

Following the tracks of a paper: origin, development and impact of the publications in international collaboration between Argentina and Spain

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Introduction

International collaboration is nowadays one of the central characteristics of the scientific activity and reveals the importance of interdisciplinarity and the formal and informal exchange of knowledge between the members of the scientific community. The knowledge and comprehension of the dynamics that originate and promote this collaboration can provide relevant information to increase its efficiency. A number of formal efforts to foster collaboration are part of an international positioning strategy in the scientific and technological policies of many countries. The most frequently used indicators to monitor this type of policies are bibliometrics. Nevertheless, there is a lack of qualitative information about the motivations, difficulties and benefits of the international collaboration from the perspective of the participants. To know more about these aspects, in the present study we propose a methodology in which **papers in bilateral collaboration** are studied understanding them not only as a "result" but as an integral part of a complex process, trying to analyze their origin and consequences.

Data sources and Methodology

1-Bibliometric analysis: the whole production in collaboration between Argentina and Spain in the Web of Science in the period 2000-2007 was studied. First, all documents from Argentina and Spain were analyzed separately. Secondly, the documents in co-authorship were studied through the following indicators:

- activity: number of publications, documental typology, language and scientific area.
- impact: IF of the journals used, relative IF (compared to each separate country in the discipline), citations/doc and % of documents without citation (also relative).
- collaboration: profile of collaboration (national, international, no collaboration). Networks in each scientific area (size, specialization, institutions).

2-Opinion of the authors: considering the e-mail included in the Reprint address, all authors of co-publications Argentina-Spain were contacted and an on-line survey was sent (between August and October 2009). The rate of response was 37% for the Argentineans and 32% for the Spaniards. The survey included four big blocks of questions: origin of the collaboration (how did co-authors know each other, activities before the publication, motivation for

cooperation); dynamics of the process (length of collaboration, leadership, financing, difficulties); perception of the results (current relations with partners, continuity of collaboration, consequences) and their evaluation of the process. Personal information (age, gender) and academic data (degree, institution, professional category) for each author were also obtained.

3-Data processing: To obtain bibliometric indicators the institutional data were normalized, following the IEDCYT methodology for Spain (Fernández et al: 1993) and that of CAICYT for Argentina (Barrere et al: 2008). The classification of areas and disciplines followed WoS assignment of journals.

The survey was created using LIME SURVEY software with a standard form for researchers from both countries. The answers were normalized homogeneously. A database with bibliometric information and data provided by the survey was constructed in MySQL (the analytic unit is the journal article). Data were analyzed with statistical program SPSS.

Results

1-Bibliometric analysis: 3292 papers in collaboration between Argentina and Spain were produced in the period 2000-2007 (1% of the production of Spain and 7% of Argentina). For Argentina, Spain is the 2nd country in importance of collaboration but for Spain, Argentina is in 12th position. Considering scientific areas, the most relevant collaboration takes place in Physics (27%), Biomedicine and Chemistry. Bilateral collaboration is predominant (2/3 of the cooperation) although some documents are signed by up to 61 countries. Bilateral cooperation is not specialized in any scientific field; but when the number of participant countries increases Physics and Clinical Medicine predominate. Considering the impact collaboration has for each country, when Argentinean and Spanish researchers

publish together, they write in journals with higher IF and a higher number of citations is obtained, especially in the field of Mathematics. This is because there are centers with high prestige in this field in both countries and a symmetrical cooperation is established. The scientific activity is highly concentrated and most cooperation is produced between institutions of Madrid and Buenos Aires.

2-Opinion of the authors: the contact e-mail of 933 unique authors was obtained and 260 of these have answered the survey (117 from Spain and 143 from Argentina).

-origin of collaboration: they got to know their partner mainly through relations with other international colleagues (25%), congresses or conferences (15%), and through bibliography (5%). Pre-doctoral and post-doctoral mobility, courses or stays in the other country are other important ways to establish contacts. The joint activities previously developed that gave rise to publications are mainly bilateral research projects (40% of the answers).

Motivations for collaboration are related to its advantages to produce new knowledge; good personal relations and reasons referred to technical and material aspects.

-dynamics of the process: the bilateral collaboration that originates the co-publication is usually short term: more than half of the interviewed researchers indicate duration under two years. In spite of having surveyed the main author of each document, leadership is predominantly perceived as shared (over 50% indicate a joint leadership). The financing, in the case of Spanish authors, comes mainly from National R&D Plan, AECID bilateral program and other agreements; in the case of Argentinean researchers it comes from their own resources, followed by the Spanish National Plan. The difficulties are concentrated mainly on the economic resources. Around 25% of researchers consider that there have been “enough” or “many” difficulties in this field, which

increases to 50% including those who mentioned “some difficulties”.

–*consequences of collaboration*: as to the relations that they maintain at the moment with their partner, activities related to participation in bilateral projects predominate, followed by participation in research networks. The activities with the group of the other country continue for 90% of researchers, producing mainly papers (2 to 4) and congress presentations.

–*evaluation of the process*: considering the consequences, activities related to training of researchers were the most valued, followed by participation in other projects. As to the importance of the other country for the partner, 59% of researchers affirm that the other country (Argentina or Spain) is one of most important in their international relations.

Final comments

The methodology used has demonstrated to be very useful to discover bibliometric aspects such as the impact of bilateral cooperation and to determine the specialization of collaboration and participant centers. Through the survey it has been possible to deepen in these aspects and to know why this collaboration takes place. The inclusion of the survey is thus strongly recommended due to its low cost, facility to detect the contact address of main authors and high rate of answers obtained when personalizing the forms.

Although we work with “successful” collaborations (those that have produced a WoS publication), we claim about the importance of analyzing collaboration reflected in a paper as a production process and not only as a final output. For that purpose it is necessary to observe several dimensions of the process (origin, motivations, development, perception of the researchers) and to relate them with bibliometrics indicators (as IF, citations and frequency of collaboration). Presently a combination of data from the two phases is being analyzed. We try to establish the relation between certain aspects as the

origin of financing or duration of the cooperation with the results related to impact, visibility and frequency of the collaboration. The final goal of the study is to relate the motivations to the possible results.

Acknowledgments

The support of the Argentinean CONICET and the Spanish CSIC to the research project COARES co-directed by Jesus Sebastián and Mario Albornoz (period 2009-2010) is acknowledged.

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