

## Sci Bytes @ SciSTIP Nr 1

### How many scientific papers does South Africa produce annually?

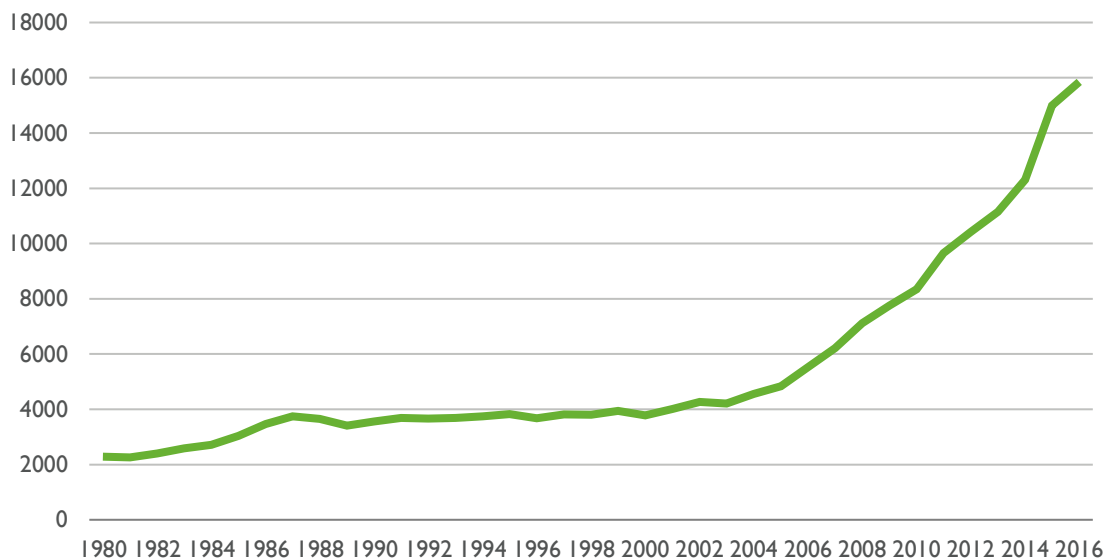
Although it should be easy to establish what the volume of South Africa's published scientific production is, the question requires clarification on three accounts: what we mean by "scientific", what is meant by "papers" and what "data source" we use to calculate the number of papers. As far as the former is concerned, we use a very comprehensive definition of "science" to include all scientific and scholarly disciplines. In the original meaning of "scientia" (Lat.) the word refers to knowledge. We follow this usage and include all "knowledge" disciplines that are typically found at universities ranging from the natural sciences and engineering to the health sciences, social sciences and humanities. As far as our definition of "paper" is concerned we follow standard bibliometric practice and define paper according to the "document type" of "articles" and "review articles" in the TR Web of Science. This means that we exclude documents such as books, book chapters and conference proceedings in our counts.

As far as the "data source" is concerned, a number of possible approaches can be followed. For the sake of simplicity we reduce these alternatives to two. The first approach is to limit the counting of papers to one or both of the standard citation databases used in most bibliometric studies. These are the Web of Science database and the Scopus database<sup>1</sup>. The advantages of using one or both of these databases as the source for counting scientific papers are threefold: (1) both databases are proper bibliometric databases; (2) are reasonably comprehensive in their coverage across scientific disciplines and (3) allow for comparison across countries.

Figure 1 below shows the trend in the production of scientific papers for South Africa over the past 37 years in the Web of Science. From a very low base of 2279 papers in 1980, SA has increased its annual output to a high of 15 850 in 2016. This represents an annual average growth rate of 4.6%.

Sci Bytes @ SciSTIP is a new information series produced by SciSTIP. Its aim is to disseminate on a regular basis brief reports about some aspect of the science and innovation system in South Africa. The aim is to inform and share knowledge produced by SciSTIP. The "bytes" are written in a non-technical style. Every issue of Sci Bytes will be structured in the form of a main question (with some elaboration). This series also forms part of SciSTIP's science engagement strategy. We want to invite anyone to send us any suggestions for topics/questions that you would want us to address in future issues. You can send the emails to Johann Mouton at [jm6@sun.ac.za](mailto:jm6@sun.ac.za)

<sup>1</sup> The Web of Science (WoS) database consists of a number of collections. In our counting we confine ourselves to the Web of Science Core Collection which consists of three Citation Databases: the Science Citation Index Expanded (SCI), the Social Sciences Citation Index (SSCI) and the Arts and Humanities Citation Index (AHCI). The current version of the WoS has two precursors: it was originally established as the ISI-database (referring to the Institute for Scientific Information established by Eugene Garfield). In 2005 ISI was acquired by Thomson Reuters (TR). Between 2005 and 2015 we hence referred to the database as the TR WoS. In 2015 Clarivate Analytics bought



**Figure 1:** SA's production of scientific papers in the Web of Science

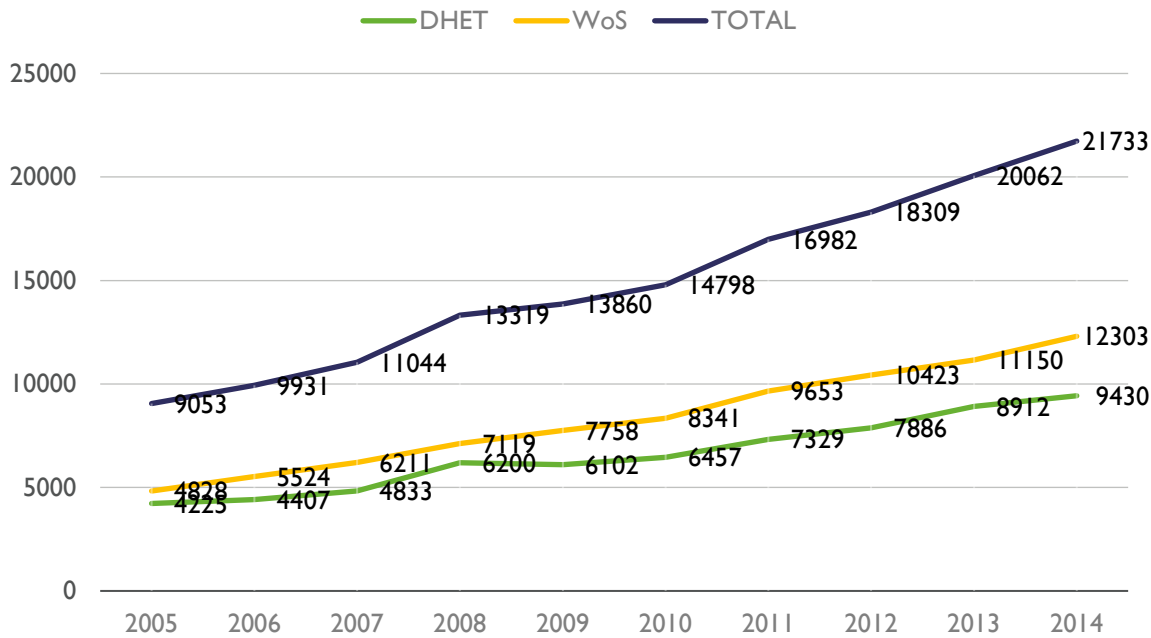
However, this is not the full picture about SA's scientific production. A unique feature of the South African science system is the role that the research funding framework of the Department of Higher Education and Training plays. This framework which was established in 1987, has subsequently been revised: first in 2003 and more recently in 2015. Within this framework, SA universities receive subsidy for publications in different lists of accredited journals. In addition to the citation databases included in the Web of Science (which are represented in Figure 1), there are currently two other lists – a list of local South African journals and lists included in ProQuest's International Bibliography of the Social Sciences (IBSS). Articles published in journals included in these two lists also qualify for subsidy. We would, therefore, argue that any count of SA's scientific papers need to include articles which are published in journals included in these lists<sup>2</sup>.

When we take these additional titles into account it results in an adjusted count. We have confined our count of papers in these lists to the period between 2005 and 2015 for two reasons: first, because of the huge impact that the 2003 revision of the DHET framework had on the system (huge increases in the monetary values of subsidy-units resulting in a threefold increase in output between 2005 and 2014); and second, because the 2016 data for the HE sector is not yet available.

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out the Web of Science. The correct reference today is to refer to the database as the Web of Science. The Scopus database is a product of Elsevier. For our purposes here, we have not counted papers published in Scopus.

<sup>2</sup> As of 2017, three other lists are also included in the DHET Framework: Scopus, Scielo and the Norwegian List of Scientific Journals. Since we confine our counting to 2016 in this report, we have not included articles which appear in journals included in these lists. Our current estimate is that the addition of these lists (especially Scopus) will result in an increase of between 10 and 15% in the overall count of SA papers.



**Figure 2:** SA's production of scientific papers in the Web of Science and DHET lists combined

The result of the counts reflected in Figure 2 allows us to answer our initial question:

How many scientific papers does South Africa produce annually?

**The answer: Currently around 22 000 papers per year**

**This Sci Byte @ SciSTIP was authored by Johann Mouton with data inputs from Johann Spies and Herman Redlinghuys. Suggested citation:** Mouton, J. 2017. How many scientific papers does South Africa produce annually? Sci Byte@SciSTIP, No1, August. DST-NRF Centre of Excellence in Scientometrics and STI Policy, Stellenbosch University (accessed dd month yyyy, <http://www.sun.ac.za/scistip...>)