Assessing the publication output on country level in the research field communication using Garfield's Impact Factor

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Summary.

The ever-increasing evaluation of science has led to the development of indicators at different levels. In the present study, we intend to calculate the Impact factor for production in the field of Communication studies at country level. Our objective is to describe the publication activity of those countries that were most productive in the field between 2013 and 2019. We use the Impact factor to analyze the production of countries indexed in the Web of Science Core Collection, their international collaboration, and the scientific impact of their production. Our results show that the most productive countries are not those that make the most impact. We also confirm that English-speaking countries dominate the scenario in terms of number of publications and that states such as Spain and the Netherlands benefit from the Emerging Source Citation Index. Furthermore, we have found that at least 30% of most countries' scientific production involves international collaboration and that the United States of America is the collaborator of choice in Communication studies. Our country-based Impact factor also correlates with indicators such as normalized impact, 5-year impact, or the number of publications in the top 10%.

Keywords: Bibliometrics; Impact factor; Communication studies; International collaboration; Web of Science; Scientific production

INTRODUCTION

The main function of bibliometrics is to synthesize and describe complex information through mathematical methods in order to analyze the scientific process, determine patterns, and understand how it develops. Pritchard (1969) defined bibliometrics as "the application of mathematics and statistical methods to books and other media of communication".

Bibliometric methods are applied to the evaluation of science at different levels of aggregation: the macro-level, for countries and fields of study; the meso-level, for institutions and journals; and the micro-level, for research teams and individual researchers (Glänzel & Moed, 2002). At the macro level, science indicators are in high demand as national economies are increasingly knowledge-based and science has been organized on a grand scale, as well as receiving substantial economic investment (Leydesdorff et al., 2016). For example, the United Nations studies human development through indexes and indicators that include expenditure on research and development. Accordingly, the UN Human Development Report for 2018 takes account of public and private spending on increasing knowledge "including knowledge of humanity, culture and society, and the use of knowledge for new applications. Research and development covers basic research, applied research and experimental development."

Scientometric indicators to evaluate science have emerged and their number has increased in step with institutional and governmental demands for evaluation. These indicators are widely debated, as they have become management tools that are applied at different levels. Leydesdorff et al. (2016) distinguish between four groups of agents that use the same indicator in different ways: producers (of indicators), bibliometricians, managers, and scientists. From different standpoints, each develop their own interpretations of results that may have different implications in different contexts. While one group may think that a particular methodology is justified, another may not. Furthermore, indicators like university rankings have a significant global audience. Even in countries like the United States of America, the media often report their results (González-Riaño, Repiso, & López-Cózar, 2014) and both university and pre-university students frequently use them (Meredith, 2004).

So, the evaluation of science remains a topic of debate, with an ever-growing audience but a system that meets all needs and addresses all issues remains a utopian dream. One single approach cannot possibly fit all realities. Nonetheless, we can approach scientific reality via existing methods and tools that have already been validated and accepted by the scientific community. To do so, we should make the most of what we have—instruments that are constantly being improved—to evaluate and classify journals, authors, departments, institutions, fields of study, and countries or regions.

Bibliometric indicators approximate scientific phenomena that have been recorded in publications. Like any indicator, they come in different forms: "frequencies, percentages, ranks, means, rates, ratings" (Schmitz, 1993). "Their use is based on the important role that publications play in the dissemination of new knowledge, a role assumed at all levels of the scientific process" (Gómez Caridad & Bordons, 2009). Indicators used for scientific evaluation often generate classifications like informal rankings that are based on the number of documents or citations. They synthesize and reduce information about a given phenomenon and this renders them inaccurate and flawed. However, they constitute data that can trigger important decisions about the allocation of resources, student admissions, staffing, curriculum validation, and other issues.

The most widely recognized bibliometric indicator is the Impact factor (IF), from which the Journal Citation Report (JCR) is generated. It is so well known that it has given birth to a range of other indicators based on production and citations received: so-called impact indicators. Other indicators, like the h-index, are popularly used to characterize the publication activity of individual researchers (Hirsch, 2005). In turn, these have given rise to some of the most commonly used indicators: SCImago Journal Rank; Eigenfactor Score and Article Influence Score; h-5 index; CiteScore; SNIP. Work is currently under way to standardize citation impact (Bornmann & Marx, 2015), especially with regard to fields of study, and to overcome the limitations of the IF through new metrics (Glänzel & Moed, 2002).

Since 1955, when Garfield first described the IF—and despite the malicious or biased use that can be made of it—it remains a means of exploring publication quality and, by association, of evaluating science (Hoeffel, 1998). Moreover, the IF is widely misused as a measure of quality because it can be molded to match expert opinions as to which specialized journals are the "best" in any given field (Hoeffel, 1998).

The first JCR was published by the Institute for Scientific Information—now Clarivate Analytics—in 1975. The JCR provides quantitative tools that classify, evaluate, categorize, and compare journals. Of these tools, the IF is the most important. It is a measure of the frequency with which the "'average' article" in a journal has been cited in a given year or period (Garfield, 1976). The annual IF published in the JCR relates citations to recently-published cited articles which, according to its creator, tends to diminish bias caused by journal age, size or frequency of publication. Following Garfield (1976), "...the 1979 impact factor of journal X would be calculated by dividing the number of all the SCI source journals' 1979 citations of articles journal X published in 1977 and 1978 by the total number of source items it published in 1977 and 1978." Hence, it relativizes its results to the dimensions of the publications studied.

However, despite being one of the most widely-used indicators, the IF is frequently criticized because of *how* it is used, rather than as an indicator in itself. Glänzel & Moed, (2002) collated many of its defects previously identified elsewhere. These include the lack of any discipline- or field-related standardization; the absence of any distinction between the nature or merits of the journals cited; bias in favor of journals with long articles; frequency of citation; the absence of any indication of statistical deviations; the fact that the mean time-lapse between the publication of a journal article and its peak in citations is not always two years; the fact that a single measure may not be sufficient to describe the citation practice of scientific journals; the inadequate operationalization of citation as a concept; errors made in calculating the JCR IF due to incorrect identification of the journals cited. Furthermore, when calculating the IF, the asymmetry between the numerator and denominator cannot be ignored. While the numerator includes all citations received, in all document types, in a given period, the denominator consists of those documents considered citable: i.e. articles, reviews and proceedings papers. Add to this the fact that the data from which the JCR is generated is not reproducible (Glänzel & Moed, 2002). The literature contains numerous proposals to supplement and minimize these biases, although none of them has been put into practice.

Glänzel & Moed (2002) also highlight the IF's strengths and argue that these lie in its comprehensibility, stability, and apparent reproducibility. Garfield (1972) points out that the IF on its own cannot be used as a unique measure for any purpose. Perhaps the most important application of citation analysis is in scientific policy studies and research evaluation (Garfield, 1972). Despite its failings, the IF is widely accepted by the community and—through IF-generated rankings—is undeniably important both in bibliometrics and in science management.

Studies of scientific performance draw on widely-studied and analyzed databases that, despite the well-known biases described in the literature, facilitate our approach to scientific reality. Archambault et al. (2006) point to geographical deficiencies in the Web of Science (WoS) Social Science Citation Index (SSCI). They warn that any country-based comparison is impossible because English-speaking countries like the USA, England and Canada are favored over Germany, Spain, France and other non-English-speaking countries—a bias that could affect publication counts and citation analysis. To diminish this bias, the WoS included the Emerging Sources Citation Index (ESCI) in 2015. The ESCI covers all SSCI and Science Citation Index Expanded disciplines, and includes both wide-ranging international publications and those that provide regional or more specialized coverage (https://clarivate.com/webofsciencegroup/solutions/webofscience-esci/).

The WoS or Scopus can provide access to classifications based on a simple record count. Indicators such as the h-index or the h-5 index have also been applied. For example, the SCImago group's Scimago Journal & Country Rank applies the h-index—and other indicators—to countries. The WoS also facilitates classification on the basis of record number-counts. And Clarivate Analytics' Incites provides indicators that can be applied to countries: the h-index, normalized citation impact, or the percentage in the top 10%, among others. Using these comparisons, it has been shown elsewhere that the most productive countries are not those in the higher ranks of citation impact classifications (Bornmann & Leydesdorff, 2012; Trabadela-Robles, Nuño-Moral, Guerrero-Bote, & De-Moya-Anegón, 2020).

In Communication studies, these evaluations have been scarcely developed but, potentially, they constitute a starting point for the study of publication activity. Trabadela-Robles et al. (2020) analyzed the scientific production of the 27 most productive countries in the field for the period 2003-2018. Previous studies had analyzed the bibliometrics of Communication studies at journal level (Lauf, 2005, Park & Leydesdorff, 2009; Barnett, Huh, Kim, & Park, 2011). They identified and generated collaboration networks linking disciplines or showcased the dominant position of English-speaking countries.

From an academic perspective, several authors have approached the field by studying university doctoral programs. Barnett et al. (2010) proposed systems that measure quality by studying programs and the tenured professors teaching them through the recruitment of recent PhD graduates and professors. Barnett & Feeley (2011) compared the National Research Council and previously-studied recruitment data with results indicating the importance of reputation, publications, and scholarships, among other factors relevant to recruitment. Cervi et al. (2020) analyzed the study programs in Communication studies and Journalism of the highest placed European universities in the QS World University Rankings. Most such rankings are linked to publication activity because statistical calculations include number of publications and number of citations, among other elements.

University rankings, such as the Academic Ranking of World Universities, the Global Ranking of Academic Subjects or the QS World University Rankings by Subject, distinguish between fields of study. This facilitates analysis of the countries of origin of the institutions being studied. These rankings are based on bibliometric indicators: citations per article, number of publications, h-index, articles in top journals, Category Normalized Citation Impact, quartiles, percentiles, or research collaboration between countries.

Collaboration between authors, institutions and countries is an important part of scientific evaluation. According to Kwiek, scientific collaboration implies international recognition, the possibility of being eligible for more funds, and improved career opportunities in the academic world (Kwiek, 2018). Research studies supported by a number of institutions are more frequently cited than those coming from a single center. Moreover, when institutions are in different countries, the importance of their production surpasses that of studies from a single country (Kwiek, 2018). Hence, collaboration is more than an individual matter as it impacts on funding and on institutional prestige; it is even positively weighted in rankings like the Scimago Institution Ranks. Earlier studies pointed to an increase in international collaboration and in the number of countries with which any given country collaborates (Arunachalam & Doss, 2000). Furthermore, the USA has been described as the collaborating country of choice (Arunachalam & Doss, 2000). Not only is collaboration taken into account in the development and implementation of scientific policies, it is rewarded with both funding and academic recognition. Governments need evaluations to optimize research allocations, re-orient research support, rationalize research organizations, restructure research in specific fields, or increase research productivity (Moed, 2016).

Research questions

The objective of the present study is to describe the activity of the major countries publishing in Communication studies by using the IF to determine their publication activity, international collaboration, and scientific impact. We intend to analyze the field and answer the following questions:

- **RQ1.** Which countries are the most prolific in Communication studies?
- **RQ2.** What is the IF of the countries studied and how has this evolved over the last 5 years?

- **RQ3.** To what extent does the ESCI affect the country-based IF?
- **RQ4.** Is there a correlation between the country-based IF and indicators like Category Normalized Citation Impact and the percentage of publications in the Incites top 10%?
- **RQ5.** How do countries collaborate internationally? How does this collaboration affect their IF?

METHODOLOGY

Data collection

Our sample comprises the 25 countries that have published the most articles, reviews, and proceedings papers in the WoS Core Collection (SCI, SSCI, and A&HCI) in the category of Communication studies between 2013 and 2019. The documents needed to calculate the IF for 2015 to 2019 were published between 2013 and 2018.We have also included 2019: the last year for which we have complete WoS records. Of the 27 683 records identified for this period, 26 092 correspond to the sample countries. In other words, the top 25 countries in the field generate 94.25% of all publications. These 25 countries are:

Table 1. Distribution of scientific papers in Communication studies by country (Top 25) for 2013-2019

RK	*Countries/Regions*	*Records 2013-2019*	*RK*	*Countries/Regions*	*Records 2013-2019*
1	USA	12 637	14	SWITZERLAND	440
2	ENGLAND	2513	15	SINGAPORE	434
3	AUSTRALIA	1871	16	FINLAND	428
4	SPAIN	1423	17	ITALY	400
5	NETHERLANDS	1295	18	SOUTH AFRICA	385
6	GERMANY	1280	19	NORWAY	337
7	PEOPLES'S REPUBLIC OF CHINA	1173	20	AUSTRIA	329
8	CANADA	1082	21	NEW ZEALAND	306
9	SOUTH KOREA	672	22	TAIWAN	282
10	SWEDEN	654	23	FRANCE	245
11	BELGIUM	628	24	SCOTLAND	203
12	ISRAEL	547	25	JAPAN	178
13	DENMARK	472		OTHERS (105 countries)	2749

Note: Countries or regions are as listed by the WoS.

The total number of documents listed is 30 214, which is clearly in excess of the figure of 20 978 mentioned earlier. This discrepancy is due to collaboration between countries as the table reflects duplicate records. Table 1 shows a total of 32 963 records, so the top 25 countries account for 91.66% of publications. Some 8.34% of the publications from a total of 105 countries were excluded. The first 22-23 countries were responsible for 90% of the records; 95% came from countries between positions 32 and 33.

The IF for each country is calculated as if they were journals. That is, total citations received in the previous two years and made after the year for which the indicator is being calculated (2015-2019) are identified; this is divided by the number of papers published in those two years (Figure 1).We have also calculated the country-based 5-year IF using the formula shown below.

Figure 1. Example calculation of the country-based IF and the country-based 5-year IF for 2019.

$$\text{2019 Country Impact Factor} = \frac{9688}{3742} = \mathbf{2.589} \qquad \text{2019 5-Year Country Impact Factor} = \frac{27411}{8799} = \mathbf{3.115}$$

$$\textbf{Country Impact Factor} = \frac{\text{Citations in 2019 to all items published by each country in 2017 and 2018}}{\text{Number of citable items (Article, Review, Proceedings Papers) published by each country in 2017 and 2018}} = \frac{9688}{3742}$$

$$\textbf{5-Year Country Impact Factor} = \frac{\text{Citations in 2019 to all items published by each country in 2014, 2015, 2016, 2017 and 2018}}{\text{Number of citable items (Article, Review, Proceedings Papers) published by each country in 2014, 2015, 2016, 2017 and 2018}} = \frac{27411}{8799}$$

Analysis of results

Excel (Figures 2, 3 and 4), Inkscape, and Tableau (Figure 5) software have been used to analyze and display our results. Inkscape superimposes different aspects of the results to display these in a single figure and, thus, facilitate their comprehension and visualization. (The diagram of evolution was produced with Excel and the international collaboration pie charts with Tableau [Figure 5]).

To calculate normalized impact, WoS Core Collection records (SCI, SSCI and A&HCI, articles, reviews and proceeding papers) in Communication studies for 2013-2018 were exported to Incites. We then conducted 2-year searches from Incites (2013-2014; 2014-2015; 2015-2016; 2016-2017; 2017-2018) to calculate normalized impact, with and without ESCI citations, and the percentage of studies in the top 10%, also with and without ESCI data. Standardized indicators were correlated with the country-based IF.

Network analysis

Pajek software was used to create the social network (Batagelj, 2008). This shows collaboration between countries through the number of documents in which they cooperate, as well as those documents published by each country that involve no collaboration (Loop). The Kamada Kaway algorithm (Kamada & Kawai, 1988) and the Louvain clustering algorithm have been applied (Blondel, Guillaume, Lambiotte, & Lefebvre, 2008) for vector size. Once the network was generated, both it and the vector and participation created were exported in a format compatible with VOSviewer software to generate the display (van Eck & Waltman, 2010) while maintaining the position and groups generated by Pajek.

Table 2. Methodological process of analyzing WoS publication activity in Communication studies by country (2013-2019)

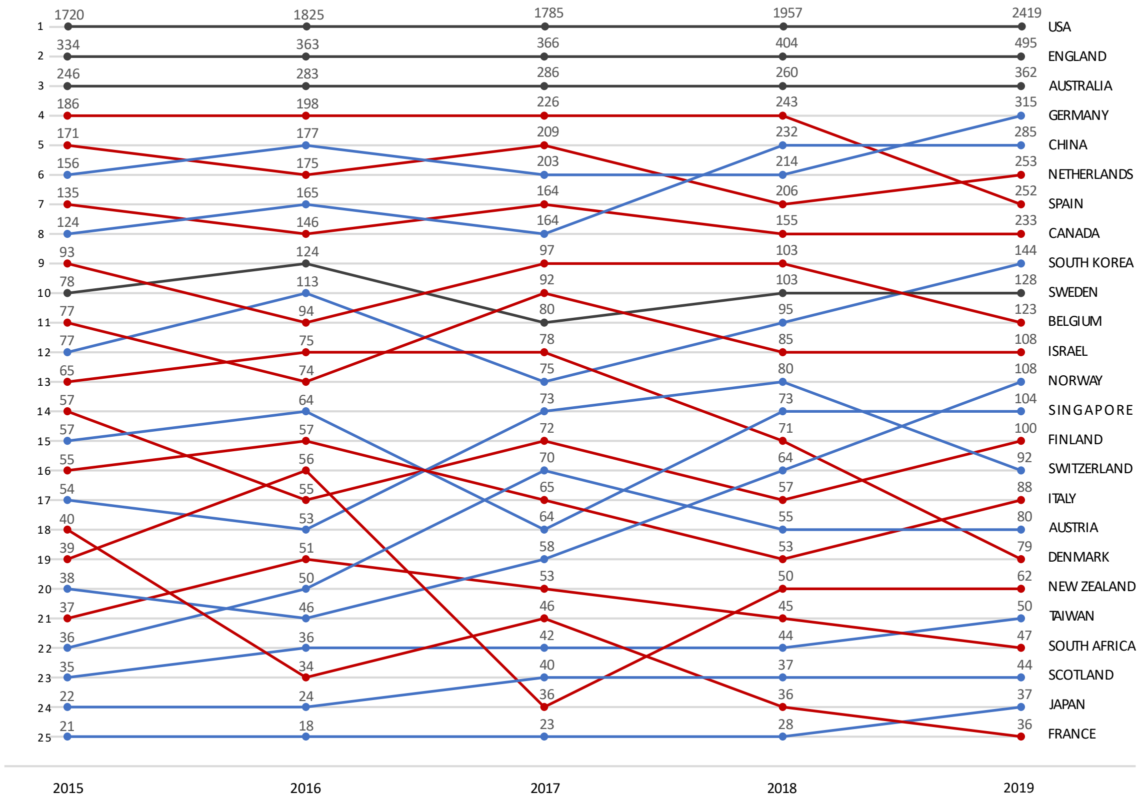
Stages:
1. Identification of year-on-year publication activity of the Top 25 countries in Communication studies for 2013-2019.

2. Country-based IF per year 2015-2019 (Top 25).
3. Country-based 5-year IF calculation for 2019 (Top 25).
4. Normalized impact calculation and percentage of publications in the first 10% per year and per country (using studies from the previous two years as a reference). This is calculated with and without the ESCI database. These results are compared with the country-based IF for each period.
5. Creation of an international collaboration network using all papers published between 2013 and 2018.

RESULTS

In Communication studies research, the publication activity of the 25 most productive countries—with the exception of France—generally increased over the five years studied (2015-19). The mean growth rate was around 15% although countries like Norway, Austria, and China evolved beyond this, with means ranging from Norway's 31.5% to in China's 24.3%. The opposite occurred in countries like the Netherlands, Spain, or Canada which in 2019 recorded mean figures below their nearest "competitors" (Figure 2) despite increases in the number of publications. The top three countries, the USA, England and Australia—1st, 2nd and 3rd respectively—maintained their leadership in productivity over the five years. The USA published some 41.8% of all studies and together with the England and Australia accounted for 56.3% of the total analyzed.

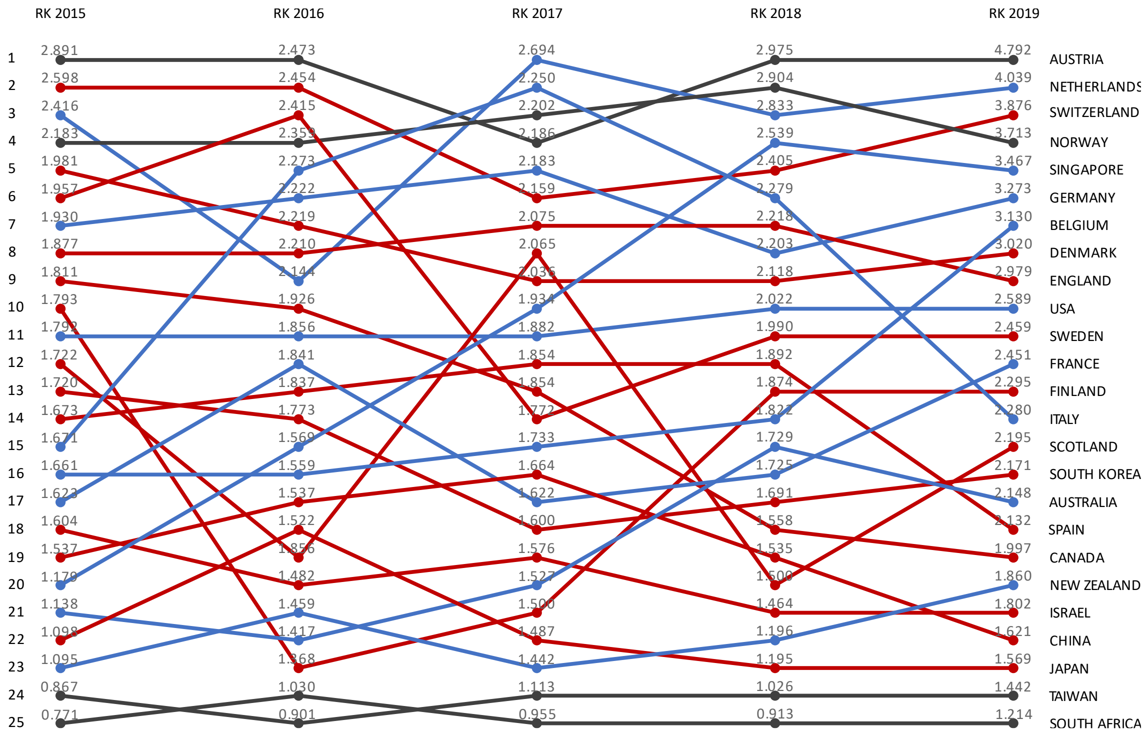
Figure 2. Evolution of publication activity in Communication studies (SSCI) over the period 2015-2019



Note: Countries in red fall in the ranking between 2015 and 2019; those in blue rise; and those in gray maintain their positions.

We have calculated and ordered the IFs of the countries studied for 2015, 2016, 2017, 2018 and 2019. These data show slight changes in rank order (Figure 3) with Austria, the Netherlands and Switzerland recording the highest IFs in 2019, relegating the most productive countries to 2nd place. This shows that Austria has held on to the top position, while Sweden has improved since 2015. The Netherlands has climbed from 3rd in 2015 to 2nd in 2019. Switzerland has also changed its position, falling from 2nd in 2015 to 3rd. In 2019, only four countries maintain their positions of 2015: Austria and Norway (1st and 4th) at the top of the table; South Africa and Taiwan (2nd last and last) at the bottom. The countries with the highest levels of publication activity—the USA, England and Australia—are 10th, 9th and 17th, respectively.

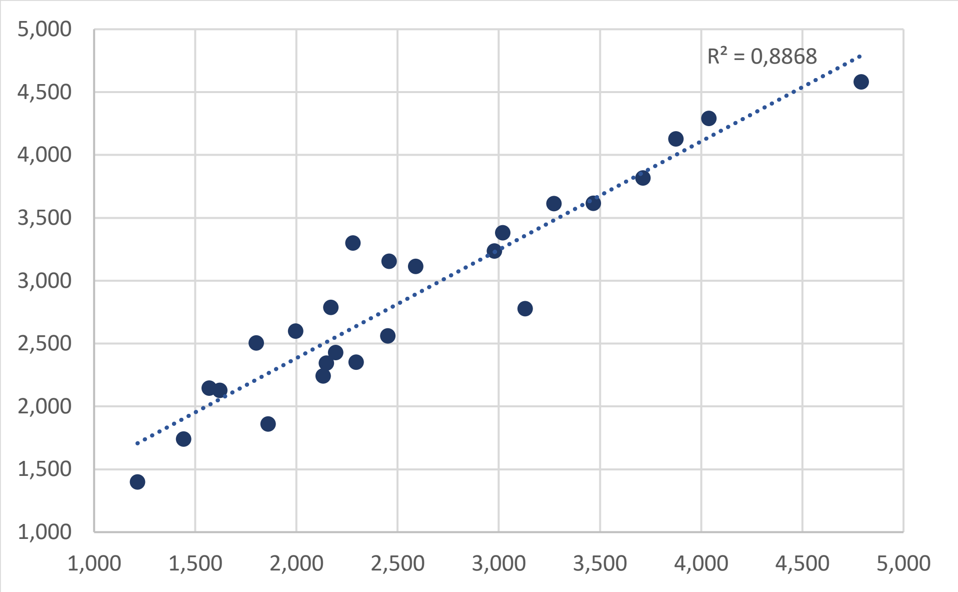
Figure 3. Evolution of country-based IF scores (Top 25) in Communication studies (SSCI) for the period 2015-2019



Note: Countries in red fall in the ranking between 2015 and 2019; those in blue rise; and those in gray maintain their positions.

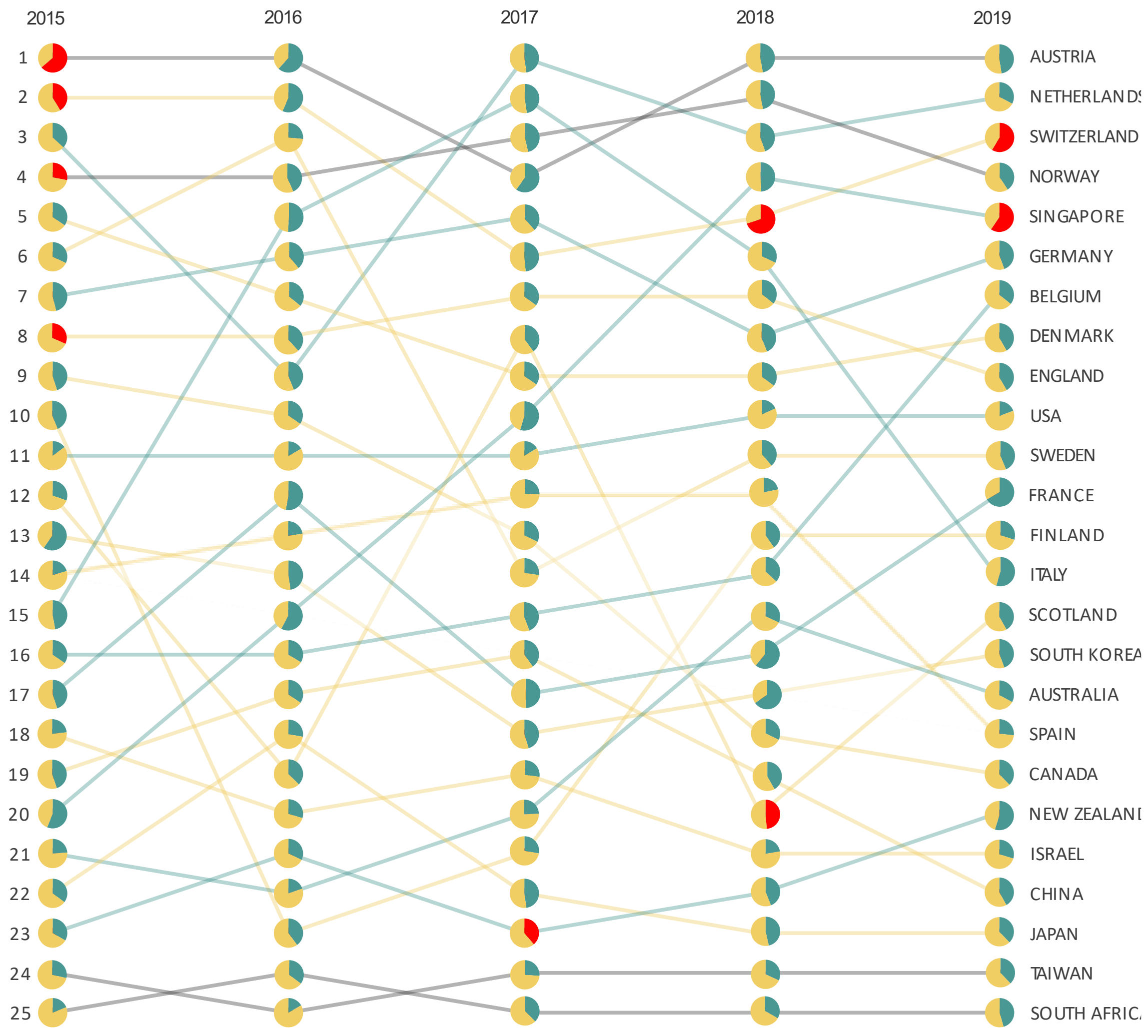
We then calculated the 5-year IF for 2019, which shows a strong correlation with the IF for 2019 (R^2=0.886) (Figure 4).

Figure 4. Correlation between 5-year IF and 2019 IF.



We have also analyzed collaboration between countries. We have identified how much of each country's production has been entirely the work of national institutions and how much has been the result of international collaboration (Figure 5). At least 30% of the scientific production of most countries results from international collaboration—except for Taiwan (28.9%), Australia (26.9%), Israel (26.6%), Spain (23.6%) and the USA (17.7%). In contrast, the international collaboration of a few countries outperforms their production involving no collaboration or only national collaboration. This is the case of Switzerland (56.2%), Singapore (55.8%) Austria (55.3%), France (54.7%) and South Korea (51.6%). Overall, when measured in terms of citations, international collaboration makes a greater impact than the mean of the country. Of the 125 countries studied, in only 9 instances was the mean impact of articles involving international collaboration lower. The most significant case is Switzerland whose IF fell in 2015, 2018 and 2019 due to the low mean number of citations obtained by articles produced in international collaboration. However, the fact that Switzerland does have a high IF score must be taken into account.

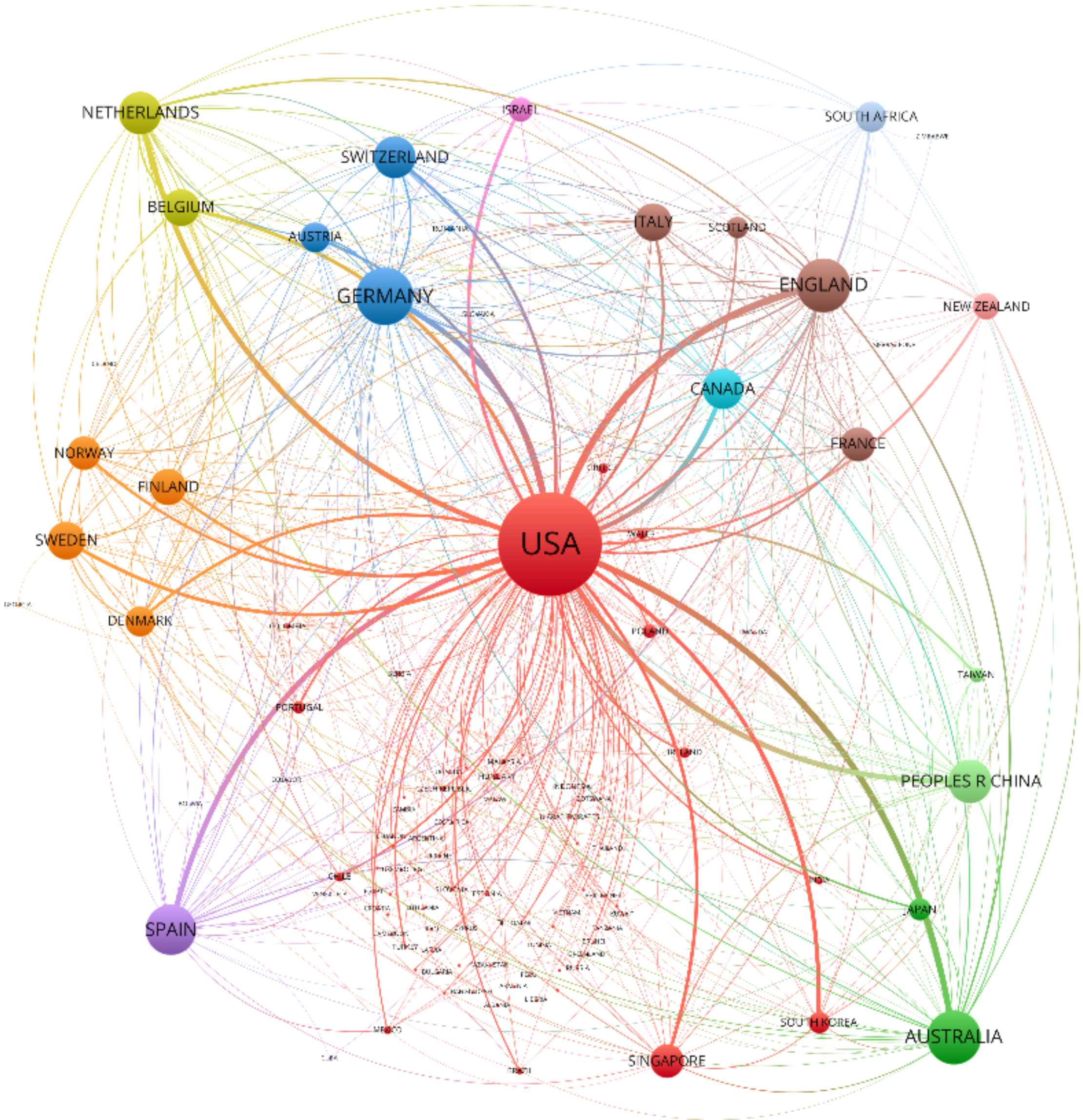
Figure 5. Country-based ranking of the evolution of the IF calculated by country over 5 years, (2015 to 2019) and international collaboration



Note: Yellow circles indicate the percentage of national publications; green or red circles indicate the percentage of international collaboration. Red indicates those countries with a collaborative IF lower than their non-collaborative IF. Green lines denote those countries that rose in the ranking between 2015 and 2019; yellow lines denote those that fell; gray lines denote those that remained unchanged.

To better understand the impact of international collaboration, we have identified which countries have collaborated with which during the period 2015-2019. To do so, we have generated a social network that identifies 12 distinct (color-coded) groups (Figure 6). Of these, the largest is the red cluster, which is made up of 73 countries and is led by the USA. The USA clearly stands in the center and is the most important node in both size and connections. Other groups also appear: the Nordic countries, Norway, Sweden, Finland and Denmark (orange); the central European countries Austria, Germany and Switzerland (blue); the Netherlands and Belgium (yellow); and a group of Ibero-American countries led by Spain (purple). Line thickness indicates the strength of collaboration and in almost all cases collaboration with the USA is strongest. Highly independent countries with substantial levels of production generate their own groups, as is the case of South Africa, Canada, New Zealand, Australia, China, Israel and Spain.

Figure 6. Social network of collaboration between countries in Communication studies (WoS 2013-19)



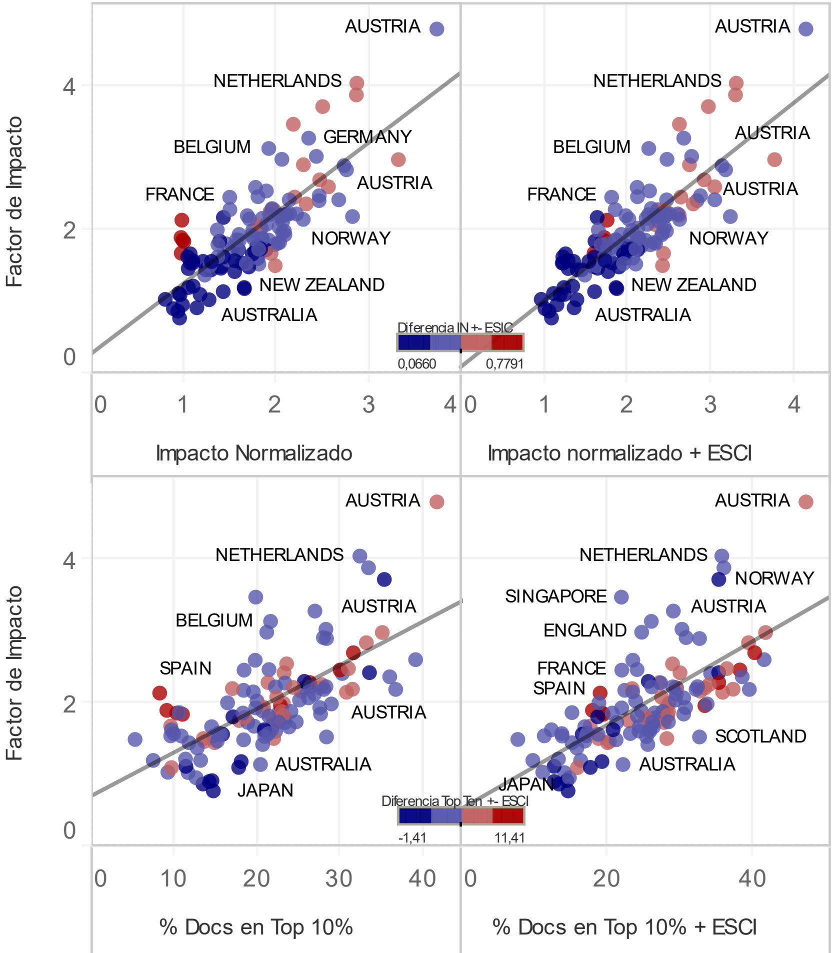
The IF shows a strong correlation with Incites normalized impact (0.834), especially when ESCI data is included (Table 3, Figure 7). The correlation with the percentage of items in the first 10% of publications is lower but quite similar when ESCI data is included. In contrast, normalized impact and percentage in the first 10% of publications correlate strongly (>0.8).

Table 3. Similarity between country-based IF, normalized impact, and the percentage of publications in the first 10% (with and without ESCI data)

	IN	IN ESCI	FI	%10	%10 ESCI
Impacto Normalizado	1	0,979	0,798	0,900	0,880
Impacto Normalizado + ESCI	0,979	1	0,834	0,880	0,894
Factor de Impacto	0,798	0,834	1	0,686	0,704
% Documents in Top 10%	0,900	0,880	0,686	1	0,958
% Documents in Top 10% +ESCI	0,880	0,894	0,704	0,958	1

Countries vary little when we analyze those cases—countries and periods—for which the difference between the IF and normalized impact is greatest, regardless of whether ESCI data is included. Time periods do not show inequality, but countries do. Spain differs most if we compare the IF with normalized impact and the percentage in the first 10% of publications, with and without ESCI data. This suggests that publications in Communication studies significantly influence publications in ESCI-indexed journals. To a lesser extent, something similar happens to the Netherlands.

Figure 7. Similarity between IF, normalized impact and percentage in the first 10% of publications of the Top 25 countries in Communication studies (WoS 2015-2019)



DISCUSSION

The fundamental issue of debate in this paper is whether or not the IF satisfactorily reflects the scientific impact of countries. This has been studied elsewhere using indicators like the h-index—which was originally designed to describe researchers (Jacsó, 2009). For example, the Scimago Journal & Country Rank calculates the h-index of countries, as well as the mean number of citations. However, when describing countries with the h-index, size is not relativized, which generates very unequal values. As an indicator, researchers are well accustomed to working with the IF. The construct has become so deeply embedded in the academic consciousness that, although its weaknesses have been studied in depth and dozens of alternatives have appeared, it remains *the* reference point in scientific evaluation, the benchmark and, for many scholars, the only indicator they know and pay attention to.

Our results resemble those of King (2004), who analyzed citation production and the number of studies in the 1st percentile in all fields of study between 1993 and 2001. The dominant role of the English-speaking countries, the leadership of the USA, and the good performance figures of central and northern European countries remain unchanged more than a decade later. In our sample, the USA contributes 41.8% of production during the study period—a leading position that can be explained by the over-representation of English-speaking countries' publications in databases like the WoS. Archambault et al. (2006) warn that any country-based comparison is impossible because English-speaking countries—like the USA, England, and Canada—are over-represented in the SCCI, while non-English-speaking countries such as Germany, Spain and France are adversely affected. This bias could affect publication counts and citation analysis. However, the WoS remains one of the most important, comprehensive databases worldwide; it is the foundation on which the JCR is built.

To limit the bias, we need to include databases like the ESCI, which record data from local publications in all fields of study. Doing so led to an increase in the number of journals from peripheral regions such as Latin America. Including their citations when calculating the JCR IF increased the impact of Spanish journals and placed one—*Comunicar*—in the first quartile of the Communication studies category. Similarly, country-based IF scores for Spain vary most when comparing normalized impact and percentage in the first 10% of publications, with and without ESCI data, which demonstrates the extent to which the impact of Spanish research depends on ESCI-indexed journals. Furthermore, research in Communication studies has been uneven and countries like Spain joined the field later in the day.

In their analysis of Communication studies journals indexed by the WoS, De Filippo (2013) identified the countries that publish the highest number of journals as the most productive. However, as our results show, the most productive country does not make the most impact. Although English-speaking countries dominate the field in our data set, higher numbers of publications do not equate with being considered "better," as Trabadela-Robles et al. (2020) also noted. Thus, a country-based IF classification provides us with a more comprehensive and more accurate view of the current state of research in Communication studies.

Aside from the Scimago Journal & Country Rank, no other classification evaluates the country-based impact of research by subject area. Only rankings of institutions by field of study can bring us closer to the reality of countries. A comparison of our results with the number of universities per country in the Shanghai Ranking (http://www.shanghairanking.com/Shanghairanking-Subject-Rankings/communication.html) shows much similarity with size. In our study, 54% of papers are published by the USA, England and Australia; in the Shanghai Specialties Ranking (Communication studies) 60% of the universities belong to these countries, but this does not reflect their impact. Again, we are witness to the dominance of the English-speaking countries in university rankings, although this may be obvious given that one of the main indicators for generating these classifications is WoS publications.

Across the academic world, international collaboration is seen as a means of obtaining greater impact. Earlier studies reported an increase in production worldwide and greater international collaboration, as well as a rise in the number of countries with which any given country collaborates (Arunachalam & Doss, 2000). These authors described the status of the USA as collaborator-of-choice across all fields and Trabadela-Robles et al., 2020 described this specifically with reference to Communication studies—both findings that are supported by the present study. Gingras & Khelfaoui (2018) found that the very presence of the USA in the WoS means collaborating countries benefit from citation.

Our results show that in Communication studies most collaborations contribute to an improvement in the country-based IF. This was the case for 20 of the 25 countries in our sample. In a bibliometric study of research in astronomy in the Netherlands, Van Raan (1998) considers it reasonable that international collaboration should lead to an increase in impact beyond that resulting from self-citation as internationalization expands readership. Sud & Thelwall (2016) do not identify international collaboration as necessarily advantageous but they do stress that collaboration with certain countries—the USA, among others—increases impact.

CONCLUSIONS

In response to RQ1, in Communication studies during the study period, we have found that 72.8% of all records are the product of English-speaking countries; the USA alone accounts for 48.4%; and the USA, England and Australia together—the three countries making the largest contributions—account for 62.2%. The least productive countries are Scotland, Japan and France.

In response to RQ2, in 2019, the countries with the highest IF and 5-year IF scores were Austria, Netherlands and Switzerland. In descending order, the lowest IF scores were those of Japan, Taiwan and South Africa; the lowest 5-year IF scores were those of New Zealand, Taiwan and South Africa. Between 2015 and 2019, the most significant changes in IF ranking positions were those of France, climbing from 17th in 2015 to 12th in 2019; Singapore, rising from 20th to 5th; Belgium, up from 17th to 7th; Canada falling from 9th to 19th; Sweden down from 6th to 11th; and Spain up from 14th to 18th.

In response to RQ3, the inclusion of the ESCI has most benefited Spain, followed by Norway and Switzerland. In contrast, the Asian countries—South Korea, Japan, China and Taiwan—have benefited the least. Singapore alone ranks 8th among those that have most benefited.

In response to RQ4, the IF shows a strong correlation with Incites-calculated normalized impact, especially when ESCI data is included (0.834). Though weaker, the relationship with the percentage of articles in the first 10% approximates more closely when ESCI data are included. On the other hand, there is a strong correlation (0.880) between normalized impact and the percentage of studies in the first 10%. Spain, followed by the Netherlands, shows the greatest difference when IF is compared with normalized impact and the percentage of the first 10% of publications both with and without ESCI data. This suggests that publications in Communication studies significantly influence publications in ESCI-indexed journals.

In response to RQ5, the collaborating country of choice is the USA. Geopolitical factors condition collaboration between countries. Collaboration improves the country-based IF which was increased as a result of collaboration in 20 of the 25 countries in our sample. The only exception is Switzerland which in 3 of the 5 years studied saw its IF fall. At least 30% of the scientific production of most countries involves international collaboration.

Future research in Communication studies could analyze the scientific production of the Shanghai Ranking Universities and determine whether or not those who publish research in the field actually belong to it because, due to its interdisciplinary nature, publications are often the work of investigators from other fields. It would also be of interest to calculate impact when including ESCI citable documents in order to establish the weight of peripheral regions in Communication studies research.

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