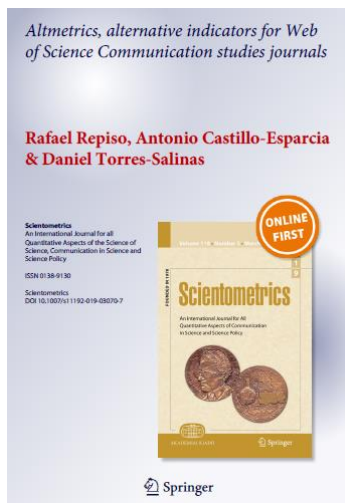


# Altmetrics, alternative indicators for Web of Science Communication journals



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## **ABSTRACT**

The aim of this study is to analyse the occurrence of communication journals in the so-called Altmetrics (Facebook, Mendeley, Twitter, etc.) and how these indicators relate to each other and to the citations received. To this end, we study how the articles published by the Journal Citation Reports of the Web of Science for the 5-year period 2013–2017 on the Altmetric.com platform are registered. The results show how only a few platforms have significant coverage for studying the whole and in the case of Mendeley and Twitter, the coverage is superior to the citations offered by Web of Science. There is a proven relationship between citations and their occurrence on social media and platforms and their intensity varies by product. In general, the journals with the highest number of citations (Journal of Computer Mediated, Journal of Communication or New Media & Society) with few exceptions (Continuum) stand out.

## 1. Introduction

With the appearance of web 2.0 and social media, the communication processes of scientific journals are changing and becoming more democratic. In the past, it was the exclusive function of scientific journals to evaluate and publish papers (Repiso 2015). With this new digital scenario, the number of distribution channels has increased, and in addition, the task of dissemination has become a shared responsibility between the journal, authors and producer research centres, thus empowering these traditionally passive actors and offering possibilities for interaction and bidirectionality (Leiner and Quiring 2008). Web 2.0 records an enormous amount of information that, properly identified, organized and analysed, can be used to further study scientific communication and its processes.

The evaluative study of the research through the analysis of the new Web 2.0 tools was named by Jason Priem as Altmetrics (Priem et al. 2010). The potential of Altmetrics, which are included within Webmetry and Scientometry (Wouters et al. 2015) covers the main areas of study, "capturing digital traces of scientific products, aims to improve scholarly communication, scientific evaluation and literature discovery" (Moed 2015). There is an increasing number of Altmetrics sources and data that study phenomena as diverse as the occurrence and dissemination of scientific work on social networks such as Facebook or Twitter, digital press or even bibliographic managers. Facebook and Twitter have been specially studied in the field of Communication and have become one of the main subjects of study since their appearance (Boyd and Ellison 2008), but in the context of the dissemination of scientific works the studies have been carried out from the Library and Information Science field.

Social Media have revolutionized communication in the last decade. In 2008 and 2009, articles were published setting the bases (Boyd and Ellison 2008; Diga and Kelleher 2009; Eyrich et al. 2008; Waters et al. 2009) and they would create a precedent and multiply over the years. The study of new social media has been consolidated in the different environments of academic participation such as scientific conferences, monographs and textbooks. In the teaching area, the appearance of subjects in undergraduate and master's degrees is noteworthy and even the high level of scientific production has led to the creation of new specialized journals (for example, *Social Media and Society* or *Journal of Digital & Social Media Marketing*) and has thematically redirected and enhanced the impact of a journal which was ahead of its time, the *Journal of Computer-Mediated Communication* (1995). According to Marc de Mey, this development would place the Social Media paradigm, to Phase 3 where the theoretical subject has proven its consistency (Mey 1992).

Most of the research related to new social media focuses on studying the basic aspects of communication, author, receiver, transmitter or message (Williams et al. 2013). In fact, there are studies which analyse the occurrence of journals in these new media, but they are usually limited to the profiles of journals in products such as Twitter and Facebook (Segado-Boj 2013) and to the use given to them. Only one work applies Altmetrics to the Communication area (Torres-Salinas et al. 2013) though in a superficial way, in order to exemplify the possibilities of social networks in scientific communication.

Therefore, the use of social platforms for data logging, subsequently applied to scientific evaluation, namely, the Altmetrics, is an umbrella under which any social platform keeping useful information to study

the academy has a place. The Snowball Metrics Recipe Book (Colledge 2017) classifies Altmetrics into four groups: 1. Scholarly Activity (Mendeley, CiteULike, Google Scholar, Academia.edu, etc.), 2. Scholarly Commentary (Publons, F1000, Wikipedia, Youtube, Vimeo). 3. Social Activity (Facebook, Twitter, Reddit, Google+, Pinterest, LinkedIn and delicio.us). 4. Mass Media (digital press).

Nevertheless, in the evaluative context, are social metrics comparable to the traditional citation study? This is the purpose of many scientific works (Thelwall et al. 2013) where it has been identified that there is a strong correlation between the number of Mendeley quotations (Mohammadi and Thelwall 2014) and twitter, it even appears that the tweets received in the first three days of a paper's publication allow us to predict future citations of a paper (Eysenbach 2011). In order to define the symbolic value we give to each platform, it must be weighed in relation to different dimensions such as meaning, potentiality, diffusion, effort and filtering.

- A. **Meaning.** Meaning is fundamental when we choose a subject of study, since it justifies and gives meaning to the study itself. Traditionally, quotations are important because they are a recognition meaning that an author has relied on previous knowledge, the quoted one, in order to build new knowledge (Velho 1986). Hence, we have to ask ourselves what implicit meaning and value an article has to appear in a tweet, to be in a Mendeley user's library, in a LinkedIn post or in any of the other tools analysed.
- B. **Dissemination.** It shows us the capacity of an indicator to measure scientific dissemination, since there are indicators which directly measure occurrence in the media. However, in some tools such as Twitter, dissemination is not a simple matter, as it depends not only on the occurrence of an article but also on the volume of occurrences and the issuers' characteristics; popularity (number of followers), centrality (position on the net), etc. (Simmie et al. 2014). Depending on the characteristics and audience of the social tools, some indicators have a larger audience than others. For example, the presence of an article in a Mendeley bookstore adds little visibility to the article, while the presence of a scientific article in the press exponentially multiplies its circulation to a much wider audience.
- C. **Potentiality.** It is the capacity of these data to be used and analysed in different ways in order to obtain a greater number of results. For example, the number of tweets can be related to the dates on which they were published (temporality), the characteristics of their authors or the geographical area where they are produced (Zahedi et al. 2014a).
- D. **Effort.** The effort is understood as the work that must be done in order for an article to be present in any of the applications studied. Writing a 140/280 character twitter message or including a file in our Mendeley library is not comparable to writing an article in the press (News Stories) or writing a scientific article that will then be evaluated and hopefully published by a journal indexed in Web of Science (citations).
- E. **Filtering.** It is the existence of filters, i.e. evaluation processes carried out by third parties that allow or prevent the presence of an article in the media and platforms studied. The filters in this case have two variants, on the one hand, the status of the author; there are media in which in order to log information you have to have a previous status as a journalist (News Stories), a researcher (Citations and F1000 post) or policy docs. Similarly, some media also have evaluation systems

which accept or reject the publication of content, such as Wikipedia, while others lack filtering (Twitter, Mendeley, etc.).

Both effort and the ability to be evaluated and filtered indicate the susceptibility of an indicator to manipulation. For example, twitter has shown itself to be an easily manipulated indicator, which has millions of false profiles used by companies and governments for unethical purposes (Haustein et al. 2016), and which breaks the supposed democratization of Twitter. This is the reason why it would be advisable to use several indicators which complement and validate the indicators that are easily manipulated, such as the presence on Twitter. The selection of the Communication area is especially significant because these web platforms are studied in the area with a different perspective, as interpersonal and mass media. Consequently, a certain predisposition of Communication journals to be present in these platforms is assumed.

The nature of this work is exploratory, which determines the absence of hypotheses and the general aim of its objectives.

RQ1: The main objective is to explore the use and validity of a set of tools called Altmetrics for a specific scientific area; Communication.

RQ2: Secondly, to determine which Communication journals obtain the best Altmetrics indicators and therefore to establish the ones which have the most visibility and impact on the Internet.

RQ3: Thirdly, to analyse the existing relationship between the traditional and the Altmetric citations to establish what new information can be offered in the ecosystem of the Communication journals.

## **2. Material and Methods**

This paper is a retrospective (2013-2017) scientometric analysis of articles published in the *Social Science Citation Index* (WoS) Communication category journals registered on Altmetrics.com: "The reason the Social Sciences Citation Index (SSCI) was used for journal selection criteria is that it is generally recognised that SSCI journals have a higher quality of research, a longer history and easier accessibility in academia" (Zhang and Leung 2015). A total of 9,977 papers and 82 journals are being studied.

### **Information Sources**

The works studied, articles and reviews are those published in journals of the *Communication* category of the *Social Science Citation Index* (WoS) in the period 2013-2017 and that are registered in Altmetrics.com. Accordingly, to identify them it is essential to know the DOI of each work (Robinson García et al. 2014). The Altmetric.com tool tracks and registers the presence of electronic documents on different virtual platforms. Of all the works that make up the object of study (24,192), Altmetrics registers 9,977 articles and *reviews* (Table I), which means that not all the articles in the journals or even in some journals are present because they have not incorporated the DOI or because WoS does not register its DOI, as is the case with the *International Journal of Communication*. Currently, both the most famous altmetrics platforms; Altmetrics, Plum Analytics and Impacstory (Melero 2015) as well as the less known ones suchas

CitedIn, ReaderMeter, PaperCritic, ScienceCard or PLoS Impact Explorer (Galligan and Dyas-Correia 2013) use DOI as their main search element.

*Table I. Article Search Strategy*

1. <b>Group 1</b> (population). The references of 24,192 articles in the <i>Communication</i> category of the <i>Social Science Citation Index</i> (Web of Science) for the five-year period 2013-2017 are identified and downloaded.
2. <b>Group 2</b> (articles with DOI). From this set, 14,451 articles are identified whose registration in Web of Science includes DOI. Many articles, even if they have DOI, are not registered in WoS because of an error by the journal itself.
3. <b>Group 3</b> (Group 3 (articles registered on Altmetrics.com). The data for set 2 is entered and Altmetrics identifies 9,875 of which 8 jobs are incorrectly identified. Finally, 9,977 records of articles were obtained in Altmetrics.

The source selected for this study, Altmetric ([www.altmetric.com](http://www.altmetric.com)), is a British *start-up* supported by Digital Science, a company belonging to the Macmillan group. It offers a payment service which tracks and tracks the presence, in many cases through mentions, of electronic documents in different tools and web portals in order to identify and analyse the attention these works have received. The following are the sources of the tool that make up the product according to its classification:

*Table II. Platforms and altmetric indicators available on the Altmetric.com platform*

No. of uses in Mendeley (readers)	No. of mentions on expert portals ( <i>peer reviews</i> )
No. of mentions on Twitter	No. of mentions in F1000 publications
No. of mentions in press releases ( <i>news stories</i> )	No. of mentions in Weibo publications
No. of mentions in Facebook publications	No. of technical reports ( <i>policy documents</i> )
No. mentions in blog articles	Number of mentions in videos (Youtube)
No. of mentions in Google+ publications	No. of mentions in Q&A publications
No. of mentions on Wikipedia pages	No. of mentions in LinkedIn publications
No. of mentions in Reddit	No. of pins (Pinterest)

Notes: For a more detailed description of the sources, please consult the Altmetric website <https://www.altmetric.com/about-our-data/our-sources/>

In addition, Altmetric generates its own synthetic indicator using the products it records as a basis; Altmetric Attention Score is an indicator that is not exempt from criticism because it synthesises measurements from very different platforms with an unjustified weighting into a score (Gumpenberger et al. 2016), which gives it a strong subjective character (Liu and Adie 2013) and is therefore not taken into account in this study.

#### Method

A descriptive statistical analysis of the presence of the articles in the different social platforms studied as of 25 January 2018 is carried out and the number of citations received by the articles in the Web of Science (WoS) is included as a comparative element. In addition, the correlation between the indicators with the

greatest weight in the set of Communication journals is studied in order to know the relationship between them, to know the similarity between indicators through a Pearson correlation and to see how these similarities group the indicators through a Multidimensional Scaling.

*Table III. Elements analysed in the study of Altmetrics in Communication*

<p>Presence and Distribution of Communication journals in Altmetrics.com sources (Table 4)</p>	<p>Analysis of the presence of the works studied according to web platform in order to know the coverage of communication works in each of them. The citations received by the works in WoS are included as a comparative element. In this section, the platforms with the most information on the set are found.</p>
<p>Distribution of journal values by main indicators (Table 5)</p>	<p>Description of the number of articles identified by each journal in the period and the values they show in the platforms with the best coverage (readers of Mendeley, Tweets, Facebook, News and Blogs). The total number of citations received by journals in the same period is incorporated as a comparative element.</p>
<p>Correlation between indicators (Figure 1)</p>	<p>Relationship between the almetric indicators studied and the citations. A Multidimensional Scaling is performed (Torgerson, 1952) which allows us to see the similarity between indicators in a two-dimensional space. The Pearson coefficient is used. Calculations are performed with XIStat and two-dimensional representation with Tableau 10.3 (Murray &amp; Chabot, 2013).</p>
<p>Correlation between Altmetrics and Citations from journals (Figure 2, Figure 3, Figure 4, Figure 5 and Figure 6)</p>	<p>Correlation between different aspects. The indicators are relative to the number of articles published by each journal in order to avoid the bias introduced by the size of each journal. Twitter and citations; Mendeley and citations; Blog and citations; News and citations; Twitter and Mendeley. The two-dimensional representations have been made with Tableau 10.3 (Murray &amp; Chabot, 2013).</p>
<p>Citation dissemination, Twitter, Mendeley, Blogs and News Stories (Figure 7)</p>	<p>The distribution of the set of articles analysed is studied according to the number of presences in each indicator (citations, Twitter, Mendeley, Blogs and News).</p>
<p>Gini Index of Citations, Tweets and Mendeley Readers</p>	<p>The Gini index (Gastwirth, 1972) is calculated to check the heterogeneity of the distributions. Here it is defined as an indicator to measure the concentration of indicators, specifically the number of tweets, citations and Mendeley Readers per article in the studied set. It gives values between 0 and 1: 0 indicates no concentration in an item; 1 indicates concentration in a few items.</p>

### 3. Analysis and Results

### 3.1. General indicators

A total of 9,977 papers and 82 journals in the JCR Communication category are being studied in 16 different Altmetrics indicators, which has led to the identification of 348,595 occurrences on these platforms. Out of the 16 sources studied, only Mendeley and Twitter recorded a coverage of more than 85% of the works studied (*Table IV*). On the other hand, in other sources such as F1000, LinkedIn, Q&A Post or Pinterest, the references to Communication articles are minimal or irrelevant. Mendeley and Twitter are the platforms with the best coverage, above the ones getting the quotations, since 98.85% of the jobs are in at least one Mendeley bookstore or 85.15% receive no less than one tweet. The data on Facebook registered by Altmetrics puts this network at 20.46% of the total. Approximately only 11% of the articles studied occur in blog entries or press releases. If you study the presence of jobs, a job may appear more than once in the databases analysed (having more than one reader, dozens of tweets, etc.), Mendeley and Twitter are again the platforms with the highest ratio, since the jobs that appear do it with a very high average, 22.58 times in Mendeley and 8.22 times in Twitter. It should also be noted that the articles appearing in the digital press, though few, represent 9.2% of the total, also have high visibility because each article appears on average in more than five news items.

*Table IV. Distribution of information in Altmetrics of 2013-2017 Web of Science Communication articles by platform*

<b>Altmetrics</b>	<b>Jobs</b>	<b>Coverage</b>	<b>Occurrence</b>	<b>Occurrence/ Jobs</b>
<b>Mendeley</b>	9.862	98,85%	225.302	22,85
<b>Tweets</b>	8.495	85,15%	69.817	8,22
<b>Cites*</b>	6.935	69,51%	42.622	6,15
<b>Facebook Post</b>	2.041	20,46%	3.009	1,47
<b>BLOG Post</b>	1.105	11,08%	1.867	1,69
<b>News Stories</b>	921	9,23%	4.617	5,01
<b>Wikipedia Pages</b>	305	3,06%	374	1,23
<b>Google +</b>	270	2,71%	434	1,61
<b>Policy Documents</b>	166	1,66%	190	1,14
<b>Peer Reviews</b>	120	1,20%	136	1,13
<b>Reddit Post</b>	90	0,90%	134	1,49
<b>Weibo Post</b>	33	0,33%	61	1,85
<b>Videos</b>	23	0,23%	27	1,17
<b>Q&amp;A Post</b>	3	0,03%	4	1,33
<b>F1000 Post</b>	1	0,01%	1	1,00
<b>Linkedin Post</b>	0	0,00%	0	0
<b>Pinterest</b>	0	0,00%	0	0

A more complete and transparent view of the whole, though subject to the production of journal articles, is that of the presence by journal of articles in the main Altmetrics indicators (*Table V*). First of all, we

acknowledge a normal trend: the journals with the highest number of articles are those with the highest figures in the altmetrics indicators and in the number of citations received in Web of Science. The journals occupying privileged positions in the Journal Citation Reports are also those that register the highest number of attendances at Altmetrics.

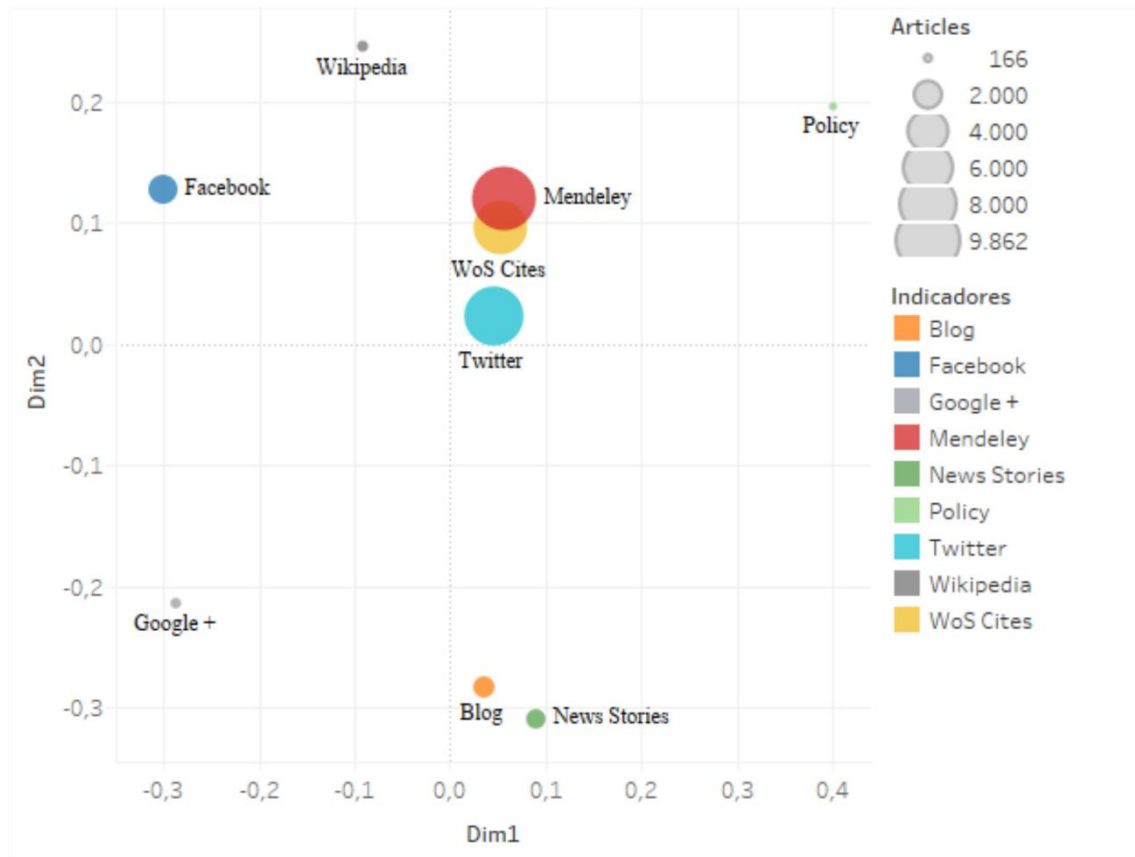
*Table V. Distribution of Altmetrics indicators and citations in the JCR Communication journals (2013-2017). Top 25*

Communication Journals	Arts in Altmetrics	Citations	Mendeley readers	Twitter mentions	Facebook mentions	Blog mentions	News mentions
J. of Health Communication	504	2568	10176	2573	111	46	243
New Media & Society	452	3384	20119	5686	142	112	175
Health Communication	433	1441	8213	1623	91	50	223
Information Com & Society	385	2589	16483	7385	72	66	183
Public Unders. of Science	303	1669	8030	4055	105	148	92
Media Culture & Society	286	1090	6800	2308	193	16	26
Journalism Studies	279	913	2538	1056	258	28	18
J. of Soc. & Personal Relation.	272	985	4900	1613	66	201	467
Public Relations Review	269	1042	9042	851	62	5	27
Journalism	259	1110	4702	1429	31	27	78
Journal of Communication	240	2170	11261	3159	147	102	462
Continuum	228	334	1753	737	38	4	42
Television & New Media	206	515	3033	1016	35	20	31
Personal Relationships	193	465	2604	2731	114	149	409
Journalism & M. Com. Qtly	184	578	3161	1611	46	68	95
Comunicar	183	1102	4643	1826	191	5	8
Public Opinion Quarterly	173	773	3163	2064	45	81	107
Telecommunications Policy	170	821	6476	405	23	5	35
J. of Comp.Mediated Com.	167	1937	9673	3428	122	108	464
Communication Research	167	1125	5485	945	43	47	135
J. of Lang. & Social Psychol.	150	510	2534	783	25	57	140
Convergence	149	395	3067	863	25	11	5
J. of Broadcasting & Elect. M.	148	685	3327	761	23	17	49
Science Communication	139	732	3439	1228	44	87	84
European Journal of Com.	139	652	3173	978	20	14	10

If we study the correlation between indicators based on the presence data provided by these journals in Altmetrics (Figure 1), we can see how the number of readers in Mendeley, indicator with the highest correlation with the citations, higher than 0.9. Another aspect which can be appreciated is that, in general, the altmetrics indicators related to Communication (News, Blogs, Google +, Twitter and Facebook) have some similarity among them. For example, blogging resembles digital press presence. In the Multidimensional Scaling, the presence close to the centre means similarity on average with the whole, so we understand that Twitter is the set indicator that individually chosen could best represent the whole. On the contrary, peripheral positions indicate that they are indicators which have little to do with the whole. That is why the most independent and unique indicators of the group are the presence on Facebook, in Political Documents, in digital news, Wikipedia and Google +.



Figure 1. Correlation between Altmetrics indicators and citations in JCR Communication journals (2013-2017). Multidimensional Scaling



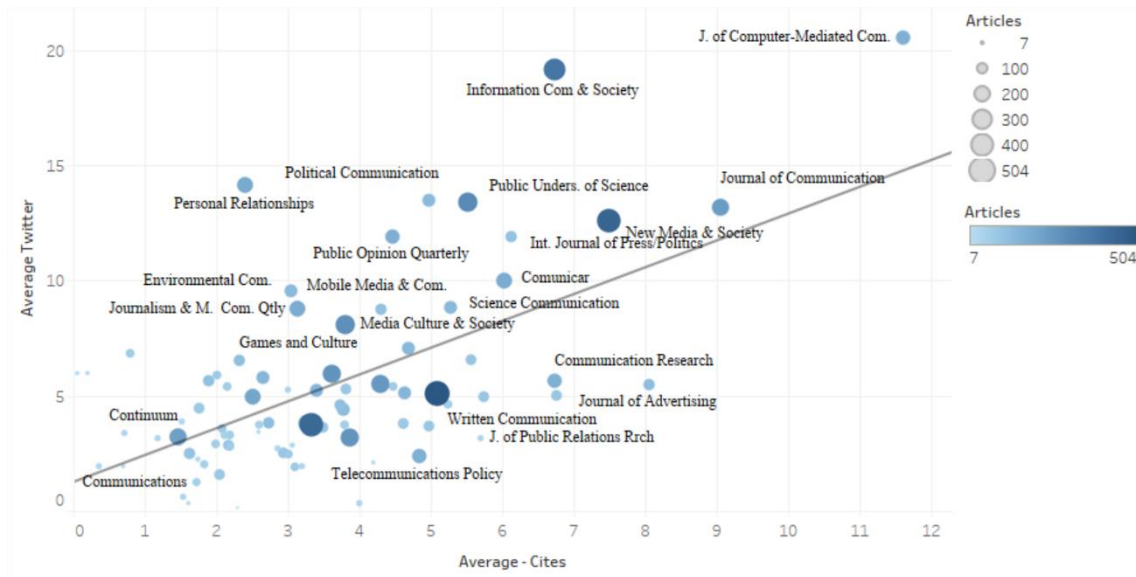
\*The indicators with the highest correlation are Mendeley-Cites (0.967), Mendeley-Twitter (0.889), Twitter and Cites (0.885), Blog-News Stories (0.844) and Twitter-Wikipedia (0.899).

Once the distribution of the values by journals is known (Table 5) and the relationship between the main Altmetrics indicators (Figure 1), it is essential to relativize the latter to the size of the journals, the number of articles studied, and compare them with the reference indicator: citations.

### 3.2. Correlation studies by platform and journals

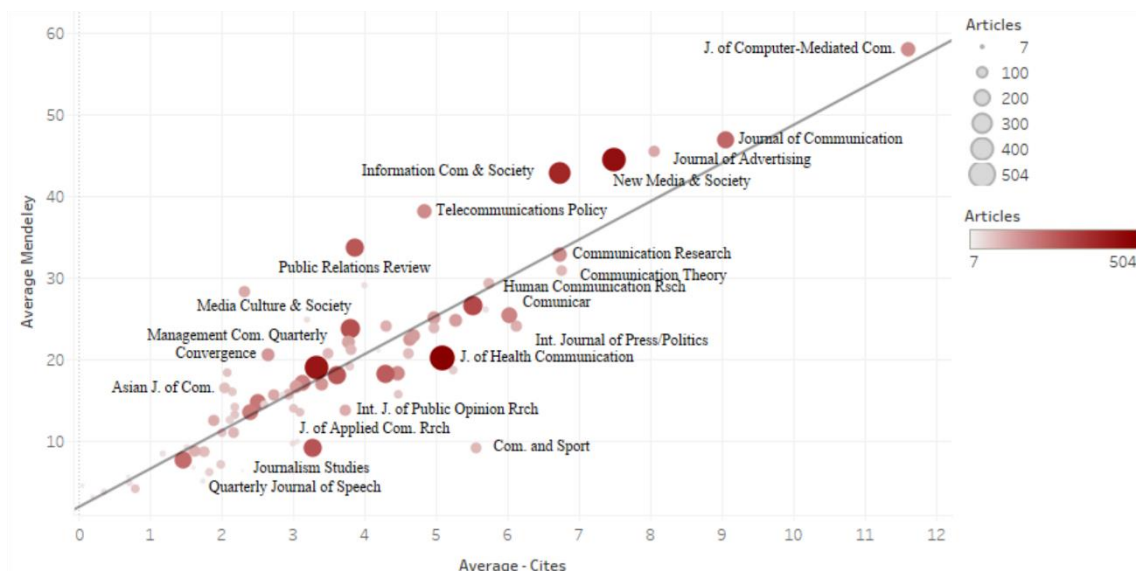
In the case of the Communication articles present on Twitter, there is a strong relationship (0.883) between the average number of citations and the average number of tweets received by the journals studied (Figure 2). The journals occupying prominent positions in JCR are located to the right of the graph, where *Journal of Computer Mediated Communication*, *Journal of Communication*, *Journal of Advertising* and *New Media & Society*, among others, stand out. As to the average number of citations per job, the *Journal of Computer Mediated Communication* stands out followed by *Information Communication & Society*, *Political Communication*, *Personal Relationship*, *Public Understanding of Science*, *Journal of Communication*, *New Media & Society*, *International Journal of Press / Politics*, *Public Opinion Quarterly* and *Comunicar*, all of which receive on average more than 10 tweets per article. It is appreciated how the number of jobs is not a related factor to determine the average number of appointments nor the average number of tweets.

Figure 2. Distribution of Web of Science Communication journals (2013-2017) according to their presence on Twitter and citations received



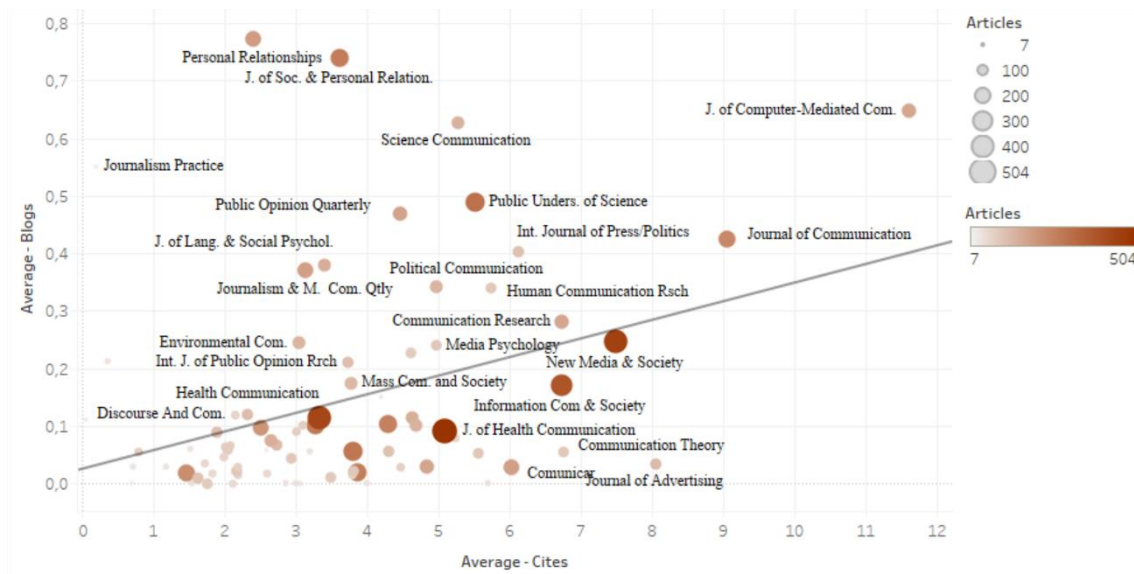
The number of readers in Mendeley presents the highest relationship (0.967) with the citations (Figure 3) of all the elements studied. The Figure 3 shows how the journals receiving the most citations on average are those whose articles have the greatest presence in Mendeley and at the same time the least cited journals are those that have the greatest absence in the bibliographic manager, with exceptions such as *Public Relations Review* or *Telecommunication Policy* whose values are far from the trend. That is why the journals which get the most citations and presence in Mendeley are the *Journal of Computer Mediated Communication*, followed by the *Journal of Communication*, *Journal of Advertising*, *New Media & Society*, *Information & Communication Society*, *Telecommunications Policy* and *Public Relations Review*. All of which have an average presence in Mendeley of over 33 per article.

Figure 3. Distribution of Web of Science Communication journals (2013-2017) according to their presence at Mendeley and citations received



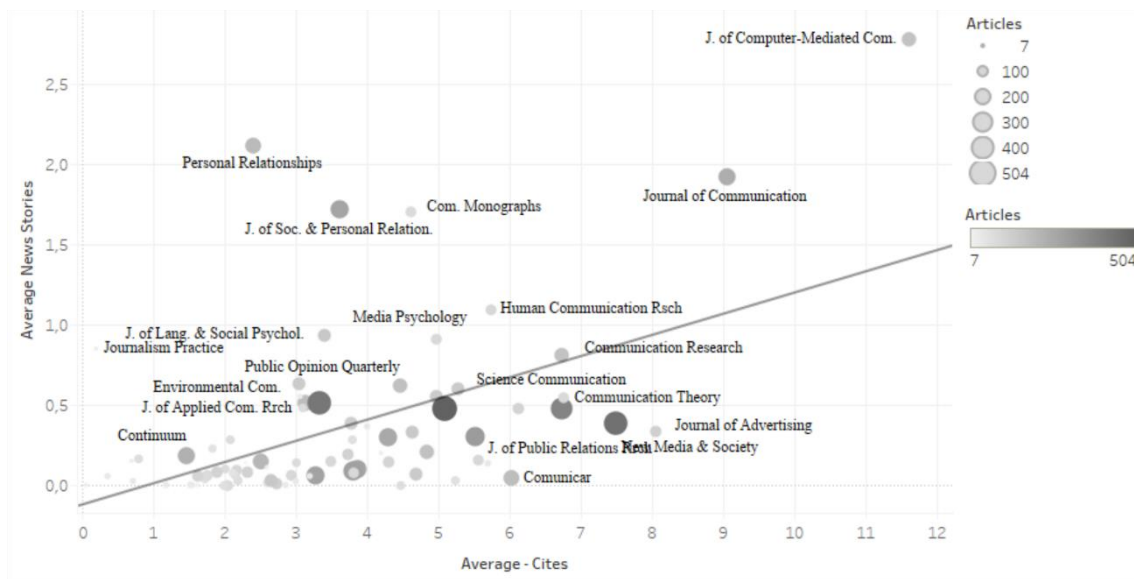
Blogging is an element that correlates well with News Stories presence but nevertheless shows a weak correlation with citation (**Figure 4**). The presence of news items that mention Communication articles in blogs is low. However, there are also slight differences between journals, highlighting the two titles that are dedicated to the studies of interpersonal relationships, the *Journal of Personal Relationships* and the *Journal of Social and Personal Relationships*, followed by journals such as *Journal of Computer Mediated Communication*, *Science Communication* or *Journalism Practice*. Also noteworthy is the low presence of journals with a high number of prominent citations in other social platforms such as the *Journal of Advertising* or *Comunicar*.

Figure 4. Distribution of Web of Science Communication journals (2013-2017) according to their presence in Blogs and citations received



The presence of the Communication articles in Blogs (**Figure 4**) is strongly correlated with the presence of the articles in the Press (**Figure 5**). Both indicators have a reduced positive representation with the citations (0.624 and 0.638 respectively) and show a strong correlation between them (0.844). The presence of personal relations journals in both blogs and the press is particularly noteworthy. Nonetheless, the *Journal of Computer Mediated Communication* is the most viewed in the digital press and receives the most citations on average. Again, the *Journal of Advertising* and *Comunicar* have a low presence in the indicator, especially when compared to the high average number of citations they get. There is a large group of journals with an average occurrence higher than the already highlighted, such as *Human Communication Research*, *Communication Monographs* or *Journal of Communication*.

Figure 5. Distribution of Web of Science Communication journals (2013-2017) according to their presence in News Stories and citations received

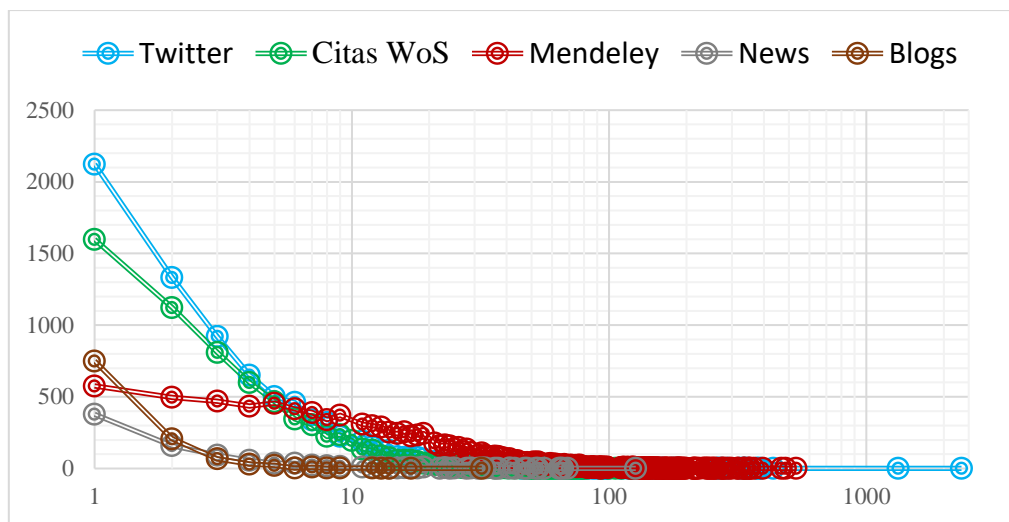


By studying the distribution and relationship of the journals according to the indicators with the highest coverage, Mendeley readers and number of Tweets (Figure 6), we obtain a wider image that goes beyond the most outstanding journals. It also allows us to see how the *Journal of Computer Mediated* is the journal with the highest average presence in Mendeley and Twitter. Most of the journals do not have more than 20 appearances on Mendeley per article and 7 on Twitter. It should be noted that there is a strong relationship between citations and distribution on Mendeley and twitter. The journals with the highest number of citations on average are the furthest from the axes of the abscissa, with rare exceptions such as *Journal of Advertising* or *Telecommunication Policy*, which record a low number of tweets. The journals that fit

positively and with the best results to the prediction are the *Journal of Communication* and *New Media and Society*.

It is worth noting that those journals with a more humanistic profile have a lower presence on the networks, also related to their low production of articles.

Figure 6. Distribution of Communication journals according to their presence in Mendeley and Twitter



Finally, if we compare the distribution of presences on the platforms with the greatest coverage (Twitter, Mendeley, News, Blogspot) and the number of citations received by each work (Figure 7). The citations and the tweets are highly concentrated in very few articles. Nevertheless, the number of occurrences in Mendeley is much more distributed. The Gini index confirms this fact; citations and tweets have a high Gini index (0.683 and 0.700, respectively) whilst the distribution of presence in Mendeley user libraries shows a more moderate Gini index of 0.559, due to the greater coverage of the product in the set of Communication articles studied. Only 1.15% of the works do not appear in Mendeley and its style is seven, compared to the tweets and the citations where the most repeated value is zero. More marginally, the number of Communication articles that appear in Blogspot and NewStories is much smaller, few articles appear in these networks and it is normal that the same article does not exceed five presences.

Figure 7. Distribution of presences on Twitter, Mendeley, WoS citations, News Stories and Blogspot in the WoS Communication articles (2013-2017)

#### 4. Discussion and Conclusions

The impact of journals depends on the community that publishes them, but the dissemination of their work, as indicated above, is a shared task. Altmetrics are therefore a set of indicators useful for checking and measuring the dissemination tasks carried out by journals, authors, institutions and the community. Through Altmetrics, not only is the scientific impact of the work visualized, but we can also study the scientific dissemination of the journals themselves in the media, using them as an evaluative element in the processes of transformation and improvement. The community is in luck, since the increase in the number of evaluation indicators makes it possible to specify more precisely the analytical studies of the distribution

of scientific results and even the existence of highly correlated indicators facilitates the validity of classic indicators, which in some cases required a control test, as if a diagnostic test were being used to detect strange cases, manipulations of the classic citation rates or extraordinary phenomena. The arrival of new indicators will enable us to study the phenomenon of Scientific Communication in greater depth, precision and exhaustiveness, reducing our dependence on traditional bibliometric indices.

Of all the tools studied, only a few present enough data to be able to reliably represent all the Communication journals, with Mendeley and Twitter being the platforms with the greatest presence, accumulating more records for articles than the citations identified in WoS. There are other platforms such as Facebook, presence in Blogs, presence in the Press, presence in Wikipedia or in political documents where there is hardly any mention of articles in communication journals, but which nevertheless have a specific value in relation to the characteristics of each medium, due to the significance of its existence and the target of readers. Finally, some social platforms are presented where the news is the absence of mentions of scientific articles of communication, platforms such as Weibo Post, Videos, Q&A Post, F1000 Post, LinkedIn Post or Pinterest.

The segmentation of the platforms in relation to their profile and the target of their users, thematic and geographical, is fundamental when analysing these new metrics. Of the platforms studied, many are generalist and others specialized. Four of them focus on academic content (having a special treatment at the time of being studied in the university context; Mendeley, Peer Reviews, F1000 and Post). Hence, they should have a special treatment at the time of being studied in the university context. Mendeley is the social tool with the most information about the sample. Weibo is one of the networks with most users in the world, but it is an Asian platform, rated as a local microblogging platform by Yu et al. (2017). Therefore, it is logical that there is a low presence of works from eminently Western Web of Science journals in an Eastern product.

In principle, they are the journals that receive the highest number of citations on average, those that register the most articles and the highest absolute presence and on average have on the platforms studied by Altmetric.com, as one more example of "Mateo Effect" (Merton 1968); those having the most are those receiving the most. If we consider the division in the area of journals into two subcategories proposed by Leydesdorff and Probst; Mass Communication and Interpersonal Communication (Park and Leydesdorff 2009), we can indicate that the journals that obtain the most registrations in Altmetrics are those that include Mass Communication studies, especially the general journals in the area, while the highly specialized ones register a lower number. Of all the journals studied, the *Journal of Computer-Mediated Communication, Information, Communication & Society, Journal of Communication*, etc. stand out. In short, the journals with the greatest absolute diffusion in 2.0 tools are the generalists on Mass Communication, edited by commercial publishers, with more citations, coinciding with the Lauf list of Anglo-Saxon journals of Communication in JCR (Lauf 2005) and usually with the greatest production of articles.

Of course, the platforms where several factors come together seem to stand out; on the one hand, the effort to register an article is less, with exceptions (Facebook or LinkedIn register a low number of articles). On the other hand, the number of users of the platforms is high and the profile of the authors is wider. It is logical that the Asian network Weibo should register a low number of works because most of the authors

who publish in WoS are Western. For these reasons, it is important to highlight the value of platforms where the presence of articles is a special effort, such as blogs, news and political documents, although in principle they have a much lower coverage.

Mendeley and Twitter are the social platforms that offer the most coverage to the Communication articles studied. They are also those where on average the articles have more presence. Therefore, they offer more coverage and presence than the classic WoS citations. Since the Altmetrics began to be studied, Mendeley has been the product with the highest coverage of the works, around 70% (Zahedi et al. 2014b), and this work shows a coverage that almost surpasses the total number of works studied (98.85%), which shows the consolidation of Mendeley as an academic product. However, we must think that the meaning of a tweet or presence in a Mendeley bookstore is not comparable to that of receiving a citation. However, the appearance in a Mendeley tweet or library begins to increase in meaning when it increases in number. If an article is present in hundreds of libraries or has been tweeted dozens of times, it becomes a remarkable indicator. Specifically, in these platforms where the effort to appear is reduced, the significance of the articles has a direct relationship with the number of occurrences.

Mendeley is presented as an alternative to traditional citation analysis, not only because of its coverage and correlation with citation, higher than 0.9, which can be interpreted as measuring the same phenomenon. The analysis of citations allowed us to study aspects such as the authors (affiliation and subject area), the sources of origin of the citations (journals, books, etc.), to generate networks through the study of co-citations and a large number of possibilities that the imagination of researchers has been creating over time. Mendeley also offers resources, as we can obtain very interesting information about the academics who keep a paper in their library, they are potential readers, not as Emilio Delgado and Alberto Martín (2016) warn us. Information such as affiliation, occupation, academic degree, ORCID, professional category (in the case of professors) or areas of research. Instead, Mendeley, has several weak aspects such as metrics. It does not have a clear academic meaning, it only indicates that someone, without filtering of any kind, has included a work in their virtual library. On the other hand, it is very difficult to manipulate the metric in Mendeley because although the effort to upload a job to Mendeley is small, to multiply its presence on the platform would require creating several profiles. To conclude with Mendeley, it should be pointed out that the results show a fundamental aspect, the Communication articles have a greater presence in Mendeley than in any other social tool, they receive more information and their presence is better represented in the whole than the citations or the tweets.

Mendeley and Twitter represent two different and therefore complementary dimensions. Mendeley's data comes from an act whose original purpose is not dissemination, but the book logging and which has been specially studied in the areas of Information Sciences. On the contrary, Twitter is a network whose objective is public communication and is studied in depth in Communication and to a lesser extent in Information Sciences. There are several reasons why presence on Twitter and Mendeley are ahead of citation. On the one hand, the immediacy of data, especially on Twitter, which allows us to obtain information on recent work. Secondly, through Twitter we can observe how the diffusion of the works is viralised.

In the case of the press coverage of the scientific articles in Communication (News Stories) is relatively low, around 10%, but the presence of these selected articles in the press is multiplied on average by five,

probably due to two factors: the first is that scientific news usually comes from news agencies, or from Communication offices, both from the university and in exceptional cases from the editorial groups of the journals (Repiso and Chaparro-Domínguez 2018), so that the same news item in which a scientific work is mentioned may appear in several headlines and the second is that many communication groups have several journals, usually regional, whose audiences do not overlap and share news. The presence in the press and in blogs are two rare indicators, but on the other hand they are based on a considerable effort, the articles in the press also have their own filters and add an extra diffusion to the articles and journals that publish them. especially the presence in the national and international press, so that the presence in the press and to a lesser extent in blogs are especially valuable indicators, although not very common. “The press citation count allows us to estimate what we can call media impact” (Casino 2018).

Another fundamental aspect whose relevance is perceived in this article is the importance of DOI in scientific communication. DOI is created with the idea of having a direct and permanent hyperlink (Langston and Tyler 2004) and uniquely identifying electronic documents. In the scientific context, it has another substantial role; it serves in the disambiguation of articles in scientific databases such as Web of Science and Scopus. The use of DOI in the 2.0 tools allows us to hyperlink and identify scientific articles easily when they are mentioned on these platforms, which facilitates the overall evaluation of the system. For this reason, the use of DOI should also be encouraged outside the academic media (university communication offices, science journalism, etc., network communication, etc.) in order to be able to correctly identify and link scientific works and to obtain exhaustive and easy feedback on the dissemination of scientific research.

The work has two limitations. The most notable bias is the dependence on the DOI itself, an essential element for the current Altmetrics platforms that generates certain biases. Working with DOI means restricting possible jobs to only those that have DOIs. The use of the DOI is not frequent in most of the platforms studied, although it is true that the DOI also makes it possible to identify a document when the original address of the works is used, while the works deposited on other pages (personal websites, repositories, etc.) are not identified. The only platform that DOI uses and almost requires registration is Mendeley, where all identifying data for each work is recorded for bibliographic purposes and DOI is mandatory in many standards, such as the APA since its sixth edition (American Psychological Association 2017). In short, the use of DOI is not widespread in scientific dissemination and that is why identifying the presence through the DOI of articles in Altmetrics necessarily generates an under-representation in most networks, which explains, among other aspects, the preponderance of Mendeley in these metrics.

Another limitation relates to the restricted access that the Altmetrics platform offers to LinkedIn and Facebook data. Most of the information on these sites is privately accessible, so Altmetrics has only identified the data from the public messages on Facebook and LinkedIn. Therefore, it is necessary to qualify the low representativeness of the work, whilst Twitter and Mendeley allow full access to their sources, from LinkedIn and Facebook only public data are analysed; in the case of LinkedIn the public ones were examined at the beginning of 2017, before they closed the general access. In short, it should be noted that the presence in these two networks is estimated to be much higher than that recorded, but the tool used gives us a limited view of them.



This paper leaves several questions unanswered for future lines of research, delving deeper into the characteristics of a) 1. Issuers: Are there active dissemination policies in social networks by academic journals of Communication? b) Recipients: To what extent does the presence in social networks implement the readings and citation of the works? c) Does the diffusion in social networks increase the reading or replace other accesses to information? d) Content: Does the theme of the works influence their presence in social networks? Alternative metrics are an area of convergence between the areas of Communication and Information & Library Science that allow Communication researchers to play a relevant role in the analytical processes of the area.

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