



The challenges of Spanish scientific publications in the development of the Europe of knowledge



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Resumen

Las publicaciones científicas se están viendo afectadas por las transformaciones que se han producido en la última década a partir de la creación del EEES y EEI. Uno de los objetivos prioritarios de la Unión Europea es conseguir una Europa del conocimiento vertebrada por la actividad universitaria. En este contexto, las publicaciones científicas juegan un papel destacado como exponente de la producción científica y medio autorizado de difusión. Sin embargo, la actividad científica europea medida a través de las publicaciones especializadas no alcanza los niveles en los que se encuentran sus competidores más directos, Estados Unidos y Japón (principalmente en biomedicina y ciencias de los materiales, respectivamente).

Palabras clave: revistas científicas, EEES, EEI, criterios de calidad, investigación e innovación

Resum

Les publicacions científiques s'estan veient afectades per les transformacions que s'han produït en l'última dècada a partir de la creació del EEES y EEI. Un dels objectius prioritaris de la Unió Europea és aconseguir una Europa del coneixement vertebrada per l'activitat universitària. En aquest context, les publicacions científiques juguen un paper destacat com exponent de la producció científica i mitjà autoritzat de difusió. No obstant, l'activitat científica europea mesurada mitjançant les publicacions especialitzades no arriba als nivells en què es troben els seus competidors més directes, Estats Units i Japó (principalment en biomedicina i ciències de les materials, respectivament).

Paraules clau: revistes científiques, EEES, EEI, criteris de qualitat, investigació i innovació

Abstract

The scientific publications are being affected by the transformations that have taken place in the last decade from the creation of the EHEA and ERA. One of the priority aims of the European Union is to obtain a Europe of the knowledge, with the backbone provided by the activity of the university. In this context, the scientific publications play a key role as prime example of the scientific production and authorised way of diffusion. Nevertheless, the European scientific activity measured by the specialised publications does not reach the levels of its most direct competitors, The United States and Japan (mainly in Biomedicine and Materials Science, respectively).

Keywords: scientific journals, EHEA, ERA, quality criteria, reaserch and innovation (R&I)



1. Introduction

Spanish scientific journals are facing a moment of unquestionable and necessary changes in order to be competitive in the European context. We cannot claim that the analysis carried out in the present article is exhaustive but we consider it sufficiently illustrative of the present situation of such publications. In some aspects, the description may be alarming for many of our publications because, with no intention on our behalf of sounding catastrophic, it seems more than probable that a great number of them will disappear in a not too distant future, if not in reality yes in the field of scientific prestige, which will make them uncompetitive journals, with no visibility. We do not share the opinion of those who believe that journals from certain areas of knowledge, such as the ones depicting the investigation in Experimental Sciences, the situation is possibly irreversible, and somewhat more favourable in Humanities (Guillamón 2006: 5). Some of the data provided here, certainly support this theory, but it is also true that this changing situation, common to all European journals, may allow us, to a certain extent, to redirect the present tendency or, at least to have more scientific exposure through our publications, which must aspire to trans-nationality. Renewal, reorganization and innovation, within the framework of European proposals on scientific publications, must be the guiding criteria for the future of the Spanish scientific publications.

The adoption of the principles of the Declaration of Bologna (1999) is a reality in the new study plans for graduate and postgraduate studies that have been introduced since the 2009-2010 course in universities¹. While us European professors know more or less directly and in some detail the entire process of adapting the degrees to the European Higher Education Area (EHEA), we cannot say the same for the development of the European Research Area (ERA). The proposal to create this Area came soon after the first one (Lisbon Strategy, 2000)², but its evolution has not been so fast nor has it had such clear and perceptible results for the scientific community as it occurred with the EHEA. Such difference in development has become patently clear, in general, through the minor implication on behalf of university professors in the follow-up of the evolution and implementing of the policies conducive to the consolidation of the ERA³, despite the fact that it has a direct effect on their investigative facet.

The decade passed since the Declaration of Bologna still leaves areas with paths to be explored⁴ in order for this Europe of knowledge⁵ to become reality and the backbone of the entire activity in universities. The Commission's study on universities acknowledged these institutions as crucial for research, education and innovation, and which make the

construction and development of the economy and the society of knowledge possible (CCE 2002: 5). Furthermore, universities contribute to the achievement of other strictly related objectives: employment, social cohesion and improving the educational standards. The key role that the European Union has attributed to universities makes them face new challenges and this has implied necessary changes. At the moment of making such a reflection we are at an almost equidistant point between two decades of renewal projects in the mission, organization and evolution of universities: since the Declaration of Bologna to 2010 and from this date to 2020. The first decade of the 21st century, which has culminated in the well-known convergence to the Bologna process, has been marked by profound changes in six main lines of action: (i) an increase in the demand for higher education; (ii) the internationalisation of education and research; (iii) close and effective cooperation between the university and the industry; (iv) multiplication of the knowledge producing locations; (v) reorganization of knowledge; (vi) lifelong learning. The next ten years will be marked by three main axes oriented towards making knowledge the motor of sustainable growth: (i) investigation, (ii) innovation and (iii) creativity and with clear well-defined lines of action, as we will see (CCE 2010).

In the framework we present, the role of scientific publications is fundamental as exponent and disseminator of scientific knowledge, as cohesion platform for the research efforts and as stimulus of the growth in research activity. However, not all journals are in a position to face the new challenges marked by the EHEA and the ERA. The lack of a common stance on behalf of researchers and educators as to the necessary renewal of the journals is easily verifiable, and reflection and discussion of the common grounds that allow for the identification of Spanish publications as integrating elements of the Europe of knowledge are called for.

2. Considerations on Spanish scientific journals in Europe

The scientific publication in Europe is at the forefront of the world production and shows an upward trend. In 2004, 41.3% of all journals were published in Europe, compared to 31.4% in the U.S., according to data provided by the European Commission by that date.⁶ Recent data provided by the Commission in 2007 presented a more favorable situation, and about 780 of the 2000 scientific journal editors (which produce about 1.4 million items per year) are located in the European Union (EU) and produce 49% of the journals (CCE 2007a: 3). In addition, in 2006, 37.6% of the world output of scientific articles submitted to peer review was signed by at least one author of the EU compared to

¹ The establishment of new degrees within the framework of the EHEA does not exhaust the possibilities of the Higher Education Area, as proven by the recent Conference of Budapest-Vienna, 2010 and the plans for the next ministers meeting in Bucharest in April 2012.

² The European Union adopted the Lisbon Strategy with the prospect of becoming the world's most competitive and dynamic economy. The precedent of this statement is the Commission's Communiqué Towards a European Research Area (CEC 2000a) and the general approaches are reflected in the document *Implementation of the "European Research Area"* (CEC 2000b).

³ Among the official European documents that have given coherence and continuity to this education and research area, we consider the following as particularly relevant: the Declaration of Bologna, 1999; Lisbon Strategy, 2000; Berlin Communiqué, 2003; Renewed Lisbon Strategy, 2005; Green Papers (CCE 2007b and CCE 2007c); European Council conclusions of 13 and 14 March 2008 ("fifth freedom"); Ljubljana Process (2008); A European Economic Recovery Plan (CCE 2008); European Research Area Vision 2020, 2008; Consultation of the future "UE 2020" strategy, 2009 (CCE 2009).

⁴ During 2009 the community's studies and analysis have focused, among other things, on the policies that stimulate R&D and the impact of the collaboration between science and technology in Europe (Kroll and Stahlecker 2009; Kroll, Zenker and Schubert 2009; Peter and Frietsch 2009).

⁵ This is the name given to the European Area resulting from the convergence of the EHEA and the ERA, in the Berlin Communiqué (2003: 5).

⁶ Data regarding the total volume of scientific production is also provided: "The number of scientific periodicals published throughout the world exceeds 20 000. Every year, 1.5 million scientific articles are published worldwide". (IP/04/747: p. 1).

31.5% in the U.S. (CCE 2008: 61). However, these figures do not correlate with the number of references of their publications, which is globally lower. It is also important to point out, that some European countries have a very small presence in absolute values if we analyze the figures. They show the low representation of European publications compared with the rest of the world and Spain is also one of the countries below the European average⁷. According to data from the 2008-2011 National Plan (2007: 24), in 2006 the number of articles carried out by Spanish institutions and published in journals of the Science Citation Index (SCI), in which at least one author belonged to the institution was of 36,840, which is 3.1% of the world production.

As it is well known, quality criteria according to standard set parameters are applied for the assessment of scientific publications⁸. Quality indicators can be organized into five groups, although the number of criteria, their management and prioritization may vary: (i) editorial quality criteria, i.e. criteria that affect the aspects related to Paratext, (ii) quality of content, (iii) ability to attract - interest aroused by the publication among the authors - (iv) dissemination quality, visibility and accessibility, in particular, presence in databases, and (v) quality of impact, focusing primarily on the impact index. The presence of journals in recognized databases acquires a special relevance, given the importance that these indexes have acquired. These indexes go beyond the criterion of publication and have to do with the impact of the published articles, their author and the institutions and the country in which they are produced⁹.

The explanation for the low representation of Spanish scientific journals in the indexes¹⁰, including the journals of Humanities, responds to causes that have been well identified: the reluctance in the use of English, low professionalism of the editorial teams, lack of regularity in publication, limited distribution and little or inadequate scientific monitoring of the contents (Pérez Sedeño 2005: 4). Among the above mentioned reasons, the use of English deserves particular attention, because of the changes it has originated in national publications of non-English speaking countries and because of the controversy it arises.

It is beyond doubt that language is a very important factor for the widespread of scientific articles and English is, without a doubt, the language of scientific communication, as well as that of other areas of knowledge. However, we should think about the fact that to publish in English is, for many non-Anglophone researchers, an additional difficulty that should not be neglected, since it may affect negatively the quality of the articles. Legibility is a factor taken into account when assessing an article, and the articles are not always written at a level of first language(L1) proofreading. Although there are no accurate data on English language proficiency of Spanish researchers, in my opinion, they should be similar to those collected in France on this issue¹¹. The latest report by the *Délégation générale à la langue française et aux langues de France* for the Parliament offers specific data on the use of English among scientists, recognized by 92% of researchers as the most common international language, but being its real use in France lower (*Rapport* 2009: 58-62). In the abstract of this report, English is recognized by the respondents (heads of laboratories, researchers and teachers) as an international language of widespread use in Natural Sciences, surpassing the 70% of exclusive use, compared with 34% in Social Sciences and Humanities (*Rapport. Synthèse* 2009: 6)¹².

On the other hand, the monolingualism of part of the English researchers also represents a constraint to their research activity. It is worth referring to the wake-up call that the British Academy has made as a result of the study made to determine the status of foreign language learning in the UK at all levels (British Academy 2009). As for the researchers in Social Sciences and Humanities, the report reveals that they are in a position of disadvantage, as they do not know other languages. For this reason they find the choice of topics for their research limited and they have difficulties to collaborate in international projects, what is detrimental to the British interests (Levitt et al., 2009: xiii-xvii).

Apart from the above mentioned considerations on the linguistic competence of scientists, it is clear that there is a change in scientific articles, mainly that they are written in

⁷ Nevertheless, without giving precise figures, the latest *ERAWATCH* report regarding the R&D policies in the ERA states that knowledge production has increased in the academic sector and research results in publishing terms are satisfactory, as opposed to patent production (Heijs 2009: 16).

⁸ Scientific publications are mainly evaluated from three different spheres: (i) public institutions in charge of valuing teaching and research academic staff's research activity at public and private centres; (ii) bibliographic data bases in charge of spreading high-level scientific information; (iii) libraries and documentation centres, due to the internal necessity of having relevant information for the implementation of acquisition and cancellation policies adapted to each centre, and to libraries' purpose of offering users the necessary information to carry out their work. The authors of scientific reports themselves use the established criteria. Further details regarding the analysis of assessment criteria can be found in the extensive report by Delgado López-Cózar, Ruiz-Pérez and Jiménez-Contreras (2006).

⁹ "The JIF [ISI Journal Impact Factor] is now commonly used to measure the impact of journals, and by extension the impact of the articles they have published, and by even further extension the authors of these articles, their departments, their universities and even entire countries" (Bollen, J. et al., 2009: 1).

¹⁰ Only 90 magazines were registered in 2009 between JCR Science Edition (59) and Social Science Edition (31) although there has been a noticeable increase as compared to 2008, when only 53 magazines were published (Roldán López 2010). The quartile in which a magazine is placed in its field, an issue that is almost as important as being included in the JCR records, has not been considered in this study since many researchers consider that only magazines in the top quartile are worth publishing.

¹¹ The most recent data regarding the use of languages in the European Union (CCE 2005b; Eurobarometer 64.3, 2006) are quite illustrative in this respect. 56% of EU citizens declare being able to have a conversation in a language other than their mother tongue, 28% in two languages, and 44% declare only speaking their mother tongue. Spain is below the European average regarding being able to have a conversation in a language other than their mother tongue, and is below countries such as France (51%), Poland (57 %) or Germany (67 %). Although English is the foreign language in which most citizens are able to have a conversation (38%), in Spain only 27% are capable (Eurobarometer 64.3, 2006: 8-13). Obviously, teachers and researchers are an elite group in this field due to their training. However, it should be pointed out that it seems clear that many of them need to make an extra effort to reach a higher level than the average European citizen, whose language training is higher.

¹² The surveys included in the *Rapport* (2009) regarding competence in six natural languages give priority to the use of English, although its use varies widely depending on the discipline, ranging from 82% in physics to 52% in mathematics, due to France's long tradition in these fields of studies. The researchers' command of English also varies. 3% of researchers have difficulty reading in English and 18% have trouble with oral comprehension. 29% of researchers have difficulty speaking it and another 29% have trouble writing it. Only 37% of researchers are at ease using other languages, whereas 42% have difficulties in English. Finally, 55% of researchers declare not having tried to improve their knowledge as opposed to 32% who have, though only in English.

English in non-English speaking countries. However, this change is not enough for a scientific journal to become part of the scientific databases. A quick glance at the area of Science or Social Science in the *Journal Citation Reports (JCR)* in 2009¹³ reveals several interesting facts for this respect. One very obvious fact is the predominant use of English in the scientific literature, but there are also other relevant data that deserve a detailed analysis.

For several reasons, we have chosen the field *Biochemistry and Molecular Biology* for our analysis from the numerous JCR indexes. On the one hand, because it is the area in which there are the largest number of publications (283), although in others such as *Engineering Electrical & Electronics* (245) or *Neurosciences* (230), there are also many publications. On the other hand, because it is representative of many countries worldwide, as they devote many resources to this investigation. The analysis of the *Biochemistry and Molecular Biology* field (JCR 2009) provides following data of 283 registered publications: (i) of 23 countries with publications indexed in this field, English is the official or co-official language in only six of them¹⁴; (ii) 186 magazines come from English speaking countries, mainly U.S. and the United Kingdom¹⁵, in that order, (iii) the number of journals in this area in countries outside the European Union except the UK, Holland and Germany¹⁶, is less than five and in Spain there is only one¹⁷; (iv) in the *language* field, there are only 16 publications in which its multilingual character has been specified (which generally means bilingual, English being one of the languages), and (vi) only one of them is monolingual in a language other than English, namely Chinese.¹⁸ The data cannot be extrapolated to the whole scientific production published, but are certainly revealing. The comparative figures we can extract when we classify the publications with respect to the number of inhabitants of each of the countries listed in the selected field and to their respective gross domestic product (GDP) are particularly interesting.

The Figures 1, 2 and 3 show the low position of the Spanish journals in the *Biochemistry and Molecular Biology* field, particularly with respect to the GDP, as we have pointed out. Less than half of the journals in the *Biochemistry and Molecular Biology* field recorded in the JCR 2009 are published in the EU. In fact, only eleven of the 27 countries have indexed journals and besides, there is a clear imbalance regarding the production of these eleven countries. In comparison to 2008, the situation in the United States is similar, as only two of the nine journals that enter for the first time in *Biochemistry and Molecular Biology* are published in the U.S. and four in the EU, but with a real difference of two publications, because one title from Romania and one from the UK have left the index.

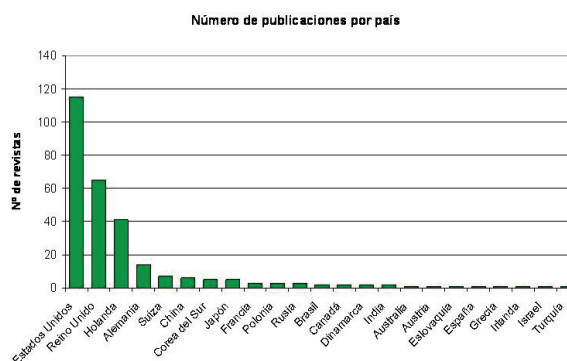


Figure 1. Data on the Biochemistry and Molecular Biology field (JCR 2009).

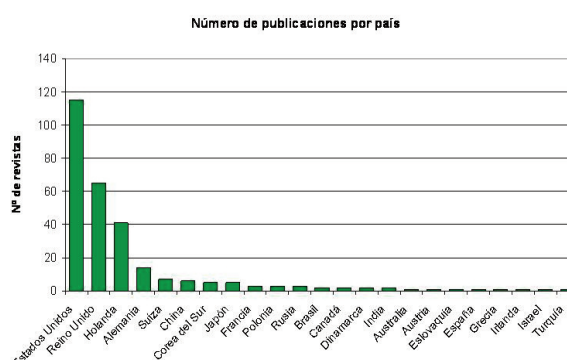


Figure 2. Data obtained from the combination of the Biochemistry and Molecular Biology field (JCR 2009) and the world population census of the IDB¹⁹

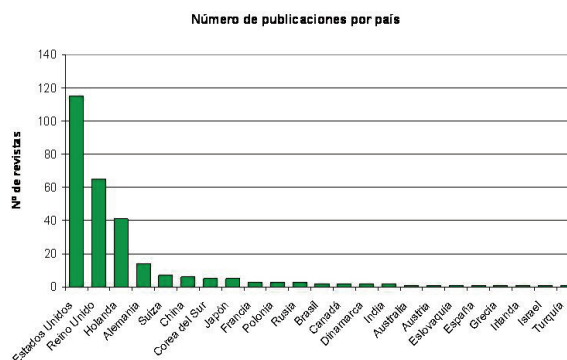


Figure 3. Data obtained from the combination of the Biochemistry and Molecular Biology field (JCR 2009) and the GDP per 20.

¹³ Latest data published as this article was being written.

¹⁴ The countries in which one or more magazines included in this index have been edited are the following: Germany, Australia, Austria, Brazil, Canada, China, South Korea, Denmark, Slovakia, Spain, United States, France, Greece, India, Ireland, Israel, Japan, Netherlands, Poland, United Kingdom, Russia, Switzerland, Turkey.

¹⁵ Besides Ireland and countries in which English coexists with one or more languages. The USA produces 115 magazines in this field and 65 are edited in the United Kingdom.

¹⁶ Holland and Germany each have 41 and 14 publications in the *Biochemistry and Molecular Biology* field.

¹⁷ *Journal of Physiology and Biochemistry* is the registered magazine, number 235 (1,172), and is bilingual.

¹⁸ Of the six magazines in this section published in China only one of them, *Progress in Biochemistry and Biophysics*, is published in Chinese, but its impact index is the second lowest (0,211), in position number 282. The Chinese magazine *Journal of Huazhong University of Science and Technology [Medical Sciences]*, published in English and with some articles in German, has been included in the 2009 index.

¹⁹ International Data Base (IDB), U.S. Census Bureau, Population Division (Consultation date: July 2010).

²⁰ International Monetary Fund official data for 2008 (<http://imf.org/external/pubs/ft/weo/2009/02/weodata/index.aspx>).

At a quick glance at the JCR indexes in the different fields we see that the total number of registered publications in Spanish is very low and, moreover, that they are not always published in Spain. For example, for the field of *Linguistics* until the 2009 index, which has incorporated the journal *Revista Española de Lingüística Aplicada*, there was only one publication in Spanish language, *Revista Signos*, published in Chile. The multilingual journals with a language being Spanish are not necessarily published in Spain, like the previous one, or another example, *Revista de Biología Tropical* in the Field *Biology*, published in Costa Rica, whose set structure is organized on two linguistic elements, (i) abstract in English and Spanish, and (ii) the text written in one of the two languages. Data for other European countries in our environment, such as France or Italy, are not much better and publications in French²¹ or Italian have little representation.

*Geologica Acta*²² is a clear example of how important it is to publish in English, but this is not a prerequisite to enter the databases than are part of the impact indexes²³. This magazine was published in Spain between 1966 and 2002 under the name of *Acta Geologica Hispanica* as a result of a collaboration with the Institut de Ciències de la Terra Jaume Almera (CSIC) and the Faculty of Geology at the University of Barcelona. Since March 2003 the magazine is published entirely in English with the new title *Geologica Acta*. This change occurs after a brief period (1998-2002) in which contributions in English had considerably increased: 43% in Spanish compared to 49% in English, the rest in French and in Catalan²⁴. Only a simplistic analysis would establish a cause-and-effect relationship between its full publication in English and its current impact index in the JCR (2,245), 6th position of 42 for the category *Geology*. The final transition from Spanish to English happened along with other changes affecting, in general, the quality of content and the edition and distribution efficiency through free internet access²⁵. These changes were consequence of the previous period of the publication, as mentioned above, especially since the nineties²⁶.

The cause of the low number of Spanish publications in the databases is not only to be found in the linguistic question, although this argument is sometimes used, but in the confluence of different parameters linked to the scientific and formal quality. The analysis of data provided by the index of scientific journal databases leads to a first obvious

conclusion, at least apparently, namely that the magazines that are not recorded in the prestigious databases do not meet the required quality standards. The lack of impact index of a publication has a direct and very negative impact for researchers, particularly in some fields of knowledge. Public institutions have to assess the researchers' work using these databases²⁷ and those publications which are not indexed or have low rates of impact are not taken into account, because standardization and quality criteria for publications and scientific summits is currently very well defined, there are few margin calls. In order to get a quick and clear idea of the parameters used to establish and measure the quality of publications we can check out any database or the recent literature in this field of analysis.

The European Higher Education Area partially uses these criteria for evaluating scientific publications and provides a number of indicators whose guiding principle is, without doubt, the quality of scientific information.

The consolidation of general criteria accepted by the scientific community to measure quality and relevance of research gives the publications that meet quality standards a certain homogeneity. However, this criterium of homogeneity starts to show some questionable points. It might be more adequate to say that other criteria related to network dissemination and accessibility of scientific literature should also be considered in order to evaluate the number of quotes of a publication (Bollen et al. 2009). The proposed amendment to the criteria, now fully accepted, is interesting and may improve the evaluation of scientific journals as a whole and that of separate articles. But also when the field of research is minority, local, or simply does not have a recognition in the database, the criteria related to indexing in general and to impact factors in particular should be qualified. In Humanities this type of situation is relatively common. The book *El libro blanco de la investigación en Humanidades* (LB Humanidades) reproduces this situation and also defines the system of evaluation through impact factors as "difficult and of questionable validity" (LB Humanidades 2006: 23), although in practice this wise observation has been ignored. It is frequent to work on issues that are not published in indexed journals or in journals having a very low impact rate. The paradox lies in the fact that prestigious and interesting publications for specialists in this field have no impact on the databases from scientific publications. Research in lexicography, is a clear example, as it

²¹ The aim of publishing and finding out how to get a manuscript to be accepted also generates bibliography in other languages, as can be seen from Cossette's latest work (2009).

²² Most of the data I used concerning this publication I found in the web page <http://www.geologica-acta.com/HomeAC.do>.

²³ Of the 38 Spanish magazines included in the 2009 JCR (Roldán López 2010) for the first time, a minority is exclusively in English. Most are multilingual, generally bilingual in English and Spanish, and in many of them Spanish is predominant. Some titles that are only published in Spanish have also been included. *Trabajos de Prehistoria*, only available in Spanish, deserves being reviewed, as it has been included in the second quartile, which is not common. *Revista Matemática Complutense*, at present only edited in English, has also been included in the second quartile.

²⁴ During the previous period considered by the same publication (1994-1997) the situation was diagonally opposed: about 70 articles were published in Spanish as opposed to a bit more than 10 articles in English. It is particularly interesting to contrast these data with those concerning the first author's nationality, mainly in Spanish before the new publication began. Between 1988 and 2002, 62% of the articles published had a Spaniard as first author, clearly revealing the bid of Spanish authors of writing in English as the most efficient way of reaching the largest number of specialised readers in their field.

²⁵ Various aspects stand out as key for the new magazine, of which we highlight the following: (i) in the content: relevant conceptual developments in any area of Earth Science; monographies about research results of one or more groups; partial results of ongoing work; contributions to congresses, etc.; (ii) new format, publication solely in English, increase of members of the scientific committee, increase of external inspectors; (iii) permanent free access quick publication.

²⁶ A brief historical summary on the publication's developments can be accessed in the magazine's website. Since the nineties the magazine consolidated within its field, the number of articles causing an impact and the contributions of international research teams increased, and the inclusion of a lengthy summary for articles written in Spanish or Portuguese became generalised.

²⁷ The conflict that researchers face between the pressure of publishing to be academically valued and assuring the quality of the results of their research, an interesting issue recently addressed by D. Fanelli, has not been contemplated in this study (Fanelli, 2010).

*Quality criteria of scientific publications in the EHEA*²⁸**1. Indicators for evaluating scientific journals: the fundamental criterion for assessment → quality**

- a. Editor's Prestige
- b. Prestige of the editorial team
- c. Dissemination, visibility and accessibility
 - (i) Electronic version
 - (ii) Presence in databases
 - (iii) Presence in the EHEA libraries, both national and international.
 - (iv) Circulation, subscriptions and exchanges.
- d. Type of content × taken into account
 - (i) The selection process of articles
 - (ii) The subject-oriented publications, identifying the quality of informations and explanations of text which has to be:
 - Innovative
 - Methodologically rigorous
 - Current and relevant
 - To have abstract with its corresponding English translation and key words
- e. Conform to the ISO, AENOR, UNESCO
- f. Evaluation parameters
 - (i) Regularity: uninterrupted publication is taken into account
 - (ii) The ISSN
 - (iii) Media type, format

2. The publication of the journals of the EHEA should limit mainly to specialized journals**3. Relationship between scientific journals and fields of knowledge****Table 1.** Quality criteria of scientific publications in the EHEA

only has an indexed publication in JCR and only since 2007, *International Journal of Lexicography*. The only Spanish indexed magazine in this field is *Revista de Lexicografía*, which is registered in the REGESTA IMPERII and in the ISOC. However, research in this field is increasingly more visible through other means and there are many researchers working in meta-lexicography and publishing dictionaries and other lexicographical works.

The absence of prestigious journals for researchers in the databases has different consequences. First, (i) they are presented to the scientific community as publications without prestige, which is not always true, and their publication has a negative impact on curricula evaluated by the commissions assessing the career of researchers. The inevitable consequence, which is already happening, is (ii) the depopulation of interesting and qualified articles in these magazines, to the point that it could eventually lead to the disappearance of the publication itself, since (iii) many of them begin to have difficulties in getting collaborations. It is increasingly common to find requests for contributions in specialized mailing lists in local specialized publications, which is a clear indicator of the situation of many scientific journals. The data of Spanish authors that conduct researches in Spain and choose foreign journals to publish their results as first option and in which proportion is unknown. Besides the data of papers written totally or partially by Spanish authors, it would be very interesting to know, if possible, data on the number of rejected articles in foreign journals with high impact index, which are afterwards published in Spanish indexed journals of less importance.

In response to the created situation there has been, from my point of view, a late reaction by many consolidated specialized publications that have not applied the necessary quality controls to be indexed. Possibly, their own status as

consolidated journals within a given field has contributed to this indifference. It is surprising that publications in Spain with more than half a century of existence and prestige in their area are being collected in foreign databases. This is the case of some of the most popular magazines of the CSIC, which report of these changes on their website. Their presence in SCOPUS is very recent for many of these journals, despite being in a leading position in their respective areas, for example *Revista de Filología Española*, indexed since 2008 or *Revista de Literatura*, indexed since 2009.

Considering our present situation, many scientific journals currently produced in Spain must find new ways of understanding the generation, management and communication of knowledge in Europe in order to survive.

3. Innovation in scientific publications

The Bologna Declaration and the Lisbon Strategy, to which we referred earlier in this article, are the basis for developing common principles in teaching and research in all EU countries and for the identification of its members. From this first Statement, with more principles than resolutions, derive unifying elements that have been developed in the subsequent years. The first of these common criteria is quality, linked to competitiveness in the different areas. This goal of excellence in scientific results will always be present in the documents that address the construction of the EHEA and the ERA, especially in recent years. While the Bologna Declaration focuses primarily on Higher Education, the Lisbon Strategy proposes the creation of a European research and innovation area. In fact, this proposal embodies the recommendations of the Commission made in the Communiqué *Hacia un espacio europeo de investigación* (CEC 2000a). There, research is given a central role in the implementation of public policies and in political decisions. The analy-

²⁸ Information provided by the Vice-chancellorship of EHEA of the Complutense University of Madrid.

sis of the research and technological development paints a black picture in comparison to the development of other powers such as Japan or the United States. The Council of Europe considered that the conflict could only be turned around if there a joint action to enhance the global transition towards the economy of knowledge was implemented. The considerations made in this document and in other original ones are general statements and do not address specific issues such as scientific publications policy, which will be drawn up in the next years. However, I think it is worth noting some general lines of action, because they are accurate and valid for scientific publications. In these documents there are several points that must be considered and analyzed, if we are to follow the lines defined by the EHEA and the ERA: (i) quality of research to reach scientific excellence, (ii) fragmentation of efforts (iii) make Europe more attractive for researchers from around the world, (iv) the need to strengthen and to ensure the links between the EHEA and the ERA, (v) the need to increase competitiveness, (vi) rapid and widespread dissemination of the results of the research to accelerate innovation, (vii) preservation of publications and research data²⁹; (viii) good practice in relation to new models of access to scientific information and its dissemination, and (ix) transition from printed to digital support.

These principles can be found, to a greater or lesser extent, on the three phases we have considered for the decade: Phase 1 (1999-2003), Phase 2 (2004-2007) and Phase 3 (2005-2009). The first phase determines the establishment of basic criteria to be maintained and developed in ten years to build the Europe of knowledge. In these years research is given a leading role as a key factor in achieving an economy of knowledge. The analysis of the research and technological development had painted a black picture for Europe in comparison to the development of other powers such as Japan or the United States. The new considerations on the importance and necessity of promoting scientific production are covered in a text that has changed the idea on the dissemination of the findings, the Berlin Declaration (2003)³⁰, which has a proposal of open access to information, familiarly known as open access. The Berlin Declaration is the culmination of three previous initiatives: (i) the Budapest Initiative (2001)³¹; (ii) ECHO Charter (2002)³²; y (iii) Declaration of Bethesda (2003)³³. These previous proposals shared a common core objective: to ensure immediate and free access to research publications over the Internet. The proposal is aimed at the scientific community and at those

responsible for scientific policy, funding, management, dissemination and preservation of knowledge. The impact of this statement has been enormous and has changed the policies of scientific publications, also sponsored by the rapid involvement of the European Community in this initiative, quickly adopting policies in this regard (EURAB 2006), but the widespread of open access has not been reached yet. Only about 15% of the articles published in the world are of open access (Informe APEI 2 2008: 26).

The second phase, which corresponds to the half of the decade, develops and expands the principles proposed so far, some of them stemming from the Berlin Declaration. The conclusive results of comparing the volume of European scientific production with the number of references of publications, which was much lower, led to a deep reflection on the possibility of reversing these numbers³⁴. To that effect the Commission asked for a thorough study on the economic and technical development of the publishing market in 2004. The main goals of this report were (i) to determine the necessary conditions for an optimal functioning of the scientific publishing industry and (ii) to find out the contribution rate of the Commission. Some of the main issues addressed are: the future of the printed journal, the risk of accessing for researchers because of the increased price of publications, the free access to findings and how to combine the Authors' copyrights and the publishers' economic interests. The results of this extensive study were published in January 2006, under the name *Study on the economic and technical evolution of the scientific publication markets in Europe*³⁵. This study addresses specific aspects of scientific journals, such as the impact of VAT, the electronic publications or the use of standards in markup languages. It gives ten recommendations that should be taken into account to ensure the future of scientific journals (*Study* 2006: 87-89), among those that stand out the need to guarantee public access shortly after their publication to findings of those researches carried out using public funds, continuous access to specialized digital journals, fostering and encouraging flexible tools that improve the visibility of knowledge, its accessibility and dissemination, the creation of the "extended quality ranking" in the scientific journals or the creation of a new business model in publication.

The various documents produced by the European Community on the ERA until 2007³⁶ are being analyzed and synthesized in the book *Libro Verde* (2007), which proposes a number of important objectives in order to deepen and

²⁹ This point only applies to the third phase considered. See DO L 236/28.

³⁰ Since October 2003, the Declaration has been signed by 281 research institutions (information obtained on 11 July 2010 at <http://oa.mpg.de/openaccess-berlin/signatories.html>) and is still open to signature. Open Access Publishing provides free access to scientific contributions that can be used as long as authorship is adequately recognised. A complete version of the work and any additional material must also be deposited at least in one online repository.

³¹ The Budapest Open Access Initiative was the result of a meeting organised by the Open Society Institute (OSI), Budapest, on 1-2 December 2001. The purpose of the meeting was to promote international efforts to provide free online access to research articles from all academic fields.

³² The purpose of the ECHO (European Cultural Heritage Online) Letter, Berlin, 30 October 2002, is to define the criteria to ensure the potential of new technologies is adequately exploited to preserve exploration education and academic files, as well as a public distribution of the common cultural heritage of humanity through Internet.

³³ The Bethesda Declaration is the result of the conclusions of a wide representation of the agents involved in biomedical research (scientists, scientific societies, libraries, editorials, financial agencies and institutions) regarding how to proceed immediately to provide open access to scientific publications. This meeting took place in the Howard Hughes Medical Institute headquarters in Chevy Chase, Maryland (EEUU), on 11 April 2003.

³⁴ One and a half million scientific articles were published worldwide and Europe was at the top with 41,3% of the total, compared to 31,4% in the USA. Nevertheless, Europe was at the back regarding the number of references in most disciplines. (IP/04/747: 1).

³⁵ The study was ordered by the European Commission's Directorate-General for Research to four working groups from two universities, the Free University of Brussels and the University of Social Sciences of Toulouse.

³⁶ Among which we highlight the Report LEG, 2007.

widen the ERA and to contribute to the renewed Lisbon Strategy: (i) adequate flow of competent researchers, (ii) infrastructure of global research, (iii) outstanding research institutions, (iv) effective sharing of knowledge, (v) good coordination between programs and research priorities, (vi) opening-up of ERA to the world³⁷.

From 2007 on (phase 3), references to scientific journals are tangential, related to broader issues, such as accessibility of knowledge in Europe and its free circulation, which has been called the “fifth freedom” (Quinta Libertad 2008). Nowadays, all proposals that are made on the ERA are part of the Ljubljana Process, April 2008 (Informal Meeting, 2008). The initial conclusions reached in May establish a better management of the European Research Area (Ljubljana Process, 2008). They highlight the need to develop a vision for the ERA in the long term on the basis of the Lisbon Strategy goals. The document Vision 2020 mentions specifically the main points necessary to achieve excellence in research and competitiveness in a global context. They can be summarized in four principles: (i) the ERA as a support and a guarantee of development and competitiveness of Europe, (ii) modernization of research, education and innovation systems (interactions in the knowledge triangle), (iii) coordinated assistance to researchers and research institutions engaged with research excellence, and (iv) strengthening scientific and technological capabilities throughout Europe. The decade closes with the consulting on the future EU Strategy 2020 (CEC, 2009), one of which principles is to create value by basing growth in knowledge: education, innovation and creativity.

A fourth phase has just started in 2010, considered by the European Community as a turning point in the economic crisis of recent years that will develop until 2020. In the EU Strategy 2020 (CCE 2010) there are five general objectives to be transformed into national objectives: (i) employment, (ii) research and innovation, (iii) climate change and energy, (iv) education and (v) the fight against poverty. There are three priority action lines of the 2020 EU Strategy for achieving the interconnected goals: (i) smart growth: development of an economy based on knowledge and innovation, (ii) sustainable growth: promoting a greener and more competitive economy that makes a more efficient use of resources (iii) inclusive growth: building an economy with high employment that has social and territorial cohesion.

From the lines of action proposed by the EU to address the points highlighted by the Community we want to stop at the first one, namely smart growth, which involves the development of an economy based on knowledge and innovation. This means the consolidation of knowledge and innovation as triggers of future growth, which requires (i) to improve the quality of our education, (ii) to consolidate the results of the investigation, (iii) to promote innovation and knowledge transfer throughout the Union, (iv) to fully exploit ICT and ensure that innovative ideas can become new products and services that create growth and quality jobs. The consecution of this ambitious goal will require EU countries to increase their investment in R&D, in ICT technologies and to pay special attention to education, training

and lifelong learning. For the 2010-2020 decade, the European Union has planned to implement three “singular initiatives”: (i) association for innovation, (ii) youth in movement, and (iii) a digital agenda for Europe. The content of these initiatives is very broad, but the goals are clear. All these changes will have a constant impact on scientific literature, that has to do an effort to adapt in order to have a specific value in the future Europe of knowledge.

4. Conclusions

As we have seen so far, the development of actions made by the European Community on scientific journals has principally taken place during the main development of the ERA and the EHEA, although there are contributions to the European initiatives proposed even today. The report on future EU 2020 (2009) addresses the problems involved in all areas and the current crisis. Regarding the European Education and Research Area, there is a principle to be considered: *to create value by basing the growth on knowledge*, which recognizes knowledge as the engine of sustainable growth. In a changing and competitive world, the factors that make a difference are education and research, innovation and creativity, i.e., focusing on the knowledge triangle again. The EU should set more attractive conditions for innovation and creativity, especially by preparing measures to encourage the growth of knowledge-based companies³⁸.

If we are to synthesize the necessary changes to be made in our journals in three words these would be: renewal, reorganization and innovation, because it is necessary to (i) renew the scientific journals in form, content and dissemination following parameters of quality and excellence, (ii) reorganize the conglomerate of scientific journals in fields of knowledge, subjects and areas having the background of the Spanish institutions, and (iii) innovate, by adopting the criteria set by the EU to converge and achieve an identity in scientific journals. The fourth phase that has now started is already defining the guidelines for education and science policy in the next decade.

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³⁷ Objectives already pointed out in document CCE 2005a and collected in the Green Papers.

³⁸ The reports ordered by the Commission in the last two years point to these lines of action STC key figures report 2008/2009 and the already cited documents, Kroll and Stahlecker 2009; Kroll, Zenker and Schubert 2009; Peter and Frietsch 2009.

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