brand extension projects, for which brand strength and consistency with the original product are determinative, remain open. In addition, these new practices will be subject to the journalistic companies' investment capabilities.

Keywords

Digital journalism; Advertising; Brand; Brand extension; Business; Charging for content; Digital; Monetization; Online newspapers; Digital media; Cybermedia; Sources of income; Value creation; *Unidad Editorial*; *El Mundo*.

1. Introduction

With digitization, journalistic companies tested out different ways of creating value through the capabilities that technology provides (**Sullivan**; **Jiang**, 2010). The parent brand came to strengthen the commercial viability of this new activity: It was felt that efficient brand management ensures that the brand's values help when developing projects, entering new markets, and generating growth (**Arrese**, 2013). During the final decades of the last century and the first decades of this century, companies, including media conglomerates, made greater use of corporate branding, attempting to position products and services under a single brand rather than backing a variety of individual brands (**Aaker**; **Keller**, 1990).

In their attempt to build revenue models that went beyond the classic models for advertising and charging for content, online newspapers applied the experience they had with their print versions to brand extensions. These extensions have helped leverage brand value by expanding their name to new products. The aim is to use brand equity with positive, strong, and unique associations to facilitate the market launch of an item or service (**Caspar**, 2002; **Habann**; **Nienstedt**; **Reinelt**, 2008). If executed correctly, a well-known brand's recognition and reputation can be an important business asset (**McDowell**, 2006). However, extensions can have both serious risks (**Martínez**; **Pina**, 2003) and high rewards (**Mierzejewska**; **Shaver**, 2014).

Researchers have paid particular attention to management strategies and brand equity analysis, echoing the concerns of companies and professionals (**Hoeffer**; **Keller**, 2003). The power of brands, the processes of building them, the ability of commercial logos to inspire consumer loyalty and sensitivity, and the implementation of brand extensions and the definition and measurement of key dimensions for the success of brand extensions are recurring topics and have received increasing interest in recent years (**John**; **Loken**; **Joiner**, 1998; **Shokri**; **Alavi**, 2019; **Kim** 2019; **Huang**, 2020; **Ma**; **Wang**; **Da**, 2021; **Ke**; **Wagner**, 2022; **Deng**; **Messinger**, 2022). In that vein, **Ha** and **Chan-Olmsted** (2001) studied the audience perception of broadcasters' use of websites to enhance television offerings, **Kim** (2019) applied this to the movie industry, and **Huang** (2020) applied this to the transfer of online brand loyalty to the core brand.

The use of brand extensions in the consumer goods sectors and the factors influencing their success have increasingly attracted academic attention (**Elliott**; **Wattanasuwan**, 1998; **Mitchell**, 2001; **Holt**, 2002; **Christodoulides**, 2009; **Ots**, 2008). Some research has focused on the concepts of fit, similarity, consistency, and congruence (**Aaker**; **Keller**, 1990; **Arrese**, 1998). The common theoretical thread has been that, for a product to take full advantage of an extension, it must fit well with the brand value of the core brand. If not, the extension will not inherit sufficient capital to propel the product forward (**McDowell**, 2006).

More recently, research has addressed understanding the phenomena triggered by the global Covid-19 pandemic from the brand extension perspective (**Ke**; **Wagner**, 2022), as well as neural characteristics and the influence that brand familiarity and product category have on consumers' cognitive processes (**Ma**; **Wang**; **Da**, 2021).

Brand extensions involve reciprocal effects (**Zimmer**; **Bhat**, 2004). The meaning of a brand in the minds of consumers may change as the company matures and develops diversified product lines (**McEnally**; **De-Chernatony**, 1999). As a result, companies develop brand communication strategies that focus more on abstract, intangible associations, allowing for an extension to somewhat different products. In addition, there is a relationship between the brand extensions' fit and a brand's reputation regarding social responsibility, such that a reputation for social responsibility leads to more favorable responses toward low-fit brand extensions by inducing a desire to support and help a company that has acted to benefit consumers (**Johnson** *et al*., 2019).

In a context in which the media industry is bolstering alternative revenue streams (*PwC*, 2022), this study focuses on the use of brand extensions during the digital transformation process of *Unidad Editorial*, which undertook initiatives aimed at testing the power of the digital brand *elmundo.es* and developing other revenue streams to expand the boundaries of the business. Its executives were particularly innovative between 2002 and 2005, when most of the projects were carried out. These projects turned out to be significant and accounted for 35% of total revenues, until 2007 (interview with executive 1, 7/10/2017). The executives stated that, in terms of monetization, they focused on improving the product, volume, and advertising model leading up to 2015 (interview with executive 2, 6/28/2020). At the same time, they stated that the business needs to incorporate products that enable them to take advantage of users' knowledge and handle large volumes of data, which opens up options for experimentation with brand extension (interview with executive 3, 6/19/2017).

The contraction in advertising investment from 2020 onward led to a spike in brand extensions with initiatives such as affiliations and event organization (interview with executive 16, 11/8/2022). However, the alternative that they have been trying out is charging for content, which was fueled by the coronavirus crisis. The success of *elmundo.es*'s initiative in October 2019 was a shot in the arm for the market, with an estimated 750,000 readers of paid content, including pure digital natives (*Reuters Insti-*

During the digital transformation process, *Unidad Editorial* undertook initiatives aimed at testing the power of the digital brand *elmundo.es* which accounted for 35% of total revenues

tute, 2022). *Unidad Editorial*'s experimentation with brand extensions helps us understand digital media's shift towards charging for content in their search for alternatives that ensure the viability of the business. At the same time, it leaves room for further attempts at brand extensions for which brand strength and consistency with respect to the original product will be major factors. In addition, these new practices will be subject to the journalistic companies' investment capabilities.

2. Research questions and methodology

After conducting a review of the literature, we formulated three research questions to gain a more nuanced understanding of the meaning of brand extensions and their relevance to digital transformation as a monetization pathway:

RQ 1. Are brand extensions currently an alternative for the monetization of digital newspapers?

RQ 2. What effect does a news brand's influence have on the sales capacity of non-news products?

RQ 3. To what extent has experimentation with brand extension shaped digital newspapers' paid content strategy?

To find out how *Unidad Editorial* viewed brand extensions and what outcomes its experimentation in monetizing the digital business yielded, we used information gathered from 23 in-depth interviews with fourteen professionals from the top brass of the company, and another interview with an executive from outside the group (Table 1). In some cases, interviews were repeated after some time. These were semistructured interviews with open-ended responses. The spectrum of professionals was intentionally broad to include different perspectives and interpretations. The interviews were conducted between November 2011 and November 2022, allowing us to speak with executives from various stages, ranging from the early days of their online business to the present, thus yielding a comprehensive picture. Other papers address business outcomes (**Sangil**, 2020).

Table 1. Interviews

Position/category	Number	Duration
Corporate management		
Chief Executive Officer	2	20 min + 20 min
Deputy Director	2	30 min + 30 min
Publisher	1	20 min
Digital management		
Chief Executive Officer/Managing Director	5	60 min + 60 min + 60 min + 30 min + 30 min
Assistant	3	30 min + 40 min + 30 min
Area Director	4	30 min + 30 min + 20 min + 20 min
Commercial management		
Sales Manager	2	40 min + 30 min
Chief Strategy Officer	2	45 min + 45 min
Content management		
Director	1	30 min
Outside of *Unidad Editorial*		
President or Chief Executive Officer	1	40 min
Total	23	approx. 12 hours

3. Results

The experimentation carried out by *Unidad Editorial* –originally called *Unedisa*– and its results are discussed below, in order of their relative closeness to the use of advertising space.

3.1. Revenues from co-branding

Co-branding is a special case in brand extension wherein two established brands are extended to launch a product (**Leuthesser**; **Kohli**; **Suri**, 2003). The creation of the cable channel *MSNBC* through a partnership between *Microsoft* and *NBC* is an example from this sector. *Elmundo.es* began using this sales formula around 2003 as a solution for clients who wanted pay-per-click or pay-per-acquisition when the newspaper exclusively used a cost-per-thousand model, a formula that was not viable for advertisers with intensive, high-volume, and long-term campaigns and campaigns that involved payment by the end user. *Elmundo.es* chose to offer its own services to clients who became sponsors (interview with executive 4, 3/5/2012). Operationally, a joint webpage, with content of interest for each advertiser, was created in the newspaper. It appeared to be part of *elmundo.es*, but the technology and payment systems belonged to the client.

Initially, it had a permanent position on the front page under the heading "Sponsored Services" ["*Servicios Patrocinados*"] with internal rotation. Although partners were selected, they sometimes experienced saturation: a download service with *Softonic*; lotteries with *Ventura24*; yellow pages with *Telefónica*; matchmaking with *Partnership*, or flower shopping with *Interflora* (interview with executive 5, 2/2/2012, and interview with executive 6, 5/5/2012). End customers shopped under the *elmundo.es* brand umbrella, which gave users confidence. Partners gained presence, brand recognition, and a number of advertising insertions. The newspaper generated additional traffic (as noted by a meter from Spain's print media circulation monitoring office, the *Oficina de Justificación de la Difusión* [*OJD*]) and improved user stickiness, and successfully marketed advertising space. The model involved a high fixed price (from €120,000 to €200,000 per year) and an additional variable fee based on targets. Some clients ended up generating as much as €300,000 per year for *elmundo.es* (interview with executive 5, 2/2/2012).

The newspaper's executives considered co-branding to be a way to enter a market without specific development and without competing with the international companies that controlled it (interview with executive 4, 3/5/2012). At the same time, they recognized that this was a variable advertising sales formula, dependent on results (interview with executive 7, 7/10/2012). Owing to internal matters and the flat rates, it was recorded as a different revenue stream from advertising. However, when the advertising department felt that the agreements were their responsibility, it began to manage them until they had to be abandoned because they required exhaustive monitoring.

It was found that Internet customers had a different profile than that of print customers. For example, although technological products were well received on the website, they did not do well in print. The differences in these profiles ran even deeper: The user profile for the store also did not match that of the digital newspaper

3.2. Revenue from e-commerce

Practically all Spanish newspapers implemented e-commerce strategies from the beginning of their time on the Internet, with peculiarities in each case (**Flores**; **Aguado**, 2005, pp. 138-165). The heads of *El Mundo* relied on brand strength when developing their e-commerce strategy. In the early years of *elmundo.es*, concerns arose when it became clear that the company lacked business presence, contrary to market expectations (interview with executive 8, 2/1/2012).

We differentiate between two types of experimentation at *Unidad Editorial*: the marketing of its own products, mostly promotions, and e-commerce, which involved using the newspaper as a platform for promoting third-party products. Their promotion of third-party sales through the website can be broken down into four stages. The first covers the period up to 2005 through various attempts. The second, between 2005 and 2008, focuses on the project's particular momentum. The third was during the economic crisis, when e-commerce was expected to compensate for revenues not brought in by advertising. Finally, in 2014, *Unidad Editorial* decided to abandon its online commerce activities. However, at the end of 2019, it started them up again using an affiliation model. Although perhaps it was more marked in the first stage, executives from all three stages agree that e-commerce and the store were based on an advertising model.

> "It's about selling the audience, but rather than through a CPM payment model, through one of pay-per-sale, pay-per-acquisition by the client, and a commission from the sale" (interview with executive 4, 3/5/2012, and interview with executive 17, 11/15/2022).

In the beginning, sales were not even made through the website; instead, buyers had to make the purchase over the phone. Beginning in 2005, the company decided to take it a step further because the executives of the print version of *El Mundo* believed that higher revenues could be generated. The inclusion of the e-commerce operation in the newspaper's budget from the second year onward demonstrated the confidence in this line of business (interview with executive 10, 2/12/2012). Apparently, the store belonged to *elmundo.es*, but *Mundinteractivos*, the company set up to operate *elmundo.es,* kept the model of outsourcing its management. A technical partner provided products, along with invoicing, distribution, storage, delivery, and after-sales service. Meanwhile, *elmundo.es* played its part in the business through its communication capabilities.

During this period, *elmundo.es* was an intermediary that maintained ownership of the business under the *Tiendas del Mundo* brand. Several suppliers coexisted on the site, each with different products and the corresponding responsibility for logistics. The newspaper was not able to consolidate the purchases a user had made from different suppliers, make joint shipments, or generate a single invoice that included all of these purchases (interview with executive 4, 3/5/2012). There was a huge increase in suppliers, but the difficulty of management reduced this in later years. *Elmundo.es* earned income from promotion and a percentage of revenues (interview with executive 9, 5/30/2012). Specific conditions and margins were negotiated with each supplier, depending on the type of product. In addition to product selection, a key factor in good performance was price, owing to the existing competition. The percentage of sales that *Mundinteractivos* earned varied depending on the supplier and product. It ranged from 25% to 45%, except in information technology, where it was around 6%. As of October 2004, the group was assigned to Internet sales, and *Unidad Editorial* was responsible for the costs of supply and customer billing.

The company was involved in product selection. When a product was particularly successful, it could also be sold as a promotion from *El Mundo* at the newsstand. However, it was found that Internet customers had a different profile than that of print customers. For example, although technological products were well received on the website, they did not do well in print (interview with executive 5, 2/12/2012). The differences in these profiles ran even deeper: The user profile for the store also did not match that of the digital newspaper (interview with executive 11, 11/17/2011).

Executives noted the influencing power of the *El Mundo* brand: The user did not have an advanced digital profile, but the brand lent its trustworthiness to digital purchases (interview with executive 11, 11/17/2011).

At the beginning of the 2008 economic crisis, *Unidad Editorial* was confident that the store would be one of the ways it could balance revenues, but expectations were not met (interview with executive 11, 11/17/2011 and 11/24/2011).

A stand-alone model was implemented for the paper, separate from self-promotion and other related businesses. During this period, it decided to start up a store of its own. There were discussions of whether it made sense for the point of sale where users came to shop to be called *elmundo.es* and what role the brands played when it came to trust.

> Executives noted the influencing power of the *El Mundo* brand: The user did not have an advanced digital profile, but the brand lent its trustworthiness to digital purchases

> "Regardless of whether the store brand was *elmundo.es* or something else, we are still traffic drivers for the store" (interview with executive 7, 7/10/2012).

The discussions were settled when it was decided that *Unidad Editorial*'s sole target business was providing content and earning advertising revenues. They decided to maintain the model with external suppliers and limit *elmundo.es*'s role to communication (interview with executive 7, 7/10/2012). The model had a three-year run. In mid-2014, the company decided to close the store because its conversion rate was low: "users were visiting the media outlet, but not buying anything" (interview with executive 12, 12/20/2019). E-commerce's contribution to *elmundo.es*'s revenues varied. At its peak, it accounted for some €300,000 in annual turnover (interview with executive 4, 3/5/2012, and interview with executive 11, 11/24/2011). In some executives' opinion, e-commerce never really took off. Among the reasons given was the lack of adequate human resources. Moreover, the business was based on using unsold advertising space:

> "if space had been factored in, e-commerce would have run a deficit from the start. The model only works for websites with large amounts of unsold inventory" (interview with executive 6, 5/5/2012).

Other executives emphasized that the model allowed them to be more flexible, learn, and generate a valuable customer database: users interested in buying products online (interview with executive 4, 3/5/2012).

More recently, the company considered developing a model with third parties to "leverage the audience and monetize it" (interview with executive 13, 8/25/2017). While acknowledging the power of being "the third largest source of digital audience after *Google* and *Facebook*", one of the executives admitted that it lacked the knowledge required for e-commerce, which "is a business of volume and logistics and only with both assets can you be competitive". On the other hand, they noted that a publishing group was not a priority partner for e-commerce operators, even when the volume and quality of user data were taken into account.

Another experiment linked to the brand's influencing power started in November 2019: *Bazar*, based on product promotion from the newsroom that allows for shopping through various e-commerce platforms (interview with executive 16, 11/8/2022). Its beginnings can be seen in *Píxel*, the technology section of the digital newspaper that was conceived of as a service to generate traffic. It started in an ad hoc manner in connection with Black Friday or Prime Day.

As activity shifted from sporadic to steady and from selling technology to a wide range of products, it added links to the *Amazon* sales platform, and the newspaper began to earn a percentage on sales. With more than 90% of sales coming from *Amazon*, it has also experimented with other online stores such as *El Corte Inglés*, *Ikea*, and *Martinelli*. In addition, this was expanded to sections of *elmundo.es* such as *Papel* or *La Lectura*, the cultural supplement, which divert traffic to *Bazar*. It was later extended to other *Unidad Editorial* brands such as *marca.com* and *expansion.com* (interview with executive 17, 11/15/2022).

Research confirms that knowledge of the original brand has a positive influence on the formation of attitudes toward the supplementary product (**Förster**, 2015; **Siegert** *et al*., 2015). Moreover, a newspaper reader's attitude toward an extension is not more positive than that of a nonreader. On the contrary, there is even a slightly negative effect. A reader is less open to the "commercialization" of the newspaper. The negative influence of awareness of the original brand on products unrelated to the content supports this thesis. There is no evidence of a significant influence on news products (**Habann**; **Nienstedt**; **Reinelt**, 2008; **Krebs**; **Siegert**, 2015). Supplemental non-news-related products dilute the original function of the newspaper and, therefore, are associated even more with its "commercialization," leading readers to reject them.

3.3. Revenues from selling supplementary items

Its first steps in e-commerce centered around using the website to promote the sale of third-party products. At the same time, it created offers for its readers in the digital newspaper that mirrored the promotions in the printed newspaper (interview with executive 11, 11/24/2011). Some heads of *elmundo.es* labeled these sales as "supplementary," based on the terminology used by the printed press, where goods that are marketed together with the core product are referred to as "supplements." *Unidad Editorial* replicated this traditional print business on the Internet (interview with executive 5, 2/2/2012, and interview with executive 10, 2/12/2012). In the early days, the same promotions that *El Mundo* put in print, through the use of coupons, could also be purchased on the website. These were print-based product marketing initiatives through a secondary marketing channel.

> E-commerce's contribution to *elmundo.es*'s revenues varied. At its peak, it accounted for some €300,000 in annual turnover

In the stages with the best results, the heads did not consider the promotions to have been purely print or online: Without the support from the printed paper, none of the Internet promotions would have worked. At that time (2003-2005), the printed paper was widely distributed and had remarkable influencing power. The printed edition's support was instrumental for Internet promotions: 65% of sales were made through the printed edition. Revenues were allocated on the basis of whether the user had redeemed a coupon from the printed paper or through a code on the Internet (interview with executive 4, 3/5/2012). The coexistence between print and online was based on the fact that revenues were consolidated under the category of offers to readers, which was considered to be part of print in the reports to the publishing group's parent company in Italy. The digital component was consolidated in the subsidiary for Internet management (interview with executive 4, 3/5/2012).

> A newspaper reader's attitude toward an extension is not more positive than that of a nonreader. On the contrary, there is even a slightly negative effect. A reader is less open to the "commercialization" of the newspaper. The negative influence of awareness of the original brand on products unrelated to the content supports this thesis

The first marketing manager of *elmundo.es* began to explore this revenue stream (interview with executive 9, 5/30/2012). However, the best figures were not reached until the end of 2003. Advertising was taking longer than expected to produce results, and consequently, managers sought alternative revenue streams (interview with executive 6, 5/5/2012). The initiatives were based on four pillars:

- the audience of *elmundo.es*, which was expanding;
- the newsstand channel, which had 30,000 points of sale, performing well;
- product selection; and
- the creation of a joint profit-and-loss statement with partners who provided the product, licenses, or the ability to produce the product at no cost (interview with executive 14, 4/2/2012, and interview with executive 7, 7/10/2012).

The first initiative was a list of software programs published in November 2002 with the title "The 1,000 best programs for your PC" (interview with executive 5, 2/12/2012). Almost 350,000 units were sold in the twelve issues of the list. The initiative brought *Mundinteractivos* net profits of more than €430,000, with a return of 29%. The experiment was repeated in 2003, with a net profit of over €230,000 and a return of 24%, and again in 2004, albeit with more modest results.

The most profitable initiatives for *Mundinteractivos* were DVD collections of highly rated television series that were created with the cooperation of the television or production companies that owned the rights. Two series were particularly successful. They sold the first three seasons of *Telecinco*'s *7 vidas* between 2003 and 2004: in total, 790,121 DVDs (interview with executive 7, 7/10/2012). In June 2004, a collection of *Aquí no hay quien viva* was launched with *Antena 3*, which sold more than 1 million copies. The promotion accounted for 70% of *Mundinteractivos*'s profit in 2004 (€1,350,296).

The selling of supplementary products lasted until 2007. That year, this activity moved to the marketing department of the printed newspaper. Digital advertising already provided a sufficient source of income, and the printed paper was showing signs of weakening sales at the newsstand. Marketing claimed any activity related to this sales channel as their own (interview with executive 4, 3/15/2012, and interview with executive 7, 7/10/2012). Not all sales of supplementary products achieved equal success: 2003 and 2004 were the years with the best results. They accounted for around 25% of *elmundo.es*'s total profit (in those two fiscal years, interview with executive 7, 7/10/2012).

3.4. Revenues from Internet access and data traffic

The business plan that *Mundinteractivos* developed in the midst of the Internet "bubble" was more similar to telecommunications. The environment was conducive to shared projects: The boundaries between the Internet and telecommunications were not so well defined; telecommunications companies had the resources to invest, and companies such as *British Telecom* were trying to enter the Spanish market (interview with executive 10, 2/12/2012). *Mundinteractivos*'s activity in this field was limited to four years (1999-2003) and centered around two projects: an Internet access service aimed at the general public and participation in a consortium that was granted a data traffic license.

At the end of the 1990s, users did not access the Internet directly through operators but rather through intermediaries. Providers were generating millions of minutes for telephone operators, and it was believed that growth would parallel that of the Internet: continuous and immense. Asymmetric digital subscriber line (ADSL) internet had not yet been envisioned. Service providers multiplied even among communications companies. In those years, *AOL* (*America Online*), an Internet provider, bought *Time Warner* (interview with executive 10, 2/12/2012). Partnership with news portals was a source of value for suppliers.

In 1999-2000, *Mundinteractivos* participated in the creation of *Mundofree*: a free Internet access provider in which *Comunitel* was a 50/50 partner. *Elmundo.es* provided its communication capacity, branding, and user acquisition capacity (interview with executive 7, 7/10/2012), while *Comunitel* provided the technological platform. *Prisa* also entered the business through *Inicia* (interview with executive 9, 5/30/2012). *Mundofree*, which had an annual turnover of around

€200,000 at its peak, had two lines of business. On the one hand, the advertising operation of its site aimed to monetize the thousands of visits received by the portal, although with limited results (interview with executive 7, 7/10/2012).

> Supplemental non-news-related products dilute the original function of the newspaper and, therefore, are associated even more with its "commercialization," leading readers to reject them

The second source of income was traffic. Initially, the service was free of charge: The user paid *Comunitel* for the connected minutes, and *Comunitel* also received a percentage of the consumption and reached 70,000 customers. *Mundofree* later launched a flat-rate service and gained 1,500 subscribers for this option. Finally, it launched a self-installable ADSL offering before the other companies started offering high-speed Internet, which gave it a competitive advantage over *Telefónica*, the leading operator. High speed and the "bursting of the technological bubble" substantially changed market conditions. After an attempt to sell *Mundofree* to *Wanadoo*, *Mundinteractivos* ended its relationship with *Comunitel* by ceding the use of the brand.

Mundinteractivos's second line of activity in the telecommunications field was its participation in a consortium that was granted a data traffic license. In 2000, alongside the calls for tender in mobile phones, the government called for tenders in digital radio, digital terrestrial television (DTT), third-generation mobile cellular technology [universal mobile telecommunications system (UMTS), and local multipoint distribution system (LMDS)]. *Unidad Editorial* participated in a consortium that bid for LMDS licenses (a broadband point-to-multipoint system utilizing broadcasting centers operating on frequencies that allow for the transmission of large data packets). With a 25.5% stake, *Mundinteractivos* participated in this consortium, named *Skypoint*, along with an international technology partner and the *Recoletos* publishing group (interview with executive 15, 3/25/2015).

Skypoint was awarded a 26 gigahertz enterprise service license. Another successful bidder was *Firstmark*, in which *Prisa*, *El Corte Inglés*, and a global benchmark operator participated (interview with executive 7, 7/10/2012). *Mundinteractivos* placed particular value on the potential to become a business telecommunications operator and the market value that would bring to the company. The license boosted *Skypoint*'s valuation: Figures of 5 billion pesetas were estimated, and the consortium's valuations had an impact on its partners' valuations (interview with executive 10, 2/12/2012).

LMDS technology was not developed: Mergers of operators and sales to form larger operators took place. *Skypoint* merged with *Neo Networks*, a consortium of the *Iberdrola* group, and changed its name to *Neo Sky*. In successive capital injections, *Mundinteractivos*'s stake was reduced to 1%. *Unidad Editorial*'s subsidiary sold its shares in the spring of 2003 (interview with executive 7, 7/10/2012).

Mundinteractivos's investments in telecommunications were dwindling. Faced with limited investment capacity, the company decided to focus its efforts on content development rather than on distribution channels:

> "*Unidad Editorial* decided to focus on its core: to prioritize what we were good at and what the market demanded we participate in: to be a multi-platform content provider." (interview with executive 7, 7/10/2012).

3.5. Revenues from mobile applications

Another business area that *Mundinteractivos* experimented with to achieve higher revenues was the development of mobile content applications when there were no existing models or market:

> "It was clear to us that cell phones were going to play a powerful role and that in the short to medium term it would not be a business. But it had to be part of our R&D" (interview with executive 14, 4/12/2012).

In 2001-2002, *Broadmedia* was incorporated. *Nortel* owned 50% of this company, and later 100% was owned by the subsidiary of *Unidad Editorial* (interview with executive 4, 3/15/2012). Initially, it developed free services for telephone operators: alerts and content for wireless application protocol (WAP) sites, the international open standard for wireless communications applications. The most well-known sites in Spain were *Vodafone Live!* and *Movistar*'s *Emoción*. They were free because it was expected that they would generate traffic that could be exploited for advertising. Traffic proved low over time, and the technology did not support advertising. *Broadmedia* approached operators to share in the income that users generated when mobile micropayments became available two years later. *Mundinteractivos* earned 10% of the price –initially €0.15– which increased to 20%. Advertising was dropped (interview with executive 4, 3/15/2012).

An agreement was reached with *Telefónica* to move from a once-daily service to a system that sent notifications when there was news of interest. The user paid for each alert (interview with executive 4, 3/15/2012). Vodafone implemented a similar system, though they only charged for the first message. As of August 2002, the volume of messages increased substantially thanks to an advertising campaign. In a second stage, paid browsing systems leading to *elmundo.es* were offered. In some cases, the user paid each time they accessed the newspaper using a cell phone; in others, they had a monthly subscription. The latter worked better, reaching a monthly net turnover of €30,000, although the subsidiary was affected by user dissatisfaction because the services "turned out to be slow and expensive" (interview with executive 4, 3/15/2012). Of *Broadmedia*'s revenues, 20% came from alerts and 75% from mobile access to *elmundo.es*. *Mundinteractivos* earned half of the €800,000-€1 million that *Broadmedia* invoiced for these two items. This was practically net margin: Excluding development, the cost was zero.

The model changed when 3G arrived on the scene and the *iPhone* was launched because users no longer needed the operator's site to act as an intermediary:

> "it was viewed as another gateway to the Internet and that the activity should not consist of generating content for mobile phones but rather producing content for the Internet" (interview with executive 4, 3/15/2012, and interview with executive 14, 4/12/2012).

The free mobile version of *elmundo.es* was launched in 2007 without advertising, with more pressure being placed on obtaining traffic than marketing it.

The first campaign centered around a medium-term profitability approach. Initial expectations were high and resulted in a higher CPM than usual on the web (interview with executive 4, 4/12/2012, and interview with executive 6, 5/27/2012). Gradually, free smartphone applications were developed. The initiatives sought revenue from charging for news alerts and soccer match results (interview with executive 11, 11/24/2011). However, the launch coincided with the beginning of the economic crisis and *Unidad Editorial*'s focus on *Orbyt*, which affected *elmundo.es*'s mobile presence. It was decided that the free version of *elmundo.es* would be promoted on all devices as a strategy to differentiate *Orbyt* (interview with executive 11, 11/24/2011).

Broadmedia marketed the web applications, and *Unedisa* focused its efforts on the *elmundo.es* advertising server, the in-house development that was most relevant and applicable to other companies. Outsourcing the model proved to be complicated, and in the end, the tool was sold and its maintenance outsourced. The clients were companies from the *Intercom* group (*Softonic*, *InfoJobs*) and *Finantial Group*, a network of financial sites. *Mundinteractivos* earned around €50,000 per year through this channel (interview with executive 4, 3/15/2012, interview with executive 5, 2/2/2012, and interview with executive 10, 2/12/2012).

3.6. *Su vivienda*, a site for real estate deals

The launch of *elmundovivienda.com*, a site specializing in the real estate sector, was an important experiment in brand extension. In September 2002, they worked on a project with the real estate broker *CB-Richard Ellis* (*CBRE*). In addition to receiving €180,300 in direct sponsorship, *elmundo.es* was able to tap into the market through advertising because *CBRE* did not have exclusivity. *Elmundo.es*, which had 170 million page views in 2002, provided the real estate consulting firm with a means of promoting its products. *Elmundovivienda.com* had a variety of content: reports and information from the print supplement *Su vivienda*, up-to-date daily news, promotional offers from *CBRE*, mortgage market indexes, legislation, and expert reports. In addition, tools were developed to drive user traffic to the consulting firm's services: a search engine, classified ads, a mortgage simulator, a borrowing power simulator, and a selling costs simulator.

Elmundo.es's partner received advertising and editorial support, both online and in print. *CBRE* held advertising space with key placement on *elmundo.es* that was worth €72,000. In addition, it was also offered a 20% discount on regular investment in print. For a time, it sponsored –at no cost– *Últimas Noticias* for the personal digital assistant (PDA), the afternoon edition of *El Mundo* in PDF, the sending of headlines by e-mail, and the monthly newsletter to the medical community. After this experiment, the heads of Internet management thought that, although *El Mundo* was benefiting from the real estate growth through its weekly supplement, there was an opportunity that it did not know how to take advantage of (interview with executive 4, 4/12/2012). In 2005, *Unidad Editorial* entered discussions with market operators aimed at reaching collaboration agreements. The most intense negotiations took place with *idealista.com*, a leader in buying and selling homes (interview with executive 6, 5/5/2012).

In April 2005, *idealista.com*'s shareholders agreed that *Unedisa* would acquire 51% of the site, maintaining management for three or four years, after which time they would decide whether to integrate it into *Unidad Editorial*. Negotiations failed: *elmundo.es* decided to develop its own site (*suvivienda.com*) to provide a comprehensive real estate database (interview with executive 7, 7/10/2012). Estimates indicated that revenues would be around half a million euros for each of the first three years, especially those from advertising. More than 65% would come from the clients from the supplement published with the printed newspaper. The project stood out for its cost-effectiveness based on reduced human resources. Accumulated earnings before interest and taxes (EBIT) were estimated at €1.14 million in the first three years.

When *suvivienda.com* was developed, it was designed as a platform supported by traffic from *elmundo.es*, which had more traffic than *idealista.com*. However, the project did not work well. The site was late to the market, where other portals were already well positioned. *Elmundo.es*'s users came to the website looking for news, not for real estate. In addition, *elmundo.es*'s service did not have enough of an offering and did not have geo-targeting capabilities. Improving this content would require more ads from clients, who found that the response rates from *Mundinteractivos*'s website were low (interview with executive 4, 4/12/2012, and interview with executive 6, 5/5/2012).

> At that time (years 2003-2005) the printed paper was widely distributed and had remarkable influencing power. The printed edition's support was instrumental for Internet promotions: 65% of sales were made through the printed edition

Following this experiment, at the end of 2009, *Unidad Editorial* bought 22% of *globaliza.es*; fifth in the Spanish ranking of real estate sites in terms of unique users per month, it focused on a niche of real estate agencies (*idealista.com*, November 26, 2009). The idea was to participate in solid businesses whose value would increase as a result of *elmundo.es*'s investment, such that *Unidad Editorial* could revalue the investment (interview with executive 4, 4/12/2012).

> In a constantly changing digital market, business frontiers were mobile, and there is currently room to make inroads into new experimentation with brand extension

Mundinteractivos's heads considered *suvivienda.com* to be one of *elmundo.es*'s biggest failures. The project reflected an inability to lead the classified ads market (interview with executive 14, 4/2/2012). Between launching *suvivienda.com* and acquiring a stake in *globaliza.com*, *Unidad Editorial* created a classifieds department for print and online. Some managers disagreed with this strategy and advocated for shared organization by market segment: *Su vivienda* would be the shared housing classifieds site for *El Mundo*, *Marca*, *Expansión*, and *Telva*, in print and online (interview with executive 4, 4/12/2012). In the final period of this project, the company observed how foreign publishing groups had achieved good results with classifieds. The most convenient path for *Unidad Editorial* would have been to have integrated established companies (interview with executive 13, 8/25/2017). At the end of 2022, *Unidad Editorial* decided not to expand into classifieds, where it felt that it would be difficult to compete with specialized companies and that incorporating a company would be a departure from its core business.

> "We are not thinking about it even if the opportunity presents itself. Our majority shareholder is only interested in the media" (interview with executive 16, 11/8/2022).

3.7. Income from sponsorship

Like supplements, sponsorships have been a well-established activity in traditional business. This includes those that make brand extensions possible. In some cases, specific departments were created for business. Other departments generated custom content that extended the brand into the healthcare arena in innovative ways. Among the first type of project, the *Swatch* hour was created, an agreement was reached with *BBVA* for a market scoreboard on *elmundodinero.com*, *Telefónica* helped provide content for the phone number lookup service, a special on renewable energies was developed with *Iberdrola*, and a space covering routes for the *Campsa* guide was created (interview with executive 4, 3/15/2012).

Their agreement with *ONCE* in January 2003 for €150,250 and a renewable one-year sponsorship for solidarity initiatives was significant. A special about the "European year of people with disabilities", a *Solidaridad* section, and the portal *www.elmundo.es/accesible* were created. The most novel aspect of the agreement was the creation of a vertical portal: The aim was to optimize versions of *elmundo.es* for people with disabilities, including sections and several of the portals: *elmundosalud*, *elmundodeporte*, *elmundomotor*, *elmundouniversidad*, and the navigator, as well as weather forecasts and television programming (interview with executive 6, 5/5/2012). In 2005, a second agreement produced the special section "Toward equality" [*Hacia la igualdad*], increasing the timeliness, relevance, and depth of the *Solidaridad* section and the version for people with disabilities "*elmundo.es/accesible.*" There was particular emphasis placed on covering technologies that improve the quality of life for people with disabilities as well as international initiatives of interest to the sector.

Another experiment centered around *elmundosalud* involving tailored content (interview with executive 5, 2/2/2012). The advertiser was offered a specialized audience and an average of one million page views per month. This included enriched news pieces such as videos or digital interviews with guests. The agreements generated large revenues from pharmaceutical companies with biennials contracts (interview with executive 4, 3/15/2012). In May 2004, an agreement was reached with Pfizer to create a section with in-depth and continuous coverage on news and advances related to pain prevention and treatment. With a budget of €234,000, the profit margin was calculated to exceed 59%. Its high yield was due to the use of structural, human, and technical resources. This action facilitated the signing of contracts with similar benefits.

A contract was signed with *Aventis* for 191,870 € to create a section on oncology "capable of establishing the necessary communication between the oncologist, cancer patients, and their families, to educate and inform them about the disease". With *Roche*, a section on hepatitis and acquired immunodeficiency syndrome (AIDS) was launched with an investment of €216,000, which resulted in a profit margin of more than 50%. The *Bristol Myers Squibb* (BMS) agreement resulted in a €248,014 contract for the creation of spaces for diseases such as Alzheimer disease and Parkinson disease. By September 2004, this revenue stream had become so important that the heads of *elmundo.es* decided to bolster the teams as one of the measures aimed at consolidating its leadership in traffic and readership and increasing the newspaper's profitability.

3.8. Other revenue streams

In the years in which advertising marketing was more costly, multiple smaller-scale, short-term initiatives were undertaken. They explored any and all sources of income:

> "The Internet allowed for trial and error. Occasionally, one worked, but none changed the bottom line".

When advertising held significant weight, the management committee criticized the digital department for supporting activities that "shopkeepers" ["*tenderos*"] do (interview with executive 14, 4/2/2012). These lines included the selling of editorial content, tenders and bids, video game and gambling portals, private fashion sales, online surveys, and online movie rentals.

> The e-commerce experiment on *elmundo.es* illustrates the brand's strength in the newspaper industry, whether it plays an all-encompassing role or only a slight and indirect one in brand extensions close to the core product or whether it includes more distant associations

The Internet department took care of selling editorial content for newspapers as well as for textbooks and Spanish language learning books. Occasionally, content that came from print or illustrations was sold. Of note were the sale of interactive graphics to other newspapers and didactic material to clients such as educational institutions, associations, non-governmental organizations (NGOs), and pharmaceutical companies. The usual price for a graphic was around $300, with discounts depending on purchase volume. *Elmundo.es* received several awards for the quality of its graphics over the years. In 2002, the *Society for News Design* recognized the website as "a world leader in the field of multimedia journalism design" (*elmundo.es*, November 12, 2002). In relation to the sale of content, *Mundinteractivos* established *Difernet* to provide service to external clients and carry out in-house activities (interview with executive 7, 7/10/2012).

Elmundo.es also earned revenue as a supplier through tenders. The web team won a grant from the *European Parliament* for bolstering European institutions between 2008 and 2010. In addition, it received aid from *Canal Sí* for technological development in 2008 and 2009 and obtained the approval for the 2004-2008 global plan for technological development as part of the *Ministry of Industry*'s *Avanza Plan* as well as aid, in the form of tax relief, for R&D&I plans. Receiving the 2005 *Tiflos Award* made *elmundo.es* the first digital media outlet to receive an award for its sensitivity to the integration of people with disabilities.

Another revenue stream was video games and gambling portals. In the early days, a lottery portal was launched, with good results (interview with executive 14, 4/2/2012). The most noteworthy transaction was the 2006 negotiation to acquire 80% of *Meristation*, a benchmark video game portal with a leading position in Spain (60% of page views in the category and 623,000 unique users per month) and a presence in the United States, Argentina, and Mexico. *Meristation* had just finished a five-year contract with *Prisa*, which wanted to exercise an option to buy 100% of the company. For *elmundo.es*, this opened up its expansion into revenue lines related to gaming, e-commerce, and mobility and enabled it to access the hard-to-reach 18-34-year-old segment. The accounts from 2006 showed revenues of €500,000 and earnings before interest, taxes, depreciation, and amortization (EBITDA) of €300,000, with a margin of 60%. The estimated value of the company, according to the offer document, was €3.7 million and the offer for 80% of the capital represented an outlay of €2.96 million. The break-even point was expected to be reached in the third year.

In the contract with *Prisa*, *Meristation* had previously stated that the media group could acquire the portal for €600,000. Five years later, the founders considered this figure to be below its true worth. This was the reason for the offer to *Mundinteractivos*. Subsequently, *Meristation* and *Prisa* went to court, and in January 2011, Kamal Bherwani, CEO of *Prisa Digital*, announced that *Meristation* would be joining the group (*Prisa.com*, July 17, 2008, and January 31, 2011). No further efforts were made in this area. At the end of the period studied, *Unidad Editorial* dropped out of this area because it considered it difficult to penetrate the market, even through acquisitions (interview with executive 16, 11/8/2022).

Private fashion sales, online surveys, and movie rentals were more short-lived. *El Mundo Outlet* was an initiative involving the exclusive private sale of fashion between 2006 and 2007. In a similar vein, *Mundostocks*, a web-based shopping store, was launched (interview with executive 14, 4/2/2012, and interview with executive 5, 2/2/2012). Regarding surveys, *Arlaban Sigma* was created with *Sigma Dos* –the first Spanish market research and polling company; it was a joint venture for market analysis through online media. Personal or telephone interviews were replaced by an online platform, and the newspaper provided access to a market that could be used as a sample in the studies (interview with executive 7, 7/10/2012). In 2010, another experiment was developed with *Telefónica* as a partner: *Pixbox*, a video store accessed through an application that the user downloaded onto their computer. In the first two days, 11,000 downloads were recorded, but activity was limited, and revenues were only around €1,000-1,500 per month. The project fizzled out because *Telefónica* tried to back another streaming project. In 2012, *Unedisa* wanted to resume this activity with other partners (interview with executive 11, 11/24/2011).

Other brand extension experiments revolved around events. *Unidad Editorial*'s first initiatives were led by *Marca* and *Expansión*. As a source of revenue, *Expansión* would account for around 30% of its business volume in 2022 (interview with executive 16, 11/8/2022). The sports newspaper *Marca sport weekend* stands out as a highly profitable development (interview with executive 17, 11/8/2022).

> The limited scope of both charging for content and users' willingness to pay suggests that it would not make sense to rule out further exercises in brand extensions

El Mundo made its debut in this area in November 2022 with *The time of women* [*El tiempo de las mujeres*], a series of round tables, presentations, and workshops to discuss leadership, entrepreneurship, sports, culture, motherhood, and the challenge posed by technology (*Elmundo.es*, 2022b). Envisioned as *El Mundo*'s women's event, it involved print and digital. It was inspired by *RCS MediaGroup*'s experiment in Italy with the newspaper *Corriere della Sera* (interview with executive 17, 11/15/2022, and interview with executive 18, 11/11/2022). Another activity in the gastronomy sector was in the pipeline by the end of 2022, although 2023 was targeted as the year of growth for these brand extension experiments, some of which were linked to the relaunch of the *Economía* section of the newspaper (interview with executive 16, 11/8/2022).

> *Elmundo.es*'s experimentation with brand extensions and other sources of revenue outside of advertising helps us understand digital media's shift towards charging for content in their search for alternatives to compensate for the decline in advertising revenue

A failed attempt at brand extension in recent years was the launch of the daily podcast "*El Mundo* al día," imitating *nytimes.com*. Although it achieved outstanding ratings (*Elmundo.es*, 2022a), it failed to achieve its monetization objectives, beyond occasional sponsorships.

> "It's a new narrative that is important to be involved in because at some point it will be monetized" (interview with executive 17, 11/15/2022).

During 2022, *Unidad Editorial* tested out a brand extension project linked to the US market; it used the *El Mundo* brand and produced English-language content with the objective of monetizing traffic through programmatic advertising. The forerunner was *Marca*, which had had *Marca English* since 2012. Its revenue model is based on leveraging CPMs that are high, compared with the Spanish market.

> "We have managed to build something capable of competing in SEO with American brands" (interview with executive 16, 11/8/2022).

Unidad Editorial believes that it is competitive in search engine (SEO) traffic acquisition techniques thanks to its efforts to compete in the Spanish market, "not comparable to that of other countries in the sector where traditional media dominate the digital market" (interview with executive 18, 11/11/2022).

As with *Marca*, the *elmundo.es* model will be based on a reduced investment through coordination from Madrid and the hiring of local editors who write in English. The project, which has exclusively American content, has been waiting to be able to use the *elmundo.com* domain, owned by a Colombian company that ceased operations in April 2021 (*elmundo.com*, April 6, 2021). *Unidad Editorial* has been considering using an alternative brand if it cannot buy the domain (interview with executive 18, 11/11/2022).

4. Discussion and conclusions

4.1. Brand extensions as a current alternative for the monetization of digital newspapers

The first research question centers around whether brand extensions are currently an alternative for the monetization of digital newspapers. This case illustrates that the brand extensions were motivated by the search for alternative revenue streams. However, the initiatives were carried out primarily in the period when *elpais.com* decided to charge for its content and *elmundo.es* took advantage of the opportunity to expand its advertising market. Between 2002 and 2007, the newspaper experienced double-digit growth in advertising, with the exception of one year, and reached market shares that have never been seen again (**Sangil**, 2020). Despite this performance, since the portal produced more page views than it was able to market through advertising, they decided to monetize these spaces: The main initiatives were based on unsold advertising spaces. However, several activities were related to testing the brand's influencing power to boost other businesses. Searching for new business frontiers at a time of market turmoil was a factor that motivated the projects described herein, in addition to the draw of gaining a foothold in the telecommunications sector. However, as investment in areas outside of content were short-lived and spending capacity was limited, the company decided to focus on more strategic activities. In this sense, in a constantly changing digital market, business frontiers were moveable, and there is currently room to make inroads into new experimentation with brand extension, such as the initiatives that began in 2019, which seem to have been especially subject to the investment capacity of newspaper companies. However, the executives observed that advertising is the main source of revenue and will remain so (interview with executive 18, 11/11/2022).

> "In our case, in the most optimistic scenario, in 2025 more than 80% of our revenue would come from advertising" (interview with executive 16, 11/8/2022).

Charging for content is the second channel, and

> "we currently collect more from subscribers than from any individual advertiser" (interview with executive 17, 11/15/2022).

In most of the experiments described, what the research has shown holds true: In brand extensions, a product's fit is more important than complete consistency with the brand image. This applies to extensions of common product lines with a leading role in the category (**Bhat**; **Reddy** 2001). **Park**, **Milberg**, and **Lawson** (1991) also showed that, in brands with a structure defined more by the product, the similarity within the category has a greater influence on the evaluation of the supplementary product than the fit with the brand image. Future experimentation with brand extension will require consistency and similarity within the category.

> Interestingly, the original brand's strength and the fit with the brand's image influence less regular readers. This may indicate that press brands are positioned in people's minds, even when they do not consume them

4.2. Effect that a news brand's influence has on the sales capacity of non-news products

With respect to the second research question regarding the effect that a news brand's influence has on the sales capacity of non-news products, it can be affirmed that *Unidad Editorial*'s results with brand extensions are in line with academic research when it comes to the following: The most influential factors of success are the brand's strength, and the fit and consistency of the product with the original brand, as in the consumer goods sector (**Völckner**; **Sattler**, 2006).

The e-commerce experiment on *elmundo.es* illustrates the brand's strength in the newspaper industry, whether it plays an all-encompassing role or only a slight and indirect one in brand extensions close to the core product or whether it includes more distant associations. When it comes to brand extensions of non-news products, the importance of the original brand is greater and has a greater influence on attitudes toward the supplementary product. In these cases, consumers are insecure and rely mostly on their impression of the original brand (**Hem**; **De-Chernatony**; **Iversen**, 2003; **Huang**, 2020).

The implementation of non-news products is more complex and is only advisable for strong brands with a broad image. Not only should the product's fit be taken into account but also its consistency with the brand's image. Interestingly, the original brand's strength and the fit with the brand's image influence less regular readers. This may indicate that press brands are positioned in people's minds, even when they do not consume them. The success factors related to less frequent readers show that supplementary products can expand the market beyond regular readers (**Habann**; **Nienstedt**; **Reinelt**, 2008).

Newspaper brands can be considered "functional brands" ["*marcas funcionales*"] owing to the stronger influence of product fit on both news products and products beyond content. This implies that its image and brand concept are mainly characterized by the newspaper product. Consequently, the image is based more on concrete product features than on conceptual associations. In fact, the impact of the relationship to brand image is greater for products beyond content than for news products, although it does not outweigh fit (**Förster**, 2015), as is the case with symbolic or prestige brands (**Park**; **Milberg**; **Lawson**, 1991).

4.3. Experimentation with brand extension shaped digital newspapers' paid content strategy

Regarding the third research question on whether experimentation with brand extension shaped digital newspapers' paid content strategy, it should be noted that *elmundo.es*'s experimentation with brand extensions and other sources of revenue outside of advertising helps us understand digital media's shift towards charging for content in their search for alternatives to compensate for the decline in advertising revenue. Some brand extension initiatives were integrated as advertising activities; others, such as their attempts to move into the telecommunications sector, no longer made sense when the turmoil in the media industry settled; and a third group contributed to dissociating news influence from that on buying non-news products.

When the market matured in terms of its willingness to pay for content, the media outlet did not consider reviving their brand extensions to non-news products. Their brand extension experiments had not achieved revenue volumes that contributed significantly to the sustainability of the digital business. Thus, the revenue generated by charging for content does not seem to guarantee the business as we know it. Globally, digital newspaper circulation revenues amounted to $5.2 billion in 2018, 28% of their turnover (*World Association of Newspapers*, 2019). The limited scope of both charging for content and users' willingness to pay (*Reuters Institute*, 2020; **O'Brien** *et al*., 2020) suggests that it would not make sense to rule out further exercises in brand extensions. The case study showed this with new brand extension experiments once it debuted its paywall.

The analysis suggests that further attempts at brand extensions are possible. The brand strength and a product's fit and consistency with the original product are two main factors in the sales capacity of non-news products. Past experimentation did not earn amounts of revenue that contributed significantly to the sustainability of the digital business, but it does not seem that the revenues generated by charging for content guarantee the business either. In addition, the new practices will be subject to the investment capabilities of the journalistic companies.

This research provided in-depth knowledge of the experimentation of a leading digital newspaper, but it is limited to a specific example. Therefore, future research will be able to contrast the experimentation with brand extension carried out by other national and international publishing groups. The eventual resurgence of the use of brand extensions in response to reduced advertising revenues, as well as charging for content and the changing market conditions, may also be tracked..

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Trajectories and regimes in research versus knowledge evaluations: Contributions to an evolutionary theory of citation

Loet Leydesdorff; Lin Zhang; Paul Wouters

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Loet Leydesdorff
https://orcid.org/0000-0002-7835-3098

University of Amsterdam, Amsterdam School of Communication Research (ASCoR), PB 15793
1001 NG Amsterdam, The Netherlands
loet@leydesdorff.net

Lin Zhang
https://orcid.org/0000-0003-0526-9677

Wuhan University, School of Information Management, Center for Science, Technology & Education Assessment (Cstea)
Wuhan, China
linzhang1117@whu.edu.cn

Paul Wouters ✉
https://orcid.org/0000-0002-4324-5732

Leiden University, Centre for Science and Technology Studies (CWTS)
Leiden, The Netherlands
p.f.wouters@cwts.leidenuniv.nl

Abstract

Citation analysis can provide us with models of the evolutionary dynamics in scholarly and scientific communication. We propose to distinguish between institutional research evaluation (usually, *ex post*) and knowledge evaluation *ex ante*, in relation to directionality in citation analysis. We discuss the theoretical literature on communication systems which distinguishes between information and meaning, in which the concept of redundancy plays an important role as measure of the potential of a communication system. This is the basis for a model of knowledge dynamics which differentiates between observable variation and latent selection environments. We use indicators at the journal level and analyze the citation environments of journals in both the cited and citing directions. Among journals, the citing direction can be analyzed by co-citation and indicates the integration of knowledge from different fields. The cited direction can analogously be analyzed by bibliographic coupling and represents the extent to which the cited journal has become relevant for different disciplines, hence indicates knowledge diffusion. We apply this analysis on three different case studies of journal-journal relations: a small scale study of the journal *Public Understanding of Science*, a random sample of 100 journals, and a large-scale analysis of the set of *JCR* 2016 journals. Combined, the results seem to confirm the hypothesis that interdisciplinarity cannot be captured by one-dimensional citation analysis. Both citing and cited directions are relevant for knowledge and research evaluations, respectively. We raise the question whether indicators of interdisciplinarity can be developed by combining both directions in citation analysis, indicate further research, and discuss the normative implications of our preliminary results.

Keywords

Interdisciplinarity; Synergy; Theory of citation; Bibliographic coupling; Co-citation; Research evaluation; Knowledge evaluation; Evolutionary theory of citation; Scholarly communication; Scientific journals; Indicators; *Journal Citation Reports*; *JCR*.

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1. Introduction

Whereas citation impact can be measured for the purpose of research evaluations, scholars reconstruct boundaries among disciplines and specialties with reference to literatures. The act of referencing can be interpreted as an instance of *knowledge* evaluation, different from the institutionally oriented *research* evaluations. Knowledge evaluations can be expected to have a dynamic different from research evaluations. Although variation in the cited and citing dimensions can be captured in a single (asymmetrical) citation matrix, selections in the two directions involve distinct environments .

The citation matrix shows all variation and co-variation, but *not* necessarily the underlying selection mechanisms. The latter may remain latent. Variation is phenotypical and thus observable, whereas selection environments cannot be observed directly because they are based on virtual codes in human communication: they need to be defined theoretically.

Unlike biological codes (such as DNA), codes in interhuman communictions are not given naturally. However, intersubjectively binding codes can be specified reflexively as theoretical constructs by a (scientific) community. Because communication is dynamically developing, the selections can iteratively operate on one another. The highly-skewed distributions of citations, for example, suggest recursive selections of selections (**Bruckner** *et al*., 1994). Furthermore, the social system is highly differentiated and different selection mechanisms can therefore interact with each other. In social systems, markets operate as selection dynamics differently from political decision-making. Following **Schumpeter** (1939), one can also distinguish between selections on the market with a tendency toward equilibrium and innovations that upset equilibria (**Dosi**, 1982; **Nelson**; **Winter**, 1977; 1982; **Sahal**, 1981). The historical development of social organization can be seen as a retention mechanism in an evolutionary system which stabilizes social and cognitive relations and thereby functions as a localizable selection environment that is analytically different from e.g., global quality control or peer review routine. Without specification of selection environments –that is, genotypical criteria– the reconstruction cannot reach beyond a redescription of phenotypical variation. Understanding the dynamics of communication and knowledge creation, therefore requires models that enable us to specify selection criteria and their development over time.

The complexity of communication can *evolve* in systems which process both information and meaning. First, information is produced in historical processes and is measurable as entropy (**Shannon**, 1948; **Gleick**, 2011); meaning can reflexively be provided with reference to the codes in the information. We understand the providing meaning to information as asking to the selection of a signal from noise (**Leydesdorff**, 2021, p. 7). After all, not all information is meaningful in a particular context. The subsequent processing of meaning mediates between the historical developments and their evolutionary dynamics. While information can be communicated, meanings can be shared (one of the forms of processing meaning). The cycling of meanings on top of the entropy flow can be expected to generate redundancy in the system and thus enlarge the number of options available (although not yet used) (**Leydesdorff**, 2021, pp. 75-76). In information system terms, the maximum information content is then increased without communicating more than zero information (e.g. one can signal the existence of empty boxes) (**Brooks**; **Wiley**, 1976, p. 76). We shall argue below that citation analysis can provide us with access to the complex interaction between information and meaning processing in the evolution of interhuman communications (**Leydesdorff**, 2021).

2. Modelling knowledge dynamics

Knowledge can be expected to develop as the result of co-evolutions and tensions among the various subdynamics in the communication. **Kuhn** (1977), for example, considered science as the result of “essential tensions” between stability and change. **Popper** ([1935] 1959) further distinguished between contexts of discovery and justification as (potentially co-evolving) subdynamics. **Gibbons** *et al.* (1994) added the context of application as typical of the dynamics facilitated by the internet.

Three subdynamics operating upon one another can encompass all species of complex dynamics (**Langford**; **Hall**, 2005; **Li**; **Yorke**, 1975; cf. **Langford** *et al*., 2006). The knowledge structures resulting from such co-evolutions (re)produce, among other things, the observable network structures in which cultural evolutions can historically be retained (**Fujigaki**, 1998; cf. **Giddens**, 1984). By recursively and discursively selecting on historical trajectories with reference to criteria, new regimes of expectations can emerge as a consequence of the existing redundancies in a communication system. In this way, expectations about the future development can “invert the arrow of time” without violating the laws of physics.

Understanding the dynamics of communication and knowledge creation, requires models that enable us to specify selection criteria and their development over time

In physical evolution, this development is a blind interaction between variation and selection (for example when a superfluous piece of biological code is transformed leading to a new property). In cultural evolution, anticipatory systems (such as humans) can introduce a goal-oriented selection which introduces a fundamentally novel dimension in the communication dynamics. This is also the key to understanding the relation between information and meaning: meaning is the second-order linkage between information and anticipatory selection regimes (see **Leydesdorff**, 2021, for further details about the implication for the social sciences).

Knowledge can be expected to develop as the result of co-evolutions and tensions among the various subdynamics in the communication

In other words: along trajectories, entropy is generated in observable changes; regimes, however, operate in terms of expectations which add to the redundancy in the opposite direction and thus reduce the relative weight of the observed information. Using **Shannon** (1948), redundancy *R* can be measured as the difference between the maximum entropy (H_{max}) and the observed information ($H_{observed}$). Redundancy can serve as an information-theoretical measure of the potential of the systems for options that have not yet been realized (**Brooks**; **Wiley**, 2011; **Leydesdorff**; **Ivanova**, 2014; 2021; **Petersen** *et al*., 2016).

The complexity, recursive dynamics, and nesting of the operations along different axes generate asynchronicities and tensions (**Kuhn**, 1977). These tensions can be relaxed by changing the landscape; for example, as in the case of avalanches. Such discontinuities can be large or small, to variable extents. From this (neo)evolutionary perspective, breakthroughs are a consequence of "self-organized criticality" in communication structures (**Bak**; **Tang**; **Wiesenfeld**, 1987; **Leydesdorff**; **Wagner**; **Bornmann**, 2018).

The evolving knowledge bases are archived and reflected in the literature as the "footprints" of scientific (r)evolutions. In the background the scholarly literature functions both as a repository of these footprints and provides the common ground on the basis of which new dynamics can be generated as variation (**Luhmann**, 1996). This repository can also be seen as an archaeological source which enables the reconstruction of the process of knowledge creation. For this reason, citation indicators can be used as elements in models of knowledge dynamics.

2.1. The processing of meaning

How the processing of meaning (citing) can make a measurable difference for historical information processing was conjectured by Luhmann in his discussion with Habermas in 1971 (1971, p. 34; 1990a, p. 27). At the time, Luhmann formulated programmatically as follows:

> "[…], what is special about the meaningful or meaning-based processing of experience is that it makes possible *both* the reduction and the preservation of complexity; i.e., it provides a form of selection that prevents the world from shrinking down to just one particular content of consciousness with each act of determining experience." (**Luhmann**, 1990a, p. 27)

Notwithstanding the author's explicit *caveat* that this characterization "is still not adequate," Luhmann was ahead of his time by claiming meaning-processing as a selection mechanism that is different from natural selection. The processing of meaning includes a second-order dynamics which feeds both back and potentially forward on the stream of historical events. **Luhmann** (2012, p. 238) speculated that "[w]e need only a sufficiently subtle theory of time that determines the present as the boundary between past and future." Although the relevant question was raised, this program was not elaborated into empirical operationalizations.

For example, Luhmann formulated against Habermas as follows:

> "Social structures do not take the form of expectations about behavior (let alone consist of concrete ways of behaving), but rather take the form of expectations about expectations." (**Luhmann**, 1990b, p. 45 [1971, p. 63])

However, this was not elaborated into historical developments of expectations along trajectories as different from evolutionary mechanisms of the generation and evolution of expectation with reference to horizons of meaning.

2.2. A neo-evolutionary perspective

In the neo-Schumpeterian tradition of evolutionary economics and technology studies, **Dosi** (1982) first addressed the tension between trajectories and regimes in a paper entitled "Technological paradigms and technological trajectories: A suggested interpretation of the determinants and directions of technical change" Dosi formulated the relations between trajectories and regimes as follows:

> "A technological trajectory, i.e., to repeat, the "normal" problem solving activity determined by a paradigm, can be represented by the movement of multi-dimensional trade-offs among the technological variables which the paradigm defines as relevant. Progress can be defined as

The creation and observation of interdisciplinary connections can be used as an empirical case study to analyze the role of future oriented expectations in knowledge dynamics. For this analysis, the difference in direction of the citation is relevant

the improvement of these trade-offs. One could thus imagine the trajectory as a "cylinder" in the multidimensional space defined by these technological and economic variables. (Thus, a technological trajectory is a cluster of possible technological directions whose outer boundaries are defined by the nature of the paradigm itself)." (**Dosi**, 1982, p. 154)

> Whereas interdisciplinarity as co-citation can be interpreted as a measure of interdisciplinary integration of knowledge, interdisciplinarity as bibliographic coupling can be interpreted as a measure of interdisciplinary diffusion

"[…] In broad analogy with the Kuhnian definition of a "scientific paradigm," we shall define a "technological paradigm" as "model" and a "pattern" of solution of *selected* technological problems, based on *selected* principles derived from natural sciences and on *selected* material technologies." (**Dosi**, 1982, p. 152)

Note the specification of three selection environments. However, Dosi's research program was overshadowed by **Nelson** & **Winter**'s (1982) groundbreaking book *Evolutionary theory of economic change.* Unlike their earlier agenda calling for "a useful theory of innovation" (**Nelson**; **Winter**, 1977), **Nelson** & **Winter** (1982) shifted the focus to the firm as the unit of analysis. They formulated as follows:

"The heart of the conceptualization problem discussed in the preceding section was to characterize the generation of innovation as purposive, but inherently stochastic." (**Nelson**; **Winter**, 1982, p. 54)

The earlier focus on deterministic *selection environments* was thus abandoned (cf. **Nelson**; **Winter**, 1978, p. 64). **Casson** (1997) noted that the delineation of innovation systems in institutional terms offers the advantage of compatibility with (e.g., national) statistics (**Griliches**, 1994). However, an institutional perspective on innovation leads sooner or later to a theory of entrepreneurship rather than accounting for the dynamics of communication and innovation (**Carter**, 1996; **Godin**, 2006).

The emphasis in evolutionary economics has increasingly been on co-evolutions between regional economics, economic geography, and technological options (**Audretsch**; **Feldman**, 1996; **Boschma**; **Balland**; **Kogler**, 2014; **Feldman**; **Storper**, 2016). This literature suggests a mutual shaping among the various factors of knowledge production, inducing trajectories and niches (**Geels**; **Schot**, 2007). As **Andersen** (1992) and **Boulding** (1978) noted, the evolution-theoretical perspective became secondary to an empirical approach with a focus on the historical development (**Malerba** *et al*., 1999). This paper aims to redress the balance and draw attention again to the evolutionary perspective.

3. Operationalization

The creation and observation of interdisciplinary connections can be used as an empirical case study to analyze the role of future oriented expectations in knowledge dynamics. For this analysis, the difference in direction of the citation is relevant.

Is another perspective on "citation" possible when one studies references ("citing") rather than citations ("cited") (**Garfield**, 1964)?; **Zitt** & **Small** (2008), for example, transposed the aggregated journal-journal citation matrix and thus generated a mirror image of the journal impact factor (JIF), (**Garfield**, 1971), which they called the "journal audience factor." In a similar vein, **Leydesdorff** & **Ward** (2005) suggested "disclosure" to audiences as an objective different from "impact." Whereas impact measures "sending" along the arrow of time, the operation in the opposite direction requires "disclosure" of alternative options.

Figure 1 illustrates the difference in the directionality of co-citations (**Marshakova**, 1973; **Small**, 1973) *versus* bibliographic coupling (**Kessler**, 1963). Co-citations are generated in an historical process; bibliographic couplings are knowledge-based and thus subject to organized knowledge production and control (**Nonaka**; **Takeuchi**, 1995; **Whitley**, 1984).

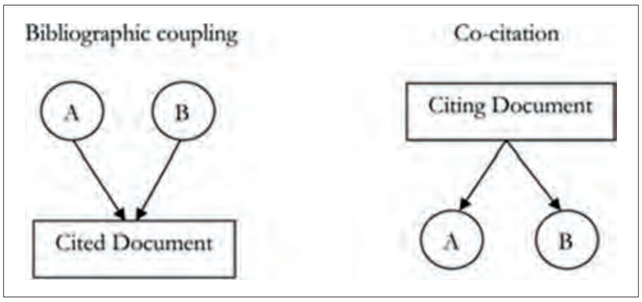

Figure 1. Bibliographic coupling and co-citation. Source: **Meireles**, **Cendon** & **De-Almeida** (2004).

The distinction between referencing to horizons of meaning and citation as references to past performance is not to be equated with the distinction between qualitative story-telling versus quantitative testing. Quantification is an issue of measurement scales. New ideas are first developed qualitatively, but for hypothesis testing and at a more aggregated level one may need statistics.

In a recent blogpost, **Ràfols** (2021) suggested that interdisciplinarity is based on a second *directionality* in citation data –"citing"– and cannot be captured in one-dimensional analyses of "citedness." **Marres** & **De-Rijcke** (2020) have proposed using "indicating," as different from citing or referencing. "Indicating" refers to "horizons of meaning" (**Husserl**, [1935/36] 1962) in addition to informing us about the data. If one wishes to measure elements of the process of "indicating" one will also need indicators that combine the different directions in citation analysis.

Whereas interdisciplinarity as co-citation can be interpreted as a measure of interdisciplinary integration of knowledge, interdisciplinarity as bibliographic coupling can be interpreted as a measure of interdisciplinary diffusion. We are interested in the interplay of both directions as an empirical case of the interplay between trajectories and selection regimes. It is this interplay which may create fundamental novelty in the system. Is it possible to capture this development in an integrated indicator of interdisciplinarity?

4. Exploring potential indicators

4.1. A specific set

Let us first develop the model using a relatively small citation matrix among 24 journals citing articles in *Public Understanding of Science* (*PUS*) during 2019 as an example.[1] Figures 2 and 3 provide (rather standard) visualizations of the co-occurrences matrices in the cited and citing directions, when *PUS* is used as the seed for mapping the relevant citation and referencing environments. We chose *PUS* because this journal is programmatically oriented towards the subject that we theorize.

In Figure 2, *PUS* has a peripheral position as part of a group of small journals (including, e.g., *Science Communication* colored yellow in Figure 2), whereas this journal is central at the crossroads of the citation traffic among three journal clusters in Figure 3. The three journal groups in Figure 3 indicate specialties focusing on (1) sustainability, (2) science communication, and (3) science and public policy, respectively.

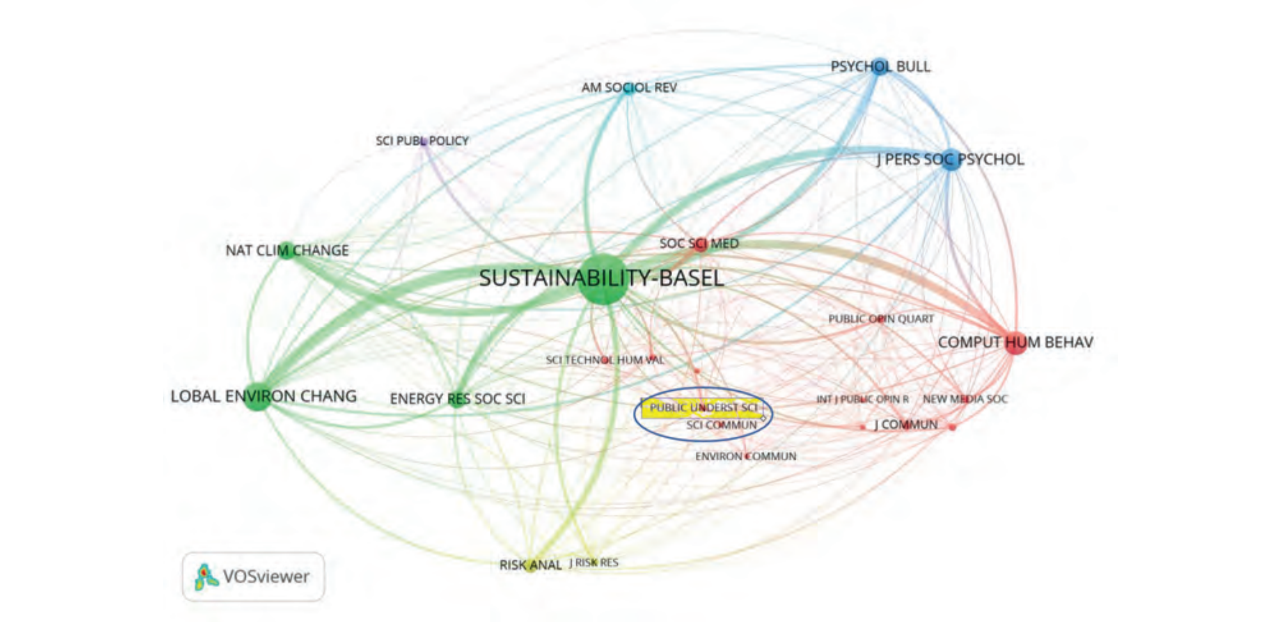

Figure 2. Citations in the *cited* direction for *Public Understanding of Science*, mapped and grouped using *VOSviewer*.

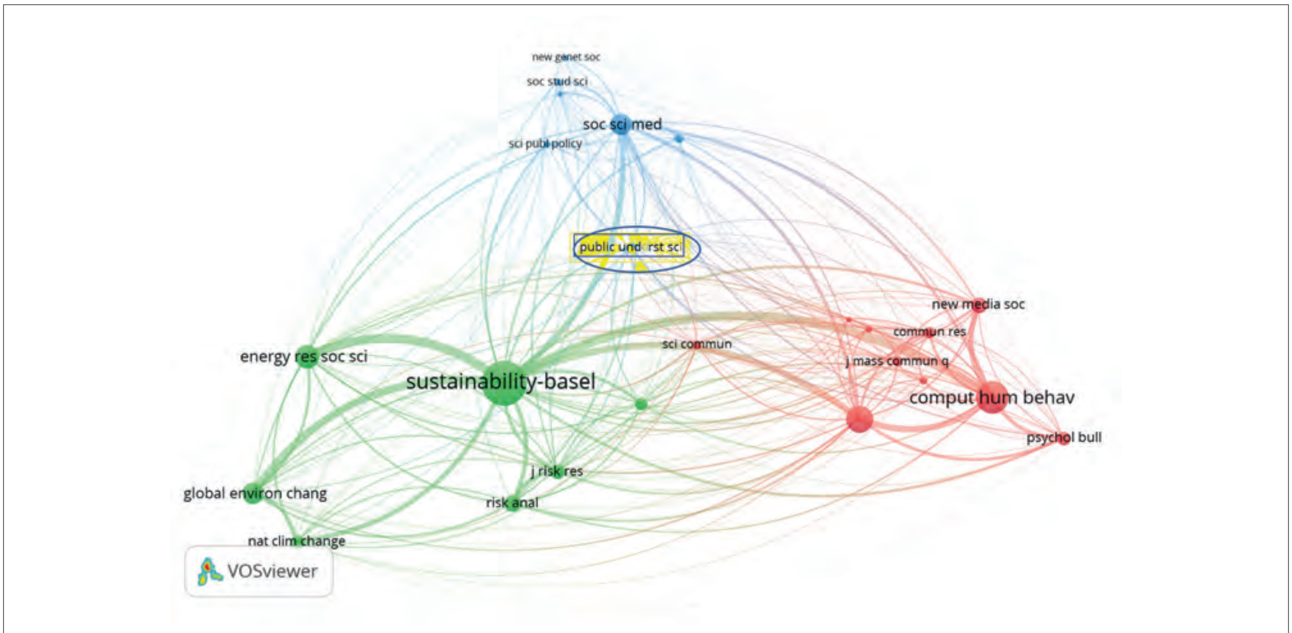

Figure 3. Citations in the *citing* direction for *Public Understanding of Science*, mapped and grouped using *VOSviewer*.

Figures 2 and 3 show that *PUS* is cited as a specialist journal in the field of "science communication," but papers published in *PUS* cite journals from different disciplines in their relevant environments. A mapping, however, is not a sufficient basis for quantitative evaluation if one wishes to compare different groups, or if one wishes to analyze current and past relations between disciplines. This raises the question: how one can indicate the relations between disciplines from the perspectives of research evaluations *versus* knowledge evaluations?

4.2. Operationalization in terms of indicators

One can consider indicators in the cited and citing directions as two analytical axes *x* and *y* of a map. For example, the journal impact factor (JIF) can be considered as an indicator of prestige and reputation, among other possible indicators in the "cited" direction. Indicators for measuring interdisciplinarity in the "citing" direction have been developed more recently (**Ràfols**; **Meyer**, 2010; **Stirling**, 2007; **Leydesdorff**; **Wagner**; **Bornmann**, 2019; **Zhang**; **Rousseau**; **Glänzel**, 2016; **Zhang**; **Leydesdorff**, 2021).

The most straightforward impact indicator in the cited dimension is "times cited" (TC). One advantage of this indicator is that citations and publications can be counted: counts can be added and subtracted, whereas issues of normalization may lead us astray into discussions about proper statistics and baselines. "Total cites" (TC) is a size-dependent indicator, whereas JIF is size-normalized.

Analogously, one can use a variety of indicators for the measurement of interdisciplinarity. In this second dimension, we chose *DIV** (Figure 4) as one among the advanced indicators of interdisciplinarity. This indicator has advantages when compared with alternative options (**Zhang**; **Leydesdorff**, 2021). As data, we again use the matrix of 24 journals in the citation environment of the journal *PUS*.

Figure 4 shows that the distributions are skewed: some of the 24 journals specialize in one of the two dimensions (along the respective axes). The two indicators are inversely correlated (Pearson's r = -.38, *n.s.*; Spearman's ρ = -.41, p < .05): scoring high on TC is related to a low score on *DIV**. One can find *PUS*, for example, represented at the right-most end along the *x*-axis (x = 8.17), while the psychology journals lead the ranks along the *y*-axis (TC > 50,000). Closer to the origin, we find journals which are thematically close to *PUS*, but lower on interdisciplinarity. A few journals, such as *Global and Environmental Change* and *Sustainability-Basel* populate the map towards the middle. In these latter journals trade-offs between the two dimensions are indicated. This analysis therefore reveals the different roles of the journals in terms of social network theory –observable relations in history– and latent communication structures –evolutionary. This may inform science policy and the potential targeting of journals for priority programming. The distances to the origin ($\sqrt{x^2 + y^2}$) provide a size-dependent statistic.

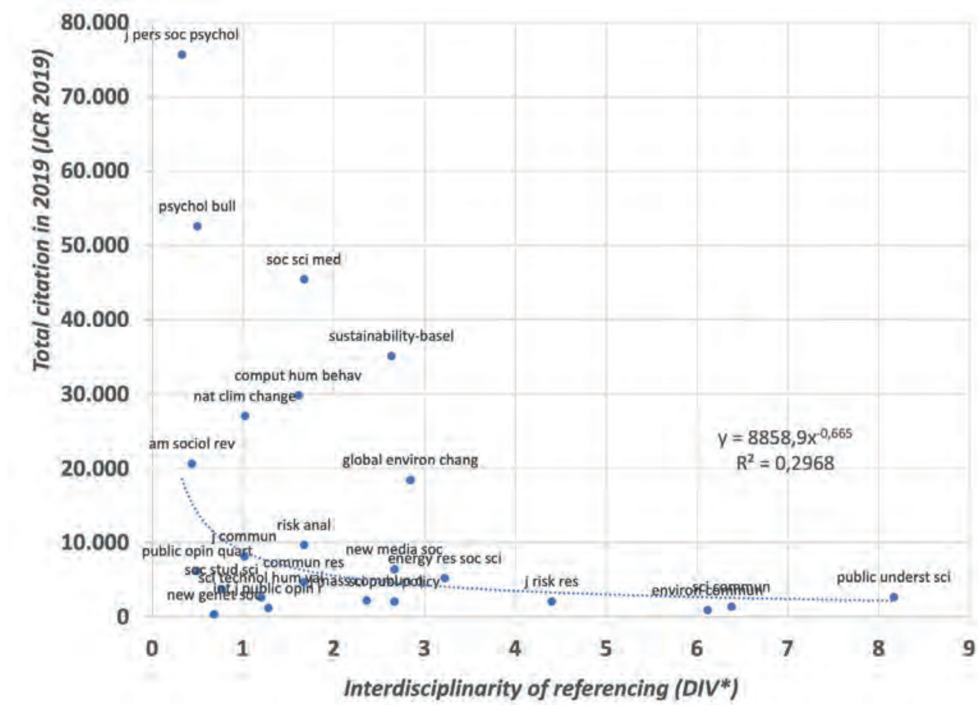

Figure 4. Twenty-four journals citing from and cited by *PUS* during 2019 in terms of interdisciplinarity (*DIV**) on the *x*-axis and times impact (times cited; *TC*) on the *y*-axis.

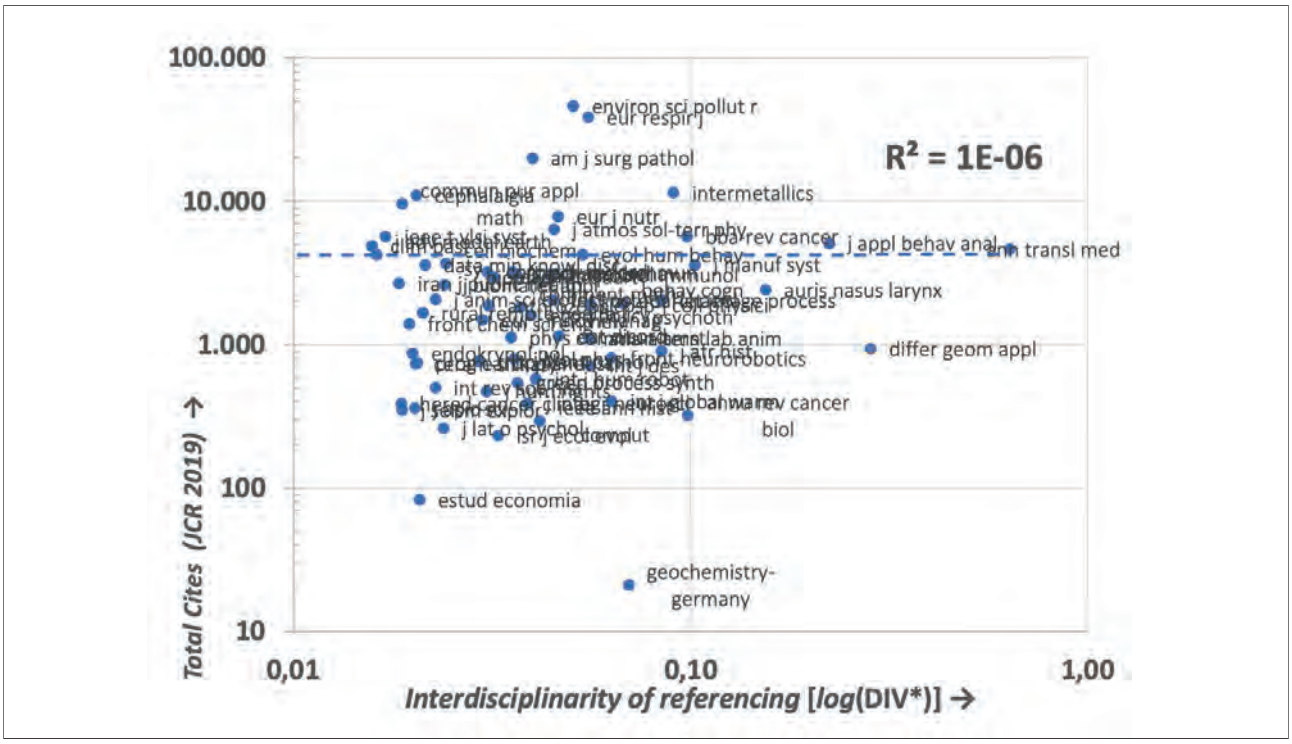

Figure 5. Total Cites plotted against *DIV** for a random sample of 100 journals listed in the *JCR* 2019; $r < 0.01$.

4.3. Random sample

Is the inverse relation found above between the two dimensions specific for *PUS*, or would it be structural and also hold for a random sample of journals drawn from the set of journals in the *Journal Citations Reports* (*JCR*) of *Clarivate*? Since the computation of *DIV** for more than 10,000 journals is time-consuming, we first attempted to work with a random sample of 100 journals.[2] Thereafter (next paragraph), we use 2016 data, for which indicator values were available from a previous project (**Leydesdorff** *et al*., 2019).

Figure 5 shows the results using a random sample ($N = 100$), but otherwise the same methods as in the case of Figure 4. The two dimensions are statistically independent in this sample: $r = 0.001$ ($p > .99$). We may thus conclude as to the absence of correlation or, in other words, orthogonal perspectives.

4.4. *JCR* 2016 journal set

The results of a random sample can be incidental given the sample choice. We therefore enlarged the analysis to the population of 11,487 journals in *JCR* 2016. The *Journal Citation Reports* (*JCR*) have provided journal indicators (impact factors, etc.) based on yearly aggregated journal-journal citation relations since the mid-1970s.[3, 4]. The usual journal indicators are provided with the files for the basic indexes by *ISI/Clarivate*. We have added centrality measures –betweenness, closeness, in- and outdegree, and eigenvector (Table 1)– to each journal in this file because these network measures were sometimes found to be relevant for indicating interdisciplinarity (**Abbasi**; **Hossain**; **Leydesdorff**, 2012; **Leydesdorff**, 2007).

In sum, the input file for the analysis contains the following indicators at the journal level for 11,487 journals included in *JCR* 2016:

Table 1. Indicators included in the analysis of *JCR* 2016 data

Journal indicators (Source: *JCR* 2016)	**Diversity indicators** (Source: **Leydesdorff** *et al*., 2019)	**Network indicators**
- Total cites, *N* of self-citations. - Two and Five-Year Impact Factors. - Immediacy and Eigenvector indicators.	- Rao-Stirling and True Diversity; - *DIV* and *DIV** - Simpson, Shannon, Variety - Disparity, operationalized as (1 – cosine) at the database level	- indegree, - outdegree, - betweenness, - closeness, - eigenvector.

As could be expected, we find complexity in the interactions among the network and diversity measures. Without the network measures, however, the first factor with highest factor loading for TC and JIF is followed by a second factor with highest loadings for *DIV**. This two-dimensional structure confirms **Ràfols**' *et al.* (2012) conjecture: the two components are negatively correlated.

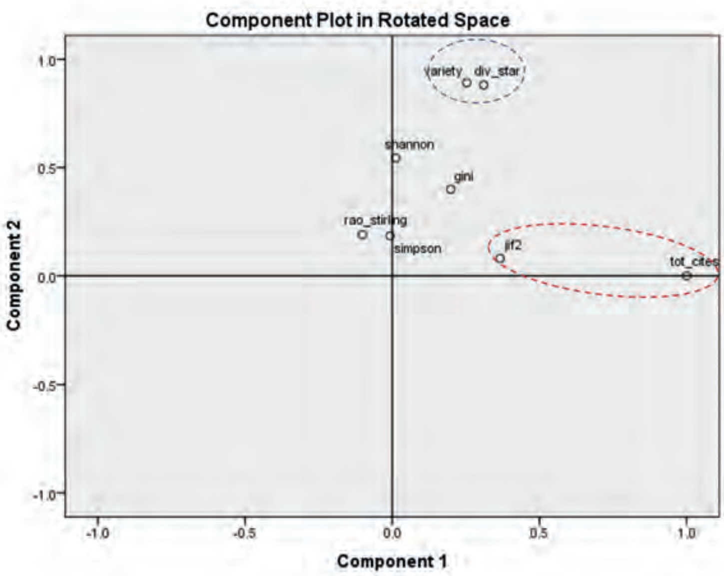

Figure 6. Visualization of the two-factor solutions (*SPSS v.22*) of the matrix of indicators *versus* 11,487 journals (without the network measures; oblique rotation). Structure matrix.

Figure 6 shows the two-dimensional component plot. The figure visualizes the (relative) orthogonality between the two components. "Total cites" correlates completely (r = 1.0) with Factor 1. *DIV** is grouped with variety as a second dimension. Using oblique rotation, the correlation between these two components is 0.232.

Table 2. Two-factor solution (without the centrality measures)

	Rescaled component	
	1	2
Total cites	**1.000**	**.232**
jif-2	.385	.165
DIV*	**.515**	**.953**
variety	.460	.950
Shannon	.138	.547
Gini	.291	.445
Simpson		.183
Rao-Stirling		.167

5. Discussion and further perspectives

The discussion above and the preliminary testing of our hypotheses against empirical data call for the specification of selection environments. Specification of what is evolving may enable us to be more precise (in further research) about what can be tested and how, so that the model can be further filled out empirically. We recall that first answering the question "What is evolving?" should not be skipped, however speculative the initial responses may be.

One of our objectives in this study was to unpack the issues from an analytical perspective. Citation analysis can provide us with models of the (neo)evolutionary dynamics. Considering observable citation as phenotypical variation, one can raise the question of the specification of relevant selection environments. Selection is operating in processes of "mutual shaping" between cited and citing at each moment of time, and dynamically as stabilization and globalization over time. Selection mechanisms tend to develop orthogonally (**Maturana**, 1978). However, codes operate as selection mechanisms upon one another, in addition to operating on variation. Stabilizations provide second-order variety for globalizations as a second-order layer of selections.

Our case study shows that citation analysis which is based on only one direction (be it either citing or cited) may miss the complex interaction between variation and selection regimes. This is especially important in the case of anticipatory systems which recursively redefine the criteria for selection. For example, the rise of interdisciplinary research in the life sciences has completely redefined chemistry, physics and biology.

6. Normative implications

In a knowledge-based economy, not only the state and knowledge-based enterprises should have access to the knowledge production process. Citizen groups and other stakeholders can be relevant reference groups that submit demand (variation). From the perspective of innovation policy, there is a need for the articulation of demand, countervailing the supply-side orientation of academia. In Mode-2 configurations of university-industry-government relations one needs new options resulting from the interactions among novelty generation (in academia), wealth generation (in industry), and governance.

In other words: evaluation of the societal role of knowledge cannot be based on research assessments of past performance. When one focuses on the horizontal interactions among codes, one needs to move beyond an agenda of research evaluation towards an agenda for the evaluation of knowledge –both inside and outside of academia. This orientation would also enable a more inclusive appreciation of the different forms in which research results diffuse socially. Exploring a broader agenda of knowledge evaluation may go along with the move from indicators based on past performance to indicating the interdisciplinary creation and circulation of knowledge in search of possible synergies.

> In a knowledge-based economy, not only the state and knowledge-based enterprises should have access to the knowledge production process. Citizen groups and other stakeholders can be relevant reference groups that submit demand (variation)

7. Notes

1. The data was retrieved from the *Journal Citation Reports* 2019 in the *Web of Science* (*WoS*) of *Clarivate*™.

2. To make a random selection from a list with no repeats, see at
https://www.ablebits.com/office-addins-blog/2020/07/22/random-sample-excel-no-duplicates

3. Of these 11,467 journals included in *JCR* 2016, 11,459 (that is, 99.8%) are included in the analysis.

4. The computation of the interdisciplinarity and diversity indicators for 12,185 journals (*JCR* 2019) is computationally time-consuming. We first tried to work with a random sample, but the results were then not clear.

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How do journals deal with problematic articles. Editorial response of journals to articles commented in *PubPeer*

José-Luis Ortega; Lorena Delgado-Quirós

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José-Luis Ortega ✉
https://orcid.org/0000-0001-9857-1511

Instituto de Estudios Sociales Avanzados (IESA-CSIC)
Plaza Campo Santo de los Mártires, 7
14004 Córdoba, España
jortega@iesa.csic.es

Lorena Delgado-Quirós
https://orcid.org/0000-0001-8738-7276

Instituto de Estudios Sociales Avanzados (IESA-CSIC)
Plaza Campo Santo de los Mártires, 7
14004 Córdoba, Spain
ldelgado@iesa.csic.es

Abstract

The aim of this article is to explore the editorial response of journals to research articles that may contain methodological errors or misconduct. A total of 17,244 articles commented on in *PubPeer*, a post-publication peer review site, were processed and classified according to several error and fraud categories. Then, the editorial response (i.e., editorial notices) to these papers were retrieved from *PubPeer*, *Retraction Watch*, and *PubMed* to obtain the most comprehensive picture. The results show that only 21.5% of the articles that deserve an editorial notice (i.e., honest errors, methodological flaws, publishing fraud, manipulation) were corrected by the journal. This percentage would climb to 34% for 2019 publications. This response is different between journals, but cross-sectional across all disciplines. Another interesting result is that high-impact journals suffer more from image manipulations, while plagiarism is more frequent in low-impact journals. The study concludes with the observation that the journals have to improve their response to problematic articles.

Keywords

PubPeer; Bibliometrics; Retractions; Plagiarism; Data manipulation; Editorial notices; Journals; Journal impact; Scholarly communication; Publishing fraud.

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1. Introduction

Research journals are the central element in the current publishing system, where they are critical intermediaries between researchers and their scholarly audiences. This leading role gives them a great responsibility with regard to the research integrity of the published articles (**Marusic** *et al.*, 2007). Editorial boards and invited reviewers are the main gatekeepers to detect and filter erroneous and unreliable publications. However, the role of these actors is to select suitable studies for the journal and to improve the technical quality of the contributions, but not to discover data manipulations or infringements of copyright (**Martin**, 2012).

Furthermore, when these problematic articles are identified, many journals lack policies or procedures to handle these publications. In many cases, fraudulent practices go unnoticed because editors and reviewers lack of forensic skills and equipment to detect, for instead, image manipulations (i.e. forensic droplets) or text reusing (i.e. anti-plagiarism software). In other cases, editorial boards are unknown how reporting their suspicious to the authorities (i.e. universities, integrity offices), initiating an internal investigation or answering to their audiences. In consequence, many cases of errors in methods or questionable results have not been adequately treated, by not releasing its corresponding editorial notice (**Wager**, 2015). The creation in 1997 of the *Committee on Publication Ethics* (*COPE*) has helped editors and publishers to palliate this situation, increasing and normalizing the notifications (**Moylan**; **Kowalczuk**, 2016).

> The objective of this paper is to study the response of scholarly journals facing reports of research errors or misconduct about their publications

However, the absence of notices about investigations makes very hard to understand the real incidence of errors and misconduct in the current scientific literature, because we are not aware of whether an investigation has been carried out and, in that case, what decision was reached (**Smith**; **Godlee**, 2005). A supplementary way to understand this phenomenon is to explore social platforms such as *PubPeer*, where users can critically comment published papers, even report irregularities and fraud. This information allows to be contrasted with the journal responses to obtain a different point of view about the incidence of unreliable science.

This work aims to shed light on this problem exploring the response of journals to article reported in *PubPeer* of errors or misconduct. Using a new approach, comments about publications in that post-publication peer review site were compared with the response of journals by means of editorial notices, with the aim of studying how the journals react to troublesome articles.

2. Literature review

The study of the incidence of misconduct in the scientific literature has been focused on the response of journals releasing editorial notices. The first quantitative studies about these notifications were performed by **Budd** *et al.* (1998; 1999), who summarized the reasons of retractions and the citation of retracted papers. Later, other studies warned of the increase of this type of editorial publications (**Cokol** *et al.*, 2008, **Redman** *et al.*, 2008). **Steen** (2011) also perceived that the levels of misconduct appeared to be higher than in the past when he studied 742 articles from *PubMed*; and two year later, **Steen** *et al.* (2013) concluded that the increment of retractions was mainly due to lower barriers in the detection of bad practices. More recently, **Tripathi** *et al.* (2019) perceived that open access journals had a greater number of retractions as compared to subscription based journals, introducing the influence of the venue in the fraud. In this sense, many studies have observed a positive relationship between journal impact and editorial notices (**Cokol** *et al.*, 2007; **Fang** *et al.*, 2012; **Aspura** *et al.*, 2018; **Faggion** *et al.*, 2018).

Many other studies have focused on the content of the editorial notices, because not all of them are released by fraudulent cases. **Budd** *et al.* (1998; 1999) were the first one in exploring the content of the retractions and they found that 37% of them are due to evident misconduct. **Nath** *et al.* (2006) found that more than the half of the retractions in Medicine were caused by nonintentional mistakes. **Wager** and **Williams** (2011) detected that 28% of retractions were due to research misconduct and 17% to redundant publication. **Fang** *et al.* (2012), studying more than 2,000 research articles, observed that 67.4% of retractions were attributable to misconduct. In a similar study, **Decullier** *et al.* (2013) found that plagiarism (20%) and fraud (14%) were the common motives for retraction. Most recently, **Lei** and **Zhang** (2018) detected that misconduct is the cause of three quarters of the retractions in China; while **Vuong** (2020) observed important inaccuracies in retraction notices, where 10% of them did not contain information related to reasons for retractions. This disparity in the results evidences problems in the definition of misconduct, the creation of a standard taxonomy and the lack of transparency in some notices.

However, fewer articles have treated the response rate of journals to suspicious or problematic articles. **Wager** (2007) was the first one to address this issue, analysing cases submitted to *COPE*. Her results showed that from 79 cases, 49 (62%) were reported in the journal. That same year, **Cokol** *et al.* (2007) estimated the proportion of flawed articles no retracted, finding that 10,000 articles should be retracted, instead of the 596 observed. **Neale** *et al.* (2007) studied the cases of misconduct reported by the *Office of Research Integrity* (*ORI*) annual reports and *National Institutes of Health* (*NIH*) *Guide*, and they found that 83% of articles were noticed in the journals. In a similar study, **Resnik** and **Dinse** (2013) found 127 out of 174 (73%) fraudulent publications with an editorial notice. **Elia** *et al.* (2014) checked the editorial response to articles that warranted retraction from a specific misconduct case, and the result was a 90% of retracted articles. These studies are based on previously investigated publications; accordingly, the degree of response is high. Nevertheless, there are few studies that have explored this issue using external sources. **Brookes** (2014), who analysed anonymous complaints in a specialized blog. His findings were that only 23% of the reported articles were later corrected or retracted. More recently, **Bik** *et al.* (2018) manually inspected image manipulation in *Molecular and cellular biology* journals, and they found that approximately 10% of the papers with demonstrated image manipulation were retracted.

The post-publication review site, *PubPeer*, is becoming an interesting source for studies on scientific misconduct due to the posting of comments on questionable practices. The first studies have focused on discussing conceptual and ethical issues. **Blatt** (2015) and *PubPeer* (2015) debated on the risks of anonymous comments; while **Da-Silva** (2018a) criticized the ownership and copyright of these comments. However, more and more studies have explored its influence on the elucidation of suspicious publishing practices. **Wager** and **Veitch** (2017) used that platform to test its ability in reporting fraudulent cases, and they concluded that only 9% of comments required a journal reaction. **Ortega** (2021) analysed the coverage of editorial notices in this site, finding that the relationship between them is scant. More recently, **Ortega** (2022) categorized the content of *PubPeer* posts, observing that more than two-thirds of comments are posted to report some type of misconduct.

> This work sheds light on the response of journals to articles reported for errors or misconduct on the post-publication peer review site *PubPeer*

3. Objectives

The objective of this paper is to study the response of scholarly journals facing reports of research errors or misconduct about their publications. Using a descriptive approach, the study attempts to analyse the number and types of editorial notices released by issue type and journal. In addition, the incidence of these responses is analysed regarding to the academic impact and the research area of journals. Four research questions were addressed in this study:

- How often do journals react on articles reported of errors or misconduct? And what type of editorial notice do they release?
- How does evolve the proportion of editorial notices throughout the years? Is it improving the identification and correction of suspect literature?
- Is there any relationship between the academic impact of journals and their editorial response?
- Is this response different according to research areas?

4. Methods

4.1. Sources

PubPeer defines itself as journal club where scholarly documents can be discussed after being published or uploaded to the Web. Created in October 2012, the success of this post-publication peer review site resides in the possibility of posting comments anonymously. This particular feature has caused the specialization of the site in reporting of misconduct and errors in the scientific literature. This fact is generating considerable controversy because many authors feel defenceless in the face of unknown accusers (**Torny**, 2018). On the contrary, research integrity is benefiting from this format because allows the uncovering of bad practices with no reprisals. *PubPeer* also included comments from external sources such as *Twitter* and *PubMed Commons* (**Da-Silva**, 2018b).

Retraction Watch is a web blog created in 2010 by two scientific journalists, Ivan Oransky and Adam Marcus, concerned on the overall absence of transparency in the investigation of misconduct in science and, concretely, on the lack of information in retractions. In this manner, the blog investigates the hidden reasons behind inscrutable retraction notices with interviews and inquiries about retraction cases. These retractions are storage in a publicly accessible bibliographic database, *Retraction Watch Database*:
https://www.retractiondatabase.org

This is an exhaustive list of retracted publications, which includes the reasons of the retraction from the retraction notice or as result of their investigations.

PubMed is an academic search engine created by the *National Institutes of Health* (*NIH*). Launched in 1997, the engine connects with *Medline* database to retrieve research publications on Biomedicine and related disciplines. *PubMed* was used because is one of the few search engines that links the original publication with the associated editorial notices.

4.2. Data access and extraction

PubPeer does not provide open access to their data. Due to this, information about publications and associated comments were directly extracted from the website (*pubpeer.com*) using web scraping techniques.

Two samples were extracted for this study in different moments. In March 2019, 32,097 threads and 65,179 posts were obtained. This sample was enlarged and updated with a second sample in January 2020, which included 7,659 threads and 21,200 posts. In total, 86,379 posts from 39,757 threads associated with 24,779 publications were retrieved. *PubPeer* does not provide a full list of the commented publications. Then, a search strategy was designed to retrieve the largest sample of publications but without committing any bias in the selection process. The best option was to select neutral terms that retrieve documents from any disciplines and written in any alphabetic language. The first letters of the alphabet (a, b, and c) were searched in the standard search box to ensure the randomness of the sample. Only these first letters were used because the results showed a high overlap and it was estimated that querying for the other letters would report similar results, but with more effort.

> The absence of notices about investigations makes it very hard to understand the real incidence of errors and misconduct in the current scientific literature

These queries retrieved comments to publications, including the internal ID of each paper. A web crawler was designed to retrieve this information. The crawler code consisted in pasting a base URL (i.e., *https://blog.pubpeer.com/publications*) and the ID of each publication previously retrieved (i.e. CF52AD098D3AC462697D-50B97B3105). Next, from each URL, bibliographic metadata and information about the comments associated to those publications (user, text, date, etc.) were extracted and storage in a csv file. *WebQL Studio* was used for this task:
https://www.ql2.com

> An editorial notice is released by a research journal to correct or highlight any problem with a published research article, and is associated with a decision of the editorial board

The sample was cleaned removing comments generated by robots (11,469, 13.3%) when the same text was repeatedly posted by the same account. Concretely, that is the case of "statcheck" user who checked statistical inconsistencies in thousands of articles and then included automatic posts in *PubPeer* about the resulting test for each publication:
https://retractionwatch.com/2016/09/02/heres-why-more-than-50000-psychology-studies-are-about-to-have-pubpeer-entries

Publications without user comments were also removed (6,328, 7.3%). Finally, 68,595 (79.4%) posts about 26,133 research documents published after 2000 were selected. This cut-off was set because the number of discussed papers in *PubPeer* published before 2000 is very low, which could produce statistical distortions in the longitudinal analysis (Figure 2).

4.3. Classification and selection criteria

From these records a sample of 17,244 (66%) articles were classified according to the content of the comments. The remaining publications (8,889, 44%) were rejected due to the comments were not sufficiently explanatory (e.g., very short comments, little reasoning) or they do not fit with the classification scheme. The classification process was based on the extraction of keywords that described the content of the comments. Then, publications through the keyword's comments, were grouped in seven categories (**Ortega**, 2022):

- Positive review: Comments that praise and highlight publications according to the reach and importance of the results.
- Critical review: Comments that discuss the methods and results and their interpretations. This group includes discussions about theoretical implications and scientific disagreements.
- Lack of information: Inside Critical review, this is a sub-category that addresses the problematic absence of information about how the study was performed, the availability of raw data, and lack of relevant bibliographic references.
- Honest errors (**Resnik**; **Stewart**, 2012): They could be rectifiable mistakes (e.g., erratum) due to confusion and oversight in the writing of the paper.
- Methodological flaws: They are motivated by a lack of awareness of statistical or other scientific techniques (e.g., western blots, spectroscopy) that throw up wrong results (e.g., correlation fishing, bar errors, loading controls). This category could be bordering on fraud, because this confusion could be intended to obtain the desired results. However, such intentionality is not always evident, and these issues are given the benefit of doubt.
- Publishing fraud: Interference with the publishing system to increase production and impact. It mainly includes plagiarism, reused text, ghost authorship and fake peer review.
- Manipulation: Intentional edition and manipulation/fabrication of data and images to obtain better results than those expected, to corroborate the desired hypothesis.

Finally, to validate the accuracy of this classification procedure, a sub-sample of comments (4,000) were manually classified and compared with the original procedure. A confusion matrix showed a high overall precision (88.1%), demonstrating that close to nine out of ten posts were correctly assigned (**Ortega**, 2022).

Subject matter classification and impact quartiles we obtained from *SCImago Journal & Country Rank* (*SJR*) portal, 2020 version:
https://www.scimagojr.com

This site uses *All Science Journal Classification* (*ASJC*) to categorize and rank journals. If a journal is assigned to more than one discipline, and therefore more than one quartile, then the discipline with the best quartile is selected. This ranking was used because it includes more journals than others (i.e., *Journal Citation Reports*).

When a publication had generated several editorial notices, the most serious one was selected. The importance goes from Erratum, Expression of Concern to Retraction. Thus, whether an article has been corrected with an erratum, and later was finally retracted, we have then considered this paper as retracted.

Data sets about this study are openly available in:
https://osf.io/hecbg

4.4. Editorial notices coverage

First, it is important to verify whether a publication has received an editorial notice. An editorial notice is a publication released by a research journal to correct or notice any problem about a published research article, and associated to a decision of the editorial board. These editorial notices are mainly erratum, expression of concern and retraction. *PubPeer* indicates when a publication has been subject of an editorial notice, such as retraction, expression of concern and erratum (**Ortega**, 2021). However, we are not aware of the reliability of this platform detecting when an editorial notice is released and it is associated to a publication. A way to test this ability is matching the sample of publications commented in *PubPeer* with the *Retraction Watch*'s database (24,421 publications) and the set of publications with editorial notices in *PubMed* (8,621 publications).

This comparison was performed with the initial sample of 26,133 publications because the coverage test does not depend on the thematic classification of the publications, bringing a most reliable view about the coverage. 3,076 (11.8%) were subject of an editorial notice according *PubPeer*. The search in *Retraction Watch* and *PubMed* achieved to detect 370 (12%) additional publications with notices. 366 (11.9%) from *Retraction Watch* and 288 (9.4%) from *PubMed*, being 3,445 (13.2%) the total set of articles with editorial notices. This means that *PubPeer* has an efficacy of 89.3% detecting this type of editorial publications.

5. Results

Finally, this study is based on 17,244 publications thematically classified according to their comments in *PubPeer*, from which 3,203 (18.6%) received an editorial notice. 14,290 (82.9%) are considered troublesome articles, publications that are reported of Publishing fraud, Manipulation, Methodological flaws, or Honest errors and therefore they could be subject of an editorial notice.

Table 1. Distribution of publications and editorial notices according to type of comment

Type of comments	Articles		With editorial notices	
	n	%	n	%
Positive review	131	0.8	2	1.5
Critical review	2,539	14.7	108	4.3
Lack of information	284	1.6	23	8.1
Honest errors	408	2.4	86	21.1
Methodological flaws	1,195	6.9	229	19.2
Manipulation	10,989	63.7	2,256	20.5
Publishing fraud	1,698	9.8	499	29.4
Total	17,244	100.0	3,203	18.6

Table 1 shows the number of publications commented in *PubPeer* according to the type of comment posted on *PubPeer* and the consequent editorial notice. Manipulation (63.7%) and Critical review (14.7%) are the categories with the most publications, followed by Publishing fraud (9.8%) and Methodological flaws (6.9%). These results confirm that *PubPeer* is used almost exclusively for reporting errors and misconduct cases. The high incidence of image manipulations has been previously reported (Bik *et al.*, 2016; 2018), and confirms that this problem is spread across the biology research. Publications with comments related to misconduct such as Publishing fraud (29.2%) and Manipulation (20.5%) receive the largest number of editorial notices. But also, Honest errors (21.1%) and Methodological flaws (19.2%) gather a considerable proportion of editorial notices. In general, only 18.6% of the publications have been subject of an editorial notice. If this percentage is limited to publications accused of misconduct or errors (troublesome articles), the percentage climbs to 21.5%. This could mean that almost only one out of five research papers suspected of errors or misconduct according to *PubPeer* received a notification from the editorial board of the journal.

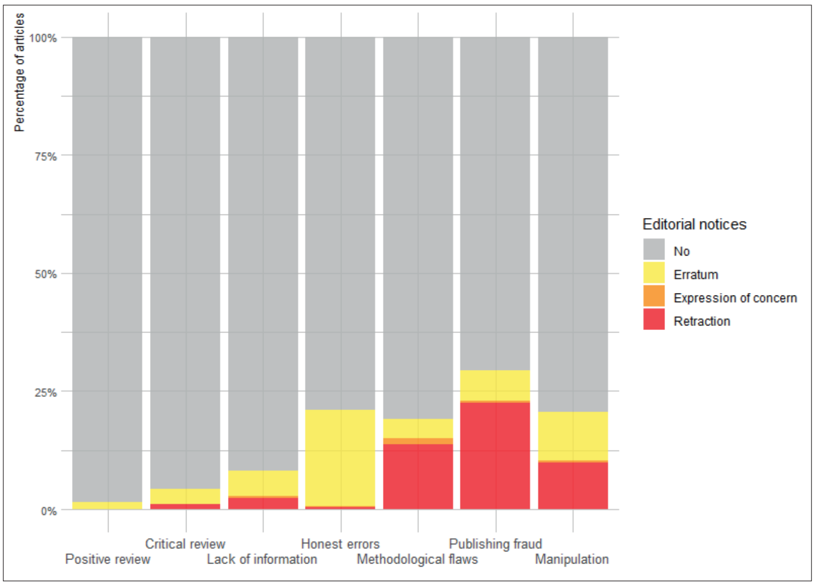

Figure 1. Distribution of editorial notices by type of comment

In detail, Figure 1 shows the percentage of different editorial notices by type of comment. This allows us to know what type of reaction is more common according to the type of problem. The bar graph depicts that Errata are mainly published for Honest errors (20.3%) and Manipulation (10.1%). In the first case, minimum and honest errors can easily be solved with an erratum. However, the second case, illustrates that a considerable proportion of manipulations could be due to unintentional mistakes in the use of images or that troublesome images are just retired to avoid the entire retraction of the publication. Publishing fraud (22.5%), Methodological flaws (13.8%) and Manipulation (9.8%) are the type of comments that generate most retractions. The high proportion of Publishing fraud can only be explained by the great difficulty of correcting plagiarism, compromised peer review or ghost authorship.

Figure 2 displays the proportion of editorial notices according to the publication date of publications. This graph aims to show if the percentage of editorial notices increases or decreases as time goes on. The trend of publications without editorial notices is descending up to 2011, while Retraction increases up to 2012 and Erratum up to 2015. This change of tendency could be mainly due to the great delay in the release of these notices (**Stricker**; **Günther**, 2019; **Ortega**, 2021). Considering the time delay between the moment in which a paper is commented in *PubPeer* and then is subject of an Erratum (296 days) or Retraction (541 days), it is necessary to estimate the influence of this delay. A linear fit allows us to estimate the percentage of editorial notices for the most recent publications. Dot lines show the estimation, R^2 the goodness of fit and β_1 the slope coefficient. Thus, for articles published in 2019, we estimate a proportion of 34.1% of editorial notices for troublesome publications (R^2=.79 and β_1=-.0115), whereas the proportion of retractions climbs to 19.6% (R^2=.71 and β_1=.0068) and errata to 14.4% (R^2=.85 and β_1=.0051).

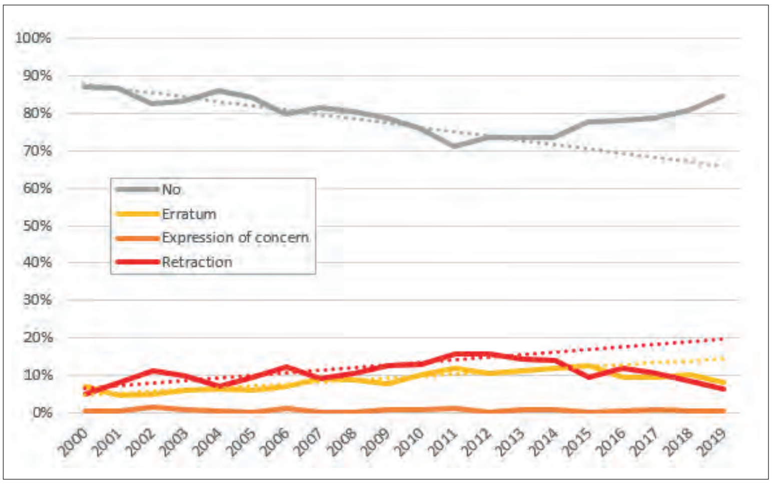

Figure 2. Proportion and estimation of editorial notices by publication date (dot lines show the linear estimation)

Table 2. The ten journals with most troublesome articles in *PubPeer* and the proportion of editorial notices

Journal	Troublesome articles		With editorial notices	
	n	%	n	%
Journal of biological chemistry	751	5.3	287	38.2
PLoS one	526	3.7	191	36.3
Oncotarget	407	2.8	53	13.0
Cancer research	395	2.8	103	26.1
Oncogene	335	2.3	48	14.3
Proceedings of the National Academy of Sciences (PNAS)	266	1.9	60	22.6
Molecular and cellular biology	220	1.5	47	21.4
Blood	189	1.3	29	15.3
Scientific reports	186	1.3	35	18.8
Clinical cancer research	176	1.2	51	29.0
Total artículos en las diez revistas	10,839	24.2	904	26.2
Total	14,290	100	3,070	21.5

Table 2 shows the ten journals with the highest number of problematic articles in *PubPeer* along with the proportion of editorial notices. The purpose of this table is to describe differences in the editorial management of suspicious articles at journal level. *Journal of biological chemistry* (5.3%) and *PLoS one* (3.7%) are the journals that have the most suspect publications, and also those that react the most to this type of publications, correcting 38.2% of the publications in *Journal of biological chemistry* and 36.3% in *PLoS one*. However, the journals that few respond to troublesome articles are *Oncotarget* (13%) and *Oncogene* (14.3%).

Figure 3 details the type of editorial notice released by each journal according to the different problems identified in *PubPeer*. This picture enables to ascertain what is the particular response of the journals that suffer the most from suspect articles. All the journals correct honest errors with errata in a high proportion (53.7%), being *Oncogene* and *Clinical cancer research* the journals that release errata in every case of honest errors. However, this response ratio drops significantly in the other more serious issues. In Methodological flaws, journals respond with an editorial notice in 26.9% of the cases, mainly retractions (16.8%). *PLoS one* (60.9%) and *Oncotarget* (36.4%) are the journals with the most editorial notices about this issue. A similar proportion of editorial notices is found in Manipulation (23%), with 11.6% of errata and 9.5% of retractions. *Journal of biological chemistry* (34.7%) and *PLoS one* (28.6%) are the journals with the highest proportion of editorial notices. Finally, Publishing fraud is the second type of complaint with most editorial responses (43.8%), being the retraction the most frequent (21.8%). Again, *Journal of biological chemistry* (79.2%) is far and away the journal that more respond to publishing misconduct.

Almost only one out of five research papers suspected of errors or misconduct according to *PubPeer* received a notification from the editorial board of the journal

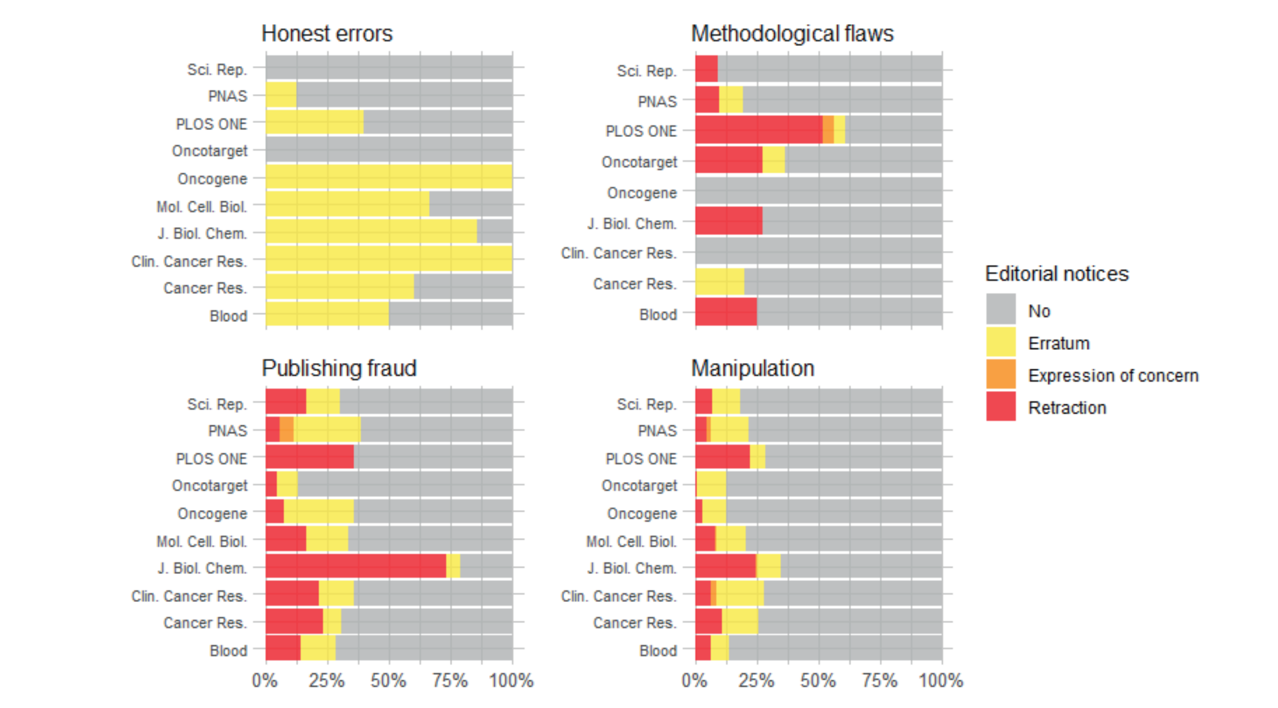

Figure 3. Distribution of editorial notices by type of comment in the ten journals with the most troublesome articles

Table 3. Distribution of troublesome articles and editorial notices by impact quartile

Quartile	Journals		Troublesome articles		With editorial notices	
	n	%	n	%	n	%
Q1	7,646	29.5	11,328	79.3	2,617	23.1
Q2	6,527	25.2	2,091	14.6	333	15.9
Q3	6,030	23.3	410	2.9	71	17.3
Q4	5,684	22.0	122	0.9	17	13.9
No indexed			339	2.4	34	10.0
Total	25,887	100	14,290	100	3,072	21.5

Table 3 describes the proportion of troublesome articles according *PubPeer* and their editorial notices in each impact quartile. The impact of journals is measured by *SJR* and grouped by quartiles. Not indexed journals in *SJR* are grouped as Not indexed. The aim is observing the incidence of these publications according to the research quality of the journals. The results show a high concentration of troublesome articles in Q1 journals (79.3%), which could suggest that fraudulent publications could be attracted by the prestige of high impact journals or that that category of journals could be more exposed to the public scrutiny. The proportion of responses to these papers slightly falls from the 23.1% in Q1 to the 10% of non-indexed journals in *Scopus*, which would indicate an association between the impact of the journal and its ability to detect suspect articles.

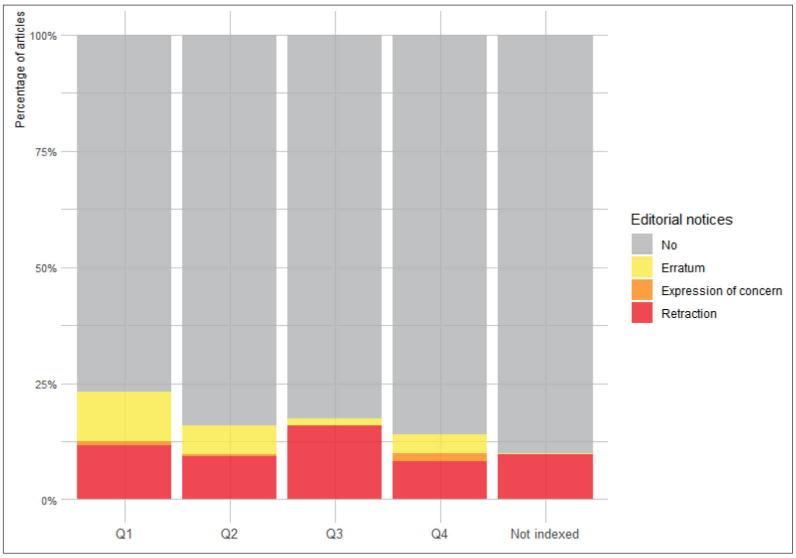

Figure 4. Distribution of editorial notices by impact quartile

Figure 4 illustrates the distribution of the different editorial notices in the impact quartiles. The aim is to appreciate if there is any relationship between editorial notices and the impact of the journals. The bar graph shows that the number of editorial notices drops as the impact decreases. This decline of editorial notices is mainly due to errata, which go from

10.7% in Q1 to 4.1% in Q4 and 0.2% in Not indexed. This descending pattern evidences that the use of errata as correction mechanism is more associated to high impact journals. However, retractions are more transverse, with a constant proportion in all the quartiles, going from the 15.9% of Q3 to the 8.2% of Q4. These results are in line with **Campos-Varela** *et al.* (2021). A possible explanation of these tendencies could be found in Figure 4.

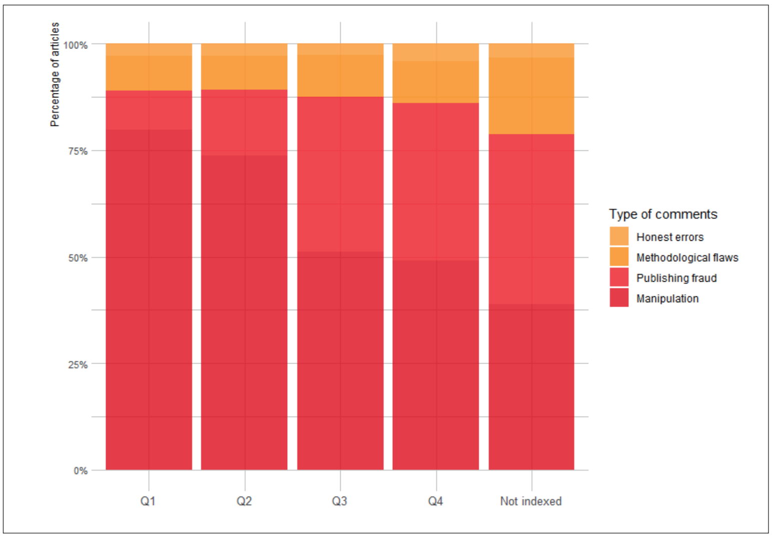

Figure 5. Distribution of troublesome articles by type of error or misconduct in each impact quartile

Figure 5 depicts the distribution of type of error or misconduct by impact quartile of the journal. This result aims to show how the incidence of different problems in *PubPeer* changes with the impact of the journal. It is interesting to notice that the two types of misconduct (Publishing fraud and Manipulation) evolve in a contrary direction. Manipulation is a very frequent problem in high impact journals (Q1=79.9%), while it considerably falls in Q4 (49.2%) and more than the half in not indexed journals (38.9%). Contrarily, Publishing fraud is little significant in Q1 (9.2%), but it gains importance in Q3 (36.3%), Q4 (36.9%) and not indexed journals (39.8%). These opposed trends could be interpreted in different ways. Image or data manipulation is a complex practice difficult to uncover and focused on justifying significant advances that increase the prestige of researchers. It is possible that these practices could be more focused on high impact journals, because these venues publish the most important discoveries in each discipline. On the other hand, Publishing fraud is mainly oriented to increase the production and not really the prestige. In addition, a great part of publishing fraud is plagiarism, and it is possible that this practice could be addressed to low impact journals with less editorial control. As we have observed in Figure 1, Errata are very frequent in cases of manipulation. Then, the great presence of manipulations in Q1 and Q2 would explain the results of Figure 4, where the high presence of errata in high impact journals could be due to these journals have more cases of manipulation.

Table 4. Distribution of troublesome articles and editorial notices by research area

Research areas	Journals		Troublesome articles		With editorial notice	
	n	%	n	%	n	%
Health Sciences	5,497	16.8	3,289	19.6	636	19.3
Life Sciences	3,601	11.0	9,510	56.6	2,136	22.5
Multidisciplinary	102	0.3	1,446	8.6	413	28.6
Physical Sciences	13,607	41.6	2,025	12.0	369	18.2
Social Sciences & Humanities	9,921	30.3	539	3.2	113	21.0
Total	32,728	100	16,809	100	3,667	21.8

Table 4 depicts the reaction of journals to troublesome articles according to the main disciplinary area in *ASJC*. Note that articles and journals could be classified in more than one research area. Life Sciences (56.6%) and Health Sciences (19.6%) are the disciplines with the most suspect publications. However, Multidisciplinary (28.6%) journals release more editorial notices than Life Sciences (22.5%) and Social Sciences & Humanities (21%). This suggests that journals in Multidisciplinary category would have more editorial control on problem publications, whereas Health Sciences (19.3%) journals could detect less erroneous articles.

Figure 6 depicts the proportion of editorial notices by troublesome articles grouped by the main disciplinary area. There are not important differences between disciplines, which would mean that journals react in the same manner independently of the research field. Thus, in Publishing fraud, Life Sciences shows 36.6% of editorial notices, while Physical Sciences only 25.3%. Regarding to Manipulation, there are also little differences, outstanding Multidisciplinary (28.3%) and Social Sciences & Humanities (27.7%) as the fields with the most editorial notices. Honest errors and Methodological flaws describe more differences, being Life Sciences (33.3%) the area with the most editorial releases for the first issue, and Multidisciplinary (32.6%) for the second one. According to the type of notice, the picture shows that errata is more frequent for Honest errors (20.2%) and Manipulation (10.3%).

This low response rate suggests that the publishing system in general is not aware of external investigations, mainly from web platforms such as *PubPeer*, which can negatively affect the correction of misconduct in science

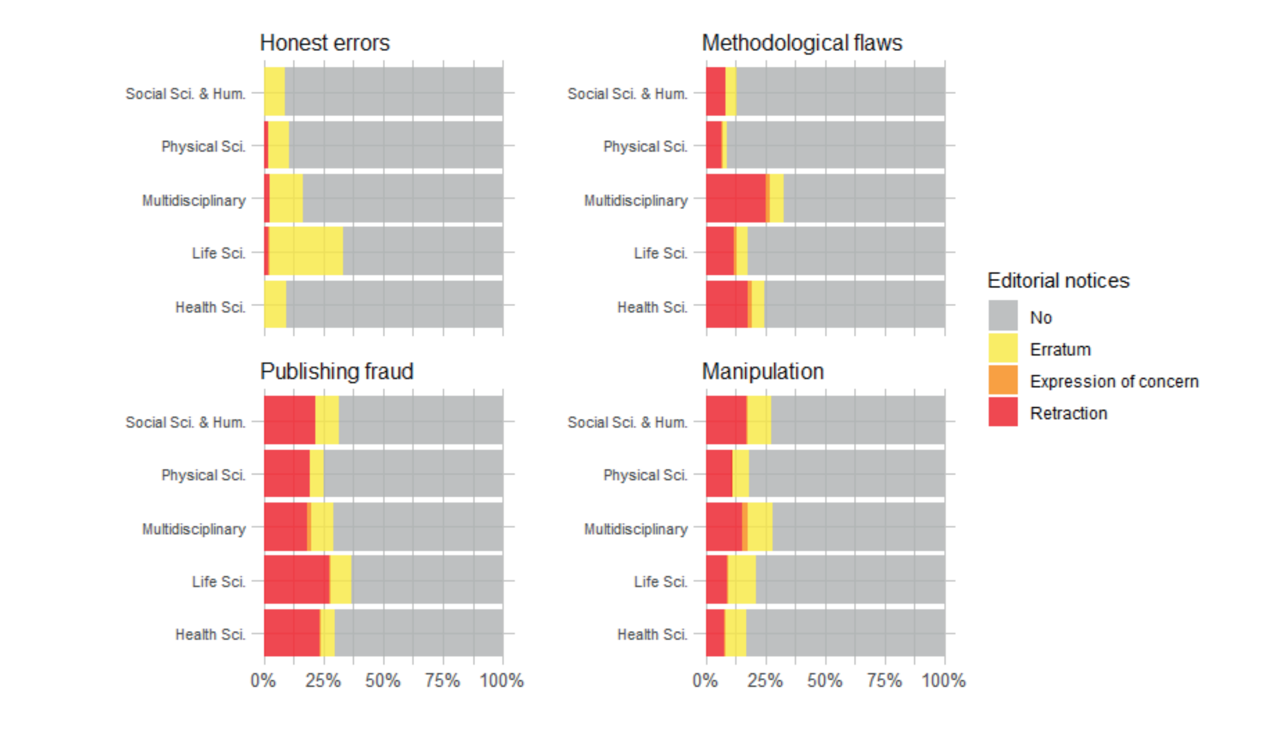

Figure 6. Distribution of editorial notices by type of comment according the main disciplinary subject area of the journal

6. Discussion

This study provides the opportunity to relate the complaints expressed in *PubPeer* on errors and misconduct of research papers with the consequent editorial response of journals. The most surprising result is the low response rate of research journals when a scientific paper is reported of misconduct or error in *PubPeer*. Only 21.5% of the papers that should deserve a notification were subject of an editorial notice. This means that almost only one out of five reported articles in *PubPeer* are corrected by journals. A similar proportion (23%) was also found by **Brookes** (2014) in articles publicly discussed in a blog. These proportions depend on what type of errors or misconduct we think that deserve an editorial notice. For example, the early *PubPeer* comments classification conducted by **Wager** and **Veitch** (2017) concluded that only 9 (7%) articles required a journal action. However, analysing their classification, we found that this figure should be 31 (4 for Fabrication, *2* for other misconduct, 5 for honest errors and 20 for methodological issues). If we compare this amount with the number of editorial notices released (5), the response rate is even lower than in our study (16%). In line with this result, the manual image inspection of **Bik** *et al.* (2018) verified that approximately only 10% of the papers with evident manipulations were retracted. This low response rate suggests that the publishing system in general is not aware of external investigations, mainly from web platforms such as *PubPeer*, which can get worse the correction of misconduct in science.

However, other studies based on already investigated cases show a higher journal response, suggesting that the reaction of journals is determined by the conclusions of official investigations (**Wager**, 2014). Even though, this response is not complete and significant number of articles do not receive any alert. **Neale** *et al.* (2007) found that 83% of articles reported of misconduct were noticed, and **Resnik** and **Dinse** (2013) found 127 out of 174 (73%) fraudulent publications had an editorial notice. These studies show that a non-trivial proportion of articles that have already been investigated and with a clear statement of misconduct (17% in the first, and 27% in the second one), have not been notified by their journals. These low response rates could indicate some disconnection of the publishing system with other scholarly environments (research organizations, integrity offices, web platforms, etc.), that impede be aware of misconduct reporting. Another possible causes would be a deliberate neglect of editorial duties (**Shelomi**, 2014), lack of misconduct policies (**Bosch** *et al.*, 2012) or absence of investigation by research organizations (**Wager**, 2015). Independent of the reasons, these results evidence that the identification and correction of erroneous literature is far from being properly addressed because it involves the responsible engagement of multiple agents (authors, organizations, journals, public) to create an efficient correction system.

> The identification and correction of erroneous literature is far from being properly addressed because it involves the responsible engagement of authors, organizations, journals, and public to create an efficient correction system

The positive trend observed in Figure 2 allows us to be slightly optimistic about the improvement in the detection of fraudulent practices in research publications, because the share of suspect publications with an editorial notice increases .07% each year. However, this growth rate is still slow and more actions would be needed to close the current gap in the correction of erroneous and fraudulent literature.

> There is a high concentration of troublesome articles in Q1 journals (79.3%), which could suggest that fraudulent publications could be attracted by the prestige of high impact journals, or that that category of journals could be more exposed to public scrutiny

It is also interesting to discuss how editorial notices are used for different problems. Errata, which is accustomed to be used for minor cases (96.5% in Honest errors), is also used for serious cases (49.3% of Manipulation), while retractions are also released for non-intentional errors (72% for Methodological flaws and 30% for Lack of information). These different uses of editorial notices can cause confusion about their meaning when they are utilized for research integrity studies (**Da-Silva**, 2022). This result suggests that the study of research misconduct cannot be based only on retractions because there is an important amount of, for instance, manipulations that are corrected with errata (false negatives) and retractions due to non-fraudulent practices (false positives) (**Nath** *et al.* 2006; **Campos-Varela** *et al.*, 2021).

Other significant result is the high proportion of problematic articles in Q1 journals (79%), when the general proportion of articles is almost the half (44%) in this quartile (**De-Moya-Anegón**, 2020). This great concentration evidences that the publication of erroneous or fraudulent studies mainly occurs in high impact journals (**Steen**, 2011). The list of journals with the most erroneous articles includes important multidisciplinary journals (i.e., *PLoS one*, *PNAS*, *Scientific reports*) and reputed journals in their fields (i.e., *Cancer research*, *Oncogene*, *Blood*). This high incidence seems to indicate that fraudulent publications target top journals because these venues receive more attention, which could increase their prestige and fame. This great visibility would also attract potential commenters, overestimating the reporting of problem papers in these journals. Otherwise, these journals compete in publishing adventurous and attractive studies, which would increase the risk of accepting troublesome articles.

All these factors could explain the high incidence of errors and misconduct in high impact journals. However, Figure 4 shows a more nuanced view, in which the image manipulation is more frequent in high impact journals, while publishing fraud occurs more often in average journals. This fact was already observed by **Fang** *et al.* (2012). These opposed patterns would suggest that manipulation is used to achieve success, while plagiarism and reutilization to increase the production, independent of the quality of the publication. In addition, the high disproportion between Manipulation (63.7%) and Publishing fraud (9.8%) evidences that the scientific success is more attractive than the mere production. This landscape would explain that Q1 journals (23.1%) react more than other categories, due perhaps to a higher control by their editorial boards or simply because they are the object of the majority of the misconduct practices (**Corbyn**, 2012).

7. Limitations

An important limitation that could be attributed to this study is that not all the complaints in *PubPeer* are based on evidences. This platform does not check the veracity of the reports and therefore it could be possible to observe unfound accusations that do not deserve a statement. In that case, the proportion of articles that deserve an editorial notice could be lower. However, this fact only can be demonstrated when precisely journals initiate investigations and release editorial notices. Only in those cases, when an investigation has been accomplished, and a notification is released, we can assume veracity or falseness to these comments.

Another important limitation is the slowness of the editorial actions, which could delay the release of editorial notices (**Stricker** and **Günther**, 2019; **Ortega**, 2021). This problem causes that some recent publications that would deserve an editorial notice could be still under investigation. Figure 2 has evidenced this delay in more than 5 years and has estimated that the response to these troublesome articles would climb to 34% if this delay is taking into account. Therefore, forthcoming studies are necessary to confirm the reliability of these findings with more robust data. A second question is related to *PubPeer* as data source, because publications discussed in this site would influence on their investigation and the release of editorial notices. Although we have not found evidences of that, it is a question that we must consider in the interpretation of the results.

8. Conclusions

The main conclusion of this study is that, in average, only 21.5% publications that should deserve a correction or retraction according to *PubPeer* are subject of an editorial notice. Although this proportion would climb to 34.1% in recent publications, this result demonstrates that there is still a long way to reach a successful detection and investigation of misconduct publications. Errata are principally published for Honest errors (20.3%) and Manipulation (10.1%), while Retractions are mainly used for Publishing fraud (22.5%). The evolution of this editorial control improves throughout the years, with a steady increase of 0.07% each year. However, this rate is very slow and more actions are necessary to improve this share.

> It seems that manipulation is used to achieve success, while plagiarism and reutilization are used to increase production, irrespective of the quality of the publication

The study has shown that there is a positive relationship between the impact of a journal and the proportion of publications with an editorial notice. High-impact journals publish more problematic publications, which causes more editorial notices, mainly errata. It is also interesting to appreciate that high-impact journals are more damaged by manipulation, while the low-impact journals suffer from Publishing fraud.

> The appearance of post-publication peer review sites such *PubPeer* or *Publons*, and other social networks, bring a new perspective to misconduct in the scientific literature

Finally, the disciplinary analysis does not have disclosed any important thematic difference. Life Sciences (56.6%) and Health Sciences (19.6%) are the disciplines with the most problematic publications. Multidisciplinary (28.6%) category has more editorial control on erroneous articles, being the strictest field detecting manipulations (28.3%). Life Sciences (33.3%) is the research area that more detects honest errors, while Physical Sciences (25.3%) releases fewer editorial notices for Manipulation.

In general, we can conclude that the appearance of post-publication peer review sites such *PubPeer* or *Publons* and other social networks open a new perspective about the misconduct in the scientific literature. They provide an open and participatory environment to audit publications, questioning the role of institutions and fostering the demands of the scholarly community to find better correction mechanisms in science.

9. References

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Early career researchers and predatory journals during the Covid-19 pandemic. An international analysis

David Nicholas; Blanca Rodríguez-Bravo; Cherifa Boukacem-Zeghmouri; Eti Herman; David Clark; Jie Xu; Abdullah Abrizah; Marzena Świgoń; Anthony Watkinson; David Sims; Hamid R. Jamali; Carl Tenopir; Suzie Allard

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David Nicholas
https://orcid.org/0000-0001-8046-2835

CIBER Research Ltd
Newbury, Berkshire
RG147RU, UK
dave.nicholas@ciber-research.com

Blanca Rodríguez-Bravo ✉
https://orcid.org/0000-0002-9476-7602

Universidad de León
Área de Biblioteconomía y Documentación
Campus de Vegazana
24071 León, Spain
blanca.rodriguez@unileon.es

Cherifa Boukacem-Zeghmouri
https://orcid.org/0000-0002-0201-6159

Université de Lyon
Departamento de Informática
69100 Villeurbanne, France
cherifa.boukacem-zeghmouri@univ-lyon1.fr

Eti Herman
https://orcid.org/0000-0001-8526-9081

CIBER Research Ltd
Newbury, Berkshire
RG147RU, UK
eherman@univ.haifa.ac.il

David Clark
https://orcid.org/0000-0002-5893-4274

CIBER Research Ltd
Newbury, Berkshire
RG147RU, UK
david.clark@ciber-research.uk

Jie Xu
https://orcid.org/0000-0002-9820-8066

Wuhan University
School of Information Management
Hubei 430072, Wuhan, China
xuj@whu.edu.cn

Abdullah Abrizah
https://orcid.org/0000-0002-8224-5268

University of Malaya
Faculty of Arts and Social Sciences
Department of Library & Information Science
50603 Kuala Lumpur, Malaysia
abrizah@um.edu.my

Marzena Świgoń
https://orcid.org/0000-0003-3600-8349

Uniwersytet Warminsko-Mazurski
Wydział Humanistyczny
10-719 Olsztyn, Poland
marzena.swigon@uwm.edu.pl

Anthony Watkinson
https://orcid.org/0000-0002-2317-6557

CIBER Research Ltd
Newbury, Berkshire
RG147RU, UK
anthony.watkinson@btinternet.com

David Sims
https://orcid.org/0000-0003-1916-5617

University of Tennessee
School of Information Sciences
1345 Circle Park Drive, 423
Knoxville, Tennessee 37996-0341, USA
dsims7@utk.edu

Hamid R. Jamali
https://orcid.org/0000-0003-1232-6473

Charles Sturt University
School of Information Studies
Locked Bag 588, Wagga Wagga
NSW 2678, Australia
h.jamali@gmail.com

Carol Tenopir
https://orcid.org/0000-0002-9056-8251

University of Tennessee
School of Information Sciences
1345 Circle Park Drive, 451
Knoxville, TN 37996-0341, USA
ctenopir@utk.edu

Suzie Allard
https://orcid.org/0000-0001-9421-3848

University of Tennessee
School of Information Sciences
1345 Circle Park Drive, 423
Knoxville, TN 37996-0341, USA
sallard@utk.edu

Abstract

Around 170 early career researchers (ECRs) from 8 countries were interviewed about the whole range of their scholarly communication attitudes/behaviours during pandemic times and this paper analyses what they said about predatory journals in a wide range of scholarly communication contexts. Because of the delicacy of the topic there was just one question exclusively directed at predatory journals, which asked about policies rather than actions, which yielded nevertheless wide-ranging comments on the topic. ECRs also volunteered information on predatory journals in another half dozen questions, most notably including one on questionable research practices. The source of data was mainly the final interview of three undertaken, with some comparisons made to rounds one and two. Findings disclose the existence of a whole raft of formal and informal assessment policies/codes that direct ECRs to legitimate journals and away from predatory ones. Despite being junior, ECRs are very accultured to the criteria of what is considered as prestige and quality and believe predatory publishing is not even conceivable. They are far more concerned about low-quality research, preprints and borderline 'grey' journals. The pandemic has increased the level of questionable practices and low-quality research, but predatory journals were only singled out by a relatively small number of ECRs.

Keywords

Predatory journals; Questionable research practices; Low-quality research; Preprints; Policies against predatory journals; Publishing; Research; Scholarly communication; Early career researchers; ECR; Pandemic consequences; Covid-19; Harbingers project; Interviews; Country differences; China; France; Malaysia; Poland; Russia; Spain; UK; United Kingdom; USA; United States.

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1. Introduction

As a host of editorials, opinion pieces and policy statements indicate, the increasingly felt presence of predatory publishing has been a matter of great concern in scholarly circles. Indeed, recent times have seen the inexorable rise of predatory journals: according to *Cabells Predatory Reports*, the number of predatory journals is currently over 16,000 (**Linacre**, 2022), a considerable increase from the 8000 or so identified in 2014 (**Shen**; **Björk**, 2015). Predatory publishing, disregarding editorial and publication practices for the sake of monetary gains, is thus widely held to be debasing scholarly research and polluting the scholarly communications system, indeed, to be a real threat to the very integrity of science, its credibility and trustworthiness (**Linacre**, 2022; **Ojala**; **Reynolds**; **Johnson**, 2020; **Shaghaei** *et al.*, 2018). With the world, focussed as it is on COVID-19, by ignoring the issue of predatory publishing, things may even go from bad to worse (**Da-Silva**, 2020). However, with all that there are compelling deterrents against straying from the straight and narrow in scholarly publishing, researchers, independent of their age, status, country and discipline were found to have published in predatory journals (see literature review).

Much to our surprise, therefore, our findings in the four-year (2016-2019), longitudinal *Harbingers-1* research project which explored the working lives and scholarly communication behaviour of 116 junior science and social science researchers in eight countries (China, France, Malaysia, Poland, Russia, Spain, UK and US), indicated otherwise.

http://ciber-research.com/harbingers.html

Contrary to expectations, predatory publishing turned out to be quite marginal to the scholarly pursuits of ECRs: it was little practiced, with only one instance reported, and seen as an irritant rather than a danger to the scientific undertaking and its stakeholders (**Nicholas** *et al.*, 2021). When alluded to at all, it was only in passing, not even as a problem in itself, but as part of the problems surrounding open access publications and the possibility that predatory journals might bring about further deterioration in their quality (**Nicholas** *et al.*, 2017; **Nicholas** *et al.*, 2019).

True, as we speculated, the ECR participants in our study were not generally inexperienced or naïve, came from good universities and were part of research groups of high-flying, knowledgeable and practised researchers, so they were neither likely to fall prey to unscrupulous publishers nor come up with such low-quality research that their only option was publishing it in scam journals (**Nicholas** *et al.*, 2021). However, with the literature cataloguing many instances of senior researchers from developed countries publishing in predatory journals, as we will learn, our reasoning may not have captured the entire range of factors involved in the situation we were witnessing. Given the opportunity to continue our investigations of ECRs' circumstances in the *Early Career Researchers and the Pandemic – Harbingers-2* research project, funded by the *Alfred P. Sloan Foundation*, we decided to probe deeper into the question:
http://ciber-research.com/harbingers-2

Drawing our data again from the aforementioned eight countries, this time covering 167 ECRs from the sciences and social sciences, we thus set out to revisit young researchers' attitudes to and practices of predatory publishing.

2. Aims and objectives

The aim of this study is to explore the perceptions and practices of pandemic-era ECRs regarding predatory publishing.

Its specific objectives are:

1. To determine what ECRs think about predatory publishing, inclusive of the policies and practices that exist to prevent their use;
2. To establish whether early career researchers and/or their colleagues publish in predatory journals;
3. To identify national and disciplinary differences in opinions and practices, if any;
4. To see whether the pandemic has changed opinions and practices.

3. Definitions

ECR

For lack of a universally accepted definition of an ECR, indeed, with different and conflicting definitions of ECRs circulating (**Da-Silva**, 2021), a pragmatic conceptualization of an ECR was decided on. Thus, the definition focusses on the common denominators of their standing, that is, their being employed in a research position but, being relatively young and in an early phase of their career, not yet established as permanent faculty:

> "Researchers who are generally not older than 40, who either have received their doctorate and are currently in a research position or have been in research positions, but are currently doing a doctorate. In neither case are they researchers in established or tenured positions. In the case of academics, some are non-tenure line faculty research employees." (Authors)

Predatory publishing

Predatory publishing is definable as entities that, prioritizing self-interest at the expense of scholarship, are characterised by false or misleading information, deviation from best editorial and publication practices, a lack of transparency, and/or the use of aggressive and indiscriminate solicitation practices (**Grudniewicz** *et al.*, 2019), as well as by poor quality and/or misuse of peer review processes (**Dobusch** *et al.*, 2020). Predatory journals, often referred to as questionable, illegitimate, dark or deceptive journals, too, are therefore fake and scam publishing venues that accept manuscripts for fees, without sufficient quality control, while pretending the opposite (**Frandsen**, 2017). However, we did not define the term for our study participants, and indeed limited its use. In general, we wanted the ECRs to have ownership of the topic/concept and, in many cases, left it up to them to talk about it. It was also easier to do it this way given that the interviews were conducted in 5 languages and in 8 countries.

4. Literature review

Seeking to anchor the study reported here in the current state of the knowledge on the topic, the literature review, which follows, summarises, analyses and synthesizes the extant evidence pertinent to predatory publishing. The review protocol, developed for the purpose, had at its heart a list of keywords, distilled from the research questions and trialled by means of searches in multiple databases –*Google Scholar*, *Google Search*, *Web of Science*, and *ProQuest*. In its resulting, refined form, the list included the following terms: predatory/ questionable/ illegitimate/ dark/ deceptive/ fake/ scam journals/ predatory publishing/ questionable research practices/ pandemic/ Covid-19/ policies against predatory publishing.

Focussing on these keywords, systematic literature searches were conducted in the aforementioned databases to find the published literature on the topic as well as relevant 'grey literature', such as conference proceedings, theses, and reports. In an effort to make sure that all relevant studies were noted, backward as well as forward searches were conducted to identify germane work. The former, to include any important information in the studies cited in the articles reviewed, and the latter, to add new information reported in articles that have since cited the articles reviewed. Finally, backward and forward searches by key authors were performed to round out the emerging picture.

The extent of the threat to the scientific enterprise that predatory publishing poses became clear once it transpired that its presence in the scholarly world was not limited to novice researchers from developing countries, as first explorations seemed to indicate (**Demir**, 2018; **Frandsen**, 2017; **Kurt**, 2018; **McCann**; **Polacsek**, 2018; **Moher**; **Srivastava**, 2015; **Moher** *et al.*, 2017; **Nobes**; **Harris**, 2019; **Shen**; **Björk**, 2015; **Xia** *et al.*, 2015). Newcomers to academe from the Global South may have been in the eye of the predatory storm, but the socio-economic and geographical dispersion of the problem turned out to be much wider, extending to academics from high- and upper-middle-income countries (*IAP*, 2022; **Elliott** *et al.*, 2022; **Moher** *et al.*, 2017; **Segado-Boj**; **Martín-Quevedo**; **Prieto Gutiérrez**, 2022), as well as to the senior and experienced among them (**Alecci**, 2018; **Elliott** *et al.*, 2022). Indeed, researchers from Italy (**Bagues**; **Sylos-Labini**; **Zinovyeva**, 2017), Belgium (**Eykens** *et al.*, 2019) and Denmark (**Shaghaei** *et al.*, 2018) were found to have published in questionable journals, as did senior academics (**Alrawadieh**, 2018; **Eykens** *et al.*, 2019; **Frandsen**, 2022; **Perlin**; **Imasato**; **Borenstein**, 2018; **Pyne**, 2017; **Shaghaei** *et al.*, 2018; **Wallace**; **Perri**, 2018). Perhaps most tellingly, over 5000 researchers from German universities, institutes and federal agencies, inclusive of prominent professors, even a Nobel laureate, have also been found to have published articles in predatory journals with no peer review processes (*NDR*, 2018; **Offord**, 2018).

The prevalence of predatory publishing among scholars of all career levels and from all over the globe brought to the fore the need to discover why a researcher would choose a publishing venue that may not do justice to their scholarly achievements. Obviously so, for combating the predatory publishing problem is contingent on understanding researchers' motivations and incentives for straying from the straight and narrow in a decision that has been shown to be crucially important for their reputation and careers –choosing the 'right' publishing venue (**Nicholas** *et al.*, 2022). **Frandsen**'s (2019) analysis of the literature identifies two types of authors who take up the option: the uninformed and the unethical. Building on **Grimes**, **Bauch**, and **Ioannidis**'s (2018) modelling of science trustworthiness, she thus differentiates between researchers who do not intentionally behave dishonestly, but fall prey because they are not aware that the journal that they have published in is in fact predatory, and researchers who knowingly publish low-quality research in scam journals in order to pad out their publications list.

Indeed, researchers' lack of awareness that the journal chosen for publication may be questionable is cited in study after study among the possible explanations for their doing so (**Cobey** *et al.*, 2019; **Cohen** *et al.*, 2019; **Demir**, 2018; **Elliott** *et al.*, 2022; **Eriksson**; **Helgesson**, 2016; **Kurt**, 2018; **Noga-Styron** *et al.*, 2017; **Salehi** *et al.*, 2020; **Shehata**; **Elgllab**, 2018). This seems surprising, at least at first glance, as by now many more scholars must be acquainted with the ever-more acutely felt presence of scam journals, if for no other reason than because of the aforementioned admonishments constantly heard. However, admittedly, distinguishing between legitimate and deceptive publishing venues has become much more challenging, as we shall see.

The root of the problem is there is substantial diversity in types and degrees of predatory publishing, so much so, as **Siler** (2020) suggests, that predation in academic publishing can be perceived as a spectrum with varying types and degrees of illegitimacy, with journals and publishers of multiple shades of grey occupying borderline or ambiguous niches between predation and legitimacy. Thinking along the same lines, **Silva** *et al.* (2021) also posit that there exist degrees or dimensionality, whereby a journal may be increasingly/decreasingly predatory (or legitimate) in comparison to some standard or criteria (whether ideal or in relative contrast to one another).

In consequence, as **Dunleavy** (2022) argues, the use of whitelists, whilst certainly helpful for detecting and avoiding some bad faith actors in the publishing world, is inevitably limited. He identifies three main reasons that hamper the efficacy of these whitelists (reasons that seem to be no less applicable to blacklists):

1) the inability of scholars to agree upon a precise and objective definition of –or criterion for– the term 'predatory';

2) the heterogeneity and somewhat arbitrariness of characteristics subsumed under the 'predatory' label; and

3) the problem of 'false positive' and 'false negative' cases, i.e., when a non-predatory journal is mistakenly labelled as 'predatory' and vice versa.

Further muddying the waters:

- finding predatory journals in lists of accredited journals, such as *WoS*:
  https://mjl.clarivate.com/home
- encountering articles published in predatory journals in major indexing databases such as like the aforementioned *WoS*, and *PubMed* and *Scopus* (**Cortegiani** *et al.*, 2020; **Demir**, 2018; **Marina**; **Sterligov**, 2021; **Severin**; **Low**, 2019) or in popular social-media based platforms, such as *ResearchGate*:
  https://clarivate.com/webofsciencegroup/solutions/web-of-science
  https://www.elsevier.com/solutions/scopus
  https://pubmed.ncbi.nlm.nih.gov
  https://www.researchgate.net
- or coming upon reviews of them in the *Publons* database of review reports (**Severin** *et al.*, 2021):
  https://webofscience.help.clarivate.com/en-us/Content/publons.html

The difficulties involved in identifying predatory journals have become even greater now that scam journals ever-more successfully masquerade as genuine ones (**Gasparyan** *et al.*, 2015), mimicking titles or logos of prestigious, well-known journals, sporting a fraudulent IF and even exhibiting the outward furnishings of traditional and trustworthy journals, such as DOIs and ISSNs. The latter two, which are often available for the asking (if at a cost), perhaps should not be seen as quality indicators –but they are. At times predatory hijack legitimate ones by creating fraudulent websites that mimic authentic and reputable journals and their websites, abusing both established names and identities such as the ISSN, so that even experienced scholars have no way of knowing that what they see is not the genuine prestigious journal. Indeed, even knowledgeable researchers, who advise others about predatory publishers, may not be aware of hijacked journals (**Abalkina**, 2021; **Dadkhah**; **Borchardt**, 2016; **Dadkha**; **Maliszewski**; **Da-Silva**, 2016).

The unethical researcher, unlike the uninformed/unaware researcher, knowingly risks publication in a predatory journal because it enables them to build quickly and easily a publication record, and to do so without long turnaround times, high fees, unnecessarily critical peer reviews and a bias toward publishing the work of well-known researchers (**Cobey** *et al.*, 2019). It is certainly a minimal-effort process, which guarantees success in getting a work published even when it is not up to par, all for the sake of adding another line to a researcher's list of publications. No wonder that **Crotty** (2017) puts the blame for the rise of the predatory publishing phenomenon on the publish or perish driven incentive system of the scholarly world. As things stand now, he contends, with publishing in a predatory journal at times an informed, deliberate choice for some researchers, driven by the need "to minimize efforts and maximize advancement in a system with a lack of oversight in evaluation", predatory publishers serve "a market need, namely the desire by some authors to fool those in charge of evaluating their performance".

However, with the publication record serving in academe as the basis for attaining career-related benefits and at times even financial rewards, questionable it might be, but such padding of one's publication record may, in fact, turn out to be advantageous on the individual level. Indeed, as **Mertkan**, **Aliusta** and **Suphi** (2021) suggest on the causal factors involved in researchers' deciding to publish their work in predatory venues, the assumption that doing so leads to career risks does not seem to be supported by empirical evidence. Rather the contrary, as the studies they cite testify: publishing in predatory journals often had a positive effect on career progress but at least posed no risk, certainly not in countries where local assessment policies emphasise quantity of publications over their quality.

True, scholars on the periphery of the global scholarly enterprise have additional reasons, too, specific to their idiosyncratic circumstances, for finding predatory outlets attractive. Most notably, researchers from developing countries may prefer to publish in predatory journals because of concerns that legitimate Western journals might be prejudiced against scholars from non-Western countries or because, lacking the resources and guidance that researchers in more developed nations have, they consider their work less publishable in mainstream scholarly journals (**Demir**, 2018; **Kurt**, 2018; **Mills**; **Inouye**, 2021; **Tella**, 2020).

All in all, then, it is the acutely felt need to showcase one's scholarly productivity, which is the motivating force common to the uninformed and the unethical researcher, both of whom opt for publishing in a predatory journal with this very purpose in mind, if proceeding from different premises. Obviously, the current situation of a seemingly endless availability of journals that may –or may not– be legitimate publishing outlets can be confusing and/or tempting to any researcher, but even more so to an inexperienced researcher. If they are neither well-versed in the ways of academe nor well connected, they may choose a publishing outlet unaware of its questionable nature. However, even when they are well-aware of the suspect nature of a predatory journal, they may find it difficult to resist the temptation of choosing an easy, sure-fire way of publishing. After all, as ECRs, whose career advancement is wholly contingent on their productivity, they are very pressured indeed to publish. However, it is important to note here, that ECRs are certainly not predestined to publish in predatory journals. Thus, for example, as **Mertkan** *et al.* (2021) suggest it is international publishing experience rather than the length of their career or the number of their publications that counts, indeed, greatly diminishes the likelihood of ECRs' opting for predatory practices.

5. Methods

This paper focuses on the interview leg of the project, which was at the very heart of the *Harbinger-2* project. There were three rounds of repeat interviewing with 6-month gaps between each round, providing a longitudinal element to the study, although this paper focuses largely on the final and most developed interview, with some references to the two earlier ones.

5.1. Recruitment

The interview participants included both ECRs who participated in *Harbingers-1* (an earlier manifestation of the project) and new ones, recruited to fill the ranks of participants who had left research or no longer qualified as ECRs (e.g., because they obtained tenure). New ECRs were recruited by the eight national interviewers, utilizing their local networks and connections, with numbers supplemented by mail-outs from scholarly publisher lists. Each country was allocated a quota of interviewees (between 20 and 24) to achieve an element of representativeness in terms of age, gender and subject and also to ensure some consistency across countries.

5.2. Make-up of cohort

Originally, 177 ECRs were recruited and by the third round of interviews 167 remained, largely because a few had left academe. Table 1 provides a country and discipline breakdown of the cohort.

Table 1. Discipline and country breakdown of ECR panel (Round 3)

	Total	CHEM	ENV	LIFE	MATH	MED	PHY	SOCH[1]	SOCS[2]
CN	23	0	0	0	5	9	5	1	3
	14%				22%	39%	22%	4%	13%
ES	20	3	3	2	2	2	2	4	2
	12%	15%	15%	10%	10%	10%	10%	20%	10%
FR	17	2	0	2	3	2	5	0	3
	10%	12%		12%	18%	12%	29%		18%
GB	24	1	2	5	2	6	2	4	2
	14%	4%	8%	21%	8%	25%	8%	17%	8%
MY	20	1	0	3	4	2	2	5	3
	12%	5%		15%	20%	10%	10%	25%	15%
PL	22	2	3	3	3	3	4	1	3
	13%	9%	14%	14%	14%	14%	18%	5%	14%
RU	20	3	2	2	2	3	4	3	1
	12%	15%	10%	10%	10%	15%	20%	15%	5%
US	21	2	2	3	2	5	3	2	2
	13%	10%	10%	14%	10%	24%	14%	10%	10%
Total	167	14	12	20	23	32	27	20	19
	100%	8%	7%	12%	14%	19%	16%	12%	11%

5.3. Interviews

The interview protocol[8] contained a mix of closed, open and hybrid questions, covering every aspect of the scholarly system: job, status, career aims/progression, assessment, research directions, working life, reputation, as well as, their scholarly communications –collaboration searching/finding, networking, ethics, informal communication (preprints, blog posts, posters), social media, publishing; metrics, sharing outreach and scholarly transformations. All, of course, asked with the pandemic looming in the background.

Aware of the problems of asking, especially young and vulnerable (in terms of their jobs) researchers about a stigmatised form of scholarly behaviour –predatory publishing, we avoided, where possible, asking direct question and when we did, it was done generally and without giving any sense of targeting junior researchers. Thus, nobody was asked whether they published in predatory journals or knew of colleagues who did. There were, however, two questions that tackled the predatory issue in the broad:

- the first, about policies for avoiding predatory publishing asked as part of questioning about open access publishing;
- the second, about whether they were aware of questionable practices being employed and published and this was asked in context as part of a series of questions about integrity.

In order to discover where else predatory arose a keyword search was conducted on the database containing the transcripts. The terms predatory, blacklist, whitelist, low quality and grey were searched for possibly relevant material.

Interviews that were conducted in the local language were transcribed and translated into English. All the interview transcripts were transferred to a 'coding sheet' by national interviewers, which closely matched the questions of the original interview protocol. Closed questions and answers were coded consistently using relevant codes (e.g., y/n). Closed questions usually also included further commentary by the interviewees that supplemented their answers. Free-text data were analysed using thematic coding using the themes from the questions and any new theme emerging from the data.

6. Results

6.1. Policies on predatory journals

This was the topic of the one direct question on predatory journals and it was worded as such: 'Does your research team / department / university have a policy on avoiding predatory journals? There was a coded response of yes, no and don't know. If they said yes, they were asked for further details. The question deliberately did not ask about individual practices for ethical and honesty reasons. The free-text element to it did offer up some valuable information on the topic, with the question turning out, as intended, to open out a broader discussion on predatory journals.

Table 2. Policies for avoiding predatory journals: country analysis

Interview 3	Total	Don't know	No	Yes
CN	23	0	12	11
ES	18	3	7	8
FR	16	7	8	1
GB	24	10	6	8
MY	20	5	7	8
PL	22	9	6	7
RU	20	0	4	16
US	21	4	13	4
Total	164	38 (24%)	63 (38%)	63 (38%)

Of the 164 ECRs who answered the question 38% said there was a policy, the same percentage said there was not a policy they knew of and the remaining ECRs did not know. Table 2 shows that there was a considerable divergence between countries with Russian ECRs (16/20) most aware of a policy and French ECRs most unaware (7/16), largely because there are no French predatory journals, although there is lot of debate on what they call 'grey' journals (something picked-up on later). British ECRs stood out in that there was a large number of them who did not know (10/24).

One hundred and twenty-five ECRs offered an explanation for their coding and this was provided not just by those that said yes who were prompted to do this, but also by a few that said no or don't know. Those that said no or don't know either tended to say that while there were national policies they had not been put into practice at the university or departmental level or that there were just informal policies. In regard to the latter, a US medic explained:

> *I don't know if it's a policy, but we're certainly aware of how to avoid those, and I know our libraries try to push out information to us about being aware of that. I think we're pretty on top of that*.

A summation of the most important comments made follows and is analysed by country.

China

In order to understand the Chinese findings, it needs to be said that:

1) the term 'predatory journal' is alien to most Chinese ECRs, often they are referred to as "water-filled" journals, meaning they publish many low-quality papers which leads to a "dilution" in the journals' quality;

2) there are no general blanket policies/blacklists in China, but different fields have their own approved whitelists or journal ranking lists. Dealing with Chinese ECRs that said they were aware of a policy, most mentioned the existence of blacklists, which provide early 'warnings' (a frequently used term in China) of questionable journals or said they followed the directions of the Chinese Academy of Sciences. There were also comments made about 'punishments' for not following the warnings, which might mean losing your job or not being considered for permanent positions. For instance, a Chinese soft social[1] scientist told us:

> *There is no clear policy, but the deputy dean for research management is wary of predatory journals. Last year, someone was eliminated from the job application because he had published a paper in such journals.*

A mathematical scientist was even more fearful saying:

> *If I don't refer to it [the approved list], it won't be very pleasant.*

France

With only one French ECR saying they were aware of a policy in regard to predatory journals ("revues prédatrices"), it is not surprising that none of them took to explaining their coding further. This is largely explained by the fact that predatory journals are not mentioned / known / thought about in France because they do not penetrate the ECR's world and concerns. Blacklists are therefore unknown, and even the prestigious academic consortia *Couperin* prescribes no blacklist as it is considered unnecessary and expensive. For the moment, the old and outdated Beall's list is still the main reference. As in Spain, French ECRs tend to adopt international databases standards such as that of the *Web of Science*

(*WoS*) when it comes to choosing their journals, and avoiding others. The national interviewer for France adds that, as in Spain, *MDPI* and, also, *Frontiers*, are considered controversial open access 'grey' publishers who have seen the number of French papers published increase significantly these past few years.

Malaysia

Again, although less than half of ECRs said they were aware of predatory policies and fake journals (*Beall*'s list was mentioned as a blacklist by a few of them), they seemed only too aware of only publishing in listed or trusted titles and how best to avoid the trap of publishing in journals, which would not count in their research assessment. Thus, this physical scientist explained:

> *Faculty always update us with list of predatory journals. I find it quite a big issue for researchers – if you find yourself publishing (previous) in predatory journal, it would be a waste and not counted.*

ECRs commonly spoke of whitelists which guided them rather than policies, as this Malaysian hard social[2] scientist put it:

> [I don't know of policies] *I guess because we strictly publish in whitelist*.

WoS and *Scopus* were also mentioned in this context of whitelist where indexation status in these databases plays a major criterion for Malaysian ECRs in deciding where to publish (**Nicholas** *et al.*, 2022).

Poland

In the case of Poland, it is not so much a case of where you should not publish, but where you should. So, like France, there are no lists of predatory journals ("czasopisma drapieżne"), just the ministerial list of journals (built upon *WoS* and *Scopus* lists) that attract reputational points for Polish ECRs. A third of ECRs said they were aware of policies, but yet again they turned out to be thinking of unofficial and informal policies as well, and the exercise of just common sense. There was also a dismissive attitude towards the question, such as why ask me, we know what we are doing? For instance, a physical scientist said:

> *I have not heard about such journals*

and a soft[1] social scientist said this:

> *Hard to say, I ignore such magazines.*

Another soft social scientist, got to the heart of the matter:

> *I do not know if this is formal, but since the ministry does not give credit for such publications, the university does not give money for publications in such journals either, and this is clearly written in the application for funding for research activities.*

Meaning if you went ahead and published in predatory journals you would not be rewarded, indeed, you would miss out.

As in Spain and France there is some discussion whether *MDPI* is good or a predatory publisher, but nothing official has happened regarding this in respect to the Ministry list. Some ECRs published in *MDPI* because the journals there are high (citation) scoring journals, and that absolves everything.

Russia

In Russia, the policy on avoiding predatory journals ("Hishchnicheskie zhurnaly", "musornye zhurnaly") differs among research institutions, including universities. Instead of official policy, as a rule they prepare reference lists of highly-rated international journals listed in *Scopus* and *WoS* showing where researchers should publish in order to ensure their grant and work reports are accepted. In addition, some research institutions monitor journals excluded from reference databases and put these lists online. And this must be what ECRs were thinking of when over three-quarters said they knew of policies, the biggest proportion of all our countries. Looking more closely through their individual comments, even those that said there were policies, in fact, they were referring to an unofficial "code of honour" to avoid such journals. The following quotes are illustrative:

> *I have not seen or read any specific university documents or anything like that. But here we are making sure that this does not happen* [Mathematical scientist]
>
> *It's even scary to even hint about publishing in such journals.* [Physicist]
>
> *This is not policy; this is an adequate sense not to do so. I don't know, no one teaches us this. It's just obvious.* [Chemical scientist]

Spain

Less than half of Spanish ECRs said they were aware of policies, but even more (and some of the former) said they were directed where to publish and the *WoS* list is for most of them their 'Bible' when it comes to choosing journals. They also mentioned the guidelines of *Aneca*, the national agency for researchers' assessment, which in 2021 published a list of questionable journals. ECRs were generally more uncomfortable about publishing with *MDPI*, a big publisher, because many of them are on *Aneca*'s list and for them that is bad news because they can publish in *MDPI*'s journals which is relatively easy for them and pay the APCs (a big bone of contention for Spanish ECRs) with vouchers obtainable for peer reviewing for the publisher. The other methods for avoiding predatory journals mentioned was to publish in prestigious journals, the 'same' journals or only in Spanish or Portuguese ones –the assumption being that predatory journals were mainly English language ones. It would be true to say that Spanish ECRs are not as familiar with the concept of a predatory journal ("revista depredadora") as those of the UK and US.

UK

One-third of UK ECRs said they knew of policies. An even higher proportion said they did not know with a good number of them saying they were not necessary as everyone knew what a predatory journal looked like and, anyway, they only submitted to those journals they knew or had published in. This mathematical scientist spoke for many:

> *No policy per se, but of course we avoid predatory journals and submit manuscripts to well-known and respectable journals.*

This was echoed by a medical scientist:

> *Use credible journals that have previously been used in the field.*

There were also references from two ECRs to the role that libraries played:

> *There is no policy that I am aware of, but we do get regular emails from the library staff warning us of the latest predatory journals and emails.* [environmental scientist].

Thus, ECRs with one exception, thought the idea about publishing in predatory journals was ludicrous, since they would never submit to a journal, they were unfamiliar with. The exception had done their first two degrees in an African university and had published in predatory journals. He said by doing his doctorate he was learning a new and better way of doing science.

US

Just 4/22 ECRs were aware of official policies, so the US appears to be a policy free zone in respect to predatory journals, although many have heard of journal lists they are not supposed to publish in, but rarely go to because they are very aware of the problem, as this medical scientist explained:

> *I don't know if it's a policy, but we're certainly aware of how to avoid those, and I know our libraries try to push out information to us about being aware of that. I think we're pretty on top of that.*

A physicist put it more succinctly:

> *The policy is: don't do it*.

6.2. Awareness of questionable practices

There were clearly opportunities for predatory journals to be mentioned in many other questions asking about scholarly communications (around 50 all told), and most notably, the one about questionable practices. ECRs were asked whether they were aware of questionable practices being employed and published and, if so, whether they had become more prevalent during the two-years of the pandemic. The term 'questionable' was employed because we wanted ECRs to have ownership of what they thought was involved and 'aware' was used because it is a problematical question and we did not wish to infer that they were guilty of such practices, or, indeed, people they worked with. A large proportion of ECRs did know of questionable practices. Two-thirds (99/157) said they did and as many as a third (39/118) thought the pandemic had made things worse. ECRs were asked to explain their coding and nearly 100 ECRs provided a free-text comment. What was regarded as being questionable was very wide-ranging and evenly spread: multiple submissions, fake papers, fraudulent peer reviewing, plagiarism (including self-plagiarism), duplicate submissions, bogus authorship, lack of reproducibility or verification, paper factories and paying for papers, same data published a number of times and selective reporting (p-hacking, the misreporting of true effect sizes in published studies; it occurs when researchers try out several statistical analyses and/or data eligibility specifications and then selectively report those that produce significant results). This is a long and worrying list, but predatory journals were, surprisingly, only mentioned by name twice in this context. Once, by a British life scientist, who pointed out that 'proper' journals are guilty of questionable practices too:

> *This is true of journals with good impact factors as much as local journals – not just predatory journals*.

The other, from a Malaysian soft social scientist, mentioned the problems of differentiating between predatory and non-predatory because of 'phishing' journals which

> "*often praise your previous work, then ask you to submit to their journal***"** tricking them into thinking they are conventional journals. *It's a new issue now,* they said.

In addition, half a dozen ECRs thought it was not so much questionable practices, but low-quality practices and superficiality brought on by light-touch peer review alleged to have been introduced to meet the need for speed in disseminating important information during the pandemic. Low quality and preprints seemed to be associated in ECRs minds and predatory journals were hardly mentioned in this context. Some ECRs levelled the blame for the prevalence of low quality papers at competition, as one Spanish chemist said:

> *It's because people have to compete more for positive evaluation, funds, etc.*

Poor ethical training was also blamed. A British medical scientist, however, warned it would only get worse:

> *It is going to get bigger and bigger as a problem as more material gets published – it's linear with quantity of work being done and being published. The pandemic has produced accelerated publishing processes, which translate to "light touch" peer review, also contributing.*

6.3. Mentions of predatory in other questions

In order to determine whether other questions had given rise to comments on predatory journals, a search for the term predatory and related terms, such as whitelist, blacklist and low quality was undertaken on all the free-text comments furnished in R3. The search identified 6 questions and after deleting false positives, that produced a total of just 11 mentions. The questions and responses were:

Q. Achieving visibility for research outputs is argued as being important in building reputation: do you agree?

A. The mention here, from a Chinese medical scientist, was in effect a warning suggesting that the relentless *pursuit of visibility could be associated with low quality channels, such as preprints and predatory journals*. So, care needed to be taken when pursuing such an objective.

Q. How do you decide to trust informally disseminated evidence in your own specialisms. Answer in respect to blogs and posters.

A. [I Trust] *Blogs only as long as they are not tied to a predatory journal, same for posters* [Polish soft social scientist].

Q. Have your attitudes to established scholarly communication practices, largely based on traditional journals, changed?

A. *Attitudes have changed due to the fact that I have changed. I just know more and understand how publication, journals work, what they are. Just experience and that's it. When you are just starting your academic career, you do not understand anything. Then you, for example, begin to distinguish predatory journals. It's hard to do in the beginning because you don't understand the interaction structure*. [Russian chemical scientist]

Q. Is there a big opportunity for the current generation to fundamentally change way in which the scholarly communication system works?

A. [Yes] *Towards more openness. Also to move against what many call predatory journals, such as Nature because of cost of APCs. This generation does not accept this or to fill the pockets of publishers. Now people are looking elsewhere*. [British environmental scientist]. This is an interesting take on the meaning of the word 'predatory' and included here for that reason.

Q. What role will libraries have for researchers in ten years' time as compared to their current role?

A. *I think libraries are increasingly important. There are predatory journals and hiccups accessing things. In the digital world, there is so much stuff evolving to navigate. Having a skilled librarian is absolutely critical, even more so now than it used to be.* [US medical scientist]

Q. When choosing a journal to submit their paper to which factors rate most highly: f) geographical location.

A. *I pay attention to journals coming from Asia as sometimes they are predatory* [French life scientist]. The ECR is basically saying that is a factor which determines where not to publish.

6.4. Comparisons with round 1 of interviews

Because the predatory direct question was only introduced for the third round of interviews held in Summer 2022, we deal with the first round of interviews held in Spring 2021 separately, as the data would not have been fully comparable. With ECRs with no direct or obvious outlet for comments on predatory journals we need to look to see whether they surfaced elsewhere and if so where. Overall, roughly the same proportion (two-thirds) said they were aware of questionable practices. But it was in respect to mentions we see the real differences with interview 3. There were in fact 24 mentions all told and half emerged in the questionable practices question. The R3 figure as we have seen was 2. Amongst these, a Malaysian life scientist gave a very interesting answer, ascribing predatory publishing to the fact that researchers in developing countries wished to replicate research found elsewhere in the context of their own countries leading to weak research:

> *Publishing in predatory journals, I would say that it is more about the low-quality work. A lot of low-quality work is being published in my field, in predatory journals, because the problem now is people are publishing what found in other countries in their context. They like to emulate what others have done, and put it in their own context, and it cannot be done, not enough information to go around and that I regard it as low-quality work.*

A French mathematical scientist, pointed to wholesale and ingrained questionable practices occurring a developing country:

Publishing in predatory journals, because in Columbia, there are incentives to publish papers, the salary is accorded to the paper you have. Many professors have published in predatory journals, a terrible practice. There is also the sausage [salami] *publication phenomenon. There is very little control and the big risk is that students may reproduce these bad practices".*

A high proportion of the free-text comments mentioning predatory were in regard to whether the pandemic was responsible in some way for an increase in questionable practices, and such comments were largely missing in R3. Those who said the pandemic had made a difference said:

I only saw spam from predatory journals being more frequent in my email box. [French mathematical scientist]

Predatory publishing [is on the increase]*, journals asking you to review papers that are not at all in your areas. Even good IF journals (are also) citing predatory journals.* [Malaysian life scientist]

Perhaps possible predatory journals, I've heard about them and I keep clear. I mean, I would rather not publish than go for a journal that openly is asking for papers. [Malaysian hard social[2] scientist]

Publishing in predatory journals, even we have motivational speakers (making speeches) on scientific publishing having (published) papers in predatory journals. [Malaysian hard social scientist]

Those who said the pandemic had not responsibility made the following comments:

No. It's about publishing in predatory journals, either intentionally or maybe you are being trapped to publish there. But it's tricky to differentiate because some of these journals hide under Scopus (indexed by Scopus). [Malaysian soft social scientist]

Plagiarism and predatory publishers. I don't think they have anything to do with the pandemic, maybe only predatory publishers and a rash of low-quality publications related to the pandemic. Low quality because they are prepared and conducted in an unreliable manner or "stretched" to fit the pandemic theme. [Polish medical scientist]

No. Not necessarily more prevalent. I've noticed more of this activity over the last few years. Some COVID-related research may have found its way into predatory journals. [US medical scientist]

Predatory journals cropped up in other questions in R1, too, and in many different contexts as the following comments illustrate:

Q. What were the criteria by which they were assessed?

A. *The formal criteria are minimal and I do not remember exactly what they are. It seems one participation in an international conference and one article, but not from predatory journals.* [Russian environmental scientist]

Q. Do they judge their success as a researcher (and that of others) by citation metrics, such as journal impact factors and/or h indexes?

A. *Partly, high impact factor journals can be both good and bad journals. There are predatory journals (with a high impact factor) which have a large circulation and high fees. However, for journals with higher impact factors, regardless of those unqualified journals, its papers are indeed better than those with lower impact factors* [Chinese medical scientist]

Q. Are you sympathetic to improving ways in which scientific research output is evaluated by taking into account of openness and transparency factors?

A. *Yes, many researchers in developing countries do not have research support or English language support. Very little is done to address this. The consequence is the use of predatory journals, etc.* [UK medical scientist]

A. *In general, yes, but: 1) On the one hand, the fact that a person can have access to an article without problems is very convenient. But a lot of open publications are paid for, and this raises the issue of research quality. There are cases of minimal peer review, or, when the article is not accepted, someone can pay and easily get published; 2) There are editors who say, why do you need a publication in this journal? Go to our subsidiary OA journal, pay there and you will be published for sure, you have passed the editorial board and I can advise you. Thus, on the one hand, for the ECR, OA is good and convenient, but the question of quality arises: if there is money, then it is possible not to improve the article and submit untested data, and it will be in the OA paper. But it depends on the level of the publication.* [Russian chemical scientist]

The ECR does not actually use the predatory word but it is plain that is what they are talking about.

Q. Does the peer review system need improving?

A. *It could be better if it was paid, but it would be difficult because the open access character of the journal would be in danger, it could become "predatory peer review"* [French mathematical scientist]

Q. Have you/your team a policy in regard to OA publishing?

A. *No mandate policy from the national government level, but there are some university level policies in regard to OA, my university made a blacklist for OA journals. Publishing papers in the blacklisted OAJ will be punished. I think OA is something worth encouraging, but in the domestic context of evaluating people it is problematical.* [Chinese mathematical scientist]

Q. Will journals still have a central role to play in five years' time?

A. *The academic community is highly inert and does not change so quickly. Therefore, the role of journals in the next five years will not change much. The criteria for journals will change, because there are too many of journals, and it is very difficult to find out those journals are worth reading and publishing, and those journals that we conventionally call garbage / predatory.* [Russian hard social scientist]

6.5. 'Grey' journals enter the debate

Because ECRs were allowed ownership of the term 'predatory' and asked about it in the broader context of scholarly communications, as we have seen, it allowed them to raise concerns around the topic's boundaries. This is especially important given the topic is clearly in transition as we have seen in the literature review. As it turned out, their concerns were not so much predatory publishers, but those 'grey' publishers, thought by some, to be on the margins who employ peer review but who have commercial/fast/proactive practices that may be seen as unethical and questionable. This was particularly the case with French, Spanish and Polish ECRs. As we saw from the quotes, the 'grey' publishers they exclusively mention in this connection are *MDPI*, a Chinese owned publisher and *Frontiers*, an Indian owned publisher.

Thus, in the final round of interviewing, 23 (14%) ECRs mentioned *MDPI* or *Frontiers* in various scholarly communication contexts. The most common mentions (5) occurred in answers to the question about predatory journals. ECRs said they were aware that there were issues raised about the non-standard, proactive methods of these publishers (sometimes reminded of it by local university directives, such as given in Spain and Poland), but ECRs were tempted to publish with them because of the speed and convenience of publishing with them, especially for those titles indexed by *WoS*. A Spanish mathematical scientist explained it like this:

> *When we need to publish fast, we use MDPI but now we try not to publish there because they are not well considered for assessment.*

The other mentions of relevance concerned reviewers being rewarded with credits, which contribute towards APC payments for papers published with them. Some thought this was a good idea while others were not sure as this Polish chemist was:

> *Fixed rates for reviewers - I would change the way reviewers are rewarded at MDPI, because now a lot of people do a lot of these reviews because you can get a discount on publication for doing each review - this is not good.*

Many more (a quarter, 38) ECRs mentioned these two publishers in interview 2 and again the most mentions arose from the question about predatory journals (6), again mainly showing that ECRs were in two-minds about the operations of these publishers, for instance, appreciative of the speed of the process (two weeks it is said and (sometimes) the rewards for reviewing, but worried about the consequences of such speed – hurried or short reviews, for instance. Another question about how to improve peer review elicited 4 mentions of the methods employed by *MDPI*. They were split between those that thought the rewards offered for reviewing were a good idea or not, with one Polish medical scientist, very much in the latter camp, saying:

> *... the American Diabetes Society requires reviewers to have specific parts in the review that must be mandatorily considered. A minimum number of characters would have to be introduced, as I have seen one-sentence reviews in MDPI. Vouchers exacerbate the phenomenon of unreliable reviews.*

There were just 22 mentions of the two publishers in the first interview where there was not a question on predatory journals. The comments of relevance concerned initiatives for quicker and more efficient peer review developed for the pandemic and publishing on new OA platforms.

7. Conclusions

After two-years of interviewing around 170 ECRs about every aspect of the scholarly communications system and how it was bearing up under the pressure of the pandemic it is clear that while questionable practices are thought to be widespread, and on the increase, predatory journals are not a big concern. Despite being novice, although not naïve, researchers and driven to publish papers to survive and prosper, they have not been tempted to publish in predatory journals (or, indeed, use them), despite being bombarded by email requests to do so. Often ECRs do not even want to talk about them much because they were not a feature of their research world where a research 'code of honour' and a certain dragooning ensures they are never even in the frame for predatory publishing. Just one ECR, in a previous job, admitted to doing so and this was confirmed by checks on their CVs. However, low quality research really did concern them and they came across quite a bit of it being the research workhorses they are, but they do not necessarily link this with predatory journals. They are more likely to talk about open access journals, preprints and so-called 'grey' journals in this regard. The boundaries of concern have widened.

From the very start of their careers ECRs are shepherded to publish in legitimate journals by a whole array of factors: university/government policies, prescribed trusted lists, research team colleagues, collaboration partners, their own libraries, who appear to be increasingly involved, and a healthy understanding of their own best interests. They are far from being whet behind the ears and they certainly know what predatory journals *et al.* are, and they would certainly not publish with them accidently or though ignorance. Many of their stark and abbreviated comments on predation have been chronicled in this paper and they clearly betray not so much a lack of interest or concern, but more an irritation that they have been asked something silly or juvenile. Instead, they tend to debate and criticise the low or poor quality of research outputs and publishers pushing the boundaries. They also have other fish to fry, partly as a result of the pandemic, such as the acceptability and status of preprints and the credibility of speedily reviewed papers.

Nearly a quarter of ECRs felt that the pandemic had inflated questionable practices, which is a sizeable proportion, but only a minority mentioned the rise of predatory publishing in this context and although there was a general sense it had helped usher in accelerated publishing processes, which translated into "light touch" peer review and produced low quality research outputs.

Finally, **Linacre** (2022) argues that the real 'predator effect' is the risk that society at large is exposed to journals purporting to be scholarly and peer reviewed presenting articles that have not been validated and contain disinformation or 'junk science'. However, while ECRs were not ignorant of such concerns and, indeed thought this was a significant and growing risk the finger of blame was not pointed at predatory publishing alone, but to to a general lowering of standards that have occurred over the last few years. The message is almost move on (from predatory) and address the real issues that are degrading the research base by stealth.

8. Notes

1. We include within the "Soft Social Sciences": Anthropology, Political Science and Sociology.

2. We include within the "Hard Social Sciences": Economic and Business Sciences, Geography and Psychology.

9. References

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Professional dynamics between journalists and politicians: Professional routines and assessment of trust and credibility generated by Spanish congressional spokespersons in the specialized press (2019-2022)

Antonio Baraybar-Fernández; Sandro Arrufat-Martín; Belén Díaz-Díaz

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Antonio Baraybar-Fernández
https://orcid.org/0000-0002-5474-5214

Universidad Rey Juan Carlos
Camino del Molino, 5
28942 Fuenlabrada (Madrid), Spain
antonio.baraybar@urjc.es

Sandro Arrufat-Martín ✉
https://orcid.org/0000-0002-3104-4765

Universidad Rey Juan Carlos
sandro.arrufat@urjc.es

Universidad Internacional de La Rioja
sandro.arrufat@unir.net

Belén Díaz-Díaz
https://orcid.org/0000-0001-7421-4085

Universidad de Cantabria
Avda. de los Castros, s/n
39005 Santander, Spain
belen.diaz@unican.es

Abstract

This article deals with the interactions between and opinions of parliamentary journalists covering the Spanish *Congress of Deputies* regarding their main source of information –the spokespersons of the parliamentary groups. This quantitative and qualitative study is based on both data obtained through a survey as well as semistructured personal interviews. The results have made it possible, among other aspects, to identify the patterns of behavior and frequency of relationships between media professionals and spokespersons; to recognize which of their skills are most appreciated by reporters; to evaluate the levels of empathy, trust, and credibility generated by the different political representatives in journalists; and finally, to establish a statistical correlation between the empathy–trust and trust–credibility variables to determine the level of effectiveness of the messages issued by parliamentary representatives. The study found that journalists find satisfaction with their work and with the level of recognition of the media they represent; they consider that the information they generate has importance for society, although with a limited social influence; that empathy, clarity, and credibility are the three most valued attributes of the parliamentary spokesperson; and that the perception of parliamentary spokespersons is acceptable. Finally, despite the criticism that the media sometimes receive for their ideological and biased interpretation of the news, no appreciable bias was found in the responses referring to the ideology of the spokesperson and the editorial line of the media to which the journalists surveyed belong, an issue related to their professionalism, independence, and objectivity, which are key to the economic and financial development of a country.

Keywords

Political communication; Journalists; Politicians; Parliamentary spokespersons; Professional routines; *Congress of Deputies*; Public opinion; Empathy; Trust; Credibility; Journalism.

1. Introduction and the current context

The capacity of the media to shape public opinion has generated a broad and controversial field of reflection addressed from different academic disciplines. This is a central issue for the political and communication sciences, from both a normative and an empirical perspective.

Continuing with the tradition of communication research, most current proposals attempt to address the complex process of media influence as the main source of citizen opinion (**Wolf**, 2020, p. 9) and its relevance in the creation of the public sphere, a concept proposed by Júnger Habermas related to the rise of the press and other spaces of civic exchange that emerged during the eighteenth and nineteenth centuries (**Habermas**, 1982).

The formation of public opinion is a distinctive feature of any democratic society in which power resides in the populace and political power is publicly accountable and legitimized through debate and deliberation (**Habermas**, 1998). However, at present, there is no consensus on how the media shape or contribute to shaping public opinion. Individuals make their own decisions regarding their information consumption or routines, and the media try to respond to these changes to maintain audience interest (**Foos**; **Bischof**, 2022, p. 19). However, the trust and credibility of the media's sources for their news are determining values for any media, both in the direct relationship with audiences and in the amplification made through their own social network accounts (**Baraybar-Fernández**; **Arrufat-Martín**; **Rubira-García**, 2021, p. 10).

Throughout the last century, the foundations of what we now call political communication were built. Pioneering studies include those by **Lippmann** (1922), **Lasswell** (1927), and **Lazarfeld**, **Berelson**, and **Gaudet** (1944). Later, in the 1960s, studies on the concept of agenda-setting emerged, focusing on describing the power of the media's influence and how it constructs social reality. The relationship between the media and the public agenda is explained by **McCombs** and **Shaw** (1972), who tried to answer the question of who sets the public agenda and under what conditions (**Lotero-Echeverri**; **Romero-Rodríguez**; **Pérez-Rodríguez**, 2020). Their central hypothesis is that the media have the capacity to make choices as to the issues that the public perceives as important (**Santillán-Buelna**; **Zuart-Garduño**, 2021). Consequently, they contribute to establishing not what and how people should think, but those issues around which to think, discuss, and form an opinion. These issues thus become relevant to the public agenda as well as the political agenda in the role of proposals or laws.

> "From this perspective, we can then speak of three agendas: media agenda, public agenda and political agenda" ["*Desde esta perspectiva, se puede hablar entonces de tres agendas: agenda de medios, agenda pública y agenda política*"] (**Manfredi**; **Sánchez-Sierra**, 2020, p. 565).

Information professionals play a key role in the development and quality of democratic systems (**Curran**, 2005; **Entman**, 2010). Journalism performs, among others, two essential functions: on the one hand, it becomes a platform for public debate and the expression of opinions, which is essential in democratic terms; and on the other hand, it functions as a control over the political system and provides visibility to its activities (**Schudson**, 2008), a basic political function of intermediation between the points of view of political parties and institutions and public opinion (**Martínez-Nicolás**; **Humanes**, 2012, p. 61). In today's societies, both issues acquire a prominent importance as they affect

> "key issues such as legitimacy, consensus, power, influence, decision-making and social perception of political reality" ["*cuestiones clave como la legitimidad, el consenso, el poder, la influencia, la toma de decisiones y la percepción social de la realidad política*"] (**Casero-Ripollés**; **López-Rabadán**, 2011, pp. 138-139).

The strong interdependence between the political system and media or information systems affects the ways of doing politics and the ways of presenting information in a way that compromises the proper functioning of the public sphere in contemporary democracies (**McCombs**, 2020; **Schudson**, 2020; **Siegel**, 2022). This can be seen in the adaptation of politics to the logic of spectacle (**Swanson**; **Mancini**, 1996), typical of the medium of television and of North American influence, and managed by marketing specialists –so-called spin doctors– or the relevance of emotional aspects that shape messages and, in turn, are the result of partisan polarization, public opinion, and political attitudes (**Webster**; **Alberston**, 2022; **Cazorla**; **Montabes**; **López-López**, 2022). The objective of the media is to increase its audience: the more shocking the news, the greater the possibility of being published (**Mohammed**; **McCombs**, 2021).

The facilities of creation, distribution, and access to content provided by digital media allow for the multiplication of political and social actors trying to shape the public agenda (**Chadwick**, 2017). There is no unanimity regarding how they affect traditional relations between political power and the media. Some research shows that they may have weakened their social influence in articulating the political debate (**Feenstra** *et al.*, 2017; **Casero-Ripollés**, 2018); on the contrary, other studies suggest that social networks enhance the power of those actors who were already influential outside the digital environment, especially traditional political actors, journalists, and mainstream media that also use these new communication tools efficiently (**Dubois**; **Gaffney**, 2014; **Dagoula**, 2019; **Casero-Ripollés**, 2021).

The creation of an effective political agenda is a complex task, and among its objectives is to convert those issues considered important in the political agenda into relevant issues for the public agenda. Their interest is usually focused on the exposure of those issues considered more transcendent for the populace and that allow them to improve their positions when compared with the rest of the parties (**Melero-López**, 2019). Consequently, different spokespersons will design different discursive strategies aligned with their political parties depending on whether they are in government or opposition with the aim of shaping relationships with journalists and the media (**Hänggli**; **Kriessi**, 2012).

Political and media systems are connected in a way that depends on their divergent interests, and their study constitutes one of the main areas of scientific research in journalism owing to its central and strategic character within the information production process. Journalists turn to politicians as sources of information as part of the daily content renewal process that is typical of news routines or news-making. Politicians gain public visibility by possessing information, give legitimacy to the news, and try to achieve control of the public debate by imposing their own approach or point of view. Political deputies also sometimes use the media as sources for their initiatives, as the latter can help parliamentarians to make informed decisions by denouncing and revealing certain situations (**Martín-Llaguno**; **Navarro-Beltrá**; **Berganza**, 2022, p. 52).

Several studies point to skepticism as a defining element of these relationships. The journalistic outlook toward political activity is qualified in harsh terms related to manipulation, deceit, and obscurantism in a discourse of distrust and distancing toward politicians. In contrast, the production of good journalism corresponds to exhibiting truth, transparency, and service to public opinion through the surveillance of political power (**Martínez-Nicolás**, 2015). Meanwhile, politicians are quite cynical about the media and journalists, especially when they feel that the media are willing to set the political agenda (**Brants** *et al*., 2010). In this sense, in Spain, **Franch** and **Micó** (2021) identified an endogamic relationship between journalists and politicians in social networks, with the two groups sharing information in a self-referential loop.

According to journalists and experts, the issues that significantly shape public opinion are mainly defined by political sources, while political journalists devote much of their professional effort to what one might call the cultivation of sources, as if it were a seedbed to care for and pamper (**García-Orosa**; **Vázquez-Herrero**; **López-García**, 2022, p. 56; **Martínez-Nicolás**, 2015). It thus seems interesting, to say the least, to determine how such relationships are produced in the current context that is characterized by the holding of four elections in five years, the arrival of new actors to the Spanish *Congress of Deputies*, the change from an imperfect bipartisanship to a fragmented multiparty system that has forced the implementation of a machinery of pacts and consensus, and consequently in which the figure of the different spokespersons of the parliamentary groups has gained prominence (**Sánchez-Muñoz**, 2017; **Berdón-Prieto** *et al*., 2021).

2. Objectives and methodology

With the general aim of outlining the professional activity of journalists specialized in political information and their relationships with their sources, this study has the following specific objectives:

O1: To quantify the degree of satisfaction of journalists with the activity they perform, their perception of the relevance of their work for society, and their assessment of who takes the initiative in the relationship between the reporter and the parliamentary spokesperson, as well as to identify the type and frequency of contacts with them.

O2: To determine their opinion regarding the skills that a parliamentary spokesperson should have and their assessment of the criteria of disposition-empathy toward their activity, the trust generated, and the credibility of their messages.

O3: To estimate the effectiveness of spokespersons by establishing a statistical correlation between the empathy-trust, trust-credibility, and credibility-message variables according to opinion of journalists.

To achieve these objectives, a comparative study was designed by means of a 14-item questionnaire divided into two large blocks. The first block of questions aimed to ascertain the opinions of journalists on issues related to their professional activity, being evaluated on a scale from 1 to 10 (including issues such as their degree of satisfaction with their work, the recognition of their work by the media outlet(s) they represent, the degree of relevance of the information they produce for society, and the level of influence their information has on society). Open-ended questions about who they consider to be taking the initiative, the frequency of their relationships with parliamentary spokespersons, the most common way of maintaining relationships with parliamentary spokespersons, the characteristics they would highlight in a parliamentary spokesperson, and the parliamentary spokespersons who have most facilitated their work were also included.

The second block of questions gathered the journalists' assessments of the different spokespersons of the parliamentary groups, evaluating them on a scale from 0 to 5 regarding the levels of empathy, trust, credibility, and political message generated by them.

Spokespersons were chosen when they were considered as political representatives of each parliamentary group most present in the media, a categorization used in previous research (**Campos-Domínguez**; **Esteve-del-Valle**; **Renedo-Farpón**, 2022). The timeframe for contact (submission and receipt of responses) with journalists was from November 7 to 20, 2022.

During the exploratory phase of the research, we identified those parliamentary spokespersons in the Spanish *Congress of Deputies* who performed this function during the XIV legislature from December 3, 2019 to the date of sending the questionnaire, and once the General State Budget was approved, which enabled the conclusion of the legislature before entering a pre-electoral period. As a result, 16 spokespersons were selected, ordered here from highest to lowest according to the parliamentary weight of their respective groups: Patxi López (*PSOE*); Héctor Gómez (*PSOE*); Adriana Lastra (*PSOE*); Cuca Gamarra (*PP*); Cayetana Álvarez de Toledo (*PP*); Iván Espinosa de los Monteros (*Vox*); Pablo Echenique (*Podemos*); Irene Montero (*Podemos*); Gabriel Rufián (*ERC*); Inés Arrimadas (*Ciudadanos*); Edmundo Bal (*Ciudadanos*); Aitor Esteban (*PNV*); Mertxe Aizpurua (*EH Bildu*); Joan Baldoví (*Plural*); Iñigo Errejón (*Plural*) and Laura Borràs (*Plural*).

To obtain the survey responses, a sample of parliamentary journalists from the main news agencies and media outlets with daily activity in the Spanish *Congress of Deputies* were contacted beforehand by telephone and subsequently sent a questionnaire in electronic format. The sample included journalists from news agencies (*EFE*, *Colpisa*, *Servimedia*, and *Europa Press*), print media (*El País*, *El Mundo*, *ABC*, *La Razón*, and *La Vanguardia*), digital media (*El Confidencial*, *El Español*, *Infolibre*, *Público*, *Eldiario.es*, *El Independiente*, and *El Periódico de España*), radio stations (*SER*, *COPE*, *Onda Cero*, and *RNE*), and television stations (*Antena3*, *Telecinco*, *TVE*, and *La Sexta*). Cuatro was not included in the latter group because it did not have a journalist on site at the *Congress of Deputies*. A total of 20 responses were obtained anonymously in an orderly and sequential manner.

To present the results in an orderly manner and to reach statistical conclusions, in the third phase of the research, the responses were ordered individually by categories of questions, calculating the average for each politician. This made it possible to obtain a matrix of averages for four of the variables analyzed (empathy, trust, credibility, and political message) for each of the spokespersons. This matrix was then applied to carry out a two-dimensional statistical analysis of the linear correlation among the following three pairs of variables (X, Y): “empathy” versus “trust,” “trust” versus “credibility,” and “credibility” versus “political message.” First, Pearson’s linear correlation coefficient (r) was calculated for each of the pairs, a statistical measure that quantifies the linear dependence between two variables and takes values between −1 and 1. A value close to 1 indicates a positive and perfect linear relationship.

The coefficient of determination (r^2) was also calculated to evaluate the percentage of the Y variable that is explained by the X variable for each pair. The coefficient of determination reflects the goodness of fit of a model to the variable it is intended to explain. Its value ranges between 0 and 1, and the closer it is to 1, the better the fit of the model to the variable one is trying to explain.

Finally, once the information collected in the questionnaire had been analyzed and its statistical analysis completed, the research was complemented with personal interviews, one of the most popular methodological tools for qualitative research in the social sciences (**Ulloa-Martínez**; **Mardones-Barrera**, 2017). Qualitative interviews are characterized by their flexibility and open style and tend to focus on the personal experiences of interviewees rather than on general opinions and beliefs (**King**; **Horrocks**, 2010). As a qualitative research technique, one of the most significant benefits of in-depth interviews is their contribution to understanding how people construct their realities, including how they see, define, and experience the world (**Taylor**; **Bogdan**; **DeVault**, 2015).

Semistructured interviews were thus used, based on an outline of topics or issues that the interviewer could modify by incorporating additional questions to specify or expand data or information; consequently, not all questions were predetermined (**Hernández-Sampieri**; **Fernández-Collado**; **Baptista-Lucio**, 2010). The semistructured interview format was chosen because, starting from the initial questions that compile the key research areas, they offer freedom to go deeper into topics that arise and to modify questions according to the answers of each interviewee during the conversation (**Baños-González**; **Baraybar-Fernández**; **Rajas-Fernández**, 2020).

The objective of this part of the research was not to generalize the results obtained but to improve the understanding, using the opinions and reflections of the interviewees, their own professional dynamics, and how they establish their relationships with political spokespersons. **Morse** (1995) states that, in qualitative research, there are no guidelines for defining the optimal sample size as there are in quantitative research. For the cited author, the key to achieving excellence in a study of this type is to accumulate data until reaching saturation, understood as the moment at which data collection no longer provides new information. One of the four models of saturation in qualitative research, identified by **Saunders** *et al*. (2018), relates to the identification of redundancy in the content of responses. Another concept considered in the design of this part of the study was **Sandelowski**’s (1995) “information power” [“*poder de la información*”], according to which, the more information the sample group contains, the fewer the number of subjects needed, as long as it is relevant to the research.

The sample consisted of 12 journalists (5 women and 7 men), from the previous survey. They matched the criteria applied in the original survey in terms of their distribution between news agencies (2 participants), print media (2 participants), digital media (4 participants), radio (2 participants), and television (2 participants). The interviews were conducted individually during the week of December 19-24, 2022, with a scheduled duration of 45 minutes.

The topics covered were structured in three blocks. The first was an introductory section, with two questions about what led them to their current job as a political reporter and what aspects of it are most appealing to them. In the second section, six key questions were addressed, being related to work pressures, their feelings toward and reactions to attempts at manipulation, the type of relationships they maintain with spokespersons, the initiative in the preparation of information, the behavior and availability of spokespersons in this situation, and their perception of the social repercussions of the information they received. To conclude, they were asked about the issues they consider to be essential in their professional routine and their recommendations for those who are interested in this journalistic specialization.

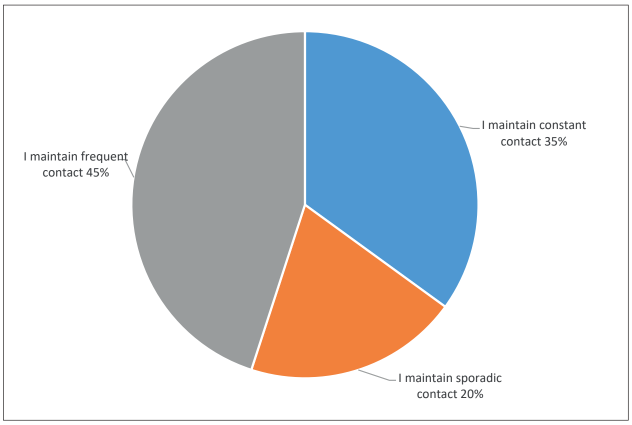
3. Results

The results are described in four sections, corresponding to the structure of this study. The first one gathers the data from the questionnaire items related to the degree of satisfaction of journalists with their work, the recognition of their work by the media for which they work and for society in general, and finally, their opinion on the initiative and typology of the meetings between the press and parliamentary spokespersons. The second section contains the answers to the questions related to the journalists' opinions and assessments of generic spokesperson skills and their individual appraisal of the selected sample in terms of disposition-empathy toward their work, the degree of trust generated, and their perceived credibility. In the third section, the linear correlation between the pairs of these three selected variables is analyzed. Finally, analysis and interpretation of the information from the data obtained from the personal interviews are carried out.

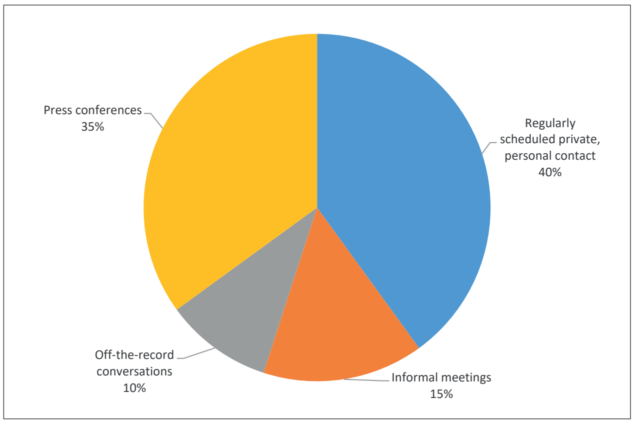
3.1. Journalists' perceptions and evaluations of their activity

The results for the satisfaction of journalists with their professional performance were positive in terms of both personal satisfaction (with an average of 8) and their perception of the recognition of their work by the media they represent (slightly higher at 8.35). They consider that the information they generate is relevant to society (with an average of 7.30); however, the level of social influence was notably lower (with an average of 6.95). Regarding this last issue, the wide dispersion in the assessments of the importance and impact of their publications on public opinion is also relevant, although many of their reports are prominent in the daily media agenda.

Regarding who takes the initiative in the relationships between journalists and politicians, an evident duality was recorded, with 50% believing that politicians do while 50% state that journalists do. The vast majority state that they maintain constant or frequent contact with parliamentary spokespersons (80%), while only 20% do so sporadically (Graph 1). As for the type or form that these meetings take, 40% of the journalists state that they have regularly scheduled private personal contacts, which is the most common type, followed by official scheduled press conferences (35%), informal meetings (15%), and off-the-record conversations (10%). On the basis of these results, it is worth noting that 65% of the meetings between journalists and spokespersons are outside scheduled official appearances (Graph 2).



Graph 1. Frequency of relationships with parliamentary spokespersons



Graph 2. Types of relationships with parliamentary spokespersons

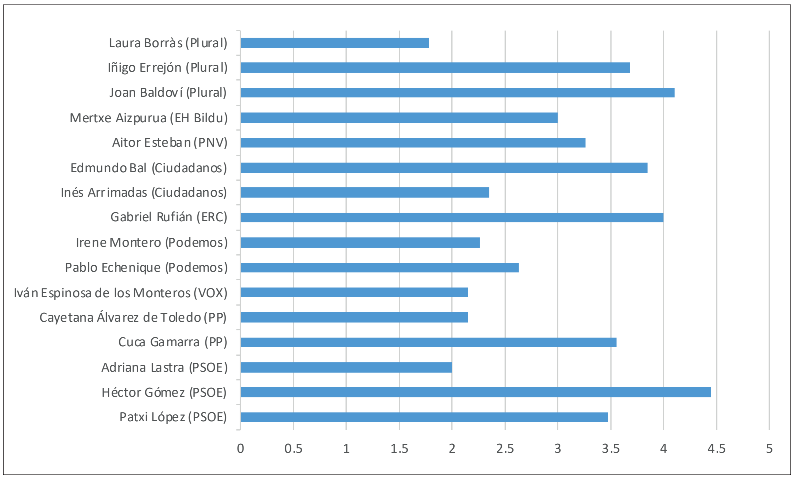
3.2. Journalists' opinions and assessments of parliamentary spokespersons

Journalists value communication skills and public speaking as the fundamental characteristics that a parliamentary spokesperson should have. In addition, characteristics such as empathy, clarity, credibility, truthfulness, and negotiation stand out as complementary factors in the good work of a spokesperson (Graph 3). In their assessment of the three spokespersons who have most facilitated their work during the legislative period analyzed, the spokesperson of the *So-*

Graph 3. Main characteristics of a parliamentary spokesperson

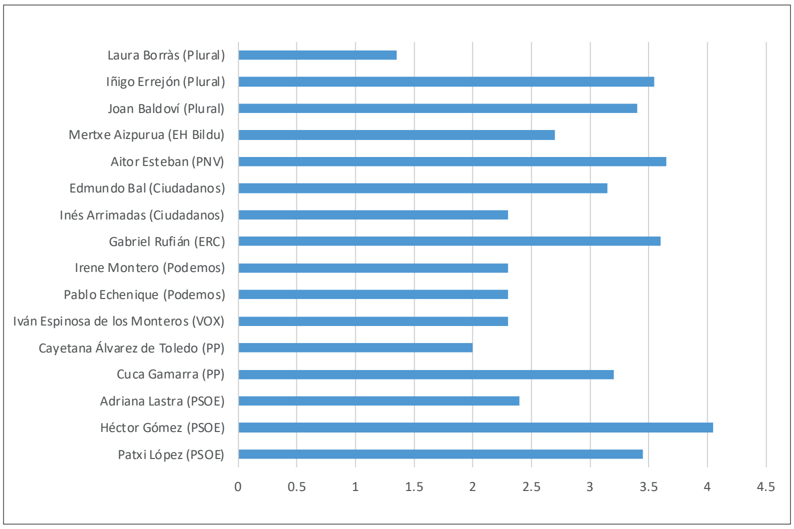
cialist Parliamentary Group Héctor Gómez is above the average, being mentioned by 17 of the 20 journalists surveyed, followed by Gabriel Rufián of *Esquerra Republicana de Catalunya* (14 out of 20), and Cayetana Álvarez de Toledo (*Grupo Parlamentario Popular*) (7 out of 20).

Disposition or empathy was considered to be a key element in the interactions between journalists and politicians. The spokesman of the *Socialist Parliamentary Group*, Héctor Gómez, was the best rated in the study with 4.45 points out of 5, followed by Joan Baldoví of the *Plural Group* (4.1 points), and Gabriel Rufián of *Esquerra Republicana de Catalunya* (4 points). Laura Borràs of *Plural* (1.78 points) and Adriana Lastra of the *PSOE* (2 points) were the worst rated (Graph 4).



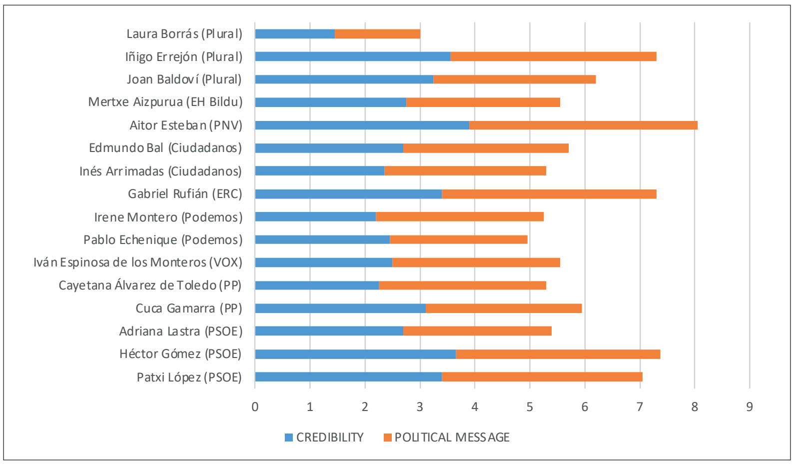
Graph 4. Willingness or empathy of spokespersons regarding journalistic activity

Undoubtedly, the variable of trust is transcendental in the relationship between journalists and their sources of information. The data collected once again rated the spokesman Héctor Gómez as the spokesperson generating the greatest confidence (4.05 points), followed by Aitor Esteban of the *Basque Parliamentary Group* (3.65 points) and Gabriel Rufián of *Esquerra Republicana de Catalunya* (3.6 points). Among the worst rated were Laura Borràs of the *Plural Group*, once again in the lowest position (1.35 points), and Cayetana Álvarez de Toledo of the *Popular Parliamentary Group* (2 points).



Graph 5. Confidence generated by parliamentary spokespersons

Credibility and communication and public-speaking skills are the main characteristics that journalists considered essential for a parliamentary spokesperson. These two variables were analyzed individually but are represented in a grouped bar chart (Graph 6) to facilitate the joint visualization of the most prominent parliamentarians. Aitor Esteban of the *Basque Parliamentary Group* (4.02) attained the first position, followed by Gabriel Rufián of *Esquerra Republicana de Catalunya* (3.6), and Héctor Gómez of the *Socialist Parliamentary Group* with the same rating (3.6). It is worth mentioning that both Iñigo Errejón, from the *Plural Parliamentary Group*, and Patxi López, from the *Socialist Parliamentary Group*, also received very close ratings. Laura Borràs of *Grupo Plural* (1.5) once again appeared in the last position.



Graph 6. Collected variables of credibility and political message of the spokespersons

3.3. Statistical correlation between the variables of empathy-trust, trust-credibility, and credibility-political message

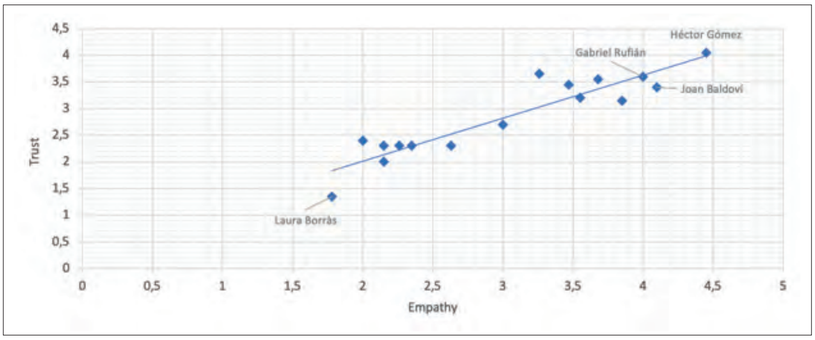
For the study of the linear correlation between the variables of "empathy-trust," "trust-credibility," and "credibility-political message," and to analyze the type and strength of the relationship between them, a matrix of the average results of the variables studied was established for each spokesperson, being obtained as an average of their individual ratings in each category of questionnaire items. In the results matrix (Table 1), the three most highly valued ranks are shown: the first in green, the second in orange, and the third in gray, while red corresponds to the lowest rated spokesperson.

Table 1. Matrix of averages of variable results studied in the spokespersons

Speaker	Empathy	Trust	Credibility	Political message
Patxi López (*PSOE*)	3.47	3.45	3.4	3.65
Héctor Gómez (*PSOE*)	4.45	4.05	3.65	3.73
Adriana Lastra (*PSOE*)	2	2.4	2.7	2.7
Cuca Gamarra (*PP*)	3.55	3.2	3.1	2.85
Cayetana Álvarez de Toledo (*PP*)	2.15	2	2.25	3.05
Iván Espinosa de los Monteros (*Vox*)	2.15	2.3	2.5	3.05
Pablo Echenique (*Podemos*)	2.63	2.3	2.45	2.5
Irene Montero (*Podemos*)	2.26	2.3	2.2	3.05
Gabriel Rufián (*ERC*)	4	3.6	3.4	3.9
Inés Arrimadas (*Ciudadanos*)	2.35	2.3	2.35	2.95
Edmundo Bal (*Ciudadanos*)	3.85	3.15	2.7	3
Aitor Esteban (*PNV*)	3.26	3.65	3.9	4.15
Mertxe Aizpurua (*EH Bildu*)	3	2,.7	2.75	2.8
Joan Baldoví (*Plural*)	4.1	3.4	3.25	2.95
Iñigo Errejón (*Plural*)	3.68	3.55	3.55	3.75
Laura Borràs (*Plural*)	1.78	1.35	1.45	1.55

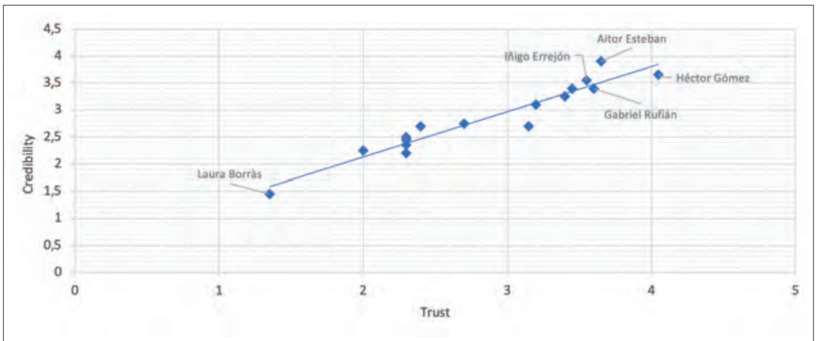
Firstly, the linear correlation coefficient (r) was calculated for the three pairs of variables (X, Y), obtaining values greater than 0.85 in all three cases and thus indicating positive and almost perfect linear relationships among the three pairs of variables. Specifically, the results obtained were as follows: empathy-trust ($r = 0.925$), trust-credibility ($r = 0.959$), and credibility-political message ($r = 0.864$). In addition, to evaluate the percentage of the Y variable that is explained by the X variable in each correlation, the coefficient of percentage determination (r^2) was calculated, yielding the following percentages: empathy-trust ($r^2 = 85.62\%$), trust-credibility ($r^2 = 85.78\%$), and credibility-political message ($r^2 = 82.34\%$). These high percentages confirm, in all three cases, that more than 80%, or four-fifths, of the variations in variable Y are explained by variations in variable X, and that only the remaining 20%, or one-fifth, of the variability is due to other, uncontrolled factors.

The next graph represents the correlation between the variable of empathy-confidence of parliamentary spokespersons. In this representation of the correlations, spokespersons located in the upper right quadrant enjoy greater empathy and trust. This is particularly seen in the case of Héctor Gómez (*PSOE*), who is located in the upper right zone, leading the correlation with values of 4.45 to 4.05; he is also the spokesperson who generates the most trust and empathy among all of those considered, followed by Gabriel Rufián (4 to 3.6) and Joan Baldoví (4.1 to 3.4). One can thus conclude that, the greater the trust generated in journalists, the more empathy there is between them and the spokespersons, hence trust is the most relevant variable when it comes to increasing the empathy between these two figures. There is thus a positive relationship and a direct cause-effect relation between these two variables.



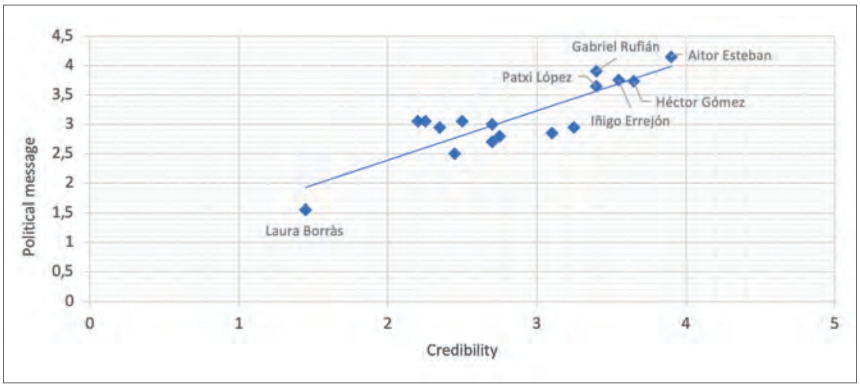
Graph 7. Correlation between empathy-confidence variables

Another of the correlations analyzed is that of the trust-credibility variable, which reveals two above-average rankings, for Aitor Esteban of the *Basque Parliamentary Group* (3.65-3.9) and Héctor Gómez of the *Socialist Parliamentary Group* (4.05 to 3.65). It is apparent from Graph 8 that these two politicians are notably separated from



Graph 8. Correlation between trust-credibility variables

the rest of the two large groups of parliamentary spokespersons, the first with notable results and the second with lower results. Among the other spokespersons, Iñigo Errejón and Gabriel Rufián also achieved positive results. In this sense, we once again see a pattern of quadrants in which one can observe a group of parliamentary spokespersons located in the upper right quadrant, in contrast to the rest of the spokespersons framed in the lower left zone, an area with negative connotations regarding the trust-credibility correlation. In this correlation, there is also a positive intervariable relationship between trust and credibility.



Graph 9. Correlation between credibility-political message variables

Finally, we aimed to study the correlation between the variables of credibility and political message (Graph 9). In this correlation, Aitor Esteban, from the *Basque Parliamentary Group*, is located above the other spokespersons and stands out with very positive parameters (3.9-4.15), in the upper right quadrant. In the correlation, we observe four other spokespersons in the upper right quadrant, who also differ notably from the rest of the spokespersons located in the middle of the figure. These four spokespersons are Gabriel Rufián (*ERC*), Héctor Gómez (*PSOE*), Iñigo Errejón (*Plural*), and Patxi López (*PSOE*). Clearly, the effectiveness of a parliamentary spokesperson's political message depends on the degree of credibility they bring to it; that is, the greater the credibility of the spokesperson, the greater the effectiveness of their political message. The variables again exhibit a positive relationship with each other and an evident cause-effect relation.

3.4. Results of the personal interviews

The structure of the interview was defined in the methodological section, while this section includes a description of the most relevant issues expressed by the interviewees for each topic. The sample's extensive knowledge of the object of study and its currency allowed for a coherent approach to the participants' perception of the current reality of the phenomenon studied.

To carry out an exhaustive analysis of the material collected, the first step was to transcribe all the interviews before adapting them to the established structure. In this process, the amount of information was reduced, which implies selecting, focusing, abstracting, and grouping the data into "content categories" according to the specific criteria determined (**Massot-Lafon**; **Dorio-Alcaraz**; **Sabriego-Puig**, 2009).

The results of the introductory questions in the personal interviews revealed a high degree of congruence with the results of the previous survey. Most of the interviewees agreed that their arrival at this professional specialization was based on a strong dose of vocation and often luck or chance, that is, "being in the right place at the right time" ["*estar en el momento y lugar oportuno*"], as one of the more experienced interviewees stated. With regard to the aspects of their work that they find most attractive, there is also a high level of consensus regarding a combination of personal satisfaction and social commitment;

> "being able to experience politics from the inside" ["*el poder vivir la política desde dentro*"],
>
> "following the dizzying political news from a privileged position" ["*seguir desde una posición privilegiada la vertiginosa información política*"], "being close to top-level sources" ["*estar cerca de fuentes de primer nivel*"], or
>
> "conveying information with obvious social impact in an understandable way" ["*trasladar de una forma comprensible una información con evidente incidencia social*"]

are some of the comments recorded that illustrate the collective feeling.

Within the key questions section, the relationship with the spokesperson is considered to be horizontal, not hierarchical, and based on interests.

> "Each one has a role; he can tell you what he wants, and I can publish according to my criteria" ["*cada uno tiene un rol, él te puede contar lo que quiera y yo publicar según mi criterio*"]

or

> "we seek to obtain information, while they seek to transmit their point of view" ["*nosotros buscamos obtener información y ellos en transmitir su punto de vista*"]

are the two opinions that might summarize their views. While all politicians respect the role of the press, there are some interesting details to research regarding their contact on the day of meeting; each spokesperson differs depending on their personality or disposition, the size of their parliamentary group (tending to be more accessible if it is small), and the experience of the journalist. "Being more confident or not depends on how long you have been in the chamber" ["*depende de cuánto tiempo lleves en la cámara para tener más confianza o no*"], says a journalist from the television media.

> The objective of politicians is to turn issues considered important on the political agenda into relevant ones for the public agenda

With regard to the pressure felt in the course of their work, three members of the sample stated that they did not feel any type of pressure, although it should be noted that these are people with a long and well-recognized career in the coverage of political information. The rest stated that they feel some kind of political pressure to gather messages that align with the editorial line of the media they represent. Different testimonies reflect the pressure derived from the immediacy and the continuous demand for information:

> "We need to inform up to the minute because now we publish information on networks and other channels" ["*necesitamos informar al minuto porque ahora informamos en redes y otros canales*"],
>
> "politicians, aware of the dynamism of digital journalism, know that any information can be nuanced or corrected quickly and pressure us more" ["*los políticos, conscientes del dinamismo del periodismo digital, saben que se puede matizar o corregir cualquier información con rapidez y presionan más*"], and
>
> "editors seek to differentiate themselves from the competition by being the first, but on the other hand, they want news and feel the obligation to get the best information, to give the best context" ["*los editores buscan diferenciarse de la competencia siendo los primeros, pero, por otro lado, quieren novedades y sientes la obligación de sacar la mejor información, de dar el mejor contexto*"].

Most of them have felt deceived or manipulated by a spokesperson, although there have been a couple of comments referring to "omitting information" ["*omitir información*"] or "telling half-truths" ["*contar la verdad a medias*"]. The general reaction is a loss of trust; on a personal level, this produces anger and rejection toward the spokesperson, while in the professional sphere,

> "we have no choice but to continue to maintain a relationship with them, although verifying and comparing the information with other sources more than usual" ["*no nos queda otra que seguir manteniendo relación con ellos, aunque verificando y contrastando más de lo habitual la información con otras fuentes*"], explains one interviewee.

They claim to constantly take the initiative regarding news-setting, although politicians and their press officers are also proactive and insistent in getting their messages onto the media agenda. When asked by journalists, they are usually accessible, although their degree of collaboration differs depending on how well the topic of discussion is in tune with their own interests. The conversations on this specific issue identified nuances that clarify their professional reality and the dynamics studied in this work.

An ideological bias was detected in the predisposition on the part of the politician, depending on the editorial line of the media and the ideology of the party to which it belongs; one interviewee commented that

> "if the spokesperson interprets that it is a related media, it is easier" ["*si el portavoz interpreta que se trata de un medio afín resulta más sencillo*"].

They also point out that, when they are the ones to take the initiative, the willingness or collaboration of the spokespersons decreases:

> "they are usually available, but they do not always give you the information you need" ["*normalmente están disponibles, pero no siempre te dan la información que necesitas*"];
>
> "they are elusive regarding information and are heavily influenced by the line of communication drawn by the party" "*son esquivos a la información y están muy mediatizados por la línea de comunicación trazada por el partido*"], and
>
> "when a party wants an issue not to be dealt with, you do not get information" ["*cuando un partido quiere que un asunto no sea tratado, no se obtiene información*"].

In addition, the accessibility of the spokesperson is greater when the information is requested by more experienced journalists and according to the apparent social influence of the media they represent.

There is an appreciable discrepancy in the responses received to the last of the key questions, regarding awareness of the social impact of their news. Some do not remember or are not concerned about the influence of their information. However, almost half of the sample are aware and follow the acceptance of and comments on their work, mainly through social networks such as *Twitter* and readership metrics. This is evidenced by some of the opinions collected:

> "almost every day, I notice its impact" ["*casi todos los días percibo su repercusión*"];
>
> "our media receives positive comments from our readers on information, especially on the exclusives published" ["*nuestro medio recibe comentarios positivos de nuestros lectores a informaciones, sobre todo ante las exclusivas publicadas*"];

"yes, I notice it in the comments generated on social networks" "*sí, lo noto en los comentarios generados en las redes sociales*"];

"*Twitter* is the most active social network" ["*Twitter es la red social más activa*"]; and

"I like to follow its impact; I have access to the readership metric, and I see when it is read a lot" ["*me gusta seguir su repercusión, tengo acceso al medidor de lectores y veo cuando se lee mucho*"].

In synthesis or conclusion, they emphasize access to and relations with the appropriate sources and respecting the codes that allow them to maintain trust as the fundamental aspects of their work. Honesty, rigor, constancy, the effort to "tell things in the simplest possible way" ["*contar las cosas de la forma más sencilla posible*"], and "giving a voice to all those who have something to say about the subject matter" ["*el dar voz a todos los que tienen algo que decir sobre el tema tratado*"] were recurring responses from all the interviewees. In terms of the last question, regarding the recommendations they would make to those who decide to dedicate themselves to this profession, it is paradoxical that, albeit highly satisfied with their professional activity, many do not recommend dedicating themselves to this profession. The most frequently mentioned reasons are poor working conditions, excessive dedication, and demands: "more than a profession, it is a way of life" ["*más que una profesión es una manera de vivir*"].

4. Discussion and conclusions

The relationships between the journalistic profession and the political system constitute an object of study of great importance and complexity. It is essential to broaden the knowledge of their dynamics and interactions prior to the construction of a news item, as it can become a factor conditioning the elaboration of the information on the policy, and can determine its content as well as its focus or frame.

In general, the current research allows us to draw significant conclusions that improve knowledge regarding the professional routines of journalists specialized in political information and their opinions about the characteristics they appreciate in Spanish *Congress of Deputies* spokespersons. These assessments, since they focus on those who are responsible for reporting on the daily work of parliament, can be useful for the spokespersons in the performance of their role as transmitters of their parliamentary groups' political agendas to the public. However, this could also be useful for those responsible for communication in any organization, regarding their relationships with media professionals.

Journalists are satisfied with their work and feel the recognition of the media they work for. One hypothesis that could explain this degree of satisfaction might lie in the feeling of being witnesses, albeit in the background, of the main events of current political affairs, since the *Congress of Deputies* is where an important part of this takes place. Indeed, the former editor of *El País*, Antonio Caño, notes that sometimes

"a journalist feels part of the story they are covering" ["*un periodista se siente parte de la historia que está cubriendo*"] (**Caño**, 2022, p. 152).

Furthermore, a large part of the media agenda in Spain is configured through political information; therefore, it is understandable that the management of media outlets consider the work of these professionals to be important.

However, according to the opinions gathered in the in-depth interviews, they define their profession as demanding, with working conditions that could be improved, and observe that a strong vocation is essential for its performance. During the conversations held, there is a certain mythification of the profession, surrounded by romanticism, which can become a drawback in the definition of an adequate business framework and decent labor relations.

It is worth considering that the majority of the sample is composed of experienced professionals specialized in political information. Unlike what may occur regarding the relations between journalists and politicians in other institutions, in the Spanish *Congress of Deputies* there is a frequent and direct relationship with sources. Two of the comments collected during the interview illustrate this idea:

"the parliament is an open place, and there is a lot of freedom; no other institution has this" ["*el parlamento es un sitio abierto y hay mucha libertad, ninguna otra institución la tiene*"] and

"in the Congress there is not such a marked hierarchy; the spokespersons are usually available to talk to you, and there is no power relationship" ["*en el Congreso no hay tanta jerarquía marcada, los portavoces suelen estar disponibles para hablar contigo, no hay una relación de poder*"].

They believe that the information they generate is important for society. However, it is noteworthy that their assessment of their level of social influence is decreasing. On this last issue, the wide dispersion observed in the evaluations is also revealing, reflecting a high level of discrepancy as to the importance and impact of their work on public opinion despite their media prominence. Those who are interested in the impact of their news preferably do so through social networks or readership metrics.

They are aware of the intermediary role they play between politics and society, and are concerned about generating honest and truthful content for their audiences. Faced with the more direct and ideological use that

> On the basis of these results, it is worth noting that 65% of the meetings between journalists and spokespersons are outside scheduled official appearances

politicians make of digital platforms, with messages that could increase the polarization of their electorate (**Alonso-Muñoz**; **Tirado-García**; **Casero-Ripollés**, 2022, p. 84), the search for diverse sources and the contextualization of information remain among their priorities. Consequently, the existence of serious and rigorous professionals aids in the reduction of partisan or biased information that favors the political radicalization of society. An understanding of reality is necessary and entails the intellectual and reflective effort of journalists, although at present this does not seem to be well recognized by the public, as evidenced by its replacement with messages that seek a more direct and emotional impact.

> In his assessment of the spokespersons who have facilitated his work the most during the analyzed period, the spokesman for the *Socialist Parliamentary Group*, Héctor Gómez, stands out, followed by Gabriel Rufián of the *Esquerra Republicana de Catalunya* and Cuca Gamarra, of the *Popular Parliamentary Group*

Access to proprietary sources enables journalists to obtain exclusives and construct unique stories, which is essential to their daily work. According to the results of the interview regarding the dynamics of the contacts between journalists and politicians, there is an evident duality: 50% think that it is the politicians who take the initiative, while 50% believe that it is the journalists. However, during the in-depth interviews, the participants almost unanimously claim to take the initiative on the information they prepare according to their own journalistic interests or those demanded by their media. Most of them acknowledge that they maintain permanent contact through meetings outside scheduled official appearances, although the latter still have considerable prominence.

Comparison of these results with previous international research reveals slight differences or an evolution in this type of interaction. Berganza, Van Dalen, and Chaparro found that less than half of Spanish journalists frequently took the initiative in making contact and gave greater prominence to press conferences, an issue that they contemplate in their conclusions and that

> "could translate into the media following the agenda of their sources instead of organizing their own" ["*podría traducirse en que los medios siguen la agenda de sus fuentes en lugar de organizar la suya propia*"] (**Berganza**; **Van-Dalen**; **Chaparro**, 2010, p. 20).

Journalists are aware that the interest is in relationships that they consider to be horizontal; spokespersons try to introduce their messages into the media agenda, and though they are free to incorporate them into their news, they do not perceive a situation of power on the part of the politician, nor do they feel that they are setting their agenda.

In terms of the pressures during their daily work, the immediacy of the new digital media stands out. All conventional media have other channels and also disseminate their news through social networks. The possibility of making changes to the information published has altered professional routines, increasing the pressure on spokespersons and their communication teams to modify or qualify their information, and decisively, the demand of their own social media accounts to generate news continuously, which on occasion, impacts the time and reflection necessary to prepare good information.

Empathy, clarity, and credibility are the three attributes of the parliamentary spokesperson most highly valued by the journalists. Empathy is related to the availability and understanding of the spokesperson so that the journalist can fulfill their tasks in accordance with the dynamics and timing of the media agenda. In the current era of convergence, journalists have increased access to information and a variety of sources; however, in line with other studies (**Ibáñez-Cuenca**; **Baraybar-Fernández**, 2011), it is confirmed that credibility and reliability, arising from mutual trust, continue to be paramount in this type of relationship. They all report feeling deceived and manipulated, as well as not having been told the whole truth or not having had their questions answered. On a personal level, this causes a loss of trust and empathy; however, in the professional sphere, they are aware of their interdependence, and the only solution is to verify the information received from that source with greater rigor.

With regard to the evaluations of the spokespersons, of the 16 in the sample, 10 were rated above average value on the disposition-empathy variable. When it comes to trust, the data decrease slightly, with 9 above average compared with 6 below. Finally, in the estimation of the credibility that they contribute to the political message, only two spokespersons were rated below the average. Consequently, it can be concluded that the perception of the journalists toward most of the spokespersons is not negative, as there is an acceptable perception for the three variables considered herein.

Despite the criticism that the media sometimes receive for their ideological and biased interpretation of the news, and although there is a certain political bias in the selection of the information provided by the different media (**Martín-Llaguno**; **Berganza**, 2001), it is striking that we did not find any appreciable bias in the responses referring to the ideology of the spokesperson and

> Clearly the effectiveness of the political message of a parliamentary spokesman depends on the degree of credibility that he brings to it, the most prominent being Aitor Esteban, from the *Basque Parliamentary Group*

the editorial line of the media professional surveyed. For example, it can be seen how two spokespersons of the same political group achieve divergent results, while the best and worst rated spokespersons have different political affiliations. This assessment can be interpreted as an indicator of the objectivity, independence, and rigor of information professionals, an essential issue in reference to the determining role it has in a society that presents polarization features and in which there is an abundance of styles

> Disposition or empathy was considered to be a key element in the interactions between journalists and politicians

> "of populist political communication that assumes the position of a truth that does not need dialogue or consensus and, therefore, puts at risk the free debate of ideas" ["*de comunicación política populista que asume la posición de una verdad que no necesita dialogar, ni consensuar y, por lo tanto, pone en riesgo el libre debate de ideas*"] (**Ruiz-Méndez**, 2021, p. 47).

The statistical correlation of the variables analyzed has made it possible to outline a model for the creation of an effectiveness index for parliamentary spokespersons in their relationships with media professionals, an aspect to be considered regarding their ability to permeate society with their messages. These issues go beyond the individual reflections and responsibilities of the spokespersons or individual members of each parliamentary group; they are of general interest as they have an influence on the perception of political activity in society.

This study does not intend to have a definitive character; rather, it seeks an approximation in the present case of journalistic activity within an area still little explored, as is the case of parliamentary communication (**Campos-Domínguez**; **Esteve-Del-Valle**; **Renedo-Farpón**, 2022). The methodological proposal of the research raises two aspects open to discussion. The first has to do with the difficulties in analyzing personal factors, such as empathy or friendship, which can decisively determine journalists' assessment of spokespersons. It is inevitable that, during their daily work, bonds of affection will be created and may influence the creation of the news and their opinions about the sources. A second issue refers to the sample and the different length of time the spokespersons have held office. Some have held office for the entire period and others for a reduced part of it; for this reason, it is significant that among the best rated is the socialist spokesperson Héctor Gómez, who has held office for one year.

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