

## EDITORIAL

### Recognition to the scientific production in Chile

Science's institutions are key to contribute to generate scientific knowledge, in Chile this task is mainly developed by the universities, which in this sense, are intended to help in transforming the country into a knowledge-based society, thus fulfilling a significant public role.

For this reason, the Government provides financial resources to the universities so they may develop their research activity and, therefore, these ones should respond according to the requirements and guidelines that meet the required goal.

In this context, a broader discussion arises on the issue of assigning resources for research and development (R&D), that not only encourages the economic point of view, the % GDP spent on R & D, but also in how to allocate, to whom and for what purpose. Currently, Chile is investing about 0.5 % of its GDP in R&D, using a competitive resource allocation model. However, this is not the topic to be discussed, but just only one of the multiple components that are used to assign resources to the Chilean Higher Education Institutions: the scientific production.

It is clear that, among lots of objectives and research contributions, subjecting scientific production to peer review evaluation is important because, in essence, it is the product of research activity to generate new knowledge. However, the problem is how to measure it in order to effectively quantify the performance of the research institutions and in this way, for example, enable the definition of development policies, among them the allocation of resources. Although the challenge is not new, so far there is no universal consensus on the issue.

The search for solutions to this problem has come from the application of bibliometric analysis to scientific production, thus resulting in a series of bibliometric indicators that have evolved over time, beginning with first generation indicators that only quantify amount for a determined period of time, i.e.: number of publications and/or citations attributed to a group of authors (University, country, etc.). The second generation could be from H and G indicators, up to the advanced indicators which try to quantify issues such as scientific collaboration, international visibility, impact and quartile of scientific journals, citation and self citation, authorship and co-authorship, among others.

However, these indicators have a basic requirement: a scientific database and therefore the need for a scientific publishing industry and with this another problem arises: which one to choose? Not to mention the fact that there are also many commercial interests.

In the national context, first-generation indicators are still used, which only quantify the number of publications produced per year in a given scientific database, regardless even of the number of citations. In this sense, the publications belonging to the databases "Thompson Reuters Web of Science" (WoS), usually referred to as ISI, and "Scientific Electronic Library Online" known as SciELO (i.e.: "Ingeniare, Revista Chilena de Ingeniería" journal), have historically been the benchmark in the country, since they are the ones recognized by the Ministry of Education of Chile (MINEDUC) and aid for the access to the competitive 5% of the direct contribution from the state.

The former situation persisted until the end of 2012, when the Ministry of Education breaks the paradigm of recognizing only ISI and SciELO publications, now considering the items in the Scopus

database as one of the parameters for the assignment of basal contributions to universities. In this way, a new scientific data base is installed in the National Universities Community, which in practice means that the spectrum of recognized scientific journals is raised from 10,000 to nearly 30,000 and with this what is more relevant, the opportunity to improve the international visibility of the R&D carried out in Chile.

While the recognition of Scopus in Chile has not yet changed the model of privileging quantity over the quality of the scientific production of the country, it has started the discussion about third generation indicators, among these there are three to which special attention should be paid: Excellence, Leadership, and Excellence with Leadership<sup>1, 2</sup>.

Excellence indicates the proportion of an institution's scientific output found in the set formed by the 10% of the highly cited papers in their respective fields, so it is a measure of high quality scientific production.

Leadership indicates an institution's "output as main contributor", that is the number of papers in which the corresponding author belongs to the institution, therefore this indicator has the ability to reveal its own capacities and distinguish the credits between the co-authors of an article.

Finally, Excellence with Leadership indicates the number of papers in the Excellence rate in which the institution is the main contributor.

However, the subject of the bibliometric indicators has multiple points of view and even though there are various proposals there is no consensus or a universally accepted standard to quantify the productivity of scientific research. What indicators should be used in the country? Finding the answer is not trivial, especially in countries where research is still emerging, such as in Chile, because the inappropriate use of the bibliometric indicators might generate negative effects on the development of a system of science and technology. Nevertheless, it is clear that these indicators sooner or later will be part of the new challenges for higher education institutions that carry out research.

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<sup>1</sup> L. Bornmann, F. de Moya Anegón, L. Leydesdorff. "The new Excellence Indicator in the World Report of the SCImago Institutions Rankings 2011". *Journal of Informetrics*. Vol. 6, Issue 2, pp. 333-335. April 2012.

<sup>2</sup> Scimago Institutions Rankings 2013. URL: [http://www.scimagoir.com/pdf/SCImago Institutions Rankings IBER en.pdf](http://www.scimagoir.com/pdf/SCImago%20Institutions%20Rankings%20IBER%20en.pdf)