

An assessment of South Africa's research journals: impact factors, Eigenfactors and the structure of editorial boards

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Journals are the main vehicles for scholarly communication within the academic community. As such, assessments of journals are of interest to a number of stakeholders, from scientists and librarians to research administrators, editors, policy analysts and policy makers, for a variety of reasons. A study was conducted that aims to identify the performance of South African journals that are indexed by Thomson Reuters' Journal Citations Reports.

Researchers would like to know where to publish in order to maximise the exposure of their research and what to read in order to keep abreast of developments in their fields. Librarians would like to have the most reputed journals available, and research administrators use journal assessments in their evaluations of academics for recruitment, promotion and funding purposes. Editors are interested to know the relative performance of their journal in comparison with competitor journals. Finally, policy makers have to monitor the quality of journals because they use published articles as indicators of the research system's success.

In South Africa, the assessment of scholarly and scientific journals is particularly important because higher education institutions receive financial support from government for their research activities. These institutions receive financial support according to the number of publications their staff members produce and publish in predetermined journals.

Two approaches, expert opinion and citation analysis, are used for the comparison and assessment of journals. In expert opinion assessments, experts such

as well-known researchers and deans of faculties are asked to assess particular journals. Subsequently, the collected opinions are aggregated and a relative statement can be made. However, this approach has the same drawbacks as peer review. Will the opinions remain the same if the experts were different? How can an astronomer assess a plant science journal? Are there unbiased researchers in scientifically small countries?

The second approach is using citation analysis to rank journals. Citations are the formal acknowledgement of intellectual debt to previously published research. The impact factor of a journal is measured by the frequency with which the average article in that journal has been cited in a

particular year. Despite the continuous debate related to the validity of Garfield's journal impact factor for the identification of the journal's standing, citation analysis has prevailed in the past (Vanclay, 2012; Bensman, 2012).

Scientific publishing in South Africa has experienced a revolution during the last ten years. In 2000, the South African government terminated its direct financial support to research journals and only the *South African Journal of Science* and *Water SA* continued to receive financial support. An investigation in 2005 showed that the termination of government involvement in the affairs of the journals generally had a beneficial effect on the impact factors of the journals.

During 2006, the Academy of Science of South Africa (ASSAF), at the request of the Department of Science and Technology (DST), produced a new strategic framework for South Africa's research journals. This strategic framework recommends, among others, the periodic peer review of the country's journals and a change in the publishing approach, i.e. a move into an open-access system. Finally, in 2008, Thomson Reuters substantially increased the coverage of South African journals.



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The number of journals indexed in the Science Citation Index increased from 17 in 2002 to 29 in 2009 – an increase of 70%. The coverage of social sciences journals in the Social Sciences Index showed an even more substantial increase from four in 2002 to 16 in 2009 – a 400% increase.

Methodology

Assessment and comparison of journals according to their impact factors is a well-established approach in scientometrics, despite its limitations and shortcomings. The impact factor of a journal is defined as the quotient between the number of times an article published in a journal over the previous

two years is cited in the year of observation and the number of articles this journal has published in these preceding two years. Today, the journal impact factor, as estimated by Thomson Reuters in the Journal Citation Reports, is one of the most important indicators in evaluative bibliometrics (Bornmann, Neuhaus and Daniel, 2011). It is used internationally by the scientific community, among other things, for journal assessments, research grants, academic subsidy purposes, and hiring and promotion decisions.

More recently, the Eigenfactor® approach has been developed and used for journal assessment (Bergstrom and West, 2008;

Fersht, 2009). The Eigenfactor ranking system is also based on citations, but it accounts for differences in prestige among citing journals. Hence, citations from *Nature* or *Cell* are valued highly, as opposed to citations from third-tier journals with a narrower readership. Another difference is that while the impact factor of a journal has a one-year census period and uses the previous two years for the target window, the Eigenfactor metrics have a one-year census period and use the previous five years for the target window.

The composition of the editorial boards is an indicator of the internationalisation of

the journal. It should be clarified that the editorial boards are both indicators of quality and inputs in the process of publishing a journal. For example, researchers are selective in terms of how they spend their time and would prefer to be associated with “top” journals. On the other hand, international researchers introduce standards and approaches in the peer review of the articles that may improve the relevant journals.

The performance of South African journals

Table 1 shows the impact factors, quartiles and scientific categories of the South African journals covered by the Journal Citation Reports during

→ Table 1: Impact factors and quartiles of pre-existing South African journals in Thomson Reuters' Journal Citation Reports Science Citation Index in 2002, 2009 and 2010

Journal	Impact factor 2002	Impact factor 2009	Quartile 2002	Quartile 2009	Quartile 2010	Category
<i>African Entomology</i>	0.455	0.420	3	4	4	Entomology
<i>African Journal of Marine Science</i>	0.754	1.520	3	2	3	Marine and Freshwater Biology
<i>African Zoology</i>	0.516	0.746	3	3	2	Zoology
<i>Bothalia – African Biodiversity and Conservation</i> [†]	0.358	0.242	2	4	3	Plant Science
<i>Journal of the Southern African Institute of Mining and Metallurgy</i>	0.052	0.216	4	4	4	Metallurgy and Metallurgical Engineering
				3	–	Mining and Mineral Processing
<i>Journal of the South African Veterinary Association</i>	0.366	0.224	3	4	3	Veterinary Science
<i>Onderstepoort Journal of Veterinary Research</i>	0.506	0.430	3	3	3	Veterinary Science
<i>Ostrich</i>	0.149	0.250	4	4	4	Ornithology
<i>South African Journal of Animal Science</i>	0.381	0.412	3	3	3	Agriculture, Dairy and Animal Science
<i>South African Journal of Botany</i>	0.394	1.080	2	3	4	Plant Science
<i>South African Journal of Chemistry</i>	0.265	0.429	4	4	4	Multidisciplinary Chemistry
<i>South African Journal of Geology</i>	0.659	1.013	2/3	2	4	Geology
<i>South African Journal of Science</i>	0.7	0.506	2	3	2	Multidisciplinary Science
<i>South African Journal of Surgery</i>	0.25	0.429	4	4	4	Surgery
<i>South African Journal of Wildlife Research</i>	0.224	0.562	4	4	4	Ecology
<i>South African Medical Journal</i>	1.019	1.325	2	2	2	General and Internal Medicine
<i>Water SA</i>	0.481	0.911	3	3	3	Water Resources

[†] Previous title was *Bothalia*

2002 for that year and for 2009 and 2010. The ranking to quartiles has been undertaken to consider the variation in citations among the various scientific disciplines.

Of the 17 South African journals in the Journal Citation Reports, four declined in terms of quartiles from 2002 to 2010. Only one journal – *African Journal of Marine Science* – improved its performance and moved from the third to the second quartile. *South African Journal of Geology* moved definitively into the second quartile in the list of the relevant disciplinary journals during 2009, while it was exactly in the middle of the second and third quartiles during 2002. During 2010, this journal moved into the fourth quartile. The journal's impact factor dropped from 1.013 during 2009 to 0.638 during 2010.

The examination of the impact factors indicates that 12 journals increased their impact factors. However, these increases were insufficient to move them into higher quartiles.

It seems that, as in the domain of journals, it has become more and more difficult to compete internationally. It is also interesting to note that *South African Journal of Science* – the country's flagship journal – exhibited a substantial drop in its impact factor and its position among multidisciplinary journals internationally during 2009. However, it recovered during 2010 and was part of the second quartile journals. It can be argued that this variability is the result of changes in the journal's management structure. Prior to 2009, the journal had a full-time editor. From 2009, it moved to a model with a part-

time editor assisted by an editorial board.

Table 2 shows the impact factors, quartiles and scientific categories of South African journals that were recently added to the Journal Citation Reports. With the exception of *African Invertebrates*, which is positioned in the second quartile of the relevant journals with an impact factor of 1.216, all the other journals fall within the fourth quartile of their categories.

Inclusion in the international citation indices as an indicator of journal visibility is crucial. In South Africa, inclusion in the citation indices is particularly important, as publications in the indexed journals automatically qualify the country's universities for government subsidy. Universities in South Africa receive government subsidy

according to a funding formula in which one of the components is the number of research publications. Universities currently receive more than R120 000 for each publication that their staff and students publish in qualifying journals.

The increase in the number of indexed South African journals during recent years undoubtedly increases the country's scientific visibility. A comparison of the journals' performance during 2002, 2009 and 2010 identified a relative decline in impact factor. During the most recent period, the majority of South African indexed journals belong to the fourth and third quartile in terms of impact factor. Only three of the scientific journals were in the second quartile. Similarly, all the social sciences journals were in the third and fourth quartiles. Journals in the tail of the Thomson Reuters

→ Table 2: Impact factors and quartiles of South African journals newly added to Thomson Reuters' Journal Citation Reports Science Citation Index

Journals	Impact factor 2009	Quartile 2009	Quartile 2010	Category
<i>African Invertebrates</i>	1.216	2	3	Zoology
<i>African Journal of Herpetology</i>	0.455	4	4	Zoology
<i>African Journal of AIDS Research</i>	0.569	4	4	Public, Environmental and Occupational Health
<i>International Sportmed Journal</i>	0.171	4	4	Sport Science
<i>Journal of the South African Institution of Civil Engineering</i>	0.125	4	4	Civil Engineering
<i>Quaestiones Mathematicae</i>	0.267	4	4	Mathematics
<i>South African Journal of Enology and Viticulture</i>	0.314	4	3	Food Science and Technology
<i>Southern African Journal of HIV Medicine</i>	0.457	4	4	Infectious Diseases, Virology
<i>South African Journal of Industrial Engineering</i>	0.093	4	4	Industrial Engineering
<i>South African Journal of Obstetrics</i>	0	–	4	Obstetrics and Gynaecology
<i>South African Journal of Psychiatry</i>	0.409	4	4	Psychiatry
<i>Southern Forests</i>	0.5	4	3	Forestry

ranking are at risk of being dropped from the citation indices. Furthermore, as researchers prefer to submit their articles to high-impact journals, the journals in the tail run the risk of not receiving an adequate number of quality articles, and hence will either reduce their quality standards or cease to exist.

The identification of the South African journals' Eigenfactors will provide a valuable benchmark of performance for future investigations, as there is currently no historical data of this indicator.

The identification of the structure of the editorial boards emphasises the above findings. The majority of South African journals are dominated by local researchers. As many as 20 journals do not have any foreign researchers or academics on their editorial boards. As international gatekeepers, they can transmit international standards and practices in local journals, and because they may increase the prestige of the journal with their presence, the relevant authorities should address the issue. It should be emphasised that international researchers on editorial boards alleviate the shortcomings of peer review in scientifically small countries like South Africa. It has been argued that, in scientifically small countries, a small number of researchers work in the same field. They know each other personally and are socially tied to each other and to the social community surrounding them. When these researchers have to render a verdict on a research proposal or research



The addition of new journals in the indices has implications for the future of science policy.

article, these ties impair them from being objective. While other approaches (such as monitoring the comments of peers and increasing the number of members on editorial boards) may be able to alleviate the challenges of bias, the incorporation of international researchers on editorial boards is probably among the most effective approaches.

It is important for the prestige of the country, and of ASSAf, to take appropriate actions to improve the country's journals. The approach of coupling scientometric assessments with peer reviews can further provide evidence of the validity of the above findings.

The addition of new journals in the indices has implications for the future of science policy and warrants intensive relevant

monitoring in countries like South Africa, which monitors their science performance using the Thomson Reuters indices. The addition of journals in the indices increased the coverage of the various countries' scientific articles, but created discontinuities in the time series data. Similarly, the differentiated coverage of the various disciplines (for example, social sciences versus engineering) can create changes in the countries' publication profiles. Science authorities should take action to create compatible time series and relevant country-scientific profiles.

Finally, it should be mentioned that the addition of South African journals in the citation indices has not adversely affected the country's scientific profile. Even though Thomson Reuters (2008) stated that "the importance of the [inclusion of the] regional journal is measured in terms of the specificity of its content rather than in its citation impact," this investigation shows that the newly added journals were of the same quality in terms of impact factor as the pre-existing ones. 📍



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