# REPORT ON THE EVALUATION OF THE 2019 UNIVERSITIES' RESEARCH OUTPUT

MARCH 2021

***Evaluated in terms of the Research Outputs Policy, 2015***

higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

Department of Higher Education and Training

123 Francis Baard Street

Pretoria

0001

Private Bag X174

Pretoria

0001

Tel (012) 312 5911

Fax (012) 323 5618

Website: http://www.dhet.gov.za

Published by the Department of Higher Education and Training

Copyright © Department of Higher Education and Training, 2021

Enquiries:

Director: Policy and Development Support

Telephone: 012 312 5446

## FOREWORD BY THE DIRECTOR-GENERAL

It gives me great pleasure to present to the higher education sector the 2020 Research Outputs Report (2019 publications). It is even more satisfying for me to be sharing this with you taking into consideration that 2020 was off to an interesting start, to say the least. The spread of the novel coronavirus (COVID-19) was a disruption that no business or individual could have predicted and created a new and challenging reality for all of us. Fortunately, the Department has been gradually working on a shift into the use of digital tools to foster and enhance submissions and the evaluation of the Universities' research outputs. The effect of the pandemic has, in a way, forced us to fast-track the thinking about the online submission and evaluation including how we can embrace the future direction of this work in the digital era.

Together with our institutions and the National Research Foundation (NRF), discussions were held to ensure a collective response to the inevitable changes of how the research outputs are submitted and evaluated as forced by the extended lockdown conditions and restrictions of COVID-19. It became business unusual from the Department as we changed from the physical submission process to online submissions. For the first time, the evaluations were largely conducted online and remotely with considerable success. This has afforded us an opportunity to test and prepare ourselves for the use of technology and online platforms.

Since the implementation of the Research Outputs policy, the South African higher education sector has witnessed an increase in the number of research publications produced by universities and across all publication types. The total number of publications has increased from 7 230 units in 2005 to 21 019 units in 2019, which translates into a compound average annual growth rate (CAGR) of 7.92%. It is also noteworthy that for the first time since the establishment of our new universities, this report covers all 26 universities.

In previous reports, the Department has expressed concern about the quality and integrity of Research Outputs, in line with the purpose of the Research Outputs Policy which is to "encourage research productivity by rewarding quality research outputs at public higher education institutions". We reiterate our commitment to ensuring that an appropriate framework and procedures are in place to assure the quality and integrity of publications that receive subsidy. To this end, the Department is embarking on a Collaborative Project towards the development of a national Research Quality Evaluation Framework

to focus on the quality of the research outputs produced by our universities. The project is still in its infancy, and the Department will communicate with the sector on this initiative and any changes that may be required in future.

Once again, I appreciate the collective effort by all parties involved during this tough time: the NRF for providing the online platform; the institutional Research Offices for working with the Department; the Centre for Research on Evaluation, Science and Technology (CREST); the Research Outputs Advisory Panel; expert academics who serve on the field-specific panels; and the universities for continuing to support the Department in implementing the Research Outputs policy.

This work would not be possible without your support.

Mr GF Qonde

Director General: Department of Higher Education and Training

**Table of Contents**

**List of figures**

**List of tables**

**ACRONYMS**

| | |
|---|---|
| CAGR | Compound Average Growth Rate |
| CESM | Classification of Educational Subject Matter |
| CPUT | Cape Peninsula University of Technology |
| CUT | Central University of Technology |
| DHET/ the Department | Department of Higher Education and Training |
| DOAJ | Directory of Open Access Journal |
| DUT | Durban University of Technology |
| HEMIS | Higher Education Management Information System |
| IBSS | International Bibliography of Social Science |
| ISBN | International Standard Book Number |
| ISI | Institute of Science Information |
| MUT | Mangosuthu University of Technology |
| NMU | Nelson Mandela University |
| NRF | National Research Foundation |
| NWU | North West University |
| ROSS | Research Outputs Submission System |
| RU | Rhodes University |
| SciELO SA | Scientific Electronic Library Online South Africa |
| SMU | Sefako Makgatho Health Sciences University |
| SPU | Sol Plaatje University |
| 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 |

| | |
|---|---|
| UKZN | University of KwaZulu-Natal |
| UL | University of Limpopo |
| UNISA | University of South Africa |
| UNIVEN | University of Venda |
| UNIZULU | University of Zululand |
| UP | University of Pretoria |
| UWC | University of the Western Cape |
| VUT | Vaal University of Technology |
| WITS | University of the Witwatersrand |
| WoS | Web of Science |
| WSU | Walter Sisulu University |

List of CESM Categories

| CESM |
| --- |
| 01: Agriculture, Agricultural Operations and Related Sciences |
| 02: Architecture and the Built Environment |
| 03: Visual and Performing Arts |
| 04: Business, Economics and Management Studies |
| 05: Communication, Journalism and Related Studies |
| 06: Computer and Information Sciences |
| 07: Education |
| 08: Engineering |
| 09: Health Professions and Related Clinical Sciences |
| 10: Family Ecology and Consumer Sciences |
| 11: Languages, Linguistics and Literature |
| 12: Law |
| 13: Life Sciences |
| 14: Physical Sciences |
| 15: Mathematics and Statistics |
| 16: Military Sciences |
| 17: Philosophy, Religion and Theology |
| 18: Psychology |
| 19: Public Management and Services |
| 20: Social Sciences |

# 1. INTRODUCTION: PROCESS AND PROCEDURE

## 1.1 The process

The Department of Higher Education and Training (the Department) implements the *Research Output Policy (2015*), which provides a framework for the evaluation and subsidy allocation for research outputs produced by South African public higher education institutions (universities). The subsidisation of research outputs forms a basis for sustaining research and promoting increased research productivity and other forms of knowledge generation required to meet national development needs. The Policy recognises three types of publications: journal articles, book publications and published conference proceedings.

The Policy accords all South African universities the responsibility to be co-participants in its implementation. In order to reduce errors, institutions are required to ensure that all research office personnel are well acquainted with the policy; that an institutional panel assesses all publications before submitting to the Department as per paragraph 8.2 (d) of the Research Outputs Policy; and that all are familiar with the general requirements, principles, objectives and ethics upon which the policy is set. Only claims which meet the policy requirements must be submitted to the Department.

All public higher education institutions annually submit to the Department their subsidy funding claims for research outputs in the form of publications on or before the deadline of 15 May of each reporting year. Due to the COVID-19 lockdown, the Department extended the deadline for the submissions of the 2019 research outputs to 30 June 2020.

All 26 universities submitted their 2019 research publication outputs for the purposes of subsidy claims. The Directorate: University Research Support and Policy Development administered the process and evaluated technical compliance of all submissions.

The Department assessed the extended lockdown conditions and considered the challenges and risks brought about by the unprecedented pandemic, in relation to the 2019 Research Outputs evaluations. Together with the National Research Foundation (NRF), which hosts the Research Outputs Submission System (ROSS), the Department explored different scenarios in an effort to find a better process of ensuring a successful evaluation of the research outputs submissions. As a result, the evaluations were largely conducted online and remotely and the sub-panels only convened for the physical copies which were not available electronically.

To ensure quality, integrity and transparency and to improve the evaluation process, research outputs (books and conference proceedings) are evaluated by field-specific peer review sub-panels using pre-determined evaluation criteria in line with the Research Output Policy. The sub-panellists, who are drawn from the university sector, are expert-practitioners in their respective fields.

The sub-panels conducted evaluations of book publications and conference proceedings under the guidance of the Research Output Evaluation Panel (the Panel), whose members chair the respective sub-panels. The Panel is mainly composed of Deputy Vice-Chancellors responsible for research at their respective institutions.

The Policy requires institutions to submit audited subsidy claims for research outputs appearing in approved journal indexes and lists. The Department recognises the following lists: Scopus; Scientific Electronic Library Online South Africa (SciELO SA); the Norwegian Register for Scientific Journals; Clarivate (formerly Thomson Reuters) Web of Science; the ProQuest International Bibliography of the Social Sciences (IBSS) and the Department of Higher Education and Training (DHET) list of SA journals.

The Department, together with the National Research Foundation (NRF), have developed the Research Outputs Submission System (ROSS) which is an electronic platform for capturing the research publications submitted by the universities. The development of the ROSS aims to: (i) improve the efficiency of the research outputs submissions process, from the capturing of information by institutions to the evaluation of the submissions by the Department; (ii) improve the efficiency of the research outputs evaluation process by the evaluation sub-panels; (iii) improve the process and cost effectiveness of the evaluation of research outputs; (iv) facilitate efficient analysis of the research productivity of the public higher education system; and (v) assist with information gathering on research outputs and research information management system for the purpose of improving the quality of research information analysis and management system.

The process followed in the evaluation of the 2019 research outputs, can be summarised as follows:

a) The Department received all institutional submissions in the form of Books, Conferences and Journals in June 2020 and electronic copies of publications in August 2020.
b) The Department screened all the submissions for eligibility and according to the technical criteria as per the policy.
c) Expert or discipline-based evaluation sub-panels were convened and evaluated the research outputs according to predetermined criteria and scholarship of the publications on 14-28 September 2020 and physical evaluations on 5-6 October 2020.

d) The Department, supported by the NRF, analysed the outcomes of the sub-panels and calculated the number of units allocated to each institution for publications in books and conference proceedings.

e) Audited claims for publications in accredited journals submitted by universities were checked and verified against the approved journal indexes and lists and final unit allocations for each institution were calculated.

f) Individual institutional reports were developed by the Department but had not yet been sent to the respective institutions at the time of completion of this report.

g) This report on the evaluation of 2019 Universities' research outputs was drafted by the Department, with the assistance of the Centre for Research, Evaluation, Science and Technology (CREST) on statistical analysis and quality, and will also be reviewed for endorsement by the Research Output Evaluation Panel.

Late publications for the year 2018 (n-2) were considered where valid and legitimate reasons for late submission were provided and accepted, but publications dating before 2017 (n-3 and beyond) were not considered, as stipulated in the policy. For the sake of pattern analysis and improving its systems, the Department will in future request a separate submission of n-3 publications and articles appearing in non-approved publications. However, they will still not be considered for subsidy.

## 1.2 Methodological notes

A number of methodological clarifications are in order with regard to-

- The distinction between publication output units and publication outputs
- The framework for the classification of scientific fields/disciplines used in the report
- The definition and meaning of normalized indicators used in the report
- The analysis of demographic trends in publication output

### 1.2.1 Publication output units and publication outputs

This report makes a distinction between publication output **units** and publication **outputs.** The former refers to the subsidy units awarded for each approved publication (according to the criteria set out in the Policy) based on the submissions made in a particular year. This means that a university is awarded a total subsidy based on the calculation of all submissions made in, say, 2020 for the preceding year (2019). However because the policy allows for late submissions accompanied by valid reasons (i.e. 2019 – 1 year or year *n* minus 1), the result is that the total subsidy units awarded in 2020 for 2019 publications will invariably include a small proportion of publications that had been published in 2018. In this report, the total number of subsidy units (or output units) that have been awarded to universities

based on the submissions made in 2020 are reported at the beginning of each section. When the results are reported by scientific field, journal index or demographics, the analyses are based on the actual publication year of each output instead of the submission year of publication output.

### 1.2.2 Classification of outputs by scientific field or discipline

This report provides analysis of subsidy-earning research outputs in accredited journals; approved book publications and approved conference proceedings published in 2019. The analysis also makes use of the Classification of Education Subject Matter (CESM) categories, among others. Since the CESM categories were designed for the purposes of subsidy allocations (which are input factor), they are not entirely suitable for the classification of outputs measures in the system, such as research publication outputs. For future submissions and analyses of the publications outputs, the Department will replace the CESM classification with a more suitable classification framework of scientic fields. In this report the CESM framework is still used, but with some revisions as explained in the text.

### 1.2.3 The definition and meaning of normalized indicators used in the report

Four indicators are included in the report:

- Per capita research publication output (where the total number of publications by a university is divided by the headcount of the permanent instructional and research staff in the same year). The result is the number of publications per permanently employed academics per annum.
- Weighted per capita research output (where all research output - including research masters and doctoral graduates - is calculated against set norms and divided by the headcount of academic staff in the same year). Each research masters graduate has a weight of 1 unit, while a doctoral graduate has a weight of 3 units.
- Proportion of academic staff by their highest degrees or qualifications against the research outputs.
- Proportion of doctoral graduates per academic staff with doctorates.

### 1.2.4 The analysis of demographic trends in publication output

This report includes a number of analyses related to demographic shifts in the publication outputs of universities. Four demographic variables used in these analyses are:

- Gender of the author
- Nationality of the author (SA-nationals and foreign nationals)
- Race of the author (only for SA nationals)
- Age of the author

The analyses of the above categories are based on data sourced from the most recent submissions. It is important to point out that coverage of these variables in the current version of the database varies (for example, 'gender of author' is much better covered than the 'nationality of the author'). However in all cases information about these variables is available for more than 80% of the individual records on which the final analyses were conducted.

The purpose of analysing the demographic patterns assists the Department to monitor the trends in transformation of knowledge production in the university sector, particularly the development of young academics into research which distinguishes universities, among other higher education institutions. Such knowledge assists the Department to design the necessary interventions as, for example, in the University Capacity Development Plan. The understanding of shifts in the above-stated demographics over time is imperative if the Department and the individual institutions are to make a contribution to redress and transformation of our country.

### 1.3 Quality and Integrity of Research Outputs

The Department remains committed to ensure that an appropriate framework is in place to assure the quality and integrity of publications. There are currently initiatives underway in this regard in order to strengthen existing frameworks and procedures. The Department will continue to communicate with the sector on these initiatives and any changes that may be required in the future to ensure that the subsidy system is not abused in any way that goes against its stated mission to support only publications of high quality and ethical integrity. As stated before, the Department reserves the right to withhold payment of research output subsidy in respect of any publication unit that does not meet the criteria as outlined in the research output policy, violates international rules about research integrity and ethics, or does not uphold acceptable academic practices of good scholarship.

The purpose of the Research Outputs Policy, is to "encourage research productivity by rewarding quality research outputs at public higher education institutions". The emphasis must be put on 'quality' research and publications. In the pursuit of only quality research publications receiving subsidy, each year the Department has scrutinized the quality of submissions made by institutions. Such scrutiny has assisted in improving the polic,; processes and procedures for submission and determination of subsidy allocations. In certain instances, engagements have been held directly with affected institutions where discrepancies have been observed in their submissions, in order for them to improve their processes.

The Department is compiling a separate report on the publication units that were withheld in the 2018 submissions, pending an investigation. Based on some of the analysis already completed on the 2018 submissions and combined with the 2019 submissions, some submissions particularly pertaining to

published conference proceedings were declined, and do not form part of the analysis in this report. Regrettably, similar unethical practices are being uncovered in other types of publications, book publications and journals. The analysis report on these unethical practices will be shared with the sector with a view to put a stop to it and to strengthen the quality initiatives mentioned above.

# 2. OVERALL RESEARCH PUBLICATIONS OUTPUT

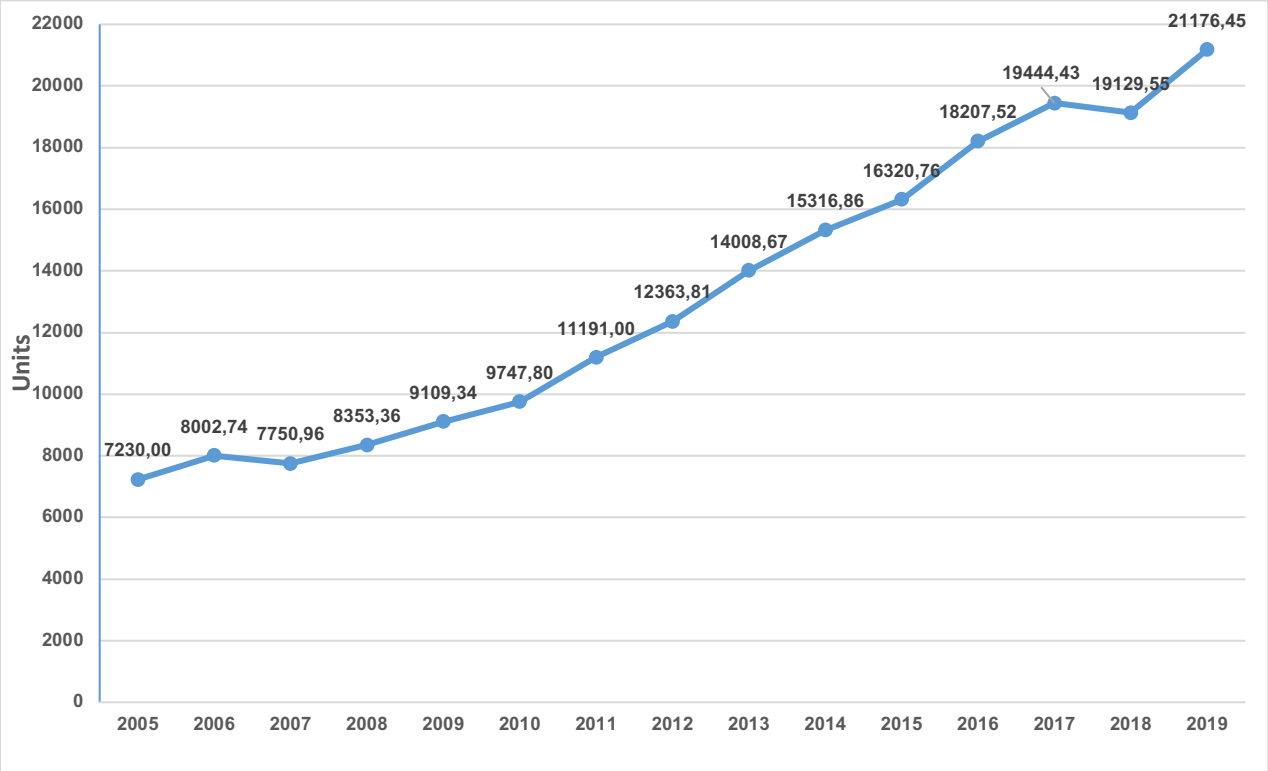
## 2.1. Overview and trends

A total of 21 176.45 publication subsidy units in all publication categories (journal articles, books and book chapters and published conference proceedings) were awarded to universities for the 2020 submission year (2019 publication year). This constitutes a 10% increase from the 2018 publication units, from 19 129.55 to 21 176.45 units. **Figure 1** presents the timeline of the approved publications units generated by the university sector for the past 15 years.

Despite two marked declines during the period 2005 to 2019, from 2006 to 2007 and, then, again from 2017 to 2018, the overall trajectory of the graph is of sustained and consistent growth of research publications outputs from the sector. Between 2005 and 2010, the inclination of the graph is relatively gradual. This was the first five years of the implementation of the Research Outputs Policy. The gradual increase of outputs during this five-year period could be attributed to the fact that the sector was adjusting to the newly revised policy. Moreover, the sector had recently emerged from institutional mergers which had been completed in 2005. The decline in output in 2007 could also be attributed to the above-mentioned factors.

The inclination of the graph gets steeper from 2010 to 2015, perhaps signalling the fact that the sector had settled in many respects, and that the effects of the policy were beginning to take effect. An even higher rate of growth occurred between 2016 and 2019. The observed decrease between 2017 and 2018 requires further analysis and explanation. The sustained growth during the last four-year period is most probably related to the fact that additional journal indexes (most notably Scopus) were included in the list of approved journals with effect from 2017. At the same time, the weighting of book publication units was increased through the 2016 policy revision.

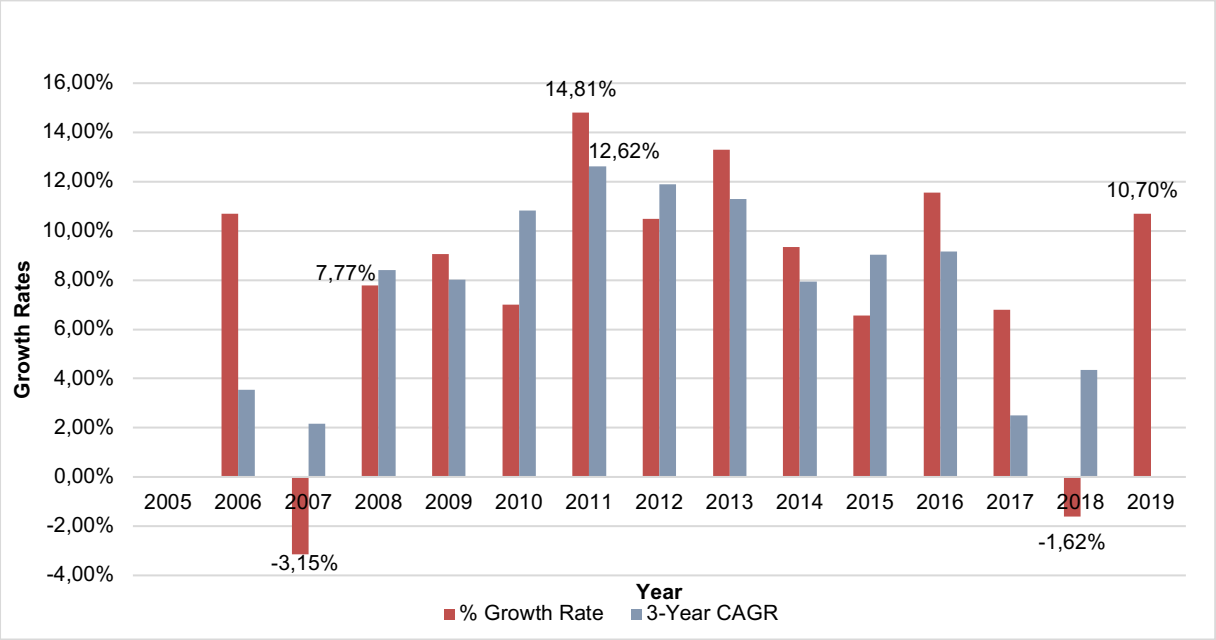
***Figure 1: Total Publication Units awarded, 2005 - 2019***




The overall percentage growth rate of research publications outputs from 2005 to 2019 was 8.06%. The sharpest rise yet (of 9.08%) occurred between 2018 and 2019 (see **Figure 2**).

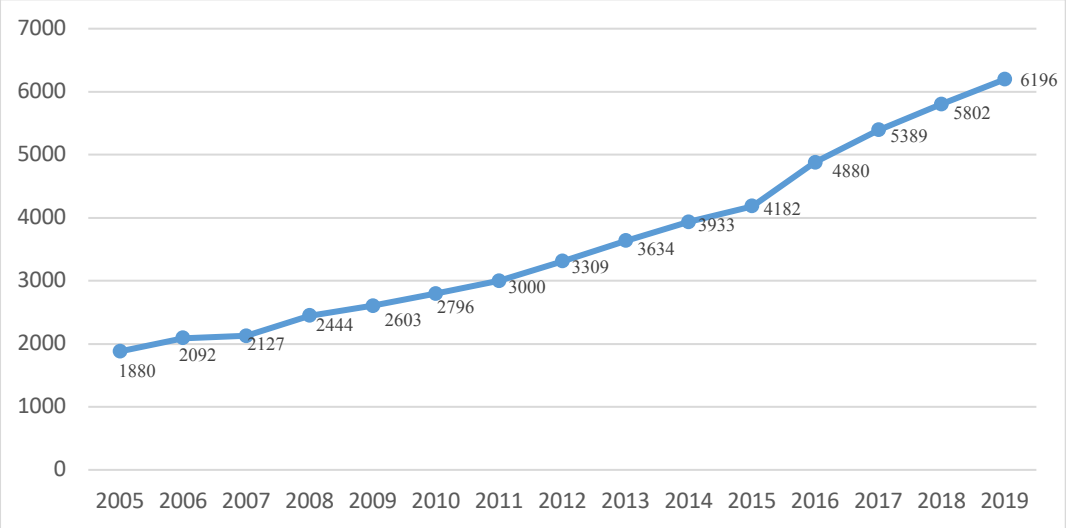
**Figure 2** shows the Annual Growth Rate and the Compound Average Growth Rate (CAGR). The Annual Growth Rate is the year-to-year calculation of growth. The graph shows that growth in publication outputs, in the past 14 years, peaked at 14.81% in 2011. Further disaggregation of the CAGR into three year time frames (Figure 2) helps to understand the differences in trends in publication output over the past 15 years. For instance, the CAGR bar of 2006 represents compounded growth between 2005 to 2007, and so on. The rate of growth in publication output rose and reached a peak of 12.62% between 2010 and 2012. Since then the rate of increase has gradually decreased.

*Figure 2: Percentage Growth Rate and 3-year Cycles of CAGR, 2005 - 2019*




As mentioned above, the addition of more journal lists in the 2016 revision of the policy provided university academics with more publication outlets for journal articles. This is clearly evident from **Figure 3** which shows the increase in the number of unique journals in which SA academics have published their papers over the past 14 years and especially since the revised policy in 2016.

*Figure 3: Increase in the number of journals in which SA academics published (2005 - 2019)*



## 2.2. Publication output by publication type

The Research Outputs policy recognises three publication types for subsidy: book publications, published conference proceedings and journal articles. The output units awarded in 2019 by each type and by university are listed in **Table 1** (in descending order of overall units in 2019).

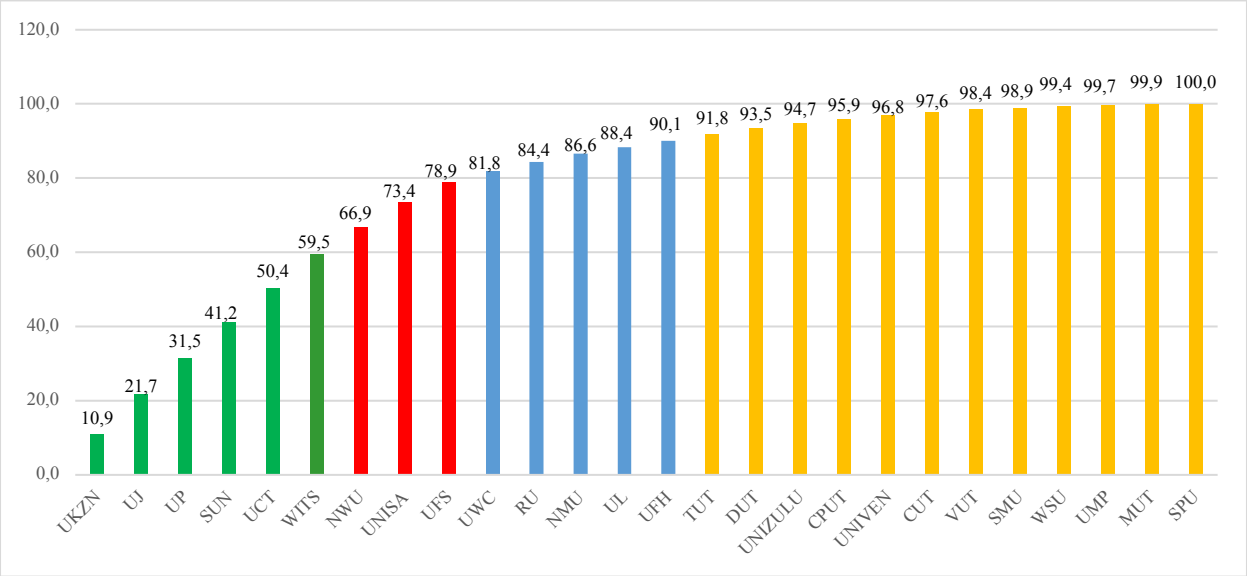
***Table 1: Publication output units by publication type by university, 2019***

| Institution | Book Units | | Conference Proceedings Units | | Journal Units | | Overall units in 2019 | Share of total sector units |
|---|---|---|---|---|---|---|---|---|
| | Actual Units | % of total institutional units | Actual Units | % of total institutional units | Actual Units | % of total institutional units | | |
| UKZN | 156.8 | 6.14% | 61.9 | 4.87% | 2067.3 | 12.02% | 2286.1 | 10.88% |
| UJ | 359.0 | 14.05% | 294.8 | 23.20% | 1622.6 | 9.44% | 2276.3 | 10.83% |
| UP | 296.0 | 11.58% | 82.2 | 6.47% | 1682.4 | 9.78% | 2060.6 | 9.80% |
| SU | 327.7 | 12.83% | 110.2 | 8.67% | 1595.8 | 9.28% | 2033.7 | 9.68% |
| UCT | 220.0 | 8.61% | 79.9 | 6.29% | 1636.2 | 9.52% | 1936.0 | 9.21% |
| WITS | 272.4 | 10.66% | 68.5 | 5.39% | 1577.8 | 9.18% | 1918.8 | 9.13% |
| NWU | 189.2 | 7.41% | 118.8 | 9.34% | 1233.2 | 7.17% | 1541.2 | 7.33% |
| UNISA | 125.6 | 4.92% | 73.1 | 5.75% | 1167.9 | 6.79% | 1366.6 | 6.50% |
| UFS | 305.9 | 11.97% | 52.3 | 4.12% | 813.5 | 4.73% | 1171.7 | 5.57% |
| UWC | 68.0 | 2.66% | 12.3 | 0.97% | 513.8 | 2.99% | 594.2 | 2.83% |
| RU | 65.8 | 2.58% | 21.7 | 1.71% | 460.5 | 2.68% | 548.1 | 2.61% |
| NMU | 21.0 | 0.82% | 49.6 | 3.90% | 389.0 | 2.26% | 459.6 | 2.19% |
| UL | 13.1 | 0.51% | 25.9 | 2.04% | 348.7 | 2.03% | 387.7 | 1.84% |
| UFH | 7.6 | 0.30% | 1.5 | 0.12% | 353.1 | 2.05% | 362.2 | 1.72% |
| TUT | 8.2 | 0.32% | 58.4 | 4.59% | 294.8 | 1.71% | 361.3 | 1.72% |
| DUT | 33.7 | 1.32% | 19.5 | 1.53% | 300.1 | 1.75% | 353.3 | 1.68% |
| UNIZULU | 19.1 | 0.75% | 17.2 | 1.36% | 219.7 | 1.28% | 256.0 | 1.22% |
| CPUT | 32.0 | 1.25% | 32.6 | 2.57% | 178.1 | 1.04% | 242.7 | 1.15% |
| UNIVEN | 6.7 | 0.26% | 1.4 | 0.11% | 189.5 | 1.10% | 197.6 | 0.94% |
| CUT | 9.5 | 0.37% | 49.1 | 3.87% | 112.4 | 0.65% | 171.0 | 0.81% |
| VUT | 4.7 | 0.19% | 29.9 | 2.35% | 127.3 | 0.74% | 161.9 | 0.77% |
| SMU | 1.2 | 0.05% | 0.0 | 0.00% | 105.5 | 0.61% | 106.7 | 0.51% |
| WSU | 4.5 | 0.18% | 4.0 | 0.32% | 86.7 | 0.50% | 95.2 | 0.45% |
| UMP | 1.7 | 0.07% | 3.1 | 0.24% | 65.9 | 0.38% | 70.8 | 0.34% |
| MUT | 0.5 | 0.02% | 0.4 | 0.03% | 45.3 | 0.26% | 46.2 | 0.22% |
| SPU | 4.6 | 0.18% | 2.4 | 0.19% | 7.2 | 0.04% | 14.2 | 0.07% |
| **Total** | **2554.7** | **100.00%** | **1270.8** | **100.00%** | **17194.2** | **100.00%** | **21019.7** | **100.00%** |

**Figure 4** shows the cumulative relative share to sector output by individual universities. Almost 60% (59.53%) of the research publications output units accrued to the first six universities. The first 10 institutions produced nearly 82% of all outputs in 2019. A further four universities adds10% to the total output making it 90%. The remainder of the universities (12 in total) contributed 10% to total sector output. This picture shows how the university sector remains very differentiated and reaffirms

the challenge for smaller universities and the historically disadvantaged universities and universities of technology to contribute more to knowledge production in the sector.

***Figure 4: Relative cumulative share to sector output by individual universities***



# 3. JOURNAL PUBLICATION OUTPUT

## 3.1 Overview of journal publications

Journal articles remain the predominant mode of knowledge dissemination across the majority of scientific fields and disciplines. **Figure 5** shows the long-term trend of units awarded for journal outputs. The CAGR-values over this period are presented in **Table 2**.

***Figure 5: Trend in journal article output units, 2005 – 2019***

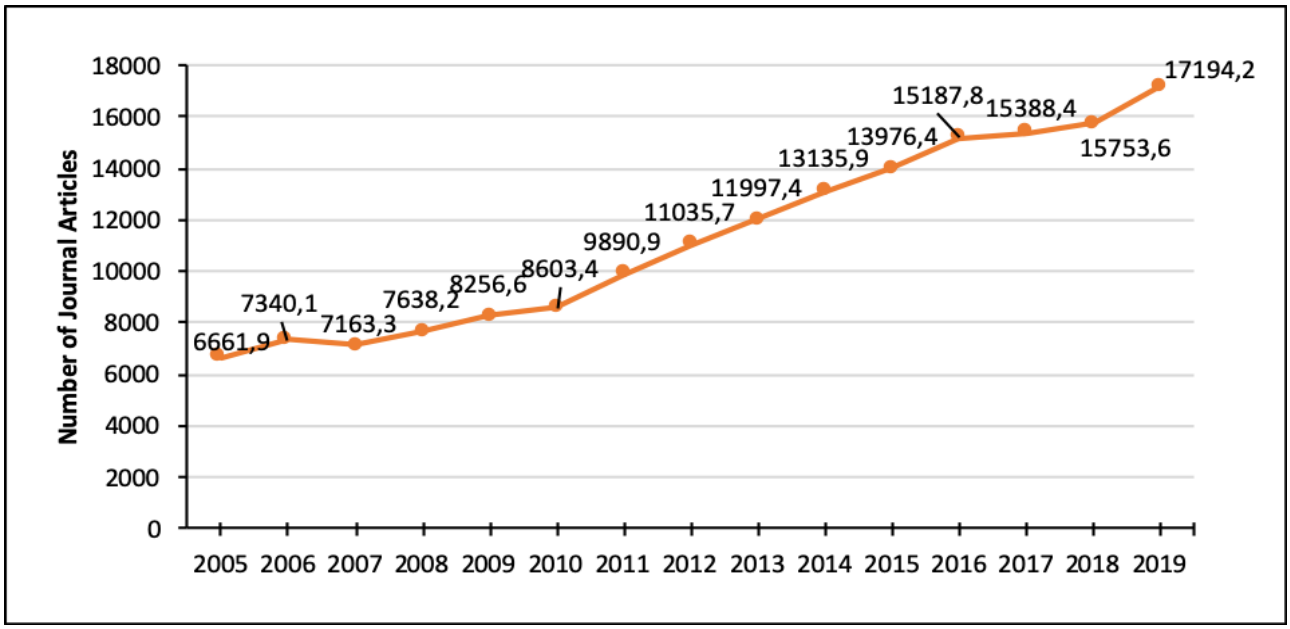


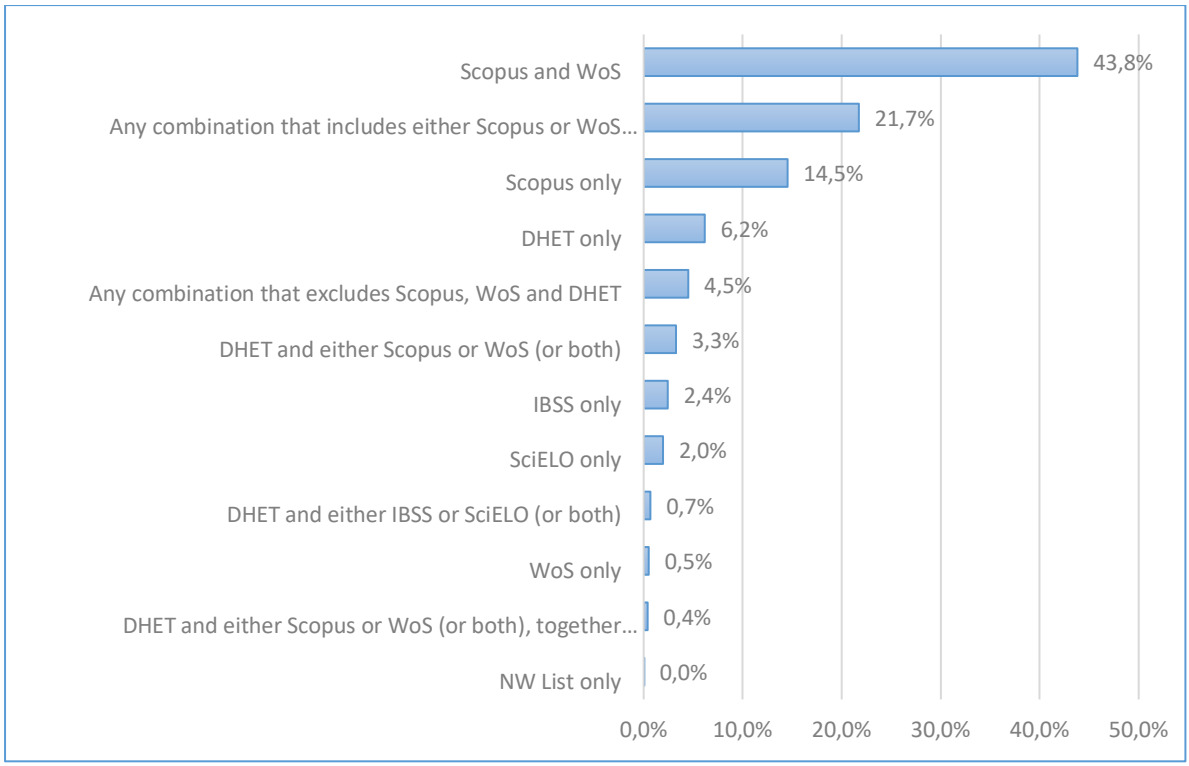

***Table 2: CAGR by rolling three-year windows for journal articles, 2007–2019***

| | **Journal Articles Output** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Three-year Periods | | | | | | | | | | |
| | 2007-2009 | 2008-2010 | 2009-2011 | 2010-2012 | 2011-2013 | 2012-2014 | 2013-2015 | 2014-2016 | 2015-2017 | 2016-2018 | 2017-2019 |
| CAGR | 7,36% | 6,13% | 9,45% | 13,26% | 10,14% | 9,10% | 7,93% | 7,53% | 4,93% | 1,85% | 5,71% |

Over the years the only time that there was a real decline in output was from 2006 to 2007. That was the second year of data collection or submissions by universities under the new policy (revised in 2003 and coming into effect in 2005). Otherwise, the overall positive growth has been constant at a 7% compound average growth rate.

**Figure 6** presents the breakdown of journal output by journal index or list. All journal articles are linked to a specific journal that is indexed or included in one or more of the DHET approved journal lists. The results show the dominance of two indexes: Scopus and the Web of Science. When combining the percentages of articles published in the Web of Science and Scopus indexes (journals that appear in both or in one of them only), 84% of all submitted articles appear in these indexes. Conversely, approximately 10% of all articles only appear in a South African journal, that is, DHET only (6,2%) or DHET in combination with any other list (3,3%). The percentage of articles that appear only in IBSS-listed journals constitutes 2,4%.

***Figure 6: Journal Publication Outputs by Index, 2019 (n = 25 544 articles)***



### 3.2. Journal publication outputs by scientific field

In this report, and henceforth, the classification of output units by CESM categories has been revised to create groupings of scientific fields that are more comparable in terms of overall volume of output (**Table 3)**. The last three years have been selected for purpose of comparison.

***Table 3: Output Units by Scientific Fields, 2017 to 2019***

| Discipline | CESM Codes | 2017 | | 2018 | | 2019 | |
|---|---|---|---|---|---|---|---|
| | | No. of Units | % of Total | No. of Units | % of Total | No. of Units | % of Total |
| Social Sciences & Humanities | 3,5,7,10,11,12,17,18,19,20 | 4670.7 | 30% | 4657.6 | 29.6% | 4986.5 | 29% |
| Health Professions & Related Clinical Sciences | 09 | 2834.8 | 18% | 3008.9 | 19.1% | 3366.4 | 20% |
| Economic & Management Sciences | 04 | 1613.1 | 10% | 1471.3 | 9.3% | 1498.4 | 9% |
| Life Sciences | 13 | 1557.4 | 10% | 1797.6 | 11.4% | 1840.4 | 11% |
| Physical Sciences | 14 | 1494.6 | 10% | 1542.5 | 9.8% | 1744.8 | 10% |
| Engineering & the Built Environment | 02,08 | 1216.9 | 8% | 1390.6 | 8.8% | 1739.6 | 10% |
| Agriculture | 01 | 1195.5 | 8% | 927.3 | 5.9% | 1029.3 | 6% |
| Mathematics, Statistics & ICT | 06, 15 | 756.7 | 5% | 905.6 | 5.7% | 937.7 | 5% |
| Military Sciences | 16 | 48.8 | 0.3% | 54.6 | 0.3% | 51.1 | 0% |
| **TOTAL** | | **15 388.42** | **100%** | **15 756.1** | **100%** | **17 194.2242** | **100%** |

The analysis reveals no shifts or very small shifts over the past three years in terms of the proportional shares by scientific field. This is not surprising as universities are organized – through their departmental and faculty structures - around scientific fields and disciplines that do not change substantially in the short term.

### 3.3. Journal articles by journal index and scientific field

**Table 4** shows the distribution of journal publication output units in six main scientific fields. The results show how articles in these six fields map to the journal list combinations discussed above. We have highlighted those cells where 5% or more of the publication in a scientific field were published in the relevant combination of journal lists. Not surprisingly the majority of articles in the STEM fields (Agriculture, engineering, health sciences and natural sciences) appear in either the Web of Science or Scopus or both. Conversely, articles in the social sciences and humanities are more likely to be

published in the DHET list (local South African journals) or IBSS (which is a list that caters predominantly for the social sciences). Having said that, it is also noteworthy that substantial proportions of journal articles in the Humanities (more than 45%) and the Social sciences (more than 60%) are now published in journals listed in either the Web of Science of Scopus.

***Table 4: Journal Publication Outputs Units by Index combinations (2019)***

| Scientific fields | Agricultural sciences | | Engineering & applied technologies | | Health sciences | | Humanities | | Natural sciences | | Social sciences | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Combinations of journal lists** | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **n** | **n** | **%** | **n** | **%** |
| Scopus and WoS | 1023 | 61,8% | 1029 | 42,8% | 3049 | 53,8% | 242 | 9,5% | 5033 | 69,3% | 1090 | 17,3% |
| Any combination that includes either Scopus or WoS but not DHET | 307 | 18,5% | 435 | 18,1% | 1335 | 23,6% | 695 | 27,3% | 1245 | 17,2% | 1629 | 25,9% |
| Scopus only | 190 | 11,5% | 706 | 29,4% | 627 | 11,1% | 227 | 8,9% | 698 | 9,6% | 1136 | 18,1% |
| DHET only | 17 | 1,0% | 59 | 2,5% | 148 | 2,6% | 452 | 17,8% | 95 | 1,3% | 819 | 13,0% |
| DHET and either Scopus or WoS (or both) | 36 | 2,2% | 47 | 2,0% | 204 | 3,6% | 156 | 6,1% | 105 | 1,4% | 308 | 4,9% |
| IBSS only | 8 | 0,5% | 1 | 0,0% | 13 | 0,2% | 104 | 4,1% | 3 | 0,0% | 474 | 7,5% |
| WoS only | 5 | 0,3% | 4 | 0,2% | 35 | 0,6% | 8 | 0,3% | 46 | 0,6% | 32 | 0,5% |
| DHET and either Scopus or WoS (or both), together with any other | 1 | 0,1% | 12 | 0,5% | 3 | 0,1% | 7 | 0,3% | 10 | 0,1% | 68 | 1,1% |
| DHET and either IBSS or SciELO (or both) | 1 | 0,1% | 13 | 0,5% | 3 | 0,1% | 71 | 2,8% | 12 | 0,2% | 73 | 1,2% |
| SciELO only | 30 | 1,8% | 85 | 3,5% | 118 | 2,1% | 223 | 8,8% | 4 | 0,1% | 85 | 1,4% |
| NW only | 0 | 0,0% | 0 | 0,0% | 0 | 0,0% | 2 | 0,1% | 0 | 0,0% | 0 | 0,0% |
| Any combination that excludes Scopus, WoS and DHET | 38 | 2,3% | 12 | 0,5% | 131 | 2,3% | 357 | 14,0% | 8 | 0,1% | 570 | 9,1% |
| **Total** | **1656** | **100%** | **2403** | **100%** | **5666** | **100%** | **2544** | **100%** | **7259** | **100%** | **6284** | **100%** |

# 4. BOOK AND BOOK CHAPTER OUTPUTS

## 4.1 Overview and trends

Research publication units in scholarly books for 2019 amounted to 2554.67 units, an increase of 484 units from 2069.9 units in 2018. This is a 23% increase over the last year. The longer term trend in book and book chapter production, presented in **Figure 7**, shows that after the first year of the change in policy (maximum 10 units per book), where the increase in book publication units doubled, there was a decrease in year on year units awarded in 2017 and 2018. The overall CAGR for books and book chapters between 2005 and 2019, however, remains high at 19%.

***Figure 7: Trend in book and book chapter output: 2005 - 2019***

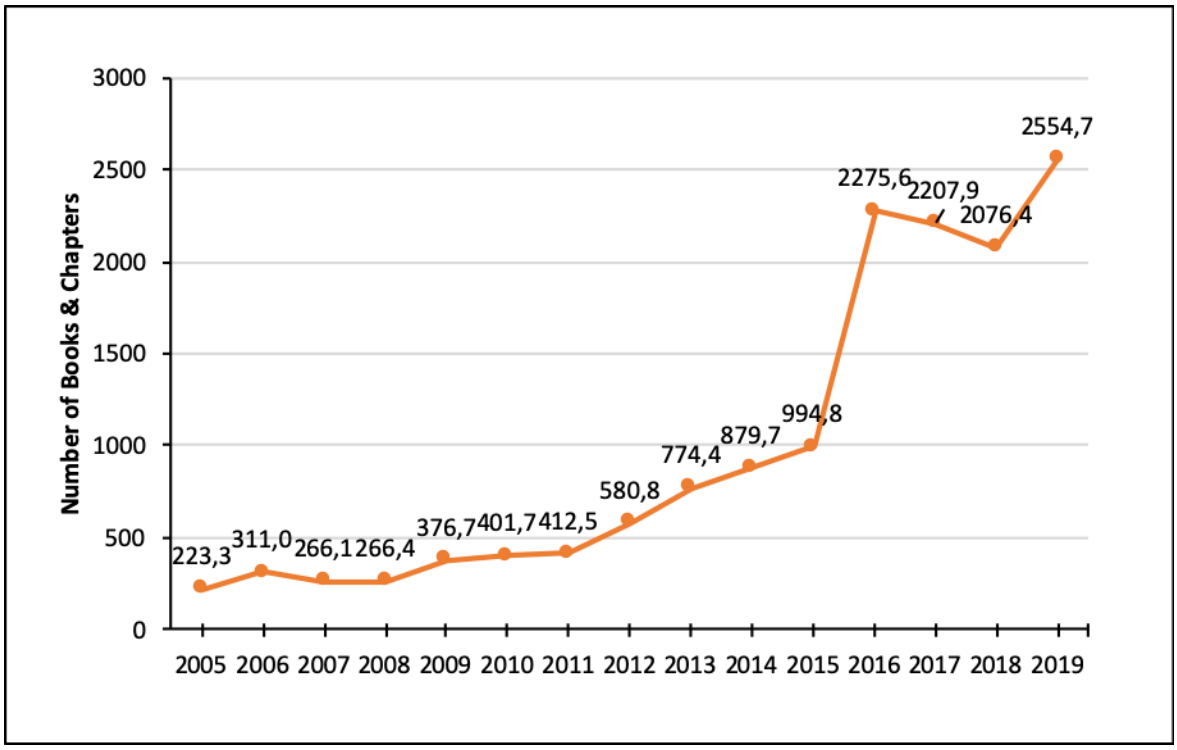


***Table 5: CAGR by rolling three-year windows for books and chapters, 2007-2019***

| | Books & Chapters | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Three-year Periods | | | | | | | | | | |
| | 2007-2009 | 2008-2010 | 2009-2011 | 2010-2012 | 2011-2013 | 2012-2014 | 2013-2015 | 2014-2016 | 2015-2017 | 2016-2018 | 2017-2019 |
| CAGR | 18,98% | 22,79% | 4,64% | 20,25% | 37,01% | 23,07% | 13,34% | 60,84% | 48,98% | -4,48% | 7,57% |

**Table 5** presents the CAGR-values for three-year window periods from 2005. The high fluctuations are to be expected as book publications form a relatively small component of overall output and the actual numbers of units in a specific year are small compared to journal article output (which constitutes 85% or more).

### 4.2 Book and book chapter output by university

The distribution of book publications units by university for the past two years is presented in **Table 6**. The results are organized in descending order of the relative share by university of the 2019 subsidy units.

***Table 6: Percentage of book publications output units by university, 2018 and 2019***

| Institution | 2018 | | 2019 | |
|---|---|---|---|---|
| | No. of Units | % Column | No. of Units | % of Total |
| UJ | 220.4 | 10.6% | 359.01 | 14.05% |
| SU | 280.5 | 13.6% | 327.67 | 12.83% |
| UFS | 182.5 | 8.8% | 305.89 | 11.97% |
| UP | 266.8 | 12.9% | 295.95 | 11.58% |
| WITS | 196.5 | 9.5% | 272.44 | 10.66% |
| UCT | 169.6 | 8.2% | 219.96 | 8.61% |
| NWU | 131.9 | 6.4% | 189.22 | 7.41% |
| UKZN | 176.0 | 8.5% | 156.85 | 6.14% |
| UNISA | 146.6 | 7.1% | 125.63 | 4.92% |
| UWC | 45.4 | 2.2% | 68.00 | 2.66% |
| RU | 94.9 | 4.6% | 65.83 | 2.58% |
| DUT | 49.7 | 2.4% | 33.74 | 1.32% |
| CPUT | 13.9 | 0.7% | 31.98 | 1.25% |
| NMU | 35.5 | 1.7% | 21.05 | 0.82% |
| UNIZULU | 17.4 | 0.8% | 19.06 | 0.75% |
| UL | 2.7 | 0.1% | 13.13 | 0.51% |
| CUT | 6.2 | 0.3% | 9.51 | 0.37% |
| TUT | 3.9 | 0.2% | 8.17 | 0.32% |
| UFH | 12.1 | 0.6% | 7.63 | 0.30% |
| UNIVEN | 10.8 | 0.5% | 6.66 | 0.26% |
| VUT | 2.7 | 0.1% | 4.75 | 0.19% |
| WSU | 0.7 | 0.0% | 4.50 | 0.18% |
| SPU | 0.0 | 0.0% | 4.59 | 0.18% |
| UMP | 3.3 | 0.2% | 1.74 | 0.07% |
| SMU | 0.0 | 0.0% | 1.24 | 0.05% |
| MUT | 0.0 | 0.0% | 0.48 | 0.02% |
| **TOTAL** | **2069.9** | **100.0%** | **2554.7** | **100.0%** |

The longer term view on the growth rates of book publication units by university is presented in **Table 7**. The table is organized in descending order of the CAGR-values. In interpreting the results presented here, however, a cautionary note is necessary, as annual numbers of output units vary considerably, with large year-to-year increases and decreases. The most significant trend is the huge increase in output units between 2018 and 2019 (from 1299,47 to 2554,68), which is far more prominent at some institutions than others. This near doubling of output in one year constitutes the biggest change recorded for any publication type. Further analyses will be carried out to inform an understanding of the increase.

***Table 7: CAGR of books and book chapter units by university, 2013 - 2019***

| **Institution** | **Units per year** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **CAGR** |
| UFS | 33,02 | 39,59 | 46,34 | 33,42 | 39,71 | 33,07 | 305,89 | 44,9% |
| UWC | 16,73 | 10,06 | 6,82 | 10,41 | 7,25 | 11,26 | 68 | 26,3% |
| WITS | 68,46 | 77,94 | 86,38 | 79,06 | 102,94 | 83,73 | 272,44 | 25,9% |
| UNIZULU | 7 | 6,85 | 11,33 | 6,78 | 5,59 | 8,71 | 19,06 | 18,2% |
| UKZN | 58,34 | 52,35 | 51,21 | 61,03 | 67,08 | 46,82 | 156,85 | 17,9% |
| SU | 126,74 | 103,51 | 82,64 | 115,61 | 105,17 | 98,7 | 327,67 | 17,2% |
| UP | 119,64 | 147,04 | 151,02 | 139,83 | 111,86 | 86,7 | 295,95 | 16,3% |
| RU | 28,69 | 29,8 | 34,6 | 29,45 | 23,8 | 13,31 | 65,83 | 14,8% |
| UJ | 182,5 | 253,47 | 288,44 | 304,15 | 303,72 | 304,06 | 359,01 | 11,9% |
| DUT | 17,37 | 10,93 | 31,82 | 8,73 | 21,25 | 18,96 | 33,74 | 11,7% |
| UNISA | 68,13 | 78,61 | 87,73 | 85,15 | 57,94 | 76,28 | 125,63 | 10,7% |
| UCT | 122,48 | 117,29 | 102,62 | 103,94 | 104,46 | 101,92 | 219,96 | 10,3% |
| NWU | 119,98 | 107,34 | 126,8 | 90,13 | 82,37 | 134,62 | 189,22 | 7,9% |
| WSU | 4 | 1 | 2,5 | 2,75 | 4 | 4,17 | 4,5 | 1,9% |
| CPUT | 41,79 | 46,5 | 33,44 | 32,6 | 23,4 | 42,82 | 31,98 | -4,4% |
| CUT | 13,02 | 13,65 | 30,85 | 44,89 | 44,23 | 63,39 | 9,51 | -5,1% |
| UNIVEN | 9,15 | 13,68 | 9,08 | 13,08 | 8,9 | 5,74 | 6,66 | -5,2% |
| UFH | 11,26 | 14,75 | 8,85 | 15,99 | 17,91 | 2,83 | 7,63 | -6,3% |
| UL | 23,83 | 9,21 | 33,01 | 17,78 | 15,99 | 33,8 | 13,13 | -9,5% |
| VUT | 13,01 | 29,85 | 13,28 | 18,21 | 22,86 | 40,79 | 4,75 | -15,5% |
| NMU | 84,16 | 77,39 | 63,64 | 84,09 | 54,23 | 43,17 | 21,05 | -20,6% |
| MUT | 2,25 | 1,63 | 1,25 | 2,87 | 0,25 | 1,88 | 0,48 | -22,7% |
| TUT | 65,37 | 58,63 | 44,43 | 47,92 | 49,5 | 41,4 | 8,17 | -29,3% |
| UMP | - | - | - | - | 1,5 | 0,79 | 1,74 | |
| SMU | - | 0,25 | 1,5 | - | - | 0,57 | 1,24 | |
| SPU | | | | | | | 4,59 | |
| **TOTAL** | **1236,92** | **1301,32** | **1349,58** | **1347,87** | **1275,91** | **1299,47** | **2554,68** | **12,8%** |

### 4.3 Book Publications by scientific fields

**Table 8** presents the breakdown of book publications output units by scientific fields. The results correspond with our reporting in the 2020 report of 2018 submissions. More than 70% of all book and book chapter submissions that were approved are from the social sciences and humanities. The next two largest fields (Economic & Management Sciences and Engineering and the Built Environment) both accounted for about 8% of all submissions in these two categories.

***Table 8: Book and book chapter output units awarded by scientific field (CESM), 2018 and 2019 compared***

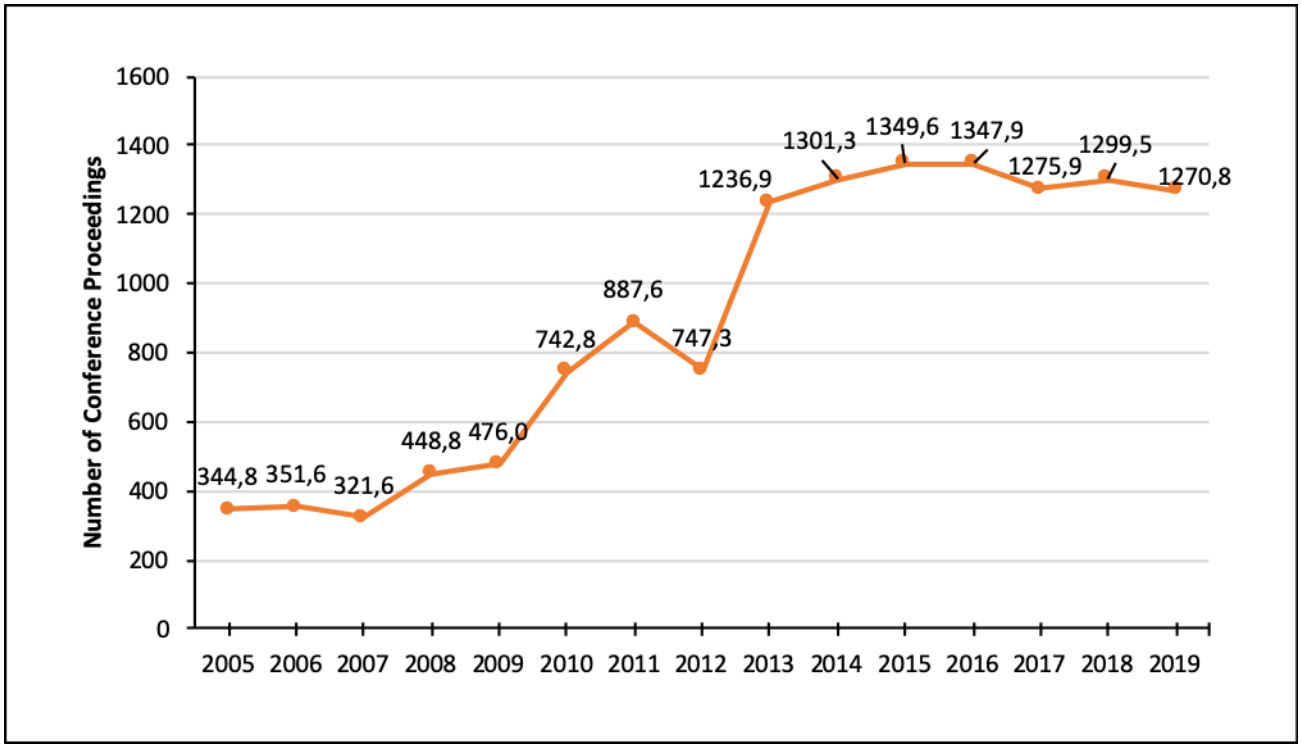
| Discipline | CESM | Units 2018 | % of Total 2018 | Units 2019 | % of Total 2019 |
|---|---|---|---|---|---|
| Social Sciences & Humanities | 3,5,7,10,11,12,17, 18,19,20 | 1968,233 | 77% | 2263,2016 | 71,14% |
| Economic & Management Sciences | 4 | 177,7328 | 7% | 272,5964 | 8,57% |
| Engineering & the Built Environment | 02,08 | 153,6413 | 6% | 258,2163 | 8,12% |
| Health Professions and Related Clinical Sciences | 9 | 62,8442 | 2% | 81,6121 | 2,57% |
| Physical Sciences | 14 | 57,4101 | 2% | 106,1152 | 3,34% |
| Mathematics, Statistics & ICT | 06, 15 | 56,0514 | 2% | 80,5735 | 2,53% |
| Life Sciences | 13 | 21,2387 | 1% | 39,4696 | 1,24% |
| Agriculture | 1 | 26,7181 | 1% | 38,6823 | 1,22% |
| Military Sciences | 16 | 30,8039 | 1% | 40,7087 | 1,28% |
| **TOTAL** | | **2554,6735** | **100%** | 3181,1757 | 100,00% |

# 5. PUBLISHED CONFERENCE PROCEEDINGS

## 5.1 Overview and trends

The trend line of published conference proceedings shows that output in this category has remained steady over the past six years despite recording a CAGR value of 9,77% since 2005. However, it is important to note that the 2018 and 2019 units do not include units that have been withheld for various reasons. This trend could therefore still change once this process has been completed.

***Figure 8: Trend in the output of published conference proceedings*:, 2005 - 2019**




A closer look at the trend in published conference proceedings (**Figure 8**) reveals three distinct phases: an initial period between 2005 and 2011/2012 of very steep growth. During this period the rules were tighter on the recognition of conference proceedings. The second phase, of a sharp rise occurred between 2012 and 2013. During the initial phase, representations were made by academics in the disciplines that traditionally use this platform of knowledge dissemination more than the others. Thus, the recognition of conference proceedings publications was expanded. The steep rise of units between 2012 and 2013, therefore, relates to the changes that were effected as a result. The third phase occurred for the past 6 years, and reflects a static picture. These very different rates of increase are captured in **Table 9** which presents the CAGR-values for the corresponding time frames.

***Table 9: CAGR values for growth rates in annual published conference proceedings (2007 to 2019)***

| | Conference Proceedings | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Three-year Periods | | | | | | | | | | |
| | 2007-2009 | 2008-2010 | 2009-2011 | 2010-2012 | 2011-2013 | 2012-2014 | 2013-2015 | 2014-2016 | 2015-2017 | 2016-2018 | 2017-2019 |
| CAGR | 21,66% | 28,65% | 36,55% | 0,30% | 18,05% | 31,96% | 4,45% | 1,77% | -2,77% | -1,81% | -0,20% |

In order to shed more light on the overall trends in output it is also useful to present the trends by university. **Table 10** summarizes these trends (units are organized in descending order by CAGR-values for the past 6 years).

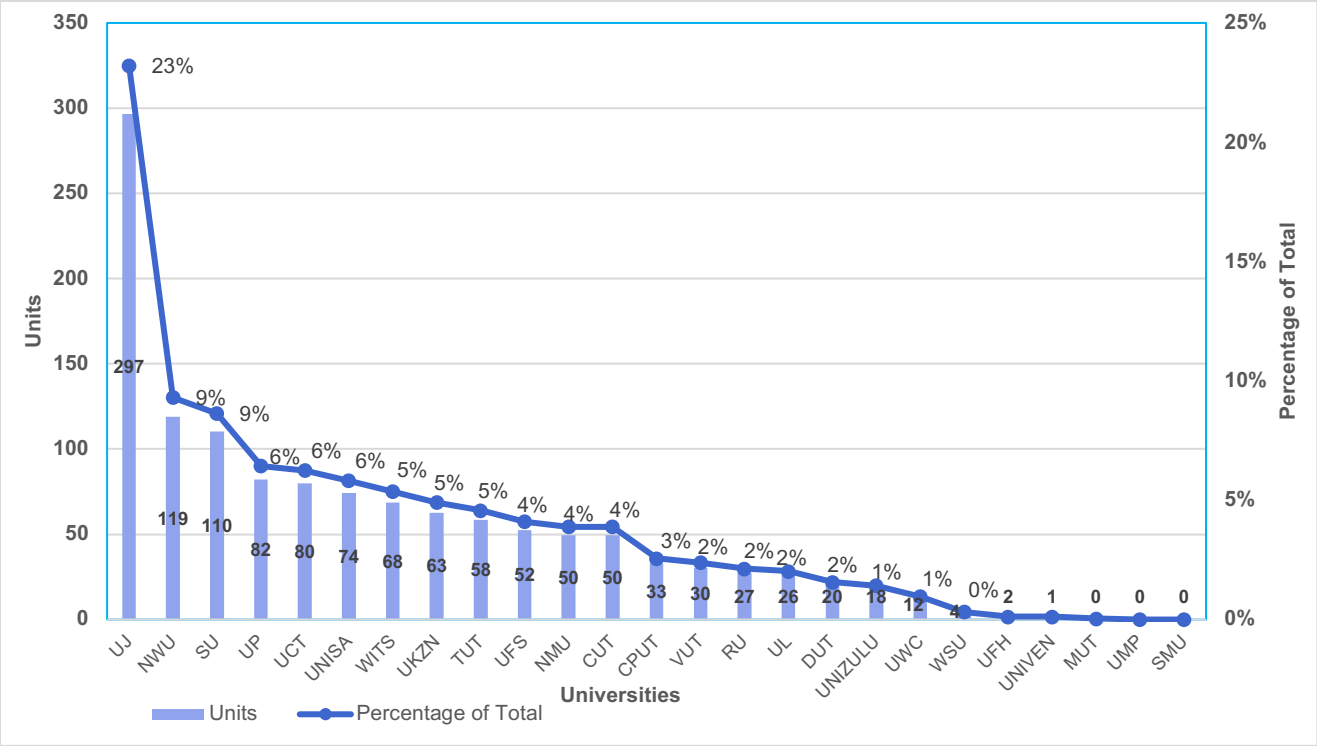
***Table 10: Published Conference Proceedings Units per university, 2014 – 2019***

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | CAGR from 2014 to 2019 |
|---|---|---|---|---|---|---|---|
| **WSU** | 1 | 2,5 | 2,75 | 4 | 3,92 | 4 | 31,95% |
| **CUT** | 13,65 | 30,85 | 44,89 | 44,23 | 58,89 | 49,1 | 29,18% |
| **UL** | 9,21 | 33,01 | 17,78 | 15,99 | 31,42 | 25,9 | 22,97% |
| **UNIZULU** | 6,85 | 11,33 | 6,78 | 5,59 | 8,21 | 17,2 | 20,22% |
| **DUT** | 10,93 | 31,82 | 8,73 | 21,25 | 18,46 | 19,5 | 12,27% |
| **UFS** | 39,59 | 46,34 | 33,42 | 39,71 | 26,95 | 52,3 | 5,73% |
| **UWC** | 10,06 | 6,82 | 10,41 | 7,25 | 11,26 | 12,3 | 4,10% |
| **UKZN** | 52,35 | 51,21 | 61,03 | 67,08 | 46,57 | 61,9 | 3,41% |
| **UJ** | 253,47 | 288,44 | 304,15 | 303,72 | 301,14 | 294,8 | 3,07% |
| **NWU** | 107,34 | 126,8 | 90,13 | 82,37 | 133,38 | 118,8 | 2,05% |
| **SUN** | 103,51 | 82,64 | 115,61 | 105,17 | 97,63 | 110,2 | 1,26% |
| **VUT** | 29,85 | 13,28 | 18,21 | 22,86 | 40,62 | 29,9 | 0,03% |
| **TUT** | 58,63 | 44,43 | 47,92 | 49,5 | 41,34 | 58,4 | -0,08% |
| **UNISA** | 78,61 | 87,73 | 85,15 | 57,94 | 75,06 | 73,1 | -1,44% |
| **WITS** | 77,94 | 86,38 | 79,06 | 102,94 | 83,4 | 68,5 | -2,55% |
| **RU** | 29,8 | 34,6 | 29,45 | 23,8 | 12,81 | 21,7 | -6,15% |
| **CPUT** | 46,5 | 33,44 | 32,6 | 23,4 | 41,9 | 32,6 | -6,86% |
| **UCT** | 117,29 | 102,62 | 103,94 | 104,46 | 101,17 | 79,9 | -7,39% |
| **NMU** | 77,39 | 63,64 | 84,09 | 54,23 | 41,93 | 49,6 | -8,51% |
| **UP** | 147,04 | 151,02 | 139,83 | 111,86 | 85,2 | 82,2 | -10,98% |
| **MUT** | 1,63 | 1,25 | 2,87 | 0,25 | 1,88 | 0,4 | -24,50% |
| **UNIVEN** | 13,68 | 9,08 | 13,08 | 8,9 | 5,42 | 1,4 | -36,61% |
| **UFH** | 14,75 | 8,85 | 15,99 | 17,91 | 2,83 | 1,5 | -36,69% |
| **SMU** | 0,25 | 1,5 | 0 | 0 | 0,57 | 0 | -100,00% |
| **UMP** | 0 | 0 | 0 | 1,5 | 0,79 | 3,1 | - |
| **SPU** | 0 | 0 | 0 | 0 | 0 | 2,4 | - |
| **TOTAL** | **1301,3** | **1349,6** | **1347,9** | **1275,9** | **1272,7** | **1270,8** | **-0,47%** |

After the spike of 2013, the increase has been gradual and has almost reached a plateau. However, some institutions have more than doubled their published conference proceedings during this period, and most noticeable are CUT, UL and UNIZULU. A few have dropped significantly and these are UFH, UNIVEN and MUT.

UJ accrued the highest number of units (23%) of all published conference proceedings as shown in **Figure 9**. The pattern is almost exactly the same as that reported for 2018 outputs.

***Figure 9: Units awarded (rounded off) for published conference proceedings by universities 2019***



## 5.2 Published conference proceedings by CESM field

**Table 11** presents a comparison of the conference proceedings output units by scientific fields for 2018 and 2019 respectively. The comparison shows minimal changes from the previous year with the largest share of units recorded for the Engineering & the Built Environment (41%) followed by Mathematics, Statistics & ICT (19%) and the Social Sciences and Humanities (17%). As was the case in 2018, it is clear that conference proceedings do not constitute a major publication outlet for the physical, agricultural, life or health sciences.

***Table 11: Published Conference Proceedings by Scientific Field (2018 and 2019 compared)***

| Discipline | CESM | Units | % of Total | Units | % of Total |
|---|---|---|---|---|---|
| | | 2018 | | 2019 | |
| Engineering & the Built Environment | 02,08 | 608.0143 | 48% | 523.6834 | 41% |
| Mathematics, Statistics & ICT | 06, 15 | 207.5598 | 16% | 238.6545 | 19% |
| Social Sciences & Humanities | 3,5,7,10,11,12, 17,18,19,20 | 191.5564 | 15% | 213.7384 | 17% |
| Economic & Management Sciences | 04 | 181.4037 | 14% | 213.1913 | 17% |
| Physical Sciences | 14 | 65.28 | 5% | 53.627 | 4% |
| Health Professions and Related Clinical Sciences | 09 | 8.6684 | 0.7% | 9.422 | 1% |
| Agriculture | 01 | 6.9233 | 0.5% | 11.4915 | 1% |
| Life Sciences | 13 | 2.6668 | 0.2% | 4.6166 | 0% |
| Military Sciences | 16 | 0.75 | 0.1% | 2.375 | 0% |
| | | **1272.8** | **100%** | **1270,8** | **100%** |

## 6. NORMALIZED RESEARCH OUTPUT INDICATORS

The following four indicators are used to report on normalization procedure:

- *Per capita research publication output* - where a total number of publications by a university is divided by the headcount of the permanently employed instructional and research staff.
- *Weighted per capita research output* - where all research output, including research masters and doctoral graduates are divided by the headcount of permanently employed academic staff. A doctoral graduate has a weighting of 3 units while a research masters graduate has a weighting of 1 unit.
- Proportion of academic staff with doctoral degrees.
- Proportion of doctoral graduates per academic staff with doctorates.

### 6.1 Per capita research publication output

The average per capita research publications output for all universities in 2019 was 1.06 units. This means that the average permanently employed academic in the country produced one research publication unit in 2019. That is an equivalent of a single article in a peer-reviewed journal. However, the units are for all publication types (journal articles, books and book chapters and conference proceedings). Academics at eight universities (UKZN, SU, UJ, UP, UCT, WITS, RU and UFS) on average produced publications higher than the national average in 2019.

**Table 12** presents the breakdown of per capita research publications output per university in 2019. The production of publications remains but one aspect of academic activities and is a tool for distribution of research subsidy, and should not be interpreted as an overall assessment of academic performance. Moreover, it is perfectly normal that some universities would be research-led while others may be teaching intensive, yet others may have a combination of both. Either way, the Department encourages a focus on quality across all academic activities.

*Table 12: Per capita research publication output, 2019*

| Institution | Headcount of permanently employed academics (A) | Research Publications in Units (1) | Per Capita Research Publications Units (1/A) |
|---|---|---|---|
| UKZN | 1249 | 2286.0566 | 1.83 |
| SU | 1181 | 2033.6761 | 1.72 |
| UJ | 1330 | 2276.3393 | 1.71 |
| UP | 1224 | 2060.6269 | 1.68 |
| UCT | 1184 | 1936.0157 | 1.64 |
| WITS | 1204 | 1918.7522 | 1.59 |
| RU | 357 | 548.0629 | 1.54 |
| UFS | 947 | 1171.732 | 1.24 |
| **Sector Average** | | **1.06** | |
| UFH | 354 | 362.1806 | 1.02 |
| NWU | 1575 | 1541.1503 | 0.98 |
| UWC | 675 | 594.1763 | 0.88 |
| UNIZULU | 319 | 256.0233 | 0.80 |
| UNISA | 1866 | 1366.6236 | 0.73 |
| NMU | 678 | 459.6075 | 0.68 |
| UL | 615 | 387.7238 | 0.63 |
| DUT | 609 | 353.2832 | 0.58 |
| CUT | 306 | 171.0457 | 0.56 |
| UMP | 127 | 70.7514 | 0.56 |
| UNIVEN | 431 | 197.5993 | 0.46 |
| VUT | 378 | 161.8988 | 0.43 |
| TUT | 928 | 361.3074 | 0.39 |
| CPUT | 776 | 242.7472 | 0.31 |
| MUT | 220 | 46.2186 | 0.21 |
| SMU | 633 | 106.7062 | 0.17 |
| WSU | 616 | 95.1828 | 0.15 |
| SPU | 119 | 14.2097 | 0.12 |

## 6.2 Weighted per capita research output

The weighted per capita research output indicator combines the publication output with two categories of graduate production: research masters and doctoral graduates (weighted by a factor of 3) and it is normalized by dividing the total units by the total headcount of permanently employed academic (instructional and research) staff.

The results show that the weighted per capita research output value for all universities in 2019 was 2.01. In other words, the average academic in the country produced two research output units in 2018. Academics at seven universities (UKZN, UP, SU, WITS, UCT, RU, and UJ) produced weighted per capita research outputs above the national average of 2.01 units in 2019.

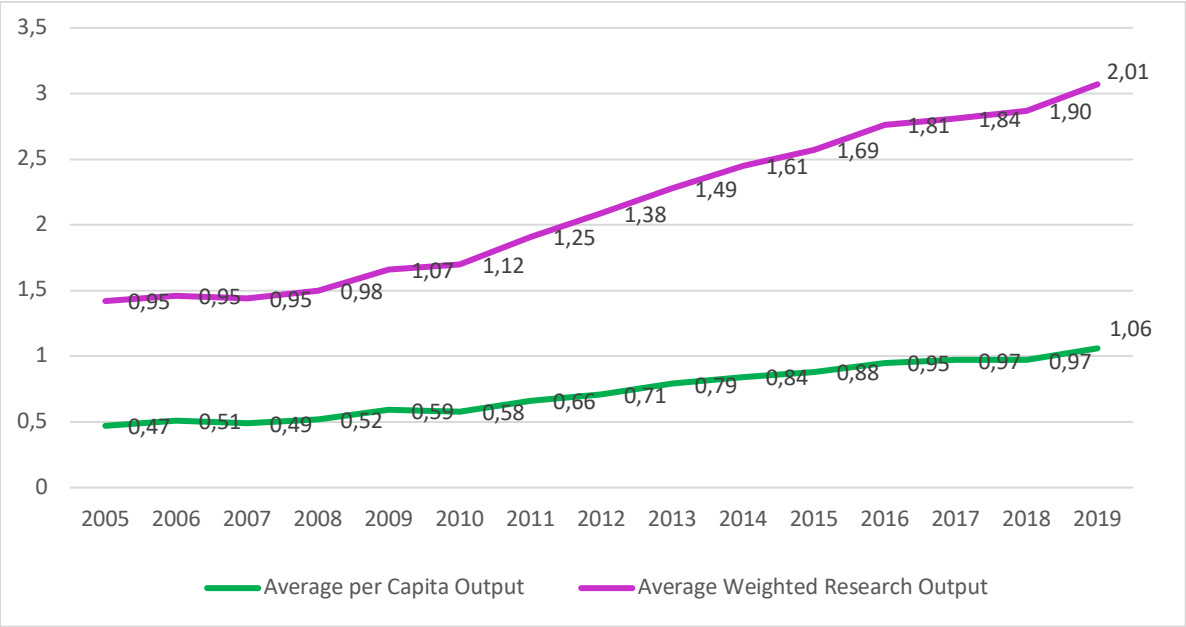
**Table 13** presents the breakdown of weighted per capita research output per university in 2019. When comparing the *per capita research publications output* with the *weighted per capita research output* each institution should be able to determine the distribution of research production by type (publications or graduates). A further analysis can be carried out by scientific fields and staff qualifications (discussed in subsequent sections).

***Table 13: Weighted per capita research output (2019)***

| Institution | Headcount of permanently employed academics (A) | Research Publications in Units (1) | Research Masters Graduates in Units (2) | Doctorate Graduates in Units (3) | Total Weighted Research Output (1+2+3) | Weighted Output per capita (1+2+3)/A |
|---|---|---|---|---|---|---|
| UKZN | 1249 | 2286.0566 | 880 | 1353 | 4519.0566 | 3.62 |
| UP | 1224 | 2060.6269 | 1167 | 1197 | 4424.6269 | 3.61 |
| SU | 1181 | 2033.6761 | 889 | 1077 | 3999.6761 | 3.39 |
| WITS | 1204 | 1918.7522 | 868 | 873 | 3659.7522 | 3.04 |
| UCT | 1184 | 1936.0157 | 690 | 783 | 3409.0157 | 2.88 |
| RU | 357 | 548.0629 | 199 | 258 | 1005.0629 | 2.82 |
| UJ | 1330 | 2276.3393 | 697 | 669 | 3642.3393 | 2.74 |
| **Sector Average** | | | | | | **2.01** |
| UFS | 947 | 1171.732 | 329 | 384 | 1884.732 | 1.99 |
| NWU | 1575 | 1541.1503 | 575 | 942 | 3058.1503 | 1.94 |
| UFH | 354 | 362.1806 | 123 | 192 | 677.1806 | 1.91 |
| UWC | 675 | 594.1763 | 286 | 378 | 1258.1763 | 1.86 |
| UNISA | 1866 | 1366.6236 | 551 | 1002 | 2919.6236 | 1.56 |
| NMU | 678 | 459.6075 | 262 | 291 | 1012.6075 | 1.49 |
| UNIZULU | 319 | 256.0233 | 62 | 81 | 399.0233 | 1.25 |
| DUT | 609 | 353.2832 | 169 | 135 | 657.2832 | 1.08 |
| UNIVEN | 431 | 197.5993 | 97 | 132 | 426.5993 | 0.99 |
| UL | 615 | 387.7238 | 161 | 63 | 611.7238 | 0.99 |
| CUT | 306 | 171.0457 | 59 | 63 | 293.0457 | 0.96 |
| TUT | 928 | 361.3074 | 238 | 198 | 797.3074 | 0.86 |
| CPUT | 776 | 242.7472 | 177 | 111 | 530.7472 | 0.68 |
| VUT | 378 | 161.8988 | 57 | 27 | 245.8988 | 0.65 |
| UMP | 127 | 70.7514 | 0 | 0 | 70.7514 | 0.56 |
| SMU | 633 | 106.7062 | 91 | 15 | 212.7062 | 0.34 |
| WSU | 616 | 95.1828 | 10 | 33 | 138.1828 | 0.22 |
| MUT | 220 | 46.2186 | 0 | 0 | 46.2186 | 0.21 |
| SPU | 119 | 14.2097 | 0 | 0 | 14.2097 | 0.12 |

**Figure 10** presents the publications and weighted per capita research outputs of the past 15 years. Both measures show a steady growth since the institution of the current policy. For the first time in 2019, the per capita publication output reached the 1 unit mark and the weighted per capita research output the 2 unit mark.

*Figure 10: Per Capita Publicatio Output and Weighted Research Output 2005 – 2019*




### 6.3 Proportion of academic staff with doctoral degrees

The proportion of academic staff with doctorates is generally used as proxy for relatively higher research productivity across the universities. Whilst there is a national target of 75% of all academic staff to be in possession of a PhD by 2030, set in the NDP (2012), the DHET has been analysing research productivity using this as one of the variables since the current research outputs policy came into place. It is also the basis upon which some development programmes, under the University Capacity Development Programme (UCDP), have been put in place by the DHET.

**Table 14** presents the data of permanently employed academics by their highest qualifications in the reporting year of 2019. Note the percentage of staff with doctorates as the highest qualification per university and by which the table is arranged in the descending order. The average number of academics with a doctorate as highest qualification in the sector in 2019 was 47.7%. The percentage represents a slight drop from 48% in 2018 and is the first such decrease for the past 14 years. Further analysis needs to be carried out to determine causal factors, as the drop is of concern.

***Table 14: Number of permanently employed academics by highest qualification, 2019***

| Institution | Total Instructional/ Research Staff | Academics with Masters as Highest Qualification | | Academics with Doctorate as Highest Qualifications | | Weighted per capita Output | % Staff with Honours degree and lower |
|---|---|---|---|---|---|---|---|
| | | Headcount | % of Institutional Total Academics | Headcount | % of Institutional Total Academics | | |
| UP | 1224 | 349 | 28.50% | 853 | **69.70%** | 3.61 | 1.80% |
| WITS | 1204 | 300 | 24.90% | 795 | **66.00%** | 3.04 | 9.10% |
| UCT | 1184 | 337 | 28.50% | 739 | **62.40%** | 2.88 | 9.10% |
| UKZN | 1249 | 375 | 30.00% | 768 | **61.50%** | 3.62 | 8.50% |
| UWC | 675 | 185 | 27.40% | 404 | **59.90%** | 1.86 | 12.70% |
| RU | 357 | 115 | 32.20% | 212 | **59.40%** | 2.82 | 8.40% |
| SU | 1181 | 277 | 23.50% | 673 | **57.00%** | 3.39 | 19.60% |
| NWU | 1575 | 451 | 28.60% | 804 | **51.00%** | 1.94 | 20.30% |
| UJ | 1330 | 568 | 42.70% | 660 | **49.60%** | 2.74 | 7.70% |
| UFS | 947 | 382 | 40.30% | 465 | **49.10%** | 1.99 | 10.60% |
| **National Average** | | | | | **47.70%** | | |
| UFH | 354 | 119 | 33.60% | 168 | **47.50%** | 1.91 | 18.90% |
| UNIZULU | 319 | 146 | 45.80% | 149 | **46.70%** | 1.25 | 7.50% |
| UMP | 127 | 33 | 26.00% | 58 | **45.70%** | 0.56 | 28.30% |
| NMU | 678 | 245 | 36.10% | 306 | **45.10%** | 1.49 | 18.70% |
| UNIVEN | 431 | 165 | 38.30% | 185 | **42.90%** | 0.99 | 18.80% |
| UNISA | 1866 | 560 | 30.00% | 792 | **42.40%** | 1.56 | 27.50% |
| SPU | 119 | 52 | 43.70% | 50 | **42.00%** | 0.12 | 14.30% |
| CUT | 306 | 146 | 47.70% | 122 | **39.90%** | 0.96 | 12.40% |
| TUT | 928 | 400 | 43.10% | 313 | **33.70%** | 0.86 | 23.20% |
| UL | 615 | 257 | 41.80% | 202 | **32.80%** | 0.99 | 25.40% |
| DUT | 609 | 295 | 48.40% | 193 | **31.70%** | 1.08 | 19.90% |
| CPUT | 776 | 364 | 46.90% | 239 | **30.80%** | 0.68 | 22.30% |
| VUT | 378 | 158 | 41.80% | 80 | **21.20%** | 0.65 | 37.00% |
| MUT | 220 | 113 | 51.40% | 43 | **19.50%** | 0.21 | 29.10% |
| SMU | 633 | 301 | 47.60% | 122 | **19.30%** | 0.34 | 33.20% |
| WSU | 616 | 239 | 38.80% | 97 | **15.70%** | 0.22 | 45.50% |
| **Total** | **19901** | **6932** | **Av = 34.80%** | **9492** | **Av. = 47.70%** | **Av. = 2.01** | **17.50%** |

As shown in **Table 14**, ten universities (UP, WITS, UCT, UKZN, UWC, RU, SU, NWU, UJ and UFS) had above sector average numbers of academics with a doctorate as the highest qualification. By way of comparative analysis, **Figure 11** shows the percentage proportion of academics with Masters and Doctoral degrees as highest qualifications and by institution. Institutional comparative analyses for planning purposes can be carried out between **Figures 5, 10 and 11 together with Tables 1, 12, 13 and 14**.

***Figure 11: Academics masters and doctoral degrees as the highest qualifications by institutions, 2019***

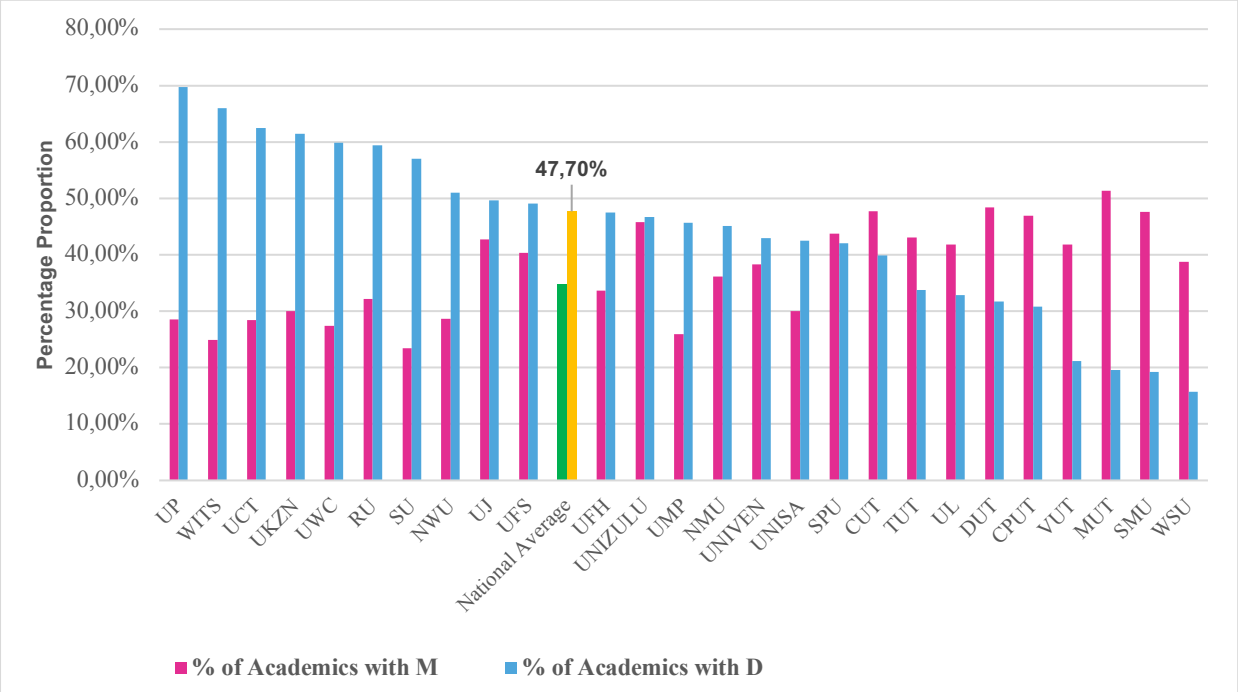
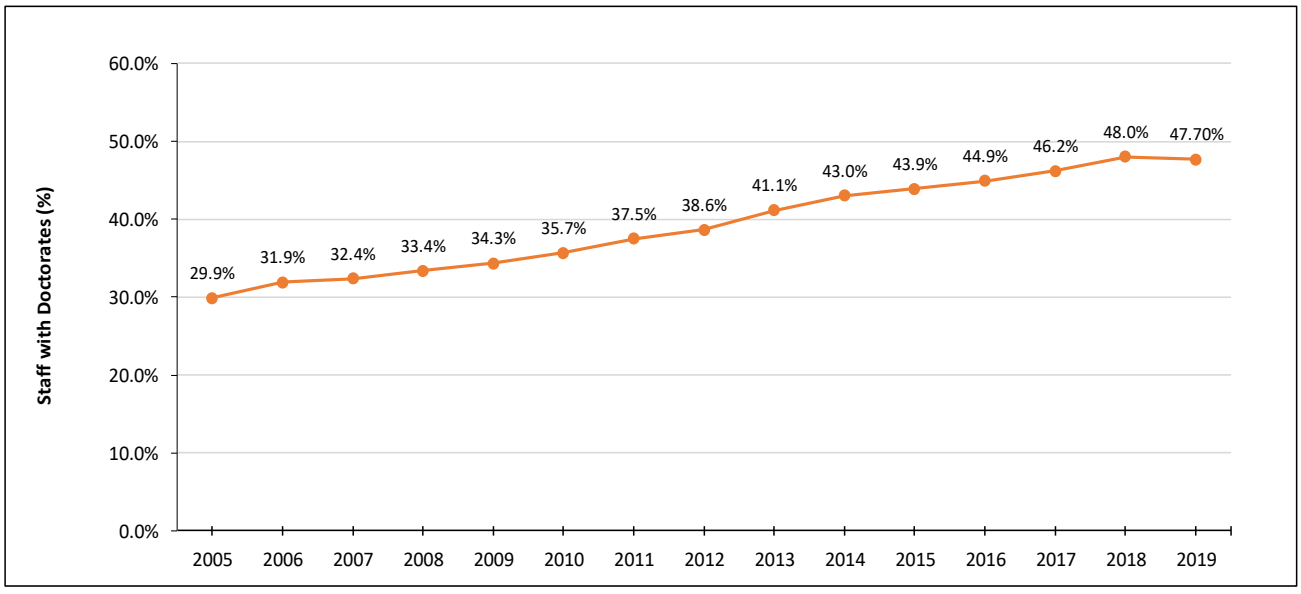



**Figure 12** presents the time series data of academics with a doctorate as the highest qualification in the sector for the period 2005 to 2019. The worrying dip in 2019, which has already been pointed out and briefly discussed above, is apparent in the graph. Overall, the total number of headcount academics with a doctorate as the highest qualification also dropped from 9498 in 2018 to 9492 in 2019

***Figure 12: Trend in proportions of academic staff with doctorates: 2005 - 2019***



### 6.4 Ratio of doctoral graduates to academic staff with doctorates

The ratio of doctoral graduates to academics with doctoral degrees as their highest qualification has been interpreted to refer to the supervisory load or 'burden of supervision' of academics. This indicator is simply caculated as the number of registered doctoral candidates to academics with doctoral degrees as their highest qualification at a university. It is important to emphasize that the ratio represents the average number of students per staff member with a doctorate. Table 15 shows that the sector average in 2019 was 0.36. This means that every staff member with a doctorate **on average** graduates a doctoral student every three years.

**Table 15** presents the analysis of the ratio of doctoral graduates per permanent academic with a doctorate by university. Eight universities recorded values above the national average. In other words, academics with doctorates at the eight universities, on average, each produced more than three doctoral graduates in 2019 (and 2019 is regarded as the end of a three-year cycle for the graduates). Most encouraging is to see that, among the eight, is the University of Fort Hare (UFH), a historically disadvantaged institution.

***Table 15: Ratio of doctoral graduates to doctorate staff member by university (2019)***

| Institution | Number of academics with Doctorate | Number of Doctoral graduates | Ratio |
|---|---|---|---|
| UKZN | 768 | 451 | 0.59 |
| SU | 673 | 359 | 0.53 |
| UP | 853 | 399 | 0.47 |
| UNISA | 792 | 334 | 0.42 |
| RU | 212 | 86 | 0.41 |
| NWU | 804 | 314 | 0.39 |
| UFH | 168 | 64 | 0.38 |
| WITS | 795 | 291 | 0.37 |
| **Sector Average** | | | **0.36** |
| UCT | 739 | 261 | 0.35 |
| UJ | 660 | 223 | 0.34 |
| NMU | 306 | 97 | 0.32 |
| UWC | 404 | 126 | 0.31 |
| UFS | 465 | 128 | 0.28 |
| UNIVEN | 185 | 44 | 0.24 |
| DUT | 193 | 45 | 0.23 |
| TUT | 313 | 66 | 0.21 |
| UNIZULU | 149 | 27 | 0.18 |
| CUT | 122 | 21 | 0.17 |
| CPUT | 239 | 37 | 0.15 |
| WSU | 97 | 11 | 0.11 |
| VUT | 80 | 9 | 0.11 |
| UL | 202 | 21 | 0.10 |
| SMU | 122 | 5 | 0.04 |
| MUT | 43 | 0 | 0.00 |
| SPU | 50 | 0 | 0.00 |
| UMP | 58 | 0 | 0.00 |

# 7. DEMOGRAPHIC TRENDS

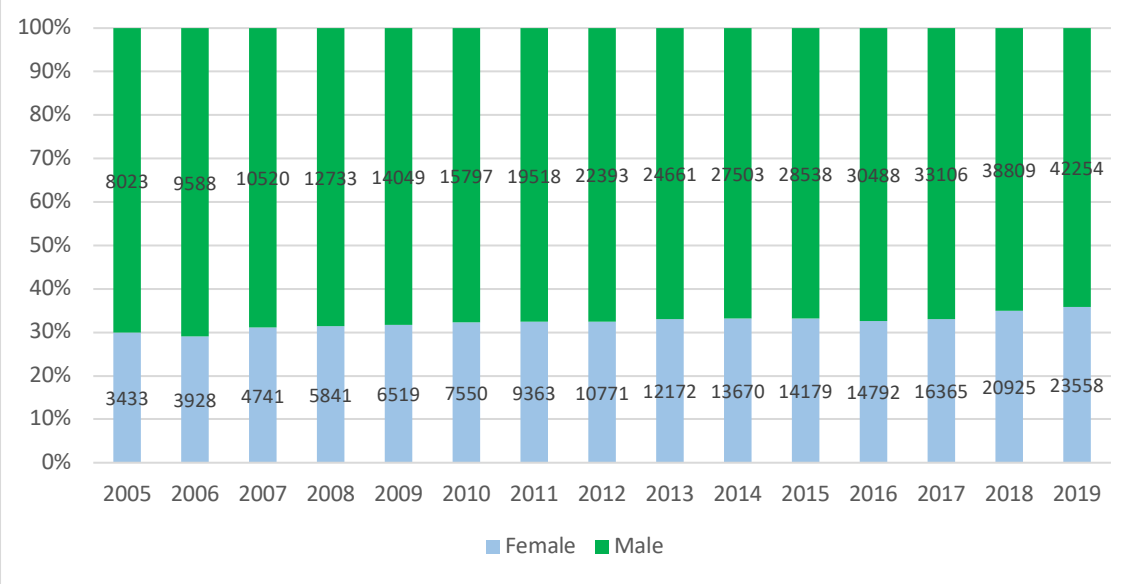
## 7.1 Publication outputs by gender of author

The Department gathers demographic information of all authors for the purposes of monitoring national trends in transformation in higher education in South Africa. Such information is required to asisst the Department as well as the individual universities to do better planning and policy development and analysis.

Since the Department began gathering biographical data, there is indeed relative improvement in the quality and reliability of the data since the earlier period of about five years to date. However, there are still some improvements which can be introduced over time. The analyses presented below is based on demographic information as submitted by the universities.

**Figure 13** presents the trend in the contribution of women and men academics to the overall publication outputs of the sector since 2005.

***Figure 13: Gender of authors of journal articles: 2005 - 2019***

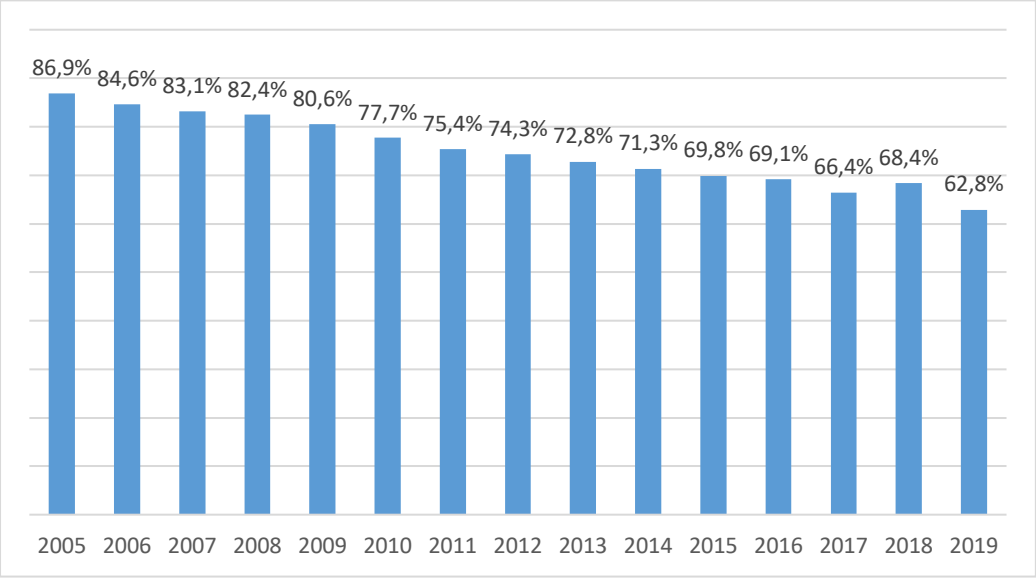



The results show that the contribution of women to university article output has increased steadily from 30% in 2005 to 36% in 2019. However, these results need to be interpreted against the fact that over the same period the proportion of female academic staff at SA universities has increased from 41% in 2005 to 48% in 2019. It is clear that more interventions are still required to reach some level of parity in the contribution of male and female staff.

### 7.2 Publication outputs by nationality of author

The second demographic indicator included in the report refers to the nationality of the contributing author. The focus is on establishing the trends in the contributions of South African academics (those who are SA citizens or permanent residents) in comparison to the contribution of non-South Africans employed at SA universities. The trend exhibited in **Figure 14** shows a decreasing contribution by SA nationals to overall sector output, from 86.9% in 2005 to 62.8% in 2019. Stated positively - SA universities are increasingly benefitting from the scholarly contribution of staff who are from other countries – and especially other African countries. Further disaggregation of fine-grained analyses of these trends is required. More questions about how these trends are distributed across scientific fields and universities also needs to be answered.

***Figure 14: Proportion of publication units produced by SA nationals***




### 7.3 Publication outputs by race of author

Another key variable that is included in our analysis is the 'race' of the contributing authors. It is important to point out that these analyses are confined to South African citizens or permanent residents. Under the Statistics Act of 1996 only SA citizens are classified by population group or race and into four categories: Black African, Coloured, Indian/Asian and White. The classification by race for purposes of measuring transformation does not apply to non-South African nationals (this is also reaffirmed by the Employment Equity Act of 1998).

**Figure 15** presents the general trends in the relative contribution by each of the 'race groups' to overall publication output between 2005 and 2019. The trend is clear as it shows the increasing contribution by

Black African, Coloured and Indian/Asian academics to the sector's knowledge production. Another was to present the same trends presented in **Table 16**. The table shows the changes in the relative shares of each population group over different time periods. Most notably the contribution of BCIA authors has increased from approximately 15% in 2005 to more than 40% in 2019. Conversely the contribution of "white" academics has declined from 85% in 2005 to less than 60% in 2019.

***Figure 15: Race of authors (SA nationals only) of all publications: 2005 - 2019***

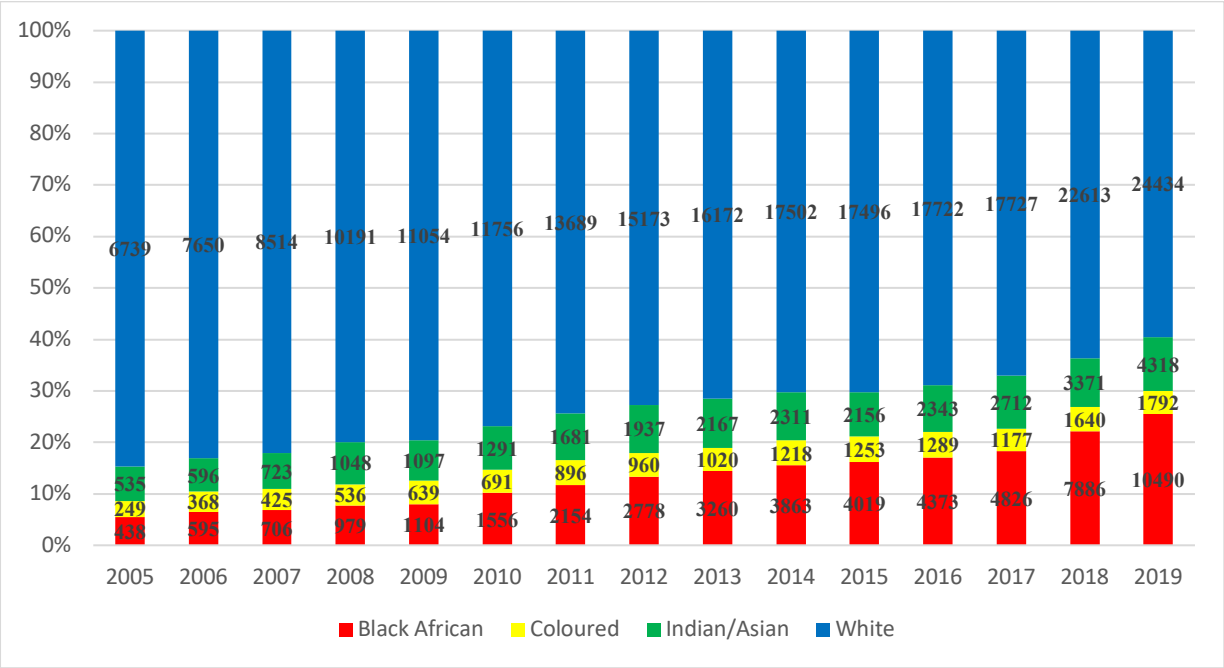



***Table 16: Trend in race of authors 2005 to 2019***

| Race of author | 2005 | 2010 | 2015 | 2019 |
|---|---|---|---|---|
| Black African | 5,5% | 10,2% | 16,1% | 25,6% |
| Coloured | 3,1% | 4,5% | 5,0% | 4,4% |
| Indian/Asian | 6,7% | 8,4% | 8,6% | 10,5% |
| White | 84,7% | 76,9% | 70,2% | 59,5% |

As indicated above, all universities are required to provide data on the demographics of the claiming author(s) to enable the Department to interpret transformation patterns and trends in knowledge production at universities. The completeness and quality of this data still needs to be improved in order to allow the DHET to undertake more rigorous and fine-grained analyses of the trends in the transformation of knowledge production in the sector.

### 7.4 Publication outputs by age of author

**Figure 16** shows the shifts in time of the age of authors (age at date of publication recoded into age intervals) for all the publications from 2005 to 2019. Authors in the age bracket 40 to 49 consistently contribute the largest share of the overall publication output, followed by authors between 30 and 39. **Table 17** provides further detail on these trends. Over the past 15 years of the current policy very small shifts are recorded. One positive result is the small proportional contribution of academics under the age of 30 where the share increased by three percentage points over this period.

***Figure 16: Grouping of academic authors by age for all publications: 2005 - 2019***

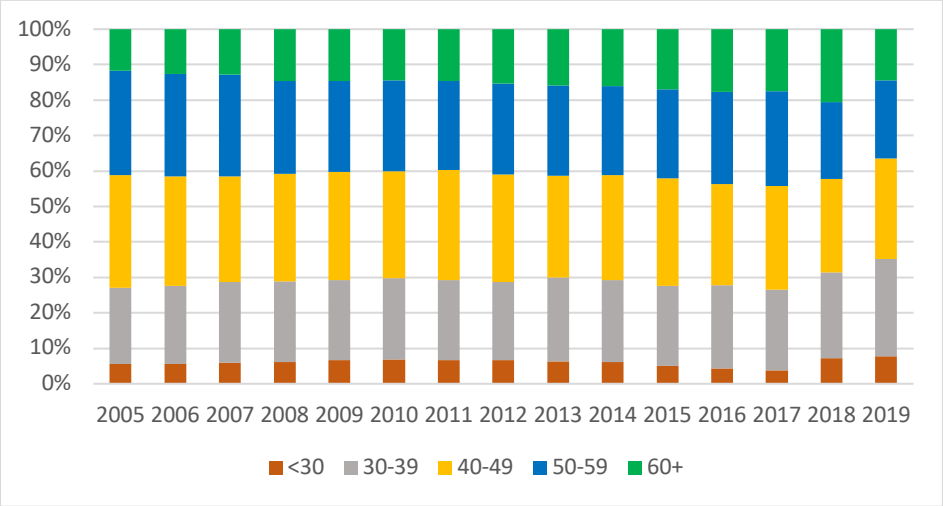



***Table 17: Trend in age of authors 2005 to 2019***

| Age interval | 2005 | | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|---|---|
| <30 | 551 | 5% | 1418 | 7% | 1856 | 5% | 3533 | 8% |
| 30-39 | 2168 | 22% | 4729 | 23% | 8268 | 23% | 12330 | 26% |
| 40-49 | 3188 | 32% | 6269 | 30% | 11087 | 30% | 12776 | 27% |
| 50-59 | 2940 | 29% | 5290 | 26% | 9185 | 25% | 9963 | 21% |
| 60+ | 1178 | 12% | 2992 | 14% | 6184 | 17% | 6480 | 14% |
| | **10025** | **100%** | **20698** | **100%** | **36580** | **100%** | **45082** | **100%** |

## 8. GENERAL OBSERVATIONS AND CONCLUSIONS

Research outputs from universities continue to increase, which shows commendable performance of the system. The Department would like to believe that the sustained increase is also as a result of the positive impact of the policy. In fact, analysts have drawn a correlation between the two. It is hoped that policy improvements and changes to processes and procedures, that are made from time to time, will continue to impact positively and sustain the growth of the system. In fact, the Department hopes that this reporting too will spur institutions to analyse their individual performance in much more detail, so that they institute holistic improvement programmes for even better performance in research productivity.

The Department continues to seek ways to improve the quality of research outputs. This is an imperative that should be prioritised by all in the system. Leaving this responsibility to the Department only amounts to a relegation of academic rigour and decisions to bureaucratic processes, and the outcome of measures to implement this may not always be pleasant. This is the reason why the Department continues to urge institutions to look after the academic profession and not to delegate the reponsibility to the Department. The Department has commenced with work on a framework to improve the quality of research outputs and subsequent subsidy claims.

The claims that were identified to be abnormal and unethical were, once again, identified from the 2020 submissions. Some were withdrawn following analysis by the Department. A separate report in this regard, also incorporating analysis of the units that were withheld in 2019, is being prepared. In certain instances it may be necessary to hold discussions with the affected individual institutions but that will be determined upon the completion of the analysis. In this regard, it is also worth reminding institutions that the Department reserves the right to withhold payment of research output subsidy in respect of claims that do not meet the criteria as outlined in the research output policy and where the Department has found evidence of unethical conduct relating to the claims.

Appendix 1:

***Table 18: Research Publications Units by Institution per CESM Categories***

| Institution | CESM 01 | CESM 02 | CESM 03 | CESM 04 | CESM 05 | CESM 06 | CESM 07 | CESM 08 | CESM 09 | CESM 10 | CESM 11 | CESM 12 | CESM 13 | CESM 14 | CESM 15 | CESM 16 | CESM 17 | CESM 18 | CESM 19 | CESM 20 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CPUT | 29.26 | 2.33 | 3.5 | 29.813 | 6 | 12.43 | 43.17 | 64.43 | 22.29 | 3.92 | | | 12.43 | 7.11 | 2.5 | | 2 | | | 1.56 | 242.75 |
| CUT | 8.25 | 16.83 | 0.85 | 32.97 | | 7.03 | 27.89 | 48.066 | 8.23 | | 2 | | 6.21 | 2.35 | 1.5 | | 1 | 2.86 | | 5 | 171.05 |
| DUT | | 1 | 14 | 49.99 | 2 | 24.37 | 18.72 | 58.03 | 33.59 | 1 | 5 | | 37.73 | 44.46 | 8.99 | 3.16 | 5 | | 7.33 | 38.9 | 353.28 |
| MUT | | | | 11.42 | | | | 32.24 | 2.56 | | | | | | | | | | | | 46.22 |
| NMU | 4.3 | 16.17 | 1.83 | 64.63 | 2 | 28.38 | 35.88 | 22.82 | 33.29 | | 7.75 | 17.93 | 120.21 | 66.83 | 7.17 | | 4.5 | 1.5 | 2 | 22.42 | 459.61 |
| NWU | 32.77 | 5.29 | 10.37 | 236.91 | 16.49 | 28.79 | 144.16 | 86.51 | 136.43 | 0.33 | 70.95 | 65.39 | 149.22 | 113.87 | 65.52 | | 193.17 | 63.72 | 15.45 | 105.78 | 1541.15 |
| RU | 3.18 | | 9.37 | 22.60 | 6.33 | 16.83 | 48.26 | 0 | 16.67 | | 39.13 | 10 | 196.45 | 89.85 | 3.88 | 1.03 | 4.5 | 19.69 | 0.92 | 59.36 | 548.06 |
| SMU | | | | | | | 0.67 | | 92.54 | | 2 | | 6.45 | 4.82 | 0.24 | | | | | | 106.71 |
| SPU | | | | 1 | | 3.17 | 1.46 | | | | | | | 1.7 | | | | | | 6.88 | 14.21 |
| SUN | 184.43 | | 14.5 | 121.79 | 16.23 | 20.79 | 85.81 | 268.91 | 345.20 | | 141.87 | 46.12 | 181.22 | 137.43 | 52.70 | 63.87 | 199.18 | 38.53 | 32.67 | 82.42 | 2033.68 |
| TUT | 11.75 | 8.46 | 9.11 | 52.47 | 1.5 | 30.79 | 15.33 | 165.54 | 21.09 | 0.75 | 7.42 | | 26.12 | 1.143 | 1.92 | 3.25 | | | 3.67 | 1 | 361.31 |
| UCT | 9 | 56.73 | 23.11 | 113.42 | 38.86 | 76.05 | 78.09 | 157.25 | 762.36 | 3.63 | 24.19 | 102.74 | 175.93 | 110.51 | 69.54 | | 11.87 | 29.86 | 12.14 | 80.74 | 1936.02 |
| UFH | 53.62 | | 1 | 19.08 | 15.49 | 4.67 | 15.13 | | 19.03 | 1 | 2.67 | 16 | 124.58 | 30.53 | 5 | | 9.33 | 14.58 | 14.49 | 15.97 | 362.18 |
| UFS | 58.50 | 30.29 | 12.51 | 29.78 | 8.92 | 22.83 | 104.60 | 1.53 | 93.05 | | 139.81 | 49.99 | 96.57 | 126.19 | 42.29 | 2 | 191.52 | 12.50 | 8.17 | 140.65 | 1171.73 |
| UJ | 3.67 | 21.18 | 17.08 | 262.89 | 26.65 | 97.16 | 170.97 | 512.54 | 75.63 | 0.5 | 27.75 | 94.64 | 73.66 | 300.99 | 43.95 | | 62.40 | 31.76 | 57.05 | 395.88 | 2276.34 |
| UKZN | 182.33 | 8.83 | 24.23 | 190.03 | 3 | 58.80 | 109.91 | 221.13 | 622.25 | 0.5 | 22.82 | 71.10 | 244.06 | 195.24 | 101.85 | | 45.96 | 16.49 | 15.79 | 151.72 | 2286.06 |
| UL | 79.34 | | | 33.67 | 11.47 | 2.92 | 30.03 | | 53.76 | | 5.5 | 31.5 | 1.8 | 5.99 | 3.33 | | 13.77 | 34.91 | 44.88 | 34.86 | 387.72 |
| UMP | 8.32 | 0.5 | | 11.92 | | 12.25 | 7.33 | 0.83 | 1 | | 1 | | 12.86 | 0.25 | | | | 7.5 | 2.58 | 4.41 | 70.75 |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNISA | 28.22 | 0.25 | 2.71 | 184.37 | 11.49 | 63.71 | 173.81 | 82.17 | 44.81 | 3 | 52.12 | 102.65 | 37.47 | 104.28 | 36.70 | 2 | 194.29 | 36.57 | 41.21 | 164.78 | 1366.62 |
| UNIVEN | 16.37 | 1.52 | | 9.33 | | 2 | 13.55 | | 18.52 | | 1 | 4.89 | 64.95 | 3.23 | 6.76 | | 3.63 | 1.99 | 5.05 | 44.81 | 197.59 |
| UNIZULU | 17.61 | | 0.5 | 22.92 | 7 | 9.76 | 50.16 | 1 | 3.69 | 0.5 | 5.84 | 2.96 | 11.84 | 45.86 | 3.64 | 7.99 | 9.5 | 4 | 14.83 | 36.41 | 256.02 |
| UP | 307.31 | 17.98 | 7.57 | 162.96 | 2.5 | 75.44 | 97.09 | 263.25 | 290.45 | 1.67 | 74.46 | 105.24 | 91.47 | 95.92 | 55.86 | | 272.05 | 8.99 | 14.38 | 116.02 | 2060.63 |
| UWC | 28.43 | | 1.33 | 42.78 | 2.33 | 15.95 | 42.18 | | 134.03 | | 29.88 | 77.07 | 46.61 | 92.66 | 13.82 | 1 | 18.94 | 8.28 | 2.31 | 36.57 | 594.18 |
| VUT | 0.5 | 0.42 | 3.11 | 26.92 | | 4.51 | 7.67 | 46.76 | 1.42 | 0.83 | | 6.58 | 6.19 | 38.25 | 4.71 | | | 2.31 | 2 | 9.67 | 161.89 |
| WITS | 0.38 | 38.18 | 16.34 | 130.98 | 0.5 | 8.84 | 67.53 | 153.39 | 589.18 | | 83.39 | 51.91 | 141.24 | 218.47 | 72.38 | | | 23.22 | 32.28 | 290.53 | 1918.75 |
| WSU | | 0.94 | 1 | 24.69 | 0.5 | 0.375 | 14.83 | 3.59 | 17.64 | 3 | | 4 | 1 | 17.91 | 0.25 | | 1 | | 1 | 3.47 | 95.18 |
| **TOTALS** | **1067.54** | **226.89** | **174.09** | **1889.33** | **179.29** | **627.85** | **1404.23** | **2189.98** | **3438.69** | **20.63** | **746.53** | **860.75** | **1866.27** | **1855.84** | **604.52** | **84.32** | **1243.62** | **359.29** | **330.22** | **1849.82** | **21019.69** |