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# Collaboration in the Iberoamerican Journals in the category Information Science & Library Science in WOS

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## **Abstract:**

This article presents a bibliometric study about collaboration in the Iberoamerican journals indexed in the *Journal Citation Report* (JCR) within the category *Information Science & Library Science*. It has been found that the rate of authors per article is 2, 24, it has been calculated the collaborative index (CI) and the degree of collaboration (DC) from 2006 to 2014 and even though both CI and DC have increased, this rise has been small. Furthermore, international collaboration in the articles is minimum and almost all of it revolves around Spain.

**Keywords:** Bibliometry, Collaboration patterns, Iberoamerican journals, international collaboration

## **Introduction.**

Scientific collaboration is present in all fields of knowledge. Current advances in the means of communication facilitate and encourage collaboration among researchers who overcome geographic or language barriers, leading to an increase in the number of publications.

The kinds of collaboration that can happen are really diverse. Katz and Martin (1997) point that collaboration can happen between individuals, groups, departments, institutions, sectors, regions or countries. In collaboration relations links are created between authors, groups and organizations because they share common aims and objectives to carry on a research (Mattesich, Murray-Close & Monsey, 2001).

An aspect on which is necessary to put attention is which factors influence so that there is collaboration in the academic and scientific field. Some authors states that among these factors are (Perianes, Olmeda & Moya-Anegón, 2010): environmental, related to

geographic location and social context of the researcher; the ones related to communication, that is those related to the broadcasting means that collaborators use to receive and transmit information. Also, there are other factors associated with economic, human and infrastructure resources.

The concept of collaboration is accepted from long ago in science where it is common to realize multidisciplinary researches or with the participation of multiple institutions or countries. However, in social science, there are still fields or areas in which individual research prevails, in others collaboration is making its way sometimes which a rapid advance and others slowly.

It is a fact that scientific journals are a natural mean to scientific diffusions, because of that, they are a valuable source of information which allows showing trends and patterns of scientific communication from diverse focus: production by geographic sectors (Haddow & Genoni, 2009), gender (Håkanson, 2005) or by sets of journals from specific fields (Yang & Lee, 2012; Maz-Machado, Jímenéz-Fanjul & Adamuz-Povedano, 2014).

Bibliometry studies and analyses behaviors and patterns that appear in scientific journals and the bibliometric indicators which allow analyzing and quantifying the influence of diverse aspects related to cooperation like productivity or scientific impact (Bordons, González & Díaz, 2013). To quantify collaboration several indicators have been made, between them highlight due to its frequent use the collaborative index (CI) (Lawani, 1980), the degree of collaboration (DC) (Subramayam, 1983) and the collaboration coefficient (CC) (Ajiferuke, Burrell & Tague, 1988).

Databases offered by Thomson Reuters *Web of Science* (WOS) are used frequently to realize different bibliometric studies about citation, authorship, collaboration, impact, etc. (Archambault, Campbell, Gingras & Larivière, 2009; Lemarchadn, 2012). However, there are many researchers who have pointed the limitations that WOS has in fields or areas which have significant production in non-English language (Andersen, 2000; Moed, 2005; Nederhof, 2006). However, due to the fact that in the last years it has been incorporated journals from no English-speaking countries in Thomson Reuters database *Social Sciences Citation Index* (SSCI) we have considered it is a right occasion

to analyze collaboration in these journals. All this has motivated that we have selected for this study the Iberoamerican journals which appear in the *Journal Citation Index* (JCR) in the category *Information Science & Library Science*.

### Objective

The main purposes of this study are to determine the degree of collaboration (DC) and the collaborative index (CI) in the Iberoamerican journals of *Information Science & Library Science* in JCR. Also, special attention was paid to international collaboration.

### Materials and Methods

Firstly, the Iberoamerican journals indexed in the JCR inside the category *Information Science & Library Science* were identified, finding only five journals: *El Profesional de la Información*, *Informacao & Sociedade-Estudos*, *Investigación Bibliotecologica*, *Revista Española de Documentación Científica* and *Transinformação*. Then on April 2015, all the documents published by these journals and indexed in WOS were consulted in the database from *Social Science Citation Index* (SSCI). Reviews, notes, letters, editorials, news and meeting abstracts were excluded. Finally, 1340 articles were obtained; all of them were published in the period 2006-2014 and the data obtained were stratified by citation, authorship and countries.

The collaborative index (CI) and the degree of collaboration (DC) show the scientific collaboration among researchers. So, for a set “K” of articles published in a journal, these indicators are defined as below:

$$CI = \frac{\sum_{j=1}^A jf_j}{N} \quad \text{y} \quad DC = 1 - \frac{f_1}{N}$$

Where  $0 \leq DC \leq 1$

$f_j$  = number of articles having  $j$  authors in collection  $K$ .

$N$  = total number of articles in  $K$ .  $N = \sum_j f_j$ .

$A$  = total number of authors in collection  $K$

It has been counted the number of authors for each article and for every year, CI and total and yearly DC were calculated. Furthermore, articles with international collaboration were also counted, considering international collaboration articles the ones in which at least two authors are from different countries. For counting the authors of

these articles it was opted for the full count system, so that all signer authors are considered equally.

## Results and discussion

These five journals contained 1340 articles. The journal *El profesional de la información* has the biggest percentage (47, 39%) of documents written in the period from 2006 to 2014. From these five journals, two of them are published in Brazil, other two are published in Spain and one is published in Mexico. It is observed that the number of papers published per year in these magazines ranges from 14, 0 of *Transinformação* to 70, 5 of *El profesional de la información*. These differences are due to some being biannual, four-monthly or bimonthly published.

Table 1. Documents and collaboration per journal

Journal	Country	First indexed by SSCI in	Documents	Documents with collaboration	Documents with international collaboration
<i>El Profesional de la Información</i>	Spain	2006	635	418	30
<i>Informacao &amp; Sociedade-Estudos</i>	Brazil	2008	184	150	23
<i>Investigación Bibliotecológica</i>	México	2007	183	84	9
<i>Revista Española de Documentación Científica</i>	Spain	2008	199	165	16
<i>Transinformação</i>	Brazil	2008	139	98	11
<b>Total</b>			<b>1340</b>	<b>915</b>	<b>89</b>

Table 1 shows that even though collaboration in some journals reaches percentages from 82, 9% (*Revista Española de Documentación Científica*) and 81, 9% (*Informacao & Sociedade-Estudos*) international collaboration is just from 9, 6% and 15, 3 respectively.

Collaboration degree (DC) is defined as the rate of the number of research articles made in collaboration in relation to the total number of research articles published during a given period and collaborative index (CI) is the average number of authors per article. For this set of journals between 2006 and 2014 DC = 0.69 and CI = 2.09. The annual

change in DC and CI revealed that these indicators have been rising although very slowly (Table 2).

Table 2. DC and CI in the Iberoamerican journals of *Information Science & Library Science* in JCR.

Año	2006	2007	2008	2009	2010	2011	2012	2013	2014
DC	0,56	0,45	0,59	0,67	0,73	0,7	0,66	0,69	0,72
CI	2,13	1,95	2,02	2,23	2,3	2,39	2,16	2,18	2,28

Figure 1 shows that the 64, 19% of the published articles in the Iberoamerican journals from *Information Science & Library Science* category are signed by one or two authors. 32, 13% of the papers has only one author while articles with more than four authors only represent 4, 72%. It has been verified that there is correlation between the number of authors per article and the number of citations received (Kendall's tau-b coefficient = 0.114,  $p = 0.000$ ). As the number of authors increases the average number of citations also increases, this average reaches its highest value for 5 authors (1.39) and from that number the average goes down.

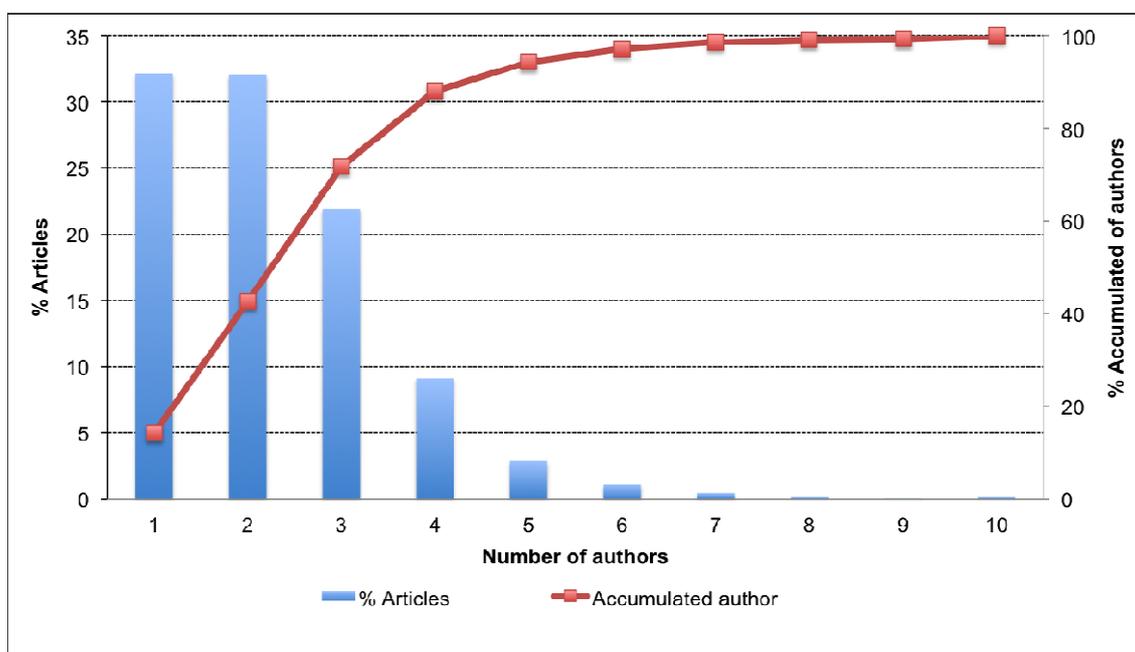


Figure 1. Co-authored distribution in % from *Iberoamerican journals of Information Science & Library Science* (2006-2014)

The analysis of international collaboration shows that this started in 2007 with only two articles and it has increased slightly until it has reached a total of 89 in 2014. In such a way that international collaboration in Iberoamerican journals from the *Information Science & Library Science* category represents only 6,6% of the total number of articles. The biggest percentages of this collaboration occurred in the years 2012 and 2014, when they reach the 10,7% and the 10,3% respectively (Figure 2).

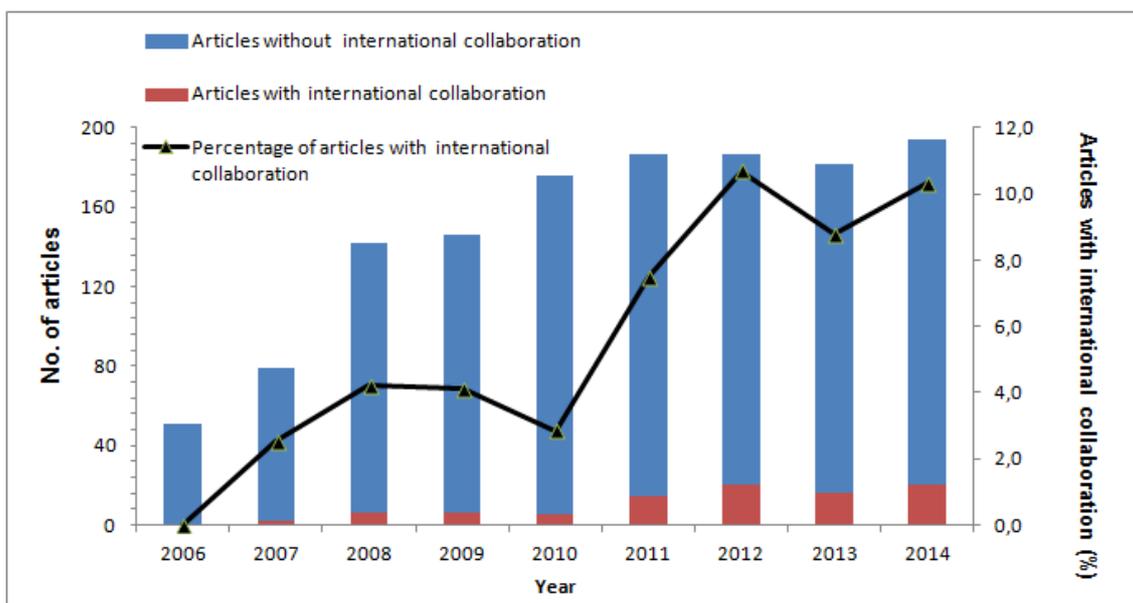


Figure 2. Trends in Iberoamerican journals of *Information Science & Library Science*

Spanish authors present the largest number of articles with international collaboration (Table 2). However, these articles only represent the 5,91% of all signed by a Spanish author. In percentage terms, France has international collaboration in 60% of its articles. Countries with no international collaboration in these journals are Czech Republic, Greece, Israel, Serbia and South Africa.

Table 3. Distribution of publications from countries with international collaboration (n≥4).

Country	Articles with international collaboration	% respect from the total of the articles in each country
Spain	46	5,91
Brazil	24	8,05
USA	10	28,57
France	9	60,00
Argentina	8	8,06
Mexico	8	8,06

Colombia	7	26,92
Cuba	7	24,13
Portugal	5	33,33
England	4	40,00

In figure 3, it is observed that Spain has collaboration with 20 countries; it becomes the center of the net of international collaboration in Iberoamerican journals of *Information Science & Library Science*. The main collaborator partner is Brazil followed by Portugal and Argentina. Some countries have all their collaboration only with one country; it is the case of Australia, Colombia, Italy, Peru and Switzerland, they have all their collaboration with Spain. The same happens with Canada and Brazil and with Scotland and England.

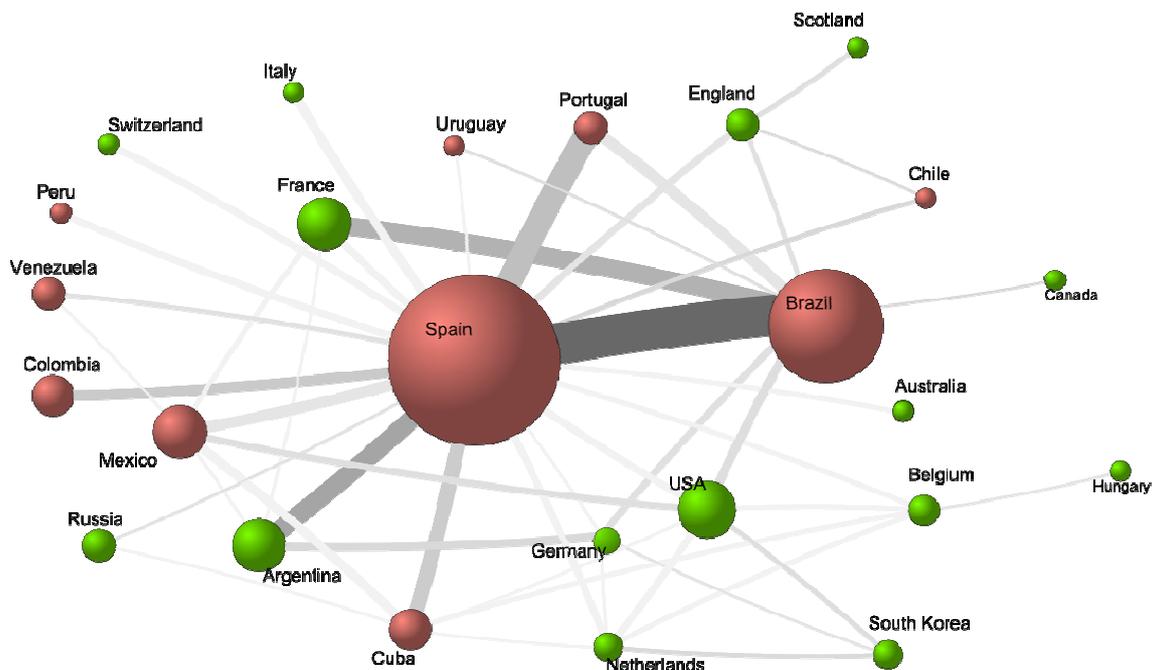


Figure 3. Collaboration net among countries in *Iberoamerican journals of Information Science & Library Science*

## Conclusion

Despite the fact that 68.28% of the articles from Iberoamerican journals in the JCR category *Information Science & Library Science* is made through collaboration between authors, international collaboration only represents 6.64% of the total of articles. This shows that local collaboration, that is internally, predominates. The number of authors per paper is 2.24, a value larger than 1.17 which was shown in *Library Science* in 1997

(Cunningham & Dillon, 1997), therefore it can be said that collaboration in this category has increased, at least in Iberoamerican journals.

It has been verified that the number of citations received by the articles is a variable correlated with the number of signers, as some bibliometric studies point (Rousseau, 2000). Although, it should be considered other factors like for example the language in which these journals are published, indeed Spanish and Portuguese, which causes that these articles have less visibility.

Collaboration in Iberoamerican journals in the category *Information Science & Library Science* is articulated around Spain, Brazil and Mexico, just the countries where the analyzed journals are edited and published.

The results of this study indicate that now it should be looked for patterns of collaboration with the English-speaking journals and compared them with these to know if they follow the same patterns or on the other hand they differ.

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