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ESTUDIOS / *RESEARCH STUDIES*

Internationality of Spanish scholarly journals indexed in Web of Science and Scopus

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Abstract: The present paper studies the internationality of Spanish scholarly journals indexed in Web of Science and Scopus on the basis of four key elements identified in the bibliographic review: articles in English, articles by foreign authors, international collaborations and foreign members in editorial teams. Research shows that subject area and access type are determinants in terms of the degree of internationality of the journals, as well as, to a lesser extent, publisher type. The Impact Factor (IF), flagship of bibliometric impact, does not correlate with any element of internationality, while the values of SJR and SNIP moderately correlate with the percentage of international collaborations. Foreign authors' participation is related with English language presence, revealing the orientation of the indexed Spanish journals towards the "core" scientific countries. The presence of foreign members in committees is accompanied by that of foreign authors, even though a cause-effect relation cannot be proved. The study concludes providing some insights on future research lines.

Keywords: scholarly journals; Spain; internationality; bibliometric impact; open access; international collaboration; editorial boards; publication language.

Internacionalidad de las revistas científicas españolas indizadas en Web of Science y Scopus

Resumen: Se analiza la internacionalidad de las revistas españolas indizadas en WoS y Scopus, en base a cuatro elementos principales identificados en la revisión bibliográfica: artículos en inglés, artículos de autores extranjeros, colaboraciones internacionales, y miembros extranjeros de los equipos editoriales. Se constata que el área temática y el tipo de acceso son determinantes en cuanto al grado de internacionalidad de las revistas, así como, en menor medida, el tipo de editorial. El Factor de Impacto (FI), buque insignia del impacto bibliométrico, no guarda correlación con ningún elemento de internacionalidad, mientras que los valores de SJR y SNIP correlacionan moderadamente con los porcentajes de las colaboraciones internacionales. La participación de autores extranjeros está relacionada con la presencia del inglés, revelando la orientación de las revistas españolas indizadas hacia los países del "núcleo" científico. La presencia de miembros extranjeros en los comités va acompañada de la de autores extranjeros, aunque no se pueda demostrar una relación causa-efecto. Se concluye con aportaciones sobre posibles líneas de investigación futuras.

Palabras clave: Revistas científicas; España; internacionalidad; impacto bibliométrico; acceso abierto; colaboración científica; comités editoriales; lengua de publicación.

1. INTRODUCTION

Internationality is a relevant issue in scientific publishing. When a journal is considered to be international, some people attribute quality to it. But, what is internationality? There is a lack of consensus and there are different approaches and points of view, depending on regions, languages, disciplines, etc.

The internationality of Spanish journals has been assessed using a variety of methodologies — measuring different aspects, designing composed indexes and ranking journals. Nevertheless, these attempts have only been carried out studying subject-specific small sets of journals. This is why there is a need of a current, global, first-hand data study that looks into the nature of internationality and discloses the relationships among its elements, and between such elements and other aspects of journal publishing.

This article intends to contribute to the topic by reviewing Spanish literature on internationality and examining such concept. It also covers a selective review of global studies. Finally, the elements of internationality are identified and analyzed in the last complete volume of 445 Spanish journals indexed in WoS and Scopus, and the results are discussed.

2. REVIEW

2.1. Concept of internationality

Currently, there are two main factors affecting the internationalization of science: English language and globalization. English became the scientific "lingua franca" after World War II, as Latin was in the past. Globalization is an economic, technological, social and cultural phenomenon that impacts in the ways of generating and sharing knowledge. Scholarly publishing "is constantly receiving more attention in a world that tends to globalization of ideas" (Buela-Casal et al., 2006, p. 1)[1].

In scientific publishing, the concept of internationality can be applied to a variety of entities (journals, articles, authors, subjects, countries) and from multiple points of view (from a specific country or region, or from a global perspective). According to Malalana Ureña et al. (2007), internationality may be observed as a phenomenon of two faces: import (collaboration and use of journals from foreign countries) and export (publication of articles by Spanish authors in foreign journals).

Internationality is often mentioned along with quality, mixed with it or absorbed by it. Ortega et al. (1992) considered internationality as a "further indicator of the quality", and Rodríguez Yunta (2015) included indicators for internationality assessment within a quality system for Spanish journals on SSH (Social Sciences and Humanities).

Quality and internationality are complementary, but different concepts. For example, a domestic journal may publish high quality articles in spite of not having foreign participation or impact outside the country borders. Following this line, Buela-Casal et al. (2006) pointed out that "it should be made clear that internationality per se is not to be equated with quality". Malalana Ureña et al. (2007) provided a definition that seems to be followed in Spain and other "peripheral" countries – internationality is "something related to the ability that [a journal] has to interest outside the cultural boundaries where it has been conceived"[2]. It seems that the concept is different in other countries or when it is approached from a different perspective – authors as Kao (2009) and Bonnevie-Nebelong (2013) referred to it as the variety of countries represented and not only as the ability of a journal to impact outside its country.

2.2. Internationalization in Spain

In late years, internationalization has been a priority. Since the restoration of democracy in 1977, the country pursued the full integration in the European Union and the end of the isolation caused by the Civil War and the dictatorship, that truncated the early development of the Spanish scientific research in the first quarter of the 20th century as led by the Board for the Extension of Studies and Scientific Research (Junta para la Ampliación de Estudios e Investigaciones Científicas, JAE). The Spanish National Research Council (CSIC) substituted JAE in 1939, but real progress did not come until late 50's with the arrival of the first technocrats to Franco's government (González Alcaide et al., 2012).

Since 1989, the performance of Spanish researchers and teachers is assessed by the National Commission for the Evaluation of Research Activity (CNEAI), which introduced internationality as a priority criteria (Jiménez-Contreras et al., 2003). First, only articles in journals indexed in Science Citation Index (SCI) qualified for research evaluation (Rey-Rocha & Martín-Sempere, 1999), as well as international subject databases for social sciences and humanities. Over the years, some other aspects as the collaboration with foreign authors, the appearance of foreign members in the editorial boards and the use of English language began to be considered (Ruiz-Pérez et al., 2010).

Nevertheless, the current criteria of the National Commission for the Evaluation of Research Activity (CNEAI, 2014) specifies that "appearing in [international] indexes is a warranty for quality content", which implies that indexation of a journal in such sources is enough to prove the quality of an article, without the need of further assessment. The National Agency for Evaluation of the Academic Career (ANECA) also mentioned international indexation as a quality criterion for journal articles[3]. The Spanish Foundation for Science and Technology (FECYT, 2015) went further and stated that, in order to qualify for its seal, at least a 10% of the authors or a 10% of the members of the editorial boards must belong to foreign institutions. This percentage is low, and, as it has been claimed so far, the proportion of foreign experts is usually higher than that of authors.

Some of the best journals on Science, Technology and Medicine (STM) are indexed in international multidisciplinary databases and have achieved recognized bibliometric impact indicators such as Impact Factor (IF) and Scimago Journal Rank (SJR). To balance this, the Spanish academia has been building quality assessment systems, initially for SSH journals only. Some of them include internationality aspects. Among the systems no longer used, the family of products IN-RECS[4], IN-RECH[5] and IN-RECJ[6] identified international citations (those coming from WoS' databases), DICE[7] collected foreign authorships, and RESH[8] analyzed advisory councils. Among the systems currently in force, CIRC[9] uses indexation in international databases to categorize or classify journals, while MIAR[10] uses the same concept but for calculating its own indicator (ICDS, International Secondary Composite Index Broadcasting)[11]. Note that discontinued systems included Spanish SSH journals and analyzed complex information, while the systems currently in force are comprehensive (cover journals from all over the world on any subject), and use easy-to-process data.

In Spain, attempts to separate degree of internationalization from quality fail to the extent that evaluation agencies assign quality to articles only when they belong to journals indexed in databases or directories with international prestige. According to Rey-Rocha & Martín-Sempere (1999), "this policy implies a tacit recognition that the academic quality of local journals is suspicious. In fact, it is leading some domestic journals to face serious problems, even to be discontinued".

First studies on Spanish journals' internationality were carried out during the 90s, and only analyzed indexation of small sets of subject-specific titles in international sources. This is the case of Amat & De la Cueva (1990) on biomedicine, Ortega et al. (1992) on STM, and García Marín & Román-Román (1998) on history.

From the 2000 onwards there was a tendency to use multiple indicators. Gutiérrez Puebla (1999) studied 19 Spanish journals on geography, and introduced analysis of countries' participation. Delgado López-Cózar et al. (2006a) defined aspects that compose "international representation": nature of the supporting institution, country of institutional affiliation of editorial team members and authors, bibliographic references cited in the articles, and dissemination in international databases. Buela-Casal et al. (2006) defined a composite qualitative Internationality Index that could reflect global perspective, including value-weighted criteria for language, Internet access, country, publishing norms, indexation in Journal Citation Reports (JCR) and other sources, editorial board, Impact Factor, authorship and other aspects. It was also used by Zych & Buela-Casal (2007, 2009 & 2010) and Zych (2009) for assessing internationality of Spanish and Latin American journals on Psychology. In the same line, Malalana Ureña et al. (2007) carried out a complete study on history titles, in which they assessed international dissemination, foreign authorships, and scientific committee members, among other aspects. Malalana Ureña extended this methodology to sets of specific Spanish journals on modern history (2007a), contemporary history (2007b) and medieval history (2007c). Aliaga & Suárez-Rodríguez (2007) and Villalobos-Galvis & Puertas-Campanario (2007) used internationality elements defined by Buela-Casal et al. (2006); the first one, for a study of a single Spanish journal, and the second, to measure the impact of three Latin-American psychology journals in Spain.

Since then, all studies on Spanish journals have considered multiple aspects for assessing internationality, including language, indexation, foreign authorships and editorial team composition, mainly. Thus, Román-Román, Sorli-Rojo & Giménez-Toledo conducted three studies between 2007 and 2010[12] on Latin American studies, psychology and humanities (Román-Román et al., 2007; Román-Román & Giménez Toledo, 2010; Giménez-Toledo, 2009). They assessed visibility in databases and the Internet (using MIAR's ICDS indicator), foreign authorships and editorial team composition. The results indicated that journals on Latin American studies and humanities had good levels of internationality, while those on psychology must improve. Sorli-Rojo (2013) carried out a study on Spanish journals on architecture, construction sciences and town planning and analyzed international dissemination ("visibility"), geographical distribution of authors,

and foreign members in full editorial teams. Sorli-Rojo complained about the lack of affiliation information in such journals, as well as their deficient international indexation and lack of foreign participation. The same author completed a bibliometric analysis of a specific journal on architecture, observing foreign participation in editorial team and authorships, but this time adding international diversity assessment (Sorli-Rojo & Mochón-Bezares, 2014). Escribà-Sales & Cortiñas-Rovira (2013) analyzed the authorship (foreign participation and international collaboration patterns) of a few top journals on communication.

There have been some attempts to build composite internationality indexes. Amat & De la Cueva (1990) created the Dissemination Index (DI)[13], applicable to journals belonging to a specific area – it was calculated as the proportion of articles published in national journals and indexed in international subject databases.

Other indicators based on articles, journals, affiliations and databases have been created, although they have been little used afterwards. This is the case of the International Dissemination Index (IDI) and the Trend to Public Abroad (TPA), by Álvarez-Ossorio et al., (1997), applicable to specific subject areas using articles. Rey-Rocha & Martín-Sempere, (1999) introduced the TPH (Trend to Publish Home), which applied to institutional sectors, and later (2004) created two brand new indexes, the Degree of International Openness (DIO) and the Degree of International Collaboration (DIC).

Rodríguez Yunta (2015) defined a methodology for assessing quality to SSH journals indexed in ISOC database, and created three ad-hoc value-weighted internationality indicators - the Compensated Index of Linguistic Internationality, the Compensated Index of Authorship Internationality, and Dissemination in International Databases. His methodology was previously applied to a number of works on specific subject areas[14], and was used to rank journals within them. Later, Rodríguez-Yunta (2016), created four "internationality indicators" based on language and author affiliation. These are calculated from the percentage of articles with specific pre-defined punctuation, and include: not-Iberoamerican language, English language, authors with foreign country affiliation, and authors with affiliation from countries different from the two most frequent ones.

There are some specific studies on internationality of journals on health and medical sciences, and they only analyze indexation. Some of the very few are Abad-García et al. (2015) who examined the presence of health journals in multidisciplinary and biomedical databases, and Jiménez Hernández (2015), who assessed "visibility and dissemination" of titles on nursing.

Summing up, internationalization of research output has been a topic of study in Spain since the 90s. During the 80s, journals began to incorporate foreign languages, especially English, and reached a moderate international dissemination (Ortega et al., 1992). During late 2000s, international indexation has been growing in all subjects, and specially in Scopus (Osca-Lluch et al., 2008).

However, there is no consensus of the improvement of the internationalization process in Spanish journals, as it is difficult to study and quantify. Escribà-Sales & Cortiñas-Rovira (2013) complained about the lack of internationalization of the top Spanish communication journals, since most of the articles were single-signed and international collaborations were mostly performed with Latin American authors only. On the other hand, González Alcaide et al. (2012) reported the increase of the internationally collaborated papers by Spanish authors on science and technology indexed in WoS' Science Citation Index Expanded, for the period 1980-2007 and specially in the 2000s. That finding points to the evolution of the internationality, but only of the Spanish scientific production, not necessarily of the Spanish journals.

A number of studies focused on internationality degree assessment, since being indexed in prestigious directories and databases does not guarantee quality of the journals or the articles (Gutiérrez Puebla, 1999). These studies, described above, have analyzed a variety of elements (separately or jointly) for different periods of time and in journals from specific disciplines or areas, not globally. As internationality cannot be measured by an isolated element or indicator, those indexes (DI, IDI, TPA, TPH, DIO, DIC) were created, but none of them were neither adopted by other researchers nor further developed.

Most works focus on journal sets from specific disciplines or subject areas, with particular ad hoc methodologies, and intend to classify, categorize or rank journals. No studies analyze universal populations of journals or try to discover the relationships among existing elements, how these elements behave, and why.

2.3. Internationalization outside Spain

The Institute for Scientific Information (ISI, later Web of Science and currently Clarivate Analytics) and Medline played an important role by considering internationality as an important selection criteria for journals to be indexed in their databases (Ruiz-

Pérez & Jiménez-Contreras, 2006, and Delgado López-Cózar et al., 2006b).

Nevertheless, the inclusion of a journal in such databases does not imply "global" internationality. For instance, the Latin American community seems to be more sensitive to world representation than Anglo-Saxon ones. Redalyc's internationalization index[15] considers foreign authors and foreign countries, while Scimago Journal Rank only collects international collaboration data as the "document ratio whose affiliation includes more than one country address"[16].

The scholars in USA, UK, Canada, etc. seem to assume that their journals are already international when perhaps they are not so. According to Malalana Ureña (2007a) and Gutiérrez Puebla (1999), their editorial boards and advisory councils are not multinational, topics treated are approached from an Anglo-Saxon perspective, authors are mostly Anglo-Saxon, and bibliography is Anglo-Saxon. Therefore, these journals are Anglo-Saxon, but not necessarily international. These criticisms usually come more frequently from SSH scholars (these two authors are researchers on history and geography, respectively) than from STM scholars, and obviously from non-Anglo-Saxon communities.

There are not many studies on internationality of British or American journals, perhaps because it is (wrongly) understood that those are already international, or because there is no need to wonder whether they are international or not. For example, Torrado-Morales & Giménez-Toledo (2012) found that only 13% of the authors in 16 British journals on film studies were from non-Anglo-Saxon countries.

Global studies or studies on other regions analyze similar elements to those seen so far. Zitt & Bassecoulard (1998) designed a complex methodology based on the distribution of journals' authors and quotes across countries, compared with the average profile of specific subject areas. In particular, they analyzed earth & space sciences and applied biology journals indexed in SCI. Their findings revealed that internationality in authorship and citations were strongly linked, while internationality as measured by indexation in databases and journal impact were only moderately associated. They added that assessment within the established indexes would lead to extreme statements, since, for instance, "even a journal with 100% U.S. authors is strongly international because of the high position of the U.S. in world science". Because of this, diversity of countries, as opposite to concentration, should be further considered.

Studies on journals' internationality, both at national or international level, usually take only a limited number of journals on a specific subject area. Works by Gazni (2015) and Gazni & Ghaseminik (2016), who collected data from thousands of journals in any subject area and from any region, are an exception. They discovered that foreign authorship depended on the region of publication and on the subject areas (STM beating SSH areas), and that titles indexed in WoS were growing international over time ("globalized", according to the authors). They also analyzed the "nationality" of bibliographic references, with similar results.

As in Spain, there are some systems for internationality assessment of SSH journals, both at national and international levels. *Listes de revues SHS de l'AERES* in France[17] is an example of the first type, and ERIH (European Reference Index for the Humanities and Social Sciences) of the second. Román-Román & Giménez-Toledo (2010) described the three categories (A, B and C) that ERIH had – international journals could be categorized A or B, depending on a series of concepts and including foreign participation in authorship and advisory council, dissemination and citations received. Currently, ERIH Plus analyzes authorship internationality of the journals applying for inclusion, and requires that at least 1/3 of the authors (not papers) from the last 2 volumes should be from countries different to the publisher[18]. If this requirement is satisfied, the journal is "international"; if it is not, the journal is classified as "national", or even "local" when more than 2/3 of the authors belong to the same institution.

3. OBJECTIVES AND METHODS

This study identifies and measures internationality elements from the Spanish scientific journals indexed in Web of Science and Scopus, in order to analyze relationships among them and with main journals characteristics: subject area, publisher type, access type and bibliometric impact.

Research questions, enumerated below, are developed into sections in Chapter 4 to provide more clarity and ease the reading:

- Q1. Do specific subject areas experiment higher internationality rates than others?
- Q2. Do publishers affect the internationality of a specific journal?
- Q3. Does Open Access contribute to internationality?
- Q4. Is there any relation between internationality and bibliometric impact?

- Q5. Are there specific relationships among internationality elements?

This study is focused on the population of Spanish[19] journals that are scholarly[20], active and with a recognized quality level. Thus, journals have been selected from lists available at the beginning of 2015 in Web of Science[21] and Scopus[22]. A previous double check has been carried out, identifying mistakes and irregularities. The final list consisted of 445 journals representing the 25.9% of all Spanish titles according to Dulcinea database[23]. These journals formed a specific set, and not a sample of the total Spanish population. Indeed, this list is not representative of the whole list of titles published in Spain, since STM and English language titles are overrepresented. In addition, indexation is uneven: 158 journals appeared in Scopus and WoS at the same time, while 278 were indexed in Scopus and only 9 in WoS (Figure 1).

The contents to be analyzed are original research and review articles, including short pieces of at least 4 pages and excluding editorials, letters to the editor, etc. The articles have been extracted from the last complete volume of each journal, which corresponds to 2014 in most of the cases, since data have been collected on Sep. 2015. A final number of 13,599 articles has been analyzed one by one, corresponding to an average of 30.6 articles per journal.

As to the sources for data collection, a first dataset has been extracted from Dulcinea, refined and enriched manually with information from the journals websites (table I).

For every journal in this study, the data described in Table I have been collected: subject area (according to Dulcinea), publisher type, access type and impact indicators. Since Scopus covers almost all journals in this study, its indicator Source Normalized Impact per Paper (SNIP), which is supposed to correct differences between subject fields, was the one chosen. In order to compare results, SJR and IF from WoS were used too.

With regard to internationality, the four main variables identified throughout the works reviewed have been considered: languages, foreign-authored articles[24], international collaborations[25] and foreign experts at the full editorial team[26]. With those values, an average was calculated as a composite internationality index.

Other aspects such as international citations and authors, and experts' countries of origin could have been included since they would have made this study deeper and more complete, but our resources did not match the requirements of such endeavor.

International indexation as measured by the ICDS indicator could have been applied as well, but, since journals studied are already internationally indexed (in WoS or Scopus), there was no point in doing so.

Inferential statistics have been used for hypothesis contrast, including non-parametric tests Spearman's rho rank correlation and Kruskal-Wallis' H test. The confidence interval used is 95%, which is typical in applied practice on social sciences.

Figure 1. Spanish journals indexed in WoS and Scopus

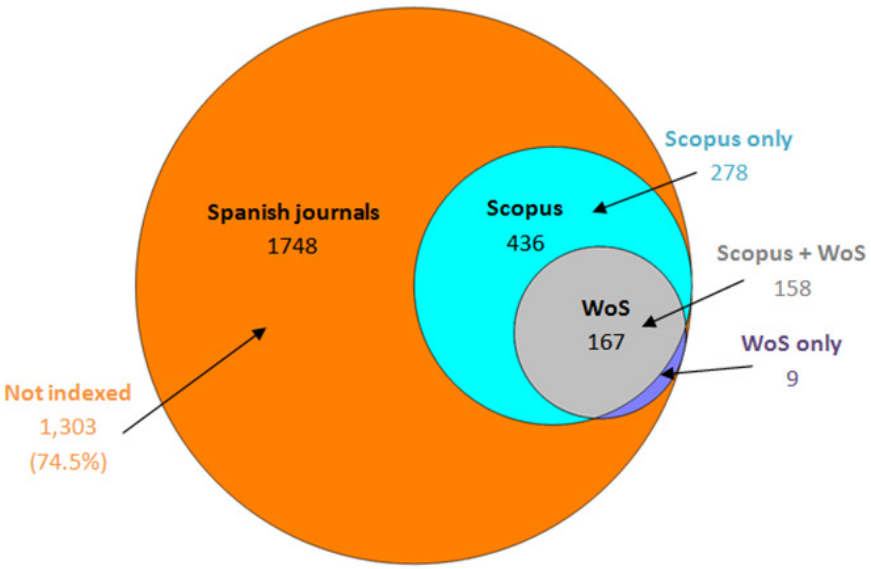


Table I. Indicators

Indicator	Values	Sources
Basic characteristics	Title, ISSNs, year, URL	Dulcinea, journal's website
Subject Area	• Arts & Humanities	Dulcinea
	• Social Sciences	
	• Health Sciences	
	• Life Sciences	
	• Experimental Sciences	
	• Engineering	
	• Mathematics & Physics	
Publisher type	• Private non-profit: professional associations, scientific societies, royal academies and foundations	Journal's website, as defined by Abadal et al. (2015, p. 83)
	• Academic: universities and research centers	
	• Government agencies: organizations depending on public administration, except the previous	
	• Commercial: publishing companies	
Access type	• Free without APCs (also known as Platinum OA)	Dulcinea and journal's website (Dulcinea does not specify if there are APCs or not). APCs include mandatory fees paid by the author. A hybrid journal may have an embargo period as well, but it will be still considered hybrid in the first place.
	• Free with APCs	
	• Embargo (also known as Delayed OA)	
	• Hybrid (restricted access journals that offer authors an OA payment option),	
	• Restricted	
RoMEO color	• White	Dulcinea
	• Yellow	
	• Blue	
	• Green	
	• Unknown	
Bibliometric impact	IF, SJR and SNIP.	WoS and Scopus, values for 2014.
Language	Languages (e.g. Spanish, English, Spanish & English, Catalan, etc.)	Journal's website. Languages have been considered only when they have been available in the full text of at least the 20% of the articles upon last complete volume.
Language %	% articles upon last complete volume available in every specific language.	Journal's website, direct consultation on print version or copies received via Interlibrary Loan.
Foreign articles	% articles upon last complete volume where there is at least one author with foreign affiliation.	
International collaboration	% articles upon last complete volume where there are authors affiliated to two different countries at least.	JournalMetrics.com for almost all Scopus titles. This information has been checked, corrected and completed manually with data from journal's website, when necessary.
Foreign experts	% of members with foreign affiliation at the complete editorial team (including editorial board and scientific/advisory committee).	Journal's website, direct consultation on print version or copies received via Interlibrary Loan.

Last but not least, percentages of internationality (Figures 2-5 and Appendix A) represent journal averages, not an average of articles' totals. This is so because the object of this study are journals as vehicles for science communication, not articles as the unit of scientific production. The same procedure applies to foreign experts at editorial teams.

4. RESULTS AND DISCUSSION

Before analyzing internationality aspects, we would like to provide a basic description of the journals studied. As it can be seen in Table II, social sciences (34.8%) and health sciences (31.5%) are by far the most populated areas, reaching together 66% of the total. Arts & humanities follow with the 18%, and the rest of STM areas are marginal.

Almost half of the journals are available only in Spanish. 26.5% is published in both Spanish and English, and 18.4% only in English. The remaining 7.6% belongs to other language categories, including some 1% published in Catalan. These results clearly show that the only language that can be taken as an element of internationality is English[27]. As a matter of fact, it has been given more value in some composite indexes and ranking systems, and for instance Rodríguez Yunta (2015) explained that the presence of other foreign languages could be ignored and only English may be considered, as an alternative to his own composite value-weighted system.

Universities and research centers account for nearly a half of the journals, while commercial bodies publish about 1/3. Private non-profit institutions (professional associations, scientific societies, royal academies, etc.) publish 21.3%, and government agencies publish less than 4% of the titles.

62% of the journals are freely accessible online, and another 2.5% is also accessible online, but includes article processing charges (APCs), which amount for an average of €214.

Table II. Journals by languages, subject areas, publisher types and access types

	Journals	%
Language		
Spanish	211	47.4%
Spanish & English	118	26.5%
English	82	18.4%
Other & multilingual	34	7.6%
Subject Area		
Arts & humanities	80	18.0%
Social sciences	155	34.8%
Health sciences	140	31.5%
Life sciences	23	5.2%
Experimental s.	14	3.1%
Engineering	18	4.0%
Mathematics & physics	15	3.4%
Publisher Type		
Private non-profit	95	21.3%
Government	17	3.8%
Academic	193	43.4%
Commercial	140	31.5%
Access Type		
Free (no APC)	276	62.0%
Free (APC)	11	2.5%
Embargo	64	14.4%
Hybrid	20	4.5%
Restricted	74	16.6%
Total	**445**	**100.0%**

Nevertheless, not every free access journal is an open access (OA) journal, since "Open-access literature is digital, online, free of charge, and free of most copyright and licensing restrictions" (Suber, 2004). Thus, if self-archiving permissions are observed and journals with SHERPA-RoMEO's white color[28] or without this information are excluded, just 88.2% of all free access journals are open access as well. It means that 56.9% of all the journals adopted a full OA model, and only 3.5% of them charged APCs.

For the rest, 14.4% imposed an embargo and 16.6% were restricted. Only 20 journals had adopted the hybrid model, with an APC average of €2,141.

4.1. Subject areas

In this section, an analysis of the distribution of internationality elements across subject areas is presented (Q1, figure 2).

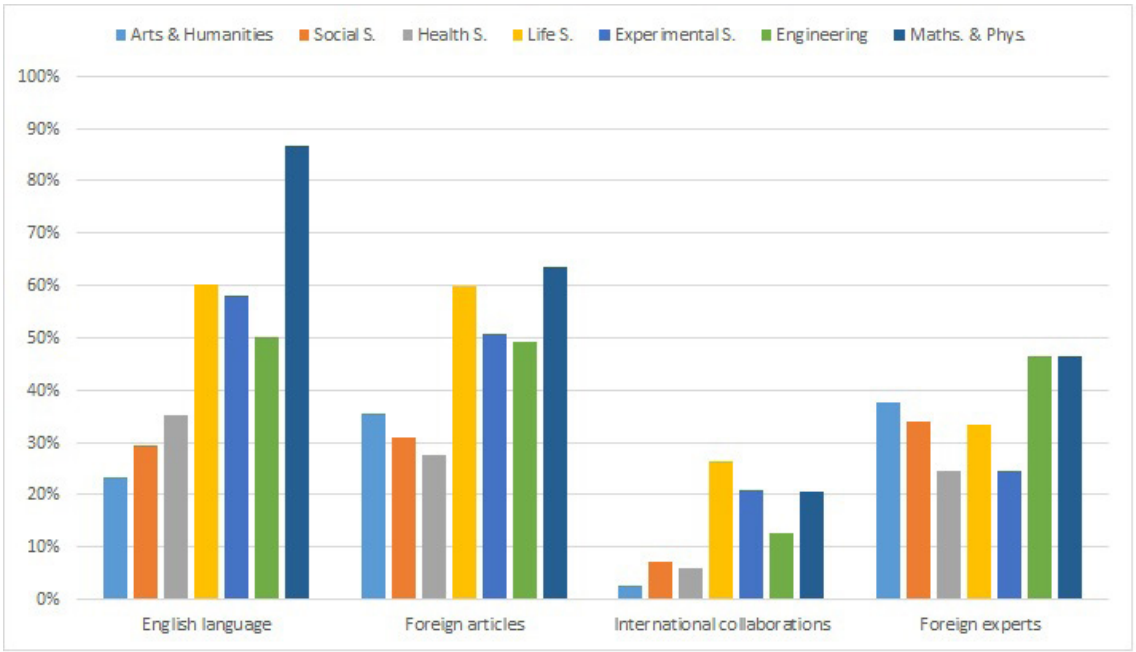
Differences are remarkable with regard to English language. It is much more present in STM fields (44%) than in SSH (27%), considering that the average for mathematics & physics (87%) doubles the global average (35%). The rest of the least representative areas (life sciences, experimental sciences and engineering) have between 50% and 60%, while the most populated (A&H, social sciences and health sciences) range from 23% to 35%.

Similarly to the English language, less populated fields have greater proportions of internationality, this time measured as a percentage of foreign-authored articles. Thus, life sciences, experimental sciences, engineering and mathematics & physics range from 51% to 63%, while arts & humanities, social sciences and health sciences remain between 28% and 36%.

International collaborations follow similar behavior in the least populated areas (those with higher averages of English language and foreign articles), but not in the rest. The proportion of such collaborations within foreign articles depends on journal categories - there are remarkable differences among subject areas. Near the half of all foreign-authored articles in life and experimental sciences is signed internationally; however this only accounts for the 7% when it comes to journals on arts & humanities. González Alcaide et al. (2012) found that 40% of articles in Spanish journals indexed in SCI Expanded (WoS) were internationally signed, with a variation oscillating from 33% to 60% depending on the subject. Although, as mentioned before, that study refers to papers and not to journals, it matches our findings to some extent.

The highest averages of foreign members in full editorial teams appear in engineering and mathematics & physics, although those areas represent only 7.4% of all the journals. Arts & humanities and social sciences, which account for great part of the population (18% and 34.8%, respectively), reach this time good levels of internationality (37.5% and 33.9%, respectively).

Figure 2. Journal internationality by subject area



Kruskal-Wallis H test (Appendix B) indicates that subject area variable is dependent on all internationality elements, or, what is the same, distribution of subject area is associated with all of them.

4.2. Publisher types

This section studies the influence of publishers in internationality (Q2, Figure 3). As to publisher types and languages, differences are smoother. Commercial type has the highest average (45%), while the rest lag behind (29% - 33%)[29].

Journals published by universities and research centers have the highest average for both foreign-authored articles and international collaborations, but all averages are close to the mean value. The type of publisher does not seem to influence much on these internationality elements, only the few journals published by the government are notably low. Also, the proportion of international collaborations within foreign articles (Appendix A) is balanced among all types (23% to 26%).

As to the presence of foreign experts, academic type is again leading the average (37%). Commercial and private non-profit publishers follow (30%), and government publications lag much behind (16%).

Kruskal-Wallis H test (Appendix B) confirms that foreign-authored articles and foreign experts are associated with publisher types, but English language and international collaborations are independent.

4.3. Access types

The differences of internationality elements within access types correspond to Q3 and Figure 4 (see also Appendix A).

Hybrid journals have the highest average for every international indicator: 82% of articles available in English, 62% of articles signed by at least one foreign author, 20% of international collaborations, and 33% of foreign experts in the editorial teams. The rest of access types behave very similarly among all elements, except free access journals charging APCs, with better averages for English language and foreign-authored articles. Embargo and restricted-access journals are especially deficient in international collaboration.

With regard to Kruskal-Wallis H test, the results are the same as for subject area: distribution of the values is dependent of all internationality elements.

4.4. Bibliometric impact

Table III shows a significant and positive correlation between internationality elements and impact indicators, which occurs in most cases but to different extents. There is a clear pattern – foreign experts' correlation is close to zero, foreign-authored articles' is still positive but weak, and English language and international collaborations correlate moderately. It is also of interest to notice that Scopus' indicators retrieve higher correlation values than IF.

Figure 3. Journal internationality by bibliometric impact

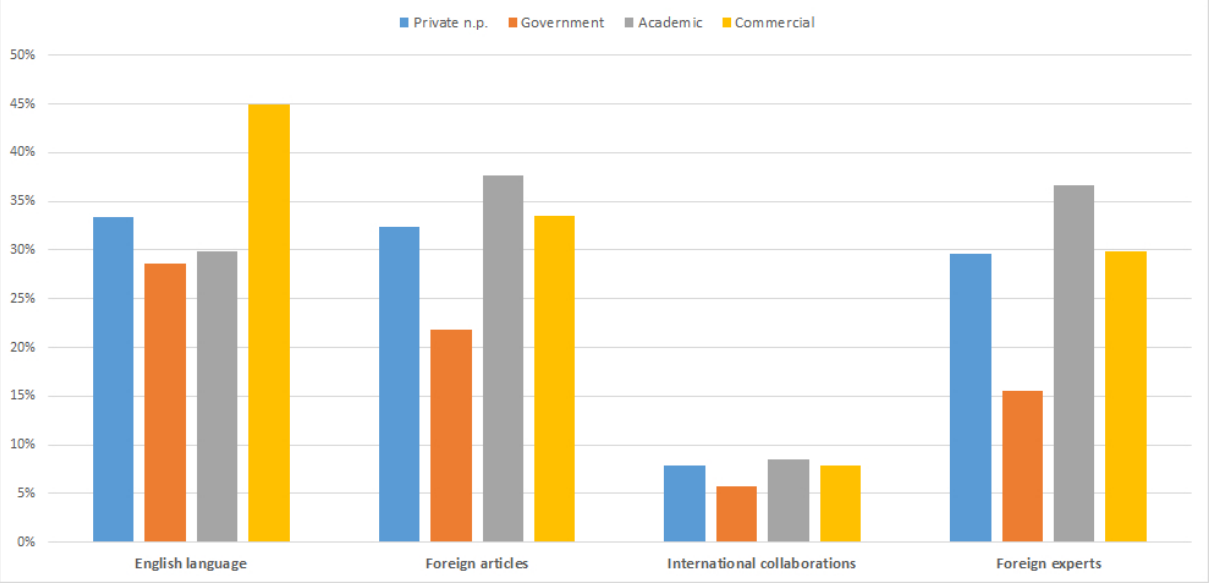


Figure 4. Journal internationality by access type

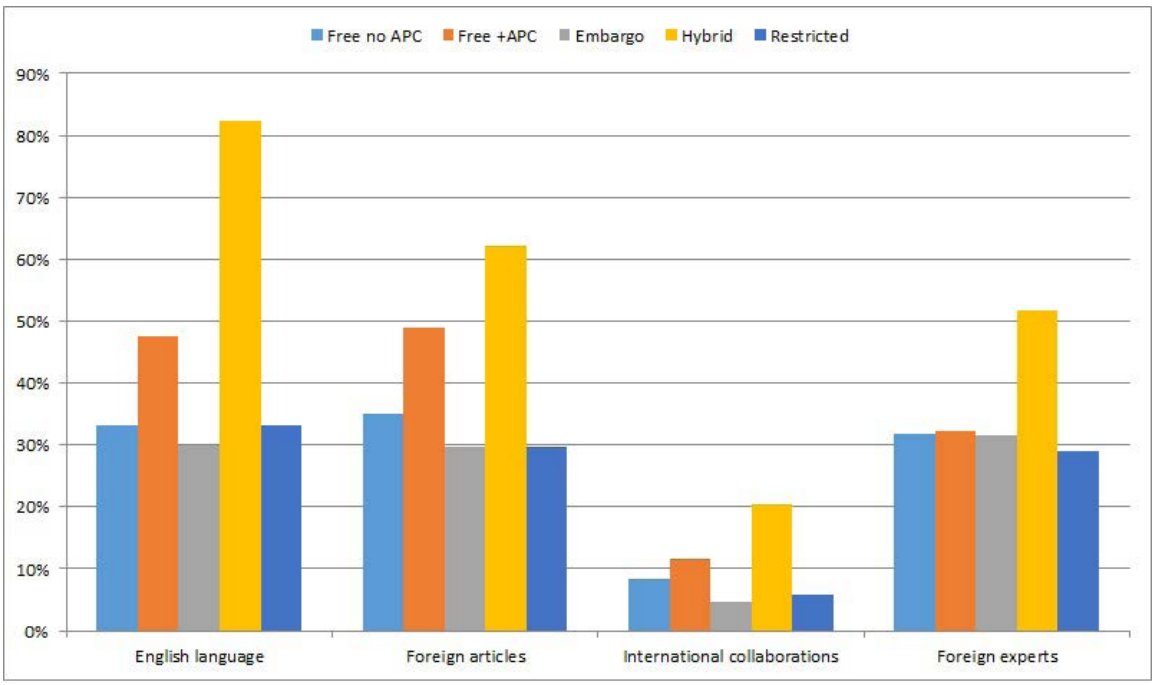


Table III. Journal internationality by publisher type

Correlation (rho)	English language	Foreign articles	International collaborations	Foreign experts
SNIP	0.444**	0.253**	0.472**	0.132**
SJR	0.502**	0.269**	0.603**	0.119*
IF	0.289**	0.191*	0.248**	-0.016

** Correlation is significant at the 0.01 level. * Correlation is significant at the 0.05 level.

4.5. Relations among internationality elements

This section develops Q5, on the relationships among internationality elements. The main ones (English language, foreign-authored articles and foreign experts) have very similar averages, ranging between 32.2% and 35.3% and amounting to the 34.0% (Figure 5, Appendix A). When adding international collaborations, total average decreases to 27.6%.

Nevertheless, these data are not meaningful alone and per se. Global averages have to be observed under the light of the relationships among them and with other journal indicators. For this reason, Spearman's correlation has been calculated for every pair of elements (Table IV). All rho values are significant not only at 0.05 level but also at 0.01 (confidence interval: 99%). All elements are positively correlated, but weakly and to different extents.

The highest correlation is that between foreign-authored articles and international collaborations (0.506), because the latter are a subclass of the former. A similar correlation appears between foreign-authored articles and foreign members at editorial teams (0.463). Some could say that the latter may be attracting foreign authors to the journal, but correlation is not very strong and, in any case, does not imply causation. That correlation could be explained by the fact that most editorial boards that try to count on foreign experts do the same with foreign authors. The other two correlations of foreign members (with English language and international collaboration) are close to zero and thus almost non-existing (0.232 and 0.186, respectively).

English language values experiment a moderated correlation with both foreign articles (0.400) and international collaborations (0.445). This means that foreign participation comes often in English.

Figure 5. Global averages for internationality elements

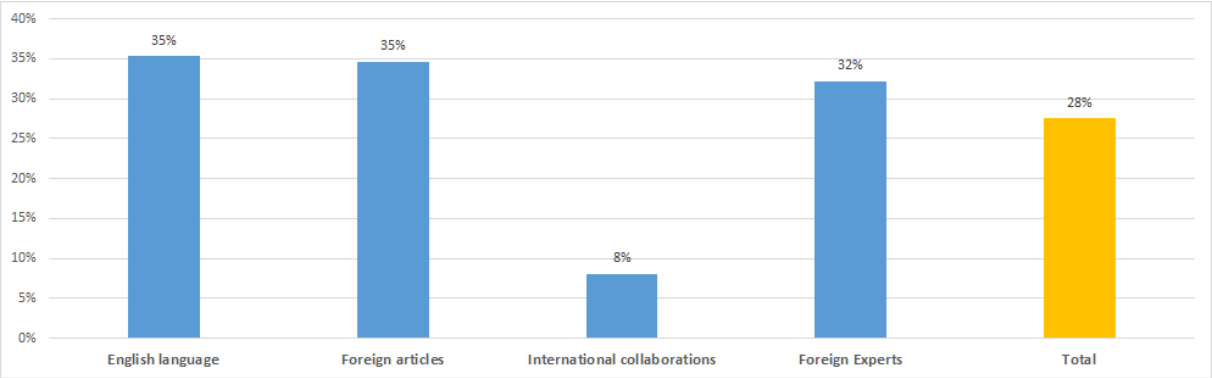


Table IV. Spearman correlation values among internationality elements

Correlation (rho)	English language	Foreign articles	International collaborations	Foreign experts
English language	1	0.400	0.445	0.232
Foreign articles		1	0.506	0.463
International collaborations			1	0.186
Foreign experts				1

All correlations are significant at the 0.01 level.

5. CONCLUSIONS

Subject areas suffer strong internationality differences (Q1). STM areas have higher values for English language and foreign articles, while the presence of foreign experts does not experiment a clear SSH/STM division. In general, STM areas other than health sciences have higher internationality levels (from 38.5% to 54.3% averages) than the rest (23-25%).

These findings match those by Malalana Ureña et al. (2007), who indicated that foreign participation may depend on subject areas, and Gazni (2015), who found that foreign authors tended to publish more in STM than in SSH worldwide. Nevertheless, Aman (2016) argued that this could be explained in part by the fact that the fewer articles per year you produce, the fewer will your chances be of becoming international – and SSH journals have on average fewer articles than STM (23 articles per journal in the former, while 40.6 in the latter, almost twice the number).

Publisher types have limited influence on internationalization (Q2). English language has stronger presence in titles by commercial publishers (44%) than in the other types (29-33%). For the rest of the elements, the academic authors' network seems to be in the best shape, since journals published by universities and research centers have the greatest proportions of both foreign/international articles and experts.

Access types have clear ties with specific internationality element: the APCs (Q3). Hybrid journals have the highest value for every journal element. Most of them, though, were reputed subscription-based publications that flipped to hybrid, in order to diversify revenue sources and increase benefits. Therefore, being hybrid does not imply internationality per se.

With regard to full open access journals, their internationality average values are very close to global averages (see Appendix A). Thus, OA titles are not necessarily "more international", if that can ever be said. The case of free-access journals charging APCs is different, since they have much higher values than those that do not.

As mentioned before, average APC is €214 for full OA journals and €2,141 for hybrid ones – which is exactly ten times more. This fact provides a clear picture: hybrid journals are for profit while free access journals strive for covering their expenses. Nevertheless, there are only 20 hybrid and 11 free-access journals – that amounts for just 7% of all the titles in this study, and no ultimate conclusions could be drawn from these data.

To sum up the relationship between internationality and basic journal aspects, Kruskal-Wallis H test (Appendix B) indicates that all of them (subject area, publisher type and access type) are associated with internationality indicators, except publisher type, which is only associated with foreign-authored articles and foreign experts. In other words, this test reveals that internationality depends on subject area and access types, and less on publisher types.

With regard to bibliometric impact indicators (Q4), correlation pattern in Table III indicates that international collaborations and English language are related to high citation impact. Although a cause and effect relationship cannot be assumed, it seems that journals with articles available in English and signed internationally (that is, more than one country) attract more citations. Wang et al. (2015) reported that internationally collaborated papers have higher citation impact than domestic ones in the field of sport sciences. That seems to be in line with our findings, in view of the moderated correlation between SJR and SNIP with the international collaboration average (rho=0.6 and 0.5, respectively).

The difference between the correlation for IF and for Scopus' indicators is big, though. With Rho values close to zero or with low significance, it cannot be said that there is a correlation. For instance, Kao (2009) found that there was no relationship between the IF and internationality (understood as a variety of countries represented) in industrial engineering journals. In this study, the lower correlation results for IF might be due to the greater dispersion of IF values[30], due to the fact that subject distribution is uneven[31], and because IF values depend much more on subject areas than SJR and SNIP[32].

With regard to the weight of internationality elements, English language, foreign-authored articles and foreign experts amount for an average of 1/3 of the journal contents, while average for international collaborations reaches only 8%. In any case, the relative values of these elements depend on subject areas and access types, and less on publisher types.

The ratio between foreign and international articles (see Appendix A) results in interesting findings. For instance, as mentioned before with regard to arts and humanities, only 7% of the articles with foreign authorship were international at the same time. This is much below the global average (23%), and should be explained by the high rate of single authorships in that field, while this "foreign-internationality rate" is higher in STM areas. Publisher type does not represent a strong influence, but there is a remarkable case in access types – hybrid journals, with the highest average (33%).

Some common patterns can be found among internationality elements (Q5). As shown above, the existence of foreign experts is slightly related to the participation of foreign authors, but it does not imply a cause and effect relationship. What is more, these data should be taken carefully and be analyzed together with other indicators, since the fact that foreign experts names appear in the boards does not mean that they actually contribute to the journal.

English language proportions correlate moderately with foreign articles (0.400) and international collaborations (0.445), but correlate in a lesser degree with foreign experts (0.232). Such information seems to support the idea that foreign experts' impact in internationality is low, and that foreign authors normally use English language.

6. LIMITATIONS AND FURTHER RESEARCH

This study has some limitations. The main weakness is that only one complete volume (2014 for most cases) has been analyzed. Thus, data for internationality elements and citation impact belongs to only one year. Also, bibliometric impact indicators and internationality elements values have been both gathered from the same volume in most cases (2014). IF, SJR and SNIP values could not have been influenced by any content published on the same year. Nevertheless, we assume that relations between internationality and impact would not change dramatically even if applying the correct time period. What is more, in spite of these weaknesses, this work intends to bring a current, all-subject and first-hand data analysis.

With regard to further research, internationality could be deeper assessed if countries were identified and recorded. This could lead to findings on concentration (few countries participate and the world is less represented) or dispersion (many countries appear, resulting in greater representation of the world). Gini coefficient[33] and its variations could be useful to measure inequality, by statistical dispersion, for both authors and experts. It has been used by Buela-Casal et al. (2006), Kao (2009), Bhattacharya & Kaul (2015), Gazni & Ghaseminik (2016) and Aman (2016).

Following with the country analysis, linkages among regions, languages and subject fields could be shown. For instance, Rey-Rocha & Martín-Sempere (2004) found that the origin of foreign authors in

earth sciences journals seems to be related, to a certain extent, to the journal main language, while international collaboration linkages seem to follow specific sociological, geographical and ideological parameters. In the case of the top communication journals in Spain, the international collaborations were related to the journal main language and/or other intrinsic linkages, since, as mentioned before, most of the international collaborations were with Latin American researchers.

Another aspect discarded has been the internationality of citations. With more research resources, an analysis of citations coming from foreign journals, foreign authors or from internationally-signed papers could be undertaken. The citations inside WoS and Scopus system could also be of use.

Another interesting approach to internationality in Spanish journals would be to analyze if journals indexed in WoS and Scopus actually have higher internationality indicators than those that are not, or they just better meet WoS and Scopus selection criteria. Also, a longitudinal study, such as that of Gazni & Ghaseminik (2016), could reveal increases or decreases in the internationalization process, and research could show if, as they found, older journals have greater proportions of foreign authors.

Also, although some possible explanations have been argued before, the differences of correlation values between Scopus' and WoS' impact indicators could be further investigated. For that, correlation should be calculated for every journal category and impact indicator.

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8. NOTES

All electronic addresses have been accessed on June 6th, 2017, except when indicated.

1. Translated by the authors.
2. Translated by the authors.
3. In the links herein, the reader can consult the decisions of the Spanish Ministry of Education and Science, published in 2005 (https://www.boe.es/diario_boe/txt.php?id=BOE-A-2005-3650) and in 2007 (http://www.boe.es/diario_boe/txt.php?id=BOE-A-2007-17492) in Spanish language.
4. http://ec3.ugr.es/in-recs/
5. http://ec3.ugr.es/in-rech/
6. http://ec3.ugr.es/in-recj/
7. http://epuc.cchs.csic.es/dice/
8. http://epuc.cchs.csic.es/resh/
9. http://www.clasificacioncirc.es/
10. http://miar.ub.edu/
11. http://miar.ub.edu/about-icds
12. Román-Román et al. (2007) on Spanish journals on Latin American studies, Giménez-Toledo et al. (2009) on psychology, and Román-Román & Giménez-Toledo (2010) on humanities (Spanish journals indexed in ERIH).
13. Wrongly translated as "Circulation Index" in the English abstract of that study.
14. Working papers are available at http://digital.csic.es/browse?type=author&authority=rp02062&sort_by=2&order=DESC&rpp=20&etal=10&submit_browse=Actualizar . Each document analyzes journals on a specific area: linguistics, archeology and prehistory, library and information science, geography, anthropology, and history. There are also two recent works on journals with FECYT quality seal, and journals indexed in Web of Science and Scopus.
15. http://www.redalyc.org/redalyc/media/redalyc_n/acerca-de/metodologia/formulas.html

16. http://www.scimagojr.com/help.php
17. http://www.aeres-evaluation.fr/Publications/Methodologie-de-l-evaluation/Listes-de-revues-SHS-sciences-humaines-et-sociales
18. https://dbh.nsd.uib.no/publiseringskanaler/erihplus/about/approval_procedures
19. A journal will be considered Spanish when it is published by a Spanish institution, or it is owned by an institution based in a Spanish city. E.g. a journal published by a commercial company not based in the Spanish territory but belonging to a Spanish society or association will be treated as Spanish.
20. Magazines and general or cultural divulgation journals have been excluded.
21. http://ip-science.thomsonreuters.com/mjl/ ("source publication documents": Arts and Humanities Citation Index Source Publication (Aug. 2014), Science Citation Index Expanded Source Publication (Jan. 2015), and Social Sciences Citation Index Source Publication (Jan. 2015). Accessed on Aug. 8, 2016.
22. http://www.elsevier.com
23. Available at www.accesoabierto.net/dulcinea/?idioma=en. Dulcinea is an exhaustive and updated database managed by Acceso Abierto research group. As per Dec. 4, 2015, there were 1,748 active Spanish scholarly journals.
24. The value recorded was the % articles with at least one author with foreign affiliation. Works reviewed used different methods: Álvarez-Ossorio et al. (1997) assigned values from dividing the number of foreign authors by the total of authors in the article, and Buela-Casal et al. (2006) and Rodríguez Yunta (2015) calculated the proportion of authors on the total authors participating in the journal during the analyzed period of time.
25. The value recorded was the % articles with at least two authors from different countries, appearing Spain or not. Thus, most of the cases match the value that can be found at Scimago Journal Rank. Other researchers applied different methodologies – e.g., Rey-Rocha & Martín-Sempere (2004) followed Buela-Casal's definitions and considered that an international collaboration was that among at least one Spanish author and one foreign author – therefore, an article signed by foreigners from different countries will be considered foreign, not international.
26. Typically, studies on editorial teams are performed by scientific committees only (e.g. Malalana Ureña et al., 2007; Román-Román & Giménez-Toledo, 2010). This is also the case for RESH and FECYT's quality seal. Nevertheless, the role of these bodies has been criticized locally and globally. For instance, Buela-Casal et al. (2006) wrote that "the 'international' editorial boards attributed to some academic journals are no more than an adornment since the actual reviewing of articles is performed by editorial members from the host nation of the journal", and Kao (2009) denounced that "in order to create an image of internationalization and prestige, many journals invite famous scholars from all over the world to serve as editorial board members. Their names are listed in the journal, although they often have no responsibilities, nor duties, regarding journal publishing. The distribution of editorial board members in such cases merely distorts the real degree of internationality". For this reason, the comprehensive approach provided by Delgado López-Cózar et al. (2006b), who considered that object of internationality analysis should be the complete "scientific team", including all members in editorial board and advisory council, has been followed in this study. Other Spanish researchers did the same - Buela-Casal et al. (2006), Román-Román et al. (2007), Giménez-Toledo et al. (2009), Zych & Buela-Casal (2010), Sorli-Rojo (2013), Sorli-Rojo & Mochón-Bezares (2014) and Torrado-Morales & Giménez-Toledo (2012). Buela-Casal et al. (2006) considered that internationality values have to be based on the diversity of countries as well, and not only on the number of foreign members.
27. Before adopting English in the full text, the Spanish systems for scientific evaluation asked authors to provide title, abstract and keywords in that language, considering that as an element of editorial quality. Today the use of English is almost followed by all indexed Spanish journals, becoming a de-facto standard.
28. "White color" stands for "archiving not formally supported". The rest of the colors indicate some self-archiving permission (http://www.sherpa.ac.uk/romeoinfo.html, consulted on Apr. 4, 2017). Journals without self-archiving information were assimilated to "white". Data have been extracted from Dulcinea and not from SHERPA-RoMEO itself, since the former provided more exhaustive, accurate and updated data.
29. Please note that the presence of English is not at odds with that of Spanish, because journals can be bilingual.
30. IF's average for the total journal population with this impact indicator is 0.788, while that of SJR is 0.212 and SNIP's is 0.330.
31. Among the journals with IF, only 37% are on SSH, while 63% are on STM. Conversely, among the titles with SJR/SNIP, SSH journals account for 52% and STM for 48%. Thus, SSH/STM distribution is much more even in Scopus' titles.
32. IF's average is 0.310 for SSH and 1.074 for STM. With regard to Scopus' impact indicators, averages are 0.163 and 0.265 for SJR, and 0.291 and 0.375 for SNIP.
33. https://en.wikipedia.org/wiki/Gini_coefficient

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APPENDIX A. FULL DATASET OF INTERNATIONALITY ELEMENTS

Percentages of articles across categories (calculated with journals' averages). "Ratio f.a./i.c." field stands for international collaborations average within the average of foreign-authored articles.

	English language	Foreign articles	International collaborations	Ratio f.a./i.c.	Experts	Global average
Subject Area						
Arts & Humanities	23.3%	35.5%	2.5%	7.0%	37.5%	**24.7%**
Social S.	29.3%	30.8%	7.2%	23.4%	33.9%	**25.3%**
Health S.	35.2%	27.6%	5.9%	21.4%	24.6%	**23.3%**
Life S.	60.3%	59.9%	26.4%	44.1%	33.4%	**45.0%**
Experimental S.	57.9%	50.8%	20.8%	40.9%	24.6%	**38.5%**
Engineering	50.1%	49.1%	12.7%	25.9%	46.4%	**39.6%**
Maths. & Physics	86.7%	63.4%	20.7%	32.6%	46.4%	**54.3%**
Publisher Type						
Private n.p.	33.4%	32.4%	7.9%	24.4%	29.6%	**25.8%**
Government	28.6%	21.8%	5.7%	26.1%	15.5%	**17.9%**
Academic	29.9%	37.7%	8.5%	22.5%	36.7%	**28.2%**
Commercial	44.9%	33.5%	7.9%	23.6%	29.8%	**29.0%**
Access Type						
Free no APC	33.3%	35.1%	8.4%	23.9%	31.8%	**27.2%**
Free +APC	47.5%	48.9%	11.5%	23.5%	32.3%	**35.1%**
Open access	*32.7%*	*36.7%*	*8.5%*	*23.2%*	*32.9%*	*27.7%*
Embargo	29.9%	29.6%	4.6%	15.5%	31.6%	**23.9%**
Hybrid	82.4%	62.1%	20.4%	32.9%	51.7%	**54.2%**
Restricted	33.1%	29.7%	5.9%	19.9%	29.0%	**24.4%**
Global average	**35.3%**	**34.6%**	**8.1%**	**23.4%**	**32.2%**	**27.6%**

APPENDIX B. KRUSKAL-WALLIS H TEST

Significance level is 0.05.

For values > 0.05, null hypothesis is retained (distribution is the same across categories, variables are independent).

For values < 0.05, null hypothesis is rejected (distribution is not the same across categories, variables are dependent)