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& training

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THE QUALITY OF SOUTH AFRICA'S RESEARCH PUBLICATIONS

Final report to the DHET

Submitted by Prof Johann Mouton and team
(Herman Redelinghuys, Johann Spies, Jaco Blanckenberg, Lynn Lorenzen, Kyle Ford,
Annemarie Visagie and Marthie van Niekerk)

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List of abbreviations

ABDC	Australian Business Deans Council
ABS	Association of Business Schools
ACM	Association for Computing Machinery
AJBM	African Journal of Business Management
AJPHRD	African Journal for Physical Health Education, Recreation and Dance
AJPHEs	African Journal for physical activity and health sciences
APCs	Article processing charges
ASSAf	Academy of Science of South Africa
CAGR	Compound Annual Growth Rate
CESM	Classification of Educational Subject Matter
CPCI	Conference Proceedings Citation Index
CPP	Citations per publication
CPUT	Cape Peninsula University of Technology
CREST	Centre for Research on Evaluation Science and Technology
DHET	Department of Higher Education
DST	Department of Science and Technology
DUT	Durban University of Technology
ERIH-Plus	The European Reference Index for the Humanities and Social Sciences
ESF	European Science Foundation
ESRC	Economic and Social Research Council
FAQs	Frequently Asked Questions
GII	Group of Italian Professors of Computer Engineering
GRIN	Group of Italian Professors of Computer Science
HEMIS	Higher Education Management Information System
IBSS	International Bibliography of the Social Sciences
IEEE	Institute of Electrical and Electronic Engineers
ISI	Institute for Scientific Information
ISSN	International Standard Serial Number
JCR JIF	Journal Citation Report (Journal Impact Factors)
JIF	Journal Impact Factor

JQI	Journal quality and integrity
KNAW	Royal Netherlands Academy of Arts and Sciences
MIS	Management information systems
MUT	Mangosuthu University of Technology
NMU	Nelson Mandela University
NRF	National Research Foundation
NSD	Norwegian Centre for Research Data
NW	Norwegian
NWU	North-West University
OA	Open Access
PLOS One	Public Library of Science
PQ	ProQuest
RU	Rhodes University
SA	South Africa
SAK	South African Knowledgebase
SATNAC	The Southern Africa Telecommunication Networks and Applications Conference
SCH	Standing Committee for the Humanities
SCI	Science Citation Index
SCIE	Spanish Computer Science Society
ScieLO	Scientific Electronic Library Online
SciSTIP	DST-NRF Centre of Excellence in Scientometrics and Science, Technology and Innovation Policy
Sense	Socio-economic and Natural Sciences of the Environment
SSCI	Social Science Citation Index
SU	Stellenbosch University
TUT	Tshwane University of Technology
UCT	University of Cape Town
UFH	University of Fort Hare
UFS	University of the Free State
UJ	University of Johannesburg
UK	United Kingdom
UKZN	University of KwaZulu-Natal

UL	University of Limpopo
UNISA	University of South Africa
UNIVEN	University of Venda
UP	University of Pretoria
US	United States
UWC	University of the Western Cape
UZ	University of Zululand
VUT	Vaal University of Technology
WITS	University of the Witwatersrand
WITS	University of the Witwatersrand
WoS	Web of Science

Introduction

Background to the study

We have witnessed an exponential increase in total publication output by the South African higher education sector since the implementation of the revised funding framework in 2005. The total number of publications has more than doubled – from 7 230 units in 2005 to 18 872 units in 2017. Journal articles increased from 6 662 units in 2005 to 15 388 in 2017. Even higher rates of increases were recorded for books and book chapters – from 223.3 units in 2005 to 2 207.9 in 2017; as well as for conference proceedings – from 344.8 in 2005 to 1 275.9 in 2017. Over this period, a number of new journal lists were added to the list of accredited journals that qualify for subsidy. These include the addition of the ProQuest International Bibliography of the Social Sciences (IBSS) list in 2005 and, more recently, the addition of Scopus, Scielo and the Norwegian Centre for Research Data (NSD) after the most recent revision of the funding framework in 2015. The unit subsidy value has also increased from around R75 000 in 2006 to around R120 000 in 2017. Both the increase in the number of accredited journals and the increased subsidy amount would most likely explain the sustained high rate of increase across all publication output types.

Nevertheless, while the quantity (volume) of research output has increased significantly, concerns over the quality of university publication output have increased. The “demand” to publish continues to place a huge pressure on academics to publish as many papers as they can in order to meet the requirements of performance appraisals, rating systems and so on. However, the question arises whether this demand to publish at any cost has not at the same time compromised the quality of the sector’s publications. Perhaps this is best illustrated by high-profile cases where South African universities have in recent years submitted claims for publications in predatory journals. The advent of predatory journals (and predatory publishers) has led to some academics submitting their manuscripts to these journals – usually because of promises of speedy and prompt acceptance and publication of the manuscripts. Predatory publishers and journals have no interest in measures to assure research quality; hence standard peer-review practices are suspended. But there are also other examples of questionable publication practices that have surfaced in recent years, including excessive claims by editors and members of the editorial boards of a specific journal for articles published in “their” journals.

Another issue of concern – not necessarily related to quality – is the widespread practice that has become common at some institutions to submit claims for subsidies by scholars and scientists who do not have a formal or official affiliation with the university concerned. In order to access the subsidy funding, some universities have resorted to “dubious” practices to expand their publishing base, with the result that monies are paid in cases where the authors have only a weak or very tenuous links to the university.

These examples of unethical and dubious publication practices reflect the growing tension between maintaining a high standard of **quality** and **ethics** amid the demand for **quantity** and growth in output. Of course, the imperative to assure quality and ethical compliance is located at different points in the system: the author, the university (research office), the journal editor, reviewers, the publishers and the Department of Higher Education (DHET).

Against this background, in March 2017 the DHET commissioned CREST to investigate these issues and to make recommendations about how the current system can be changed

and strengthened to ensure that only the best and highest quality South African publications are subsidised.

Terms of reference

The overall goal of the study was formulated as:

To advise the DHET on processes and mechanisms to ensure that quality research outputs are allocated subsidies.

CREST has unpacked this goal statement into the following four objectives:

- (1) Advise the DHET on the criteria used in the screening of accredited journal indexes (with special focus on the continued listing of the IBSS), as well as the continued use of the Classification of Educational Subject Matter (CESM) categories for publication output classification.
- (2) Advise the DHET on the criteria for the inclusion of credible book publishers and the possibility of developing a list of “accredited” book publishers to be used in the allocation of subsidies for books and book chapters.
- (3) Advise the DHET on the criteria for the inclusion of credible publishers of conference proceedings and the possibility of developing a list of “accredited” conference titles to be used in the allocation of subsidies for conference proceedings.
- (4) Advise the DHET on mechanisms to curb or stop unethical behaviour by researchers and public higher education institutions that encourage academics to publish in poor quality and predatory publications.

Layout of report

In Part 1 of the report we present a high-level analysis of the main trends in publication output of South African universities over the past thirteen years. In this discussion we also address two specific issues that were included in the terms of reference: Whether the IBSS list should be retained as one of the lists of accredited journals, and whether the current practice of applying the CESM classification as a framework for classifying publications into scientific fields is the best approach.

Part 2 addresses the question of whether a list of accredited book publishers can be developed and implemented to be used by the DHET in the allocation of subsidies for books and book chapters.

Part 3 addresses the same issue as far as conference proceedings is concerned and investigates whether a list of accredited conference proceedings can be developed and implemented by the DHET when making decisions about conference proceeding submissions.

Parts 4 and 5 address the challenge to ensure and improve quality and integrity as far as journal articles are concerned. In Part 4 the focus is on issues of “integrity” specifically. The various instances of unethical behaviour (including predatory publishing) among SA academics are discussed and what can be done to curb or eliminate such behaviour. In Part 5 a conceptual and measurement framework is developed that can be used by the DHET in assessing the quality and integrity of SA journals.

Acknowledgments

CREST would like to thank the following people:

- The DHET, who agreed to provide us with the necessary micro data on university submissions as well as the panel decisions on books, chapters and conference proceedings.
- Staff at the Academy of Science of South Africa (ASSAf), who provided us with survey data on the review of selected journals.

Executive summary

Trends in publication output

Finding 1: Since the introduction of the state-funded publication system in 1986, university research publication output has grown at an average annual rate of 5.6%. The rate of increase in the average rand value per publication unit over the same period was 9.2%. However, closer inspection shows that the introduction of much higher rand values in 2005 (effective 2007) led to even higher growth rates in publication outputs. Between 2005 and 2017, a comparison of the growth rates (CAGR) in publication output was 8.6%. Disaggregation by document type shows that the biggest increases in output over the past thirteen years were recorded for books and book chapters, and conference papers, respectively. However, journal articles continue to constitute the biggest single output category (around 80%).

Finding 2: In an analysis of the output disaggregated by scientific field, we compared the results of the current classification framework (CESM) with the Web of Science (WoS) classification of subject categories. The current framework produces results that are in some respects misleading and at best not helpful. The application of an output-based framework (WoS) produces more granular results that can be used more effectively both for the historical and international benchmarking of SA universities' research output. In addition, the adoption of an output-based framework will also eliminate capturing errors that are currently found in the submissions data.

Finding 3: Our analysis of publication output by journal list/index revealed that the introduction of Scopus in 2015 (effective 2016) has had a huge impact on the distribution of articles by list. Nearly three-quarters (74%) of total output in 2017 appeared in journals indexed either in the WoS or Scopus. The third biggest proportion of papers (14%) appeared in the DHET list of SA journals. Articles in IBSS journals constituted only 6% of all output in 2017. However, because of the overlap of journal titles across the different lists, the proportion published in journals included in the IBSS reduces to only 3%. The proportion for the Norwegian list is even smaller at 0.3%.

Finding 4: It is important to keep in mind that the IBSS list (now ProQuest IBSS), was included in the list of accredited lists in 2005 in order to "rectify" the under-coverage of the social sciences and humanities in the WoS (at that stage). It is, therefore, not surprising that a breakdown by scientific field shows that more than 90% of all articles published in IBSS over the past thirteen years are from the social sciences and humanities. The inclusion of Scopus in 2015 and the improved coverage of the social sciences and humanities in the WoS in recent years, raise the question whether it is still necessary to retain the IBSS list to cater specifically for the social sciences and humanities. The argument for the exclusion of the IBSS list is strengthened by another concern: In our analysis of the emergence of predatory publishing, the majority of predatory journals originally appeared on the IBSS list. Although ProQuest (the new owner of IBSS) claims that it has strengthened its quality control criteria for the inclusion of new journals, we remain unconvinced that this matter has been adequately addressed.

Finding 5: Our final section addresses the question whether there are other journal lists that the DHET should consider in the future. We looked at two very different lists: The European Reference Index for the Humanities and the Social Sciences (ERIH-Plus) as a possible alternative list to cater for the social sciences and humanities, and the Directory of Open

Access Journals (DOAJ) list for open-access journals. Both these lists have very stringent quality control criteria and would be strong contenders for inclusion in future.

Recommendation 1: The DHET should replace the current practice of CESM-based field classification with an output-based classification framework for journal articles. Implementing this recommendation would involve an instruction to universities not to include the CESM field in their annual submissions for journal articles anymore. This decision can be implemented immediately and would have no negative impact on annual submissions. The classification of output by scientific field can then be undertaken through the standard reference to the WoS and/or Scopus subject categories.

Recommendation 2: The DHET should exclude both the ProQuest IBSS and Norwegian lists from the current list of accredited journals.

Recommendation 3: The DHET should consider the inclusion of the ERIH-Plus and DOAJ lists in the future. Before such a decision is taken, however, it is advisable that further analyses be conducted to establish what the impact of the inclusion of these respective lists would be on the system.

Books and book chapters

General trends in book and book chapter submissions

- (1) Our analysis of the growth rates in authorship shows how steep the increase for both book and book chapters were:
 - CAGR book authorships = 16.7%;
 - CAGR chapter authorships = 24.6%; and
 - CAGR combined = 23.6%.
- (2) The number of unique book chapter submissions increased at an average annual growth rate of 21.9%. Even more positive is the substantial increase in the number of authors who made these submissions over this time period. The number of authors increased from 166 in 2005 to 2017 in 2017. This translates to a CAGR of 23.1%.
- (3) The breakdown by university shows that four universities each submitted more than 10% of the total number of submissions:
 - University of Cape Town (UCT) (17%);
 - Stellenbosch University (SU) (11.7%);
 - University of the Witwatersrand (WITS) (11.0%); and
 - University of Pretoria (UP) (10.1%).
- (4) The breakdown by publisher and publisher group shows that the majority of book and book chapter submissions were published by international publishers. These include the most prestigious publishers such as Springer, Taylor and Francis, Elsevier, Wiley, Oxford UP, Cambridge UP, Bloomsbury and De Gruyter. Local publishers that are most frequently listed are Juta, African Sun Media and Jacana Publishers.

Recommendation 4: Based on the analysis above, CREST proposes the introduction and implementation of a decision framework for awarding book and book chapter subsidies. This

decision framework consists of the development of two lists of accredited publishers (List A and List B) and three decision rules that describe its implementation. The two lists are

- List A of internationally recognised book publishers; and
- List B of reputable international and local book publishers.

The three decision rules are:

- (1) Rule 1: All submissions from publishers from List A are automatically awarded the appropriate subsidy amount.
- (2) Rule 2: All submissions from publishers from List B are awarded if certain conditions have been met. These conditions could include a combination of (a) requesting a general letter from publishers on List B verifying that the titles that had been submitted had been peer reviewed; and (b) scrutiny of a sample of these submissions by the panels.
- (3) Rule 3: All other submissions (publishers not on either List A or List B) continue to be scrutinised individually by the DHET panels for books and book chapters.

We elaborate on each of the lists below.

List A: Internationally recognised book publishers

List A is based solely on the rank (combined score on the Sense and NSD rankings with additional data on the “success” rate as per DHET panel decision). It contains the names of 55 publishers. Our recommendation is that the DHET accepts any submissions for chapters and books from these publishers automatically without additional panel scrutiny. Once a university has provided audited evidence that a chapter or book from any of these publishers has been submitted, our recommendation is that the specific submission is treated in the same way as an article submission from a journal on any of the current accredited lists. The rationale for this recommendation is that all of these publishers appear in either Category A, B or C of the Sense ranking or in the Tier 2 classification of NSD. In addition, as our analysis shows, there is sufficient supporting evidence from the historic panel decision-making at the DHET that submissions from these publishers consistently record high success rates.

List B of reputable international and local book publishers

List B consists of 26 international and local publishers whose book submissions have been reviewed by the DHET and ASSAf panels in recent years. Although these publishers do not appear on any of the Sense or NSD rankings, their success rates in the past provide sufficient confidence in the quality of the underlying peer-review process. This list only includes publishers where more than 20 submissions have been reviewed in the past and the success or approval rate is higher than 70%.

Our recommendation, however, is **not** that submissions from these publishers automatically get approved. Some scrutiny of submissions from this list would still be necessary. This could take two forms: The publishers of these submissions could be requested to confirm in writing that the titles concerned have been properly peer reviewed, and the DHET panel of book submissions could scrutinise a sample (e.g. 20%) of submissions from these publishers as additional quality control.

The advantages of implementing a DHET list of accredited publishers are threefold:

- (1) In making these lists public, the DHET introduces more **transparency** to the system of awarding book and chapter submissions. One of the recurring criticisms of the DHET in the past has been a lack of transparency in decisions surrounding book and chapter submissions.
- (2) The introduction of this framework has immediate **efficiency gains**, since it will significantly reduce the time spent by DHET panels on making decisions. Our “test” shows that at least 40% of all submissions (from List A) will automatically be awarded.
- (3) The introduction of the framework will also, over time, lead to **quality gains**. It is anticipated that university academics will strive to publish increasingly with publishers included in List A (which translates into the automatic awarding of a subsidy). The same will apply, although to a lesser extent, to publishers included in List B.

If our proposal to implement this framework is accepted, we would in addition recommend that ongoing research and analysis is conducted to monitor the efficiency and impact of its implementation, and to allow for the inclusion of new publishers on Lists A and B in the future if so warranted.

Conference proceedings

Our analysis in this section aimed at establishing the following:

- Whether there are credible and comprehensive ranking systems for conferences that could be used by the DHET in developing a South African list of accredited conferences.
- Whether the past panel decision outcomes could be used as the basis for a proposed list of accredited conferences.
- Whether the inclusion of conferences in the WoS proceedings indexes could be used as a possible point of departure for such a list.

The results of our analysis clearly shows that the answers to the first two questions are both negative. There are three reasons for rejecting these as options in the development of a DHET list of accredited conference titles:

- (1) The coverage of the existing ranking systems is too small and predominantly only covers conferences in the computer sciences.
- (2) The evidentiary base with regard to DHET decisions only (over two years) did not provide us with sufficient evidence to make robust claims about whether it can be used as the basis for decision-making.
- (3) A comparison between the existing ranking systems and the approval rate of DHET decisions showed a very low correlation. This does not instil confidence in using either the ranking systems, or the DHET approval ratings, or a combination of these.

Our second approach was to match the conference submissions made to the DHET for the period 2005 to 2007 with the titles in the WoS proceedings indexes. This involved a lengthy cleaning process, as well as a matching process based on similarity scores between the South

African Knowledgebase (SAK) and WoS titles. Using a very conservative threshold criterion for similarity scores (0.75 and above), we could link 18 815 conference submissions in our database to the WoS titles. We believe that this is a very conservative under-estimate as we visually identified many titles with similarity scores of below 0.75 that clearly linked the same conferences. However, the “sample” of 18 815 records provided us with an initial point of departure for a possible list of accredited conferences.

Our detailed analysis of the distribution of these 18 815 records showed that nearly 50% of them appeared in 64 conference proceedings. If we increase the threshold to 70%, we could include 13 163 submissions that appeared in 200 conference proceedings. If we increase the threshold to 80% (or 16 046 submissions) we find that these appeared in 350 conferences. Based on these results, we have formulated the following recommendation:

Recommendation 5: We propose that the DHET produces two lists of accredited conference titles (similar to the list of publishers proposed in the previous section). The first list, List A, would include **only** conference titles that are indexed in the two proceedings indexes of the WoS **and** account for 80% of all submissions made to the DHET over a certain period of time. Based on the current available information, this list would contain the names of approximately 350 conference titles. The second list, List B, would include all other conference names that appear in the WoS (and possibly Scopus) proceedings indexes, as well as any South African conference titles to be added after a review/accreditation process.

The advantages of implementing such lists are similar to the advantages that we identified in our discussion on a list of accredited publishers.

- (1) In making these lists public, the DHET introduces more **transparency** in the system of awarding conference proceedings.
- (2) The introduction of this framework has immediate **efficiency gains** in that it will significantly reduce the time spent by the DHET panels on making decisions. Our “test” shows that at least 30% of all submissions (in List A) will automatically be awarded.

However, two caveats need to be registered:

- Further research and analysis is needed to compile List A based on a visual inspection of all conference titles with ratings lower than 0.75.
- Further research needs to be done to establish which SA conference titles are included in the WoS; more specifically, which are **not** included and whether there is sufficient reason to include them in List B. In order to do this research properly – and in a consultative manner – we propose that a survey be conducted among academics in the most relevant disciplines (computer sciences, engineering, mathematics, economics) to garner their views on the status and quality of the top (including South African) conferences in their disciplines.
- In order to strengthen this decision framework, we would also propose that an analysis similar to our investigation of the WoS proceedings indexes be undertaken for the Scopus conference proceedings indexes. Since CREST does not have access to the micro data of Scopus (at least not currently), a special arrangement will have to be made with our SciSTIP partner (Centre for Science and Technology Studies at Leiden) to conduct such an analysis.

Recommendation 6: Based on an in-depth analysis of conference submissions by universities and individual authors, we recommend that the DHET gives serious consideration to capping the maximum number of conference submissions that a single academic can make to the DHET in a particular year. Even if Recommendation 5 is accepted and implemented, it will not necessarily address what we believe to be a clear pattern of gaming the system by some academics. We believe that no more than ten conference submissions per academic should be accepted for subsidy purposes in a single year. In fact, only 11 academics (out of the total of more than 19 000 who authored or co-authored a conference paper) in our database, have averaged more than 10 submissions per year over the past thirteen years. We also believe that this will lead academics to be more selective in their submissions, with a resultant improvement in the quality of output that earns subsidy from the state.

Questionable publication practices

In our discussion of questionable publication practices in Part 3 of the report, as well as in our analysis of conference proceeding submissions (Part 2), we have identified a number of questionable and unethical behaviours. These include:

- continued – even if declining – instances of predatory publishing;
- questionable editorial practices that are evidenced by excessive publication by editors and members of editorial boards in “their” journals;
- examples of plagiarism in specific fields but without replication of such studies in other fields;
- growing evidence of excessive publication by individual academics in a particular journal or issue of a journal; and
- growing evidence of gaming the submissions of conference proceedings by certain universities and authors.

In addition to these demonstrated unethical behaviour, CREST also has anecdotal evidence of transgressions of generally accepted rules of authorship, including the practice of ghost authorship. We are also informed of SA academics falling prey to fake conferences.

The deeper problem is that incentive systems such as the DHET’s publication subsidy system often produce unintended perverse consequences. As long as authors are (mostly) rewarded for publishing many articles and editors are (mostly) rewarded for publishing the articles rapidly, new ways of gaming the traditional publication models will be invented quicker than new control measures can be put in place. Against this background, CREST is making the following recommendations that are aimed at counteracting the various forms of misconduct identified in this report.

Recommendation 7a: We recommend the establishment of a more timely alert and support systems and tools to assist universities (and their research offices) to identify cases of questionable publishing behaviour before submission for publication subsidies. Our specific recommendation is that the DHET, in partnership with CREST, develop a website that would provide the necessary support to scholars and students in this regard. Such a website should have the following functionalities:

- A portal with links to the most relevant and credible studies in the field.
- Links to the available tools to detect predatory publishing (See Appendix 6 for such a list).

- A link to the various lists (included the archived links to Beall's list) of predatory or fake journals.
- A link to emerging websites and blogs (such as Retraction Watch and The Scholarly Kitchen) that cover issues in this area.
- A facility to deal with FAQs (frequently asked questions).
- A tool that would enable any SA academic to check whether a particular journal (which he or she is considering for publication) is on the latest list of accredited journals and publishers of the DHET.

Recommendation 7b: We need to increase our educational and capacity-building efforts around good conduct in scholarship. This would involve more training in areas such as the following:

- Basic introduction to bibliometrics in order to understand publication and citation behaviour and the available metrics to measure research performance.
- Courses on the ethics of scholarly publishing, including issues related to scientific authorship (and contribution), unethical publication practices (including predatory publishing), and good practice in editorial processes and procedures.

Our specific recommendation is that a working group is set up between CREST , the DHET, National Research Foundation (NRF) and Department of Science and Technology (DST) (the latter two have both expressed an interest in a similar capacity-building programme) to design and develop a training and capacity-building programme that would address these and other needs of the DHET.

Recommendation 7c: We need ongoing research and analysis of SA scholarly publishing in order to maintain the requisite levels of vigilance and ensure that the public investment in the subsidy systems meet the highest standards of research quality and integrity. It is imperative that we protect the integrity of our publication system and hence also of the funding system. Growth in output must go hand in hand with proper quality and ethical “surveillance”.

Therefore, our specific recommendation is that CREST and the DHET (which may include staff from other directorates) set up a research working group that would together identify possible lines of research and studies of high importance, and subsequently design and implement such studies. Some of these studies could coincide with the attainment of a formal qualification.

A framework of journal quality and integrity

In the final part of the report we discuss and propose a **framework of journal quality and integrity** (JQI) that we believe should be adopted to assist the DHET in monitoring and assessing the quality of journals that are accredited for subsidy. The proposed framework is composed of **three** main dimensions with **eight** sub-dimensions (indicator categories) and a total of 15 indicators.

Dimension 1: Journal citation impact

The journal has acceptable levels of worldwide **citation visibility or impact** (*citation impact*).

Dimension 2: International footprint and reputation

The journal has an **international footprint and reputation** and hence attracts manuscripts from outside the country.

- 2a: The journal attracts minimal levels of foreign contributions (*foreign contribution*).
- 2b: The journal publishes acceptable levels of papers that are co-authored by SA and non-SA authors (*foreign co-authorship*).
- 2c: The journal attracts manuscripts from a wide range of institutions nationally and internationally (*institutional range*).
- 2d: There is an acceptable degree of representation by international experts on the journal editorial board or advisory board (*foreign representation*).

Dimension 3: Journal integrity

- 3a: The journal is transparent and accurate in presenting basic journal-related information, such as journal indexing, journal metrics, members of the editorial board, owner and publisher and location of journal (*publisher integrity*).
- 3b: The editorial board implements an ethically defensible publication policy and acts with integrity in all of its decisions, such as not engaging in aggressive solicitation of manuscripts, not allowing excessive publication in the journal by members of the editorial board, and not allowing a disproportionate number of papers by a single author in one issue (*editorial integrity*).
- 3c: The peer-review process is rigorous and poor articles are turned away (minimal rejection rates) (*peer-review quality*).

The framework, with the main and sub-dimensions, as well as associated indicators, is presented below.

Table 1: Suggested framework

Dimension	Indicator category	Journal-level indicators
International footprint and reputation	<i>Citation impact</i>	1. Journal impact factor (JIF) 2. Journal rank and quartiles 3. Proportion of journal self-citations 4. Citations per publication (CPP) for non-source items (SA journals not in bibliometric databases)
	<i>Foreign contribution</i>	5. Proportion of foreign authored papers
	<i>Foreign co-authorship</i>	6. Proportion of foreign co-authored papers
	<i>Institutional range</i>	7. Proportional share of institutions to total journal output 8. Proportional share of countries to total journal output
Integrity	<i>Foreign representation</i>	9. Proportion of non-SA members of the editorial board
	<i>Publisher integrity and transparency</i>	10. The journal is transparent and truthful in the information that it provides on journal-related information
	<i>Editorial integrity</i>	11. Profile of reviewers (heterogeneity measure)

Dimension	Indicator category	Journal-level indicators
		12. Proportion of papers authored by members of the editorial board or the editor 13. Level of publication intensity by a single author
	<i>Peer-review quality</i>	14. Article screening rate (rejection before peer review) 15. Article acceptance (rejection) rate (rejection after peer review)

In Part 4 of the report we discuss each of the 15 indicators in more detail and present illustrative data that shows how one would go about populating this framework of JQI.

Recommendation 8: We have presented sufficient evidence in this report to recommend that it is essential that the quality and integrity of SA journals be continuously monitored and assessed. We have developed a draft version of the framework that could be used to measure the JQI of SA journals. Our recommendation is that the DHET adopts this framework and initiates a process that will lead to its implementation in the near future. We specifically recommend that this process must include the following steps:

- (1) Submission of the proposed framework to a small group of experts in scholarly publishing and bibliometrics.
- (2) Gathering of more information and data to populate the framework indicators.
- (3) A stakeholder consultation process that would include journal editors to solicit their comments and feedback on the proposed framework.

If this process results in a consensus view to adopt a final version and to implement it, we also recommend that it be applied to all currently accredited SA journals and be used by the DHET in the future consideration of new journals.

Implementation framework

We have collated the eight recommendations into one table and added columns related to the timeframe and proposed agency for the implementation of these recommendations. The final column includes comments that identify the conditions that will co-determine the effectiveness of the implementation of these recommendations, as well as their impact over time.

Table 2: Summary of recommendations

Recommendation	Timeframe	Agency	Comments
Recommendation 1: The DHET should replace the current practice of CESM-based field classification with an output-based classification framework of journal articles.	This recommendation can be implemented immediately with effect from 2020	DHET	The DHET should consult with CREST on implications for reporting. Further work needs to be done between the DHET, CREST and NRF on how to align such a system, with the assignment of CESM categories to books and conference submissions.
Recommendation 2: The DHET should exclude both the ProQuest IBSS and Norwegian lists from the current list of accredited journals.	This recommendation can be implemented immediately with effect from 2020	DHET	The implementation of this recommendation will have no immediate negative impact on the system. Instead, it will simplify the process through the exclusion of two lists.
Recommendation 3: The DHET should consider the inclusion of the ERIH-Plus and DOAJ lists in the future.	Short to medium term with a report on this matter before the end of 2019 and possible implementation with effect from 2020	DHET to request CREST and ASSAf to undertake further analysis	It is advisable that further analyses be conducted to establish what the impact of the inclusion of these respective lists will be on the system.
Recommendation 4: Based on the analyses above, CREST proposes the introduction and implementation of a decision framework for awarding book and book chapter subsidies. This decision framework consists of the development of two lists of accredited publishers (List A and List B) and three decision rules that describe its implementation.	This recommendation can be implemented with effect from 2020 but annual monitoring of the impact of this decision on the system is required	DHET in partnership with CREST	If our proposal to implement this framework is accepted, we would in addition recommend that ongoing research and analysis is conducted to monitor the efficiency and impact of its implementation; and also to allow for the inclusion of new publishers onto Lists A and B in the future if so warranted.
Recommendation 5: We propose that the DHET produces two lists of accredited conference titles (similar to the list of publishers proposed in the previous section). The first list, List A, would include only conference titles that are indexed in the two proceedings indexes of the WoS and account for 80% of all submissions made to the DHET over a certain period of time. Based on the current	This recommendation cannot be implemented immediately but requires further research, analysis and stakeholder consultation	DHET in partnership with CREST and certain scientific societies	If this recommendation is adopted, the next steps would include further work to finalise the proposed Lists A and B, further work to get consensus among local academics on the inclusion of SA conference proceedings titles, and modelling the impact on the system.

Recommendation	Timeframe	Agency	Comments
available information, this list would contain the names of approximately 350 conference titles. The second list, List B, would include all other conference names that appear in the WoS (and possibly Scopus) proceedings indexes, as well as any South African conference titles to be added after a review/accreditation process			
Recommendation 6: Based on an in-depth analysis of conference submissions by universities and individual authors, we recommend that the DHET gives serious consideration to capping the maximum number of conference submissions that a single academic can make to the DHET in particular year at 10 submissions.	This recommendation can be implemented with effect from 2020	DHET	The impact on the system as a whole will be minimal, but it will also send a warning to academics engaged in gaming of the conference subsidy system that such behaviour is being monitored and will not be tolerated.
Recommendation 7a: We recommend the establishment of a timelier alert and support systems and tools to assist universities (and their research offices) to identify cases of questionable publishing behaviour (including predatory publishing) before submission for publication subsidies.	This recommendation can be implemented immediately	DHET in partnership with CREST	Our specific recommendation is that the DHET, in partnership with CREST, develop a website that would provide the necessary support to scholars and students in this regard.
Recommendation 7b: We need to increase our educational and capacity-building efforts around good conduct in scholarship. Our recommendation is that a training and capacity-building programme in research assessment and metrics for scholarly publishing be developed and implemented.	This recommendation can be implemented immediately	DHET in partnership with CREST (and possibly other partners such as the NRF and DST)	Our specific recommendation is that a working group is set up to design and develop a training and capacity-building programme that would address these and other needs of the DHET. CREST has developed a draft framework for such a programme.

Recommendation	Timeframe	Agency	Comments
Recommendation 7c: We need ongoing research and analysis of SA scholarly publishing in order to maintain the requisite levels of vigilance and ensure that the public investment in the subsidy systems meets the highest standards of research quality and integrity.	This recommendation can be implemented immediately	DHET in partnership with CREST	Our specific recommendation is that CREST and the DHET (which may include staff from other directorates) set up a research working group that would identify possible lines of research and studies of high importance and subsequently design and implement such studies. Some of these studies could coincide with the attainment of a formal qualification.
Recommendation 8: Our analysis has shown that there is sufficient evidence to make it essential that the quality and integrity of SA journals needs to be continuously monitored and assessed. We have thus developed a draft version of a framework that could be used to measure journal quality and integrity of SA journals. Our recommendation is that the DHET adopts this framework and initiates a process that will lead to its implementation in the near future.	This recommendation can be implemented immediately	DHET in partnership with CREST and ASSAf	We specifically recommend that this process includes the following steps: <ol style="list-style-type: none"> 1. Submission of the proposed framework to a small group of experts for comments. 2. Gathering of more information and data to populate the framework indicators. 3. A stakeholder consultation process that would solicit feedback on the proposed framework.

Part 1: General trends in publication output

This section is devoted to an overview of the main trends in publication output between 2005 and 2017. More detailed analyses of the output in different categories (journal articles, books/chapters and conference proceedings) are presented in the next sections. Our focus here is on addressing three issues:

- (1) General trends in publication output over the past thirteen years.
- (2) Disaggregation of output by scientific discipline.
- (3) Disaggregation of output by journal index/list.

In our discussion of the output by journal index/list, we also address the question of whether the IBSS and Norwegian lists should be retained. In addition, if the IBSS list should be excluded from the list of accredited lists the next question is whether any other journal list should be included.

1.1 General trends in publication output: 2005 to 2017

What are the main trends and changes (if any) in the nature of scientific journal publishing since the introduction of the revised funding framework of 2005?

Table 3: Publication outputs by document type and year (2005-2017)

Year	Books	Conferences	Journals	Documents	% books	% proceedings	% articles
2005	200	521	7 075	7 796	2.6%	6.7%	90.8%
2006	199	673	7 864	8 736	2.3%	7.7%	90.0%
2007	597	865	8 059	9 521	6.3%	9.1%	84.6%
2008	566	1 139	9 748	11 453	4.9%	9.9%	85.1%
2009	738	1 206	10 163	12 107	6.1%	10.0%	83.9%
2010	829	1 589	11 112	13 530	6.1%	11.7%	82.1%
2011	1 102	2 377	12 808	16 287	6.8%	14.6%	78.6%
2012	1 641	2 504	14 522	18 667	8.8%	13.4%	77.8%
2013	1 501	3 020	16 030	20 551	7.3%	14.7%	78.0%
2014	1 736	3 087	17 431	22 254	7.8%	13.9%	78.3%
2015	1 872	3 624	18 022	23 518	8.0%	15.4%	76.6%
2016	2 110	3 628	19 486	25 224	8.4%	14.4%	77.3%
2017	2 184	3 250	20 698	26 132	8.4%	12.4%	79.2%
Total	15 275	27 483	173 018	215 776	7.1%	12.7%	80.2%

The numbers in Table 1 refer to full document counts. This means, for example, that in total 20 698 articles (full article count) were produced and submitted for funding to the DHET in 2017. Similarly, a total of 2 184 books and book chapters and 3 250 conference papers were submitted in the same year for funding. This results in the relative shares of 79.2% (articles), 12.7% (proceedings) and 8.4% (books/chapters). In contrast, Table 2 presents the official audited data of the DHET on the publication units (fractional counting of documents) for the last three years. Again, as an example, the 20 698 full papers submitted in 2017 translates to 15 949 article units awarded for the same year. The difference is due to the fact that authors who are not affiliated to a South African university do not qualify for funding. One result of this calculation is that the relative shares of the subsidy units are not identical to the relative share

values of the full document count. In 2017, the full article count constituted 80.2% of all documents submitted. In terms of relative share of article units, this proportion was 82.1%.

Table 4: Publication units awarded to universities in each category (2015-2017)

	2015	2015 shares	2016	2016 shares	2017	2017 shares
Articles	13 960	85.60%	14 591	80.30%	15 939	82.10%
Books	995	6.10%	2 269	12.50%	2 208	11.40%
Proceedings	1 350	8.30%	1 321	7.30%	1 274	6.60%
Total	16 304	100.00%	18 181	100.00%	19 421	100.00%

The steady increase in research output (across all three categories) between 1986/87 and 2019/20 is clearly illustrated in Table 3 below. The table also shows how the average rand value per publication unit has increased quite significantly over the same period. The increase in publication units (from 3 382 in 1984 to 19 421 in 2017) translates to a CAGR value of 5,61%. The increase in the average rand value over the same time translates into a significantly higher value of 9.2%.

Table 5: State funding of publication output (1986/87-2019/20)

State funding of publication output			Research publication output		
State's financial year	Average rand value per publication unit (rand)	% increase	University academic year (3)	Publication units of the university sector (1)	% increase (2)
1986/87	7 190		1984	3 382	
1987/88	7 351	2.2%	1985	3 975	17.5%
1988/89	7 222	-1.8%	1986	4 426	11.3%
1989/90	8 845	22.5%	1987	4 943	11.7%
1990/91	10 090	14.1%	1988	5 054	2.2%
1991/92	10 179	0.9%	1989	4 935	-2.3%
1992/93	11 208	10.1%	1990	5 211	5.6%
1993/94	11 666	4.1%	1991	5 150	-1.2%
1994/95	12 575	7.8%	1992	5 369	4.3%
1995/96	13 347	6.1%	1993	5 299	-1.3%
1996/97	15 939	19.4%	1994	5 599	5.7%
1997/98	16 727	4.9%	1995	5 500	-1.8%
1998/99	18 116	8.3%	1996	5 662	2.9%
1999/2000	19 184	5.9%	1997	5 329	-5.9%
2000/01	19 961	4.1%	1998	5 477	2.8%
2001/02	21 332	6.9%	1999	5 453	-0.4%
2002/03	22 962	7.6%	2000	6 007	10.2%
2003/04	24 145	5.2%	2001	5 927	-1.3%
2004/05	71 189	194.8%	2002	6 485	9.4%
2005/06	77 609	9.0%	2003	6 381	-1.6%
2006/07	81 276	4.7%	2004	6 660	4.4%
2007/08	85 026	4.6%	2005	7 228	8.5%
2008/09	88 418	4.0%	2006	8 003	10.7%
2009/10	102 603	16.0%	2007	7 751	-3.1%
2010/11	117 144	14.2%	2008	8 353	7.8%
2011/12	127 638	9.0%	2009	9 109	9.1%
2012/13	119 331	-6.5%	2010	9 748	7.0%

State funding of publication output			Research publication output		
State's financial year	Average rand value per publication unit (rand)	% increase	University academic year (3)	Publication units of the university sector (1)	% increase (2)
2013/14	119 027	-0.3%	2011	11 191	14.8%
2014/15	115 052	-3.3%	2012	12 364	10.5%
2015/16	113 184	-1.6%	2013	14 009	13.3%
2016/17	108 693	-4.0%	2014	15 316	9.3%
2017/18	107 222	-1.4%	2015	16 304	6.4%
2018/19	110 665	3.2%	2016	18 181	11.5%
2019/20	121 871	10.1%	2017	19 421	6.8%

(Source: DHET, 2019)

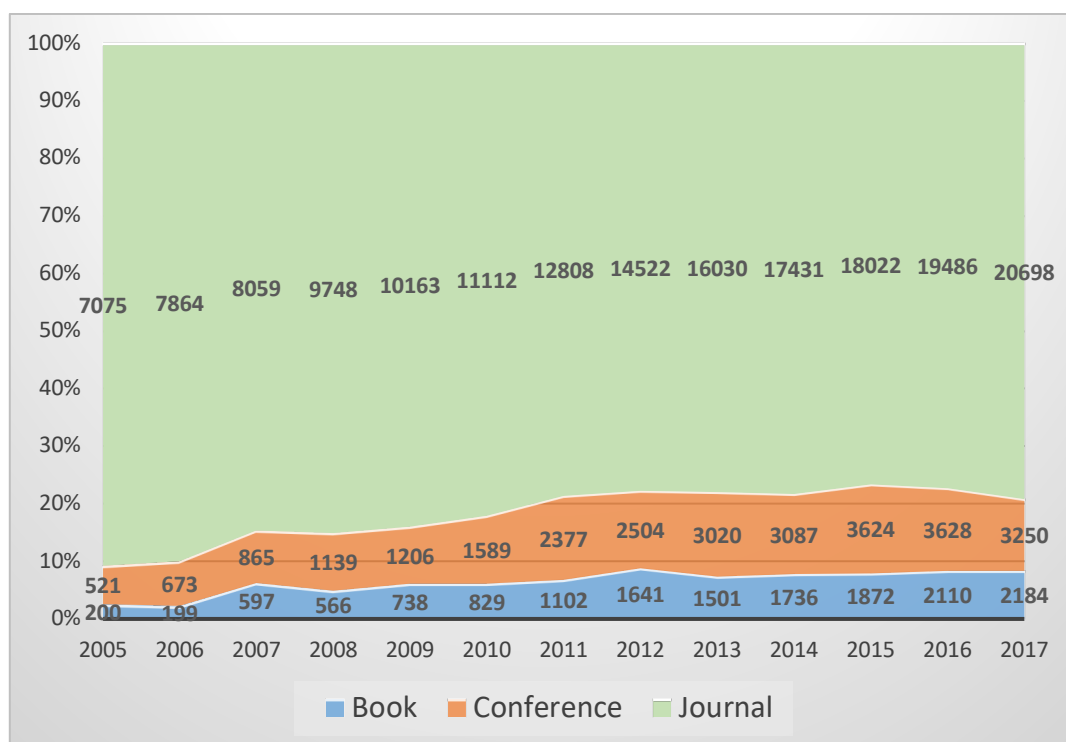


Figure 1: Relative shares of submissions by document type (2005-2017)

The CAGR between the different document types reveals that the overall rate of increase in output over this thirteen-year period was 8.3%. However, the highest rates of increase were recorded for books/book chapters and conference proceedings respectively.

Table 6: CAGR values of document types (2005-2017)

Document type	CAGR
Journal articles	7.2%
Books/book chapters	21.0%
Conference proceedings	11.5%
All publications	8.3%

In the next section, we address the question whether these trends in output were similar across different scientific fields or disciplines.

1.2 Publication output by scientific field or subject category

The DHET has traditionally used the Higher Education Management Information System (HEMIS)/CESM classification framework for classifying all publication outputs. The CESM system is primarily used for the classification of staff and student data in the annual submissions by universities to the department for funding purposes. It was designed as and remains an input classification system. However, publications are outputs of the research or knowledge production process. It is standard practice in the field of bibliometrics to use classification frameworks that have been specifically developed to measure such output. In the field of bibliometrics there are numerous such classification frameworks. The most commonly used are the classification of “subject categories” (more than 270) in the WoS and the comparable system used by Elsevier for the Scopus database.

CREST strongly advises the DHET to change from the current input-based framework (CESM categories) to an output-based framework (such as the WoS classification into subject categories or research areas). There are at least four main reasons why the DHET should seriously consider implementing this change as soon as possible:

- (1) The first and most important argument, as stated above, is that it is a more appropriate system when classifying publications that are outputs of the knowledge production system (and not staff and students who are classified as input factors in the same system). One immediate result of adopting, for example, the WoS classification system is that it is more responsive to shifts in research output. Since it is a more fine-grained classification framework (at one level it distinguishes between 270 fields and sub-fields), it is able to record changes in research focus within fields more quickly. This would apply to different levels of the research system – at least at national and institutional levels.
- (2) A second, and related argument, is that adopting a standard classification framework (such as the WoS or Scopus frameworks), will allow for international comparison and benchmarking of South Africa’s output with other countries across various scientific fields. The CESM framework is unique to SA higher education and does not allow for a “natural” comparison with any of the output-based frameworks.
- (3) The current system is based on the judgment of the author of a paper in which CESM category the specific paper should be classified. This in itself is not a bad approach. However, anecdotal evidence suggests that this judgment is not always made by the authors themselves, but rather by an administrative officer in an academic department or in the research office. In addition, when the authors of a paper are based at more than one university, it creates the possibility of different judgments as to the correct classification. We illustrate how these errors have been identified in the 2017 submissions (see Appendix 1).
- (4) From an **efficiency** point of view, the adoption of a journal-based classification system makes much more sense. This would mean that universities/authors would not need to classify their documents according to the CESM framework anymore. Once a journal title has been entered into the submission template, it is automatically linked to the correct WoS subject category.

To elaborate on the first point above as to why an output-based classification framework of research publications is better and more appropriate than any input-based framework. The table below presents a breakdown of output by CESM category for the 2017 submissions (journal articles only).

Table 7: Journal articles by CESM category

CESM field	Unique articles	Share
Agriculture	1794	8,4%
Architecture and built environment	122	0,6%
Business, economics and management studies	1 645	7,7%
Communication, journalism and related studies	112	0,5%
Computer and information sciences	328	1,5%
Education	936	4,4%
Engineering	1 555	7,3%
Family ecology and consumer sciences	4 574	21,5%
Health professions and related clinical sciences	34	0,2%
Languages, linguistics and literature	529	2,5%
Law	618	2,9%
Life sciences	2 521	11,8%
Mathematics and statistics	2 583	12,1%
Military sciences	754	3,5%
Philosophy, religion and theology	79	0,4%
Physical sciences	829	3,9%
Psychology	442	2,1%
Public management and services	252	1,2%
Social sciences	1 479	6,9%
Visual and performing arts	137	0,6%
Total	21 323¹	

Close inspection of Table 7 shows why the DHET should give serious consideration to replacing the CESM framework with an output-based framework. The results presented in the table show how skewed the output per CESM category is. The biggest category (*Health professions*) contributed 21.7% of all output and the smallest category (*Family ecology*) only 0.2%. The ratio between the highest and lowest categories in a 20-category classification framework is a staggering 131:1. From the point of classification logic, this makes no sense as one would expect to have a much more even distribution of outputs across 20 categories. As argued above, this result is not surprising, since CESM is used for funding of students and staff at universities (input factors) and has to make allowances for any possible scientific discipline that offers a qualification.

From an analytical point of view, a distribution such as this (see Figure 2 below), provides very little insight into the distribution of outputs across main and sub-fields. For example, the whole domain of the health sciences and medicine (basic and clinic, public and occupational, etc.) is grouped together in one category. If one were interested in analysing trends at lower levels, for example, whether there has been an increase in papers in output of “infectious diseases”

¹ Because the same article submitted from different universities were in some cases assigned to different CESM categories, this total (21 323) is higher than the actual number of unique article submitted in 2017 (20 698).

or “virology” or “pharmacology”, this classification cannot be used. The same argument can be made for the other larger categories, for example, life sciences, which make any fine-grained analysis impossible.

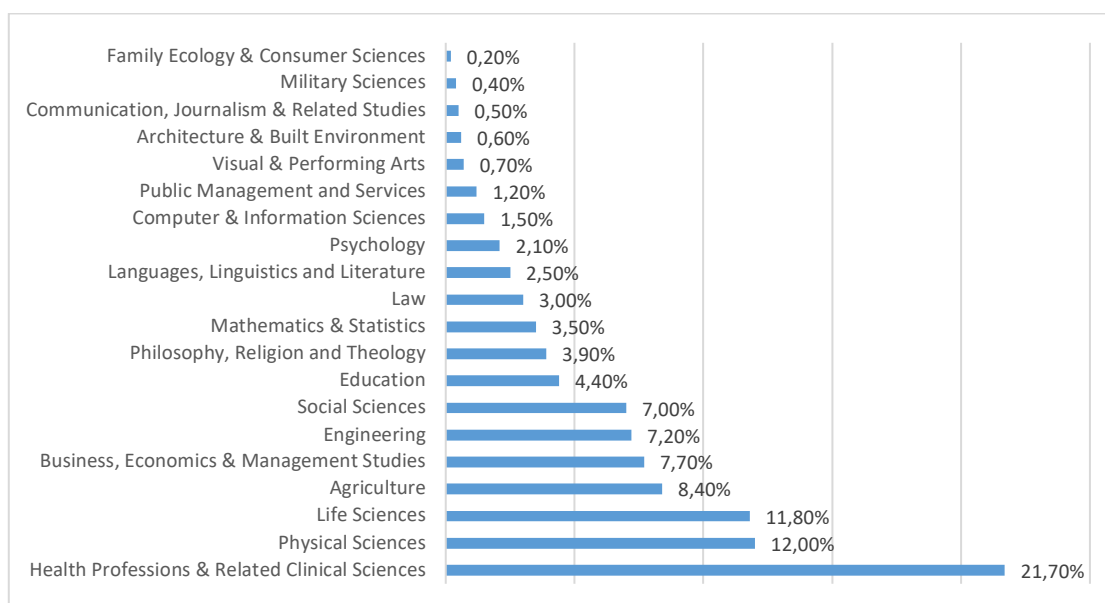


Figure 2: Distribution of output (2017) by CESM category

The biggest advantage of using a publication-output-based framework, such as the WoS subject category classification system, is that it can produce field and discipline profiles for at least four different levels of aggregation. Below are two tables – the first gives the fairly high level of aggregation (Level 2 with 28 subject categories); the second lists the output for all WoS categories at the third level of disaggregation (with 33 categories). The most detailed level of disaggregation (Level 4 with 275 categories) is included as Appendix 2. Again, it should be noted that the total number of articles in Tables 8, 9 and 10 exceed the actual number of unique articles for 2017 (20 698), since the WoS often assigns the same journal to two or more subject categories. This means that the most important column in these tables is the last one, where the relative share is recorded.

Table 8: 2017 journal output at WoS Subject Level 2

WoS-based classification	No. of articles	Field share
Agricultural sciences: Plant sciences	550	1.6%
Agricultural sciences: Veterinary sciences	179	0.5%
Agricultural sciences: Other	1 242	3.7%
Basic health sciences	1 847	5.5%
Biological sciences	1 671	5.0%
Chemical sciences	2 226	6.6%
Clinical and public health	4 846	14.4%
Earth sciences: Ecology	520	1.5%
Earth sciences: Geosciences	883	2.6%
Earth sciences: Other earth sciences	831	2.5%
Economic and management sciences	1 702	5.0%
Education	802	2.4%
Engineering sciences: Electrical and electronic	170	0.5%
Engineering sciences: Materials science	918	2.7%

WoS-based classification	No. of articles	Field share
Engineering sciences: Mechanical engineering	177	0.5%
Engineering sciences: Mining engineering	177	0.5%
Engineering sciences: Other	2 530	7.5%
Language and linguistics	724	2.1%
Law	648	1.9%
Mathematical sciences and ICCT	1 180	3.5%
Multidisciplinary sciences	441	1.3%
Other humanities and arts	681	2.0%
Other social sciences	3 985	11.8%
Physical sciences: Astronomy and astrophysics	274	0.8%
Physical sciences: General	1 781	5.3%
Psychology	1 046	3.1%
Religion	678	2.0%
Sociology and related studies	1 003	3.0%
Total	33 712	

Table 9: 2017 journal output at WoS Subject Level 3

Level 3 subject categories	No. of papers	Relative share
Astronomy and astrophysics	273	1.1%
Basic health sciences	1 480	6.0%
Chemical sciences	1 120	4.5%
Clinical and public health	3 651	14.8%
Ecology	512	2.1%
Economic and management sciences	1 221	4.9%
Education	691	2.8%
Electrical and electronic engineering	170	0.7%
Entomology	142	0.6%
General physics	995	4.0%
Geosciences	471	1.9%
Information, computer and communication technologies	256	1.0%
Language and linguistics	521	2.1%
Law	540	2.2%
Marine and freshwater biology	210	0.9%
Materials sciences	479	1.9%
Mathematical sciences	439	1.8%
Mechanical engineering	155	0.6%
Mining engineering	175	0.7%
Multidisciplinary sciences	620	2.5%
Ornithology	15	0.1%
Other agricultural sciences	703	2.8%
Other biological sciences	833	3.4%
Other earth sciences	740	3.0%
Other engineering and applied technologies	1 880	7.6%
Other humanities and arts	542	2.2%
Other social sciences	2 830	11.5%
Plant sciences	503	2.0%
Psychology	646	2.6%
Religion	664	2.7%

Level 3 subject categories	No. of papers	Relative share
Sociology and related studies	750	3.0%
Veterinary sciences	168	0.7%
Zoology	283	1.1%
Total	24 678	100.0%

The WoS classification frameworks at different levels allow us to conduct much more detailed and interesting analysis. It also allows us to address questions about the relation between knowledge production and national goals, strategies and funding in a more granular way. For example, a comparison of the growth rates of the 33 subject categories at Level 3 over the past thirteen years (Table 10) reveals some interesting trends and differences across fields.

Table 10: Growth rates of number of publications in different fields (2005-2017)

Subject category	2005	2008	2011	2015	2016	2017	CAGR
Materials sciences	70	120	189	363	443	479	17.40%
Psychology	136	263	276	461	538	646	13.90%
Electrical and electronic engineering	37	64	67	158	152	170	13.60%
Economic and management sciences	280	375	760	1 187	1262	1 221	13.10%
Astronomy and astrophysics	72	94	175	344	308	273	11.70%
Chemical sciences	306	416	730	1 030	1 092	1 120	11.40%
Other engineering and applied technologies	541	615	983	1619	1 564	1 880	10.90%
General physics	310	406	783	979	1 012	995	10.20%
Basic health sciences	478	770	966	1360	1 309	1 480	9.80%
Other social sciences	929	1 297	1 829	2966	2 735	2 830	9.70%
Ecology	172	281	326	436	392	512	9.50%
Information, computer and communication technologies	87	139	93	155	207	256	9.40%
Clinical and public health	1 272	1 845	2 220	3235	3 383	3 651	9.20%
Geosciences	166	213	320	398	481	471	9.10%
Education	252	359	477	787	808	691	8.80%
Other earth sciences	275	365	503	602	607	740	8.60%
Other biological sciences	341	526	732	808	791	833	8.30%
Plant sciences	194	321	364	429	403	503	8.30%
Mining engineering	68	79	118	163	132	175	8.20%
Mathematical sciences	172	279	342	421	392	439	8.10%
Sociology and related studies	297	378	403	727	713	750	8.00%
Mechanical engineering	64	46	81	126	132	155	7.70%
Marine and freshwater biology	92	138	159	234	248	210	7.10%
Entomology	65	79	122	109	108	142	6.70%
Other agricultural sciences	324	342	527	613	608	703	6.70%
Language and linguistics	254	425	379	490	411	521	6.20%
Veterinary sciences	83	124	149	141	148	168	6.10%
Zoology	152	210	245	308	282	283	5.30%
Religion	454	556	642	755	714	664	3.20%
Other humanities and arts	386	564	617	633	613	542	2.90%
Law	395	538	539	716	508	540	2.60%
Ornithology	15	18	20	31	26	15	0.00%
Total	8 885	12 464	16 525	23 417	23 043	24 678	8.80%

1.3 Trends in output by journal list

As indicated in the introduction to this report, a number of new journal lists were added to the list of accredited journals that qualify for subsidy in the recent past. These include the ProQuest IBSS list in 2005 and, more recently in 2015, the addition of Scopus, Scielo and NSD. As a result, South African academics now have a more expanded list of journals in which they can publish available to them. In 2018, CREST developed a consolidated list of unique journal titles from the six lists/indexes that qualify for subsidy. The result shows that there were in total 27 126 unique journals that qualified for subsidy for the 2018 submission year. The breakdown by list of these journal titles is presented in the graph below.

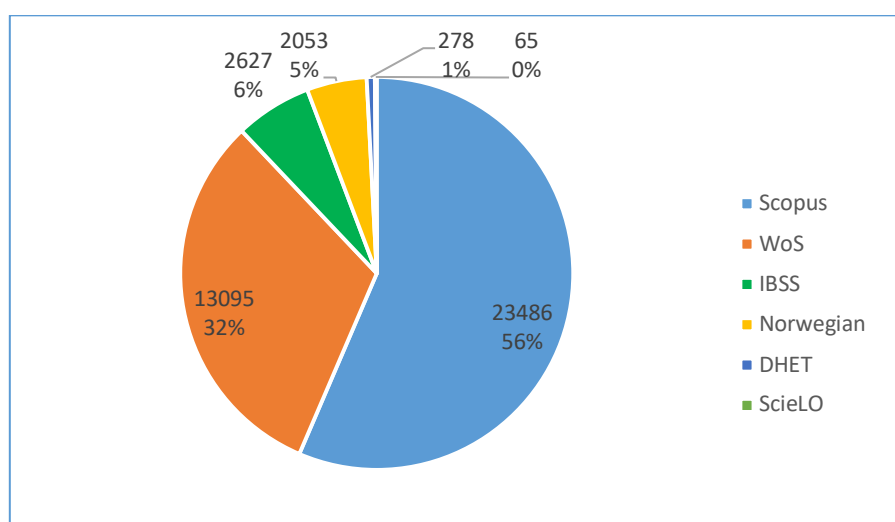


Figure 3: Number of journal titles by list/index

There is significant overlap of journal titles across the journal lists and indexes. One journal (*The SA Journal of Education*) appears in five of these lists. The distribution of the remaining journals is as tabled below.

Table 11: Number of journals appearing in each journal list

Frequency of journal titles in journal lists	Number of journals
4	307
3	1 856
2	9 843
1	15 117

The big overlap in journal titles between the WoS and Scopus is illustrated by the large number of journals that appear in three of the lists (1 856), and especially in two of the lists (9 843).

What has the impact been of the additional lists? The two graphs below contain the number of journal articles by list – first for 2017 only, then for the entire period (2005 to 2017).

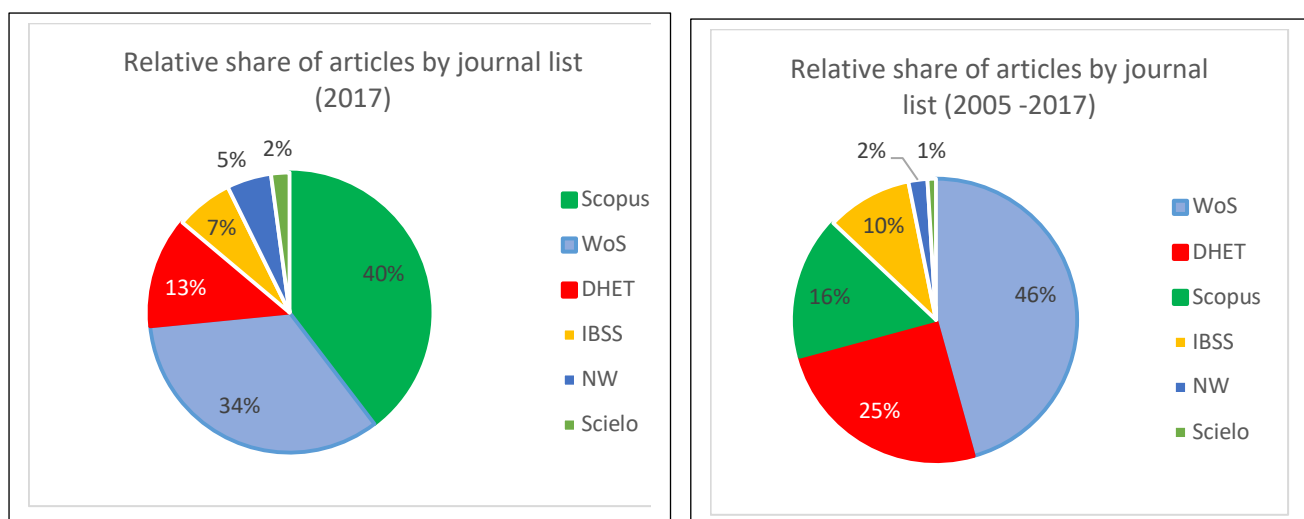


Figure 4: Journal papers by index over time

The disaggregation of the number of articles by list/index for 2017 shows that the inclusion of Scopus has had a huge impact since its introduction in 2017. In 2017, Scopus accounted for the largest proportion (40%) of all papers, followed by the WoS (34%) and the DHET's list of SA journals (13%). The second graph shows that the WoS accounted for the largest proportion of articles (46%), followed by the DHET (25%) and Scopus (16%). More detail is provided in Table 12, where the number of articles in each of the indexes and lists is given. It is important to point out that this table only lists where an article appears in a specific index or list. The overlap between these indexes/lists is not taken into consideration (this is however shown in Table 13).

Table 12: Unique articles by journal list (2005-2017)

Publication year	Unique articles	DHET	WoS	IBSS	Scopus	NW	Scielo
2005	7 076	3 582	4 587	971	0	0	0
2006	7 865	3 795	5 364	931	0	0	0
2007	8 059	3 905	5 382	1 016	0	0	0
2008	9 753	4 649	6 517	1 370	0	0	0
2009	10 164	4 563	6 980	1 304	0	0	0
2010	11 114	4 718	7 643	1 527	0	0	0
2011	12 819	5 172	8 933	1 851	0	0	0
2012	14 527	5 311	10 289	2 234	0	0	0
2013	16 044	5 914	10 943	2 591	0	0	0
2014	17 445	5 870	11 702	3 180	6	0	6
2015	17 998	5 312	11 662	2 532	12 871	1 888	867
2016	17 707	4 817	10 979	2 458	13 080	1 638	759
2017	20 712	4 556	12 139	2 369	14 233	1 850	765
Total	171 283	62 164	113 120	24 334	40 190	5 376	2 397

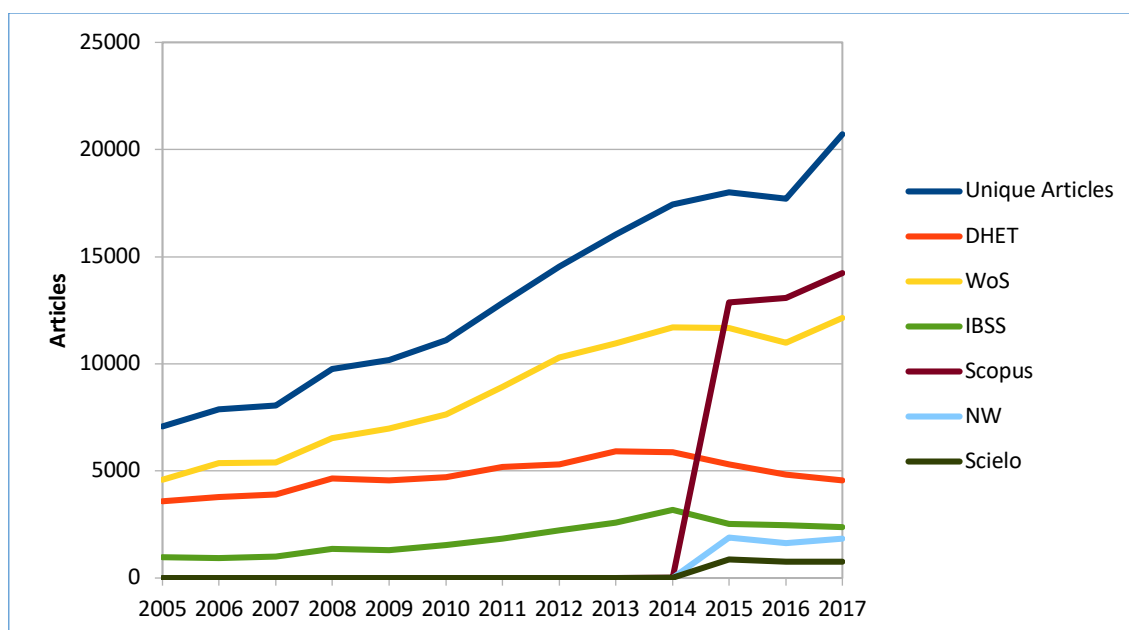


Figure 5: Unique articles by index per year

In order to establish what the relative share of each index is to the overall listing of papers, we constructed Table 13. In this table the overlaps of journals listed in each of the indexes/lists are given. The table shows the number of articles that appear in two indexes individually (e.g. DHET and WoS). Articles that appear in three or more indexes are not listed separately – only the total (14 802). The diagonal (shaded) blocks show the number of articles that are unique to each index or list.

Table 13: List of unique article titles by index per year (2005-2017)

	DHET	WoS	Scopus	IBSS	NWLlist	Scielo	Total
DHET	34 508						34 508
WoS	13 196	60 495					73 691
Scopus	1 703	22 276	5 190				29 169
IBSS	4 669	4 892	1 447	6 971			17 979
NWLlist	0	90	234	7	36		367
Scielo	813	0	173	6	0	131	1 123
Sub-total	54 889	87 753	7 044	6 984	36	131	156 837
Articles in 3 or more indexes							14 802
Grand total							171 639²

Figure 4b shows that three lists – WoS (46%), DHET (25%) and Scopus (16%) respectively – account for 87% of all articles published between 2005 and 2017. A relatively small percentage (10%) of articles submitted appeared in IBSS-listed journals. If one looks at 2017 only, the share of articles appearing in IBSS was only 7%. However, if we look at the intersections between the indexes, the proportion appearing in IBSS **only** decreases even further to 3% (806 in 2017). This is because of the large overlap between IBSS and Scopus journals and to a lesser extent to the overlapping with WoS and DHET.

² The differences in the total between Tables 12 and 13 are due to a small number of duplicate article titles remaining in our database.

1.4 Should IBSS and NSD be retained as accredited lists by the DHET?

The results presented thus far show that only 3% and almost 0% of all articles submitted for subsidy by South African academics over the past thirteen years appeared in journals included in ProQuest (PQ) IBSS and the Norwegian list respectively. As far as the Norwegian list is concerned, we believe it is self-evident that – given the minor impact that its delisting will have on the system – it should be excluded from future lists.

One of the main aims of this study was to advise the DHET on the desirability of retaining IBSS as a recognised list. We understand this requirement involves two separate but related tasks:

- (a) Whether it is advisable to retain the PQ IBSS list and what the impact would be on the funding system should it be removed (taking into account the coverage of IBSS journals in the other lists).
- (b) In the event that the IBSS list is removed, whether there are other lists that are dedicated to the social sciences and humanities that should be considered for inclusion in the future.

We begin with some background on the ProQuest IBSS list. The International Bibliography of the Social Sciences (IBSS) was established in 1951 by the International Committee for Social Science Information and Documentation, a non-governmental organisation recognised by UNESCO. From 1951 to 1989 it was prepared by the *Foundation Nationale des Sciences Politiques* in Paris and produced in four printed volumes: Economics, Political Science, Anthropology and Sociology. From 1989 to 2010 it was produced by the British Library of Political and Economic Science of the London School of Economics, with the help of funds from the Economic and Social Research Council (ESRC) from 1995 to 2009. It was purchased by ProQuest in January 2010, and production moved to ProQuest's UK headquarters in July that year. In 2016, production was transferred yet again, this time to Louisville, Kentucky.

The DHET-listed IBSS titles for 2018 were as follows: 2 478 (core coverage, actively indexed) + 150 (selective coverage, actively indexed) = 2 628.

According to the list downloaded on 27 September 2018 from the ProQuest website, there were 6 193 titles. Below is a summary of the coverage.

Table 14: DHET-listed IBSS titles (2018)

Coverage	No. of journal titles
Core coverage – actively indexed	2 478
Core coverage – indexing ceased	2 745
Selective coverage – actively indexed	150
Selective coverage – indexing ceased	819
Indexing ceased	1
Total	6 193

(Source: <https://www.proquest.com/libraries/academic/databases/ibss-set-c.html>)

According to the ProQuest website, the selection criteria detailed below have been developed in accordance with the four statements that remain the guiding principles of IBSS' editorial policy.

- (1) IBSS maintains coverage of core titles considered central to the study of the social sciences. These are published by mainstream publishers or learned societies, and

are usually in the English language. These titles encompass the standard publications in the fields of anthropology, economics, political science, sociology and related social science subjects.

- (2) IBSS provides an international perspective on the social sciences. This is achieved through the selection of journals
 - whose focus is regional,
 - whose focus is international and comparative,
 - which are the foreign-language equivalents of the core titles, and
 - which are published outside the US or UK.
- (3) Interdisciplinary research is an important feature of contemporary social science research. While the traditional disciplinary focus of the IBSS has been on anthropology, economics, political science and sociology, IBSS supports interdisciplinary research by drawing supporting material from the complementary disciplines of history, law, philosophy and psychology. IBSS also particularly supports specific important interdisciplinary fields of contemporary social sciences research: area studies, development studies, gender and sexuality, human geography and environment, business and management, policy studies, health, education, international relations, and media and communication.
- (4) IBSS maintains the academic standard of its content by ensuring that journals covered are of a scholarly nature with an editorial board of academics, and contain analytical articles, ideally peer reviewed.

Table 15 below lists the journals in which articles appeared between 2005 and 2017 that **only** appear on the IBSS list. The table contains a list of 102 journal titles. We have highlighted three titles that have been previously identified as predatory journals. In our view, many of the other journal titles are suspect or at least cater for a very specific national audience.

Table 15: Journals that appear on the IBSS list only

IBSS only	No. of articles
ACME: International e-Journal for Critical Geographies	2
Acta Universitatis Danubius Administratio	3
Acta Universitatis Danubius Juridica	3
Acta Universitatis Danubius OEconomica	30
AfricaGrowth Agenda	9
African Journal of Business and Economic Research	6
African Journal of Business Ethics	7
African Journal of International and Comparative Law	14
African Journal of Public Affairs	50
African Studies Quarterly: The Online Journal of African Studies	3
Africa Review: Journal of the African Studies Association of India	5
Afrika Focus	1
Archiv Orientalni: Quarterly Journal of African and Asian Studies	1
Asia Journal of Theology	1
Asian and African Studies (Bratislava)	1
Bangladesh e-Journal of Sociology	9
Bulletin of Geography: Socio-economic Series	5

IBSS only	No. of articles
Bulletin of the World Health Organization: The International Journal of Public Health	1
Comparative and International Law Journal of Southern Africa	15
Die Welt des Orients	1
Dirasat: Educational Sciences	8
e-Bangi Journal of Social Science and Humanities	2
Economia Internazionale	4
Economic History of Developing Regions	1
Economics. Management and Financial Markets	2
Electronic Journal of Information Systems Evaluation	1
Eurasian Journal of Business and Economics	1
Euro Economica	4
European Review of Applied Sociology	1
FOCAAL: European Journal of Anthropology	1
Foreign Trade Review	3
Forum Qualitative Social Research	2
Frontiers in Finance and Economics	3
Gender and Behaviour	132
Gender. Place and Culture: A Journal of Feminist Geography	1
Ghana Journal of Development Studies	1
Global Labour Journal	4
Health: An Interdisciplinary Journal for the Social Study of Health. Illness and Medicine	1
History in Africa	2
Indian Journal of Industrial Relations	1
Industry and Higher Education	1
Interdisciplinary Journal of Economics and Business Law	7
International Business and Economics Research Journal	12
International Journal of Business and Management Studies	16
International Journal of e-Business and e-Government Studies	8
International Journal of Economics and Business Research	2
International Journal of Economics and Finance Studies	17
International Journal of Educational Sciences	7
International Journal of Private Law	2
International Journal of social sciences and humanity studies	25
International Journal of Sustainable Economy	8
International Journal on Minority and Group Rights	1
Journal of Accounting and Management	8
Journal of African Cinemas	6
Journal of Agribusiness and Rural Development	4
Journal of Community Informatics	4
Journal of Corporate Citizenship	2
Journal of Developing Areas	14
Journal of Economics and Behavioral Studies	104
Journal of Enterprising Culture	1
Journal of Genocide Research	1
Journal of Global Analysis	1
Journal of Global Business and Technology	1
Journal of Human Ecology	8

IBSS only	No. of articles
Journal of Information Warfare	2
Journal of Namibian Studies	1
Journal of Social Sciences	49
Juridical Tribune Journal	2
LEAD Journal/Law Environment and Development Journal	2
Loyola Journal of Social Sciences	7
Management: Journal of Contemporary Management Issues	1
Managing Global Transitions International Research Journal	5
Mednarodna Revija Za Javno Upravo/International Public Administration Review	1
Migracijske i Etnicke Teme	1
Netherlands International Law Review	1
Nigerian Journal of Economic and Social Studies	2
Nordic Journal of African Studies	7
OASIS: Observatorio de Analisis de los Sistemas Internacionales	1
OPEC Energy Review	2
Oriental Anthropologist	4
Practice: Social Work in Action	2
PSL Quarterly Review	1
Public and Municipal Finance	11
Pula: Botswana Journal of African Studies	26
Revue De L'Integration Et De La Migration Internationale/Journal of International Migration and Integration	2
Sexualities: Studies in Culture and Society	1
Signs: Journal of Women in Culture and Society	1
Social Development Issues: Alternative Approaches to Global Human Needs	1
Social Identities: Journal for the Study of Race, Nation and Culture	3
Social Work and Social Sciences Review	1
Societies Without Borders	1
Socioeconomica: The Scientific Journal for Theory and Practice of Socio-economic Development	6
Sosyoloji Arastirmalari Dergisi/Journal of Sociological Research	1
South African Historical Journal/Suid-Afrikaanse Historiese Joernaal	19
Spoudai: Journal of Economics and Business	8
Studia Universitatis Babes – Bolyai Serie: Iurisprudentia	1
Studia Universitatis Babes – Bolyai Serie: Oeconomica	5
Taiwan Journal of Democracy	9
Text and Talk: An Interdisciplinary Journal of Language, Discourse and Communication Studies	1
The African Journal of Information Systems	6
Third Text: Critical Perspectives on Contemporary Art and Culture	1
Tourism Review International	9
Total	806

Figure 6 below shows that the vast majority of papers published in the IBSS journals are either from the social sciences (82%) or humanities (10%).

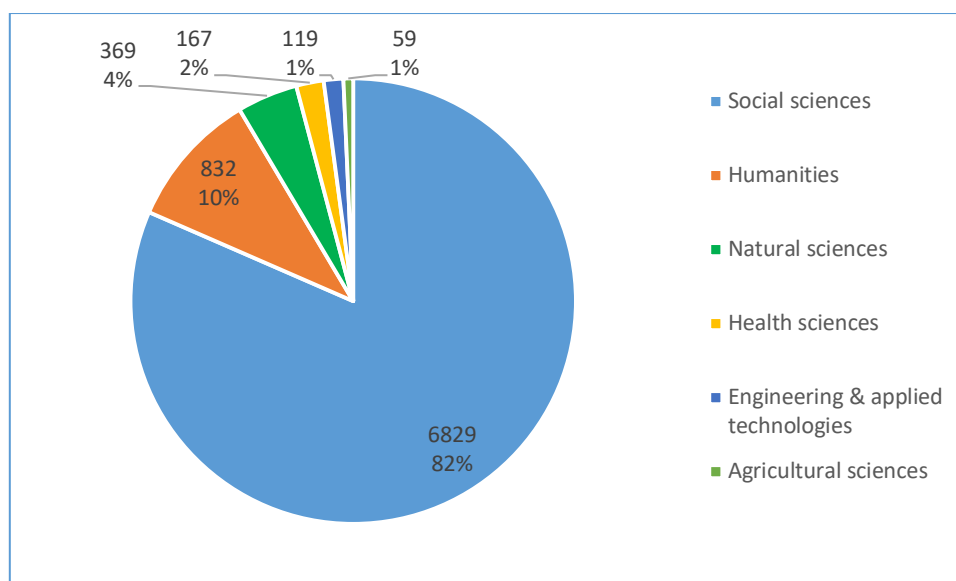


Figure 6: Number of papers in IBSS journals only by main field (2005-2017)

The breakdown by year shows that the number of total papers per year has declined over the past three years. The very high numbers of papers in 2013 and 2014 can be explained by the fact that a large proportions of these papers appeared in journals that have been identified as being predatory – most of which have subsequently been taken off the IBSS list.

Table 16: Number of papers in IBSS-listed journals by year

Main field	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Agricultural sciences		4	2	6	3	3	2	4	10	15	2	4	4
Engineering and applied technologies	10	8	2	6	5	11	6	9	12	31	4	6	9
Health sciences	8	15	9	14	4	5	5	8	8	66	13	10	2
Humanities	18	18	30	34	36	34	54	62	67	166	163	79	71
Natural sciences	14	26	26	31	12	22	26	21	32	89	18	39	13
Social sciences	95	98	137	163	160	228	415	625	990	1443	858	884	732
Grand total	145	169	206	254	220	303	508	729	1119	1810	1058	1022	831

1.5 Are there any other lists that should be considered for inclusion for subsidy purposes?

The ERIH-Plus list is a possible contender to replace the IBSS list. In addition, the DOAJ could also become an alternative list for accreditation.

1.5.1 ERIH-Plus

The European Reference Index for the Humanities and the Social Sciences (ERIH-Plus) was created and developed by European researchers under the coordination of the Standing Committee for the Humanities (SCH) of the European Science Foundation (ESF). The SCH launched the European Reference Index for the Humanities at the request of its member organisations in 2002. The main aim of ERIH from its very beginning has been to enhance **global visibility** of high-quality research in the humanities published in academic journals in various European languages all over Europe. The index enables researchers to better understand and promote the national and international importance of their research. In 2008, the SCH published the so-called ERIH “initial lists”, and in 2011/12 the “revised lists”. The approval of journals to ERIH was based on a peer review process conducted by expert panels in 14 humanities disciplines. In total, 140 researchers from 28 countries participated on a voluntary basis in the work of the ERIH panels in the two rounds.

The ERIH lists, which initially covered only humanities disciplines, were first published by ESF in 2008, while revised lists were made available in 2011 and 2012. In 2014, responsibility for the maintenance and operation of the ERIH was transferred to the NSD. The reference index at NSD is called ERIH-Plus in order to indicate that it has been **extended to include the social sciences**.

The lists published by the ESF SCH in 2011/12 form the basis for the ERIH-Plus list. As the approval procedures of the ERIH-Plus database are different from the ESF procedures (i.e. no peer review by expert panels is currently foreseen), ERIH-Plus does not feature ERIH categories but the database includes all other information accessible via the ESF website. To be included in ERIH-Plus, scientific journals in the humanities and social sciences must meet the benchmark standards described below.

- (1) ERIH-Plus requires an explicit description of the journal’s procedures for external/independent peer review. As a minimum, the journal’s website must describe how the process ensures that reviewers are independent of the authors (i.e. not affiliated with the same institution).
- (2) ERIH-Plus requires that the members of the academic editorial board are listed, along with their affiliations to universities or other independent research institutions.
- (3) ERIH-Plus requires a valid ISSN code, confirmed by the international ISSN portal. Journals with ISSN codes listed as “assigned to a publication but not yet confirmed” or “free ISSN” will not be processed.
- (4) ERIH-Plus requires that all original articles are accompanied by abstracts in English and/or another international language relevant for the field. As the ERIH-Plus team needs access to the abstracts in order to evaluate the journal, they should be available online. It is not sufficient that the journal’s author/submission guidelines refer to abstracts.

- (5) ERIH-Plus requires information on author affiliations for all scholarly articles for the last two years of publication, i.e. the full names of the respective universities or other independent research institutions. ERIH-Plus also encourages journals to include author addresses (either email or postal addresses).
- (6) ERIH-Plus requires that no more than two-thirds of the authors published in the journal are from the same institution. The authorship of journals is determined by reviewing the last two years of published issues.

As ERIH-Plus encourages transparency, the requested information should thus be available on the journal's website. However, if any of the information has limited availability (e.g. subscribers only), ERIH-Plus should be notified.

1.5.2 DOAJ

The Directory of Open Access Journals (DOAJ) was launched in 2003 at Lund University, Sweden, with 300 open-access journals. Today it contains about 12 000 open-access journals, covering all areas of science, technology, medicine, social sciences and humanities.

The DOAJ is a membership organisation and membership is available in three main categories: publisher, ordinary member, and sponsor. A DOAJ membership is a clear statement of intent and proves a commitment to quality, peer-reviewed open access (OA). The DOAJ is co-author of the *Principles of transparency and best practice in scholarly publishing* (principles) and DOAJ members are expected to follow these principles as a condition of membership. The DOAJ reserves the right to reject applications for membership, or revoke membership, if a member or sponsor is found to contravene the principles.

The DOAJ is a community-curated list of journals and aims to be the starting point for all information searches for quality, peer-reviewed open-access material. To assist libraries and indexers keep their lists up to date, the DOAJ makes public a list of journals that have been accepted into or removed from the DOAJ. The DOAJ's mission is to increase the visibility, accessibility, reputation, usage and impact of quality, peer-reviewed, open-access scholarly research journals globally, regardless of discipline, geography or language.

As a first step in comparing the lists of journals by IBSS, ERIH-Plus and the DOAJ, we produced the table below. The results are interesting as they show very little overlap between the three lists – especially between the IBSS and ERIH-Plus.

Table 17: Comparison of the lists DOAJ, IBSS and ERIH-Plus

	DOAJ	IBSS	ERIH-Plus
DOAJ	12 046	157	1 041
IBSS	157	2 626	12 046
ERIH-Plus	1 041	711	6 295

1.6 Concluding assessment and recommendations

1.6.1 Assessment

- (1) University research publication output has increased at an average annual rate of 5.6% since the introduction of the state-funded publication system in 1986. The rate of increase in the average rand value per publication unit over the same period was 9.2%. However, close inspection shows that the introduction of much higher rand values in 2005 (effective 2007), led to even higher growth rates in publication outputs. Between 2005 and 2017, the CAGR in publication output was 8.6%. Disaggregation by document type shows that the biggest increases in output over the past thirteen years were recorded for books and book chapters, and conference papers respectively. However, journal articles continue to constitute the biggest single output category (around 80%).
- (2) In our analysis of the output disaggregated by scientific fields, we compared the results of the current classification framework (CESM) with the WoS classification of subject categories. We showed that the current framework produces results that are in some respects misleading and at best not helpful. The application of an outputs-based framework (WoS) produces more granular results that can be used more effectively in historical and international benchmarking of South African university research output. In addition, adoption of an output-based framework will also eliminate capturing errors that are currently found in the submissions data.
- (3) Our analysis of publication output by journal list/index revealed that the introduction of Scopus in 2015 (effective 2016) has had a huge impact on the distribution of articles by list. Nearly three-quarters (74%) of total output in 2017 appeared in journals indexed either in the WoS or Scopus. The third biggest proportion of papers (14%) appeared in the DHET list (SA journals). Articles in IBSS journals constituted only 6% of all output in 2017. However, because of the overlap of journal titles across the different lists, if we look at articles that were published in journals only included in the IBSS, this proportion reduces to 3%. The proportion for the Norwegian list is even smaller at 0.3%.
- (4) It is important to keep in mind that the IBSS list (now ProQuest IBSS) was included in the list of accredited lists in 2005 in order to “rectify” the under-coverage of the social sciences and humanities in the WoS (at that stage). It is therefore not surprising that a breakdown by scientific field shows that more than 90% of all articles published in IBSS over the past thirteen years are from the social sciences and humanities. The inclusion of Scopus in 2015 and the improved coverage of the social sciences and humanities in the WoS in recent years raise questions about whether it is still necessary to retain the IBSS as a list that caters specifically for the social sciences and humanities. The argument for the exclusion of the IBSS list is strengthened by another concern. In our analysis of the emergence of predatory publishing (Chapter 4), we show that the majority of predatory journals were in fact included in the IBSS list. Although ProQuest (the new owner of IBSS) has claimed that it has strengthened its quality control criteria for the inclusion of new journals, we remain unconvinced that this matter has been adequately addressed.
- (5) The final section addressed the question whether there are other journal lists that DHET should consider in the future. We looked at two very different lists: ERIH-Plus as a possible alternative list to cater for the social sciences and humanities and the DOAJ list

for open-access journals. Both these lists have very stringent quality control criteria and would be strong contenders for inclusion in future.

1.6.2 Recommendations

- (1) Our first recommendation is that the DHET eliminates the request from universities to include the CESM field in their annual submissions for journal articles. This decision can be immediately implemented and would have no negative impact on the annual submissions. The classification of output by scientific field can then be undertaken through the standard reference to the WoS and/or Scopus subject categories.
- (2) Our second recommendation is the DHET excludes both the ProQuest IBSS and Norwegian lists from the current list of accredited journals.
- (3) Our third recommendation is that the DHET considers the inclusion of ERIH-Plus and the DOAJ lists in the future. Before a final decision is taken in this regard, we would suggest that CREST undertakes further analyses to establish what the impact of the inclusion of these respective lists will have.

Part 2: Analysis of book submissions

2.1 Introduction

The process of deciding to award a subsidy to a book or book chapter submission is currently conducted through convening panels that inspect individual submissions visually and then arrive at a positive or negative decision. This is a lengthy and ultimately inefficient process – especially as the number of book and book chapter submissions have increased at a high rate, especially in recent years. In addition to concerns about the time it takes to conclude this process and its cost-efficiency, there are also concerns about the quality, integrity and transparency of such a process. Given the very short time during which a decision needs to be made to award or not award a subsidy, it is debatable whether the overall decision-making can be consistent and reliable. In fact, there is evidence that the current panel-review process is not always reliable and often results in inconsistent decisions being made. The urgency to consider some alternative to the current practice is clear, especially if one considers that in 2017 book and book chapter submissions constituted 8.4% of all document submissions. However, its share of subsidy units was much higher at 11.4% (also because of the higher rand value for monographs), which translated into an amount of R269 million paid out to universities for their book and book chapter submissions.

In our view there are a number of alternative methodologies (not necessarily mutually exclusive) that the DHET should consider to improve the quality of its assessment of books and chapters. The first is to introduce a list of accredited book publishers against which universities can compare and verify their submissions. Such a list would work in a similar manner to the current lists of accredited journal titles, which means that it would still need to be checked and updated on a regular basis. The second is to consider engaging in a more in-depth (peer) review process of all or samples of book submissions. The process could be outsourced as it has been done before when ASSAf was requested to assist the DHET in this regard. Thirdly, there are a number of variations of these two approaches that combine the use of an accredited list of book publishers with a more in-depth peer review processes. We will discuss these variations at the end of this section.

In this study, CREST was tasked to investigate whether the first methodology (constructing a list of accredited book publisher titles) is a feasible approach.

2.2 Developing a list of accredited book publisher titles

In addressing the development of a list of accredited book publisher titles, we applied four successive steps:

- (1) Cleaning and harmonisation of all book submissions to the DHET over the period 2005 to 2017.
- (2) Analysis of the publisher information emanating from step 1 against the two existing ranking systems: Sense and the Norwegian system.
- (3) Analysis of the publisher information from step 1 against the DHET panel decisions (data provided by the DHET) and ASSAf recommendations (information for selected years provided).
- (4) Development of a first list of book publishers that rank them according to the outcomes of the analyses in steps 2 and 3.

2.2.1 Cleaning and harmonisation of all book submissions

Since submissions for books and book chapters are made from each university's office separately, it is not surprising that we found some cases of spelling variants in the names of book chapter titles, as well as in the names of publishers. In order to conduct the required analyses for this report, we spent some time in cleaning and harmonising all these names. The two tables below present examples of spelling variants that needed to be cleaned.

It should be quite straightforward for someone at a research office to check the title of a book or book chapter against Google Scholar and ensure standardised submissions – at least within the same university. The examples below refer to spelling variants of publisher names. Again, these refer to submissions for books and book chapters from multiple institutions. The occurrence of spelling variants across multiple universities meant that CREST spent significant time cleaning and harmonising publisher names.

Table 18: Spelling variants in names of publishers

New harmonised name	Name of publisher as submitted
Africa World Press. Inc	Africa World Press. Inc
	Africa World Press. Inc.
	Africa World Press. Inc. & The Red Sea Press. Inc.
African Sun Media	AFRICA SUN MeDIA
	AFRICAN SUN MeDIA
	SUN MeDIA Bloemfontein
	SUN MeDIA Bloemfontein under the SUN PRESS imprint
	SUN MeDIA Stellenbosch
	Sun MeDIA. Stellenbosch
	Sun Press
John Benjamins Publishing Company	John Benjamins
	John Benjamins Publishing Company
LexisNexis	Butterworths LexisNexis
	LexisNexis
Nomos Verlag	Nomos
	Nomos Verlag
	Nomos Verlagsgesellschaft

In the next section, we present some high-level results of the analyses that we conducted on book and book chapter submissions³. In all these cases, our analyses were run on the cleaned and harmonised names of titles and publishers.

³ It is important to emphasise that these analyses were conducted on the submissions as made by universities and not on the book and chapter awards. We only conducted analyses on the latter when we began the work of constructing a list of accredited book publishers.

2.2.2 Trends in book and book chapter submissions

We present an analysis of the cleaned submissions data for the period 2005 to 2017 below:

- (1) the number of book and chapter authorships⁴ by year (Table 19);
- (2) the number of unique book and chapter submissions by year (Table 20);
- (3) the number of unique individuals (authors) of these submissions by year (Table 21);
- (4) the number of unique submissions by year and university (Table 22);
- (5) the number of submissions (more than 10) by publisher (Table 23); and
- (6) the number of submissions (more than 10) by publisher group (Table 24).

The full list of book titles by publisher for the period 2005 to 2017 is included as Appendix 3.

Table 19: Number of book and chapter authorships by year

Publication year	Book authorships	Chapter authorships	Combined authorships
2005	38	204	242
2006	28	222	250
2007	63	676	739
2008	70	608	678
2009	94	815	909
2010	108	933	1 041
2011	124	1 325	1 449
2012	161	1 967	2 128
2013	156	1 826	1 982
2014	183	2 144	2 327
2015	202	2 257	2 459
2016	227	2 631	2 858
2017	242	2 850	3 092
Total	1 696	18 458	20 154

Table 20: Unique book and book chapter submissions (2005-2017)

Publication year	No. of submissions
2005	201
2006	199
2007	597
2008	566
2009	739
2010	829
2011	1 102
2012	1 641
2013	1 502
2014	1 738
2015	1 872
2016	2 110
2017	2 184

⁴ An “authorship” means that we count all the individual authors for each paper and sum this number. By dividing the total number of “authorships” for a set of documents by the unique number of documents (such as books or chapters) one arrives at the average number of authors per document.

Table 21: Ratio of unique submissions to authors by year

Publication year	Author	Unique submissions	Ratio of submissions to authors
2005	166	201	1.21
2006	182	199	1.09
2007	515	597	1.16
2008	455	566	1.24
2009	645	739	1.15
2010	735	829	1.13
2011	997	1 102	1.11
2012	1 490	1 641	1.10
2013	1 376	1 502	1.09
2014	1 640	1 738	1.06
2015	1 673	1 872	1.12
2016	1 963	2 110	1.13
2017	2 017	2 184	1.14
Total	13 854	15 280	1.15

Table 22: Book and book chapter submissions by university and year (2005-2017)

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
UCT			262	186	302	232	320	347	316	453	408	332	260	3 418
SU	67	90	76	93	220	158	127	291	205	268	225	266	266	2 352
WITS		14	175	20	12	184	197	153	244	317	329	314	250	2 209
UP	87	81	110	152	75		94	162	229	262	248	202	343	2 045
UJ	49	12	51	76	31	65	127	130	119	141	144	221	333	1 499
UKZN		1					12	262	208	120	182	269	283	1 337
UNISA		2		1	2	67	80	157	103	150	239	226	203	1 230
UFS	36	37	26	44	38	29	52	130	110	121	83	216	213	1 135
NWU				46	48	33	126	147	107	86	136	201	182	1 112
RU			1		88	81	102	90	73	117	90	106	179	927
UWC					52	78	80	71	68	95	118	148	93	803
NMU				31	6	9	42	48	36	35	47	77	66	397
TUT	2	8	6	3	17	13	25	20	14	31	13	94	144	390
UFH			24	11	2	33	13	24	28	16	18	25	49	243
UNIVEN						20	24	18	39	39	22	23	47	232
CPUT	1	2	1	6	8	13	11	12	27	19	53	21	39	213
DUT								16	23	35	50	50	48	222
UL				1	2	2	4	21	6	4	17	17	29	103
UNIZULU		2	4	5	4	10	3	7	4	6	18	17	18	98
CUT		1	3	1		11	6	4	2	4	11	15	11	69
WSU								13	19	3	7	4	14	60
MUT					1			2	2	2		5	8	20
VUT				2	1	3	4	3		2		5	1	21
SMU										1	1	1	6	9
UMP												3	7	10
Total	242	250	739	678	909	1 041	1 449	2 128	1 982	2 327	2 459	2 858	3 092	20 154

Table 23: List of submissions by publishers in descending order (>10 submissions 2005-2017)

Publisher name	Publisher group	Titles
Routledge	Taylor & Francis	1 204
Springer	Springer Nature	1 146
African Sun Media	African Sun Media	629
Palgrave Macmillan	Springer Nature	512
Oxford University Press		480
Juta	Juta	478
Wits University Press		464
Cambridge University Press		449
HSRC Press		428
Nova Science Publishers		259
Brill	Brill Academic Publishers	259
UCT Press	Juta	232
LexisNexis		221
Cambridge Scholars Publishing		217
InTech		211
Van Schaik Publishers		197
UNISA Press		183
Sense Publishers	Brill Academic Publishers	180
Elsevier	Elsevier	166
Ashgate Publishing	Taylor & Francis	165
Jacana Media	Jacana Media	163
IGI Global	IGI Global	146
Mohr Siebeck		139
Peter Lang		137
CRC Press	Taylor & Francis	135
AOSIS Publishing		134
Africa Institute of South Africa		133
Pretoria University Law Press (PULP)		133
Wiley-Blackwell	Wiley	122
Springer Science and Business Media	Springer Nature	110
Rodopi	Brill Academic Publishers	87
Pearson South Africa		79
LIT Verlag		74
Wiley	Wiley	56
Peeters Publishers		56
Berghahn Books		49
Protea Boekhuis		46
Zed Books		45
Information Science Reference	IGI Global	44
Cluster Publications		44
University of KwaZulu-Natal Press		43
Juta Law	Juta	42
Bloomsbury T&T Clark	Bloomsbury Publishing	40
Earthscan	Taylor & Francis	37
International Association of IT Lawyers (IAITL)		36
KR Publishing		32
Lincoln Institute of Land Policy		32

Publisher name	Publisher group	Titles
CABI		32
Intersentia		30
Sage Publications		29
LAP Lambert Academic Publishing		28
Lexington Books		28
Manchester University Press		28
Wageningen Academic Publishers		28
Taylor & Francis	Taylor & Francis	28
Wolters Kluwer Law & Business	Wolters Kluwer	28
Langaa RPCIG		27
Bloomsbury Continuum	Bloomsbury Publishing	26
Hart Publishing Ltd	Bloomsbury Publishing	25
Multilingual Matters		25
L'Harmattan		25
International Union for the Scientific Study of Population (IUSSP)		25
Academic Press	Elsevier	24
African Minds		24
Indiana University Press		23
World Scientific		23
Evangelische Verlagsanstalt		23
The Incwadi Press		22
CODESRIA		22
World Council of Churches		22
MIT Press		22
Bloomsbury Publishing	Bloomsbury Publishing	22
AndCork Publishers		21
Libri Publishing		21
James Currey	Boydell & Brewer	20
Rowman & Littlefield		19
Ohio University Press		19
Martinus Nijhoff Publishers	Brill Academic Publishers	19
Orient Black Swan		19
Bloomsbury Academic	Bloomsbury Publishing	18
CSIR		18
Harrassowitz Verlag		17
Woodhead Publishing	Elsevier	17
Common Ground Publishing		17
Carolina Academic Press		17
University of Pretoria		16
Inter-Disciplinary Press		16
Geological Society of South Africa		16
University of Michigan Press		16
Barbara Budrich Publishers	Columbia University Press	16
DOT Matrix Publications		15
NISC (Pty) LTD		15
Pluto Press		15
Waxmann Verlag		15
Fortress Press		15
Fanele	Jacana Media	15

Publisher name	Publisher group	Titles
Institute for Global Dialogue		15
Wiley-VCH	Wiley	15
Springer Nature	Springer Nature	15
Real African Publishers		14
Information Age Publishing		14
John Benjamins Publishing Company		14
Vandenhoeck & Ruprecht	Vandenhoeck & Ruprecht	14
Batalea Publishers		14
Centraalbureau voor Schimmelcultures (CBS)		14
Health Systems Trust		14
South African Education Law Association		14
Klaus Hess Verlag		13
Tafelberg	NB Publishers	13
VDM Publishing		13
Regnum Books International	Oxford Centre for Mission Studies	13
University of California Press		13
University of Pennsylvania Press		13
Eleven International Publishing	Boom Uitgevers Den Haag	13
Walter de Gruyter	De Gruyter	13
Centre for Advanced Studies of African Society (CASAS)		13
Trentham Books	IOE Press	12
Ivyline		12
Sheffield Phoenix Press		12
Siber Ink		11
Imperial College Press		11
Eisenbrauns		11
International Labour Office		11
Reach Publishers		11
V&R Unipress	Vandenhoeck & Ruprecht	11
Pickwick Publications		11
Pickering & Chatto		11
Geological Society of America		11
Geological Society of London		11
Global HELP organization		11
McGill-Queen's University Press		11

Table 24: List of submissions by publisher group in descending order (10+ submissions 2005-2017)

Publisher group	Title
Springer Nature	1 795
Taylor & Francis	1 591
Juta	761
African Sun Media	629
Brill Academic Publishers	556
Elsevier	216
IGI Global	202
Wileyj	194
Jacana Media	178

Publisher group	Title
Bloomsbury Publishing	131
Wolters Kluwer	33
Vandenhoeck & Ruprecht	26
Boydell & Brewer	20
Columbia University Press	16
De Gruyter	15
Rowman & Littlefield	14
NB Publishers	13
Boom Uitgevers Den Haag	13
Oxford Centre for Mission Studies	13
IOE Press	12

2.2.3 Salient findings

- (1) Our analysis of the growth rate in authorships shows how steep the increase for both books and book chapters were:
 - CAGR book authorships = 16.7%;
 - CAGR chapter authorships = 24.6%; and
 - CAGR combined = 23.6%.
- (2) The number of unique book chapter submissions increased at an average annual growth rate of 21.9%. What is perhaps even more positive is the substantial increase in the number of authors who made these submissions during this time period. The number of authors increased from 166 in 2005 to 2017 in 2017 – this translates into a CAGR of 23.1%.
- (3) The breakdown by university shows that four universities each submitted more than 10% of the total number of submissions:
 - UCT = 17%;
 - SU = 11.7%;
 - WITS = 11.0%; and
 - UP = 10.1%.
- (4) The breakdown by publisher and publisher group shows that the majority of book and book chapter submissions were published by international publishers. The latter include the most prestigious publishers such as Springer, Taylor and Francis, Elsevier, Wiley, Oxford UP, Cambridge UP, Bloomsbury, De Gruyter and so on. Local publishers that are most frequently listed include Juta, African Sun Media and Jacana Publishers.

2.3 Development of a ranking system for publishers

Our methodology for developing a DHET ranking of “accredited” publishers used two sets of information. The first was to take into account any existent rankings of book publishers and then compare the names of publishers (with their rankings) to the publishers of books and book chapters submitted to the DHET between 2005 and 2017. The second set of information was the outcomes of panel decisions on these submissions. We were given the outcomes of the DHET panels for the years 2013 to 2017 (2015 excluded), as well as the outcomes of decisions made by ASSAf panels for 2012 to 2014.

A review of the literature shows that there are very few generally accepted “rankings” of publishers. We could find only two: the Sense ranking (from the Netherlands) and the ranking by the NSD done for the Norwegian Research Council. There are, however, numerous studies

that have been done where scientists and scholars themselves were surveyed to rate the best publishers in their specific disciplines. We found such studies for the disciplines of political science (Lewis, 2000 and Garand, 2011); the social sciences and humanities in general (Giminez-Toledo, 2013); chemistry and sociology (Volkman, 2014); and history (Zucalla, 2014). For the purposes of this study, where we needed a rating or ranking system that covers all scientific fields, we did not have a choice but to revert to the Sense and NSD rankings.

2.3.1 Comparison of book submission data against existing rankings

Our database contains 13 988 unique book and book chapter titles that had been submitted for subsidy during the period 2005 to 2017 and for which we have reliable publisher data. We used this dataset to analyse the ranking scores (Sense and NSD) as presented below. Before we present the result of our analyses, we provide more information about each of these ranking systems.

2.3.1.1 The Sense ranking of publishers

The Research School for Socio-economic and Natural Sciences of the Environment (Sense) is a joint venture of the environmental research institutes of more than ten Dutch universities and research organisations. Sense provides a disciplinary and multidisciplinary research programme aimed at advanced understanding of environmental problems and advanced training of PhD candidates in this field. Sense was formally accredited by the Royal Netherlands Academy of Arts and Sciences (KNAW) for the period 1997 to 2001 and was subsequently re-accredited in 2002 and 2008.

Sense distinguishes between A, B, and C journals, and for books between A, B, C, D and E publishers:

- A = refereed book publications by the top publishers in the world;
- B = refereed book publications published by the semi-top publishers in the world;
- C = refereed book publications by other publishers;
- D = non-refereed book publications published for an academic public; and
- E = non-refereed book publications mainly published for a non-academic (general) public.

Table 25 summarises the number of book and chapter submissions made to the DHET between 2005 and 2017 with their Sense ranking (where available). The table includes the D-ranked publishers, even though Sense does not gauge them to by refereed book publishers.

Table 25: Publishers and their Sense rankings in descending order by category

Publisher	A rank	B rank	C rank	D rank
University of Chicago Press	8			
Routledge	696			
Columbia University Press	6			
Oxford University Press	452			
Cambridge University Press	384			
MIT Press	23			
Academic Press	20			
Wiley-VCH	13			
Wiley-Blackwell	121			
Yale University Press	1			
Edward Elgar Publishing		93		

Publisher	A rank	B rank	C rank	D rank
Praeger		9		
Springer		899		
Rodopi		88		
Humana Press		6		
Springer Verlag		6		
American Chemical Society		5		
Zed Books		44		
Palgrave Macmillan		411		
Cornell University Press		4		
CABI		32		
Karger		3		
Karthala		3		
World Scientific		25		
Lexington Books		24		
Cold Spring Harbor Laboratory Press		2		
Cornell University Press		2		
Royal Society of Chemistry		2		
MacMillan Publishers		14		
Ashgate Publishing		132		
CRC Press		125		
Lippincott Williams & Wilkins		1		
Sense Publishers			183	
Mohr Siebeck			121	
Peter Lang			106	
Berghahn Books			36	
Lincoln Institute of Land Policy			31	
Intersentia			29	
Wageningen Academic Publishers			28	
Edwin Mellen Press			14	
Wolf Legal Publishers			11	
Caister Academic Press			10	
Imperial College Press			10	
Food and Agriculture Organization (FAO)			9	
Channel View Publications			8	
I.B. Tauris			8	
Island Press			8	
WIT Press			8	
Amsterdam University Press			7	
Lynne Rienner Publishers			7	
University of Toronto Press			7	
Gower			6	
Trans Tech Publications			6	
Bruylant			5	
Stodium Press LLC			4	
Bentham Science Publishers			3	
Formatex			3	
Global Science Books			3	
OECD			3	

Publisher	A rank	B rank	C rank	D rank
Society for Industrial and Applied Mathematics			3	
University of Arizona Press			3	
Aalborg Universitetsforlag			2	
Il Mulino			2	
IOS Press			2	
McGraw-Hill			2	
Research Signpost			2	
Science Publishing Group			2	
American Fisheries Society			1	
American Society of Agronomy			1	
Halewijn			1	
KoganPage			1	
Matrijs			1	
Presses de l'Université du Québec			1	
Science Publishers			1	
Secretariat of the Convention on Biological Diversity			1	
Sociaal en Cultureel Planbureau			1	
Tartu University Press			1	
Walburg Pers			1	
African Sun Media				621
Annablume				1
Copenhagen Business School Press				4
De Gruyter				68
Information Science Reference				54
InTech				206
International Food Policy Research Institute				12
International Society for Horticultural Science				1
Pensoft				1
Psychology Press				3

2.3.1.2 The NSD ranking of publishers

The Norwegian Centre for Research Data (NSD) has the responsibility for the maintenance and operations of the Norwegian Register for Scientific Journals, Series and Publishers. The register forms the basis for research publications that have an impact on the weighted funding model of the Norwegian Research Council. New scientific publication channels can be submitted continuously. The submissions mainly come from researchers and librarians, but anyone can submit a new publication channel for consideration.

The Higher Education Institution (UHR) of Norway has been commissioned by the Ministry of Education to establish a permanent publication committee. This committee, the National Publishing Committee, has the responsibility for the development and technical operation of the system for documenting academic publishing. This includes the approval of new scientific publication channels, the responsibility for nomination and approval of publication channels at Level or Tier 2, as well as securing implementation according to established criteria and standards.

Level 1 is everything that can be included from the definition of academic publishing. **Level 2** is limited to publication channels (scientific journals, series, yearbooks, websites and book publishers) perceived to be the **most leading in broad professional settings**, which publish the most significant publications from different countries and scientists, and which together publish about one-fifth (20%) of the scientific publications. Each year the specialised strategic bodies nominated for Level 2 receive updated publishing statistics on their trade as a substrate for nominations. The National Publishing Committee receives proposals for changes to Level 2 and makes the final decision.

Table 26: Publishers and their NSD rankings

Publisher	Tier 1	Tier 2
Praeger		9
Boydell & Brewer		9
Routledge		806
University of Chicago Press		8
Universitätsverlag Winter		8
I.B. Tauris		8
AltaMira Press		8
LIT Verlag		67
Columbia University Press		6
CH Beck		6
Edinburgh University Press		57
Oxford University Press		544
Palgrave Macmillan		520
Duke University Press		5
Cambridge University Press		473
Zed Books		44
Waxmann Verlag		43
Stanford University Press		4
Cornell University Press		4
Bloomsbury T&T Clark		38
Berghahn Books		36
University of Michigan Press		32
Lawrence Erlbaum Associates		31
Intersentia		31
Engineering Science Reference		3
Stauffenburg Verlag		3
Franz Steiner Verlag		3
Sage Publications		27
Manchester University Press		26
Multilingual Matters		25
MIT Press		23
Hart Publishing Ltd		23
Polity Press		2
Librairie Droz		2
Kluwer Law International		2
Harvard University Press		2
Cornell University Press		2
Berg Publishers		2
Harrassowitz Verlag		15

Publisher	Tier 1	Tier 2
Barbara Budrich Publishers		15
Mohr Siebeck		149
Vandenhoeck & Ruprecht		14
University of California Press		12
Yale University Press		1
University of Hawai'i Press		1
Mouton De Gruyter		1
Springer	1037	
African Sun Media	831	
HSRC Press	497	
InTech	209	
UNISA Press	182	
CRC Press	157	
Pretoria University Law Press (PULP)	141	
IGI Global	140	
Wiley-Blackwell	124	
AOSIS Publishing	102	
Wolters Kluwer Law & Business	68	
Wolf Legal Publishers	67	
Africa World Press. Inc	62	
Information Science Reference	57	
SBL Press	51	
Carolina Academic Press	50	
Information Age Publishing	45	
McGill-Queen's University Press	41	
Liverpool University Press	36	
Taylor & Francis	31	
Australian Centre for Geomechanics	31	
Wageningen Academic Publishers	28	
African Minds	28	
Indiana University Press	26	
World Scientific	25	
Orient Black Swan	25	
Langaa RPCIG	25	
L'Harmattan	24	
Lexington Books	24	
Ohio University Press	21	
Edwin Mellen Press	20	
Academic Press	20	
Centre for Advanced Studies of African Society (CASAS)	19	
Trentham Books	17	
Inter-Disciplinary Press	17	
Imperial College Press	16	
Heinemann Educational Books	16	
Bloomsbury Academic	16	
Pluto Press	14	
Fortress Press	14	
Chandos Publishing	14	
Eleven International Publishing	13	

Publisher	Tier 1	Tier 2
Sheffield Phoenix Press	12	
Pickwick Publications	12	
Rozenberg Publishers	11	
Pickering & Chatto	11	
Geological Society of London	11	
Eisenbrauns	11	
Archaeopress Archaeology	11	
Wipf and Stock Publishers	10	
Churchill Livingstone	10	
Gorgias Press	9	
Food and Agriculture Organization (FAO)	9	
WIT Press	8	
University of Wales Press	8	
Nodus Publikationen	8	
Lynne Rienner Publishers	8	
Island Press	8	
Channel View Publications	8	
University of Virginia Press	7	
University of Toronto Press	7	
Shaker Verlag	7	
Indiana Universtiy Press	7	
Humana Press	7	
Gütersloher Verlagshaus	7	
Bruylant	7	
Basler Afrika Bibliographien	7	
ATHENA-Verlag	7	
Amsterdam University Press	7	
Willan Publishing	6	
Weaver Press	6	
UNESCO Publishing	6	
Transcript	6	
Transaction Publishers	6	
Trans Tech Publications	6	
Springer Verlag	6	
Hampton Press	6	
Oxbow Books	5	
Nordicom	5	
Wissenschaftlicher Verlag Trier	4	
Ugarit-Verlag	4	
RSC Publishing	4	
Nordiska Afrikainstitutet	4	
Fountain Publishers	4	
Fordham University Press	4	
Erich Schmidt Verlag	4	
Copenhagen Business School Press	4	
Camden House	4	
American Psychological Association	4	
University of Rochester Press	3	
University of Illinois Press	3	
University of Delaware Press	3	

Publisher	Tier 1	Tier 2
University of Arizona Press	3	
United Nations University Press	3	
Temple University Press	3	
Society for Industrial and Applied Mathematics	3	
River Publishers	3	
Rainer Hampp Verlag	3	
Psychology Press	3	
Presses Universitaires de Bordeaux	3	
Open Book Publishers	3	
Michigan State University Press	3	
MDPI	3	
Maney Publishing	3	
Magnolia Press	3	
Karthala	3	
Jessica Kingsley Publishers	3	
Global Science Books	3	
Duncker & Humblot	3	
Demeter Press	3	
Baylor University press	3	
Australian National University Press	3	
Adonis & Abbey Publishers	3	
Acumen Publishing Limited	3	
Verlag Karl Alber	2	
University of Calgary Press	2	
United States Institute of Peace Press	2	
UCL Press	2	
Thames & Hudson	2	
Texas A&M University Press	2	
Sydney University Press	2	
Suny Press	2	
Science Press	2	
Scarecrow Press	2	
Rutgers University Press	2	
Russian Academy of Sciences	2	
Rüdiger Köppe Verlag	2	
Royal Society of Chemistry	2	
Research Signpost	2	
Paradigm Publishers	2	
Open University Press	2	
New York University Press	2	
McGraw-Hill	2	
Marcel Dekker Inc	2	
Leuven University Press	2	
IWA Publishing	2	
IOS Press	2	
Hendrickson Publishers	2	
Four Courts Press	2	
College Publications	2	
Brown Walker Press	2	
Black Dog Publishing	2	

Publisher	Tier 1	Tier 2
Atlantis Press	2	
Apple Academic Press	2	
ANU Press	2	
Aalborg Universitetsforlag	2	
Aakar Books	2	
Wissenschaftliche Buchgesellschaft	1	
Westview Press	1	
Westminster John Knox Press	1	
Wayne State University Press	1	
Wallflower Press	1	
Vernon Press	1	
University Press of Kansas	1	
University Press of Florida	1	
University of the West Indies Press	1	
University of North Carolina Press	1	
University of Nebraska Press	1	
University of Exeter Press	1	
Tartu University Press	1	
T.M.C. Asser Press	1	
Sussex Academic Press	1	
Social Science Research Council	1	
Russell Sage Foundation	1	
Rawat Publications	1	
Radcliffe Publishing	1	
Presses Universitaires de Rennes	1	
Presses Universitaires de Nancy	1	
Presses Sorbonne Nouvelle	1	
Presses de l'Université du Québec	1	
Physica-Verlag	1	
Pharmaceutical Press	1	
Passagen Verlag	1	
Parlor Press	1	
Panozzo Editore	1	
Pan Stanford Publishing	1	
Novus Forlag	1	
Northwestern University Press	1	
Monash University Publishing	1	
Meyer & Meyer Sport	1	
Lippincott Williams & Wilkins	1	
Linton Atlantic Books	1	
Les Presses Du Reel	1	
Les Presses de Sciences Po	1	
Language Science Press	1	
Kopaed	1	
Kew Publishing	1	
Kent State University Press	1	
Kasperek Verlag	1	
JOVIS VERLAG GmbH	1	
Irish Academic Press	1	
International Science Reference	1	

Publisher	Tier 1	Tier 2
Institute of Southeast Asian Studies	1	
IFLA Publications	1	
IEEE Press	1	
Frank & Timme	1	
Fairleigh Dickinson University Press	1	
ETC Press	1	
Editorial Comares	1	
Edition Sigma	1	
Delmar Cengage Learning	1	
CSLI Publications	1	
Classiques Garnier	1	
Captus University Publications	1	
Canadian Music Educators' Association	1	
Cambria Press	1	
BMJ Books	1	
Armand Colin	1	
Acton Publishers	1	

The first results showed that 1 205 unique publishers produced book and book chapter submissions made to the DHET between 2005 and 2017. Of these, 891 publishers were not listed on either the Sense or NSD rankings.

Table 27 below combines the results of these two ranking systems. It shows the number of publishers in each of the ranking categories, as well as the number of book and chapter titles linked to these publishers. For example, of the total number of submissions made to the DHET between 2005 and 2007, 1 783 unique titles (12.7% of all submissions) were from 11 A-ranked Sense publishers. Similarly, 3 238 titles (constituting 19.3%) were submitted from 51 publishers ranked as Tier 2 by NSD (their highest ranked publishers).

Table 27: Comparing Sense and NSD ratings at the level of publishers and book/chapter titles

Ranking system	Ranking category	No. of publishers	% publishers	No. of titles	% titles
Sense	A	11	0.9%	1 783	12.7%
	B	31	2.6%	2 400	17.1%
	C	49	4.2%	938	6.7%
	D	11	0.9%	972	6.9%
	Not ranked	1 091	92.4%	7 904	56.5%
	Total	1 179		13 997	
NSD	Tier 2	51	4.3%	3 238	19.3%
	Tier 1	924	78.4%	6 204	37.0%
	Not ranked	225	19.1%	7 317	43.7%
	Total	1 179		16 759	

2.3.1.3 Salient findings

Of the 1 179 unique publishers included in our analysis, 102 (8.6%) are included in one of the first three Sense ranking categories and 51 (4.3%) in the NSD rankings. This would suggest that the NSD ranking is more selective (“exclusive”) than the Sense ranking. This conclusion is supported by the numbers and shares of book and chapter titles. In the Sense ranking, the 102 publishers that are ranked in Categories A, B and C account for 31.8% of all titles. In the NSD ranking, the number of titles from publishers in the top level of publishers (Tier 2) account

for 19.3% of all book and chapter submissions. We have captured these comparisons in the two graphs below.

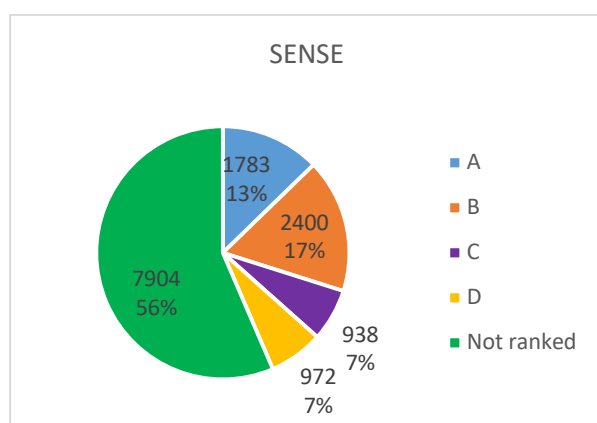


Figure 7: Submissions by Sense ranking level

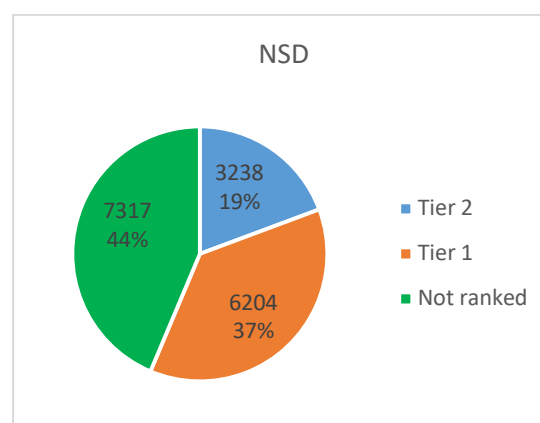


Figure 8: Submissions by NSD level

2.3.2 Panel decision on books and book chapters

The DHET annually appoints panels that review individual book and book chapter submissions made by universities. ASSAf assisted the DHET in the evaluation of scholarly books and conference proceedings for subsidy purposes in 2013, 2014 and 2015. The *ad hoc* experts in the various disciplines focused on content and quality, while the DHET focused on technical compliance. For the purposes of this report, CREST was provided both with the DHET decisions for the period 2012 to 2017 (2015 excluded) and the ASSAf decisions for 2013 to 2015. The tables below summarise the results of these decisions (the columns present the data for the submission years). The following can be surmised:

- (1) There is a large correspondence between the DHET and ASSAf regarding the proportions of submissions approved ("Yes valid") for the years 2012 to 2014. This is not surprising as it suggest that the DHET accepted most of the recommendations made by the ASSAf panels.
- (2) An analysis of the trends over time shows a significant increase in the proportion of awards approved from 2013 onwards. A breakdown by document type also shows that there are no significant difference in the proportion awarded to books and book chapters (% yes), and that a relatively high proportion of submissions (70% and more) were awarded.

Table 28: Comparison between DHET panel decisions and ASSAf panel decisions

All docs	2012	2013	2014	2016	2017	2012-2017
No	802	272	186	347	422	2 072
Yes	574	1 173	1 113	1809	1834	6 540
Total	1 376	1 445	1 299	2 156	2 256	8 612
% yes	42%	81%	86%	84%	81%	76%
valid						
Grand total	1 715	1 560	1 819	2 175	2 272	9 541
% yes	33%	75%	61%	83%	81%	69%

All docs	2012	2013	2014	2012-2014
No	595	176	183	954
Yes	559	841	1 130	2 530
Total	1 196	1 017	1 313	3 526
% yes	47%	83%	86%	72%

Chapters	2012	2013	2014	2016	2017	2012-2017
No	733	250	167	316	389	1 855
Yes	528	1 072	1 017	1 632	1 659	5 908
Total	1 261	1 331	1 191	1 948	2 048	7 779
% yes						
valid	42%	81%	85%	84%	81%	76%
Grand total	1 569	1 422	1 652	1 965	2 064	8 672
% yes	34%	75%	62%	83%	80%	68%

Chapters	2012	2013	2014	2012-2014
No	541	155	164	860
Yes	514	773	1 033	2 320
Total	1 096	928	1 197	3 221
% yes	47%	83%	86%	72%

2.3.3 Correspondence between Sense/NSD rankings and DHET book decisions

The next step was to establish to what extent the Sense and NSD rankings corresponded with the DHET book decisions. We asked whether those publishers who were ranked highest in the Sense rankings (A, B and C) and NSD ranking (Tier 2) were also the same publishers who registered a number of positive decisions or awards by the DHET and ASSAf panels. In this comparison we included only those publishers for which we had data for all the variables.

Inspection of the table below shows that there are a number of publishers who appear on either or both of the NSD rankings. For most of these there are also DHET decision outcome data, but for a few there are no decision data (e.g. Academia Press). There are, however, also publishers who do not appear on either of the rankings for which we have DHET decision outcomes (e.g. Archaeopress Archaeology).

Table 29: Overview of ranking scores (Sense and NSD) and DHET decision outcomes

Publisher Ranking or decisions	Sense				NSD		Combined score	New composite rank	DHET decisions			
	A	B	C	D	Tier 1	Tier 2				Yes	Total	% awarded
Aalborg Universitetsforlag			2		2		CB	3				
Academia Press			2		2		CB	3				
Academic Press	20				20		AB	1-	Academic Press	15	17	88%
Africa Institute of South Africa									Africa Institute of South Africa	83	102	81%
Africa World Press. Inc					62		B-	4	Africa World Press. Inc	11	11	100%
African Minds					28		B-	4	African Minds	22	23	96%
African Sun Media				621	831		DB	4	African Sun Media	113	120	94%
American Chemical Society		5					B	2				
American Society of Agronomy			1				C	3				
Amsterdam University Press			7		7		CB	3-				
Anthem Press			3		3		CB	3				
AOSIS Publishing					102		B-	4	AOSIS Publishing	114	133	86%
									Archaeopress Archaeology	10	10	100%
Ashgate Publishing		132					B	2	Ashgate Publishing	46	50	92%
Batalea Publishers									Batalea Publishers	15	15	100%
Bentham Science Publishers			3				C	3				
Berghahn Books			36			36	CA	1--	Berghahn Books	14	14	100%
Bloomsbury Academic					16		B-	4	Bloomsbury Academic	17	18	94%
Bloomsbury Publishing									Bloomsbury Publishing	20	26	77%
									Bloomsbury T&T Clark	8	13	62%

Publisher Ranking or decisions	Sense				NSD		Combined score	New composite rank	DHET decisions			
	A	B	C	D	Tier 1	Tier 2				Yes	Total	% awarded
Borntraeger Science Publishers									Borntraeger Science Publishers	9	10	90%
Brill		215					B	2	Brill	82	108	76%
CABI		32					B	2				
Caister Academic Press			10				C	3				
Cambridge Scholars Publishing					162		B-	4	Cambridge Scholars Publishing	64	82	78%
Cambridge University Press	384					473	AA	1+	Cambridge University Press	161	196	82%
Carolina Academic Press					50		B-	4	Carolina Academic Press	13	14	93%
Centre for Advanced Studies of African Society (CASAS)					19		B-	4	Centre for Advanced Studies of African Society (CASAS)	11	13	85%
Channel View Publications			8		8		CB	3-				
Cluster Publications									Cluster Publications	11	11	100%
CODESRIA									CODESRIA	12	12	100%
Columbia University Press	6					6	AA	1+				
Cornell University Press		4				4	BA	1-				
CRC Press		125			157		BB	2-	CRC Press	70	83	84%
CSIR									CSIR	17	21	81%
De Gruyter				68			D	4	De Gruyter	49	58	84%
Earthscan		52					B	2	Earthscan	10	10	100%
Edinburgh University Press						57	A	1	Edinburgh University Press	12	13	92%
Edward Elgar Publishing		93					B	2	Edward Elgar Publishing	28	37	76%

Publisher	Sense				NSD		Combined score	New composite rank	DHET decisions			
Ranking or decisions	A	B	C	D	Tier 1	Tier 2				Yes	Total	% awarded
Edwin Mellen Press			14		20		CA	3-				
Eleven International Publishing					13		B-	4				
Elsevier		137			142		BB	2-	Elsevier	49	54	91%
Emerald Publishing									Emerald Publishing	23	29	79%
Evangelische Verlagsanstalt									Evangelische Verlagsanstalt	7	11	64%
Food and Agriculture Organization (FAO)			9		9		CB	3				
Formatex			3				C	3-				
Gower			6				C	3				
									Hart Publishing Ltd	13	13	100%
HSRC Press					497		B-	4	HSRC Press	159	168	95%
Humana Press		6			7		BB	2-				
I.B. Tauris			8			8	CA	1--	I.B. Tauris	9	10	90%
IGI Global					140		B-	4	IGI Global	78	96	81%
Imperial College Press			10		16		CB	3-				
Indiana University Press					26		B-	4	Indiana University Press	11	11	100%
Information Science Reference				54	57		DB	4	Information Science Reference	11	14	79%
InTech				206	209		DB	4				
International Union for the Scientific Study of Population (IUSSP)									International Union for the Scientific Study of Population (IUSSP)	25	25	100%
Intersentia			29			31	C	1--	Intersentia	15	15	100%
									Ivyline	12	12	100%
Jacana Media									Jacana Media	65	66	98%
James Currey									James Currey	11	12	92%

Publisher	Sense				NSD		Combined score	New composite rank	DHET decisions			
Ranking or decisions	A	B	C	D	Tier 1	Tier 2				Yes	Total	% awarded
John Benjamins Publishing Company									John Benjamins Publishing Company	24	26	92%
									John Wiley & Sons. Inc	8	10	80%
Juta									Juta	184	224	82%
Karger		3					B	2				
Karthala		3			3		BB	2-				
KR Publishing									KR Publishing	33	34	97%
Langaa RPCIG					25		B-	4	Langaa RPCIG	16	23	70%
Lexington Books		24			24		BB	2-	Lexington Books	16	18	89%
LexisNexis												
L'Harmattan					24		B-	4	L'Harmattan	11	18	61%
Libri Publishing									Libri Publishing	6	12	50%
Lincoln Institute of Land Policy			31				C	3	Lincoln Institute of Land Policy	32	32	100%
LIT Verlag						67	A	1	LIT Verlag	37	39	95%
Liverpool University Press					36		B-	4				
Lynne Rienner Publishers			7		8		CB	3-				
MacMillan Publishers		14					B	2				
MIT Press	23					23	AA	1+	MIT Press	13	16	81%
Mohr Siebeck			121			149	C	1--	Mohr Siebeck	57	86	66%
Multilingual Matters						25	A	1	Multilingual Matters	20	20	100%
Nomos Verlag		1			1		BB	2-	Nomos Verlag	31	33	94%
Nova Science Publishers			230				C	3-	Nova Science Publishers	84	143	59%
Oxford University Press	452					544	AA	1+	Oxford University Press	190	212	90%
Palgrave Macmillan		411			2	520	BB	2-	Palgrave Macmillan	248	274	91%
									Pan-African University Press	10	10	100%

Publisher	Sense				NSD		Combined score	New composite rank	DHET decisions			
Ranking or decisions	A	B	C	D	Tier 1	Tier 2				Yes	Total	% awarded
Pearson South Africa									Pearson	14	24	58%
Peeters Publishers						56	A	1	Peeters Publishers	33	46	72%
Peter Lang			106				C	3-	Peter Lang	37	47	79%
Pickering & Chatto					11		B-	4				
Pickwick Publications					12		B-	4				
Pluto Press					14		B-	4				
									Polity Press	11	11	100%
Praeger		9				9	BA	1-				
Presses de l'Université du Québec			1		1		CB	3-				
Pretoria University Law Press (PULP)					141		B-	4	Pretoria University Law Press (PULP)	52	64	81%
Protea Boekhuis									Protea Boekhuis	27	28	96%
Real African Publishers									Real African Publishers	8	14	57%
Regnum Books International									Regnum Books International	12	13	92%
Rodopi		88						2	Rodopi	28	29	97%
Routledge	696					806	AA	1+	Routledge	437	491	89%
									Rowman & Littlefield	9	11	82%
									SAPES books	10	10	100%
SBL Press					51		B-	4	SBL Press	29	31	94%
									Scrivener Publishing	15	18	83%
Sense Publishers			183				C	3	Sense Publishers	107	117	91%
Springer		899			1037		BB	2-	Springer	476	547	87%
Springer Nature		6			12		BB	2-	Springer Nature	14	15	93%
Springer Science and Business Media		18			19		BB	2-	Springer Science and Business Media	69	73	95%
Springer Verlag		6			6		BB	2-				
Studium Press LLC			4				C	3				

Publisher	Sense				NSD		Combined score	New composite rank	DHET decisions			
Ranking or decisions	A	B	C	D	Tier 1	Tier 2				Yes	Total	% awarded
									Sun Media	115	126	91%
									Sun Press	63	70	90%
Trentham Books					17		B-	4				
UCT Press					378		B-	4	UCT Press	105	115	91%
UNISA Press					182		B-	4	UNISA Press	54	56	96%
University of Chicago Press	8					8	AA	1+				
University of KwaZulu-Natal Press									University of KwaZulu-Natal Press	113	115	98%
University of Michigan Press						32		1	University of Michigan Press	10	13	77%
University of Pennsylvania Press		11				11	BA	1-				
									V&R Unipress	10	10	100%
Van Schaik Publishers									Van Schaik Publishers	46	63	73%
Wageningen Academic Publishers			28		28		CB	3-				
Wiley	59						A	1+	Wiley	15	16	94%
Wiley-Blackwell	121				124		AB	1-	Wiley-Blackwell	41	52	79%
Wiley-VCH	13						A	1++				
Wits University Press					524		B-	4	Wits University Press	234	239	98%
Wolf Legal Publishers			11		67		C	3				
Wolters Kluwer Law & Business					68		B-	4				
World Council of Churches									World Council of Churches	15	19	79%
World Scientific		25			25		BB	2-	World Scientific	9	12	75%
Yale University Press	1					1	AA	1+				
Zed Books		44				44	BA	1-	Zed Books	25	29	86%

Explanation of Table 27

SENSE The number of submissions received per Sense category (A, B, C, D) is listed.

NSD The numbers of submissions received per NSD tier level (1 or 2) are listed.

NEW COMBINED SCORE A new category was created combining the Sense and NSD ranking values. For example, the new score for Academia Press (“CB”) combines the “C” in Sense with the “2” in NSD (remember for NSD Tier 2 is the higher-ranked publishers, thus receiving an “A”, and Tier 1 would receive a “B”). This is illustrated by Academic Press, where the AB combines the A ranking in Sense and the Tier 1 in NSD. Cambridge University Press is an example where both Sense and NSD ranked it in their highest category, hence the “AA”.

NEW COMPOSITE RANK This column presents a numeric value from highest (1) to lowest (4), based on the new score. The legend for this is as follows:

New composite rank	Combined score
1+	AA
1	A (Sense)
1-	AB/BA
2	B
2-	BB
3	C (Sense)
3-	CB
4	D (Sense)/B (NSD)
4-	DB

DHET DECISION SCORE We calculated which percentage of submissions that were scrutinised (excluding blanks) were awarded for the years 2012 to 2014 and 2016 to 2017. The columns list the number of books and book chapters reviewed, the number of submissions approved and the percentage awarded.

2.4 Implementation of a proposed decision framework of book subsidies

Recommendation 4: Based on the analyses above, CREST proposes a decision framework for awarding books and book chapters. This decision framework consists of the development of two lists of accredited publishers (List A and List B) and three decision rules that describe its implementation. The two lists are

- List A of internationally recognised book publishers; and
- List B of reputable international and local book publishers.

The three decision rules are:

- (1) Rule 1: All submissions from publishers from List A are automatically awarded the appropriate subsidy amount.
- (2) Rule 2: All submissions from publishers from List B are awarded if certain conditions have been met. These conditions could include a combination of (a) requesting a general letter from publishers on List B verifying that the titles that had been submitted had been peer reviewed; and (b) scrutiny of a sample of these submissions by the panels.
- (3) Rule 3: All other submissions (publishers not on either List A or List B) continue to be scrutinised individually by the DHET panels for books and book chapters.

We elaborate on each of the lists below.

2.4.1 List A: Internationally recognised book publishers

The first list below (List A) in Table 30 is based solely on the rank (combined score on the Sense and NSD rankings with additional data on the “success” rate as per DHET panel decision. It contains the 55 names of publishers. Our recommendation is that DHET accepts any submissions for chapters and books from these publishers automatically without further additional panel scrutiny. Once a university has provided (audited) evidence that a chapter or book from any of these publishers is submitted, our recommendation is that the specific submission is treated in the same way as an article submission from a journal on any of the current accredited lists. The rationale for this recommendation is that all of these publishers appear either in categories A, B or C of the Sense ranking or in the Tier 2 classification of NSD. In addition, as the last column shows, there is sufficient supporting evidence from the historic panel decision-making at the DHET that submissions from these publishers consistently record high success rates.

Table 30: DHET accredited publishers – List A

Publisher	Rank	Total	% awarded
Cambridge University Press	1+	196	82%
Columbia University Press	1+		
MIT Press	1+	16	81%
Oxford University Press	1+	212	90%
Routledge	1+	491	89%
University of Chicago Press	1+		
Yale University Press	1+		
Edinburgh University Press	1	13	92%
LIT Verlag	1	39	95%

Publisher	Rank	Total	% awarded
Multilingual Matters	1	20	100%
Peeters Publishers	1	46	72%
University of Michigan Press	1	13	77%
Wiley	1	16	94%
Academic Press	1-	17	88%
Berghahn Books	1--	14	100%
Cornell University Press	1-		
I.B. Tauris	1--	10	90%
Intersentia	1--	15	100%
Mohr Siebeck	1--	86	66%
Praeger	1-		
University of Pennsylvania Press	1-		
Wiley-Blackwell	1-	52	79%
Zed Books	1-	29	86%
American Chemical Society	2		
Ashgate Publishing	2	50	92%
Brill	2	108	76%
CABI	2		
Earthscan	2	10	100%
Edward Elgar Publishing	2	37	76%
Karger	2		
MacMillan Publishers	2		
Rodopi	2	29	97%
CRC Press	2-	83	84%
Elsevier	2-	54	91%
Humana Press	2-		
Karthala	2-		
Lexington Books	2-	18	89%
Nomos Verlag	2-	33	94%
Palgrave Macmillan	2-	274	91%
Springer	2-	547	87%
Springer Nature	2-	15	93%
Springer Science and Business Media	2-	73	95%
Springer Verlag	2-		
World Scientific	2-	12	75%
American Society of Agronomy	3		
Bentham Science Publishers	3		
Caister Academic Press	3		
Gower	3		
Lincoln Institute of Land Policy	3	32	100%
Sense Publishers	3	117	91%
Studium Press LLC	3		
Wolf Legal Publishers	3		
Formatex	3		
Nova Science Publishers	3	143	59%
Peter Lang	3	47	79%

2.4.2 List B of reputable international and local book publishers

List B consists of 26 international and local publishers whose book submissions have been reviewed by the DHET and ASSAf panels in recent years. Although these publishers do not

appear on any of the Sense and NSD rankings, their success rates in the past provide sufficient confidence in the quality of the underlying peer review process. The table below only includes publishers for whom more than 20 submissions have been reviewed in the past and the success or approval rate was higher than 70%.

Our recommendation, however, is not that submissions from these publishers are automatically approved. Some scrutiny of submissions from this list is necessary. This could take on two forms:

- (1) The publishers of these submissions could be requested to confirm in writing that the titles concerned have been properly peer reviewed.
- (2) In addition, the DHET panel for book submissions could scrutinise a sample (e.g. 20%) of submissions from these publishers as additional quality control.

Table 31: DHET accredited publishers – List B

Publishers	No. of submissions	DHET success rate
Africa Institute of South Africa	102	81%
Africa World Press. Inc	11	100%
African Minds	23	96%
African Sun Media	120	94%
AOSIS Publishing	133	86%
Bloomsbury Academic	18	94%
Bloomsbury Publishing	26	77%
Cambridge Scholars Publishing	82	78%
De Gruyter	58	84%
Emerald Publishing	29	79%
HSRC Press	168	95%
IGI Global	96	81%
Indiana University Press	11	100%
International Union for the Scientific Study of Population (IUSSP)	25	100%
Jacana Media	66	98%
John Benjamins Publishing Company	26	92%
Juta	224	82%
Langaa RPCIG	23	70%
Pretoria University Law Press (PULP)	64	81%
Protea Boekhuis	28	96%
SBL Press	31	94%
UCT Press	115	91%
UKZN Press	115	98%
UNISA Press	56	96%
Van Schaik Publishers	63	73%
Wits University Press	239	98%

2.5 Impact of implementing the decision framework

In order to illustrate what the likely impact of implementing this decision framework would be in future, we selected submissions for books and book chapters for the past three years and assigned their publishers to the proposed List A and List B.

Our first analysis focused on the distribution of all book and book chapter submissions for the period 2013 to 2017, during which time 12 633 submissions were made. If these submissions

were assigned to the new proposed lists, 44% of them would fall under List A and be automatically subsidised. A further 24% (List B) would require some scrutiny and verification, while about one third would require the current level of scrutiny. It is also worth pointing out that these 72 633 submissions were from 953 different publishers. Of these, 53 are on the proposed List A and 25 on List B. The remaining 875 are not on either list.

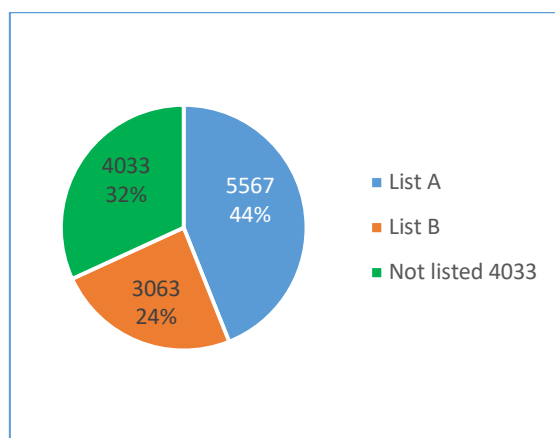


Figure 9: Submissions by proposed DHET lists (2013-2017)

A second analysis was conducted to establish how universities⁵ are distributed across publisher categories and names.

Table 32: Distribution of submissions by proposed list and university

University	Total submissions	List A	List B	Not listed
CPUT	159	31%	26%	43%
CUT	43	37%	23%	40%
DUT	206	51%	15%	33%
NMU	261	52%	24%	23%
NWU	712	46%	26%	29%
RU	565	48%	22%	30%
SU	1 230	43%	23%	33%
TUT	296	57%	6%	36%
UCT	1 769	44%	29%	27%
UFH	140	36%	26%	39%
UFS	743	37%	24%	39%
UJ	958	41%	27%	32%
UKZN	1 062	45%	20%	35%
UL	73	26%	26%	48%
UNISA	921	36%	29%	36%
UNIVEN	170	26%	14%	60%
UNIZULU	63	48%	8%	44%
UP	1 284	52%	19%	29%
UWC	522	43%	26%	30%
WITS	1 454	44%	28%	29%
WSU	47	32%	11%	57%
Total	12 723	44%	24%	32%

⁵ Only universities that had submitted more than 20 submissions were included in the table.

Closer inspection of the results reveals a fairly even spread of submissions across the two lists by university. However, there is an interesting difference in the spread of submissions across universities, as illustrated more clearly in the graph below. In the graph, we listed the universities in descending order in terms of their share of submissions on List A.

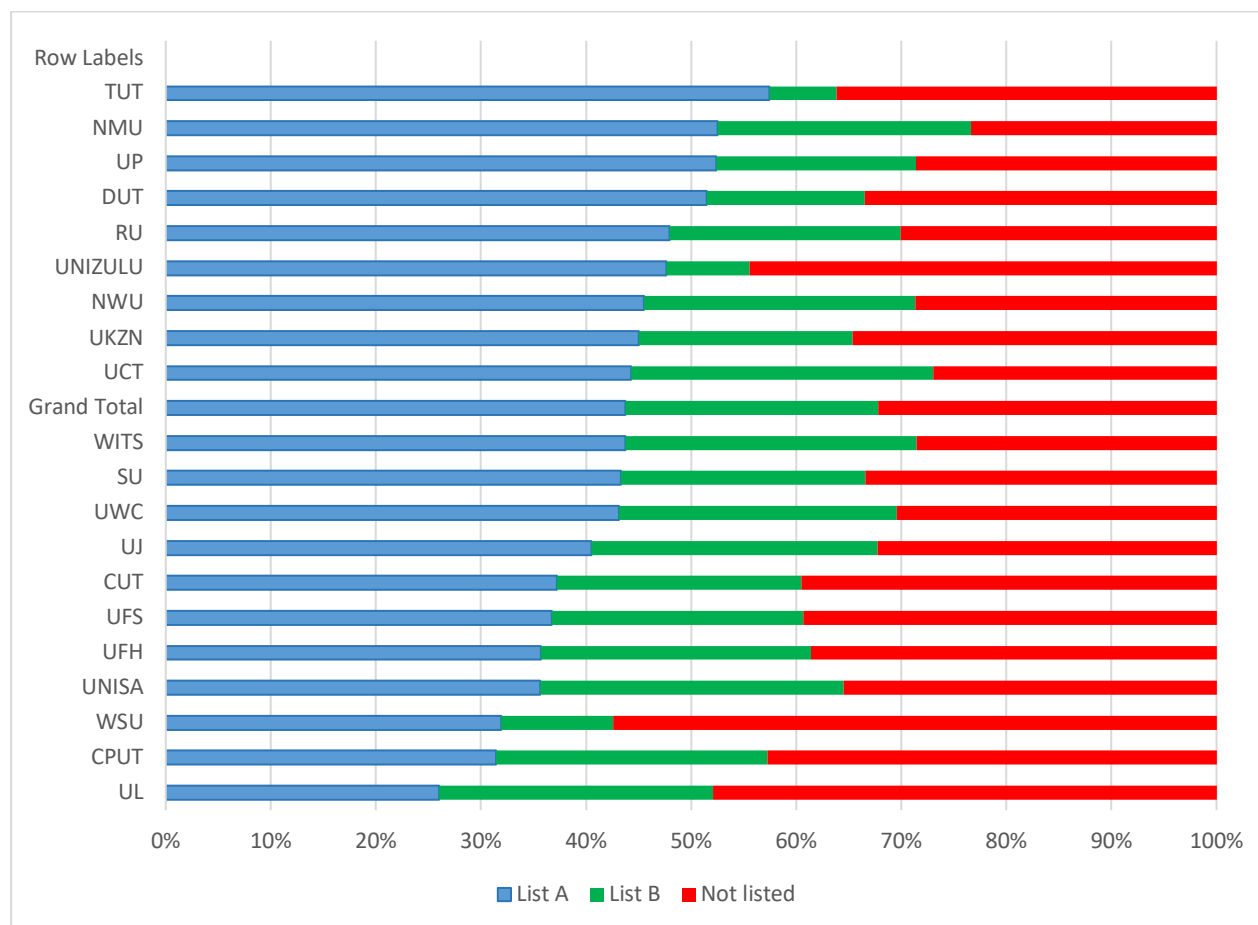


Figure 10: University submissions by list

2.6 Conclusion

In this section, we discussed the possibility of introducing lists of accredited book publishers. Our analysis made use of two main sources of data in the construction of such lists – the two existing rankings of publishers (Sense and NSD) and the outcomes of DHET panel decisions since 2013. Our results showed that the introduction of such lists is indeed not only possible but strongly advisable. Our proposal is for the introduction of a list with two categories, A and B. Our proposal contains a set of decision rules for the implementation of such a list. The advantages of implementing such as list are threefold in terms of capturing the criteria of transparency, efficiency and quality.

- (1) In making these lists public, the DHET introduces more **transparency** to the system of awarding book and chapter submissions. One of the recurring criticisms of the DHET in the past was a lack of transparency in decisions surrounding book and chapter submissions.
- (2) The introduction of this framework has immediate **efficiency gains**, since it will significantly reduce the time spent by DHET panels on making decisions. Our “test” shows that at least 40% of all submissions (in List A) will automatically be awarded.

- (3) The introduction of the framework will also, over time, lead to **quality gains**. It is anticipated that university academics will strive to publish increasingly with publishers included in List A (which translates into automatic awarding of the subsidy). The same will apply, although to a lesser extent, to publishers included in List B.

If our proposal to implement this framework is accepted, we would in addition recommend that ongoing research and analysis is conducted to (a) monitor the efficiency and impact of the implementation; and (b) allow for the inclusion of new publishers onto Lists A and B in future if so warranted.

Part 3: Analysis of conference proceeding submissions

3.1 Introduction

CREST was also requested to investigate whether a ranking (or rating) system for current conference proceeding submissions is feasible. Before we elaborate on how we addressed this task, we provide some background.

At the end of 2008, Thomson Reuters extended the coverage of their publication database, WoS, to conference proceedings. Up to that point, the publication database covered only journal articles. The introduction of the so-called Conference Proceedings Citation Indexes for Science and for the Social Sciences and Humanities (CPCI) in 2008 allowed access to conference proceedings in the WoS systematically. Thus, the combined (or separate) use of publications in journals and in proceedings was enabled for bibliometric analyses on all scales. As for all bibliometric methods and analyses, the implications of different publication and citation behaviour as well as database coverage were left to the end user. In particular, Moed and Visser already mentioned in advance that such an extension should account in any form for the fact that conference proceedings might be republished with only minor changes in other publication outlets (Moed & Visser, 2007).

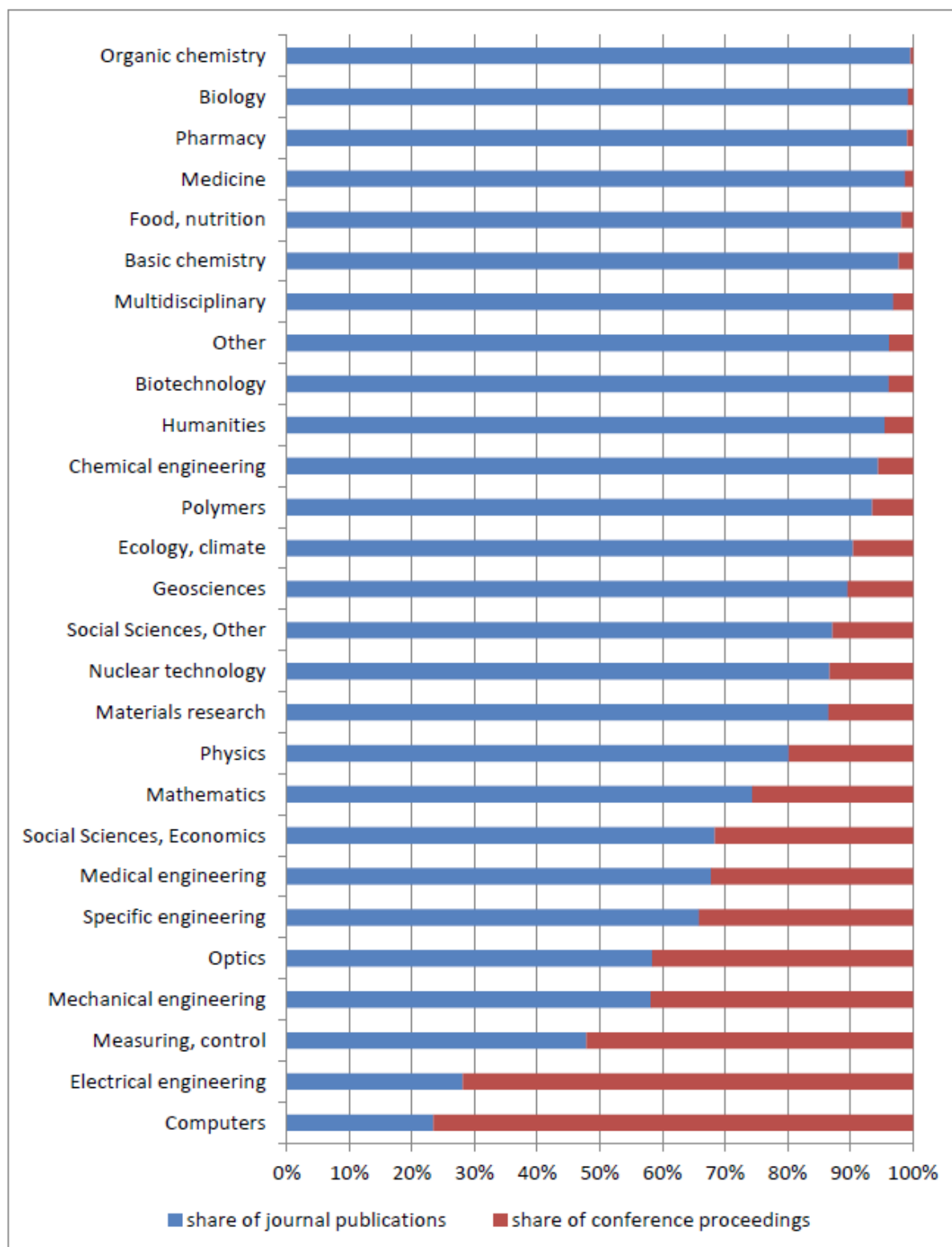
One of the important considerations when dealing with any bibliometric analysis of conference proceedings is to understand that conference papers are peculiar to specific fields of sciences (Michels & Fu, 2014). Kademani *et al.* (2009) found that publications in physics and engineering accounted for 52% and 22% respectively of conference proceedings in Scopus. However, these results were restricted to scientists from a specific research centre. According to Lisée *et al.* (2008), the relevance of conference proceedings is diminishing in most disciplines except in computer science and engineering. The results of Eckmann *et al.* corroborate this, since 34 out of 65 Computer Vision researchers thought that a foregoing conference publication improves their chances for a journal publication (Eckmann *et al.*, 2012). In addition, Glänzel *et al.* (2006) found that about one third of geosciences and more than 20% of physics, agriculture and mathematics topics were covered in the online WoS (both Science Citation Index Expanded and Conference Proceedings Citation Index) in the period 1994 to 2002. This indicates that the Institute for Scientific Information (ISI) Proceedings Index is a valuable supplement to the WoS. Cocosila (2011) showed a general increase in the number of papers and a steady increase in cooperation at three conferences in the management information systems (MIS) field. Furthermore, the leading MIS conference contributors tend to establish loyalty to a limited number of academic meetings. This shows the supplementary role of conference publications in scientific communication as well.

Glänzel *et al.* (2005) found, based on data extracted from the 1994-2002 volumes of the ISI Proceedings database's *Science and Technology* edition, that about half of the papers indexed there belonged to the field of engineering. In their categorisation, computer science is viewed as part of engineering. Their results support the prevailing view that proceedings publications have great importance in computer science.

Moed and Visser (2007) produced an extensive report on the need and feasibility of extending WoS to include proceeding publications in the field of computer science. They explored this possibility for Dutch computer scientists. The WoS source and citation data was expanded with proceedings published in the Lecture Notes in Computer Science, Association for Computing Machinery (ACM) and Institute of Electrical and Electronics Engineers (IEEE) computer science conferences. The expanded database increased the coverage of the publications of

Dutch computer scientists from 25% to 35%. The results were shown to Dutch computer scientists who claimed that even with this extended coverage some of the important conferences were missed. The internal coverage of the extended database (i.e. the percentage of citations of the items indexed by the database that referred to items in the extended database) was 51%, which is only moderate coverage, compared to about 80% internal coverage in WoS for physics and chemistry. The citation impact of proceeding series was found to be more variable than annual volumes of journals, but the citation links between recurring conferences was found to be statistically similar to journal self-citation rates.

Although somewhat dated, Michels and Fu (2014) produced the graph below that shows the proportion of conference proceedings relative to journal articles for a number of relevant fields. The results confirm the results of the findings of the studies cited above – with the largest proportion of conference papers produced by different sub-fields of computer science and certain sub-fields of engineering (such as electrical engineering and mechanical engineering) and measurement and control. A few other fields (optics, economics and mathematics) also recorded more than 20% of conference papers.



Source: Michels and Fu (2014)

Figure 11: Distribution of journal publications and conference proceedings in the 27 fields (2009)

As further confirmation of these results, we analysed the SA-authored conference papers in the WoS over the past thirteen years. The results (in descending order by number of papers) are listed by WoS subject category. The results show the predominance of sub-fields such as

electric and electronic engineering, computer science theory and methods, artificial intelligence, and information systems.

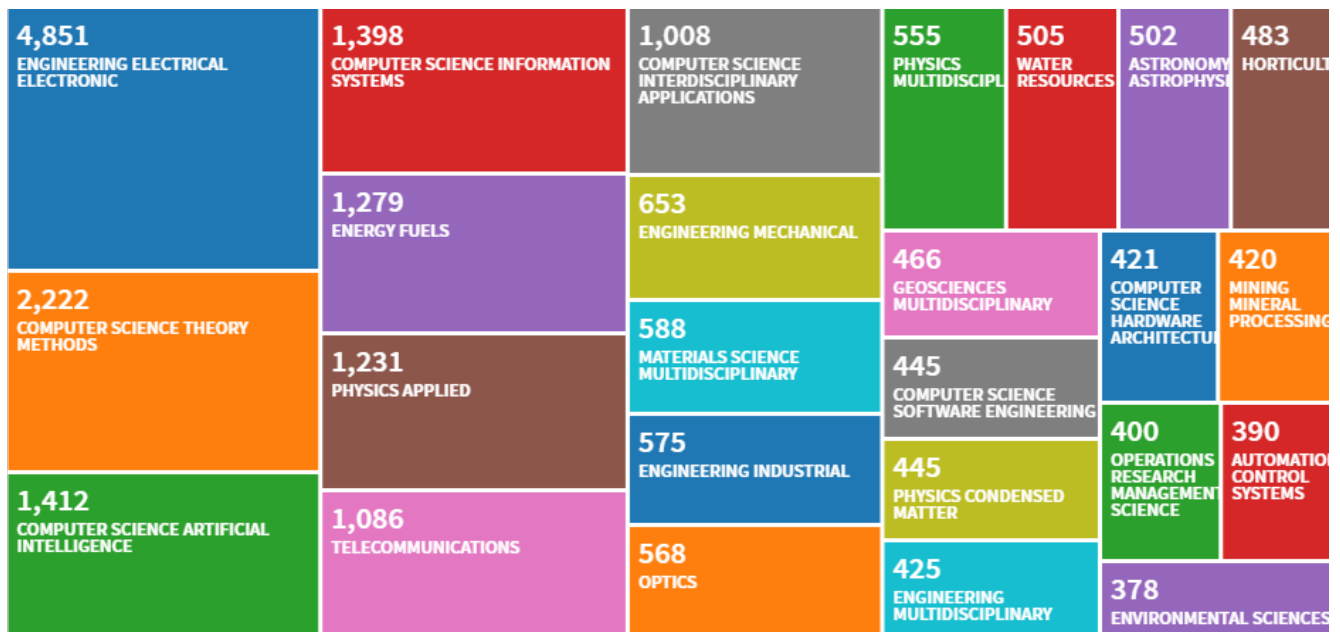


Figure 12: SA proceeding papers in the Web of Science (2005-2017) by WoS subject category

The challenge to develop a list of accredited list of conference proceedings for the DHET is already constrained by the field-dependent nature of publications. The request effectively translates into a task of developing a list (or at least some procedure) that would eventually mostly apply to computer and information sciences and some subfields of engineering.

Before we address the main question of this section (“Is it possible to develop a ranking system?”), we needed to clean the conference submissions and harmonise conference names. We subsequently conducted some basic output and trend analyses. The results of these analyses are presented before addressing the issue of a conference ranking system.

3.2 Cleaning and harmonisation of conference submissions

One of the challenges in the analysis of data on conference proceeding submissions is to harmonise (or unify) the names of conferences. In their submissions to the DHET, universities submit the name (or title) of a conference as indicated by the author(s). It is, therefore, not surprising that a comparison of submissions across various universities reveal huge variation in the names of conferences (spelling variants).

As part of the cleaning and harmonisation process, CREST staff conducted two different operations, namely

- (1) standardising the name of a conference in the same year across universities; and
- (2) standardising the name of a conference across different years.

To illustrate the extent of this cleaning work, we provide an example below of SATNAC (the Southern Africa Telecommunication Networks and Applications Conference). This is a national conference that is organised annually. In our database, we found no less than 86 spelling variants (combining annual descriptors as well as spelling variants).

Table 33: Illustrative example of data cleaning tasks

No.	Original conference name
1	2012 Proceedings – Southern Africa Telecommunication Networks and Applications Conference (SATNAC 2012)
2	Proceedings of SATNAC
3	Proceedings of the 2006 SATNAC on Next Generation Services
4	Proceedings of the Southern Africa Telecommunications Networks and Applications Conference (SATNAC 2013). 1-4 September 2013. Western Cape. South Africa
5	Proceedings Southern African Telecommunication Networks and Applications Conference (SATNAC)
6	SATNAC
7	SATNAC 2007
8	SATNAC 2008. South African Telecommunications and Networking Conference SATNAC 2008. Communication - any service, anywhere, anytime. Wild Coast Sun, Eastern Cape. South Africa, 7-10 September 2008
9	SATNAC 2009 Proceedings
10	SATNAC 2010
11	SATNAC 2010 Proceedings
12	SATNAC 2010 Proceedings: The Future – a Society Enabled by Innovation and Applications
13	SATNAC 2011
14	SATNAC 2011 Southern Africa Telecommunication Networks and Applications Conference: Social Communications – Challenging the Limits of Technology Innovation
15	SATNAC 2012
16	SATNAC 2012 – Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2012
17	SATNAC 2013
18	SATNAC 2013 Southern African Telecommunications Networks and Applications Conference
19	SATNAC 2013: South African Telecommunication Networks and Applications Conference
20	SATNAC 2014 – Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2014
21	SATNAC 2014 South Africa Telecommunication Networks and Applications Conference
22	SATNAC 2015 – Southern Africa Telecommunication Networks and Applications Conference
23	SATNAC. South African Telecommunications and Networking Conference SATNAC 2008. Communication - any service, anywhere, anytime. Wild Coast Sun, Eastern Cape. South Africa, 7-10 September 2008
24	South Africa Telecommunication Networks and Applications Conference (SATNAC): Social Communications – Challenging the Limits of Technology Innovation
25	South African Telecommunication Networks & Application Conference (SATNAC)
26	South African Telecommunication Networks and Application Conference (SATNAC) 2013
27	South African Telecommunication Networks and Applications Conference (SATNAC) 2006
29	South African Telecommunication Networks and Applications Conference (SATNAC) 2011
29	South African Telecommunications Networks & Application Conference (SATNAC)
30	South African Telecommunications Networks and Applications Conference (SATNAC 2013)
31	South African Telecommunications Networks and Applications Conference (SATNAC) 2009

No.	Original conference name
32	Southern Africa Telecommunicaiton Networks and Applications Conference (SATNAC) 2012
33	Southern Africa Telecommunication Networks and Application Conference (SATNAC) 2012
34	Southern Africa Telecommunication Networks and Application Conference (SATNAC) 2013
35	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2008 Proceedings
36	Southern Africa Telecommunication Networks and Applications Conference (SATNAC 2010)
37	Southern Africa Telecommunication Networks and Applications Conference (SATNAC 2011) 04-07 September 2011. East London. South Africa
38	Southern Africa Telecommunication Networks and Applications Conference (SATNAC 2012)
39	Southern Africa Telecommunication Networks and Applications Conference (SATNAC 2014)
40	Southern Africa Telecommunication Networks and Applications Conference (SATNAC 2016)
41	Southern Africa Telecommunication Networks and Applications Conference (SATNAC 2017)
42	Southern Africa Telecommunication Networks and Applications Conference (SATNAC)
43	Southern Africa Tele-communication Networks and Applications Conference (SATNAC)
44	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2008
45	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2008 Proceedings
46	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2009 Proceedings
47	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2009 Proceedings. 30 Aug-2 Sep. Ezulwini. Swaziland
48	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2010
49	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2011
50	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2011 Proceedings
51	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2011
52	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2012
53	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2013
54	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2014
55	Southern Africa Telecommunication Networks and applications Conference (SATNAC) 2014 Proceedings
56	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2016
57	Southern Africa Telecommunication Networks and Applications Conference Proceedings Format :Printed

No.	Original conference name
58	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2014
59	Southern Africa Telecommunications Network Applications Conference (SATNAC) 2006
60	Southern Africa Telecommunications Networks and Applications (SATNAC) 2012
61	Southern Africa Telecommunications Networks and Applications Conference (SATNAC 2014)
62	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2013
63	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2014
64	Southern African Telecommunication Networks and Application Conference (SATNAC) 2010 Proceedings
65	Southern African Telecommunication Networks and Applications Conference
66	Southern African Telecommunication Networks and Applications Conference (SATNAC 2014)
67	Southern African Telecommunication Networks and Applications Conference (SATNAC)
68	SOUTHERN AFRICAN TELECOMMUNICATION NETWORKS AND APPLICATIONS CONFERENCE (SATNAC) 2005 Proceedings. 11-14 September 2005.
69	Southern African Telecommunication Networks and Applications Conference (SATNAC) 2008 Proceedings
70	Southern African Telecommunication Networks and Applications Conference (SATNAC) 2011
71	Southern African Telecommunication Networks and Applications Conference (SATNAC) 2015
72	Southern African Telecommunication Networks and Applications Conference (SATNAC. 2004)
73	Southern African Telecommunication Networks and Applications conference 2005 - (SATNAC)
74	Southern African Telecommunication Networks and Applications Conference SATNAC (2005) Proceedings
75	Southern African Telecommunication Networks Applications Conference (SATNAC) 2006 Proceedings
76	Southern African Telecommunication Networks Applications Conference (SATNAC) 2006 Proceedings. Spier Wine Estate. Western Cape. 3-6 September 2006.
77	Southern African Telecommunications Networks and Applications Conference (SATNAC 2010)
78	Southern African Telecommunications Networks and Applications Conference (SATNAC)
79	Southern African telecommunications networks and applications conference (SATNAC) 2009 proceedings
80	Southern African telecommunications networks and applications conference (SATNAC)2009 proceedings
81	Southern African Telecommunications Networks and Applications Conference (SATNAC)2012
82	Southern African Telecommunications Networks and Applications Conference (SATNAC)2013
83	Southern African Telecommunications Networks and Applications Conference 2009
84	Southern African telecommunications networks and applications conference(SATNAC) 2009 proceedings
85	Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2011

No.	Original conference name
86	The Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2013

The figure below summarises the results of the harmonisation task. It shows that, over the period 2004 to 2017, 19 474 individual SA academics submitted 27 503 unique conference papers for subsidy (which results in a total of 55 882 authorships).

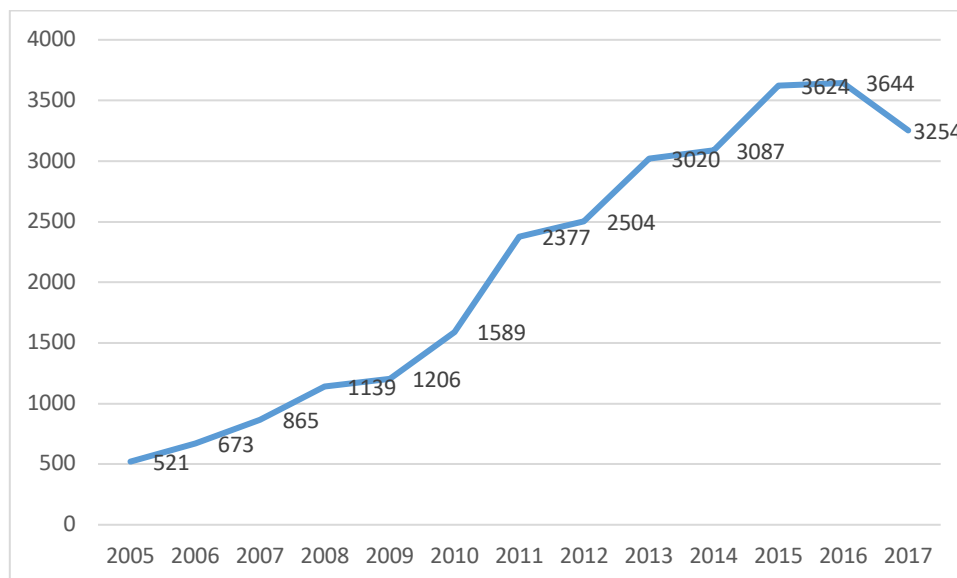


Figure 13: Number of unique conference papers per year

These 27 503 papers were produced by 19 474 unique authors. Given the size of permanent instructional staff at SA universities (approximately 18 000), it is clear that many of these authors would have to be students, post-doctoral fellows or visiting scholars to SA universities.

Table 34: Number of unique (conference) authors by year

Publication year	No. of unique authors
2005	607
2006	782
2007	1 116
2008	1 311
2009	1 450
2010	1 797
2011	2 695
2012	2 890
2013	3 462
2014	3 506
2015	3 925
2016	4 231
2017	3 555
Total	31 327

Table 35: Number of conference authorships and papers by year

Publication year	No. of authorships	No. of papers	Co-authorship
2005	976	521	1.9
2006	1 260	673	1.9
2007	1 674	865	1.9
2008	2 148	1 139	1.9
2009	2 505	1 206	2.1
2010	3 150	1 589	2.0
2011	4 874	2 377	2.1
2012	5 116	2 504	2.0
2013	6 042	3 020	2.0
2014	6 316	3 087	2.0
2015	7 404	3 624	2.0
2016	7 722	3 644	2.1
2017	6 695	3 254	2.1
Total	55 882	27 503	2.0

3.3 Towards a list of accredited conference titles: Ranking of conferences

As pointed out in the introduction to this report, the DHET funding framework uses two different main “strategies” in order to ensure that only quality research publications of any type qualify for government subsidy. The first strategy is to utilise existing lists or indexes where quality control is embedded in the list or index. Currently, this strategy is applied to journal articles only. Specifically, the DHET recognises a number of indexes (Web of Science, Scopus and Scielo) and journal lists (ProQuest’s IBSS and NSD) as indexes where sufficient quality control mechanisms are in place to warrant “automatic” acceptance of articles published in journals included in these indexes or lists for subsidy purposes. The exception to this rule – as far as journal articles are concerned – is the list of South African journals not currently included in any of these five indexes/lists. In these cases, the DHET conducts its own process of accreditation (both initially and after some period of time). Once a local journal is accredited on the DHET (SA) list, it also qualifies for subsidy.

The situation with regard to conference proceedings is much more complex, as there is no single index or list for this document type that is generally accepted as the “gold standard” and that can be used by the DHET for making decisions about awarding funding in these cases. We have managed to identify four “ranking systems” that are available in the fields of engineering sciences and information and computer sciences. We briefly discuss each below.

3.3.1 The Core ranking

Arguably the most reputable of the ranking systems of conferences is the Core conference ranking. It was developed by the Australian Research Council but only provides assessments of major conferences in the computing disciplines. The rankings are managed by the Core Executive Committee, with periodic rounds for submission of requests for addition or re-ranking of conferences. Decisions are made by academic committees based on objective data requested as part of the submission process. Conferences are assigned to one of the following categories:

- A+ = flagship conference, and a leading venue in a discipline area;
- A = excellent conference, and highly respected in a discipline area;
- B = good conference, and well regarded in a discipline area;

- C = other ranked conference venues that meet minimum standards;
- Australasian = a conference for which the audience is primarily Australians and New Zealanders;
- Unranked = a conference for which no ranking decision has been made;
- National = a conference which is run primarily in a single country with chairs from that country and which is not sufficiently well known to be ranked (papers and PC may be international); and
- Regional = similar to National but may cover a region-crossing national borders.

Conference rankings are determined by a mix of indicators, including citation rates per paper, submission and acceptance rates, and the visibility and research track record of the key people hosting the conference and managing its technical programme.

In an analysis of the DHET data, we found that only 108 titles in which SA academics have published conference papers over the past thirteen years appear in the Core ranking. The distribution of conference titles across the first four ranking categories (A+, A, B and C) is shown in the graph below.

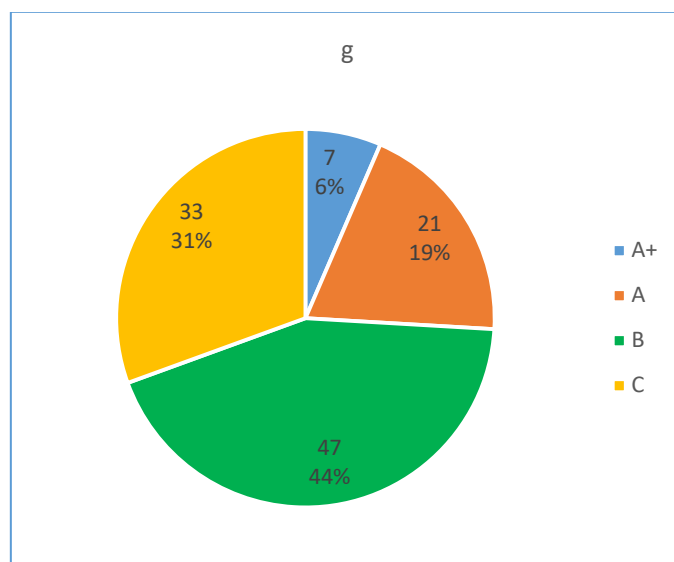


Figure 14: SA conference titles ranked in Core ranking

3.3.2 The AMiner ranker

Dr Jie Tang (Department of Computer Science and Technology, Tsinghua University) leads the AMiner project that aims to offer the best services for searching and mining academic social networks. AMiner produces a conference ranking that is based on the h5-index (as provided by Google Scholar metrics). The h5-index is similar to the h-index but takes a five-year citation window as the basis for calculation of the index score. For example, a h5-index score of 30 means that a specific conference has produced at least 30 papers with 30 citations or more over the five-year period since the conference was held.

Our analysis of the DHET data produced the following result (Table 36 below). It shows that 57 conferences appear in the AMiner ranking (in descending order in terms of their h-index values).

Table 36: SAK conference titles in the AMiner ranking

Conference	AMiner ranking (h-5 index value)
ACM SIGCHI Conference on Human Factors in Computing Systems	71.00
IEEE International Conference on Automatica (ICA)	69.00
International Conference on Machine Learning (ICML)	56.00
IEEE International Conference on Acoustics. Speech and Signal Processing (ICASSP)	45.00
AAAI Conference on Artificial Intelligence (AAAI)	44.00
AAAI Conference on Artificial Intelligence (AAAI)	44.00
AAAI Conference on Artificial Intelligence (AAAI)	44.00
Decision Support Systems (ICDSST)	43.00
Decision Support Systems (ICDSST)	43.00
IMC ACM Internet Measurement Conference (IMC)	41.00
International Conference on Artificial Intelligence (ICAI)	39.00
International Conference on Artificial Intelligence (ICAI)	39.00
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	38.00
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	38.00
International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS)	36.00
International Conference of the International Speech Communication Association (Interspeech)	35.00
International Conference of the International Speech Communication Association (Interspeech)	35.00
International Joint Conference on Artificial Intelligence (IJCAI)	35.00
IEEE Conference on Decision and Control (CDC)	32.00
IEEE Conference on Decision and Control (CDC)	32.00
IEEE International Conference on Image Processing (ICIP)	32.00
Hawaii International Conference on System Sciences (HICSS)	30.00
IEEE/ACM International Conference on Automated Software Engineering (ASE)	30.00
IEEE/ACM International Conference on Automated Software Engineering (ASE)	30.00
ACM SIGSOFT International Symposium on Foundations of Software Engineering (FSE)	29.00
IEEE Wireless Communications and Networking Conference (WCNC)	28.00
IEEE Wireless Communications and Networking Conference (WCNC)	28.00
Genetic and Evolutionary Computation Conference (GECCO)	27.00
IEEE Congress on Evolutionary Computation (CEC)	25.00
IEEE Congress on Evolutionary Computation (CEC)	25.00
IEEE Vehicular Technology Conference (VTC)	24.00
International Conference on Information Fusion (FUSION)	24.00
International Conference on Principles of Knowledge Representation and Reasoning (KR)	24.00
International Joint Conference on Neural Networks (IJCNN)	22.00
International Joint Conference on Neural Networks (IJCNN)	22.00
IEEE International Symposium on Personal. Indoor and Mobile Radio Communications (PIMRC)	21.00
IEEE International Symposium on Personal. Indoor and Mobile Radio Communications (PIMRC)	21.00
Medical Image Computing and Computer Assisted Intervention (MICCAI)	21.00

Conference	AMiner ranking (h-5 index value)
IEEE International Conference on Advanced Information Networking and Applications (AINA)	20.00
International Conference on Information Society (i-Society)	20.00
International Conference on Information Society (i-Society)	20.00
International Conference on Information Society (i-Society)	20.00
International Conference on Signal Processing Systems (ICSPS)	20.00
European Conference on Information Systems (ECIS)	19.00
International Conference on Applied Mathematics and Computer Science (ICAMCS)	18.00
IEEE Workshop on Automatic Speech Recognition and Understanding (ASRU)	17.00
Conference on Formal Methods in Computer-Aided Design (FMCAD)	16.00
IEEE ISGT : Innovative Smart Grid Technologies (ISGT)	16.00
Graphics Interface	15.00
IEEE International Geoscience and Remote Sensing Symposium (IGARSS)	15.00
IEEE International Geoscience and Remote Sensing Symposium (IGARSS)	15.00
International Conference on Availability Reliability and Security (ARES)	15.00
Uncertainty in Artificial Intelligence (UAI)	15.00
International Conference on Cloud Computing and Services Science (CLOSER)	14.00
International Conference on Field-Programmable Technology (FPT)	14.00
Artificial Life Conference	13.00
International Conference on Biometrics (ICB)	13.00

3.3.3 The GII-GRIN-SCIE ranking

The GII-GRIN-SCIE ranking system is another ranking that was developed to track conferences in the computer sciences. This initiative is sponsored by the Group of Italian Professors of Computer Engineering (GII), Group of Italian Professors of Computer Science (GRIN) and Spanish Computer-Science Society (SCIE). The goal of this initiative is to develop a unified rating of computer science conferences.

The process is organised in two stages:

- (1) Stage 1: A joint committee of GII, GRIN and SCIE members generates the rating by using an **automatic algorithm** based on well-known, existing international classifications. This automatically-generated rating is updated periodically, usually every two years.
- (2) Stage 2: Each of the three societies (GII, GRIN and SCIE) may independently submit the automatically-generated rating to the respective communities in order to revise and correct it.

On their latest website posting, they provide the following information on how to interpret the results of their ranking process. The results show that they have thus far reviewed 366 conference (Class 1 to 3), while no reviews have been concluded for 2 172 conference titles.

Table 37: GII-GRIN-SCIE ranking

Class	Ratings	Size	Description
Class 1	A++, A+	32 + 50 = 82 conferences	Excellent, top-notch conferences
Class 2	A, A-	82 + 93 = 175 conferences	Very good events
Class 3	B, B-	205 + 161 = 366 conferences	Events of good quality
	Work in progress	2 172 conferences	Work in progress

The analysis of SAK conference titles and their rankings in the GII-GRIN-SCIE ranking system shows that 16 conference titles from SAK appear in Class 1, 36 in Class 2 and 34 in Class 3. The remainder are either not rated or still under review.

Table 38: SAK conference titles in the GII-GRIN-SCIE ranking system

Class	Ranking score	No. of conferences
1	A+	9
1	A++	7
2	A	17
2	A-	19
3	B	22
3	B-	12
	Not rated (now published as journal)	1
	Work in progress	178
Grand total		265

Table 39: SAK conference titles in the top categories of the GII-GRIN-SCIE ranking system

Conference	Ranking
ACM SIGCHI Conference on Human Factors in Computing Systems	A++
International Conference on Machine Learning (ICML)	A++
AAAI Conference on Artificial Intelligence (AAAI)	A++
AAAI Conference on Artificial Intelligence (AAAI)	A++
AAAI Conference on Artificial Intelligence (AAAI)	A++
International Joint Conference on Artificial Intelligence (IJCAI)	A++
CHI Conference on Human Factors in Computing Systems (CHI)	A++
International Conference on Principles of Knowledge Representation and Reasoning (KR)	A+
IMC ACM Internet Measurement Conference (IMC)	A+
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	A+
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	A+
International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS)	A+
Hawaii International Conference on System Sciences (HICSS)	A+
ACM SIGSOFT International Symposium on Foundations of Software Engineering (FSE)	A+
Uncertainty in Artificial Intelligence (UAI)	A+
ACM SIGSOFT International Symposium on Software Testing and Analysis	A+

3.3.4 Qualis-Capes ranking

Every three years, Capes (a Brazilian research agency) releases a ranking of journals (and conferences) covering all computer science areas, called Qualis ranking. This ranking – together with other criteria – is used to classify the graduate programmes in Brazil. In addition, journals are also ranked at five major levels (A1, A2, B1, B2 and B3), mainly according to their impact factor, but also considering other metrics, like h-index. And finally, conferences (like the journals) are ranked on levels (A1, A2, B1 to B5), according to their h5-index, computed by Google Scholar. The 2017 ranking has just been released, providing a classification for 1 179 conferences, from all computer science areas. Of these, 86 SAK conference titles appear in the Qualis ranking (Table 40). Those ranked in the two highest categories are listed in Table 41 below.

Table 40: SAK conferences in Qualis ranking categories

Qualis ranking	Conferences
A1	21
A2	14
B1	24
B2	12
B3	4
B4	5
B5	6
Grand total	86

Table 41: SAK conferences listed in Qualis A1 and A2 categories

Conference title	Ranking
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)	A1
IMC ACM Internet Measurement Conference (IMC)	A1
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	A1
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	A1

Conference title	Ranking
International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS)	A1
International Conference of the International Speech Communication Association (Interspeech)	A1
International Conference of the International Speech Communication Association (Interspeech)	A1
Hawaii International Conference on System Sciences (HICSS)	A1
IEEE/ACM International Conference on Automated Software Engineering (ASE)	A1
IEEE/ACM International Conference on Automated Software Engineering (ASE)	A1
Genetic and Evolutionary Computation Conference (GECCO)	A1
IEEE Congress on Evolutionary Computation (CEC)	A1
IEEE Congress on Evolutionary Computation (CEC)	A1
International Conference on Information Fusion (FUSION)	A1
IEEE International Symposium on Personal. Indoor and Mobile Radio Communications (PIMRC)	A1
IEEE International Symposium on Personal. Indoor and Mobile Radio Communications (PIMRC)	A1
medical image computing and computer assisted intervention (MICCAI)	A1
IEEE International Conference on Communications (ICC)	A1
IEEE International Conference on Communications (ICC)	A1
IEEE International Symposium on Information Theory (ISIT)	A1
IEEE International Symposium on Information Theory (ISIT)	A1
International Conference on Principles of Knowledge Representation and Reasoning (KR)	A2
IEEE International Conference on Advanced Information Networking and Applications (AINA)	A2
European Conference on Information Systems (ECIS)	A2
International Conference on Availability Reliability and Security (ARES)	A2
International Conference on Cloud Computing and Services Science (CLOSER)	A2
International Conference on Biometrics (ICB)	A2
Americas Conference on Information Systems (AMCIS)	A2
Americas Conference on Information Systems (AMCIS)	A2
Americas Conference on Information Systems (AMCIS)	A2
Conference on Innovation and Technology in Computer Science Education (ITiCSE)	A2
European Conference on Artificial Intelligence (ECAI)	A2
European Signal Processing Conference (EUSIPCO)	A2
IEEE International Conference on Wireless and Mobile Computing Networking and Communications (WIMob)	A2
IEEE International Conference on Wireless and Mobile Computing Networking and Communications (WIMob)	A2

3.3.5 DHET decisions on conference submissions

In addition to the information from current ranking systems, we also received the conference decisions for 2016 and 2017 from the DHET. The results of our analysis of these decision outcomes by unified conference name are presented in the table below. The results show that we only have information on 661 conference titles. If we selected a threshold criterion of 10 conference titles (for which there are decisions), this reduces the list to 105 conference titles. These 105 titles produced a total of 4 461 submissions in 2016 and 2017. Of these, 3 853 (or 86%) were approved for subsidy.

It is clear from the analyses of the ranking data and the DHET decision outcomes that only a very small subset of the total number of conference titles in our database has relevant data. This is even more clearly demonstrated when we list those conferences for which there are some ranking score and a DHET decision outcome rate. Table 42 shows that we only have such data for 23 conferences.

Table 42: Conferences with DHET decision outcomes and at least one ranking value

Conference	DHET approval rate	Core ranking	Qualis ranking	CII-GRIN-SCIE ranking	AMiner ranking
(CD) of the Post-Graduate Conference on Construction Industry Development	100%			B-	
ACM Conference on Computer Supported Cooperative Work (CSCW)	100%	A	A1	A+	40.00
ACM Conference on Foundations of Genetic Algorithms (FOGA)	100%	A*	B3	A-	
ACM International Conference on Design of Communication	100%		B2		
ACM SIGCHI Conference on Human Factors in Computing Systems	100%			A++	71.00
ACM SIGSOFT International SPIN Symposium on Model Checking of Software	100%		B2		
ACM SIGSOFT International Symposium on Foundations of Software Engineering (FSE)	100%			A+	29.00
ACM Symposium on Applied Computing	100%	B	A1	A-	
ACM Symposium on Eye-Tracking Research and Application (ETRA)	100%			B	
ACM. Symposium on Applied Computing	100%	B		A-	
ACM/IEEE International Conference on Distributed Smart Cameras	100%	B			
Advanced Concepts for Intelligent Vision Systems (ACIVS)	100%	B	B1	B-	
Advances in Databases and Information Systems (ADBIS)	100%	B			
AAAI Conference on Artificial Intelligence (AAAI)	96%			A++	44.00
ACM International Wireless Communication Computing Conference	94%			B	
ACM International Conference on Supporting Group Work	92%	B	B2	A-	17.00
ACM International Conference on Modelling. Analysis and Simulation of Wireless and Mobile Systems	82%	A		A-	
ACM SIGSOFT International Symposium on Software Testing and Analysis	66%	A		A+	
ACM Conference on Computer and Communication Security (CCS)	55%	A*		A++	44.00

Conference	DHET approval rate	Core ranking	Qualis ranking	CII-GRIN-SCIE ranking	AMiner ranking
ACM SIGSOFT International Symposium on the Foundations of Software Engineering	24%			A+	
ACM Conference on Designing Interactive Systems (DIS)	19%	B		A-	19.00
Advances in Modal Logic (AiML)	0%	A	B2	B-	

3.3.5 Discussion

Even though the numbers are small, the general pattern shows some correspondence between the DHET decision outcomes and ranking scores: most of the DHET-approved submissions recorded relatively high rankings on one or more ranking system. However, there are also clear exceptions. At the bottom of Table 41 there are four conferences where the DHET success rate is below 60%, but in three cases (CCS, DIS and AiML) their rankings on one or more of the ranking systems are quite high. In fact, submissions from the ACM Conference on Computer and Communication Security recorded only a 55% success rate at the DHET, but were rated in the top categories of three of the ranking systems.

3.3.6 Conclusion

Based on our comparative analyses of the available ranking systems for conference proceedings and the DHET outcome decisions, we conclude that the development of a DHET list of accredited conferences is not a feasible undertaking. Nonetheless, the question that remains is whether the existing list of conference proceedings in either the WoS or Scopus could perform this function, i.e. that the DHET could conceivably decide only to award subsidies to conferences that are currently indexed in either the WoS or Scopus. Since CREST only has access to the micro data in the WoS we had to confine our analyses to this database.

3.4 Recognising the WoS indexes of conference proceedings for subsidy purposes

3.4.1 Introduction

In order to assess whether the conference submissions appeared in any of the WoS proceedings indexes, we had to match the “unified conference name” in SAK with the names in the WoS. This is not a straightforward exercise, since the WoS does not – in the majority of entries – contain unified, cleaned conference names. The entries in the WoS contain references to conferences held in a specific year, rather than the unified name that we have cleaned in SAK. An example is shown below. It is typical that the date of a conference is found in the WoS. In our cleaning of conference names (see section 3.3 above), all “redundant” information in the title field was stripped to arrive at the cleaned, unified name.

Table 43: Example of spelling variants of conference title

Unified conference name (cleaned in SAK)	Conference name in WoS
CIRP Conference on Modeling of Machining Operations (CMMO)	14th CIRP Conference on Modeling of Machining Operations (CIRP CMMO)

In order to take these spelling variants in the names of conferences into consideration, we ran a matching algorithm between the DHET conference names (cleaned) and the WoS. Where the names were identical, a similarity rating of 1 was recorded. We found 556 such records. For the remainder, the similarity ratings ranged from 0.999 to 0.6. However, as the entries in the table below shows, one needs to inspect each entry visually to establish whether the conference name as submitted to the DHET is the same as the name indexed in the WoS. Where similarity ratings are high (at least 0.8 and higher) it is fairly certain that the conference names are identical. However, records with identical similarity ratings (especially between 0.6 and 0.7) may or may not be identical records. We have highlighted examples of such cases in the table below.

Table 44: Examples of different similarity rating scores

Unified conference name	WoS conference title	Similarity score
CIRP Conference on Modeling of Machining Operations (CMMO)	14th CIRP Conference on Modeling of Machining Operations (CIRP CMMO)	0.962264
Computational Intelligence Methods for Bioinformatics and Biostatistics (CIBB)	7th International Meeting on Computational Intelligence Methods for Bioinformatics and Biostatistics (CIBB 2010)	0.855556
IEEE Workshop on Automatic Speech Recognition and Understanding (ASRU)	IEEE Workshop on Automatic Speech Recognition and Understanding (ASRU 2009)	0.8
International Conference on Higher Education Advances (HEAd)	3rd International Conference on Higher Education Advances (HEAd)	0.7
ISES Europe Solar Conference. EuroSun (ISES)	ISES Solar World Congress (SWC)	0.7
International Conference on Information Fusion (FUSION)	14th International Conference on Geoinformatics	0.7
International Biohydrometallurgy symposium (IBS)	18th International Biohydrometallurgy Symposium	0.672414
IEEE Conference on Decision and Control (CDC)	39th IEEE Conference on Decision and Control	0.64
International Conference on e-Learning (ICEL)	11th International Conference on Electrostatics	0.64
International Conference on e-Learning (ICEL)	10th International Conference on Virtual Learning	0.627451
Summer Computer Simulation Conference: (SCSC)	43rd Summer Computer Simulation Conference	0.627451
International Conference on e-Learning (ICEL)	10th International Conference on Clean Energy	0.6
AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition	49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition	0.6

Given these challenges, it was decided to take 0.75 as the threshold criterion in the matching process. All conference names in SAK that received a similarity rating of 0.75 and higher were assumed to correspond correctly to a conference name in the WoS. These additional names sum to 1 255 records (which include the 556 with similarity scores of 1). Between 2005 and 2016, 18 815 submissions were linked to these 1 255 conferences. The summary table below shows how skewed the distribution across conferences are.

Table 45: Distribution of DHET submissions in WoS conferences (2005-2017)

Papers	Cum no. of papers	No. of conferences	Cum no. of conferences
2 157	2 157	2	2
1 660	3 817	5	7
1 916	5 733	10	17
1 820	7 553	17	34
1 870	9 423	30	64
1 874	11 297	50	114
1 866	13 163	86	200
1 883	15 046	150	350
1 882	16 928	274	624
1 887	18 815	631	1 255

The distribution has a similar shape to the Lotka distribution that is found in many bibliometric distributions. It shows, for example, that half of all conference papers in this dataset were presented at only 64 out of the total of 1 255 conferences listed. These 64 conferences – with their corresponding number of papers – are listed in Table 46 below.

Table 46: Conferences in WoS with higher number of papers by SA authors

Unified conference name	No. of SAK submissions	Share	Cumulative share
IEEE International Conference on Communications (ICC)	1 224	6.5%	6.5%
Academy of Management (AOM)	933	5.0%	11.5%
IEEE International Conference on Acoustics. Speech. and Signal Processing (ICASSP)	492	2.6%	14.1%
IEEE International Conference on Acoustics. Speech and Signal Processing (ICASSP)	402	2.1%	16.2%
IEEE International Symposium on Circuits and Systems (ISCAS)	304	1.6%	17.8%
International Conference on Recent Advances and Innovations in Engineering (ICRAIE)	237	1.3%	19.1%
IEEE Wireless Communications and Networking Conference (WCNC)	225	1.2%	20.3%
International Conference of Education. Research and Innovation (ICERI)	222	1.2%	21.5%
IEEE International Conference on Industrial Engineering and Engineering Management (ICIEEM)	219	1.2%	22.6%
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	209	1.1%	23.7%
IEEE International Conference on Robotics and Automation (ICRA)	206	1.1%	24.8%
IEEE International Symposium on Information Theory (ISIT)	195	1.0%	25.9%
International Conference on Computers and Industrial Engineering (CIE)	190	1.0%	26.9%
IEEE International Symposium on Personal. Indoor and Mobile Radio Communications (PIMRC)	186	1.0%	27.9%
IEEE Conference on Decision and Control (CDC)	165	0.9%	28.7%
IEEE International Conference on Wireless and Mobile Computing Networking and Communications (WIMob)	162	0.9%	29.6%

Unified conference name	No. of SAK submissions	Share	Cumulative share
International Joint Conference on Neural Networks (IJCNN)	162	0.9%	30.5%
International Federation of Automatic Control (IFAC)	154	0.8%	31.3%
International Conference on Applied Energy (ICAE)	148	0.8%	32.1%
International Heat Transfer Conference (IHTC)	128	0.7%	32.8%
IEEE International Symposium on Industrial Electronics (ISIE)	127	0.7%	33.4%
IEEE International Conference on Image Processing (ICIP)	126	0.7%	34.1%
IEEE International Geoscience and Remote Sensing Symposium (IGARSS)	115	0.6%	34.7%
International Conference on e-Learning (ICEL)	102	0.5%	35.3%
IEEE International Electric Machines and Drives Conference (IEMDC)	101	0.5%	35.8%
AIAA Guidance, Navigation, and Control Conference (GNC)	100	0.5%	36.3%
IEEE Consumer Communications and Networking Conference (CCNC)	94	0.5%	36.8%
IEEE Global Telecommunications Conference (GLOBECOM)	93	0.5%	37.3%
IEEE International Conference on Electronics, Circuits and Systems	91	0.5%	37.8%
International Conference on Electrical Machines (ICEM)	91	0.5%	38.3%
International Conference on Education and New Learning Technologies (EDULEARN)	90	0.5%	38.8%
European Conference on Management, Leadership and Governance (ECMLG)	89	0.5%	39.2%
International Symposium on Information Theory and its Applications (ISITA)	86	0.5%	39.7%
International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT)	85	0.5%	40.1%
International Conference on Flexible Automation and Intelligent Manufacturing (FAIM)	80	0.4%	40.6%
EuroMed Academy of Business	79	0.4%	41.0%
AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition	77	0.4%	41.4%
IEEE Conference on Industrial Electronics and Applications (ICIEA)	75	0.4%	41.8%
IEEE International Conference on Renewable Energy Research and Applications (ICRERA)	74	0.4%	42.2%
IEEE Conference on Intelligent Transportation Systems (ITSC)	68	0.4%	42.6%
Mediterranean Electrotechnical Conference (MELECON)	68	0.4%	42.9%
International Universities' Power Engineering Conference (UPEC)	67	0.4%	43.3%
IEEE Engineering in Medicine and Biology Society	66	0.4%	43.6%
International Conference on Engineering Design (ICED)	66	0.4%	44.0%

Unified conference name	No. of SAK submissions	Share	Cumulative share
International Symposium on Advances in Computational Heat Transfer	66	0.4%	44.3%
World Congress on Computational Intelligence (WCCI)	66	0.4%	44.7%
Conference Process Integration. Modelling and Optimisation for Energy Saving and Pollution Reduction	63	0.3%	45.0%
IEEE Symposium on Computers and Communication (ISCC)	62	0.3%	45.3%
International Conference on Industrial Engineering and Operations Management (IEOM)	62	0.3%	45.7%
IEEE International Conference on Industrial Informatics (INDIN)	60	0.3%	46.0%
International Conference on Advanced Ceramics and Composites (ICACC)	60	0.3%	46.3%
World Congress on Medical Physics and Biomedical Engineering	59	0.3%	46.6%
European Congress on Obesity	58	0.3%	46.9%
Hawaii International Conference on System Sciences (HICSS)	58	0.3%	47.2%
European Conference on Power Electronics and Applications (EPE)	56	0.3%	47.5%
International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)	56	0.3%	47.8%
International Conference on Environment and Electrical Engineering (EEEIC)	56	0.3%	48.1%
International Conference on Information Fusion (FUSION)	56	0.3%	48.4%
International Conference on Tourism Research	56	0.3%	48.7%
International Symposium on Remote Sensing of Environment (ISRSE)	56	0.3%	49.0%
International Conference on Computational Science and Engineering (CSE)	52	0.3%	49.3%
International Power Electronics and Motion Control Conference and Exposition (PEMC)	52	0.3%	49.6%
Asia-Pacific Microwave Conference (APMC)	48	0.3%	49.8%
International Technology. Education and Development Conference (INTED)	48	0.3%	50.1%

3.4.2 Discussion

Our analyses in the preceding sections were aimed at establishing the following:

- Whether there are credible and comprehensive ranking systems for conferences that could be used by the DHET in developing a SA list of accredited conferences.
- Whether the past panel decision outcomes could be used as the basis for a proposed list of accredited conference.
- Whether the inclusion of conferences in the WoS proceedings indexes could be used as a possible point of departure for such a list.

The results of our analyses clearly show that the answers to the first two questions are both negative. There are three reasons for rejecting these as options for developing a DHET list of accredited conference titles:

- (1) The coverage of the existing ranking systems is too small and predominantly only covers conferences in the computer sciences.
- (2) The evidentiary base with regard to the DHET decisions only (two years) did not provide us with sufficient evidence to make robust claims.
- (3) A comparison between the existing ranking systems and the approval rate of the DHET decisions showed a very low correlation. Again, this does not instil confidence in using either the ranking systems, or the DHET approval ratings, or a combination of these.

Our second approach was to match the conference submissions made to the DHET for the period 2005 to 2007 with the titles in the WoS proceedings indexes. This involved a lengthy cleaning process, as well as a matching process based on similarity scores between the SAK and WoS titles. Using a very conservative threshold criterion on similarity scores (0.75 and above), we could link 18 815 conference submissions in our database to the WoS titles. As explained in our analysis, we believe that this is a very conservative under-estimate as we visually found many titles with similarity scores of below 0.75 that clearly linked to the same conference. However, the “sample” of 18 815 records provided us with an initial point of departure for a possible list of accredited conferences.

Our detailed analysis of the distribution of these 18 815 records showed that nearly 50% of them appeared in 64 conference proceedings. If we increase the threshold to 70%, we would include 13 163 which appeared in 200 conference proceedings. If we increase the threshold to 80% of all submissions (16 046) we would find that these appeared in 350 conferences. On the basis of these results, we are prepared to formulate the following recommendation: That the DHET produces two lists of accredited conference titles (similar to the list of publishers proposed in the previous section). The first list, List A, would include only conference titles that are indexed in the two proceedings indexes of the WoS and which account for 80% of all submissions made to the DHET over a certain period of time. Based on the current information available, this list would contain the names of approximately 350 conference titles. The second list, List B, would include all other conference names that appear in the Web of Science (and possibly Scopus) proceedings indexes, as well as any South African conference titles to be added after a review/accreditation process.

The advantages of implementing such lists are similar to the advantages that we identified in our discussion of a list of accredited publishers:

- In making these lists public, the DHET introduces more **transparency** to the system of awarding conference proceedings.
- The introduction of this framework has immediate **efficiency gains** in that it will significantly reduce the time spent by DHET panels on making decisions. Our “test” shows that at least 30% of all submissions (in List A) will automatically be awarded.

However, two caveats need to be registered – hence the “preliminary” nature of our recommendation:

- Further research and analysis is needed to compile List A based on a visual inspection of all conference titles with ratings of lower than 0.75.

- Further research needs to be done to establish which SA conference titles are included in the WoS – but more specifically which are not included and whether there is sufficient reason to include them in List B. In order to do this research properly and in a consultative manner, we propose that a survey be conducted among academics in the most relevant disciplines (computer sciences, engineering subfields, mathematics, economics) to garner their views on the status and quality of the top (including South African) conferences in their disciplines.
- In order to strengthen this decision framework, we would also propose that an analysis of the WoS proceedings indexes and the Scopus conference proceedings indexes be undertaken. Since CREST does not have access to the micro data of Scopus (at least not currently), a special arrangement will have to be made with our SciSTIP partner (Centre for Science and Technology Studies at Leiden) to conduct such an analysis.

There is another reason why our recommendation regarding conference proceedings is a provisional one. This relates to evidence that we have found of possible and increasing instances of questionable practices in the submissions of conference proceedings. We turn to this discussion in the next section.

3.5 Questionable practices in conference submissions

Our analysis of conference submissions between 2005 and 2017 also focussed on the relative contributions of universities and individual academics. We found that this (based on our analysis of predatory publishing) is a necessary process to establish whether there are any indications of questionable or unethical practices.

The relative share of individual universities are summarised in the table below. The results of the analysis show that UJ submitted 16% of all conference papers, followed by UCT (12%), UP (11.3%), SU (11.3%) and NWU (7.9%).

Table 47: Conference submissions by year and university (2005-2017)

Institution	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total	Share
UJ	182	135	151	170	237	341	667	598	808	1 249	1 437	1 545	1 667	9 187	16.4%
UCT	7	16	326	447	636	727	804	720	651	612	591	686	490	6 713	12.0%
UP	334	423	336	381	262	6	604	607	536	718	789	719	627	6 342	11.3%
SU	176	218	347	302	434	441	433	466	642	601	639	785	586	6 327	11.3%
NWU				162	148	260	361	412	568	568	769	655	554	4 457	7.9%
TUT	113	194	140	149	134	179	323	368	337	328	308	312	335	3 220	5.7%
WITS	3	31	169	7	18	212	295	321	372	410	474	421	389	3 123	5.6%
NMU				169	165	251	348	271	405	247	423	440	251	2 970	5.3%
UNISA				1	58	196	246	261	282	338	360	353	247	2 342	4.2%
UKZN	4	7	2	5	5	11	8	286	304	255	364	365	349	1 965	3.5%
UFS	64	53	90	148	81	114	211	195	232	100	232	223	173	1 916	3.4%
CPUT	82	121	88	115	113	114	164	128	164	231	155	158	95	1 728	3.1%
RU	2				161	130	157	142	160	99	185	171	123	1 330	2.4%
CUT		2	11	11		31	31	24	46	82	146	213	249	846	1.5%
VUT				10	21	37	51	53	105	108	81	128	128	722	1.3%
DUT								57	87	66	130	114	113	567	1.0%
UFH		23	4	37		24	44	37	59	63	55	90	110	546	1.0%
UL			1	1	1	20	20	10	80	37	123	126	65	484	0.9%
UNIVEN						26	47	52	52	92	40	82	68	459	0.8%
UWC			1	2	24	24	41	64	82	53	37	64	27	419	0.7%
UNIZULU	7	37	8	31	7	6	10	30	43	45	53	40	28	345	0.6%
MUT				1			5	10	5	9	4	13	2	49	0.1%
WSU							4	4	22	3	5	10		48	0.1%
SMU										2	4	3	17	26	0.0%
UMP												6	2	8	0.0%
														56 139	

The results of our analysis (figure 15) suggest no systematic inconsistency or bias in the decision-making process of the DHET. We confined our analysis to those universities that had submitted at least 50 conference proceedings for 2017. The average “success rate” was 86.7%. As the graph below shows, UKZN recorded the highest success rate (93.9%) and CUT the lowest (67.1%).

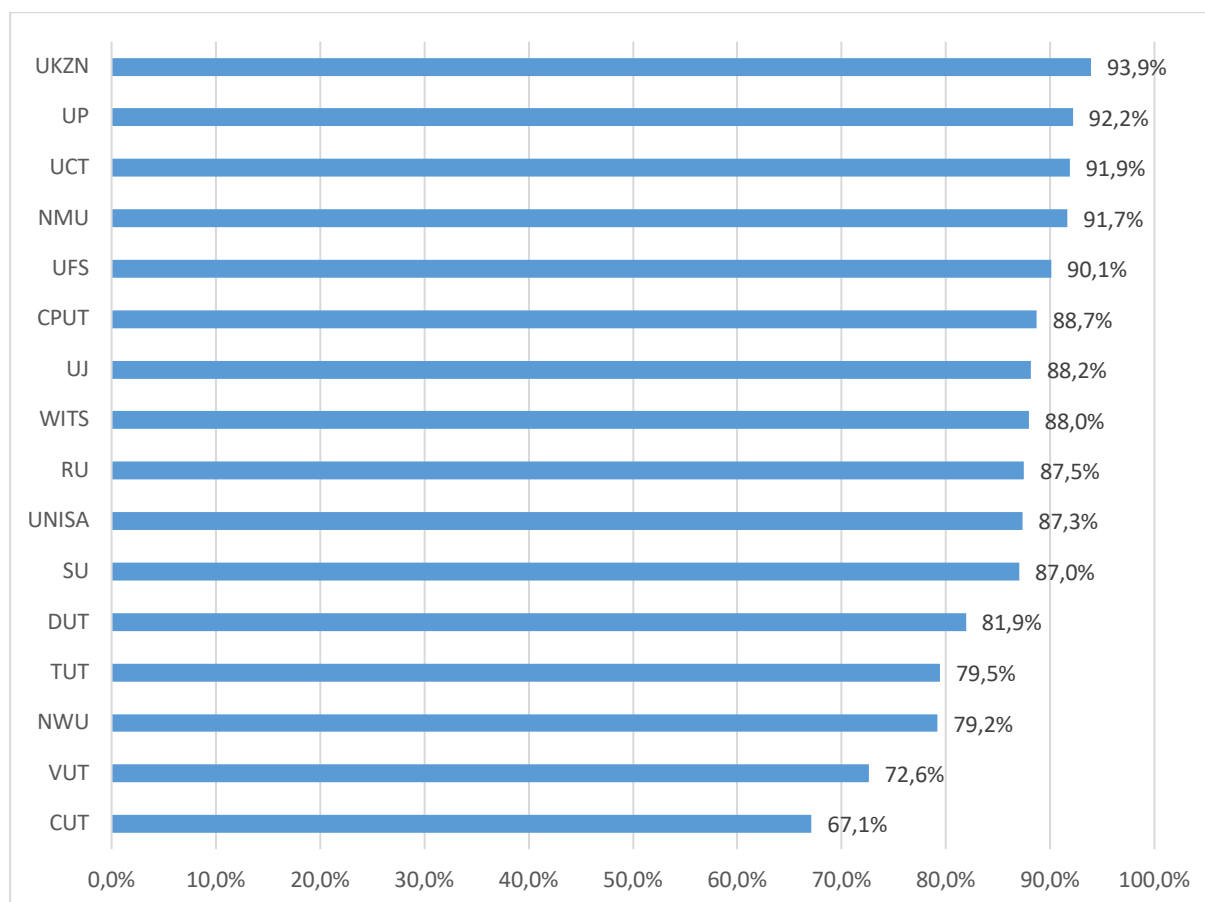


Figure 15: Success rate of universities on conference proceeding submissions (2017)

Table 48: Number of conference submissions and relative share by university

University	Number of papers	Relative share
UJ	3 021	27%
UCT	1 738	15%
SU	1 258	11%
UP	1 112	10%
NMU	852	8%
NWU	687	6%
TUT	658	6%
UKZN	370	3%
UFS	333	3%
WITS	227	2%
CPUT	212	2%
CUT	163	1%
RU	128	1%
UNISA	108	1%

University	Number of papers	Relative share
DUT	102	1%
VUT	80	1%
UNIZULU	65	1%
UFH	44	0%
UWC	37	0%
UNIVEN	32	0%
Total	11 227	

Further inspection of the data also revealed that a few authors were submitting extremely high numbers of papers per year – especially over the past five years.

3.6 Conclusions and recommendations

The results presented in this section produced two main findings:

- (1) We believe that sufficient evidence has been produced to recommend to the DHET to consider the development of a list of accredited conference proceedings (in fact, two lists).
- (2) We also believe there is sufficient evidence of the emergence of questionable practices surrounding conference submissions.

With regard to each of these findings, our recommendations are as follows:

Recommendation 5: We recommend that the DHET pursue the possibility of establishing a list of accredited conference names. However, given that there are still some outstanding issues around the harmonisation of titles and coverage of such titles in the WoS (as well as Scopus), we also recommend that the DHET considers commissioning a specific study to address these issues before such a list is finalised.

Recommendation 6: We recommend that the DHET gives serious consideration to capping the maximum number of submissions that a single academic can make to the DHET in a particular year. Even if our first recommendation is accepted and implemented, it will not necessarily address what we believe to be a clear pattern of gaming the system by some academics. We believe that no more than ten submissions should be allowed. We believe that this will lead to academics being more selective in their submissions, with a resultant improvement in the quality of output that earns subsidy from the state.

Part 4: Questionable publication practices

4.1 Background

Peer review in science has been around for at least three centuries. The system of peer review is generally acknowledged as the distinctive feature of science as a self-regulatory and self-organising system. Quality is assured through the mechanism of peer review among scholars. Peer review pervades all aspects of science and the scholarly system – in the appointment and promotion of academics, in the appraisal of the performance of academics and scientists, in the examination of master's and doctoral theses, in the submissions of funding proposals and in the submissions of article and book manuscripts for publication. Peer review can be seen as the “glue” that keeps the science and research system together.

At the same time, the shortcomings of peer review have been well documented. These shortcomings include bias in the review process (institutional bias, gender bias,), conflict of interests between reviewers and authors, rejection of very innovative (radical) research, etc. The emergence in recent years of new forms of unethical behaviour in science, such as predatory publishing, the apparent increases in cases of plagiarism and fabrication of data, have led to new initiatives to such as “Responsible research and innovation”, as well as organisations to protect the integrity of research. None of this evidence suggests the entire rejection of the peer review mechanism. However, recent trends in scholarly publishing continue to fuel debates about the best ways to ensure that scientific research is conducted in a responsible and ethical way:

- the continuing growth in demand for publishing journal articles (the role of new big players such as India and China);
- increased competition to publish (the effect of continuing globalisation and the role of ranking systems); and
- the new opportunities to publish through the availability of online journals (and specifically mega-journals such as *PLOS One*).

The enormous pressure to publish and publish fast, preferably in the very best journals, influences both authors and editors. This pressure exists almost everywhere, but is particularly intense in Asia (China and India). It is therefore no surprise that the most inventive ways to “game” the peer-review system to get manuscripts published have come from China and India (Xia, 2014). Most of the companies that provide fake peer reviews are from countries in Southeast Asia, and the authors involved in these cases mostly come from the same areas. But it would be a mistake to look at this as a Chinese or Asian problem. The situation also exists in South Africa, where we have for some time now become aware (even if only anecdotally) of the pervasive, and in some cases also perverse, effects of the DHET funding system. One of these effects have been an increase in the extent of predatory publishing (Mouton and Valentine, 2017).

4.2 Predatory publishing

4.2.1 Defining predatory publishing

The term “predatory publishing” is usually attributed to Jeffrey Beall, a librarian at the University of Colorado in Denver. Beall was regarded as the unofficial watchdog of predatory publishing administered via a website (<https://scholarlyyoa.com/>). Scholarly Open Access summarises

what is meant when scholars refer to predatory journals and/or predatory publishing. For Beall, the following are some of the key characteristics of predatory journals:

- Predatory journals are OA journals that exist for the sole purpose of profit.
- These predators generate profits by charging excessive author fees, also known as article processing charges (APCs).
- These journals typically solicit manuscripts by spamming researchers (especially Yahoo and Gmail accounts).
- These journals also typically have bizarrely broad or disjointed scopes and boast extremely rapid publication.

Between 2012 and 2017, Beall maintained two lists (a list of predatory journals and a list of predatory publishers), as well as a blog in which he commented, critiqued and also named and shamed journals and publishers that he believed were predatory. Beall's pioneering work in this regard had a number of consequences:

- (1) A burgeoning scholarship on the meaning and prevalence of predatory publishing has subsequently developed worldwide. This scholarship now counts hundreds of journal articles and reports. Much of this work can be seen as an extension of Beall's own initiative in that it attempts to describe the extent of predatory publishing in different scientific disciplines as well as countries in the world. Some of the work in this field attempted to elaborate on Beall's definition of "predatory" and at the same time also critiqued some of his claims and underlying assumptions. The debate on whether the term "predatory" is the right or appropriate term continues unabated as many scholars attempt to come up with a generally accepted conceptualisation of the term.
- (2) A second development in recent years has been attempts to set up websites and develop tools to identify predatory journals and to tag them as "deceptive" or "predatory" or "fake journals". In the same vein, various individuals and organisations have developed so-called "blacklists" (and "whitelists") to help scholars identify predatory journals. These responses form part of a wider range of initiatives (providing information on which journals are predatory, providing training and education to scholars on how to identify predatory) that are aimed at counteracting the negative and far-reaching effects of predatory publishing.

As far as the first development is concerned, a recent summit on predatory publishing held in Ottawa has resulted in a draft definition of predatory publishing:

Predatory journals and **publishers** are publications and entities that purport to serve the scholarly community but prioritize self-interest at the expense of scholarship. They are often characterized by false or misleading information, deviation from best editorial/publication practices, lack of transparency, and/or use of aggressive and indiscriminate solicitation practices.

This definition is still being discussed and, once finalised, will be published as a larger piece on predatory publishing.

4.2.2 The extent of predatory publishing in South Africa

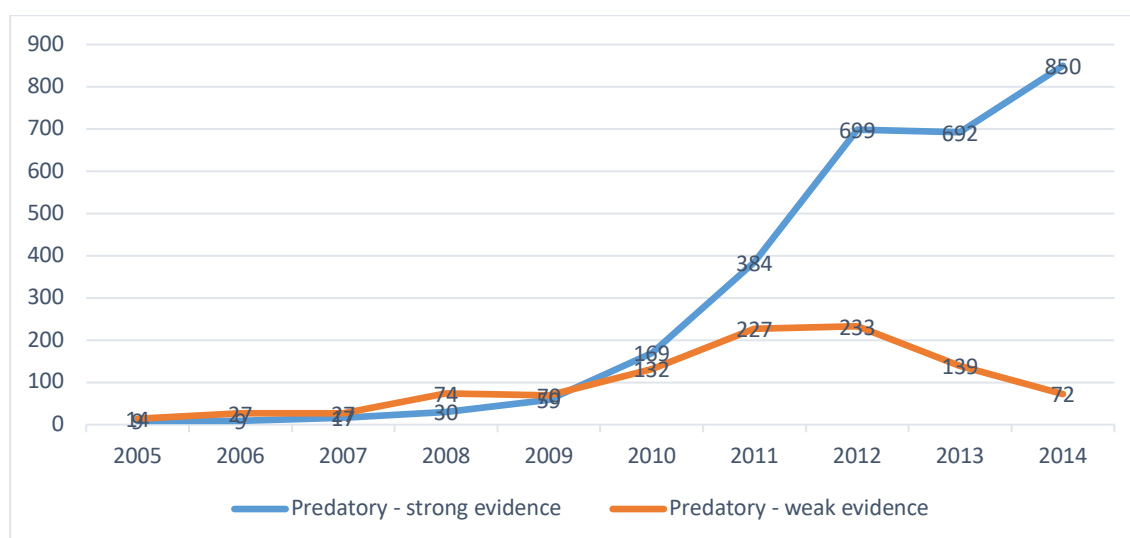
CREST was commissioned in March 2015 by ASSAf to undertake a comprehensive analysis of the state of journal and book publishing in South Africa. This commission was issued specifically to investigate how the revision of the funding framework in 2005 had impacted journal, book and conference proceeding outputs in the country. A (somewhat implicit) focus of this study would be to address issues around quality and ethics of scholarly publishing in SA rather than merely of volume and output. As part of a study for the Academy of Science of South Africa (ASSAf) in 2017, we undertook to estimate what the extent of predatory publishing in South Africa was. This study covered the period between 2005 and 2014. In the ASSAf study we decided not to take Beall's classification at face value, but to do a more in-depth assessment of the journals, tagged by him as predatory, in which SA-authored papers have been published.

We took Beall's blacklist as a point of departure and ultimately ended up with 58 journal titles in which 4 246 SA-authored papers had appeared between 2005 and 2014. We assessed each of these 58 titles and subsequently assigned each of the titles to one of four categories:

- (1) Not predatory: In these cases we believe that Beall is simply wrong in his classification of the journal or there is insufficient evidence to make such a claim.
- (2) Strong evidence for predatory: In these cases we concurred with Beall's classification.
- (3) Weak evidence for predatory: In these cases we found some evidence that the journal might be a predatory journal, but do not think the evidence is strong enough to make a definite judgment.
- (4) Insufficient evidence: In these cases we simply could not find any pertinent evidence to make a judgment either way. If one assumes that the "burden of proof" in this case is on the "assessor", these journals should probably be tagged as "not predatory", at least for the time being.

Using this four-way classification allowed us to estimate what the overall extent of predatory publishing in South Africa is. For this estimate we excluded the 339 papers in the 10 journals that we have classified as being either "not predatory" or for which we have "insufficient evidence" to make a judgement. This left a total number of 3 907 papers, which constitute 3.4% of the total article production over the past 10 years. The disaggregation by evidence categories is as follows: 2 863 papers (or 2.5%) appeared in journals which we classified as *probably* predatory (strong supporting evidence) and 1 015 (or 0.09%) appeared in journals which we classified as *possibly* predatory (weak supporting evidence).

One of the main results pertains to trends over time. A cursory inspection of data presented in the report shows that the biggest increase occurred in more recent years, especially since 2011. This is specifically true for article output in those journals that we have classified as being probably predatory. We present these trends in Figure 16 below.



(Data source: SA Knowledgebase (SAK), CREST)

Figure 16: The increase in the number of papers published by SA authors in predatory journals (2005-2014)

In the ASSAf report, we concluded that predatory publishing poses a significant threat to science in South Africa. If it continues to increase at the rate of growth as the past five years, predatory publishing may well become the norm in some disciplines and at some universities. Not only will this affect the very fabric of the science system (our confidence in the peer review system), but it will also undermine the trust and confidence of the general public in science and its products.

4.2.3 2017 university submissions to predatory journals published in 2016

In order to update the work that CREST conducted as part of the ASSAf study, in January 2017 CREST provided the DHET with a list of journals that, according to us, were predatory journals. This list (Table 49 below) contained the names of ten journals. However, as was the case for the previous period, all ten journals appeared on the (accredited) IBSS list of 2016 and hence, strictly speaking, universities were within their legal right to submit these for subsidy in 2017.

Table 49: 2016 submissions to journals identified by IBSS as predatory

Journal name	ProQuest response	Count	Listing started on IBSS	Last year listed on IBSS	ISSN
Banks and Bank Systems	Was identified as predatory pub by PQ	32	2013	2016	1816-7403/1991-7074
International Journal of Educational Sciences	Was identified as predatory pub by PQ	172	2013	2016	0975-1122
Journal of Communication (Delhi)	Was identified as predatory pub by PQ	28	2013	2016	0976-691X
Journal of Economics (Delhi)	Was identified as predatory pub by PQ	18	2013	2016	0976-5239
Journal of Human Ecology	Was identified as predatory pub by PQ	212	2009	2016	0970-9274

Journal name	ProQuest response	Count	Listing started on IBSS	Last year listed on IBSS	ISSN
Journal of Psychology (Delhi)	Was identified as predatory pub by PQ	21	2014	2016	0976-4224
Journal of Social Sciences	Was identified as predatory pub by PQ	196	2009	2016	0971-8923
Journal of Sociology and Social Anthropology	Was identified as predatory pub by PQ	62	2013	2016	0976-6634
Studies of Tribes and Tribals	Was identified as predatory pub by PQ	23	2009	2016	0972-639X
Studies on Ethno-Medicine	Was identified as predatory pub by PQ	13	2013	2016	0973-5070
Total		777			

We are aware that the DHET sent a communication to the universities during 2016 in which it was stated that the department reserves the right not to pay subsidy for article submissions that were found to be published in predatory journals. The DHET subsequently sent a query to ProQuest (the publishers of IBSS) enquiring why these journals did not appear on their 2017 list of journals. The response was that ProQuest was of the opinion that they were in fact predatory journals and hence deleted them from their list for 2017. In a subsequent correspondence with the DHET, CREST indicated that it believed that the DHET would be within its rights not to pay subsidies for journals listed in the table.

4.2.4 Submissions to predatory journals in 2017

During the course of 2017, as part of this study, CREST continued to investigate the prevalence of predatory publishing for the 2018 submission year. Table 50 contains a list of journals (and article submissions to journals) that has been listed as predatory by ProQuest IBSS (*Journal of Human Ecology* and *Journal of Social Sciences*).

Table 50: Submissions to predatory journals previously delisted

Journal title	No. of authorships
Journal of Human Ecology	1
Journal of Social Sciences	111
Grand total	113

In addition, we also found submissions to journals that Prof Phillip de Jager has identified as being predatory based on his analysis of predatory journals in the business sciences (De Jager, Van der Spuy and De Kock, 2017). The table below presents a summary of the five journals that he assessed. In addition to the *AJBM*, four other journals were also identified as probably predatory: *Corporate Ownership and Control*, *Risk Governance and Control*, *International Business and Economics Research* and *Journal of Applied Business Research*. We found submissions to the first three journals and these are listed in Table 52.

Table 51: Assessment by De Jager of possible predatory journals in business studies

	Corporate Ownership and Control	Risk Governance and Control: Financial Markets and Institutions	International Business and Economics Research Journal	Journal of Applied Business Research	African Journal of Business Management
Authoritative sources					
Removed from Thomson Reuters' journal list					X
Removed from Scopus' list of journals	X	X			
Removed from IBSS journal list	X	X			
ABDC rating removed	X				
Not rated by ABDC	X	X	X	X	X
Not rated by ABS		X	X	X	X
Flemish Academic Bibliography for the Social Sciences and Humanities (VABB-SHW) classify the journal as non-peer-reviewed		X			
Not DOAJ listed	Not open access; thus NA	Not open access; thus NA		X	X
Does not meet DOAJ's more stringent listing criteria			X		
Editorial board of international journal was dominated by South African academics			X		X
> 50% of recent published papers are from South Africa		X	X		
Publish list of names and institutions of reviewers	X	X	X		
Testimonials provided on website	X	X			
Spelling and grammar mistakes in the titles of published papers	X	X	X	X	X
Same paper published more than once	X	X		X	X
Paper also published in another journal					X
Claim made on title page is false				X	

Table 52: 2017 submissions to journals identified by De Jager as predatory

Journal title	No. of authorships
African Journal of Business Management	3
Corporate Ownership and Control	44
International Business and Economics Research Journal	25
Risk Governance and Control: Financial Markets and Institutions	53
TOTAL	125

4.2.5 Concluding assessment and recommendation on predatory journals

The DHET currently faces the same dilemma as it did in 2016, namely that there is good evidence that some SA academics continue to make submissions to journals that are deemed predatory by many scholars. In some cases, these journals have been delisted by some publishers (for example by ProQuest), which strengthens the case for not paying subsidies for these submissions. However, while some titles have been removed from IBSS, some of these journals remain on the Scopus list. This means that the universities have some legal ground for making these submissions. The table below illustrates how the indexing of a specific journal can change from year to year. These changes make it very difficult for a specific university to make submissions that are consistent. This is another argument in favour of a new template with a drop-down list of accepted journal titles. The problem is clearly complex as far as probable predatory journals are concerned.

Table 53: Summary table on 2017 submissions in possible predatory journals

Journal name	No. of 2017 submissions (authorships)	Comments	DHET lists 2016 (for 2015 pubs)	DHET lists 2017 (for 2016 pubs)	DHET lists 2018 (for 2017 pubs)
Banks and Bank Systems	42	Was identified as predatory by PQ	IBSS 2016	Scopus 2017	Scopus 2018
Corporate Ownership and Control	23	Removed from Scopus and PQ	Scopus 2016	Scopus 2017	None
International Business and Economics Research Journal	25	Not rated by ABDC and ABS	IBSS 2016	IBSS 2017	IBSS 2018
International Journal of Educational Sciences	14	Was identified as predatory by PQ	IBSS 2016	none	None
Journal of Human Ecology	14	Was identified as predatory by PQ	IBSS 2016	none	None
Journal of Social Sciences	98	Was identified as predatory by PQ	IBSS 2016	IBSS 2017	None
Risk Governance and Control: Financial Markets and Institutions	53	Removed by Scopus and PQ	Scopus 2016	Scopus 2017	None
Studies on Ethno-Medicine	13	Was identified as predatory by PQ	IBSS 2016/ ISI 2016/	Scopus 2017/ISI 2017	Scopus 2018

Journal name	No. of 2017 submissions (authorships)	Comments	DHET lists 2016 (for 2015 pubs)	DHET lists 2017 (for 2016 pubs)	DHET lists 2018 (for 2017 pubs)
			Scopus 2016		
Total	282				

The incidence of predatory publishing by SA academics (in DHET accredited journals) evidently peaked around 2014 and 2015 and has since declined. Although there are still instances of such forms of publishing, these have now become the exceptions to the rule. We would like to believe that the countermeasures that the DHET (as well as the NRF and individual universities) have taken over the past two years and the resultant high saliency of this issue have led to this decline. This does not mean that the issue of predatory publishing has disappeared. On the contrary, there is substantial evidence that it continues unabated across the world and across many disciplines. We need to remain vigilant and continue to monitor its presence in the SA system.

The phenomenon of predatory publishing is only one instance of questionable publication practices. In the next section, we briefly refer to other forms of unethical behaviour that also threaten to undermine the quality and integrity of scholarly publishing in the country.

4.3 Questionable editorial publication behaviour

In the ASSAf report of March 2017 (recently publicly released <http://research.assaf.org.za/handle/20.500.11911/114>) questionable “editorial publication behaviours” were identified. We identified two (somewhat related) behaviours in this regard:

- (1) The practice of certain editors of journals to publish extremely high numbers of papers in the journals of which they are the editor.
- (2) The practice of members of the editorial board to publish extremely high numbers of papers in the journals of which they form part of the editorial board.

In our report to ASSAf, we presented two examples of the former: the first is *African Journal for Physical Activity and Health Sciences* (AJPHEs), where the editor published 58 papers in the journal between 2005 and 2014; the second is the *African Journal of Business Management* (AJBM), where the editor published 69 papers in the journal over the same period.

An example of the second practice involved AJPHEs, where 64% of all authorships in the journal between 2005 and 2015 were produced by members of the editorial board at one time or the other. In addition, we also pointed to another questionable practice of AJPHEs: One member of the editorial board published no less than 11 out of 15 articles in one issue (October 2011).

4.4 Plagiarism in SA publishing

One of the most serious examples of scientific misconduct is plagiarism. It is regarded as one of the strongest violations of ethical conduct in that it involves the “theft of ideas”. Surprisingly, very little systematic and published research has been done on this phenomenon in South Africa. In fact, the only in-depth investigation was reported in an article published in 2011 in

the *South African Journal of Science* entitled “Plagiarism in South African management journals”. Adele Thomas and Gideon de Bruin undertook a detailed analysis of 371 peer-reviewed articles that had been published in 2011 in 19 South African management journals. They submitted these articles through the plagiarism-detection software programme Turnitin and discovered widespread instances of plagiarism. The conclusion of their study was as follows:

Our results indicate that there was extensive plagiarism in 19 South African management journals during the period under review, confirming the findings of other studies. The findings also indicate that although one journal appeared to contain more plagiarised articles than the others, the problem of plagiarism existed across the board. The type of journal (i.e. whether it appears on the DHET, WoS or IBSS lists) was not a factor in the level of plagiarism. However, the findings indicated that articles submitted by three or more authors contained significantly less plagiarised material than did those articles submitted by a single or by dual authors. A possible explanation for this finding is that potential plagiarism can be more readily detected and corrected when several authors are involved. Conversely, a single author may more easily be able to hide plagiarised work (Thomas & De Bruin, 2015:111(1/2):3).

Although this is a telling example of plagiarism in one field, it remains confined to one discipline. It is clearly important that similar investigations are undertaken for other fields in South Africa as well. Anecdotal evidence from some journal editors suggest that plagiarism is a more pervasive problem and is most often picked up and managed at the point of the submissions of manuscripts to journals. However, this assumes that all SA journals (and journal editors) are equally vigilant and have access to the necessary resources to perform this function.

4.5 Recommendations

In our discussion and analysis of conference proceeding submissions, we identified a number of questionable and unethical behaviours. These are:

- (1) continued presence of predatory publishing;
- (2) questionable editorial practices;
- (3) plagiarism;
- (4) growing evidence of gaming the submissions of conference proceedings by certain universities and authors; and
- (5) growing evidence of excessive publication by individual academics in a particular journals or issues of a journal.

In addition to this list of demonstrated unethical behaviour, CREST also has anecdotal evidence of transgressions of generally accepted rules of authorship, including the practice of ghost authorship. We have also been informed of SA academics falling prey to fake conferences.

The deeper problem is that incentive systems such as the DHET’s publication subsidy system often produce perverse (unintended) consequences. As long as authors are (mostly) rewarded for publishing many articles and editors are (mostly) rewarded for publishing the articles rapidly, new ways of gaming the traditional publication models will be invented more quickly than new control measures can be put in place. Against this background, CREST is making the following recommendations that are aimed at counteracting the various forms of misconduct identified in this report.

Recommendation 7a: We recommend the establishment of a timelier alert and support systems and tools to assist universities (and their research offices) to identify cases of questionable publishing behaviour before submission for publication subsidies. Our specific recommendation is that the DHET, in partnership with CREST, develops a website that would

provide the necessary support to scholars and students in this regard. Such a website should have the following functionalities:

- A portal with links to the most relevant and credible studies in the field.
- Links to the available tools to detect predatory publishing (see Appendix 6 for such a list).
- A link to the various lists (included the archived links of Beall's list) of predatory or fake journals.
- A link to emerging websites and blogs (such as Retraction Watch and The Scholarly Kitchen) that cover issues in this area.
- A facility to deal with FAQs (frequently asked questions).
- A tool that would enable any SA academic to check whether a particular journal (which he or she is considering for publication) is on the latest list of accredited journals and publishers of the DHET.

Recommendation 7b: We need to increase our educational and capacity-building efforts around good conduct in scholarship. This would involve more training in areas such as the following:

- Basic introduction to bibliometrics in order to understand publication and citation behaviour and the available metrics to measure research performance.
- Courses on the ethics of scholarly publishing, including issues related to scientific authorship (and contribution), unethical publication practices (including predatory publishing), and good practice in editorial processes and procedures.

Our specific recommendation is that a working group is set up between CREST, the DHET, NRF and DST (the latter two have both expressed an interest in a similar capacity-building programme) to design and develop a training and capacity-building programme that would address these and other needs of the DHET.

Recommendation 7c: We need ongoing research and analysis of SA scholarly publishing in order to maintain the requisite levels of vigilance and ensure that the public investment in the subsidy systems meet the highest standards of research quality and integrity. It is imperative that we protect the integrity of our publication system and hence also of the funding system. Growth in output must go hand in hand with proper quality and ethical "surveillance".

Therefore, our specific recommendation is that CREST and the DHET (which may include staff from other directorates) set up a research working group that would together identify possible lines of research and studies of high importance, and subsequently design and implement such studies. Some of these studies could coincide with the attainment of a formal qualification.

Part 5: Indicators of journal quality and integrity

5.1 Assessing journal quality and integrity

“Quality” is – in philosophical terminology – a **primitive** term. This means that its properties are non-reducible to other properties. Stated differently, the quality of “research” cannot be reduced to any other property of research. Research is understood to be of a high quality (or “excellent”) if we are convinced of its inherent merit or worth. Within the science system, excellent research is often defined in terms of the contribution that it makes to the existing body of knowledge. In this sense, “quality” is seemingly equated with “novelty” and “originality”.

However, excellent research in some contexts is equated with research that has a high impact – both scientific and social. As far as the former is concerned, scientific impact is measured in terms of citation impact such as normalized citation scores (article level) or journal impact factors (journal level). Moreover, increasingly good research is defined as research that is socially relevant and/or has significant social impact.

However, how do we establish the quality or merit of scientific research? Since the advent of the modern age of science in the seventeenth century, it has become common practice to accept that quality is best assessed by one’s peers. Peer review or peer judgment has become the *de facto* procedure or rule for the assessment of scientific research quality. The basic underlying assumption is that other (expert) scholars working in the same field as oneself are best placed to make a judgment on the quality of a book, journal article, doctoral thesis and so on. This “principle” is also recognised in the DHET’s official policy on this, as expressed in its *Research outputs policy of 2015*. Paragraph 24 states the following:

Peer review of the research is a fundamental prerequisite of all recognised outputs and is the mechanism of ensuring and thus enhancing quality. Peer Review is understood to be the pre-publication refereeing or evaluation of complete manuscripts by independent experts in the field in order to ensure quality and determine whether manuscripts are publishable or not. Additional proxies to determine quality, such as bibliometric data, discipline specific panels of experts and post-publication reviews may in future be utilised by the Department (2015:4).

Later on in the same policy document, the same principle is repeated and reference is made to the potential perverse effects of the pursuit of quantity over quality:

This policy aims to support and encourage scholarship. Institutions and academics must remember the importance of research integrity when submitting their claims and are urged to focus on quality research and not maximum accrual of subsidy funds (2015:6).

The statement above is interesting as it links the notion of **quality** to that of **integrity**. If one understands quality in scientific research to refer to the intrinsic merit, worth or value of a research output, then integrity refers to the decision-making that takes places during the production of such output. Research integrity then implies, at the very least, adherence to commonly accepted standards of ethical conduct in knowledge production and publication. Traditionally, this has been understood to refer to the rejection of all forms of misconduct in research – such as falsification and fabrication of data and plagiarism of evidence and results. More recent studies on research integrity have expanded the meaning to include other forms of misconduct. However, the argument here is that it is impossible and undesirable to separate the notion of research integrity from the notion of research quality. In its simplest form, the former refers to the ethical dimension of research; the latter to the epistemological dimension of research (our understanding of what constitutes truthful knowledge) (See Mouton, 1996).

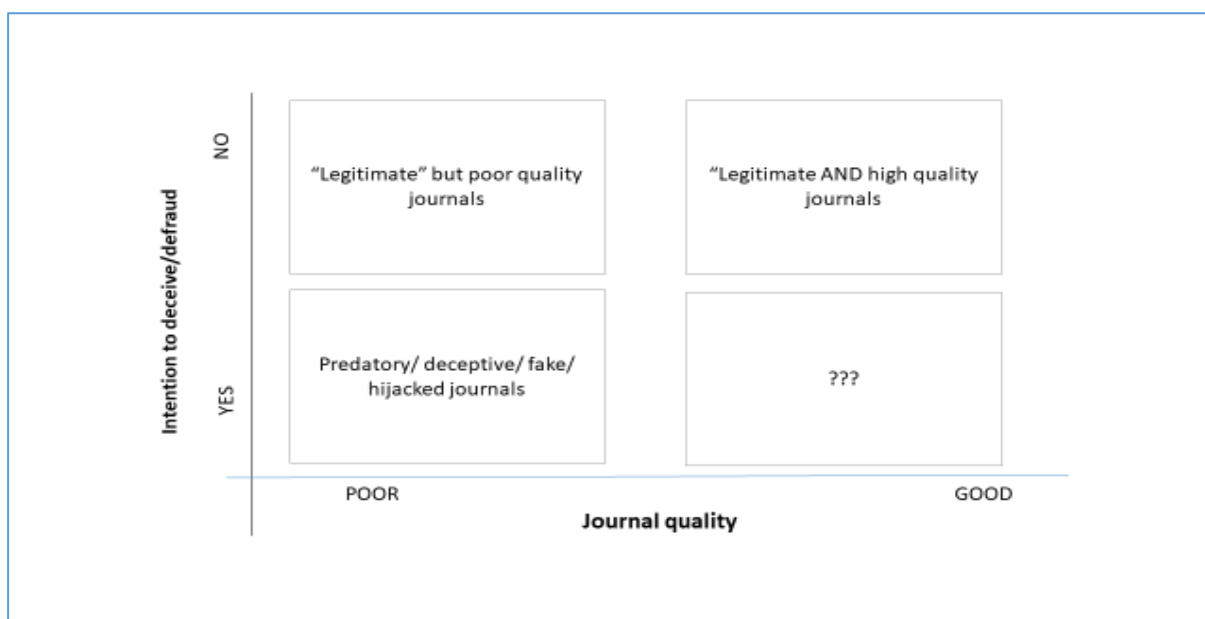


Figure 17: Intentionality and journal quality

Our view is that misconduct in scientific research should be understood as the result of a deliberate decision on the part of the researcher and other actors to act unethically. Misconduct in research is not the same as making mistakes or errors in research. The latter can be the result of poor training, poor judgment or inexperience and may result in poor quality research. Nonetheless, scientific misconduct is understood here to refer to a deliberate decision to violate common standards of good and acceptable practice of knowledge production and publication. In addition, there are various forms of misconduct. One way to understand the extent of these forms of misconduct is to link them to key stages in the knowledge production and publication process.

It is also necessary to emphasise the important role of other actors in the knowledge production process. It would be incorrect and an omission if one only concentrates on the consequences of unethical behaviour on the part of the researcher. Other actors such as journal editors and publishing houses are some of the role players in unethical behaviour.

Table 54: Forms of misconduct

Stage	Forms of misconduct
The production of the research publication (journal article/ conference paper/book/ manuscript)	<ul style="list-style-type: none"> • Ghost authorship • Plagiarism and self-plagiarism • Sequence of authors (inappropriate assignment of contribution) • Simultaneous submissions to different journals
The submission of the manuscript for publication	<ul style="list-style-type: none"> • Predatory journals • Vanity publishing • Quality (ranking) of publishers • Editorial policies/standing of Board
The review process at the journal or publisher	<ul style="list-style-type: none"> • Fake peer review processes • Acceptance and rejection rates
The submission of the publication for subsidy from the DHET	<ul style="list-style-type: none"> • Predatory journal submissions • Incorrect document types (e.g. editorials) • Incorrect journals selected (not listed or accredited) • Duplicate submissions

Against this background, we propose a **framework of journal quality and integrity** that we believe the DHET should adopt in its continuous assessment and re-assessment of the quality of all SA journals (current and new). Before we present the outlines of such a framework, in the next section we show the distribution of journals where SA academics have published in the recent past. This information provides necessary and critical background to the rationale behind the proposed framework.

5.2 In which journals do SA academics publish most frequently?

Over the period 2005 to 2017, SA academics published 174 210 unique papers in 9 641 journals. The distribution of these papers by journal index/list is summarised in Table 55⁶. The most striking result is the fact that 33.5% of all papers published over this period appeared in the 287 South African journals, which constitute only 3.0% of all the journals in which papers were published. South African academics are thus more likely to publish in a South African journal (whether it is indexed in WoS or Scopus or not).

Table 55: Share of journals and papers by journal index/list

	No. of journals	Share of journals	No. of papers	Share of papers
DHET	287	3,0%	58 700	33,5%
WoS	7 304	75,8%	108 349	61,8%
Scopus	8 381	86,9%	123 831	70,7%
IBSS	1 347	14,0%	23 011	13,1%
Total (unique)	9 641		174 210	

This is even more evident when we list, in descending order from highest to lowest, the 100 journals in which the highest number of papers was published between 2005 and 2017. We also indicate in which of the four main indexes/journal lists these journals are included.

Table 56: List of 100 journals with highest number of papers

Source	No. of papers	DHET	WoS	Scopus	IBSS
SAMJ: South African Medical Journal	1832	1	1		
PLOS One	1825		1	1	
African Journal for Physical Activity and Health Sciences (AJPHEs)	1783	1			
HTS Teologiese Studies	1664	1	1	1	
South African Journal of Higher Education	1093	1			
South African Journal of Botany	1078	1	1	1	
South African Journal of Science	1037	1	1	1	
South African Family Practice: Official Journal of the South African Academy of Family Physicians	875	1		1	
Journal of Psychology in Africa	829	1	1	1	
Monthly Notices of the Royal Astronomical Society	793		1	1	

⁶ It must be kept in mind that the same journal can be indexed in more than one index or journal list. This explains why the total of journals as well as the total of papers published do not sum to the unique journals and unique papers produced.

Source	No. of papers	DHET	WoS	Scopus	IBSS
Journal of Social Sciences	770				1
Water SA	766	1	1	1	
Acta Crystallographica Section E: Structure Reports Online	757			1	
Journal of Public Administration	753	1			
SADJ: Journal of the South African Dental Association	705	1			
Stellenbosch Theological Journal (STJ)	691	1			
In Die Skriflig	664	1			
Journal of Contemporary Roman-Dutch Law	647	1			
Journal of South African Law	604			1	
Verbum et Ecclesia	587	1		1	
Tydskrif vir Geesteswetenskappe	557	1	1		
Alternation: Interdisciplinary Journal for the Study of the Arts and Humanities in Southern Africa	553	1			
Obiter	535	1			
LitNet Akademies / Academic	529	1			
African Journal of Marine Science	516	1	1	1	
Journal of Human Ecology	515				1
South African Journal of Psychology	508	1	1	1	
South African Journal of Education	490	1	1	1	1
Potchefstroom Electronic Law Journal (PELJ)	489			1	1
International Journal of Educational Sciences	483				1
African Journal of Biotechnology	475				1
Acta Academica	466	1		1	
South African Journal of Economic and Management Sciences	460	1			
African Journal of Business Management	453				1
Acta Criminologica: Southern African Journal of Criminology	443	1			
Corporate Ownership and Control	427			1	1
Old Testament Essays (New Series): Journal of the Old Testament Society of South Africa	427	1			
SAIMM: Journal of the South African Institute of Mining and Metallurgy	426		1	1	
South African Law Journal	423	1			1
Astrophysical Journal	419		1	1	
Acta Theologica	418	1	1	1	
AIDS	415		1	1	
De Jure	409	1			
Studia Historiae Ecclesiasticae: Journal of the Church History Society of Southern Africa	408	1			

Source	No. of papers	DHET	WoS	Scopus	IBSS
Development Southern Africa	404		1	1	1
Scriptura: International Journal of Bible, Religion and Theology in Southern Africa	395	1			
SA Mercantile Law Journal	388	1			
Perspectives in Education	382	1		1	1
Physical Review D - Particles, Fields, Gravitation and Cosmology	381		1	1	
South African Journal of Animal Science	377				
Curationis	373	1		1	
Social Work / Maatskaplike Werk: A Professional Journal for the Social Worker	371	1			
Administratio Publica	362	1			
International Journal of Tuberculosis and Lung Disease	356		1	1	
Lancet	352		1		
Journal for Christian Scholarship	349	1			
SA Journal of Industrial Psychology	349	1		1	
African Zoology	346		1	1	
Journal for Semitics	340	1			
Agenda: Empowering Women for Gender Equity	340		1	1	1
Journal of the South African Veterinary Association	339	1	1	1	
South African Journal of Plant and Soil	339	1		1	
Gender and behaviour	337				1
South African Journal of Art History	337	1			
Health SA Gesondheid	335	1		1	
Southern African Linguistics and Applied Language Studies	328	1	1	1	
Koers: Bulletin for Christian Scholarship	325	1		1	
South African Journal of Industrial Engineering	325	1	1	1	
Southern African Public Law	322	1			
SA Orthopaedic Journal	322	1			
Journal of Contemporary Management	320	1			
BMC PUBLIC HEALTH	318		1	1	
Journal of Acquired Immune Deficiency Syndromes (JAIDS)	314		1	1	
African Journal of Hospitality, Tourism and Leisure	314	1			
Africa Education Review	313			1	1
African Entomology	311	1	1	1	
African Journal of Primary Health Care and Family Medicine	308	1		1	

Source	No. of papers	DHET	WoS	Scopus	IBSS
International Business and Economics Research Journal	308				1
Minerals Engineering	307		1	1	
Cardiovascular Journal of Africa	305	1	1	1	
Journal for New Generation Sciences	305	1			
Journal for Contemporary History	304	1			
Journal of economics and behavioral studies	303				1
South African Journal of Geology	300	1	1	1	
Astronomy and Astrophysics	298			1	
Journal of Ethnopharmacology	297		1	1	
Literator: Journal of Literary Criticism, Comparative Linguistics and Literary Studies	296	1		1	
Africa Insight	296	1			1
Zootaxa	296		1	1	
International Journal of Electrochemical Science	292		1	1	
Annual Survey of South African Law	292	1			
South African Journal for Research in Sport, Physical Education and Recreation	290		1	1	
African Journal of Aquatic Science	286	1	1	1	
Stellenbosch Law Review	281	1			
Journal of Infectious Diseases	275		1	1	
Journal of Southern African Studies	274		1	1	1
Southern African Business Review	274	1			
Education As Change	272	1	1	1	
South African Journal of Economics	272	1			1
South African Journal of Surgery	271	1	1	1	

Table 57: Papers submitted for 2014 in top 10 journals

Journal	No. of papers	DHET	WoS	Scopus	IBSS
PLOS One	322		1	1	
African Journal for Physical Activity and Health Sciences (AJPHEs)	312	1			
HTS Teologiese Studies	173	1	1	1	
SAMJ: South African Medical Journal	165	1	1		
Journal of Social Sciences	154				1
International Journal of Educational Sciences	133				1
South African Journal of Higher Education	123	1			
Journal of Human Ecology	106				1
Monthly Notices of the Royal Astronomical Society	103		1	1	
African Journal of Hospitality, Tourism and Leisure	86	1			

Table 58: Papers submitted for 2015 in top 10 journals

Journal	No. of papers	DHET	WoS	Scopus	IBSS
PLOS One	345		1	1	
African Journal for Physical Activity and Health Sciences (AJPHEs)	342	1			
HTS Teologiese Studies / Theological Studies	212	1	1	1	
SAMJ: South African Medical Journal	188	1	1		
International Journal of Educational Sciences	183				1
Monthly Notices of the Royal Astronomical Society	138		1	1	
Journal of Human Ecology	110				1
Journal of Social Sciences	103				1
African Journal of Hospitality, Tourism and Leisure	101	1			
Journal of Governance and Regulation	99				

Table 59: Papers submitted for 2016 in top 10 journals

Journal	No. of papers	DHET	WoS	Scopus	IBSS
SAMJ: South African Medical Journal	240	1	1		
HTS Teologiese Studies / Theological Studies	229	1	1	1	
PLOS One	200		1	1	
Monthly Notices of the Royal Astronomical Society	121		1	1	
African Journal of Hospitality, Tourism and Leisure	121	1			
Journal of Social Sciences	113				1
South African Journal of Botany	112	1	1	1	
Journal of Human Ecology	109				1
International Journal of Educational Sciences	98				1
Journal of Molecular Liquids	95		1	1	

Table 60: Papers submitted for 2017 in top 10 journals

Journal	No. of papers	DHET	WoS	Scopus	IBSS
HTS Teologiese Studies	218	1	1	1	
PLOS One	214		1	1	
South African Journal of Botany	145	1	1	1	
Gender and behaviour	132				1
SAMJ: South African Medical Journal	130	1	1		
Monthly Notices of the Royal Astronomical Society	108		1	1	
Journal of Economics and Behavioral Studies	105				1
Scientific Reports	100		1	1	

Journal	No. of papers	DHET	WoS	Scopus	IBSS
African Journal of Health Professions Education	97	1			
South African Journal of Higher Education	88	1			

Even a cursory inspection of the tables above reveals two rather worrisome results. The first is the predominance of South African journals in the top 100 journals in which SA academics publish. Nearly two-thirds (65%) of the journals listed in Table 56 are South African journals. We elaborate on this in section 5.3 below. The second is illustrated by a comparison of the order of journals over the past four years (Tables 57 to 60). These tables list the top 10 journals for each year. Over this period, there was an increasing predominance of local journals on the one hand (with very little presence of foreign journals), and a large prevalence of predatory journals (shaded rows) – especially in 2014 to 2016. These trends are early indications that journal quality needs to be addressed urgently and critically when reviewing scholarly publishing in South Africa, and whether the DHET-funding system is (inadvertently) contributing to the lowering of standards in publication quality.

5.3 A framework of journal quality and integrity (JQI)

In this section we discuss and propose a **framework of journal quality and integrity** (JQI) that we believe should be adopted to assist the DHET in monitoring and assessing the quality of journals that are accredited for subsidy. The proposed framework is composed of **three** main dimensions with **eight** sub-dimensions (indicator categories) and a total of 15 indicators.

Dimension 1: Journal citation impact

The journal has acceptable levels of worldwide **citation visibility or impact** (*citation impact*).

Dimension 2: International footprint and reputation

The journal has an **international footprint and reputation** and hence attracts manuscripts from outside the country.

- 2a: The journal attracts minimal levels of foreign contributions (*foreign contribution*).
- 2b: The journal publishes acceptable levels of papers that are co-authored between SA and non-SA authors (*foreign co-authorship*).
- 2c: The journal attracts manuscripts from a wide range of institutions nationally and internationally (*institutional range*).
- 2d: There is an acceptable degree of representation by international experts on the journal editorial board or advisory board (*foreign representation*).

Dimension 3: Journal integrity

- 3a: The journal is transparent and accurate in presenting basic journal-related information, such as journal indexing, journal metrics, members of the editorial board, owner and publisher and location of journal (*publisher integrity*).
- 3b: The editorial board implements an ethically defensible publication policy and acts with integrity in all of its decisions, such as not engaging in aggressive solicitation of manuscripts, not allowing excessive publication in the journal by members of the

editorial board, and not allowing a disproportionate number of papers by a single author in one issue (*editorial integrity*).

- 3c: The peer review process is rigorous and poor articles are turned away (minimal rejection rates) (*peer-review quality*).

The framework, with the main and sub-dimensions, as well as associated indicators, is presented below.

Table 61: Suggested framework

Dimension	Indicator category	Journal-level indicators
Citation visibility and impact	<i>Citation impact</i>	1. Journal impact factor (JIF) 2. Journal rank and quartiles 3. Proportion of journal self-citations 4. CPP for non-source items (SA journals not in bibliometric databases)
International footprint and reputation	<i>Foreign contribution</i>	5. Proportion of foreign authored papers
	<i>Foreign co-authorship</i>	6. Proportion of foreign co-authored papers
	<i>Institutional range</i>	7. Proportional share of institutions to total journal output 8. Proportional share of countries to total journal output
	<i>Foreign representation</i>	9. Proportion of non-SA members of the editorial board
Integrity	<i>Publisher integrity and transparency</i>	10. The journal is transparent and truthful in the information that it provides on journal-related information
	<i>Editorial integrity</i>	11. Profile of reviewers (heterogeneity measure) 12. Proportion of papers authored by members of the editorial board or the editor 13. Level of publication intensity by a single author
	<i>Peer-review quality</i>	14. Article screening rate (rejection before peer review) 15. Article acceptance (rejection) rate (rejection after peer review)

In the following sections we discuss each of the main and sub-dimensions in more detail. In each case we also present illustrative evidence of how one would go about populating the proposed indicators.

5.3.1 Citation visibility and impact

The citation impact of a journal has traditionally been seen as a proxy measure of journal quality. It is not a direct measure of journal quality, as that would require some metric of a peer-review processes and quality of peer review actions that are not usually directly accessible. Under this dimension we have included four indicators. The first two (*journal impact factor* and *journal rank*) are discussed first as they are related.

Indicator 1: JIF indicator (WoS)

Indicator 2: Journal (Q) rank

The JIF is one of the oldest journal-level metrics. It was developed by Eugene Garfield and first published in 1971. It is interpreted as a measure of the journal's citation impact in a specific

field. Its calculation, as shown below, is very straight-forward. The example that we use is the *SA Journal of Botany* that registered a JIF value of 1.442 in 2017.

$$\text{JIF} = \frac{\text{Citations in 2017 to items published in 2015 (212) and 2016 (277)}}{\text{Number of citable items in 2015 (142) and 2016 (197)}} = \frac{489}{339}$$

Figure 18: Example of calculation of JIF

It should be clear that the calculation of JIF (the same applies to the journal impact indicator used by Scopus, namely SNIP indicator), requires bibliometric data. The calculation assumes access to all the citations for the articles published in a particular journal from all other articles in a bibliometric database. This simply means that journals that are not indexed in any bibliometric or citation database (such as the WoS or Scopus) will not have a journal impact factor. For the purposes of this study, JIF-values are only available for the 60+ South African journals indexed in the WoS⁷.

It is important to emphasise that JIF values vary hugely across scientific disciplines because of the large differences in citation frequency across disciplines. It is also important to emphasise that, because it is a journal-level metric, one cannot interpret the JIF score at a lower level of disaggregation (i.e. the article level). The final JIF score is an aggregate score – originally calculated for a two-year period. In recent years, a five-year JIF has been included in the journal citation reports (the source of these scores), which take a five-year window to calculate the final score.

The ISI annually publishes a range of statistics about all journals indexed in the WoS. These include the two-year and five-year JIF scores for the journals assigned to each of the 275 subject categories. On the basis of these scores, a particular journal is then ranked (out of the total number of journals in a specific subject category) and subsequently assigned to one of the four quartile intervals (where Q1 is the top 25% of the journals in that category, Q2 the next 25% of journals, and so on).

To illustrate how the JIF scores and JIF rank (and quartile) can be used in our proposed framework for assessing the quality of SA journals, in Table 62 below we list the current values for the top 100 journals included in Table 61 above.

⁷ The same applies to the 100+ South African journals indexed in Scopus. As stated earlier in this report, we confine our examples to the WoS.

Table 62: Top 100 journals (2018) with JIF values, journal rank and quartile values

Source	No. of papers	DHET	WOS	Scopus	IBSS	JIF 2018	5-year JIF	Subject category	Rank 2018	Quartile 2018
SAMJ: South African Medical Journal	1 832	Yes	Yes			1,32	2,00	Medicine: general and internal	90/160	Q3
PLOS One	1 825		Yes	Yes		2,78	3,34	Multidisciplinary sciences	24/69	Q2
AJPHEs	1 783	Yes								
HTS Teologiese Studies	1 664	Yes	Yes	Yes						
SA Jnl of Higher Education	1 093	Yes								
SA Jnl of Botany	1 078	Yes	Yes	Yes		1,50	1,59	Plant sciences	112/228	Q2
South African Journal of Science	1 037	Yes	Yes	Yes		1,35	1,63	Multidisciplinary sciences	39/69	Q3
South African Family Practice	875	Yes		Yes						
Journal of Psychology in Africa	829	Yes	Yes	Yes		0,51	0,59	Psychology	127/137	Q4
Monthly Notices of the Royal Astronomical Society	793		Yes	Yes		5,23	4,99	Astronomy and astrophysics	15/69	Q1
Journal of Social Sciences	770				Yes					
Water SA	766	Yes	Yes	Yes		0,90	1,10	Water resources	79/91	Q4
Acta Crystallographica Section E: Structure Reports Online	757									
Journal of Public Administration	753	Yes								
SADJ: Journal of the South African Dental Association	705	Yes								
Stellenbosch Theological Journal (STJ)	691	Yes								
In Die Skriflig	664	Yes								
Journal of Contemporary Roman-Dutch Law	647	Yes								
Journal of South African Law	604			Yes						

Source	No. of papers	DHET	WOS	Scopus	IBSS	JIF 2018	5-year JIF	Subject category	Rank 2018	Quartile 2018
Verbum et Ecclesia	587	Yes		Yes						
Tydskrif vir Geesteswetenskappe	557	Yes	Yes			0,28	0,19	Social issues	41/42	Q4
Alternation	553	Yes								
Obiter	535	Yes								
LitNet Akademies	529	Yes								
African Journal of Marine Science	516	Yes	Yes	Yes		0,99	1,12	Marine and freshwater biology	76/108	Q3
Journal of Human Ecology	515				Yes					
SA Jnl of Psychology	508	Yes	Yes	Yes		0,78	0,76	Psychology: multidisciplinary	109/137	Q4
SA Jnl of Education	490	Yes	Yes	Yes	Yes	0,69	0,99	Education and educational research	209/243	Q4
Potchefstroom Electronic Law Journal (PELJ)	489			Yes	Yes					
International Journal of Educational Sciences	483				Yes					
African Jnlof Biotechnology	475				Yes					
Acta Academica	466	Yes		Yes						
SA Journal of Economic and Management Sciences	460	Yes								
African Journal of Business Management	453				Yes					
Acta Criminologica	443	Yes								
Corporate Ownership and Control	427			Yes	Yes					
Old Testament Essays	427	Yes								
SAIMM: Journal of the South African Institute of Mining and Metallurgy	426		Yes	Yes		0,47	0,54	Metallurgy and metallurgical engineering	67/76	Q4
South African Law Journal	423	Yes			Yes					

Source	No. of papers	DHET	WOS	Scopus	IBSS	JIF 2018	5-year JIF	Subject category	Rank 2018	Quartile 2018
Astrophysical Journal	419		Yes	Yes		5,58	5,53	Astronomy and astrophysics	12/69	Q1
Acta Theologica	418	Yes	Yes	Yes						
AIDS	415		Yes	Yes		4,50	4,50	Infectious diseases	16/89	Q1
De Jure	409	Yes								
Studia Historiae Ecclesiasticae	408	Yes								
Development Southern Africa	404		Yes	Yes	Yes	0,45	0,92	Development studies	40/41	Q4
Scriptura	395	Yes								
SA Mercantile Law Journal	388	Yes								
Perspectives in Education	382	Yes		Yes	Yes					
Physical Review D - Particles, Fields, Gravitation and Cosmology	381		Yes	Yes		4,37	3,79	Physics: particles and fields	17/69	Q1
South African Journal of Animal Science	377									
Curationis	373	Yes		Yes						
Social Work	371	Yes								
Administratio Publica	362	Yes								
International Journal of Tuberculosis and Lung Disease	356		Yes	Yes		2,02	2,36	Respiratory system	45/63	Q3
Lancet	352		Yes			59,10	54,66	Medicine: general and internal	2/160	Q1
Journal for Christian Scholarship	349	Yes								
SA Journal of Industrial Psychology	349	Yes		Yes						
African Zoology	346		Yes	Yes		0,96	0,96	Zoology	106/170	Q3
Agenda: Empowering Women for Gender Equity	340		Yes	Yes	Yes					
Journal for Semitics	340	Yes								

Source	No. of papers	DHET	WOS	Scopus	IBSS	JIF 2018	5-year JIF	Subject category	Rank 2018	Quartile 2018
Journal of the South African Veterinary Association	339	Yes	Yes	Yes		0,70	1,16	Veterinary sciences	91/141	Q3
South African Journal of Plant and Soil	339	Yes		Yes						
Gender and Behaviour	337				Yes					
South African Journal of Art History	337	Yes								
Health SA Gesondheid	335	Yes		Yes						
SA Linguistics and Applied Language Studies	328	Yes	Yes	Yes		0,38	0,39	Linguistics	157/184	Q4
Koers: Bulletin for Christian Scholarship	325	Yes		Yes						
SA Journal of Industrial Engineering	325	Yes	Yes	Yes		0,55	0,58	Engineering: industrial	44/46	Q4
SA Orthopaedic Journal	322	Yes								
Southern African Public Law	322	Yes								
Journal of Contemporary Management	320	Yes								
BMC PUBLIC HEALTH	318		Yes	Yes		2,57	3,28	Public, environmental and occupational health	59/185	Q2
African Journal of Hospitality, Tourism and Leisure	314	Yes								
JAIDS	314		Yes	Yes		3,86	3,82	Infectious diseases	22/89	Q1
Africa Education Review	313			Yes	Yes					
African Entomology	311	Yes	Yes	Yes		0,54	0,66	Entomology	77/98	Q4
African Journal of Primary Health Care and Family Medicine	308	Yes		Yes						
International Business and Economics Research Journal	308				Yes					
Minerals Engineering	307		Yes	Yes		3,32	3,57	Mineralogy	7/29	Q1

Source	No. of papers	DHET	WOS	Scopus	IBSS	JIF 2018	5-year JIF	Subject category	Rank 2018	Quartile 2018
Cardiovascular Journal of Africa	305	Yes	Yes	Yes		1,41	n/a	Cardiac and cardiovascular systems	111/136	Q4
Journal for New Generation Sciences	305	Yes								
Journal for Contemporary History	304	Yes								
Journal of Economics and Behavioral Studies	303				Yes					
South African Journal of Geology	300	Yes	Yes	Yes		0,55	0,83	Geology	41/47	Q4
Astronomy and Astrophysics	298			Yes						
Journal of Ethnopharmacology	297		Yes	Yes		3,41	3,67	Chemistry: medicinal	4/27	Q1
Africa Insight	296	Yes			Yes					
Literator	296	Yes		Yes						
Zootaxa	296		Yes	Yes		0,99	0,99	Zoology	101/170	Q3
Annual Survey of South African Law	292	Yes								
International Journal of Electrochemical Science	292		Yes	Yes		1,28	1,45	Electrochemistry	22/26	Q4
South African Journal for Research in Sport, Physical Education and Recreation	290		Yes	Yes		0,35	0,44	Social sciences: interdisciplinary	96/104	Q4
African Journal of Aquatic Science	286	Yes	Yes	Yes		0,75	0,77	Marine and freshwater biology	90/108	Q4
Stellenbosch Law Review	281	Yes								
Journal of Infectious Diseases	275		Yes	Yes		5,05	5,23	Infectious diseases	10/89	Q1
Journal of Southern African Studies	274		Yes	Yes	Yes	0,89	0,92	Area studies	33/74	Q2
Southern African Business Review	274	Yes								
Education As Change	272	Yes	Yes	Yes		0,59	0,55	Education and educational research	218/243	Q4
South African Journal of Economics	272	Yes			Yes					

Source	No. of papers	DHET	WOS	Scopus	IBSS	JIF 2018	5-year JIF	Subject category	Rank 2018	Quartile 2018
South African Journal of Surgery	271	Yes	Yes	Yes		0,58	0,62	Surgery	190/203	Q4

Legend for Table 62

Colour	Description	No. of journals	No. of articles	Share
	SA journals indexed in WoS (SCI and SSCI) with JIF indicators	20	11 180	23%
	Non-SA (foreign) journals in WoS (SCI and SSCI) with JIF indicators	17	7 550	15%
	SA journals indexed in WoS (AHCI) with no JIF indicators	3	2 422	5%
	Journals that have been identified as either being predatory or engaging in questionable practices	7	5 188	11%
	Journals not indexed in WoS (either DHET only or some combination of DHET, Scopus and IBSS)	53	22 723	46%
Total		100	49 063	

The breakdown of the number of journals and papers in the top 100 journals by journal index reveals some interesting and rather worrisome trends:

- (1) The largest single proportion of papers by SA academics in this dataset (46%) was published in journals that are not indexed in the WoS.
- (2) Only 15% of papers were published in 17 foreign journals indexed in the WoS (either the SCI or SSCI).
- (3) A significant number (11%) of the papers appeared in seven journals that we have tagged as being predatory or engaging in questionable practices during this period.

Although one should keep in mind that this – and the immediately preceding tables – only focused on the 100 journals in which SA academics published, a picture emerges of a publication culture where SA academics select SA journals because they may be of the opinion or have had the experiences that their acceptance rates are relatively low. More investigation into this topic is required: first, to test this hypothesis across all journals and fields; and second to relate such findings to information about the acceptance and rejection rates of SA journals. (This is discussed in more detail below.)

The third indicator of journal visibility/impact is another proxy measure. This indicator looks at the proportion of citations to papers in a specific journal (over a specific time period) that are generated by the journal itself (journal self-citations), compared to citations that have their origin in other journals. In cases where the proportion of journal self-citations is very high, it simply means that the journal does not have a high visibility outside a small readership or journal authorship.

Indicator 3: Proportion of journal self-citations

As an example we list in Table 63 illustrative data from selected journals for 2015 (with citations between 2010 and 2014) in descending order from higher to lowest proportion of journal self-citations (we have also included the JIF values for the same journals).

Table 63: Examples of journal self-citation proportions

Journal	% self-citations (2010-2014)	JCR JIF
African Journal of Zoology	51%	0.739
SA Journal of Industrial Engineering	50%	0.188
SA Journal of Chemistry	50%	0.667
Ostrich	46%	0.418
Journal of Psychology in Africa	44%	0.207
Tydskrif vir Geesteswetenskappe	43%	0.322
SAIMM	39%	0.121
SA Journal of Animal Science	38%	0.511
HTS	36%	
Onderstepoort Journal Veterinary Science	35%	0.603
SA Journal for Research in Sport, Physical Education and Recreation	34%	0.244
Education as Change	30%	0.313
SA Journal of Business Management	19%	0.200
African Entomology	19%	0.521
African Journal of Psychiatry	18%	
Development South Africa	18%	0.424
SA Journal of Surgery	18%	0.462
Acta Theologica	17%	
SA Journal of Botany	15%	1.244
SA Medical Journal	14%	1.500
SA Journal of Psychiatry	13%	0.193
JSAVA	13%	0.273
SA Journal of Psychology	13%	0.532
SA Journal of Geology	13%	0.909
SA Journal of Education	12%	0.560
Agrekon	10%	0.250
SA Journal of HIV Medicine	9%	0.529
Cardiovascular Journal of Africa	9%	1.022

Indicator 4: CPP for non-source items (SA journals not in bibliometric databases)

In order for a journal to have a detailed citation profile, and specifically to produce a journal impact factor value, it has to be indexed in a citation index such as WoS or Scopus. The calculation of various citation indicators (such as the JIF, Cited-Half Life, and Immediacy Index) is then based on the citations to articles in the indexed journal (such as the *SA Journal of Science*) from other articles that are published in WoS-indexed journals (so-called “source journals”).

However, the WoS also includes citations to journals **not** indexed in it. These are referred to as “non-source” citations. So, for example, citations from a WoS-indexed journal to a SA

journal such as *Curia tonis* (which is not indexed in the WoS) will appear in the WoS. This feature of the WoS allowed us to do an additional set of analyses, namely to see what the numbers of citations are to non-source SA journals from journals in the WoS. This is an interesting indicator: Although it tells us that a specific journal is currently not indexed in the WoS, it does have some visibility in the WoS. The first entry in Table 64 below (*African Natural History*) generated such a large number of references to WoS-indexed journals (under its previous name *Annals of the South African Museum*) that Clarivate Analytics (owners of WoS) decided to include it from 2014 onwards.

Table 64 lists SA journals currently not indexed in the WoS, with the number of citations to that journal since 1980. These results are interesting as they show that a number of SA journals, although not indexed in the WoS, are recognised by scholars working in those fields as producing papers that are worth citing. These are local journal with some international visibility. The results presented in Table 64 show that many of the SA journals that are currently not indexed received quite a high number of citations from journals indexed in the WoS. At the bottom of the table we however also find journals that barely registered any visibility in the WoS.

Table 64: Non-WoS (SA) journals cited in WoS

Journal name	1980-1989	1990-1999	2000-2009	2010-2019	Total citations
Historia	283	170	333	295	1 081
Curationis	32	106	592	292	1 022
South African Journal of Higher Education			374	598	972
Journal of Education			208	364	572
Africa Insight	28	113	206	179	526
African Security Review		2	338	133	473
South African Journal of Industrial Psychology			256	206	462
Journal for Language Teaching			105	271	376
Kronos: Southern African Histories	14	23	146	131	314
Reading & Writing – Journal of the Reading Association of South Africa			112	192	304
Acta Academica : Critical views on Society, Culture and Politics	1	7	83	170	261
Feminist Africa			195	58	253
Meditari Accountancy Research			117	134	251
Politeia	5	26	116	81	228
African Sociological Review			145	69	214
ORiON	24	20	116	41	201
Mousaion	6	16	75	98	195
Journal of Theology for Southern Africa			113	77	190
Acta Juridica	26	6	78	77	187
Pythagoras		6	88	85	179
Acta Commercii			45	131	176

Journal name	1980-1989	1990-1999	2000-2009	2010-2019	Total citations
South African Journal of Information Management			71	104	175
Litnet Akademies			17	158	175
African Journal of Hospitality, Tourism and Leisure				170	170
Verbum et Ecclesia			36	116	152
South African Review of Sociology			66	85	151
Neotestamentica	13	29	76	32	150
African Human Rights Law Journal			73	69	142
Journal of Contemporary Management			33	104	137
SA Journal of Human Resource Management			34	100	134
Health SA Gesondheid			39	92	131
Africa Education Review	6	3	56	64	129
English in Africa			69	56	125
OBITER	1		45	71	117
Stellenbosch Law Review			32	85	117
Journal of Educational Studies			35	81	116
South African Journal of Geomatics				115	115
De Jure		2	46	59	107
South African Dental Journal			21	84	105
South African Journal of Criminal Justice			56	48	104
South African Computer Journal			20	84	104
South African Crime Quarterly			20	84	104
New Contree	7	10	32	50	99
Old Testament Essays	2	20	69	7	98
South African Journal of Labour Relations			47	48	95
South African Family Practice	27	6	20	40	93
Marine Ornithology: An International Journal of Seabird Research and Conservation	17	9	42	24	92
Journal of African Elections			33	58	91
South African Journal of Art History			49	41	90
Journal of Economic and Financial Sciences			6	84	90
Social Work/Maatskaplike Werk			72	17	89
Studia Historiae Ecclesiasticae			15	74	89
Constitutional Court Review			27	61	88
African Journal of Disability				87	87
African Journal of Research in Mathematics, Science and Technology Education			53	32	85
Language Matters: Studies in the Languages of Southern Africa	1	1	55	26	83

Journal name	1980-1989	1990-1999	2000-2009	2010-2019	Total citations
Journal of Early Christian History: A Journal for the Study of Early Christianity and Late Antiquity			22	60	82
Southern African Review of Education			27	54	81
Jamba: Journal of Disaster Risk Studies			12	65	77
African Population Studies			17	57	74
South African Journal of Libraries and Information Science			38	34	72
Journal of Transport and Supply Chain Management			2	70	72
Town and Regional Planning			40	30	70
Strategic Review for Southern Africa			17	53	70
Southern African Journal of Environmental Education			30	39	69
Southern African Business Review			13	56	69
Journal of Engineering, Design and Technology			31	37	68
De Arte		5	27	35	67
South African Journal of Sports Medicine			19	41	60
Psychology in Society			17	41	58
In die Skriflig			14	41	55
African Journal on Conflict Resolution			22	32	54
Africa Journal of Nursing and Midwifery			15	39	54
Journal of Child and Adolescent Mental Health			41	12	53
African Finance Journal			24	29	53
Scientia Militaria: South African Journal of Military Studies	10	2	11	30	53
South African Journal of Clinical Nutrition			21	32	53
Pharos Journal of Theology			8	44	52
Administratio Publica			6	43	49
Indo-Pacific Journal of Phenomenology			25	22	47
African Journal of Science, Technology, Innovation and Development			12	35	47
Journal for Contemporary History			10	36	46
Journal of Gender and Religion in Africa				46	46
Scrutiny 2: Issues in English Studies in Southern Africa		3	42		45
Journal of Literary Studies			32	13	45
Journal for the Study of Religion			28	17	45
Journal for Islamic Studies			22	22	44
Medical Technology SA			16	26	42
Journal of Construction Project Management and Innovation				41	41
South African Journal of Childhood Education				40	40

Journal name	1980-1989	1990-1999	2000-2009	2010-2019	Total citations
Speculum Juris			16	23	39
Journal of Family Ecology and Consumer Sciences			15	24	39
African Journal of Primary Health Care & Family Medicine				39	39
IMIESA	30	2	4	2	38
Transactions of the Royal Society of South Africa			5	32	37
South African Yearbook of International Law			30	6	36
African Disability Rights Yearbook				34	34
Ergonomics SA		9	16	8	33
Journal of Construction			10	23	33
Psycho-analytic Psychotherapy in South Africa			8	24	32
South African Journal of Child Health			8	23	31
Southern African Public Law				31	31
South African Journal of Occupational Therapy			4	25	29
Journal for Juridical Science			16	12	28
South African Journal of Cultural History			10	18	28
Current Allergy & Clinical Immunology		3	20	4	27
Journal for Studies in Economics and Econometrics			16	11	27
Indilinga: African Journal of Indigenous Knowledge Systems			14	13	27
Palaeontologia Africana			6	21	27
Image & Text			1	26	27
African Historical Review			12	13	25
Akroterion		6	16	2	24
African Safety Promotion			6	18	24
Occupational Health Southern Africa			5	19	24
African Journal of Agricultural and Resource Economics			13	10	23
Journal for Semitics			13	10	23
The Independent Journal of Teaching and Learning			1	22	23
International Journal for Religious Freedom			5	17	22
Acta Structilia			11	10	21
Child Abuse Research in South Africa			10	11	21
Southern African Journal for Folklore Studies			5	15	20
French Studies in Southern Africa			2	18	20
Commonwealth Youth and Development			7	12	19
Law, Democracy & Development			7	12	19
African Journal of Rhetoric			2	17	19

Journal name	1980-1989	1990-1999	2000-2009	2010-2019	Total citations
South African Journal of Environmental Law and Policy			11	7	18
Journal for New Generation Sciences			4	14	18
Musica	4	4	8	1	17
Architecture South Africa			10	7	17
African East-Asian Affairs				17	17
Religion and Theology	3	1	7	5	16
Tydskrif vir Nederlands en Afrikaans			6	10	16
African Journal of Laboratory Medicine				16	16
African Journal of Information and Communication			7	8	15
African Vision and Eye Health Journal			5	10	15
South African Journal of Chemical Engineering				15	15
Journal of Northwest Semitic Languages			10	4	14
South African Statistical Journal			5	9	14
Journal of Contemporary Roman-Dutch Law			3	11	14
Southern African Journal of Anaesthesia and Analgesia			2	12	14
South African Journal of Accounting Research			4	9	13
Phronimon			6	6	12
African Journal for Physical Activity and Health Sciences				12	12
TD : The Journal for Transdisciplinary Research in Southern Africa			4	7	11
Yesterday & Today			1	10	11
Concrete Beton		5	5		10
Theoria: A Journal of Social and Political Theory			3	7	10
Muziki: Journal of Music Research in Africa			7	2	9
Annual Survey of South African Law			5	3	8
SA Heart Journal			2	6	8
Shakespeare in Southern Africa			2	6	8
Southern African Journal of Critical Care			2	6	8
South African Journal of Plant and Soil			1	7	8
SA Mercantile Law Journal			6	1	7
South African Journal of Agricultural Extension			4	3	7
Southern African Journal of Demography			2	5	7
South African Actuarial Journal			4	2	6
Annals of the Ditsong National Museum of Natural History			2	3	5
Italian Studies in Southern Africa			2	3	5
South African Baptist Journal of Theology			2	3	5

Journal name	1980-1989	1990-1999	2000-2009	2010-2019	Total citations
Acta Criminologica: South African Journal of Criminology				5	5
Alternation: Interdisciplinary Journal for the Study of the Arts and Humanities in Southern Africa				5	5
Bulletin of the National Library of South Africa				5	5
South African Museums Association Bulletin			2	2	4
SA Journal of Radiology			1	3	4
SAIEE Africa Research Journal			1	3	4
Durban Natural Science Museum Novitates				4	4
Vir die Musiekleier				4	4
SA Orthopaedic Journal			2	1	3
Southern African Journal of Accountability and Auditing Research			2	1	3
R&D Journal			1	2	3
Flowering Plants of Africa				3	3
Southern African Journal of Gynaecological Oncology				3	3
Southern African Journal of Infectious Diseases				3	3
Communitas: Journal for Community Communication and Information Impact			2		2
South African Rorschach journal			2		2
Southern African Field Archaeology			2		2
Acta Germanica: German studies in Africa			1	1	2
African Music: Journal of the International Library of African Music				2	2
African Review of Economics & Finance				2	2
Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie/South African Journal of Science and Technology	1				1
Communicare: Journal for Communication Science in Southern Africa				1	1
Navorsing van die Nasionale Museum, Bloemfontein				1	1
The Retail and Marketing Review				1	1
Current Writing: Text and Reception in Southern Africa					0

5.3.2 International footprint and reputation

We have operationally defined the “international footprint and reputation” of a journal in terms of four indicators:

- (1) the proportion of papers in a journal that are authored by non-South Africans;
- (2) the proportions of papers that are jointly co-authored by South African and non-South African authors;

- (3) the country and institutional range of authorships; and
- (4) the proportion of non-SA members on the editorial teams or boards of a journal.

We believe that these different measures in one way or another indicate that a specific journal is recognised and judged to be of sufficient value, relevance and interest to scholars outside a specific institution (for example, the university that publishes the journal) and country (South Africa). We believe that these indicators are useful because, in combination, they would allow us to distinguish between three “types” of journals:

- SA journals with high levels of foreign contribution and participation (co-authorship) (*international South African journals*);
- SA journals with very little footprint and reputation outside the country (*national South African journals*); and
- SA journals with very little footprint outside of a single institution (usually where the journal is published or housed) (*in-house South African journals*).

Below are examples of each of the indicators included under these four sub-dimensions.

5.3.2.1 Foreign contribution and foreign-co-authorship

Indicator 5: Proportion of foreign authored-papers

Indicator 6: Proportion of foreign co-authored papers

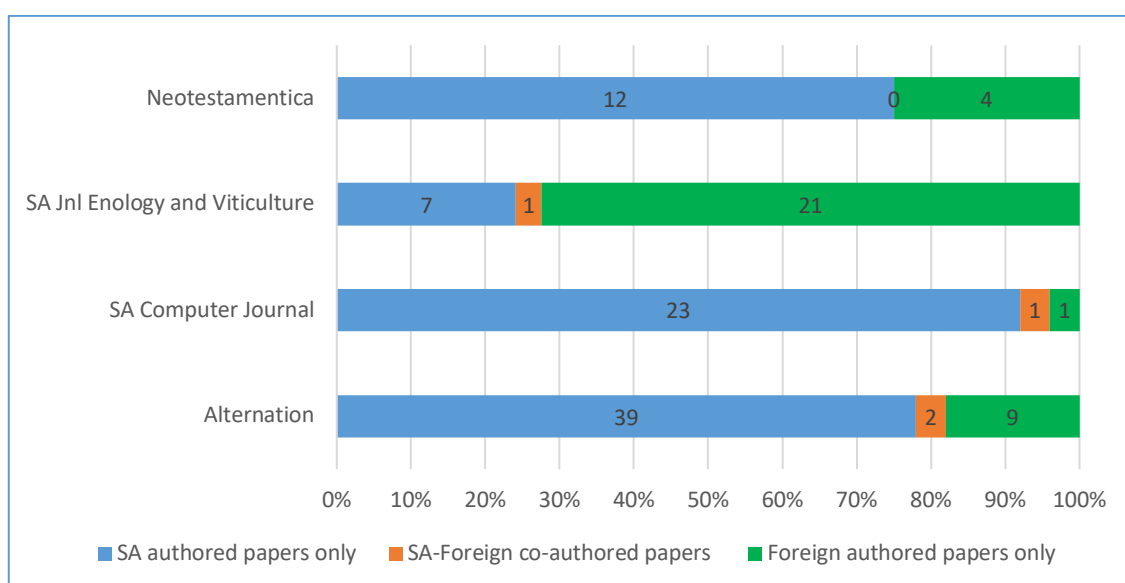


Figure 19: Illustrative examples of international reputation for selected journals (2017 data)

Table 65: Proportion of foreign-authored articles

Journal title	% foreign
Alternation	18%
SA Computer Journal	4%
SA Jnl Enology and Viticulture	72%
Neotestamentica	25%

5.3.2.2 Institutional range

Indicator 7: Proportional share of institutions to total journal output

Indicator 8: Proportional share of countries to total journal output

Table 66: Proportional institutional shares for selected journals (2017)

Journal title	Papers	Institutions	% largest share
Alternation	75	28	35% (UKZN)
Neotestamentica	17	10	None
SA Computer Journal	58	22	14% (UNISA)
SA Jnl of Enology and Viticulture	124	47	9% (SU)

Table 67: Proportional country shares for selected journals (2017)

Journal title	Papers	Countries	% RSA
Alternation	75	10	80%
Neotestamentica	17	5	76%
SA Computer Journal	58	5	93%
SA Jnl of Enology and Viticulture	126	16	29%

5.3.2.3 Foreign representation on editorial board/editorial committee

Indicator 9: Proportion of non-SA members on editorial board

Table 68: Distribution of membership of editorial committees of selected journals

Journal title	Editorial committee			
	SA	International	Total	% international
Alternation	40	18	58	31%
SA Computer Journal	6	2	8	25%
SA Jnl of Enology and Viticulture				
Neotestamentica	14	13	27	48%

5.3.3 Indicators of journal integrity

Our final dimension – journal integrity – encapsulates the ethical dimensions that are related to journal quality. We have identified three sub-dimensions of this construct:

- (1) publisher integrity and transparency;
- (2) editorial integrity; and
- (3) peer-review quality.

These three dimensions still need to be discussed further. We elaborate on each of these below.

5.3.3.1 Publisher integrity and transparency

Indicator 10: Transparent and truthful information on the journal governance and management (including members of the editorial board, editorial policies and procedures) and journal indexing and metrics is provided

The integrity of a journal publisher refers to a number of aspects. In the table below some of these are listed and we compare good (ethical) with bad (unethical) practice in journal publishing. In implementing our proposed framework of JQI, information about these various (more qualitative) measures would have to be gathered for each journal being assessed.

Table 69: Comparison between good and bad publishing and editorial practices

Category	Good practice in publishing	Bad practice in publishing
Origin of papers	Authors usually submit manuscripts to journals of their own accord.	Predatory journals typically solicit manuscripts by spamming researchers.
Journal titles	Legitimate journals usually have field and discipline-appropriate titles.	Predatory or fake journals often have bizarrely broad (e.g. the <i>Global Journal of Advanced Research</i>) or disjointed-scope titles (e.g. the <i>Journal of Economics and Engineering</i>).
Time to publication	Publication lag time is often correlated with the status of the journal (with the best journals taking more time to get to production because of high demand).	These journals boast extremely rapid (and unrealistic) response (review) and publication times. They often also publish extremely high numbers of papers per year. This is arguably one of the best indicators of whether a journal is predatory or not, as it speaks to the capacity of any editor to handle hundreds of submissions per year through proper peer review.
Journal metrics	Journals indexed in WoS and Elsevier Scopus have well-defined and transparent impact factor values.	These journals boast extraordinary and often fake journal impact factors as well as false claims about where the journal is indexed.
Peer review (stature of editorial board)	Legitimate journals have editorial boards and editorial procedures that oversee the process of peer review properly.	Predatory journals very often have fake editorial boards or, at best, editorial boards that consist of a small number of individuals from the same organisation or country. They often enlist members of editorial boards that are not experts in the field. They also often include scholars on an editorial board without their knowledge or permission.
Contact information	Legitimate journals provide accurate and appropriate contact information about their journal and editorial board.	Predatory journals often list false or insufficient contact information, including contact information that does not clearly state the headquarters location or misrepresents the headquarters location (e.g. through the use of addresses that are actually mail-drops).

5.3.3.2 Editorial integrity

Indicator 11: Profile of reviewers (heterogeneity measure)

The ASSAf has, over the past ten years, conducted regular reviews of sets of journals. These reviews are conducted by panels of experts and in preparation for these reviews, all editors of journals are sent a questionnaire beforehand to complete. We have identified four sets of items in these questionnaires that contain information that can be used to populate our proposed framework. Two of these items, which address Indicator 11, are included in Table 70 below. The last column provides information (albeit self-reported data) about the proportion of peer-reviews that are international (non-South African). The results show a large differentiation across the selected journals.

Table 70: Reviewers profiles of selected journals

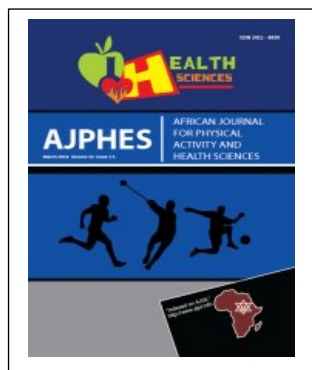
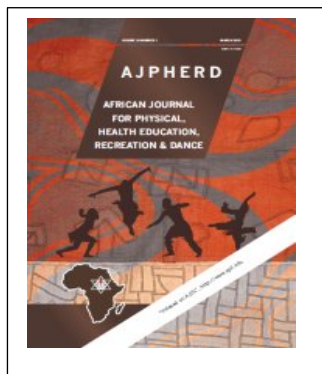
Journal title	How many peer reviewers were used in total in any ONE of the last three years?	What proportion of peer reviewers had non-South African addresses?
Innovation: Journal of Appropriate Librarianships and Information Work in Southern Africa	48 (2014)	10%
The Independent Journal of Teaching and Learning	53 (2017) (25 to 35 reviewers is our general range per edition)	17%
SAMAB – The South African Museums Association Bulletin	24 (2012)	8%
Mousaion	54 (2014)	66%
Journal of Educational Studies (JES)	155 reviewers in database	12%
Journal of Construction	24 (2014)	Most of them
Journal for Language Teaching	78 (2015) 82 (2016) 72 (2017)	5%
Concrete Beton	14 (2014)	21%
Communitas. Journal for Community Communication and Information Impact	15 (2015)	0%
Communicare	24 (2012) 31 (2013) 29 (2014)	8% 3% 3%
Bulletin of the National Library of South Africa	6 (2014?)	50%

Indicator 12: Proportion of papers authored by members of the editorial board (including by the editor)

Indicator 12 is, we would argue, a strong indicator of editorial integrity. We provide an example (the AJHPES journal) below. However, the population of data for this indicator is quite time-consuming as one needs to check the membership of editorial boards for every year of publication.

Example: AJHPES

The African Journal for Physical Health Education, Recreation and Dance (AJPHERD) became the African Journal for Physical Activity and Health Sciences (AJPHES) in 2016.



AJPHES is a refereed journal published quarterly (March, June, September and December) by LAM Publications Limited. The editor-in-chief and the editorial committee serve as a reviewing board, in conjunction with appointed reviewers throughout Africa and overseas for special topics.

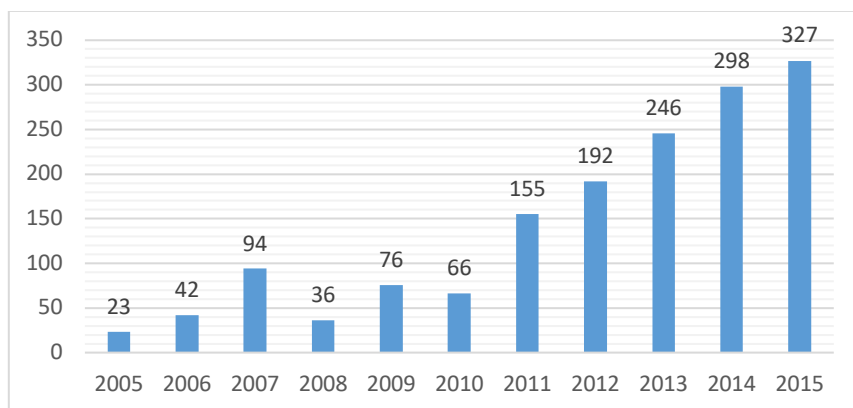


Figure 20: Number of papers in AJHPES by year

The steep increase in the number of paper in AJHPES since 2011 led to further investigation. A breakdown by address of the authors is presented in Figure 21.

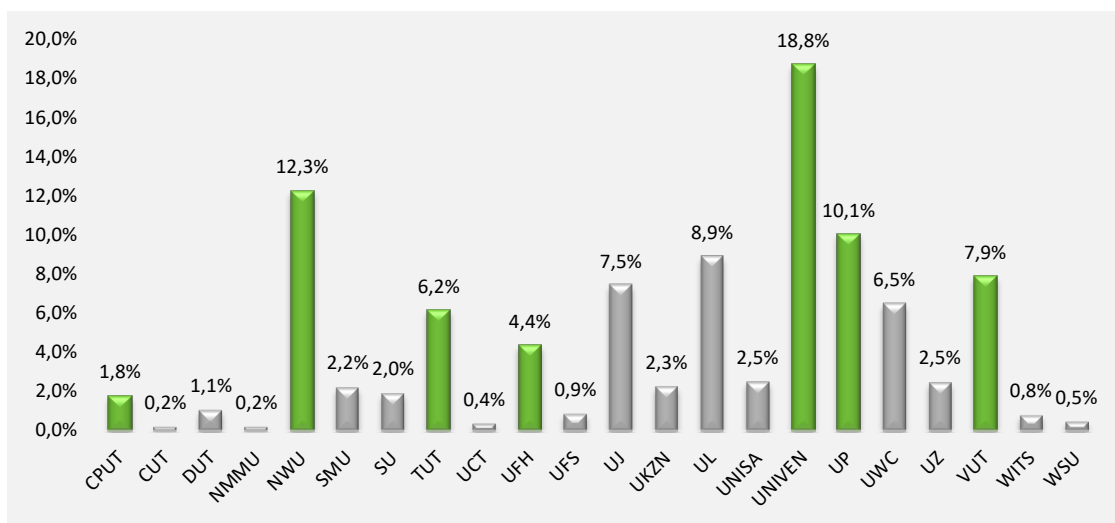


Figure 21: Institutional affiliations of AJHPES authors

The breakdown by institutional affiliation gives an indication of some questionable publication practices – 64% of all authorships were produced by members of the editorial board (indicated in green in the figure) of the journal.

Indicator 13: Level of publication intensity by a single author

A second indicator of editorial integrity measures the extent to which the editor or editorial board exercises sufficient control over the number of articles accepted by a single author, either in a single issue or a particular volume. We present an example of this from the AJHPES journal.

The disaggregation by individual author (Table 71 below) shows how a small number of authors published extremely high numbers of articles in the same journal over an eleven-year period.

Table 71: Most prolific AJHPES authors in descending order (2005-2015)

Author	Papers	Institution	Share	Cumulative %
Author 1	113	VUT/NWU	3.3%	3.3%
Author 2	77	VUT/NWU	2.2%	5.5%
Author 3	58	UNIVEN	1.7%	7.1%
Author 4	58	TUT/UNIVEN	1.7%	8.8%
Author 5	57	TUT/UJ	1.6%	10.4%
Author 6	50	UNIVEN/TUT/UFH	1.4%	11.9%
Author 7	42	UL	1.2%	13.1%
Author 8	41	UNIVEN/UL	1.2%	14.3%
Author 9	41	VUT/UJ	1.2%	15.4%
Author 10	38	UP/UNISA	1.1%	16.5%
Author 11	37	UNIVEN	1.1%	17.6%
Author 12	30	UL	0.9%	18.5%

What is most striking is the publication profile of Author 1, who is also a member of the editorial board.

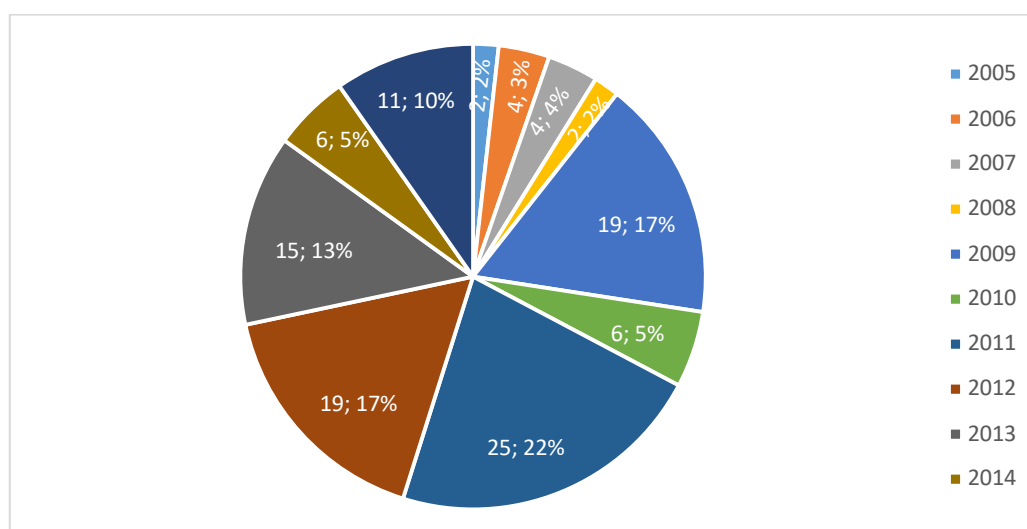


Figure 22: Publication profile of Author 1

It is not only the sheer volume of output in one journal that is striking, but the fact that it is often in the same issue. In October 2011, Author 1 authored or co-authored 11 out of the 15 articles in that issue. These are very clear examples of questionable publication practices that speak to the lack of editorial integrity of the journal.

5.3.3.3 Peer-review quality

Journal acceptance rates are not readily available outside of editorial reports. This information was in fact gathered by the ASSAf surveys conducted for the peer review panels. We present the results of two different acceptance/rejection rates: before and after peer review. The illustrative examples from a selection of journals show how different such rates are for SA journals.

Indicator 14: Article screening rate (rejection before peer review)
Indicator 15: Article acceptance (rejection) rate (rejection after peer review)

Table 72: Article screening rate (before peer review) of selected journals

Journal	How many peer-reviewed original papers have you published during the last three years?	How many manuscripts in each of the above categories were received in the last three years?	How many manuscripts in each category were rejected without peer review (as a pre-peer review decision)?	How many were rejected after peer review?
Innovation: Journal of Appropriate Librarianships and Information Work in Southern Africa	53	65	0	12 (18%)
The Independent Journal of Teaching and Learning	32	77	13/65 articles that were peer-reviewed (20%)	39%
SAMAB – The South African Museums Association Bulletin	12	25	7 (28%)	6 (24%)
Mousaion	80	n/a	3 (4%)	15 (18%)
Journal of Educational Studies (JES)	97	241	31 (13%)	26 (11%)
Journal of Construction	28		40%	25%
Journal for Language Teaching	53	79	3%	55%
Concrete Beton	7	20	4 (25%)	9 (45%)
Communitas. Journal for Community Communication and Information Impact	33	51	8 (16%)	6 (12%)
Communicare	32	88	64%	32%
Bulletin of the National Library of South Africa	12	30	5 (17%)	0

5.4 Concluding assessment and recommendation

We have presented overwhelming evidence in Parts 3 and 4 of this report that the quality and integrity of SA journals need to be continuously monitored and assessed. We subsequently developed a draft framework that could be used to measure the journal quality and integrity of SA journals.

Recommendation 8: Our recommendation is that the DHET adopts this framework and initiate a process that will lead to its implementation in the near future. We specifically recommend that this process includes the following steps:

- (1) Submission of the proposed framework to a small group of experts in scholarly publishing and bibliometrics.
- (2) Gathering of more information and data to populate the framework indicators.
- (3) A stakeholder consultation process that would include journal editors to solicit their comments and feedback on the proposed framework.

If this process results in a consensus view to adopt a final version and to implement it, we also recommend that it be applied to all currently accredited SA journals and also be used by the DHET in the future consideration of new journals.

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Appendix 1: Errors that are due to the current implementation of the CESM classification framework

There are essentially two errors that we found in our analysis of the 2017 submissions. The first occurs when authors/universities **forget to enter a CESM category at all**. We found that this happened in a small number of cases. Table A1 lists 40 cases of authorships where no CESM information was provided (incidentally, this small sample reflects poorly on the quality control at the respective research offices).

Table A1: CESM classification not done

Institution	Title
DUT	Deep sea writing: Recent conversations with Lindsey Collen, writer and activist from Mauritius
DUT	Factors associated with unintended pregnancy among women attending a public health facility in KwaZulu-Natal, South Africa
DUT	Factors associated with unintended pregnancy among women attending a public health facility in KwaZulu-Natal, South Africa
DUT	Factors associated with unintended pregnancy among women attending a public health facility in KwaZulu-Natal, South Africa
DUT	Factors associated with unintended pregnancy among women attending a public health facility in KwaZulu-Natal, South Africa
DUT	Factors associated with unintended pregnancy among women attending a public health facility in KwaZulu-Natal, South Africa
DUT	Factors associated with unintended pregnancy among women attending a public health facility in KwaZulu-Natal, South Africa
DUT	Factors associated with unintended pregnancy among women attending a public health facility in KwaZulu-Natal, South Africa
DUT	Schrodinger equations with logarithmic self-interactions: From antilinear PT-symmetry to the nonlinear coupling of channels
DUT	Schrodinger equations with logarithmic self-interactions: From antilinear PT-symmetry to the nonlinear coupling of channels
DUT	Shona personal names of spiritual significance
DUT	Shona personal names of spiritual significance
MUT	Block error rate performance of subcarrier intensity modulation FSO link with spatial diversity over GAMMA-GAMMA atmospheric channel
MUT	The nature and articulation of ethical codes on tailings management in South Africa
MUT	Work-integrated learning competencies: Industrial supervisors' perspective
UNIVEN	Computational studies of substituted phenylboronic acids in common electrolyte solvents
UNIVEN	Computational studies of substituted phenylboronic acids in common electrolyte solvents
UNIVEN	Intercultural rhetoric analysis of the daily graphic and the New York Times: A micro-genre analysis
UNIVEN	Intercultural rhetoric analysis of the daily graphic and the New York Times: A micro-genre analysis
UNIVEN	Nelson Mandela's place in South African society: Some critical reflection on his legacy
UNIVEN	The United States of America's post-1990 foreign policy towards West Africa: The case study of Ghana
UWC	Bibliometrics: Tracking research impact by selecting the appropriate metrics

Institution	Title
UWC	Exploring 'generative mechanisms' of the antiretroviral adherence club intervention using the realist approach: A scoping review of research-based antiretroviral treatment adherence theories
UWC	Forensic statistics analysis toolbox (FORSTAT): A streamlined workflow for forensic statistics
UWC	Forensic statistics analysis toolbox (FORSTAT): A streamlined workflow for forensic statistics
UWC	Metabolic syndrome is associated with increased seminal inflammatory cytokines and reproductive dysfunction in a case-controlled male cohort.
UWC	Ministerial directives to local government in Zimbabwe: Top-down governance in a decentralized constitution
UWC	Ministerial directives to local government in Zimbabwe: Top-down governance in a decentralized constitution
UWC	Ministerial directives to local government in Zimbabwe: Top-down governance in a decentralized constitution
UWC	Novel 5-(Benzo[b]thiophen-3-yl)pyridine-3-caraldehyde (BTPA) functionalization framework for modulating fullerene electronics
UWC	Novel 5-(Benzo[b]thiophen-3-yl)pyridine-3-caraldehyde (BTPA) functionalization framework for modulating fullerene electronics
UWC	Population analysis of African Y-STR profiles with UniQ TYPERS™ Y-10 genotyping system
UWC	Population analysis of African Y-STR profiles with UniQ TYPERS™ Y-10 genotyping system
UWC	Silver/carbon codoped titanium dioxide photocatalyst for improved dye degradation under visible light
UWC	The research focus question: Part 6: Finding the flaws, explaining the errors, and suggesting solutions
UWC	Translating lifestyle interventions for reducing cardiometabolic risk in vulnerable and disadvantaged populations
UWC	Very green photosynthesis of gold nanoparticles by a living aquatic plant: Photoreduction of auiii by the seaweed Ulva Armoricana
UWC	Very green photosynthesis of gold nanoparticles by a living aquatic plant: Photoreduction of auiii by the seaweed Ulva Armoricana
UWC	Very green photosynthesis of gold nanoparticles by a living aquatic plant: Photoreduction of auiii by the seaweed Ulva Armoricana
VUT	Ultraviolet and solar photocatalytic ozonation of municipal wastewater: Catalyst reuse, energy requirements and toxicity assessment

A much more serious and common problem with the current system is where the same article is assigned to different CESM categories by different authors/universities. We found 1 373 cases where this occurred (Table A2 below presents a list of the first 100 cases).

Table A2: Inconsistent assignment of CESM categories to publications

University	Title	Source	CESM category	CESM category count
UCT	Whole-genome sequencing for an enhanced understanding of genetic variation among South Africans	Nature Communications	9	4

University	Title	Source	CESM category	CESM category count
UWC	Whole-genome sequencing for an enhanced understanding of genetic variation among South Africans	Nature Communications	13	4
WITS	Whole-genome sequencing for an enhanced understanding of genetic variation among South Africans	Nature Communications	8	4
UP	Whole-genome sequencing for an enhanced understanding of genetic variation among South Africans	Nature Communications	1	4
NWU	A diatom functional-based approach to assess changing environmental conditions in temporary depressional wetlands	Ecological Indicators	14	3
RU	A diatom functional-based approach to assess changing environmental conditions in temporary depressional wetlands	Ecological Indicators	13	3
UP	A diatom functional-based approach to assess changing environmental conditions in temporary depressional wetlands	Ecological Indicators	1	3
UKZN	Charge states and lattice sites of dilute implanted Sn in ZnO	Journal of Physics: Condensed Matter	1	3
WITS	Charge states and lattice sites of dilute implanted Sn in ZnO	Journal of Physics: Condensed Matter	14	3
DUT	Charge States and lattice sites of dilute implanted Sn in ZnO.	American Journal of Physics	13	3
UKZN	Efficacy of South African Babesia Bovis vaccine against field isolates	Ticks and Tick-Borne Diseases	13	3
UNISA	Efficacy of South African Babesia Bovis vaccine against field isolates	Ticks and Tick-Borne Diseases	9	3
UP	Efficacy of South African Babesia Bovis vaccine against field isolates	Ticks and Tick-Borne Diseases	1	3
UNIVEN	Endocrine disruptors and health effects in Africa: a call for action	Environmental Health Perspectives	13	3
UP	Endocrine disruptors and health effects in Africa: A call for action	Environmental Health Perspectives	9	3
NWU	Endocrine Disruptors and Health Effects in Africa: A Call for Action	Environmental Health Perspectives	14	3
TUT	Evaluation of synergy and bacterial regrowth in photocatalytic ozonation disinfection of municipal wastewater	Science of the Total Environment	8	3

University	Title	Source	CESM category	CESM category count
TUT	Evaluation of synergy and bacterial regrowth in photocatalytic ozonation disinfection of municipal wastewater	Science of the Total Environment	13	3
VUT	Evaluation of synergy and bacterial regrowth in photocatalytic ozonation disinfection of municipal wastewater	Science of the Total Environment	14	3
SU	Exploring South Africa's southern frontier: A 20-year vision for polar research through the South African national Antarctic programme	South African Journal of Geology	13	3
UCT	Exploring South Africa's southern frontier: A 20-year vision for polar research through the South African National Antarctic programme	South African Journal of Geology	14	3
UFH	Exploring South Africa's southern frontier: A 20-year vision for polar research through the South African National Antarctic Programme	South African Journal of Science	13	3
NMU	Exploring South Africa's southern frontier: A 20-year vision for polar research through the South African National Antarctic Programme	South African Journal of Science	13	3
CPUT	Exploring South Africa's southern frontier: A 20-year vision for polar research through the South African National Antarctic Programme	South African Journal of Science	1	3
RU	Exploring South Africa's southern frontier: A 20-year vision for polar research through the South African National Antarctic Programme	South African Journal of Geology	13	3
UJ	Improving methane gas sensing properties of multi-walled carbon nano-tubes by vanadium oxide filling	Sensors	14	3
UNISA	Improving methane gas sensing properties of multi-walled carbon nanotubes by vanadium oxide filling	Sensors	8	3
WITS	Improving methane gas sensing properties of multi-walled carbon nanotubes by vanadium oxide filling	Sensors	13	3
UJ	Indoor temperatures in low cost housing in Johannesburg, South Africa	International Journal of Environmental Research and Public Health	9	3
UP	Indoor temperatures in low cost housing in Johannesburg, South Africa	International Journal of Environmental Research and Public Health	1	3

University	Title	Source	CESM category	CESM category count
NMU	Indoor Temperatures in Low Cost Housing in Johannesburg, South Africa	International Journal of Environmental Public Health	20	3
WITS	Indoor Temperatures in Low Cost Housing in Johannesburg, South Africa	International Journal of Environmental Public Health	9	3
UFH	Livestock predation in South Africa: The need for and value of a scientific assessment	South African Journal of Science	1	3
NMU	Livestock predation in South Africa: The need for and value of a scientific assessment	South African Journal of Science	13	3
WITS	Livestock predation in South Africa: The need for and value of a scientific assessment	South African Journal of Geology	9	3
NMU	Strategic water source areas for urban water security: Making the connection between protecting ecosystems and benefiting from their services	Ecosystem Services	13	3
SU	Strategic water source areas for urban water security: Making the connection between protecting ecosystems and benefiting from their services	Ecosystem Services	1	3
DUT	Strategic water source areas for urban water security: Making the connection between protecting ecosystems and benefiting from their services.	Ecosystem Services	20	3
UCT	Vulnerability mapping as a tool to manage the environmental impacts of oil and gas extraction	Royal Society Open Science	12	3
UFS	Vulnerability mapping as a tool to manage the environmental impacts of oil and gas extraction	Royal Society Open Science	13	3
UP	Vulnerability mapping as a tool to manage the environmental impacts of oil and gas extraction	Royal Society Open Science	14	3
UJ	Water, equity and resilience in southern Africa: Future directions for research and practice	Current Opinion in Environmental Sustainability	20	3
SU	Water, equity and resilience in Southern Africa: Future directions for research and practice	Current Opinion in Environmental Sustainability	14	3
UCT	Water, equity and resilience in Southern Africa: Future directions for research and practice	Current Opinion in Environmental Sustainability	13	3

University	Title	Source	CESM category	CESM category count
UKZN	Water, equity and resilience in Southern Africa: Future directions for research and practice	Current Opinion in Environmental Sustainability	20	3
WITS	Water, equity and resilience in Southern Africa: Future directions for research and practice	Current Opinion in Environmental Sustainability	20	3
MUT	Abnormalities in alternative splicing of angiogenesis-related genes and their role in HIV-related cancers	HIV/AIDS - Research and Palliative Care	9	2
UL	Abnormalities in alternative splicing of angiogenesis-related genes and their role in HIV-related cancers	HIV/AIDS - Research and Palliative Care	1	2
UJ	A case study from the southern Cape line-fishery 1: the difficulty of fishing in a changing world	South African Journal of Science	20	2
UCT	A case study from the southern Cape line fishery 1: The difficulty of fishing in a changing world	South African Journal of Science	13	2
UJ	A case study from the southern Cape line-fishery 2: considering one's options when the fish leave	South African Journal of Science	20	2
UCT	A case study from the southern Cape line fishery 2: Considering one's options when the fish leave	South African Journal of Science	13	2
UJ	A case study into the preparedness of white-water tourism to severe climatic events in southern Africa	Tourism Review International	20	2
WITS	A case study into the preparedness of white-water tourism to severe climatic events in Southern Africa	Tourism Review International	14	2
UCT	Accessing bio-specimens from the H3Africa Consortium	Biopreservation and Biobanking	9	2
UWC	Accessing bio-specimens from the H3Africa Consortium	Biopreservation and Biobanking	13	2
WITS	Accessing bio-specimens from the H3Africa Consortium	Biopreservation and Biobanking	9	2
SU	Access to health care for persons with disabilities in rural South Africa	BMC Health Services Research	18	2
UCT	Access to health care for persons with disabilities in rural South Africa	BMC Health Services Research	9	2
TUT	A comparative overview of exercise and health related professions: Athletic training, clinical exercise physiology and biokinetics	AJPHEs	13	2
NWU	A comparative overview of exercise and health related professions: Athletic	AJPHEs	9	2

University	Title	Source	CESM category	CESM category count
	training, clinical exercise physiology and biokinetics			
TUT	A comparative study of geopolymers synthesized from OXY-combustion and chemical looping combustion bottom ashes	Construction and Building Materials	8	2
UP	A comparative study of geopolymers synthesized from OXY-combustion and chemical looping combustion bottom ashes	Construction and Building Materials	14	2
UP	A comparative study of selected physical and biochemical traits of wild-type and transgenic sorghum to reveal differences relevant to grain quality	Frontiers In Plant Science	1	2
SU	A Comparative Study of Selected Physical and Biochemical Traits of Wild-Type and Transgenic Sorghum to Reveal Differences relevant to Grain Quality	Frontiers in Plant Science	13	2
SU	A comparison of self-report and antiretroviral detection to inform estimates of antiretroviral therapy coverage, viral load suppression and HIV incidence in Kwazulu-Natal, South Africa	BMC Infectious Diseases	14	2
UCT	A comparison of self-report and antiretroviral detection to inform estimates of antiretroviral therapy coverage, viral load suppression and HIV incidence in Kwazulu-Natal, South Africa	BMC Infectious Diseases	9	2
UCT	A comparison of the conditional inference survival forest model to random survival forests based on a simulation study as well as on two applications with time-to-event data	BMC Medical Research Methodology	9	2
UKZN	A comparison of the conditional inference survival forest model to random survival forests based on a simulation study as well as on two applications with time-to-event data	BMC Medical Research Methodology	15	2
UZ	A contextual review of South Africa's socio-economic content of green economy and green growth indexes	Journal of Public Administration	4	2
UKZN	A Contextual review of South Africa's Socio-Economic content of green economy and green growth Indexes	Journal of Public Administration	20	2

Appendix 2: Disaggregation of journal articles by Level 4 subject category

Level 2	Level 4	Articles
Agricultural sciences	Agricultural economics and policy	19
Agricultural sciences	Agricultural engineering	21
Agricultural sciences	Agriculture	415
Agricultural sciences	Agriculture, dairy and animal science	71
Agricultural sciences	Agriculture, multidisciplinary	67
Agricultural sciences	Agronomy	166
Agricultural sciences	Fisheries	46
Agricultural sciences	Food science and technology	207
Agricultural sciences	Forestry	64
Agricultural sciences	Horticulture	95
Agricultural sciences	Plant sciences	550
Agricultural sciences	Soil science	71
Agricultural sciences	Veterinary sciences	179
Basic health sciences	Anatomy and morphology	48
Basic health sciences	Andrology	17
Basic health sciences	Biochemistry and molecular biology	282
Basic health sciences	Chemistry, medicinal	116
Basic health sciences	Genetics and heredity	120
Basic health sciences	Immunology	393
Basic health sciences	Medicine, miscellaneous	6
Basic health sciences	Medicine, research and experimental	111
Basic health sciences	Microbiology (medical)	10
Basic health sciences	Neurosciences and neurology	287
Basic health sciences	Parasitology	128
Basic health sciences	Pathology	35
Basic health sciences	Physiology	59
Basic health sciences	Research and experimental medicine	86
Basic health sciences	Virology	149
Biological sciences	Biochemical research methods	48
Biological sciences	Biology	95
Biological sciences	Biophysics	32
Biological sciences	Biotechnology and applied microbiology	191
Biological sciences	Cell and tissue engineering	5
Biological sciences	Cell biology	78
Biological sciences	Developmental biology	7
Biological sciences	Entomology	145

Level 2	Level 4	Articles
Biological sciences	Evolutionary biology	93
Biological sciences	Life sciences and biomedicine – other topics	95
Biological sciences	Marine and freshwater biology	226
Biological sciences	Mathematical and computational biology	42
Biological sciences	Microbiology	261
Biological sciences	Mycology	39
Biological sciences	Ornithology	16
Biological sciences	Reproductive biology	19
Biological sciences	Zoology	279
Chemical sciences	Chemistry	980
Chemical sciences	Chemistry, analytical	92
Chemical sciences	Chemistry, applied	92
Chemical sciences	Chemistry, inorganic and nuclear	122
Chemical sciences	Chemistry, multidisciplinary	252
Chemical sciences	Chemistry, organic	134
Chemical sciences	Chemistry, physical	369
Chemical sciences	Electrochemistry	90
Chemical sciences	Polymer science	95
Clinical and public health	Allergy	7
Clinical and public health	Anaesthesiology	21
Clinical and public health	Cardiovascular system and cardiology	235
Clinical and public health	Clinical neurology	67
Clinical and public health	Critical care medicine	97
Clinical and public health	Dentistry, oral surgery and medicine	61
Clinical and public health	Dermatology	20
Clinical and public health	Emergency medicine	41
Clinical and public health	Endocrinology and metabolism	121
Clinical and public health	Gastroenterology and hepatology	21
Clinical and public health	General and internal medicine	411
Clinical and public health	Geriatrics and gerontology	8
Clinical and public health	Health care sciences and services	155
Clinical and public health	Health policy and services	108
Clinical and public health	Haematology	22
Clinical and public health	Hepatology	3
Clinical and public health	Infectious diseases	577
Clinical and public health	Integrative and complementary medicine	57
Clinical and public health	Medical informatics	9
Clinical and public health	Medical laboratory technology	32

Level 2	Level 4	Articles
Clinical and public health	Medicine, general and internal	548
Clinical and public health	Nursing	103
Clinical and public health	Nutrition and dietetics	99
Clinical and public health	Obstetrics and gynaecology	99
Clinical and public health	Oncology	57
Clinical and public health	Ophthalmology	38
Clinical and public health	Orthopaedics	53
Clinical and public health	Otorhinolaryngology	26
Clinical and public health	Paediatrics	149
Clinical and public health	Peripheral vascular disease	42
Clinical and public health	Pharmaceutical science	11
Clinical and public health	Pharmacology and pharmacy	324
Clinical and public health	Primary health care	12
Clinical and public health	Psychiatry	180
Clinical and public health	Public, environmental and occupational health	474
Clinical and public health	Radiology, nuclear medicine and medical imaging	57
Clinical and public health	Rehabilitation	89
Clinical and public health	Respiratory system	112
Clinical and public health	Rheumatology	21
Clinical and public health	Substance abuse	29
Clinical and public health	Surgery	76
Clinical and public health	Toxicology	43
Clinical and public health	Transplantation	5
Clinical and public health	Tropical medicine	78
Clinical and public health	Urology and nephrology	48
Earth sciences	Biodiversity and conservation	166
Earth sciences	Biology	26
Earth sciences	Ecology	507
Earth sciences	Geochemistry and geophysics	134
Earth sciences	Geography, physical	80
Earth sciences	Geography, planning and development	23
Earth sciences	Geology	316
Earth sciences	Geosciences, multidisciplinary	242
Earth sciences	Global and planetary change	8
Earth sciences	Limnology	17
Earth sciences	Meteorology and atmospheric sciences	150
Earth sciences	Mineralogy	81
Earth sciences	Oceanography	61

Level 2	Level 4	Articles
Earth sciences	Palaeontology	41
Earth sciences	Physical geography	80
Earth sciences	Remote sensing	52
Earth sciences	Water resources	250
Economic and management sciences	Business	154
Economic and management sciences	Business and Economics	399
Economic and management sciences	Business, finance	199
Economic and management sciences	Economics	462
Economic and management sciences	Management	244
Economic and management sciences	Public Administration	216
Economic and management sciences	Transportation	28
Education	Education and educational research	792
Education	Education, special	10
Engineering sciences and applied technologies	Automation and control systems	54
Engineering sciences and applied technologies	Construction and building technology	43
Engineering sciences and applied technologies	Energy and fuels	231
Engineering sciences and applied technologies	Engineering	815
Engineering sciences and applied technologies	Engineering, aerospace	14
Engineering sciences and applied technologies	Engineering, biomedical	16
Engineering sciences and applied technologies	Engineering, chemical	266
Engineering sciences and applied technologies	Engineering, civil	86
Engineering sciences and applied technologies	Engineering, electrical and electronic	173
Engineering sciences and applied technologies	Engineering, environmental	132
Engineering sciences and applied technologies	Engineering, geological	5
Engineering sciences and applied technologies	Engineering, industrial	17
Engineering sciences and applied technologies	Engineering, manufacturing	24
Engineering sciences and applied technologies	Engineering, marine	4
Engineering sciences and applied technologies	Engineering, mechanical	89
Engineering sciences and applied technologies	Engineering, multidisciplinary	80
Engineering sciences and applied technologies	Ergonomics	9
Engineering sciences and applied technologies	Imaging science and photographic technology	35
Engineering sciences and applied technologies	Instruments and instrumentation	46
Engineering sciences and applied technologies	Materials science	465
Engineering sciences and applied technologies	Materials science, biomaterials	26
Engineering sciences and applied technologies	Materials science, ceramics	14
Engineering sciences and applied technologies	Materials science, characterisation and testing	7
Engineering sciences and applied technologies	Materials science, coatings and films	33
Engineering sciences and applied technologies	Materials science, composites	16

Level 2	Level 4	Articles
Engineering sciences and applied technologies	Materials science, multidisciplinary	340
Engineering sciences and applied technologies	Materials science, paper and wood	8
Engineering sciences and applied technologies	Materials science, textiles	9
Engineering sciences and applied technologies	Mechanics	112
Engineering sciences and applied technologies	Metallurgy and metallurgical engineering	133
Engineering sciences and applied technologies	Microscopy	9
Engineering sciences and applied technologies	Mining and mineral processing	44
Engineering sciences and applied technologies	Nanoscience and nanotechnology	95
Engineering sciences and applied technologies	Nuclear science and technology	20
Engineering sciences and applied technologies	Operations research and management science	26
Engineering sciences and applied technologies	Robotics	2
Engineering sciences and applied technologies	Science and technology – other topics	438
Engineering sciences and applied technologies	Telecommunications	57
Engineering sciences and applied technologies	Transportation science and technology	3
Language and linguistics	Audiology and speech – language pathology	17
Language and linguistics	Language and linguistics	150
Language and linguistics	Linguistics	83
Language and linguistics	Literary reviews	83
Language and linguistics	Literary theory and criticism	57
Language and linguistics	Literature	269
Language and linguistics	Literature African, Australian, Canadian	33
Language and linguistics	Literature, British Isles	1
Language and linguistics	Literature, German, Dutch, Scandinavian	1
Language and linguistics	Literature, romance	4
Language and linguistics	Literature, Slavic	1
Language and linguistics	Poetry	25
Law	Government and law	95
Law	Law	487
Law	Legal medicine	33
Law	Medicine, legal	33
Mathematical sciences and ICCT	Computer science	213
Mathematical sciences and ICCT	Computer science, artificial intelligence	28
Mathematical sciences and ICCT	Computer science, cybernetics	5
Mathematical sciences and ICCT	Computer science, hardware and architecture	2
Mathematical sciences and ICCT	Computer science, information systems	25
Mathematical sciences and ICCT	Computer science, interdisciplinary applications	62

Level 2	Level 4	Articles
Mathematical sciences and ICCT	Computer science, software engineering	19
Mathematical sciences and ICCT	Computer science, theory and methods	90
Mathematical sciences and ICCT	Logic	8
Mathematical sciences and ICCT	Mathematics	415
Mathematical sciences and ICCT	Mathematics, applied	236
Mathematical sciences and ICCT	Social sciences, mathematical methods	13
Mathematical sciences and ICCT	Statistics and probability	64
Multidisciplinary sciences	Multidisciplinary sciences	441
Other humanities and arts	Archaeology	82
Other humanities and arts	Art	57
Other humanities and arts	Classics	10
Other humanities and arts	Cultural studies	84
Other humanities and arts	Ethics	30
Other humanities and arts	Ethnic studies	15
Other humanities and arts	History	135
Other humanities and arts	History and philosophy of science	21
Other humanities and arts	Humanities, multidisciplinary	117
Other humanities and arts	Medical ethics	10
Other humanities and arts	Music	39
Other humanities and arts	Philosophy	75
Other humanities and arts	Theatre	6
Other social sciences	Architecture	9
Other social sciences	Area studies	237
Other social sciences	Biomedical social sciences	89
Other social sciences	Communication	108
Other social sciences	Environmental sciences	606
Other social sciences	Environmental sciences and ecology	1025
Other social sciences	Environmental studies	204
Other social sciences	Film, radio and television	28
Other social sciences	Geography	60
Other social sciences	Hospitality, leisure, sport and tourism	87
Other social sciences	Information science and library science	157
Other social sciences	International relations	67
Other social sciences	Mathematical methods in social sciences	13
Other social sciences	Planning and development	127
Other social sciences	Political science	211
Other social sciences	Social sciences – other topics	277
Other social sciences	Social sciences, biomedical	24

Level 2	Level 4	Articles
Other social sciences	Social sciences, interdisciplinary	379
Other social sciences	Social work	88
Other social sciences	Sport sciences	121
Other social sciences	Urban studies	43
Other social sciences	Women's studies	25
Physical sciences	Acoustics	5
Physical sciences	Astronomy and astrophysics	274
Physical sciences	Crystallography	68
Physical sciences	Optics	113
Physical sciences	Physics	652
Physical sciences	Physics, applied	171
Physical sciences	Physics, atomic, molecular and chemical	114
Physical sciences	Physics, condensed matter	192
Physical sciences	Physics, fluids and plasmas	29
Physical sciences	Physics, mathematical	64
Physical sciences	Physics, multidisciplinary	97
Physical sciences	Physics, nuclear	47
Physical sciences	Physics, particles and fields	95
Physical sciences	Spectroscopy	20
Physical sciences	Thermodynamics	114
Psychology	Behavioural sciences	136
Psychology	Psychology	514
Psychology	Psychology, applied	27
Psychology	Psychology, biological	10
Psychology	Psychology, clinical	49
Psychology	Psychology, developmental	37
Psychology	Psychology, educational	13
Psychology	Psychology, experimental	19
Psychology	Psychology, mathematical	2
Psychology	Psychology, multidisciplinary	210
Psychology	Psychology, psychoanalysis	12
Psychology	Psychology, social	17
Religion	Religion	678
Sociology and related studies	Anthropology	113
Sociology and related studies	Criminology and penology	77
Sociology and related studies	Demography	42
Sociology and related studies	Family studies	42
Sociology and related studies	Geriatrics and gerontology	6
Sociology and related studies	Industrial relations and labour	91

Level 2	Level 4	Articles
Sociology and related studies	Social issues	79
Sociology and related studies	Social sciences	14
Sociology and related studies	Social sciences, biomedical	365
Sociology and related studies	Social work	17
Sociology and related studies	Sociology	157

Appendix 3: Book titles by publishers (2005 to 2017)

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
30° South Publishers									1					1
Abingdon Press										1				1
Academic Press												1	2	3
Academica Press		1											1	2
AcadSA Publishing			1							1				2
ACMRS					1									1
Acumen Publishing Limited				2		1								3
Advance music			1											1
Africa Magna Verlag										1				1
Africa World Press							1			1		1	1	4
African Institute for Culture, Peace, Dialogue and Tolerance Studies												2		2
African Minds												1		1
African Sun Media	2	1	1		1	5	4	4	2	7		8	15	50
Africana												1		1
Afrika Magna Verlag							1							1
AK Press					1									1
Akadémia Kiadó	1													1
Alma Books									1					1
AltaMira Press								1						1
Amirian Institute of Aeronautics and Astronautics									2					2

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
AMS - American Mathematical Society				1										1
Amsterdam University Press							1							1
Anthem Press							1							1
AOSIS Publishing										1		2	4	7
Aracne Editrice Srl													1	1
Archaeopress			1	1						1		1	2	6
Ashgate Publishing	2		2				1	1	2	1				9
ATHENA-Verlag					1	1	2	2	1			1	1	9
Atlantis Press								1						1
ATLAS Press										1				1
Austin Macauley												1		1
AV Akademikerverlag			1											1
Averbode					1									1
Baker Publishing Group									1					1
Barbara Budrich Publishers						1							1	2
Basler Afrika Bibliographien								1						1
Baylor University Press								1					2	3
Beacon Press										1				1
Berg Publishers								1						1
Berghahn Books									1			1		2
Best Books	1													1
Bestred HRSC PRESS												1	1	2

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Bible Media						1		1						2
Birkhauser	1	1								1				3
Birlinn Limited									1					1
Bloom's Literary Criticism	1									1				2
Bloomsbury Academic												2	1	3
Bloomsbury Continuum				1	2	1								4
Bloomsbury Publishing										3			2	5
Bloomsbury T&T Clark	1		1						1				1	4
Booklove Publishers									1					1
Boom Publishers									1					1
Brandes & Apsel													1	1
Brepols Publishers										1				1
Brill			1		4				4	3		3	2	17
British Archaeological Reports Ltd												1		1
Briza Publications							1		1				1	3
Brunnen Verlag								1						1
Business Expert Press													1	1
Butterworths LexisNexis		1												1
Bybel-Media						1			1					2
C. Hurst and Co. Publishers										1				1
CABI			1											1
Cambria Press												1		1
Cambridge Scholars Publishing			1		2		1	2				1	2	9

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Cambridge University Press	3			4	1	2	4		2	7		5	5	33
Carolina Academic Press									1					1
CBS-KNAW Fungal Biodiversity Centre									1					1
Central South University Press									1					1
Centre for Advanced Studies of African Society (CASAS)								1						1
Centre for Higher Education Transformation (CHET)							1							1
Chandos Publishing				1	1	1			1					4
Church History Society of South Africa (CHSSA)				1										1
Civitas: Institute for the Study of Civil Society			1											1
Cluster Publications				1			2	3				3		9
CODESRIA									1		1			2
Colliers Corporate Communications												1		1
Columbia University Press						1		1		1				3
Cornell University Press					2									2
Council for Geoscience												1		1
CRC Press							3	1	1			2	3	10
CSIRO			1											1
Curtea Veche Publishing								1	1					2
David Publishing Company						1	1	1		2			1	6
De Gruyter							1			1				2

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Department of English- Texas A&M University								1						1
Department of Water Affairs and Forestry							1							1
Die Erfenisstigting													1	1
Division of Institutional Advancement, University of Johannesburg						1								1
Dorrance Publishing Company													1	1
Duke University Press									1	1				2
Duncan Rogers of Helion & Co.													1	1
Earthscan							1	1						2
Echoing Green Press						1								1
Edinburg University Press								1		1				2
Edition Falkenberg										1				1
Édition Universitaires Européennes						1	1							2
Editions Honore Champion									1					1
Editions la Decouverte										1				1
Edward Elgar								1						1
Edwin Mellen Press								1						1
Eerdmans						1								1
Eisenbrauns								1						1
Elementaire Deeltjes												1		1
ELIT													1	1
Elsevier	1											2	1	4

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Emerald Group Publishing												1		1
Equateurs												1		1
Evangel Publishing House													1	1
Evangelische Verlagsanstalt								1						1
Faculty of Theology UFS – University of the Free State					1									1
Fairleigh Dickinson University Press							1							1
Faisca										1				1
Fanele										1			1	2
Firenze University Press													1	1
Fiscal Publications													1	1
FJG Publikasies								1						1
Fordham University Press				1	1					1		1		4
Fortress Press										1			1	2
Foundation Press New York, USA			1											1
Foundery Books													1	1
Fourthwall Books										1				1
Francois Bourin Editeur							1	1						2
Frank & Timme								1						1
Franz Steiner Verlag					1									1
Gallery AOP									1					1
Garant Publisher										1				1
Gerard Noodt Instituut						1								1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Golbal Forum for Health research			1											1
Gorgias Press									1			1		2
Gower										2				2
Grupo Autentica												1		1
Gütersloher Verlagshaus			1											1
Gylphi Limited									1					1
Hamilton Books													1	1
Hampton Press								1						1
Harry Printers								1						1
Hart Publishing Ltd					1	2	1	1	1			1	1	8
Harvard University Press									1					1
Haus Publishing				1										1
Hebrew Union College – Jewish Institute of Religion								1						1
Heinemann							1							1
Hemel & See Boeke				1	1									2
Hendrickson Publishers						1								1
Herder								2						2
Hermann					1					1				2
Higher Education Press													1	1
Hlovasi Productions						1								1
HSRC Press		1	3	2	2	1	1	2	2	3		2	2	21
Huis Clos								1						1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Hurst & Company					1									1
I.B. Tauris										1		1	1	3
IMASA									1					1
IMB Institute of Management Berlin									1					1
Indiana University Press						2				1				3
Institute of Engineering and Technology					1									1
Institute of Internal Auditors South Africa						1								1
Institute of Mennonite Studies										1				1
InTech													1	1
Intellect Books								1						1
International Governance Alliance										1				1
Interpak Books								1						1
Intersentia					1	1						1		3
Inter-university Centre for Education Law and Education Policy			1											1
Iqula Publishing & UFH Press				1										1
ISEAS Publishing								1						1
Isokinetic Equipment cc				1										1
iUniverse			1		1									2
Jacana Media			1	1	1	1	2	7	3	5		4	4	29
James Currey						1				2				3
Jessica Kingsley Publishers		1												1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
John Benjamins						1								1
John Wiley													1	1
Jonathan Ball							1	1	1	1			2	6
Jonathan Cape			1											1
Juta	2	1	1	2		6	8	9	3	3		7	2	44
Juvenilia Press										1				1
Karthala									1					1
KMM Review Publishing						1				1				2
Knowres Publishing (Pty) Ltd						1				1				2
Konrad Adenauer Stiftung					1									1
KR Publishing												3		3
Kraal Uitgewers			2							1				3
Kwela Books					1		1							2
La Decouverte												1		1
La Procure										1				1
Langaa RPCIG								1	1			1	1	4
Langham Global Library									1	1				2
LAP Lambert Academic Publishing					3		1	13	4	4				25
LAPA Uitgewers								1						1
Law Society of South Africa										1				1
Led Books												1		1
Left Coast Press									1					1
LeftWord													1	1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Legacy Book Publishers					1	1								2
Lemieux Editeur													1	1
Les Editions du Cerf										1				1
Lexington Books										1		2	2	5
LexisNexis			4	1	1	1			3	5		3	2	20
L'Harmattan							2	2		3		1	1	9
Librairie Droz								1						1
LINCOM GmbH						1			2					3
LIT Verlag								1				2	2	5
Litera													1	1
Liturgical Press												1		1
Lovedale Press										1				1
Lux Verbi					2									2
Magnolia Press							1	1		1				3
Manar & Kelemen Oriental Publishers													1	1
Manchester University Press					1				1	1			1	4
Martinus Nijhoff Publishers							1	1	1					3
McGill-Queen's University Press						1								1
Meinema								1		1			1	3
Memories Publisher						1								1
MF Books									1				1	2
Michigan State University Press										1				1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
MIT Press				1										1
Mohr Siebeck	2			2		1				1		1	3	10
Mowbray Publishing Inc					1									1
Multilingual Matters									1			1		2
N.G. Kerk Berg-en-Dal		1												1
Navajivan													1	1
Naval Heritage Society of South Africa	1													1
NB Publishers	1									1			1	3
Nelson Mandela Metropolitan University									1					1
Neufeld Verlag										1				1
New Academia Publishing										1				1
New Africa Books			1											1
New Clarion Press		1												1
New Voices Publishing Services								1						1
Newnes	1													1
Nordiska Afrikainstitutet							1							1
Northeast Normal University Press							1	1				1		3
Nova Science Publishers						2	3	2		1			1	9
Occasional Publications of the Natal Society Foundation													1	1
OECD				1										1
Ohio University Press									1	1				2

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Oxford University Press	1		2	4	3	3	2	2	3	6		4	2	32
Paideia Press / Reformational Publishing Project					2									2
Palgrave Macmillan	2	2		1	4	1	1	4	6	10		12	12	55
Pan Macmillan													1	1
Peeters Publishers					1			1	1	1			1	5
Penguin Books			1							1			1	3
Penguin Random House South Africa												3		3
Peter Lang			1		1		2	1		1		2	2	10
Peterson Institute for International Economics									1					1
Picador Africa									1					1
Pickwick Publications								1						1
Platinum Press							1							1
Pluto Press										2		1		3
Policy Press												1		1
Polity Press							1					1	3	5
Potchefstroomse Teologiese Publikasies				1				2						3
Pretoria University Law Press (PULP)			1		1	1	2	1		1			1	8
Princeton University Press												1		1
Print Matters Heritage													1	1
Protea Boekhuis	2		1	2	3		4	1	3	1			2	19
Publish America							1	1	1					3

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Publishing Print Matters												1		1
Rainbird												1		1
Random House Struik					2									2
Rapid Access Publishers				1										1
Reach Publishers									1					1
Rhodes University													1	1
RIP – Research India Publications													1	1
Rodopi					1		2	1				1		5
Routledge			1	2	1	1	3	1	6	6		9	16	46
Rowman & Littlefield			1									1		2
Rozenberg Publishers						2								2
Sage Publications							1						2	3
SANBI										1		1		2
Sandstone Editions									1					1
SBL Society of Biblical Literature												1		1
Scarecrow Press					1									1
Scholar's Press												2		2
SCM R. Brockhaus									1					1
Scottish Universities Law Institute Ltd /SULI									1	1				2
Sellier – de Gruyter													1	1
Sense Publishers								1	1	2		1		5
Septentrion Press													1	1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Sheffield Phoenix Press			1				1							2
Shutter and Shooter						1								1
Siber Ink			1											1
SIL International													1	1
Siri Scientific Press													1	1
Skira													1	1
Social Science Research in Eastern and Southern Africa (OSSREA)							3							3
Social Security Organisation								1						1
Society of American Archivists			1											1
Society of Biblical Literature								1	1					2
Solidariteit				1										1
South African National Biodiversity Institute										1				1
Southern African Institute of Steel Construction										1				1
Springer	1		1	3	1	3	1	3	7	2		12	16	50
Springer Science and Business Media									1					1
Staging Post													1	1
Stainbank & Associates						1								1
Standard Bank of South Africa							1							1
Stanford University Press					1							3		4
Star Publications							1							1
Steve Biko Foundation						1								1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Strategic Book Publishing and Rights Agency (SBPRA)									1					1
Struik Nature									1					1
Sub-Saharan Africa University Press												1		1
Subterranean Press									1					1
Sutton Publishing Ltd		1												1
Symposium Books								1						1
Tafelberg			1				2	2	2	2			2	11
Tauris Academic Series				1										1
Taylor & Francis												1		1
Temple University Press							1			1				2
Thames & Hudson						1	1							2
The Coleopterists Society								1						1
The Edwin Mellen Press				2			1					1		4
The Policy Press									1					1
South African Institute of Mining and Metallurgy						1								1
Timber Press	1													1
Tormentoso Books								1	1					2
Transcript Verlag							1			1			1	3
Trentham Books			1											1
UCT Press				1		4	1	3	1	1		1	2	14
Uitgeverij Averbode													1	1
Uitgeverij Ten Have		1												1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Uitgeverij Vantilt								1						1
Uitgeverij Verloren										1				1
UJ ARTS CENTRE									1					1
Umuzi						1	1							2
Unisa Press		1			3	5		2		1		2	4	18
United Bible Societies												1		1
United States Institute of Peace Press								1	1					2
Universitaires du Septentrion													1	1
Universitätsverlag Winter					1		1							2
University of Arizona Press									1					1
University of Birmingham			1											1
University of California Press				1				1					1	3
University of Chicago Press			1					1	2	1				5
University of Exeter Press							1							1
University of Illinois Press												1		1
University of KwaZulu-Natal Press			2		3	2		4	2	3		5	5	26
University of Michigan Press													1	1
University of North Carolina Press								1						1
University of Pennsylvania Press							1			1				2
University of Pretoria								1						1
University of Rochester Press								1				1		2
University of Stellenbosch, Institute for Futures Research							1							1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
University of the Free State		1												1
University of Toronto Press				1				1						2
UPA University of Washington Press		1		1										2
V&R Unipress								1					1	2
Van Schaik Publishers	2	1	1	1		1	1	2						9
Vandenhoeck & Ruprecht							1		1	1				3
Vanderbilt University Press													1	1
VDM Publishing			1	2	2	6	1							12
Verlag der Francke-Buchhandlung										1				1
Verlag Dr Kovac													1	1
Verlag Karl Alber								1						1
Verlag Katholisches Bibelwerk GmbH													1	1
Verso												1		1
Virtus Interpress												1		1
Visual Books												1		1
Walburg Pers			1											1
Walter de Gruyter			1											1
Wayne State University Press					1									1
Wes-Kaaplandse Instituut vir Historiese Navorsing, Universiteit van Wes-Kaapland	1													1
Westbow Press						1						1		2
Westminster John Knox Press								1						1

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Wiley	1	1				1	2					2	1	8
Wiley-Blackwell			1	1	1			1						4
Wiley-VCH												2		2
Willan Publishing			1											1
William B. Eerdmans													1	1
Wipf and Stock												2	1	3
WIPHOLD-Brigalia Bam Chair in Electoral Democracy in Africa										1				1
Wissenschaftliche Buchgesellschaft		1												1
Wits University Press		1	2	2	6	3	3	7	5	2		4	5	40
Wolf Legal Publishers						1								1
Wolters Kluwer				2	1				3	1		1		8
Women Living Under Muslim Laws									1					1
Woodhead Publishing													1	1
World Bank												1		1
World Scientific	1	2	2							1				6
Wydawnictwo Akademickie Dialog				1					1					2
Wydawnictwo Naukowe Uniwersytetu												1		1
Wydawnictwo Naukowe Uniwersytetu Szczecińskiego				1										1
Xlibris								1						1
Yale University Press										1			1	2
Zebra Press							2							2
Zed Books									1	1			1	3

Publisher	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Zuid-Afrikahuis - Suid-Afrikaanse Instituut (SAI)							1			1				2
(blank)	1									2	169			172
Grand total	33	22	59	59	81	90	105	147	130	161	170	172	201	1 430

Appendix 4: Books and book chapters by CESM category

CESM field	Unique documents	Share
Agriculture	30	1,3%
Architecture and built environment	20	0,9%
Business, economics and management studies	159	6,9%
Communication, journalism and related studies	35	1,5%
Computer and information sciences	29	1,3%
Education	350	15,2%
Engineering	110	4,8%
Health professions and related clinical sciences	89	3,9%
Languages, linguistics and literature	200	8,7%
Law	176	7,7%
Life sciences	99	4,3%
Mathematics and statistics	16	0,7%
Military sciences	16	0,7%
Philosophy, religion and theology	329	14,3%
Physical sciences	50	2,2%
Psychology	38	1,7%
Public management and services	45	2,0%
Social sciences	447	19,5%
Visual and performing arts	59	2,6%
Total	2 297	

Appendix 5: Conference proceedings by CESM category

CESM	Number of proceedings	Share
Agriculture	20	0,6%
Architecture and built environment	123	3,6%
Business, economics and management studies	418	12,3%
Communication, journalism and related studies	7	0,2%
Computer and information sciences	485	14,3%
Education	259	7,6%
Engineering	1 677	49,5%
Health professions and related clinical sciences	4	0,1%
Languages, linguistics and literature	28	0,8%
Law	14	0,4%
Life sciences	14	0,4%
Mathematics and statistics	41	1,2%
Military sciences	1	0,0%
Philosophy, religion and theology	16	0,5%
Physical sciences	201	5,9%
Psychology	2	0,1%
Public management and services	32	0,9%
Social sciences	16	0,5%
Visual and performing arts	33	1,0%
Total	3 391	

Appendix 6: Resources and tools on predatory publishing

In addition to the prescribed lists (DHET, IBSS, ISI, Norwegian list, Scielo and Scopus), several online resources are available to help researchers find a suitable journal to publish.

A copy of Beall's list of predatory publishers and journals is available at <https://beallslist.weebly.com/>. A European postdoctoral researcher who wishes to remain anonymous maintains the website. By 20 May 2019, an additional 134 possibly predatory standalone journals and 97 publishers were added. Beall's criteria are used for updating the lists.

An anonymous group of scholars and information professionals maintain a copy of Beall's list on <https://predatoryjournals.com/>. The site runs on GitHub, which not only allows for anonymous contributions but also subjects the list to peer review. The list was updated on 7 May 2019 and at the time contained 1 318 journal titles and 1 177 publishers. In addition, data is available on 115 hijacked journals and 55 misleading metrics websites.

Subsequently, several lists have been published, such as the Cabell's blacklist, Kscien's list and the Dolos list. The lists are briefly discussed below.

- (1) **Cabell's blacklist** was launched by Cabell's International in June 2017 and is available on a subscription basis. By the end of April 2019, the blacklist contained the titles of 11 577 journals across all disciplines. The criteria for inclusion on the blacklist was revised and published mid-March 2019⁸. More than 60 "behavioural indicators" are included in the list to assess possible deceptive journals (Hoffecker, 2018). The indicators are grouped, based on relative severity and subject matter in the following categories: integrity, peer review, publication practices, indexing and metrics, and fees.
- (2) The **Kscien** list is published online by the Kscien Organization for Scientific Research, a not-for-profit organisation based in Kurdistan. The organisation focusses on the development and improvement of scientific research in developing countries and the Middle East. The list is maintained by 23 researchers, the Predatory List Committee (PLC), who aims to update the list daily (<http://kscien.org/predatory.php>). Criteria for inclusion on the list are based on the journal's misconduct, fabrication and inadequate peer review. At the end of April 2019, the list contained 1 310 journal titles and 1 170 publishers.
- (3) The **Dolos** list is maintained by Prof Alexandre Georges, a theoretical physicist based in France. According to Prof Georges, the list includes predatory, parasitic or pseudoscientific journals and publishers (<https://www.professeur-alexandre-georges.info/operation>) and is based on Beall's list. However, every entry was reassessed and some journal titles removed. Criteria for inclusion are based on financial transparency, peer review, editorial board, accuracy of data, intellectual property and publication practices. At the end of April 2019, the list contained 1 422 journal titles and 1 286 publishers. The lists are not without contestation, as the list of publishers includes Taylor & Francis and DOAJ.

CREST is aware of two countries that are either maintaining a list of "invalid" journals (Iran) or developing such a list (China). The Journals Blacklist of the Ministry of Health and Medical

⁸ <https://blog.cabells.com/2019/03/20/blacklist-criteria-v1-1/>

Education in Iran is maintained by the Centre for Development and Coordination of Scientific Information and Publications. The last addition to the list was on 9 January 2019 and it contained 2 182 journal titles. During June 2018, David Cyranoski reported in *Nature*⁹ that the Chinese Ministry of Science and Technology (MOST) is in the process of establishing a blacklist of “poor quality” journals. Papers published in these journals will not be taken into consideration for promotion, or job or funding applications. To date, MOST has not released a list.

Researchers can download the journal evaluation tool that was developed by Shilpa Rele, Marie Kenny and Nataly Blas from the William H. Hannon Library at Loyola Marymount University (Rele, Kennedy and Blas, 2017). The rubric and scoring sheet helps the researcher to determine whether a journal is a credible publication source.



 <p>! THINK Are you submitting your research to a trusted journal?</p> <p>Publishing your research results is key to advancing your discipline – and your career – but with so many journals in your field, how can you be sure that you’re choosing a reputable, trustworthy journal?</p> <p>Tips to confirm a journal’s credentials and decide if it will help you reach the right audience with your research, and make an impact on your career.</p> <p>Take control of your career at thinkchecksubmit.org</p>	<p>The Think Check Submit campaign was launched in 2015 by a consortium of 23 publisher and library organisations, including the Committee on Publication Ethics (COPE), DOAJ, BioMed Central and Springer Nature. It provides a range of tools and resources to specifically assist early-career researchers. The campaign aims to assist researchers with identifying suitable journals to publish in (Dobson, 2016). (https://thinkchecksubmit.org/)</p>
 <p>AJOL</p>	<p>African Journals Online (AJOL) is the largest online library of peer-reviewed African-published journals. The International Network for the Availability of Scientific Publications (INASP) initiated the project in May 1998 and launched the online platform in August 2000. Since 2005, a not-for-profit company based in Grahamstown manages AJOL. AJOL hosts 523 journals, including 260 open-access journals, from 32 African countries. Journals are included based on the following criteria:</p> <ul style="list-style-type: none"> • The journal must be scholarly in content, and contain original research (in addition to other content). • The content is peer-reviewed and quality-controlled. • The journal has an established publishing track record. • The journal has an actively functioning editorial board (institutional affiliations and contact details required). • The journal has a registered ISSN and eISSN. • The journal will provide all content for inclusion on AJOL (tables of contents, abstracts, and full text) in electronic format and in a timely manner. Partner journals are responsible for ensuring their content on AJOL is up to date. • The journal guarantees all requisite permissions are granted to allow AJOL to operate an article-download service. • The journal is published within the African continent (i.e. management of publishing strategy, business development and production operations are all run from an African country).


⁹ <https://www.nature.com/articles/d41586-018-05359-8>

Given the number of scientific journals available to publish in, it is often difficult to determine whether a journal is legitimate. Various international agencies and organisations curate lists of reputable journals and publishers.

The Committee on Publication Ethics (COPE), the Open Access Scholarly Publishers Association (OASPA), Directory of Open Access Journals (DOAJ), and the World Association of Medical Editors (WAME) compiled a minimum set of membership criteria. The criteria are based on principles of transparency, and consider the following:

- website;
- name of journal;
- peer-review process;
- ownership and management;
- governing body;
- editorial team/contact information;
- copyright and licensing;
- author fees;
- process for identification of and dealing with allegations of research misconduct;
- publication ethics;
- publishing schedule;
- access;
- archiving;
- revenue sources;
- advertising; and
- direct marketing.

	<p>COPE was established in 1997 and aims to be the central body for the ethics of scholarly publishing. COPE members include mostly editors across all scientific disciplines, but also publishers and related organisations and individuals. COPE provides best practices and policies for journal publications. A member list can be accessed at https://publicationethics.org/members.</p>
	<p>The DOAJ was launched in 2003 by Lund University in Sweden as a tool for researchers (https://doaj.org) and it is the largest open-access database of peer-reviewed journals. According to Lars Bjørnshauge, the then director of libraries at Lund, the purpose of DOAJ is two-fold. Firstly, it is an attempt to establish a list of quality open-access journals. Secondly, it was created to increase access to research. The database contains 11 544 open-access journal titles and the list can be downloaded in csv format (https://doaj.org/csv). Journals can receive the DOAJ seal of approval if they comply with the following conditions:</p> <ul style="list-style-type: none"> • use DOIs as permanent identifiers; • provides DOAJ with article metadata; • deposits content with a long-term digital preservation or archiving programme; • embeds machine-readable CC licensing information in articles;

	<ul style="list-style-type: none"> • allows generous reuse and mixing of content, in accordance with a CC BY, CC BY-SA or CC BY-NC licences; • has a deposit policy registered with a deposit policy registry; and • allows the author to hold the copyright without restrictions.
	<p>On 14 October 2008, OASPA was launched at the Open Access Day celebration in London, UK. The initial founding members were Matt Cockerill (BioMed Central), Caroline Sutton (Co-Action Publishing), Caroline Martin Rasmussen (Copernicus), Paul Peters (Hindawi Limited), Gunther Eysenbach (Journal of Medical Internet Research), David Solomon (Medical Education Online), Mark Patterson (Public Library of Science), David Ross (SAGE), David Prosser (SPARC Europe) and Bas Savenije (Utrecht University Library). Further input was sought from publishers across different disciplines and included Kevin Haggerty (Canadian Journal of Sociology), Lars Bjørnshauge (Director of Lund University Library), Peter Suber (Senior Researcher, SPARC), Jan Velterop (currently CEO of Knewco), and Heather Joseph (Executive Director of SPARC). OASPA represents open-access publishers globally in all academic disciplines. Publisher applications to OASPA increases by 30% to 50% annually. There are various similarities in the indexing criteria to the DOAJ. Therefore, an agreement stated that from 7 August 2018 onwards all single-journal publishers that applied to OASPA would be referred to the DOAJ if the journal is not already listed by DOAJ. A searchable list of members that have been reviewed and follow the OASPA code of conduct is available at https://oaspa.org/membership/members/.</p>
	<p>WAME is a non-profit voluntary association of editors of peer-reviewed medical journals from countries throughout the world who seek to foster international cooperation among and education of medical journal editors. It was launched on 16 March 1995 in Italy by members of the International Committee of Medical Journal Editors (ICMJE). Membership is free and all executive editors of peer-reviewed medical journals can join the association. WAME has the following goals:</p> <ul style="list-style-type: none"> • to facilitate worldwide cooperation and communication among editors of peer-reviewed medical journals; • to improve editorial standards and promote professionalism in medical editing through education, self-criticism and self-regulation; and • to encourage research on the principles and practice of medical editing.