



REPORT ON THE EVALUATION OF THE 2018 UNIVERSITIES' RESEARCH OUTPUT



higher education
& training

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FOREWORD BY THE DIRECTOR-GENERAL

It gives me great pleasure to present to you the Report on the Evaluation of the 2018 Universities' Research Outputs. The evaluation was conducted in accordance with the Research Outputs Policy, 2015.

The Department takes great pride in the research that is produced by our universities and the commitment shown to improve research productivity within a context of dwindling financial resources for research, increased competition, and the expansion of our university sector. I encourage institutions to view this report as a resource for understanding the research outputs of our universities within a diverse public higher education landscape reflecting different institutional missions and mandates.

Over the years, the trend analysis shows a positive growth in the number of research output units awarded to universities year on year. However in the 2019 reporting cycle, the report shows that there has been an overall decline in the number of units compared to the previous reporting cycle. This may be an anomaly caused by a number of factors, including an artificial spike in the 2018 research outputs due to units withdrawn in 2017 being reallocated and counted in 2018, and a decision made to withhold a number of units in 2019, pending an investigation. It is also possible that the system has reached its capacity and that we are witnessing a plateauing of research publication productivity. Time will tell. It is however encouraging that there is an increase in the number of contributing authors from 7 264 in 2005 to 26 842 in 2018. The Department also encourages research collaboration, not only with international academics, but between South African institutions including Science Councils, research organisations and industry.

Since the inception of this policy, the Department has invested heavily in the South African research enterprise. For the 2019/20 reporting period, the department allocated R4.9 Billion for research output subsidies. This is a significant contribution to the Research and Development funding in the country. I am aware that expenditure on

research as a country is not favourable in comparison to many other systems. It is important to improve support for our institutions to undertake research, not only for the benefit of the academy, but for the betterment of South Africa.

Whilst the Department's Research Output Policy has contributed greatly to the increase in research productivity, growth must also be attributed to the contributions of a number of other role players such as the Department of Science and Innovation (DSI) and the National Research Foundation (NRF) and international funding bodies. These organisations play a significant role through creating an enabling environment for research to be conducted, through provision of research grants to researchers and or institutions. It is this multi-stakeholder contribution that has resulted in improved research productivity and improved quality of research emanating from South Africa in general and universities in particular.

The Department has noted with concern and decided to act decisively on what seems to be increasing unethical behaviours arising from "gaming" the subsidy system. Many academics have commented on such 'scheming'. Often, commentators blame the subsidy system and do not fully appreciate that these practices are facilitated by decisions taken at the institutional level.

The Department subsidises institutions, not researchers. Institutions are responsible for monitoring the quality of research in their institution and clamping down on unethical practices. The practice of rewarding individual researchers for their research publication outputs in monetary terms, may incentivise some of the gaming reported. In addition, institutions should in their submissions to the department pick up when an individual researcher is claiming for what appears to be an impossible number of publications, and should investigate the veracity of the claims. Similarly institutions should check that the publications they submit are not in predatory journals, or that an editor is not over publishing in his/her own journal. These are just some examples of practices that the system needs to clean out. I invite institutions to work with the Department to address and stem unethical practices.

I would like to thank the NRF for providing a platform to support and improve the evaluation process. I also thank the Deputy Vice-Chancellors who serve on the Advisory Panel, and academics who serve on the field-specific panels. This work would not be possible without your support.

I am grateful to universities for continuing to support the Department in implementing the Research Outputs policy.

A handwritten signature in black ink, appearing to read 'GF Qonde', with a horizontal line extending to the right.

Mr GF Qonde

Director General: Department of Higher Education and Training

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APPENDIX 1: Research Publications by Institution per CESH Categories

ACRONYMS

CESM	Classification of Educational Subject Matter
CPUT	Cape Peninsula University of Technology
CUT	Central University of Technology
the Department	Department of Higher Education and Training
DUT	Durban University of Technology
HEMIS	Higher Education Management Information System
IBSS	International Bibliography of Social Science
MUT	Mangosuthu University of Technology
NDP	National Development Plan
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
STEM	Science, Technology, Engineering and Mathematics
SUN	Stellenbosch University
TUT	Tshwane University of Technology
UCDP	University Capacity Development Programme
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
UoTs	Universities of Technology
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 *Research Outputs Policy (2015)* gives all South African universities the responsibility to enhance the effectiveness and efficiency of research production and publication. Moreover, in order to reduce errors and incorrect submissions, institutions are required to ensure that all research office personnel are well acquainted with the policy. In this regard, institutional research committees are required to assess all research publications before submitting to the Department as per paragraph 8.2 (d) of the *Research Outputs Policy*. Only claims which meet the policy requirements must be submitted to the Department on or before the deadline of 15 May of each reporting year.

Of the 26 universities, 25¹ submitted their 2018 research publication outputs for evaluation. The Directorate: University Research Support and Policy Development administered the process and evaluated technical compliance of all submissions. Submissions that did not meet the requirements as set out in the policy were returned to the respective institutions.

To ensure quality, integrity, 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),

¹ Sol Plaatjie University did not submit any 2018 research outputs for evaluation.

whose members chair the respective sub-panels. The Panel mainly comprises 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. Currently, the Department recognises the following lists: Scopus; Scientific Electronic Library Online (SciELO) SA; the Norwegian Register for Scientific Journals; Clarivate Analytics (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), has developed the Research Outputs Submission System (ROSS), which is an electronic platform for capturing the research publications submitted by 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 2018 research outputs, can be summarised as follows:

- a) The Department received all institutional claims for outputs in Books, Conferences and Journals in May 2019.
- b) All the submissions were screened for eligibility and according to the technical criteria, as per the Policy.
- c) Expert or discipline-based evaluation sub-panels were appointed.

- d) The evaluation sub-panels evaluated the research outputs according to predetermined criteria and made recommendations regarding acceptance or not of the submissions on 5 to 7 August 2019.
- e) 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.
- f) 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.
- g) Individual institutional reports were developed by the Department and sent to the respective institutions in March 2020.
- h) This report on the evaluation of 2018 Universities' research outputs was then drafted by the Department.

Late publications for the year 2017 (n-2) were considered where valid and legitimate reasons for late submission were provided and accepted, but publications dating before 2016 (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. The aim of this will be for the Department to have a complete picture of the research produced by the sector.

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; and
- 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, 2019 for the preceding year (2018). However, because the policy allows for late submissions accompanied by valid reasons (i.e. 2018 – 1 year or year n minus 1), the result is that the total subsidy units awarded in 2019 for 2018 publications will invariably include a small proportion of publications that had been published in 2017. This has been the case since the policy came into place since 2004. In this report, the total number of subsidy units (or output units) that have been awarded to universities based on the submissions made in 2019 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 2018. 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. The Department is currently investigating putting in place a more appropriate scientific field classification system for the analysis of future submissions. 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

The annual research output reports have traditionally used a number of indicators that normalize for the difference in the size of universities. Four indicators are included in the report and make use of the Higher Education Management Information System (HEMIS) data:

- 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).
- 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 doctorate academic staff

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 output 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.

These analyses 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 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.

Most importantly for the higher education system in South Africa, the purpose of analysing the demographic patterns assists the Department to monitor transformation trends in the university sector, particularly the development of academics into scholars and scientists. Such knowledge assists the Department to design the necessary and practical interventions such as the introduction of the University Capacity Development Programmes (UCDP) introduced in 2018. This knowledge should assist the individual universities to improve their planning. The understanding of shifts in the demographics over time is imperative if the Department and the individual institutions are to seriously make a contribution to redress and transform 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 that receives subsidy. There are currently initiatives in this regard to strengthen existing frameworks and procedures. The Department will communicate with the sector on these initiatives and any changes that may be required in future to ensure that the subsidy system is not abused in any way. Subsidy should only support publications of high quality and ethical integrity. As per the policy, the Department reserves the right to withhold payment of research output subsidy in respect of any publication that does not meet the criteria and violates international rules about research integrity and ethics.

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 pursuit of allocating subsidy to quality research publications, each year the Department scrutinizes the quality of submissions. Such scrutiny assists in improving the policy, processes and procedures for submission, and determination of subsidy allocations. In certain

instances, where submissions have discrepancies, engagements have been held directly with affected institutions in order to assist them to improve their processes.

In the process of analysing the 2018 research publications, some anomalies were observed. This warranted withholding of some units to allow for further investigations. In total 282.49 units were withheld. The investigation will include scrutiny of publishers; journal indices and conferences. As far as it is practically possible, the process will be made transparent by the Department but taking into consideration that personal information remains confidential. If any of the withdrawn publications are cleared, subsidy will be allocated to the affected institutions in the next round of research subsidy allocations. If any of the publications that were awarded publication units are found in the investigation to violate the policy, the subsidies accrued will be retrospectively withdrawn.

2. OVERALL RESEARCH PUBLICATIONS OUTPUT

2.1 Overview and trends

A total of 19 098.72 publication subsidy units in all publication categories (journal articles, books and book chapters and published conference proceedings) were awarded to universities for the 2019 submission year (2018 publication year). This constitutes a decrease from the previous year by 345.71 units from 19 444.43. It should be noted that the 282.49 withheld units are not included in the analysis contained in this report. Figure 1 presents the time series data for the past fourteen years (2005 to 2018).

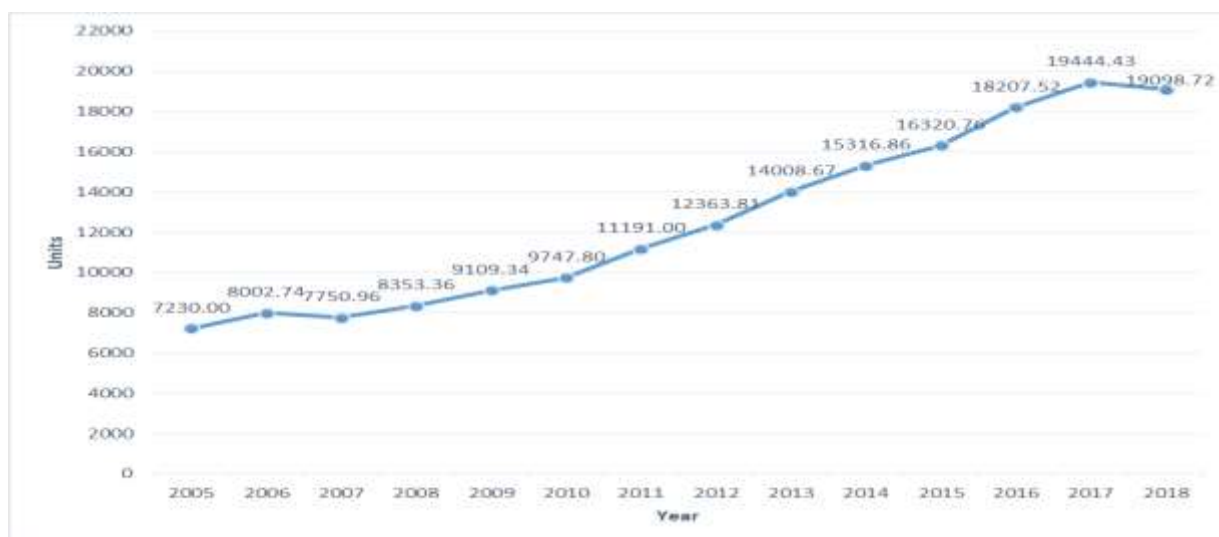


Figure 1: Total Publication Units awarded, 2005 - 2018

In the process of ensuring that quality outputs are funded, 577.91 units were deducted for the 2016 publications from institutions, following the identification of some journals suspected of being predatory. After representation from universities, the Department returned these units to institutions. Therefore the 2017 subsidy allocation is inflated. As a result, in some areas, this report may have different units for 2016 and 2017 publications from the units mentioned in the previous reports.

Although the publication output of SA universities has increased substantially over the past 14 years (at a CAGR² of 7, 77%), Figure 1 also suggests a slowing down in the rate of growth in recent years. The slowing down in growth is quite evident looking at the CAGR values for three-year rolling publication windows as presented in Table 1.

Table 1: CAGR by rolling three-year windows for total research output (2007 to 2018)

Periods	CAGR
2007-2009	8,41%
2008-2010	8,02%
2009-2011	10,84%
2010-2012	12,62%
2011-2013	11,88%
2012-2014	11,30%
2013-2015	7,94%
2014-2016	9,03%
2015-2017	9,15%
2016-2018	2,50%

The results show that the rate of increase in publication output was highest in the earliest period reaching a peak of 12.6% between 2010 and 2012. Since then the rate of increase has declined. This has been most prominent for the latest period (2.5%). The trend for the past three years may be an early indication that the university system has reached its capacity (or ceiling) in producing publications.

The above analyses of increases in research output publications are even more interesting when compared with two other trends, which are: the increase in the number of journals in which SA academic publish; and, the increase in the number of individual authors in the sector that are contributing to publication output.

As far as the increase in the number of journals in which SA academic publish is concerned, Figure 2 shows the increase in the number of journals in which academics have published their papers over the past fourteen years. The steeper increase in

² Compound average growth rate (CAGR)

titles between 2015 and 2016 coincides with the expansion of the approved journal indexes to include Scopus, ScieloSA and the Norwegian list. The addition of these indexes and list have created more publication opportunities for academics and they have evidently responded to having more publication outlets for their scholarship.

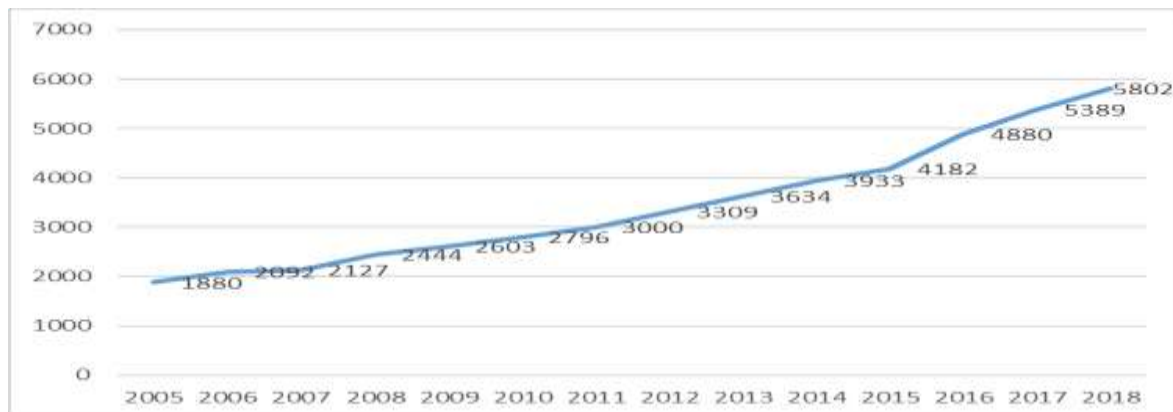


Figure 2: Increase in journals in which SA academics published (2005 - 2018)

Over the same period, the number of contributing authors has also steadily increased. The results presented below show that over the past fourteen years, the total number of contributing authors increased more than threefold from 7 264 in 2005 to 26 842 in 2018 (Figure 3). The same trend is recorded for all three publication types, although the rate of increase in two categories (journal articles and conference proceedings) over the past three years have slowed down. The rate of increase in the number of academics contributing to book and book chapter publications (especially from 2015 to 2016) has remained steady.



Figure 3: Research Output publications by publication type

2.2 Publication output by publication type

The policy recognises three types of publications: books and book chapters; published conference proceedings and journal articles. The output units awarded in 2018 in each category and per university are listed in Table 2.

Table 2: Publication output by publication type (sorted by highest to lowest percentage overall sector publications units)

	Books and Book Chapters		Conferences		Journals		Overall Units in 2018	% of Overall Sector Publications Units
	Units	% of Total Institutional Units	Units	% of Total Institutional Units	Journals	% of Total Institutional Units		
UKZN	176.05	8.5%	46.57	3.7%	1847.25	11.7%	2069.86	10.8%
UP	266.81	12.9%	85.20	6.7%	1702.54	10.8%	2054.55	10.8%
SU	280.51	13.6%	97.63	7.7%	1527.83	9.7%	1905.96	10.0%
WITS	196.46	9.5%	83.40	6.6%	1598.53	10.1%	1878.39	9.8%
UCT	169.63	8.2%	101.17	7.9%	1555.76	9.9%	1826.56	9.6%
UJ	220.42	10.6%	301.14	23.7%	1169.40	7.4%	1690.96	8.9%
NWU	131.85	6.4%	133.38	10.5%	1173.05	7.4%	1438.28	7.5%
UNISA	146.56	7.1%	75.06	5.9%	1077.64	6.8%	1299.27	6.8%
UFS	182.55	8.8%	26.95	2.1%	783.23	5.0%	992.73	5.2%
RU	94.87	4.6%	12.81	1.0%	441.70	2.8%	549.38	2.9%
UWC	45.43	2.2%	11.26	0.9%	424.61	2.7%	481.30	2.5%
NMU	35.48	1.7%	41.93	3.3%	349.93	2.2%	427.34	2.2%
DUT	49.66	2.4%	18.46	1.5%	276.81	1.8%	344.93	1.8%
UL	2.71	0.1%	31.42	2.5%	310.16	2.0%	344.29	1.8%
UFH	12.05	0.6%	2.83	0.2%	315.01	2.0%	329.89	1.7%
TUT	3.86	0.2%	41.34	3.2%	250.33	1.6%	295.53	1.5%
CPUT	13.90	0.7%	41.90	3.3%	161.87	1.0%	217.66	1.1%
UNIZULU	17.38	0.8%	8.21	0.6%	187.10	1.2%	212.69	1.1%
UNIVEN	10.76	0.5%	5.42	0.4%	163.53	1.0%	179.71	0.9%
CUT	6.19	0.3%	58.89	4.6%	105.13	0.7%	170.20	0.9%
VUT	2.74	0.1%	40.62	3.2%	106.39	0.7%	149.74	0.8%
SMU	0.00	0.0%	0.57	0.0%	88.02	0.6%	88.59	0.5%
WSU	0.73	0.0%	3.92	0.3%	54.79	0.3%	59.43	0.3%
UMP	3.33	0.2%	0.79	0.1%	45.21	0.3%	49.33	0.3%
MUT	0.00	0.0%	1.88	0.1%	40.24	0.3%	42.12	0.2%
Total	2069.93	100.0%	1272.73	100.0%	15756.06	100.0%	19098.72	100.0%

As is evident from Figure 4 below, the largest proportion of the sector's output remains in the form of journal articles (82.5%), followed by books and book chapters (10.8%) and published conference proceedings (6.7%).

The proportional share of publication output by publication type as recorded for 2018, is consistent with the historical trends over time (Figure 4 below). Ten years ago (in 2009), conference proceedings and book publications constituted 5% and 4% of all output respectively. By 2018, these proportions have increased to 6.77% (conference

proceedings) and 10.8% for book publications. The strong increase in the relative contribution of books and book chapters occurred in 2016, the year in which the subsidy units for books was revised to 10 units (maximum) for a book.

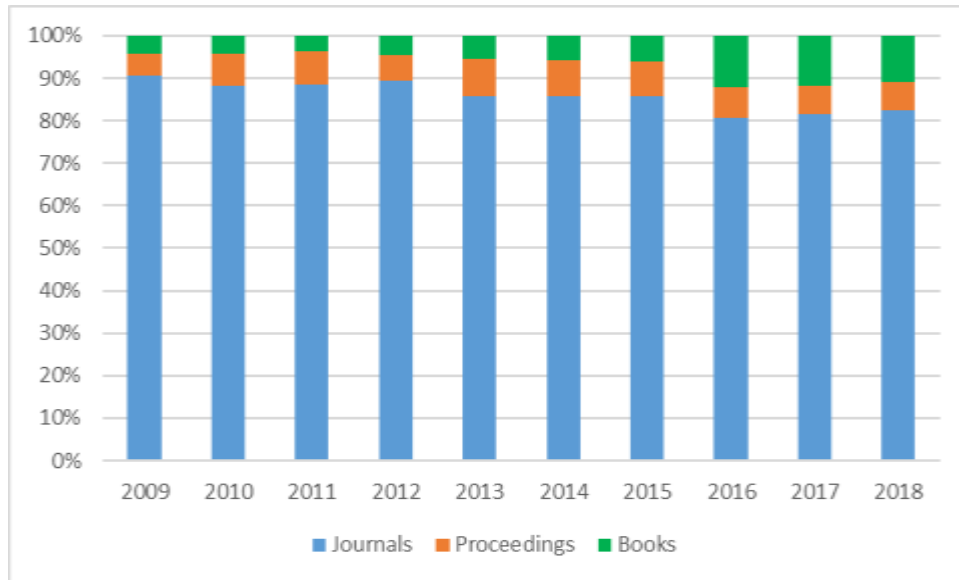


Figure 4: Proportion share of research publication output by publication type: 2009 - 2018

3. JOURNAL PUBLICATIONS OUTPUT

As indicated above, recent trends as far as the proportional contribution of different publication types to overall publications research outputs show that book publications have increased their share of total output. However, journal articles remain the predominant mode of knowledge dissemination across the majority of scientific fields and disciplines.

3.1 Overview of journal publications

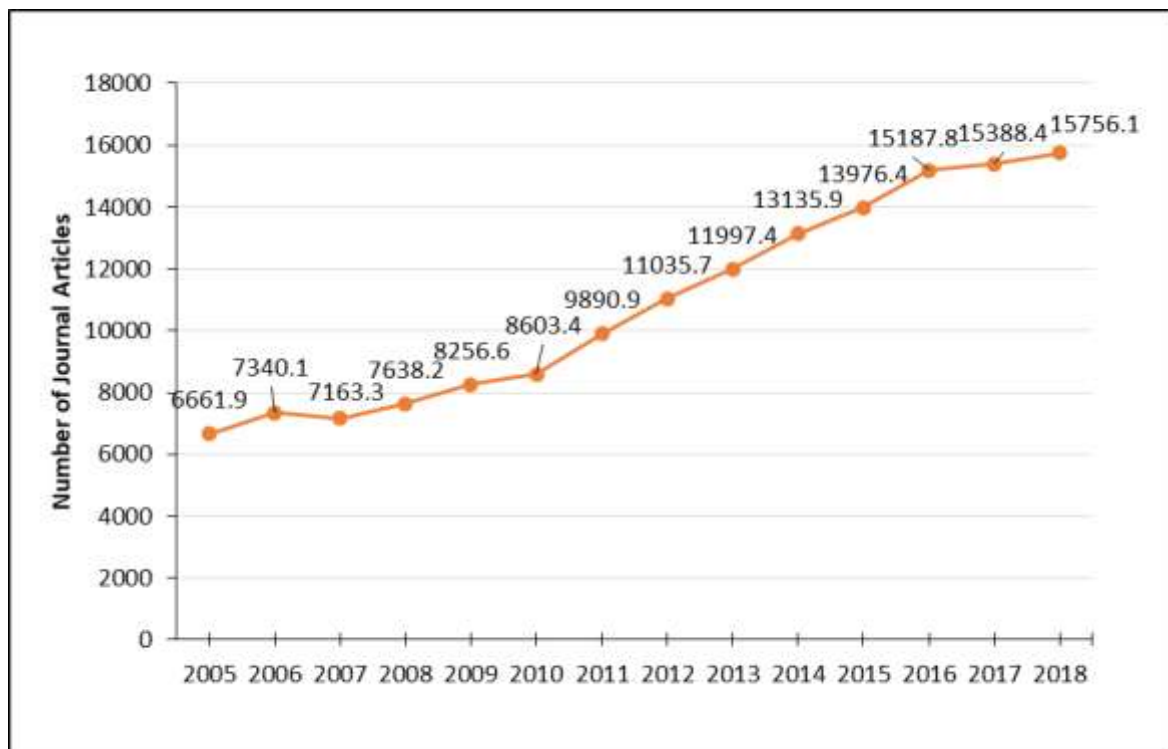


Figure 5: Trend in journal article output units: 2005 – 2018

Figure 5 shows the long-term trend of units awarded for journal outputs. The CAGR over this period is presented in Table 3. This shows the slowdown in growth in the latter periods.

Table 3: CAGR by rolling three-year periods for journal articles (2007 – 2018)

Periods	CAGR
2007-2009	7,36%
2008-2010	6,13%
2009-2011	9,45%
2010-2012	13,26%
2011-2013	10,14%
2012-2014	9,10%
2013-2015	7,93%
2014-2016	7,53%
2015-2017	4,93%
2016-2018	1,85%

Table 4 presents the breakdown of journals output by journal index or list. All journal articles are linked to a specific journal that can be indexed in one or more of the journal lists. The results show the dominance of two indexes: Scopus and Web of Science. Combined, the two indexes take up 80% of all journal articles. Conversely, the DHET accredited journals (i.e. DHET only or a combination of DHET list with any other list), made up approximately 20% of all articles.

Table 4: Journal Publication Output by Index, 2018 (mutually exclusive categories).

Index	Count	
Scopus and WoS	9185	42%
Scopus only	3532	16%
Any combination that includes either Scopus or WoS but not DHET	3153	14%
DHET only	2116	10%
DHET and either Scopus or WoS (or both)	1548	7%
IBSS only	965	4%
WoS only	640	3%
DHET and either Scopus or WoS (or both), together with any other	446	2%
DHET and either IBSS or SciELO (or both)	370	2%
SciELO only	158	1%
NW only	16	0.1%
Any combination that excludes Scopus, WoS and DHET	2	0.01%
Total	22131	

Note: No link to an index could be established for 25 journal publications.

3.2. Journal publications outputs by scientific field

The classification of output units by CESH classification has been revised to create more comparable categories. The result of this revised analysis is presented in Table 5. The last three years have been selected for purposes of comparison.

Table 5: Outputs Units by CESH Categories, 2016 to 2018

Discipline	CESM	2016		2017		2018	
		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	4 858.72	32%	4 670.69	30%	4 657.6	29.6%
Health Professions and Related Clinical Sciences	02, 08	2 760.02	18%	2 834.79	18%	3 008.9	19.1%
Economic & Management Sciences	04	1 637.66	11%	1 613.1	10%	1 471.3	9.3%
Life Sciences	01	1 525.47	10%	1 557.35	10%	1 797.6	11.4%
Physical Sciences	05, 15	1 595.28	11%	1 494.59	10%	1 542.5	9.8%
Engineering & the Built Environment	14	1 098.27	7%	1 216.94	8%	1 390.6	8.8%
Agriculture	13	884.6	6%	1 195.47	8%	927.3	5.9%
Mathematics, Statistics & ICT	09	784.95	5%	756.65	5%	905.6	5.7%
Military Sciences	16	42.8	0.3%	48.84	0.3%	54.6	0.3%
TOTAL		15 187.77	100%	15 388.42	100%	15 756.1	100%

Comparatively, Table 5 shows very small shifts in the proportional contributions of fields to total output. This is not surprising as universities are organized around scientific fields and disciplines that do not change substantially in the short term.

3.3. Journal articles by journal index and scientific fields

Table 6 shows the distribution of journal publications output units in six main scientific fields using the Web of Science subject categories. The results in Table 6 show how articles in these six fields map to the journal list combinations discussed above. High proportions of articles in the STEM fields (Agriculture, engineering, health sciences and natural sciences) appear in either the Web of Science or Scopus. 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 predominantly caters for the social sciences).

Table 6: Journal Publication Outputs Units by Index combinations (2018)

Index combinations	Agricultural sciences	Engineering & applied technologies	Health sciences	Humanities	Natural sciences	Social sciences
Scopus and WoS	71%	50%	55%	12%	67%	22%
Any combination that includes either Scopus or WoS but not DHET	8%	16%	12%	13%	13%	27%
Scopus only	16%	20%	13%	11%	10%	9%
DHET only	1%	5%	4%	24%	1%	15%
DHET and either Scopus or WoS (or both)	2%	4%	10%	17%	6%	4%
IBSS only	1%	0.2%	0.1%	3%	0.2%	15%
WoS only	1%	3%	3%	3%	3%	2%
DHET and either Scopus or WoS (or both), together with any other	1%	2%	1%	9%	1%	2%
DHET and either IBSS or SciELO (or both)	0%	0%	1%	8%	0%	4%
SciELO only	0%	0%	0%	1.0%	0%	0.2%
NW only	0.1%	0%	0.1%	0.1%	0.02%	0.05%
Any combination that excludes Scopus, WoS and DHET	0%	0%	0%	0.1%	0.0%	0%
Total	100%	100%	100%	100%	100%	100%

4. BOOK AND BOOK CHAPTER (BOOK PUBLICATIONS) OUTPUTS

4.1 Overview and trends

Research publication units in scholarly books for 2018 amounted to 2 069.9 units, a decrease of 138 units from 2 207.9 units in 2017. The longer term trend in book publications production, presented in Figure 6, shows that the decreases in the past three years came after the substantial increase in 2016 when units for a full book were increased from five to ten.

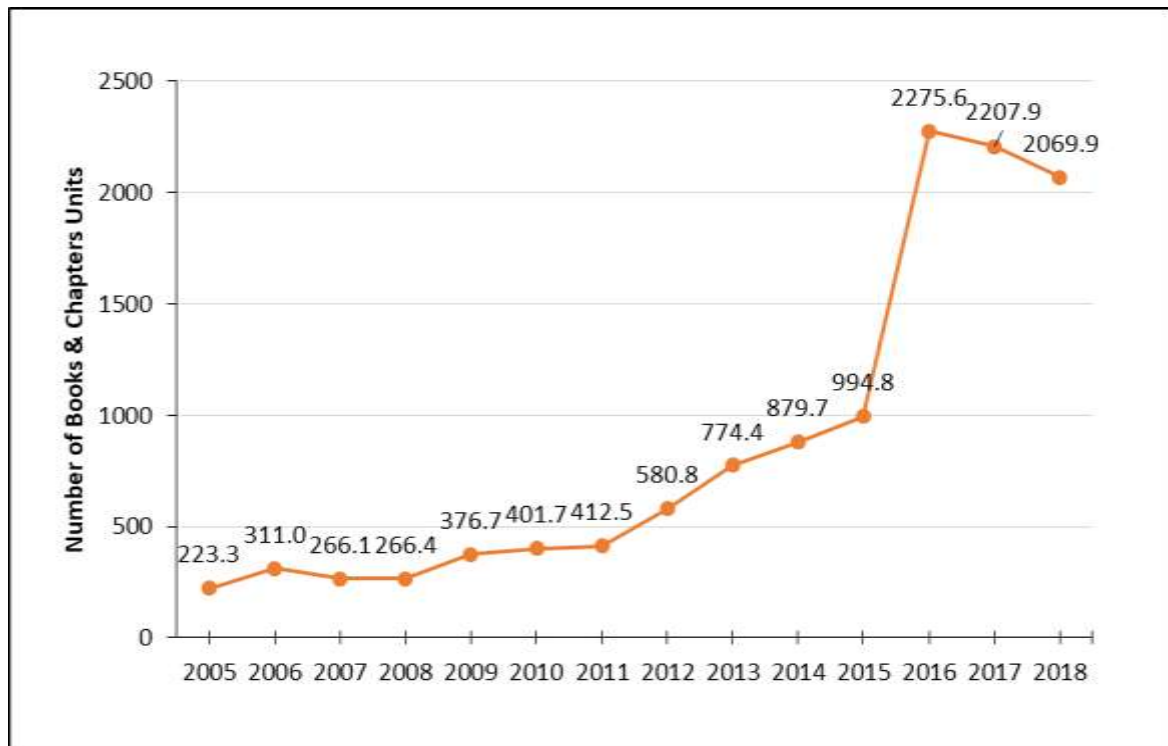


Figure 6: Trend in book and book chapter output: 2005 - 2018

Table 7: CAGR by rolling three-year periods for books and chapters (2007 to 2018)

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

4.2 Book and book chapter output by university

The distributions of book publications subsidies awarded for the past two years by university are presented in Table 8. The results are organized in descending order in terms of the 2018 subsidy units.

Table 8: Proportion of Book Publications Output Units by University, 2017 and 2018

Institution	2017		2018	
	No. of Units	% Column	No. of Units	% of Column
SUN	266.0	12.0%	280.5	13.6%
UP	237.7	10.8%	266.8	12.9%
UJ	326.5	14.8%	220.4	10.6%
WITS	286.4	13.0%	196.5	9.5%
UFS	239.2	10.8%	182.5	8.8%
UKZN	128.1	5.8%	176.0	8.5%
UCT	186.0	8.4%	169.6	8.2%
UNISA	117.6	5.3%	146.6	7.1%
NWU	110.0	5.0%	131.9	6.4%
RU	99.2	4.5%	94.9	4.6%
DUT	28.6	1.3%	49.7	2.4%
UWC	53.2	2.4%	45.4	2.2%
NMU	22.5	1.0%	35.5	1.7%
UNIZULU	24.9	1.1%	17.4	0.8%
CPUT	25.8	1.2%	13.9	0.7%

Institution	2017		2018	
	No. of Units	% Column	No. of Units	% Column
UFH	13.8	0.6%	12.1	0.6%
UNIVEN	8.4	0.4%	10.8	0.5%
CUT	3.2	0.1%	6.2	0.3%
TUT	6.5	0.3%	3.9	0.2%
UMP	0.0	0.0%	3.3	0.2%
UL	21.4	1.0%	2.7	0.1%
VUT	0.0	0.0%	2.7	0.1%
WSU	1.1	0.1%	0.7	0.0%
MUT	0.8	0.0%	0.0	0.0%
SMU	1.0	0.0%	0.0	0.0%
TOTAL	2207.9	100.0%	2069.9	100.0%

4.3 Book publications outputs by scientific fields (CESM)

Table 9 presents the breakdown of book publications output units by disciplines. The results are in line with past reports. The social sciences and humanities produce the lion's share of total output (81%) followed by the economic and management sciences (5%).

Table 9: Book publications output units awarded by scientific field (CESM), 2018

Discipline	CESM	Units	% of Total
Social Sciences & Humanities	3,5,7,10,11,12,17,18,19,20	1680.403	81.2%
Economics and Management Sciences	04	113.8088	5.5%
Engineering & the Built Environment	14	73.4379	3.5%
Physical Sciences	06,15	68.8504	3.3%
Life Sciences	01	40.8803	2.0%
Agriculture	13	31.111	1.5%
Health Professions and Related Clinical Sciences	02,08	28.3241	1.4%
Mathematics, Statistics & ICT	09	25.233	1.2%
Military Sciences	16	7.8827	0.4%
Total		2069.931	100%

5. PUBLISHED CONFERENCE PROCEEDINGS

5.1 Overview and trends

The trend line of published conference proceedings over the past fourteen years (2005 – 2018), as presented in Figure 8, reveals three very distinct phases: an initial period between 2005 and 2011/2012 of high but steady growth; followed by a significant peak between 2012 and 2013 and then, for the past 6 years, a static phase. The 2012-2013 peak followed an improvement and widening of scope of recognised conference proceedings. These very different rates of increases are captured in Table 10 which presents the CAGR values for the corresponding time frames.

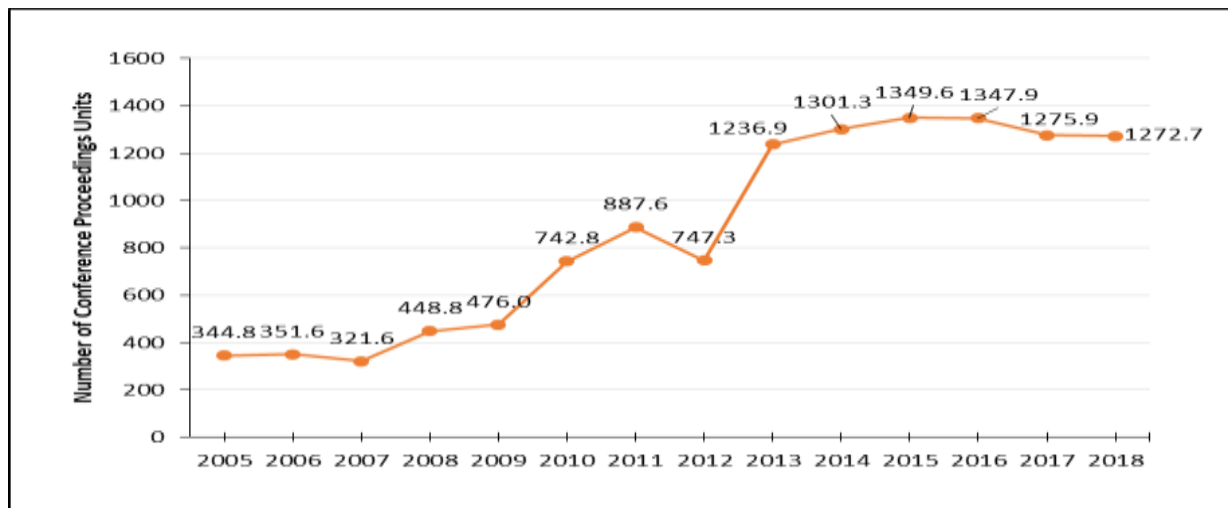


Figure 7: Trend in the output of published conference proceedings: 2005 – 2018

Table 10: CAGR values for growth rates in annual published conference proceedings

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

A further illustration of these rates of increases is carried out in the breakdown analysis of outputs by universities (Table 11). The results show that the 2012 and 2013 peak can be accounted for by the steep increases in the outputs at UJ and to a lesser extent CUT, VUT and UL.

**Table 11: Published Conference Proceedings Units per university, 2013 – 2018
(arranged in the descending order of the CAGR)**

Institution	No. of Units						CAGR from 2013 to 2018
	2013	2014	2015	2016	2017	2018	
CUT	13.02	13.65	30.85	44.89	44.23	58.89	37.24%
VUT	13.01	29.85	13.28	18.21	22.86	40.62	25.68%
UJ	182.5	253.47	288.44	304.15	303.72	301.14	10.75%
UL	23.83	9.21	33.01	17.78	15.99	31.42	7.24%
UNIZULU	7	6.85	11.33	6.78	5.59	8.21	4.46%
WITS	68.46	77.94	86.38	79.06	102.94	83.40	4.11%
NWU	120	107.34	126.8	90.13	82.37	133.38	2.33%
UNISA	68.13	78.61	87.73	85.15	57.94	75.06	2.29%
DUT	17.37	10.93	31.82	8.73	21.25	18.46	1.77%
WSU	4	1	2.5	2.75	4	3.92	0.82%
CPUT	41.79	46.5	33.44	32.6	23.4	41.90	0.49%
UFS	33.02	39.59	46.34	33.42	39.71	26.95	0.03%
MUT	2.25	1.63	1.25	2.87	0.25	1.88	-3.58%
UCT	122.5	117.29	102.62	103.94	104.46	101.17	-3.61%
UKZN	58.34	52.35	51.21	61.03	67.08	46.57	-4.30%
SUN	126.7	103.51	82.64	115.61	105.17	97.63	-4.88%
UP	119.6	147.04	151.02	139.83	111.86	85.20	-6.24%
UWC	16.73	10.06	6.82	10.41	7.25	11.26	-7.62%
TUT	65.37	58.63	44.43	47.92	49.50	41.34	-8.73%
UNIVEN	9.15	13.68	9.08	13.08	8.90	5.42	-8.91%
NMU	84.16	77.39	63.64	84.09	54.23	41.93	-12.50%
RU	28.69	29.8	34.6	29.45	23.8	12.81	-14.24%
UFH	11.26	14.75	8.85	15.99	17.91	2.83	-24.12%
UMP	-	-	-	-	1.50	0.79	-
SMU	-	0.25	1.5	-	-	0.57	-
TOTAL	1 237	1 301.3	1 349.6	1 347.9	1 275.9	1 272.73	0.99%

In 2018, UJ accounted for 24% of all published conference proceeding units awarded as illustrated in Figure 8.

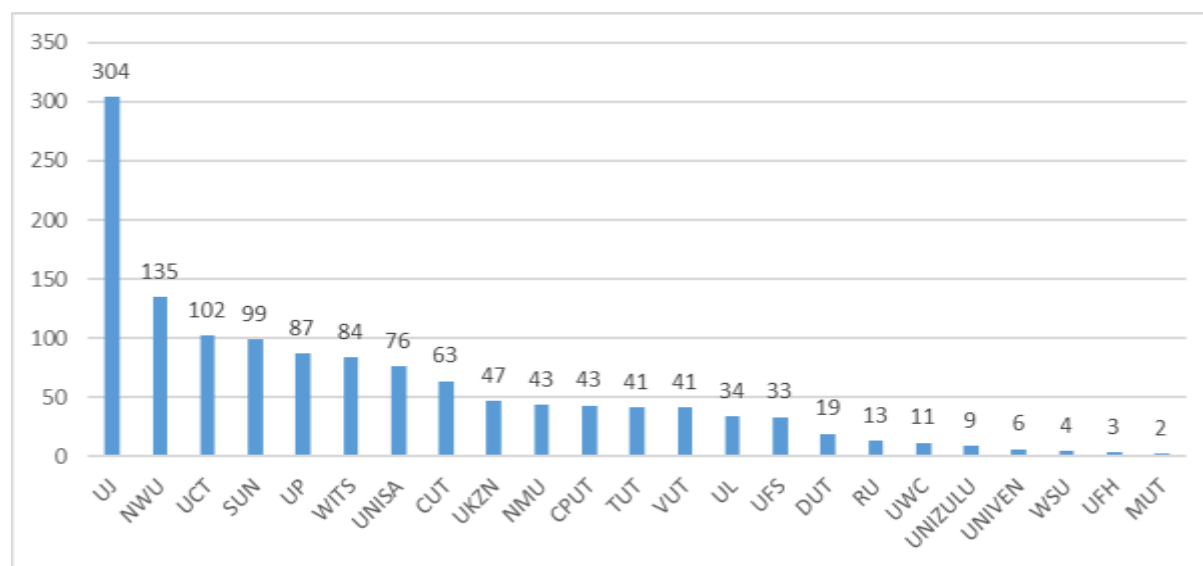


Figure 8: 2018 subsidies awarded (rounded) for published conference proceedings by universities

5.2 Published conference proceedings by Scientific field (CESM)

Table 12 presents the breakdown of conference proceedings output units by discipline. The largest share of units for published conference proceedings in 2018 is in Engineering & the Built Environment at 47.8% followed by Economics and Management Sciences at 16.3%.

Table 12: Published Conference Proceedings Outputs by Scientific Field (CESM)

2018 Conference Proceedings			
Discipline	CESM	Units	% of Total
Engineering & the Built Environment	02,08	608.0143	47.8%
Economics and Management Sciences	4	207.5598	16.3%
Social Sciences & Humanities	3,5,7,10,11,12,17,18,19,20	191.5564	15.0%
Mathematics, Statistics & ICT	06,15	181.4037	14.3%
Physical Sciences	14	65.28	5.1%
Health Professions and Related Clinical Sciences	9	8.6684	0.7%
Agriculture	1	6.9233	0.5%
Life Sciences	13	2.6668	0.2%
Military Sciences	16	0.75	0.1%
Total		1272.8	100%

6. NORMALIZED RESEARCH OUTPUTS INDICATORS

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

- Per capita research publication output (where the total number of publications by a university is divided by the headcount number of the academic (permanent instructional and research) staff).
- Weighted per capita research output (where all research output, including research masters and doctoral graduates) are divided by the headcount number of academic staff.
- Proportion of academic staff with doctoral degrees.
- Proportion of doctoral graduates per doctorate academic staff.

6.1 Per capita research publication output

The results show that the average per capita output for all universities in 2018 was 0.97. This means that the average academic in the country produced one research publication unit (rounded up) in 2018. Eight universities (UP, SUN, WITS, RU, UKZN, UCT, UJ and UFS) exceeded the national average of 0.97 units per year.

Table 13: Per capita research publication output (normalized by head count of permanent academic staff) (2018)

University	HC of permanently employed academics (a)	Research Publications Units (1)	Per Capita Research Publications Output
UP	1 205	2 057.05	1.71
SUN	1 162	1 909.03	1.64
WITS	1 185	1 879.72	1.59
RU	356	549.88	1.54
UKZN	1 341	2 070.11	1.54
UCT	1 211	1 827.98	1.51
UJ	1 276	1 693.88	1.33
UFS	966	999.85	1.04
Sector average			0.97
UFH	356	329.89	0.93
NWU	1 547	1 439.52	0.93
UWC	681	481.97	0.71
UNISA	1 844	1 300.49	0.71
NMU	626	428.58	0.68
UNIZULU	320	213.19	0.67
UL	566	343.92	0.61
CUT	300	175.20	0.58
DUT	605	345.43	0.57
UMP	107	49.33	0.46
UNIVEN	431	180.03	0.42
VUT	389	149.91	0.39
TUT	935	295.59	0.32
CPUT	804	218.58	0.27
MUT	216	42.12	0.19
SMU	621	88.59	0.14
WSU	619	59.68	0.10

6.2 Weighted per capita research output

The weighted 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 is normalized by dividing the total units by total headcount of academic staff.

The results show that the weighted average per capita research output for all universities in 2018 was 1.91. This means that the average academic in the country produced two research output units in 2018. Eight universities (UP, UKZN, SUN, WITS, UFH, RU, UKZN, UCT and UJ) exceeded the national average of 1.91 units per year.

Table 14: Weighted per capita research output (2018)

University	HC of permanently employed academics (a)	Research Publications Units (1)	Research Masters Graduates Units (2)	Doctorate Graduates (3)	Overall Research Output (1+2+3)	Weighted per capita research output (1+2+3)/a
UP	1 205	2 057.05	1 127	1 272	4 455.72	3.70
UKZN	1 341	2 070.11	907	1 491	4 468.35	3.33
SUN	1 162	1 909.03	882	915	3 706.15	3.19
WITS	1 185	1 879.72	876	840	3 595.86	3.03
UFH	356	329.89	277	396	1 003.02	2.82
RU	356	549.88	178	273	1 000.68	2.81
UCT	1 211	1 827.98	691	585	3 104.41	2.56
UJ	1 276	1 693.88	608	567	2 869.33	2.25
Sector average						1.91
UFS	966	999.85	384	414	1 798.11	1.86
NWU	1 547	1 439.52	527	744	2 710.18	1.75
UWC	681	481.97	295	372	1 148.97	1.69
NMU	626	428.58	293	306	1 027.32	1.64

University	HC of permanently employed academics (a)	Research Publications Units (1)	Research Masters Graduates Units (2)	Doctorate Graduates (3)	Overall Research Output (1+2+3)	Weighted per capita research output (1+2+3)/a
UNISA	1 844	1 300.49	527	889	2 716.15	1.47
UNIZULU	320	213.19	70	93	376.19	1.18
DUT	605	345.43	130	195	669.93	1.11
UNIVEN	431	180.03	118	128	425.03	0.99
UL	566	343.92	144	36	524.15	0.93
CUT	300	175.20	40	54	269.20	0.90
TUT	935	295.59	243	174	712.09	0.76
CPUT	804	218.58	186	99	503.08	0.63
VUT	389	149.91	45	30	224.41	0.58
UMP	107	49.33	0	0	49.33	0.46
SMU	621	88.59	52	30	170.54	0.27
MUT	216	42.12	0	0	42.12	0.19
WSU	619	59.68	11	18	88.81	0.14

The graph (Figure 9) shows that in the past 10 years (2009 – 2018) the average research **publications** per capita output grew by 61% while **overall** research outputs grew by 57%. This statement refers to the national average, individual institutions would show their respective performances.

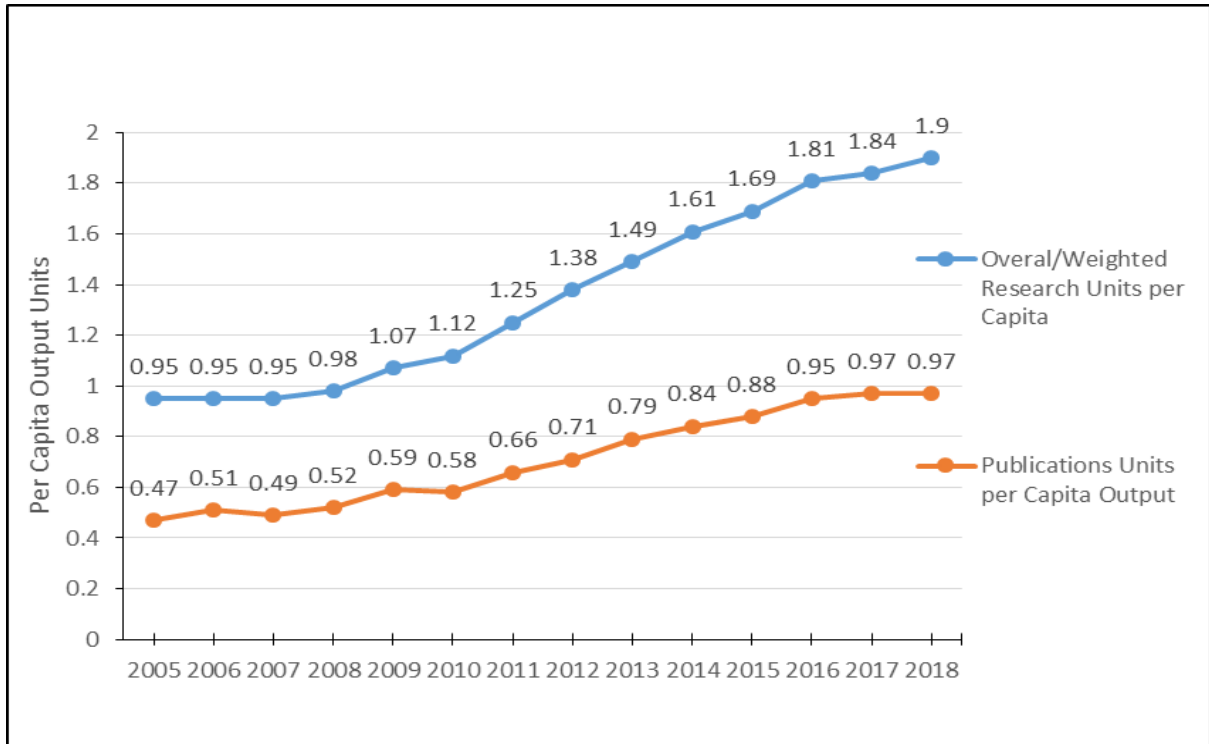


Figure 9: Overall Weighted and Publication per Capita Output 2005 – 2018

Figure 9 shows the average overall weighted units per capita and publications output units per permanently employed academic staff member (per capita) from 2005 to 2018. 2005 is the year the revised research outputs policy came into effect. Despite a tentative start in the growth of both publications and overall weighted research outputs, there has been sustained growth of research output units across all the universities. The average total publication output units per permanent academic staff member (or per capita output) for all institutions for 2018 was 0.97 units. The growth in the weighted research units per capita can be attributed to the growth of the Masters and Doctoral production.

6.3 Proportion of academic staff with doctoral degrees

In the NDP 2030 (2012), a target for the system was set stating that 75% of all academic staff in universities should have a Doctoral Degree by 2030. The pursuit of a doctoral degree is not viewed in all disciplines as essential, for example professional disciplines (such as health professions, law or engineering) or disciplines such as the

visual and performing arts, as essential. Table 15 presents the data on this indicator for 2018, whilst Figure 10 presents the time series data for the period 2005 to 2018.

Table 15: Proportion of academic staff with doctorate as highest qualification (2018)

Institution	Number of academics with Doctorate as Highest Qualifications	Number of Instructional/Research Staff	Academics with doctorates (%)
UP	839	1 205	69,6%
WITS	781	1 185	65,9%
UCT	775	1 211	64,0%
RU	208	356	58,4%
SU	665	1 162	57,2%
UKZN	745	1 341	55,6%
UWC	376	681	55,2%
UNISA	1 003	1 844	54,4%
NWU	805	1 547	52,0%
UJ	635	1 276	49,8%
Sector average			48,0%
UFH	169	356	47,5%
UNIZULU	150	320	46,9%
UFS	451	966	46,7%
NMU	290	626	46,3%
UNIVEN	182	431	42,2%
CUT	120	300	40,0%
UMP	40	107	37,4%
UL	189	566	33,4%
TUT	297	935	31,8%
SPU	35	112	31,3%
CPUT	241	804	30,0%
DUT	179	605	29,6%
SMU	126	621	20,3%
VUT	79	389	20,3%
MUT	36	216	16,7%
WSU	82	619	13,2%

The results in Table 15 show that on average 48% of the academic staff in universities have doctoral degrees. Ten universities (UP, WITS, UCT, RU, SUN, UKZN, UWC, UNISA, NWU and UK) exceeded this average. The average proportion of staff with Doctoral degree for the universities of technology is 29%.

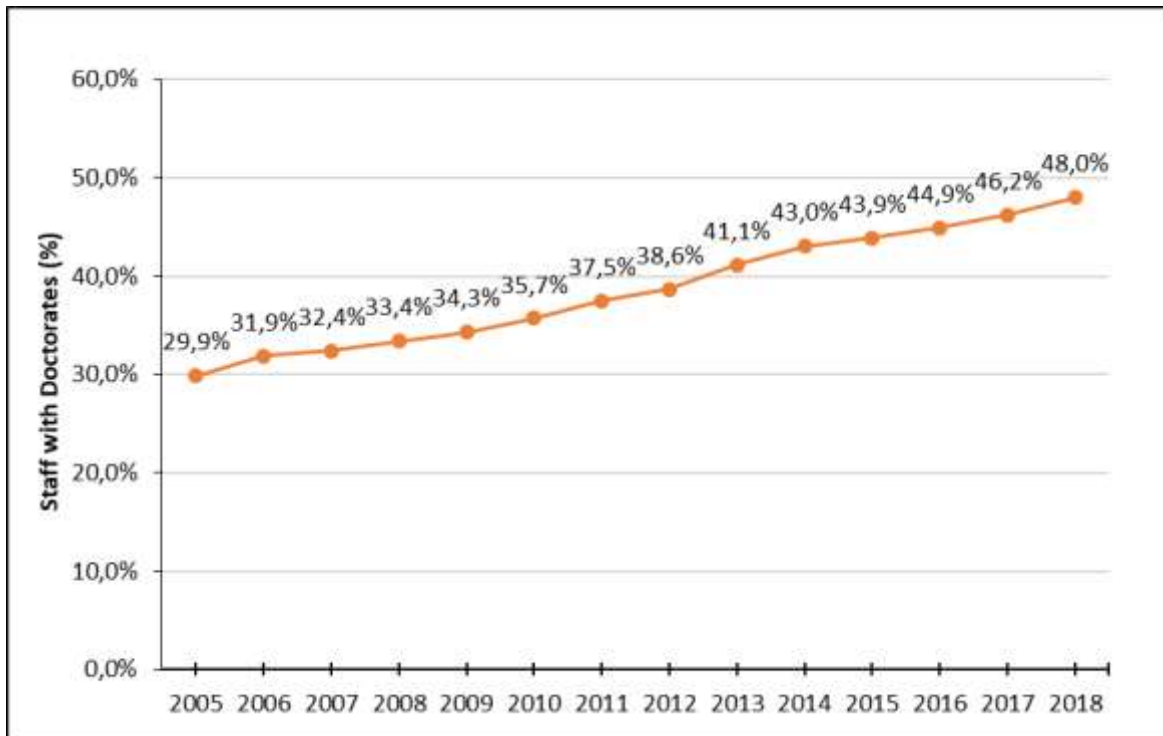


Figure 10: Trend in proportions of academic staff with doctorates: 2005 - 2018

Figure 10 shows the growth trend in staff with Doctoral degrees, which grew from 30% in 2005 to 48 % in 2018.

6.4 Proportion of doctoral graduates per doctorate academic staff

Below is the analysis of the proportion of doctoral graduates per permanent doctorate staff member by university. The data show that UFH recorded the highest ratio of doctoral graduates to staff members for 2018.

Table 16: Proportion of doctoral graduates per doctorate staff member by university

Institution	Academics with Doctorate as Highest Qualification	Doctorate Graduates	Ratio of doctorate graduates to doctorate staff
UFH	169	132	0,78
UKZN	745	497	0,67
UP	839	424	0,51
SU	665	305	0,46
RU	208	91	0,44
DUT	179	65	0,36
WITS	781	280	0,36
NMU	290	102	0,35
Average			0,35
UWC	376	124	0,33
NWU	805	248	0,31
UFS	451	138	0,31
UJ	635	189	0,30
UNISA	1003	296	0,30
UCT	775	195	0,25
UNIVEN	182	43	0,24
UNIZULU	150	31	0,21
TUT	297	58	0,20
CUT	120	18	0,15
CPUT	241	33	0,14
VUT	79	10	0,13
SMU	126	10	0,08
WSU	82	6	0,07
UL	189	12	0,06
UMP	40	0	0,00
MUT	36	0	0,00

Table 17: Permanently employed academics by qualification, 2018

Institution	Number of Instructional/ Research Professionals	Academics with Masters as Highest Qualifications	Institutional % Masters	Academics with Doctorate as Highest Qualifications	Institutional % Doctorates	Overall Units (publications, Masters & Doctorates)	Staff with Honours and Lower
UP	1205	342	28,4%	839	69,6%	4455,72	2,0%
UKZN	1341	456	34,0%	745	55,6%	4468,35	10,4%
SU	1162	275	23,7%	665	57,2%	3706,15	19,1%
WITS	1185	296	25,0%	781	65,9%	3595,86	9,1%
UCT	1211	335	27,7%	775	64,0%	3104,41	8,3%
UNISA	1844	559	30,3%	1003	54,4%	2716,15	15,3%
NWU	1547	440	28,4%	805	52,0%	2710,18	19,5%
UJ	1276	532	41,7%	635	49,8%	2869,33	8,5%
UFS	966	414	42,9%	451	46,7%	1798,11	10,5%
UWC	681	195	28,6%	376	55,2%	1148,97	16,2%
RU	356	112	31,5%	208	58,4%	1000,68	10,1%
UFH	356	131	36,8%	169	47,5%	1003,02	15,7%
NMU	626	212	33,9%	290	46,3%	1027,32	19,8%
TUT	935	396	42,4%	297	31,8%	712,09	25,9%
UL	566	223	39,4%	189	33,4%	524,15	27,2%
DUT	605	282	46,6%	179	29,6%	669,93	23,8%
UNIVEN	431	167	38,7%	182	42,2%	425,03	19,0%
CPUT	804	375	46,6%	241	30,0%	503,08	23,4%
UNIZULU	320	143	44,7%	150	46,9%	376,19	8,4%
CUT	300	141	47,0%	120	40,0%	269,20	13,0%
SMU	621	292	47,0%	126	20,3%	170,54	32,7%
Institution	Number of Instructional/ Research Professionals	Academics with Masters as Highest Qualifications	Institutional % Masters	Academics with Doctorate as Highest Qualifications	Institutional % Doctorates	Overall Units (publications, Masters & Doctorates)	Staff with Honours and Lower
VUT	389	158	40,6%	79	20,3%	224,41	39,1%
WSU	619	243	39,3%	82	13,2%	88,81	47,5%
MUT	216	109	50,5%	36	16,7%	42,12	32,9%
UMP	107	30	28,0%	40	37,4%	49,33	34,6%
SPU	112	57	50,9%	35	31,3%	0,00	17,9%
OVERALL TOTALS	19781	6915	35,0%	9498	48,0%	37659,14	17,0%

It is an established fact that institutions with relatively higher proportions of academics with doctorate as the highest qualification, vis-à-vis institutions with higher proportion of academics with Masters as highest qualification, have relatively

higher research output. In the sector currently, 17% of academics have a lower qualification than a Masters degree (see Table 17). This observation is the basis for development funding from the Department, especially with respect to the University Capacity Development Programme (UCDP).

7. Demographic trends

The Department seeks to gather demographic information of all authors for the purposes of monitoring and informing the transformation agenda of higher education in South Africa. Indeed, more and better knowledge about patterns of academic activity helps the Department to do better planning and improve its policy development process. There has been an improvement in the quality and relative reliability of the data, however, there are still some improvements which will be introduced over time. The demographic information in this report is what the institutions submitted for subsidy purposes and it is presented as such.

7.1 Publication outputs by gender of author

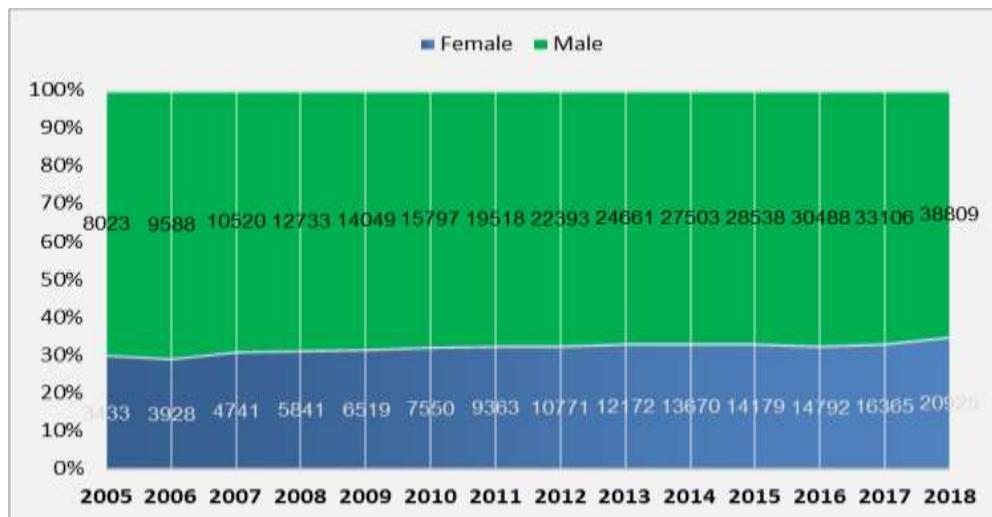


Figure 11: Gender of authors of all publications: 2005 – 2018

The proportion of women-authored publications increased from 30% in 2005 to 35% in 2018. Over the same period the proportion of female academic staff increased from 41% in 2005 to 48% in 2018.

7.2 Publication outputs by nationality of author

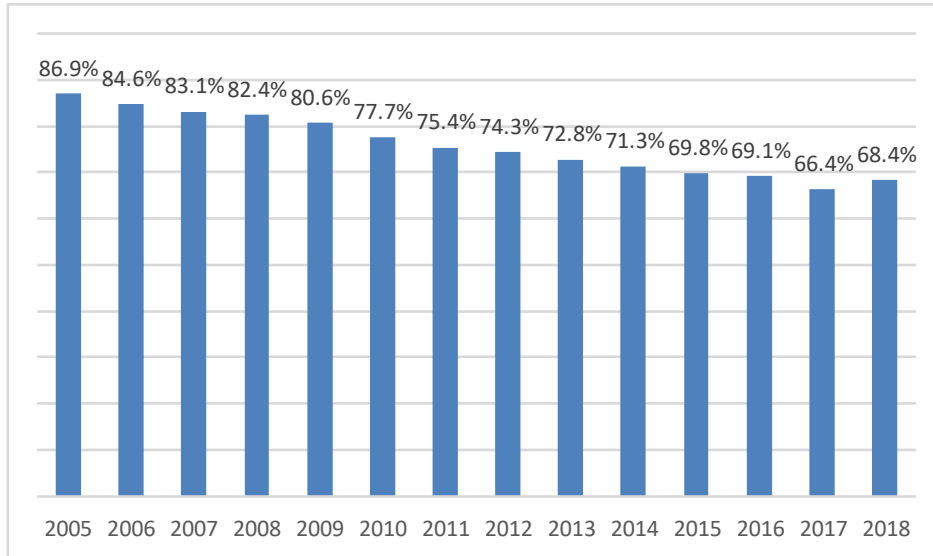


Figure 12: Proportion of publication units produced by SA nationals

In terms of the nationality of Authors, by 2018 68.4% of authors were South African, and 31.6% of authors were of foreign nationality as shown above.

7.3 Publication outputs by race of author

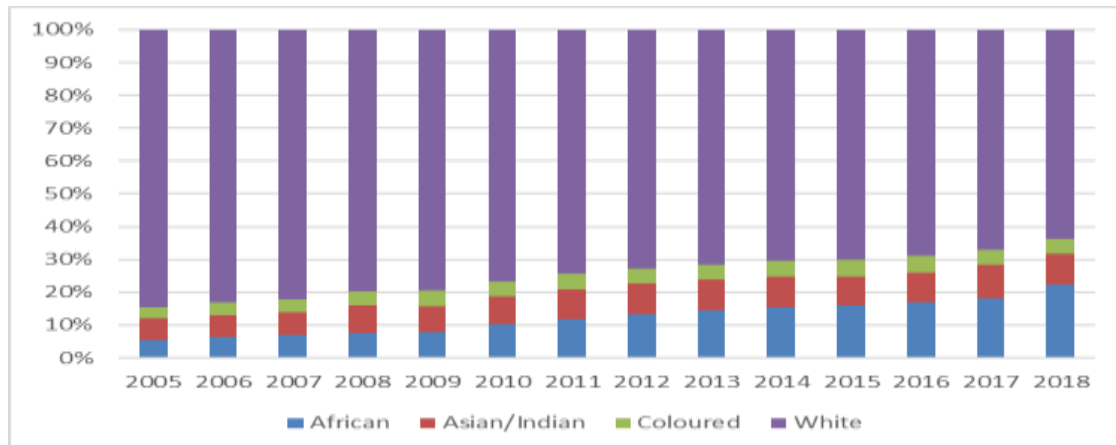


Figure 13: Race of authors (SA nationals only) of all publications: 2005 - 2018

Figure 13 shows the number of publication outputs by race of author. Out of a total of 35 510 publications outputs, 22 613 (64%) were produced by White academics, followed by Africans with 7 886 publications (22%), Indian/Asian with 3 371 (9%) and 1 640 (5%) Coloured academics.

The number of White researchers at universities in 2018 (as before) was higher than that of other races, at 42.7% of the total number; followed by Africans 39.6%; Asians 8.3% Coloureds 7.1%, and 2.2% of unknown race. It follows based on the proportions and the quantity of academics by race, therefore, that the highest number of research output publications would be produced by White researchers.

7.4 Publication outputs by age of author



Figure 14: Age of authors (age at date of publication) of all publications: 2005 - 2018

The highest number of research publications output contributions came from the age group of 30 to 49 and this has remained constant over the past fourteen year period.

8. GENERAL OBSERVATIONS AND CONCLUSIONS

Although the research publication outputs of SA universities have increased substantially over the years, the research output units for the 2018 publications shows a decline from the previous year by 345.71 units. The decline is largely due to withheld units (282.49) not included in the analysis, as well as an artificial spike in the outputs in the previous year due to units withdrawn in 2016, on the basis of alleged predatory publishing, being reinstated in 2017. The largest proportion of the sector's output remains in the form of journal articles (82.5%), followed by book publications (10.8%) and published conference proceedings (6.7%).

Institutions are encouraged to analyse their institutional research output data, together with the HEMIS data in order to better understand the patterns, and use this knowledge to influence their targeted self-development.

Institutions were required to provide data on the demographics of the claiming author(s) to enable the Department to understand transformation patterns in knowledge production at universities. While some researchers opted not to provide the required details, the analysis of demographics provided shows that the highest number of research output publications are produced by males. White academics are producing the highest proportion of outputs. Analysis of this aspect of information is incomplete due to some universities did not provide the required information.

The policy supports and encourages scholarship. Institutions and academics must remember the importance of research integrity and ethics when implementing the policy and are urged not to try and maximise subsidy at the expense of quality. The Department reserves the right to withhold payment of research output subsidy in respect of any publication in a journal that does not meet the criteria as outlined in the research output policy or where there is evidence of unethical conduct on the part of the researcher or publisher. As such, during the evaluation of the 2018 research publications, the Department declined subsidy for a number of articles published in predatory journals. Journal articles published in predatory journals,

which have been identified as such and removed from any of the approved indexes or lists were declined across all the other indexes or lists. The Department encourages anyone with knowledge of (possible) predatory journals to communicate this so that quick action can be taken. The Department encourages institutions to employ stringent measures when evaluating outputs for submission. The quality of our research output depends to a large extent on the practices by institutions and the capacity of their research offices.

In addition, the Department has identified possible unethical practices by some researchers (institutions) which include excessive publishing, possibly to accrue more subsidy which compromises the quality of research. As a result, some units have been withheld to allow for further investigations. Should it be found that these unethical practices are proven, then the subsidy will be permanently withdrawn. A full investigation will be undertaken during 2020. The Department does not prescribe to institutions how they distribute the research subsidy in their institutions. It is up to the individual institutions to decide how that subsidy should be distributed. However, the Department does not encourage institutions to directly incentivise individual authors as this practice is starting to promote perverse behaviour in some cases. The Department will conduct analysis of individual institutional policies with a view to determine best practices and recommendations for the sector.

Appendix 1:

Table 18: Research Publications by Institution per CESM Categories

Institution	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	
UKZN	180.53	11.89	23.50	177.05	13.38	40.85	113.95	205.58	512.27		35.21	53.57	183.07	195.57	89.59	1.00	74.98	7.12	8.16	142.58	2 069.86	
UP	308.06	25.65	13.67	169.98	7.38	94.10	80.54	259.71	246.16	4.35	67.30	148.15	100.10	92.97	58.00		255.08	20.49	19.50	83.36	2 054.55	
SU	197.85		17.82	130.51	11.58	18.36	80.62	231.35	296.96		121.90	34.90	176.93	174.74	44.93	53.11	145.85	49.26	30.56	88.75	1 905.96	
WITS	1.39	37.47	16.00	118.61	4.03	6.50	79.38	191.68	595.00		46.16	67.31	194.18	112.16	88.37		4.33	43.35	44.25	228.21	1 878.39	
UCT	5.06	47.35	6.00	119.98	23.31	49.35	51.91	164.44	713.14		23.36	94.95	199.69	111.80	89.15		22.84	25.91	9.27	69.06	1 826.56	
UJ	1.03	37.70	68.25	175.52	52.83	42.93	124.83	334.45	64.92		15.89	97.62	87.52	216.18	40.90		58.43	23.57	15.00	233.38	1 690.96	
NWU	27.85	4.75	16.78	232.62	10.81	30.79	113.83	106.95	128.65	1.50	62.19	53.92	112.02	113.73	51.82		185.25	50.49	18.08	116.26	1 438.28	
UNISA	11.71		11.00	199.98	18.51	55.86	167.91	38.67	29.82	3.12	49.75	107.60	45.37	99.36	32.62		169.26	40.30	23.37	195.08	1 299.27	
UFS	60.54	16.89	9.50	35.46	7.33	17.28	65.24	1.00	70.13	3.00	53.42	39.91	97.55	129.69	47.18		158.35	16.03	7.06	157.17	992.73	
RU	10.56	0.25	10.33	13.44	5.29	10.88	56.54		11.44		47.21	9.50	151.31	127.07	1.83			3.54	1.33	88.86	549.38	
NMU	8.90	19.94	2.50	63.01	3.38	23.17	35.52	10.76	22.07	1.67	3.50	13.47	104.55	59.63	2.08		13.77	3.83	4.00	31.59	427.34	
Sub Total	813.48	201.88	195.34	1 436.15	157.85	390.08	970.29	1 544.58	2 690.56	13.64	525.87	720.89	1 452.29	1 432.90	546.46	54.11	1 088.16	283.88	180.59	1 434.31	16 133.29	
UWC	18.88		1.00	18.91	3.50	7.56	32.21	0.17	134.14	1.00	30.28	45.22	44.52	45.76	9.75	1.50	21.59	8.72	4.00	52.59	481.30	
UL	34.39			63.16	9.00	7.67	12.00		38.73		2.05	7.50	33.76	12.40	4.17		5.83	33.93	37.67	42.02	344.29	
UFH	40.16	1.00		18.31	0.50	10.78	10.58		8.12		1.00	9.82	146.57	3.60	1.00		6.83	16.50	10.64	44.47	329.89	
UNIZULU	6.15		1.00	24.93	4.50	13.68	26.19	0.56	4.39	3.36	8.50	2.00	19.83	42.84	10.90		3.50	8.07	15.63	16.68	212.69	
UNIVEN	14.90	4.25		8.50		3.91	9.56		6.59	1.33	5.50	8.06	55.73	6.02	3.73		2.50	0.67	1.81	46.65	179.71	
SMU						1.00	2.00		75.29				7.97	0.82	0.50				1.00		88.59	
WSU			2.00	14.83	2.25	1.50	5.25	0.17	19.47	2.00			1.50	5.54	0.34					4.59	59.43	
UMP	2.75			19.29		0.76	7.72		1.00		1.00		7.16		1.00				3.33	1.50	3.83	49.33
Sub Total	117.24	5.25	4.00	167.93	19.75	46.87	105.51	0.89	287.74	7.69	48.34	72.60	317.05	116.97	31.38	1.50	40.25	72.22	71.24	210.83	1 745.24	
DUT	3.66		20.03	34.76		12.11	18.22	50.51	31.75			1.00	30.61	59.75	9.35				7.66	65.53	344.93	
TUT		6.02	8.91	53.22	2.00	24.67	7.50	100.29	15.30		4.91		33.49	17.73	6.83	7.66		5.00	2.00		295.53	
CPUT	25.19	14.33	4.55	32.82	1.00	15.58	57.09	26.87	15.88	3.00	0.50		0.17	9.93	0.50		2.00		3.25	5.00	217.66	

Institution	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
CUT	3.33	18.24		22.41	1.50	9.61	42.71	57.11	5.79				2.93	1.49	1.50		1.50	1.09		1.00	170.20
VUT	1.61		3.67	33.82		6.67	5.09	31.10	1.67	1.00		5.00	4.58	37.80	9.58					8.16	149.74
MUT	0.83			11.60		0.50	2.50	14.93	9.26		1.50				0.50				0.50		42.12
Sub Total	34.61	38.59	37.15	188.63	4.50	69.14	133.11	280.81	79.64	4.00	6.91	6.00	71.77	126.70	28.26	7.66	3.50	6.09	13.41	79.69	1220.19
TOTAL	965.33	245.72	236.49	1 792.71	182.10	506.09	1 208.90	1 826.28	3 057.94	25.33	581.12	799.49	1 841.10	1 676.58	606.10	63.27	1131.91	362.18	265.24	1 724.84	19 098.72