

# REPORT ON THE EVALUATION OF THE 2017 UNIVERSITIES' RESEARCH OUTPUT

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**MARCH 2019**

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Evaluated in terms of the  
Research Outputs Policy, 2015



higher education  
& training

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Higher Education and Training  
REPUBLIC OF SOUTH AFRICA



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## FOREWORD BY THE DIRECTOR-GENERAL

I am pleased to present this annual report on the evaluation of the 2017 universities' research outputs. This report provides an analysis of the research performance of South African public higher education institutions and focuses on research outputs in accredited journals, books and approved published conference proceedings.

It has been 15 years since the Department of Higher Education and Training started with the implementation of the *Policy and Procedures for the Measurement of Research Output of Public Higher Education Institutions (Research Output Policy) (2003)* which was replaced by the *Research Outputs Policy (2015)*. This policy aims to drive the imperatives of the *National Development Plan* which states that "Higher Education (HE) is the major driver of the knowledge system which then links to economic development. Universities are key to developing a nation. They set norms and standards that underpin a nation's knowledge capital and are dominant producers of new knowledge, critiquing information and finding new local and global applications for existing knowledge".

Over the years the research outputs from institutions has been steadily on an upward trajectory. It is also critical for South Africa to increase the contribution of our share in global knowledge production. I am pleased that there is an increase in the percentage of our journal publications in international indices.

The Department has invested over R18bn since the 2005/6 financial year. The actual units have grown from 7320 in 2005 to 18872.27 units in 2017. This is testament to the collaborative efforts of government, industry and institutions to funding research and increasing participation from all institutions.

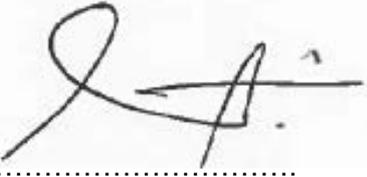
For 2017 evaluation of research outputs, 25 out of the 26 public higher education institutions submitted their research outputs. The data and pattern-analysis presented in this report continues to show positive growth of publications from year to year. This is very encouraging as it shows growth of research activity across our university system. The Department will continue with its effort to sustain current research strengths and to promote the kinds of research and other knowledge outputs required to meet national development needs.

The Department has noted with concern the number of papers in “possible predatory” journals as published in the South African Journal of Science (July/August 2017) by Profs Johann Mouton and Astrid Valentine. In producing the research, the policy encourages keeping an eye on the quality of publications by all of us in the value chain and that all South African journals must aim for international standards in order to apply for inclusion in accredited international lists or indices. Institutions and academics are urged to remember the importance of the research integrity, ethics and the importance of academic publication which is about original knowledge dissemination rather than accruing incentive funding. The Department will continue to engage the sector in finding solutions to combating this practice.

The Department appreciates the support of the National Research Foundation for the development of the Research Outputs Submission System which continues to assist the Department in improving the efficiency of the research outputs process.

This report is a collaborative effort, and the Department expresses its appreciation to the Research Output Evaluation Panel and the field specific sub-panels for their contribution to its production. We continue to seek new and innovative ways of carrying out this task for the betterment of our Higher Education system.

I would also like to thank public Higher Education Institutions for their continued support in helping the Department in the implementation of this policy.



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Mr GF Qonde

Director-General: Department of Higher Education

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## 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
DST	Department of Science and Technology
DUT	Durban University of Technology
HAIs	Historically Advantaged Institutions
HBU's	Historically Black Universities
HEIs	Higher Education Institutions
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
SET	Science, Engineering and Technology
SMU	Sefako Makgatho Health Sciences University
SPU	Sol Plaatje University
SUN	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
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

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

## 1. INTRODUCTION

The Department of Higher Education and Training (the Department) seeks to “encourage research productivity by rewarding quality research outputs at public higher education institutions”. The policy aims to “enhance productivity by recognising the major types of research outputs produced by higher education institutions and further use appropriate proxies to determine the quality of such outputs”.

Public higher education institutions, in this case universities, are required to submit their research output subsidy claims annually to the Department. The subsidisation of quality research outputs produced by universities forms a basis for sustaining research and promoting increased research productivity and other forms of knowledge generation required to meet national development needs. The research outputs policy is a goal-oriented and performance-related mechanism, and is directly linked to the allocation of funds to universities incentivising improved research outputs and contributing to the social and economic development of the country.

All research publication outputs submitted to the Department for subsidy claims must meet the criteria as stipulated in the policy. The policy uses the same proxies and indicators for quality as in any other scientific publication system around the globe, and these include “peer-review” and assessment of “scholarliness” of the published works. All institutions must have a Research Policy identifying the institution’s niche areas and developmental needs, and relevant to its mission, potential and environment. Strategies for attaining development targets must be realised. This report therefore should be read in conjunction with, and construed in accordance with the *Research Outputs Policy (2015)*. The Department hopes that institutions use it and their individual institutional reports to assist them to focus their research plans and strategies.

This report constitutes a detailed analysis of the processes, procedures and outcomes of the research publication outputs for 2017. However, there may be some aspects that individual institutions may want to examine further which this report may have not covered and the Department welcomes suggestions for its improvement in future.

## 2. PROCESS AND PROCEDURE

The *Research Outputs Policy (2015)* gives all public higher education institutions the responsibility to enhance the effectiveness and efficiency of policy implementation. In order to reduce mistakes and incorrect submissions, institutions are urged to ensure that all research office personnel are well acquainted with the Policy. An institutional panel must assess all publications before submitting them 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, 25 submitted their 2017 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 before further evaluation.

To bring credibility, 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-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 indices. Currently, the Department recognises the following indices: Scopus; Scientific Electronic Library Online (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 /SA journal list.

The Department together with the National Research Foundation (NRF) are developing the Research Outputs Submission System (ROSS) which is an electronic system for capturing and evaluating the research publications submitted by universities. The development of the ROSS aims to: (i) improve the efficiency of the research outputs submissions process and procedure, from the capturing of information by institutions to the capturing of evaluation

outcomes by the Department; (ii) improve the efficiency of the research outputs evaluation process by the evaluation sub-panels; (iii) improve on the cost effective process 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 2017 research outputs, can be summarised as follows:

- a) The Department received all institutional claims for outputs in Books, Conferences and Journals in May 2018.
- 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 appointed.
- d) The evaluation sub-panels evaluated the research outputs according to predetermined criteria and made recommendations regarding acceptance or rejection.
- 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 journals in the approved indices (Scopus, SciELO SA, Norwegian Register for Scientific Journals, Web of Science, IBSS and the Department /SA list) and the final unit allocations for each institution were calculated.
- g) Individual institutional reports were developed by the Department and sent to the respective institutions in December 2018.
- h) This report on the evaluation of 2017 Universities' research outputs was drafted by the Department and reviewed and endorsed by the Research Output Evaluation Panel.

Late publications for the year 2016 (n-2) were considered where valid and legitimate reasons for late submission were provided and accepted, but submissions 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 for pre 2016 publications, however, they will still not be considered for subsidy.

This report provides analysis of subsidy-earning research outputs in accredited journals; approved book publications and approved conference proceedings published in 2017. The analysis also makes use of the Classification of Education Subject Matter (CESM) categories, among others. These are neither perfect delineations nor accurate categories of disciplines or subject areas as there are some overlaps among them. Some subjects cannot be placed neatly into one of the CESM categories. The CESM category system was established for purposes of subsidy or funding allocation to institutions. Therefore, the interpretation of data, and this report, should take cognisance of the imperfect nature of CESM analyses provided across the publication types. Analysis of research outputs using CESM categories does, however, provide an indication of subject areas where research activity is taking place either intensely or less so. The Department will replace it as soon as a better system is determined.

The Department continues the work on ensuring only quality publications are funded. At any given stage it will communicate any findings on publications identified as “predatory” or “lacking quality” to the sector. The Department reserves the right to withhold payment of research output subsidy in respect of any article published in a journal that does not meet the criteria as outlined in the research output policy.

In the process of ensuring quality outputs are funded, for the 2016 publications, units were deducted from institutions following the identification of some journals as being “predatory journals” and “possible predatory journals”. The lists of those journals, and the details of the units deducted, were erroneously provided in the institutional reports sent to the institutions on the allocation of research output units for 2016 publications. The lists were subsequently withdrawn and communication sent to the institutions in this regard. These units have been returned to institutions and included in the 2017 subsidy allocation. As a result, in some areas, this 2017 report may have different units for 2016 publications from the units mentioned in the 2016 report.

### 3. JOURNAL PUBLICATION OUTPUT UNITS

In the majority of academic fields, publications in journals are widely accepted as the most appropriate and speedy form of communicating novel research findings. As a result, the bulk of global research outputs are in the form of journal articles. Therefore it is not surprising that

research outputs by South African Higher Education Institutions (HEIs) follow a similar pattern.

Three new journal indices (Scopus, SciELO-SA and the Norwegian Register for Scientific Journals) were included in the 2017 evaluations bringing the total number of recognised indices to six. Clarivate (formerly Thomson Reuters) Web of Science, the ProQuest IBSS and the Department /SA journal lists were already recognised.

**Table 1** shows the breakdown of journal publications across the different indices per institution, for 2017. The numbers show that in 2017, publications in journals continued to grow as in the previous years. Journal publication output units increased from 14 612.27 units in 2016 to 15 388.42 in 2017; a 5.3% growth.

Publications in international indices made up 82.38% of overall journal publications in 2017, an increase from 79.68% in 2016. It is worth noting that many Historically Black Universities (HBUs) and Universities of Technology (UOTs) have the largest proportion of their publications in journals listed in international indices. It stands to be determined whether there is a healthy balance or not between international (82.38%) and local publishing (17.62%).

Eleven institutions had above 80% of their publications in journals listed in international indices and these were UKZN, UP, WITS, RU, SUN, UCT, UJ, UL, VUT, DUT and UFH. There were eight such institutions in 2016 (UP, WITS, RU, SUN, UCT, DUT, UFH, and TUT. There has been a growth of publications in journals listed in international indices in 2017 (see **Table 2**). This is important in continuing to improve the growth and global share of knowledge production by academics at South African universities.

Twelve institutions had 70-79% of their publications in journals listed in international indices and these were UNISA, NWU, UFS, UWC, NMU, CPUT, UNIZULU, UNIVEN, SMU, MUT, UMP and TUT. There were eleven such institutions in 2016 (UKZN, UJ, UNISA, NWU, UFS, UWC, NMU, CPUT, VUT, MUT and UMP). All other institutions had between 50% and 69% of their publications in journals listed in international indices except for CUT which had 47.07%. In 2016 no institution had less than 50% of their publications in journals listed in international indices.

Table 1: Journal Publication Output Units by Index, 2017 (arranged from the highest to the lowest total number of units in journals - last column).

Institution	1 WOS	2 Scopus	3 DHET	4 IBSS	5 SciELO SA	6 Norwegian	Total International		*Total Units from South African Lists 3+5	Total Units from Journals
							Units	%		
UKZN	1058.16	266.19	310.09	180.46	17.73	1.00	1505.81	82.12%	327.82	1833.63
UP	1103.29	247.13	194.72	113.03	53.62	1.62	1465.07	85.51%	248.34	1713.41
WITS	1114.44	159.05	225.71	121.08	0	0	1394.57	86.07%	225.71	1620.28
SUN	897.45	333.24	224.73	47.92	7.00	1.00	1279.61	84.67%	231.73	1511.34
UCT	1048.91	228.65	63.92	62.51	28.71	8.48	1348.55	93.57%	92.63	1441.18
UJ	28.80	830.27	156.58	79.66	15.64	0.20	938.93	84.50%	172.22	1111.15
UNISA	305.14	306.64	231.08	201.01	63.08	1.00	813.79	73.45%	294.16	1107.95
NWU	405.73	294.54	175.40	149.65	79.49	2.83	852.75	76.99%	254.89	1107.64
UFS	365.89	116.72	126.60	66.03	41.07	0	548.64	76.59%	167.67	716.31
RU	349.61	38.24	44.25	20.33	3.00	0.59	408.77	89.64%	47.25	456.02
UWC	223.23	57.48	112.82	29.02	0	0	309.73	73.30%	112.82	422.55
UFH	137.65	119.27	44.34	77.60	4.08	0	334.52	87.36%	48.42	382.94
NMU	146.43	64.51	73.82	24.74	2.83	0	235.68	75.46%	76.65	312.33

Institution	1 WOS	2 Scopus	3 DHET	4 IBSS	5 SciELO SA	6 Norwegian	Total International		*Total Units from South African Lists 3+5	Total Units from Journals
							Units	%		
UL	71.03	88.25	48.46	64.60	5.77	0.17	224.05	80.51%	54.23	278.28
TUT	93.81	82.67	60.98	25.33	2.75	0	201.81	76.00%	63.73	265.54
DUT	70.03	77.45	34.55	28.00	0	0	175.48	83.55%	34.55	210.03
CPUT	77.15	50.52	55.68	23.42	0	0	151.09	73.07%	55.68	206.77
UNIZULU	47.72	20.68	46.14	45.91	0.33	0.50	114.81	71.19%	46.47	161.28
UNIVEN	43.57	38.97	34.28	40.09	2.00	0	122.63	77.17%	36.28	158.91
VUT	8.73	49.46	18.90	26.56	0	0.25	85.00	81.81%	18.90	103.90
SMU	26.01	27.00	25.84	13.33	1.00	0.20	66.54	71.26%	26.84	93.38
WSU	22.10	11.23	30.11	5.50	0	0	38.83	56.32%	30.11	68.94
CUT	7.84	13.97	31.64	5.33	0.00	1.00	28.14	47.07%	31.64	59.78
MUT	1.00	15.36	6.83	0	0	0	16.36	70.55%	6.83	23.19
UMP	3.71	5.16	5.41	7.41	0	0	16.28	75.06%	5.41	21.69
<b>Total</b>	<b>7657.43</b>	<b>3542.65</b>	<b>2382.88</b>	<b>1458.52</b>	<b>328.10</b>	<b>18.84</b>			<b>2710.98</b>	
<b>Percentage</b>	<b>49.76%</b>	<b>23.02%</b>	<b>15.48%</b>	<b>9.47%</b>	<b>2.13%</b>	<b>0.12%</b>	<b>12677.44</b>	<b>82.38%</b>	<b>17.62</b>	<b>15388.42</b>

\*NB –South African Journals that appear in the international indices (WoS, Scopus, IBSS and the Norwegian List) are not classified as South African Journals and nits are not included in this column but will be found in their respective listing index.

*Table 2: Journal Publication and Units Accrued to Institutions in 2016 and 2017 (arranged from highest to the lowest of 2017 units from local and international journals (last column))*

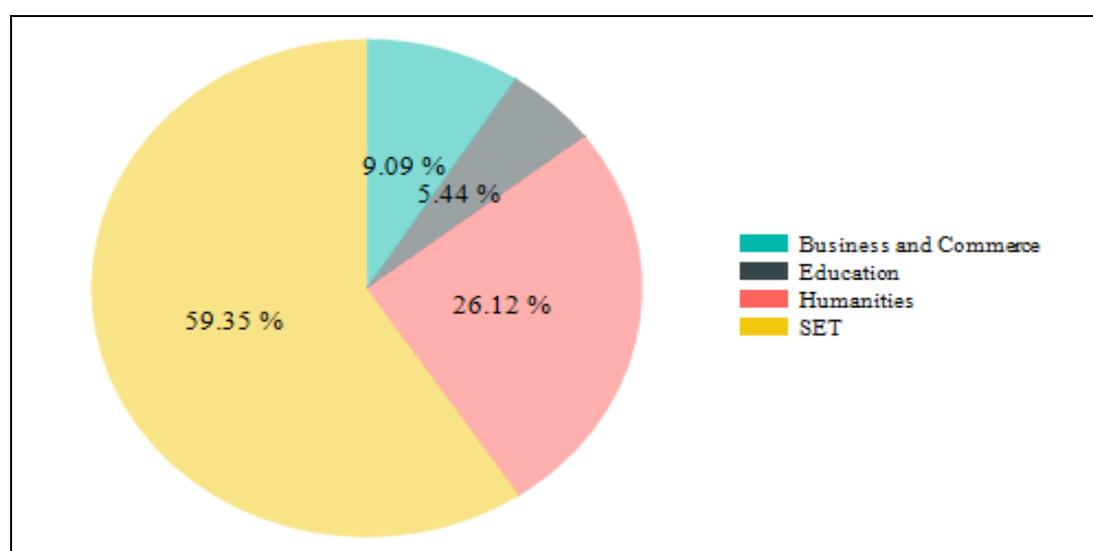
<b>Institution</b>	<b>2016 Units from International Journals</b>	<b>Proportion of 2016 Institutional Journal publications %</b>	<b>2017 Units from International Journals</b>	<b>Proportion of 2017 Institutional Journal publications %</b>	<b>2016 Units from Local and International Journals</b>	<b>2017 Units from Local and International Journals</b>
UKZN	1 280.62	76.77	1 505.81	82.12	1 668.17	1 833.63
UP	1 465.43	85.85	1 465.07	85.51	1 707.06	1 713.41
WITS	1 297.46	86.46	1 394.57	86.07	1 500.73	1 620.28
SUN	1 125.44	81.97	1 279.61	84.67	1 373.00	1 511.34
UCT	1 395.13	92.00	1 348.55	93.57	1 516.37	1 441.18
UJ	807.91	78.46	938.93	84.50	1 029.69	1 111.15
UNISA	748.84	71.27	813.79	73.45	1 050.77	1 107.95
NWU	833.81	72.61	852.75	76.99	1 148.39	1 107.64
UFS	540.48	74.88	548.64	76.59	721.77	716.31
RU	378.5	89.84	408.77	89.64	421.3	456.02
UWC	317.08	70.88	309.73	73.30	447.34	422.55
UFH	169.29	80.75	334.52	87.36	209.65	382.94
NMU	228.71	72.55	235.68	75.46	315.24	312.33
UL	166.72	65.40	224.05	80.51	254.93	278.28
TUT	232.62	81.82	201.81	76.00	284.31	265.54
DUT	145.06	82.02	175.48	83.55	176.87	210.03
CPUT	122.15	71.22	151.09	73.07	171.5	206.77
UNIZULU	77.29	69.36	114.81	71.19	111.44	161.28
UNIVEN	89.9	58.89	122.63	77.17	152.66	158.91
VUT	63.62	79.78	85	81.81	79.74	103.90
SMU	62.07	51.55	66.54	71.26	120.41	93.38
WSU	25.21	53.46	38.83	56.32	47.16	68.94
CUT	42.2	63.16	28.14	47.07	66.81	59.78
MUT	9.59	79.32	16.36	70.55	12.09	23.19
UMP	18.54	74.55	16.28	75.06	24.87	21.69
<b>Total</b>	<b>11 643.67</b>	<b>79.68</b>	<b>12 677.44</b>	<b>82.38</b>	<b>14 612.27</b>	<b>15 388.42</b>

The allocation of subsidy does not discriminate between articles published in locally or internationally listed journals. However, global exposure of knowledge production by South African researchers is indeed very encouraging and enhances the quality of our system. As such, Editors-in-Chief of local journals are encouraged to seek international listing of their journals in the recognised indices. For purposes of planned and guided development, institutions need to individually analyse patterns of publishing by their academics.

### 3.1. Journal Publication Output Units by Broad Academic Fields

The distribution of journal publications by broad academic fields has always been consistent and the pattern continued in 2017. Over half of the journal publication units accrued to the Science, Engineering and Technology (SET) field (59.35%); followed by Humanities with 26.12%; Business and Commerce with 9.09%; and Education with 5.44% (see **Figure 1**). Since the broad fields were first analysed for journal publications in 2009, it can be observed that the gap between SET and other fields has since widened with Humanities having declined while Business and Commerce and Education increased modestly (see **Table 3**).

*Figure 1: Proportion of Journal Publication Units by Broad Academic Field, 2017*



*Table 3: Journal Publication Units by Broad Fields, 2009 and 2017*

Field	2009	2017
SET	52.79%	59.35%
Humanities	37.71%	26.12%
Education	4.70%	5.44%
Business and Commerce	4.80%	9.09%
Total	100%	100%

Further analysis below shows that the new indices largely benefitted SET more than the other academic fields.

### 3.2. *Journal publication output units by Classification of Education Subject Matter (CESM) category*

**Table 4** shows the allocation of journal publication output units by the Classification of Educational Subject Matter (CESM) categories for 2016 and 2017. It will be noted that relatively large increases took place in CESM categories 01, 02, 03, 06, 08, 11, 16 and 19. These large increases are shared equally between the broad fields of Science, Engineering and Technology (SET) and Humanities. Large increases among major fields took place in CESM 01-Agriculture, Agricultural Operations and Related Studies (35.14%); 08-Engineering (10.94%); and 03-Visual and Performing Arts (10.19%). In the near future, the Visual and Performing Arts will also be covered by the *Policy on the Evaluation of Creative Outputs and Innovations Produced by South African Public Higher Education Institutions of the Department of Higher Education and Training*, thus its unit outputs are not only dependant on publications but also on artefacts. The CESM 17-Military Sciences is a relatively small field in the South African higher education system and any increase or decrease in research output units is bound to make a major shift from its previous outputs.

As it has been a pattern for many years, the highest proportion of journal publications are in CESM 9 (Health Care & Health Sciences) with 18.42% of all journal publication output units in 2017.

CESM categories 04, 05, 07, 10, 12, 14, 15, 17, 18, and 20 decreased unit outputs from their 2016 publication unit accruals. Some biggest decreases among some major fields were in CESM 07-Education (-10.91%); 15-Mathematics and Statistics (-11.89%) and 05-Communication, Journalism and Related Studies (-10.30%). The Family Ecology and Consumer Sciences is generally a small field in the South African higher education system, therefore any shift, either way, even by one unit makes a huge difference.

Table 4: Journal Publication Outputs Units by CESM Categories, 2016 and 2017

CESM Category	2016		2017		% increase/decrease from 2016 to 2017
	No. of Units	% of Total	No. of Units	% of Total	
09: Health Professions and Related Clinical Sciences	2760.02	18.17%	2834.79	18.42%	2.71%
13: Life Sciences	1525.47	10.04%	1557.35	10.12%	2.09%
14: Physical Sciences	1595.28	10.50%	1494.59	9.71%	-6.31%
04: Business, Economics and Management Studies	1441.37	9.49%	1399.07	9.09%	-2.93%
20: Social Sciences	1312.27	8.64%	1231.36	8.00%	-6.17%
01: Agriculture, Agricultural Operations and Related Sciences	884.60	5.82%	1195.47	7.77%	35.14%
08: Engineering	1001.35	6.59%	1110.90	7.22%	10.94%
07: Education	939.65	6.19%	837.12	5.44%	-10.91%
17: Philosophy, Religion and Theology	836.46	5.51%	811.02	5.27%	-3.04%
12: Law	641.66	4.22%	641.73	4.17%	0.01%
11: Languages, Linguistics and Literature	507.85	3.34%	533.09	3.46%	4.97%
15: Mathematics and Statistics	557.33	3.67%	491.07	3.19%	-11.89%
18: Psychology	348.66	2.30%	348.87	2.27%	0.06%
06: Computer and Information Sciences	227.62	1.50%	265.58	1.73%	16.68%
19: Public Management and Services	196.29	1.29%	214.03	1.39%	9.04%
03: Visual and Performing Arts	126.82	0.84%	139.74	0.91%	10.19%
02: Architecture and the Built Environment	96.92	0.64%	106.04	0.69%	9.41%
05: Communication, Journalism and Related Studies	111.02	0.73%	99.58	0.65%	-10.30%
16: Military Sciences	42.80	0.28%	48.84	0.32%	14.11%
10: Family Ecology and Consumer Sciences	34.33	0.23%	28.18	0.18%	-17.91%
<b>TOTAL</b>	<b>15187.77</b>	<b>100.00%</b>	<b>15388.42</b>	<b>100.00%</b>	<b>1.32%</b>

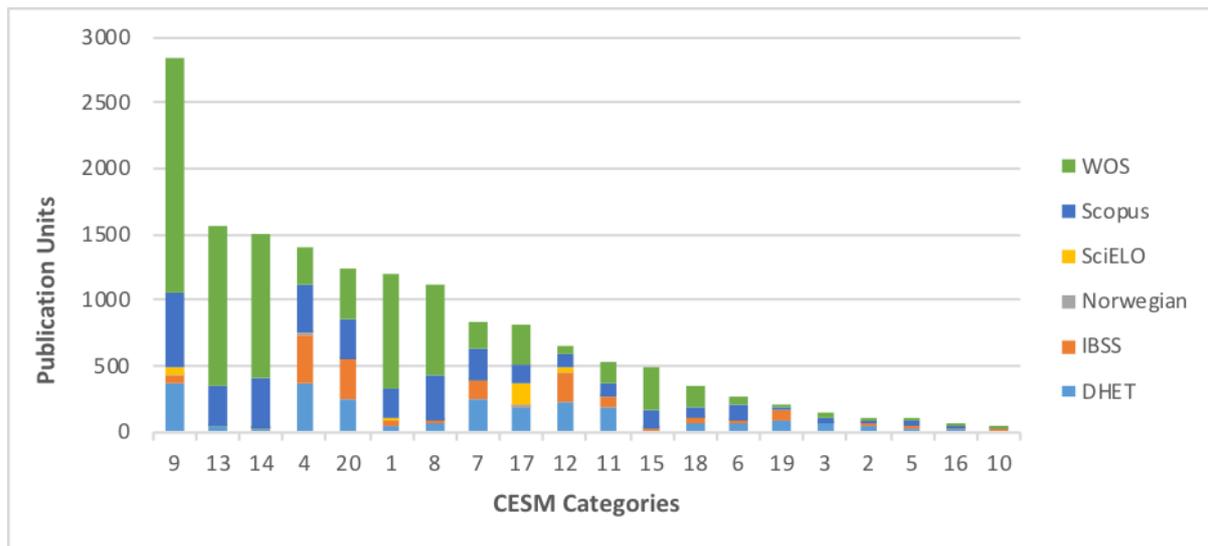
Many factors must be considered when analysing research outputs by CESM categories. Such factors include the size of the academic field with respect to: the proportion of academics in the field compared to other fields; postgraduate student enrolment; varying teaching loads; and a culture of publication in a field. The varying proportions per CESM category do not necessarily reflect the overall sector's outputs or outcomes since the policy only recognises a limited set of outputs; i.e. journal publications, book publications and conference proceedings. A full analysis would include patents and creative research outputs and all graduates from a respective field.

The largest number of outputs published in journals are in the Web of Science (WoS) 49.76%; followed by Scopus 23.02%; the Departmental list 15.48%; IBSS 9.47%; SciELO SA 2.13%; and the Norwegian List 0.12% (see **Table 5** and **Figure 2**). The new indices (Scopus, SciELO SA and the Norwegian List) comprise 25.25% of the total journal publications outputs. This means that there are now 25% additional unit claims or publications which were not recognised before 2016. This additional percentage of units is in line with the assessment done by the Department in 2010 in motivating for the addition of the three new indices that:

“The Directorate has found that over the four year period [2005-2009], approximately 20% of all institutional journal publications appeared in non-approved journals. This means that institutions are permitted to submit about 80% of their journal publications to the Department for purposes of subsidy” (the Department 2010 analysis for additional journal indices).

The DHET list and SciELO SA represent 17.61% of local journals, however it is important to note that there are South African journals that are listed in the international indices and therefore are not analysed as local journals in this report. Individual institutions would be able to analyse their publishing patterns in this regard, including publications in South African journals listed in international indices.

Figure 2: Journal Output Publications by Indices and CESM Categories, 2017



Significantly, the WoS journals are predominantly used in CESM categories 1, 8, 9, 13, 14 and 15. These are all in the SET field. That is, the majority of journal publications in SET are in WoS journals. In fact, this pattern continues across the citation indices. The DHET list is largely utilised for publications in CESM categories 4, 7, 12, and 20.

Table 5: Journal Units by CESH Categories and Citation Indices

CESM	WoS	Scopus	DHET	IBSS	SCIELO SA	Nr List	Total	Percentage of Overall
01: Agriculture, Agricultural Operations and Related Sciences	861,97	238,30	50,68	31,95	11,78	0,79	1195,47	7,77%
02: Architecture and the Built Environment	24,12	16,11	50,57	14,74	0,5	0	106,04	0,69%
03: Visual and Performing Arts	39,53	31	59,21	10	0	0	139,74	0,91%
04: Business, Economics and Management Studies	277,44	360,52	359,42	382,53	18,16	1	1399,07	9,09%
05: Communication, Journalism and Related Studies	9,33	48,17	33,67	8,41	0	0	99,58	0,65%
06: Computer and Information Sciences	62,54	113,4	56,58	32,56	0	0,5	265,58	1,73%
07: Education	215,25	225,62	245,14	137,89	10,72	2,5	837,12	5,44%
08: Engineering	674,93	346,95	73,02	10,5	5	0,5	1110,90	7,22%
09: Health Professions and Related Clinical Sciences	1772,25	581,61	374,82	52,6	48,84	4,67	2834,79	18,42%
10: Family Ecology and Consumer Sciences	8,82	0,84	13,19	5,33	0	0	28,18	0,18%
11: Languages, Linguistics and Literature	158,00	108,25	178,01	84,83	2	2	533,09	3,46%
12: Law	56,60	97,95	228,49	221,99	34,7	2	641,73	4,17%
13: Life Sciences	1209,33	295,94	38,68	4,44	8,96	0	1557,35	10,12%
14: Physical Sciences	1086,10	374,15	23,87	7,83	1,47	1,17	1494,59	9,71%
15: Mathematics and Statistics	326,72	145,22	10,67	7,25	1	0,21	491,07	3,19%
16: Military Sciences	7,44	15,24	16,66	8,5	1	0	48,84	0,32%
17: Philosophy, Religion and Theology	297,21	152,35	180,52	15,28	163,66	2	811,02	5,27%
18: Psychology	160,80	73,82	67,66	36,75	8,84	1	348,87	2,27%
19: Public Management and Services	25,22	29,32	79,16	80,33	0	0	214,03	1,39%
20: Social Sciences	383,83	287,89	242,86	304,81	11,47	0,5	1231,36	8,00%
<b>Overall</b>	<b>7657,43</b>	<b>3542,65</b>	<b>2382,88</b>	<b>1458,52</b>	<b>328,10</b>	<b>18,84</b>	<b>15388,42</b>	
<b>Percentage Overall</b>	<b>49,76%</b>	<b>23,02%</b>	<b>15,48%</b>	<b>9,48%</b>	<b>2,13%</b>	<b>0,12%</b>		<b>100,00%</b>

#### 4. BOOK PUBLICATION OUTPUTS UNITS

The Research Outputs Policy takes cognisance of the relatively long process and, if quality is to be maintained, allow for adequate time to conduct credible research and time for quality communication of (the) research in a quality book publication, and in comparison to other types of publications which generally take comparatively lesser time. As such, for a full book the number of units was increased from five to ten since 2016. Partly as a result of this change, almost all the institutions increased their book publication units in 2016. The Department will monitor the effect of the change over a period of three years. Research publication units in scholarly books for 2017 amounted to 2207.94 units, a decrease of 67,63 units from 2275.57 units in 2016. **Table 6** shows publication outputs units accrued to book publications in 2016 and 2017. The fluctuations in increases and decreases are large. The impact of the 2016 policy change on book publications units will be monitored over time. It is hoped that the policy change will incentivise book publications

With only two years of measurement of book publications outputs, it is too early to tell the developing pattern except for the obvious increase of units compared to the period before 2016. Institutional fluctuations in book publications are expected as books take relatively longer to produce compared to journal and conference publications. Thus, at this stage it is not a concern that there are such variations from 2016 to 2017 in individual institutional book publications.

##### 4.1. *Book Publications Output Units by Classification of Education Subject Matter (CESM) Categories*

**Table 7** shows book publications output units by the CESM categories between 2016 and 2017. The specifics of the subject areas that are strong on book publications and increases and decreases according to subject areas can be observed.

Table 6: Proportion of Book Publication Output Units per Institution, 2016 and 2017

Institution	2016		2017		% increase / decrease from 2016 to 2017
	No. of Units	% of Total	No. of Units	% of Total	
UJ	228,2	10,03%	326,54	14,79%	43,09%
WITS	242,68	10,66%	286,36	12,97%	18,00%
SUN	286,93	12,61%	266,02	12,05%	-7,29%
UFS	179,22	7,88%	239,2	10,83%	33,47%
UP	196,24	8,62%	237,67	10,76%	21,11%
UCT	224,56	9,87%	185,98	8,42%	-17,18%
UKZN	275,47	12,11%	128,09	5,80%	-53,50%
UNISA	238,71	10,49%	117,61	5,33%	-50,73%
NWU	118,99	5,23%	110,03	4,98%	-7,53%
RU	47,22	2,08%	99,22	4,49%	110,12%
UWC	94,33	4,15%	53,18	2,41%	-43,62%
DUT	23,77	1,04%	28,58	1,29%	20,24%
CPUT	11,87	0,52%	25,84	1,17%	117,69%
UNIZULU	5,17	0,23%	24,9	1,13%	381,62%
NMU	30,84	1,36%	22,52	1,02%	-26,98%
UL	1,59	0,07%	21,41	0,97%	1246,54%
UFH	18,6	0,82%	13,81	0,63%	-25,75%
UNIVEN	23,29	1,02%	8,38	0,38%	-64,02%
TUT	10,52	0,46%	6,47	0,29%	-38,50%
CUT	10,39	0,46%	3,21	0,15%	-69,10%
WSU	1	0,04%	1,14	0,05%	14,00%
SMU	0,65	0,03%	1	0,05%	53,85%
MUT	1,33	0,06%	0,78	0,04%	-41,35%
UMP	0	0,00%	0	0,00%	0,00%
VUT	4	0,18%	0	0,00%	-100,00%
<b>TOTAL</b>	<b>2275,57</b>	<b>100%</b>	<b>2207,94</b>	<b>100,00%</b>	<b>-2,97%</b>

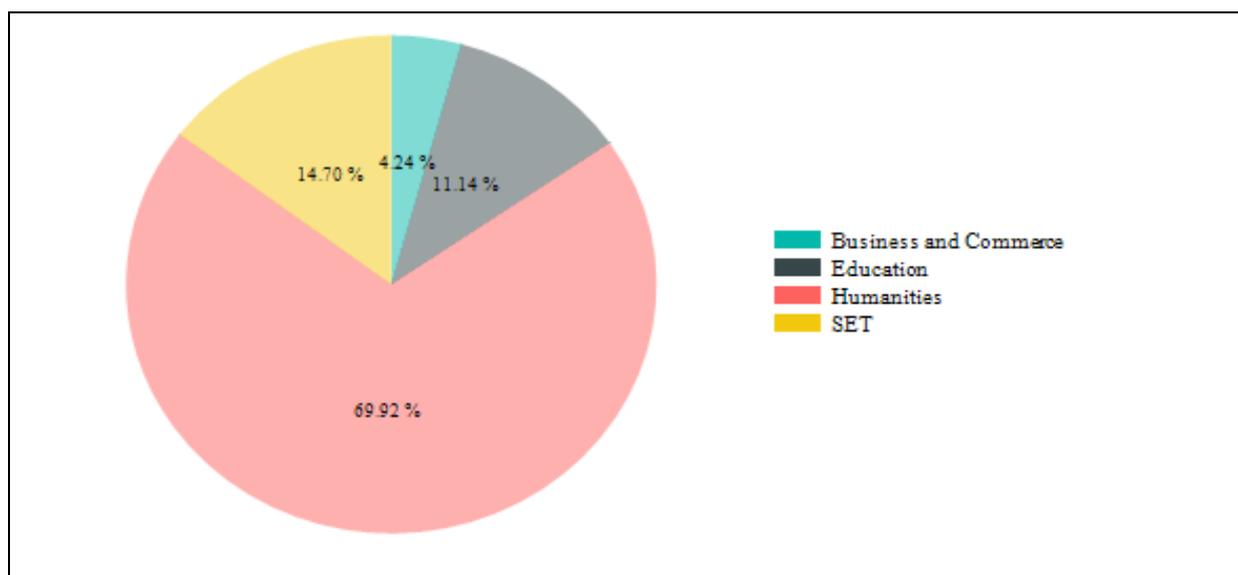
Table 7: Book Publication Output Units by CESM Category, 2016 and 2017

CESM Category	2016		2017		% increase / decrease from 2016 to 2017
	No. of Units	% of Total	No. of Units	% of Total	
20: Social Sciences	613,44	26,96%	527,29	23,88%	-14.04%
17: Philosophy, Religion and Theology	311,44	13,69%	375,35	17,00%	20.52%
11: Languages, Linguistics and Literature	264,44	11,62%	287,87	13,04%	8.86%
07: Education	195,66	8,60%	245,88	11,14%	25.67%
12: Law	248,68	10,93%	187,77	8,50%	-24.49%
08: Engineering	104,92	4,61%	111,22	5,04%	6.00%
04: Business, Economics and Management Studies	121,54	5,34%	93,68	4,24%	-22.92%
03: Visual and Performing Arts	50,48	2,22%	71,88	3,26%	42.39%
13: Life Sciences	67,65	2,97%	47,88	2,17%	-29.22%
05: Communication, Journalism and Related Studies	34,38	1,51%	39,49	1,79%	14.86%
14: Physical Sciences	54,14	2,38%	36,22	1,64%	-33.10%
19: Public Management and Services	35,62	1,57%	32,55	1,47%	-8.62%
09: Health Professions and Related Clinical Sciences	45,52	2,00%	32,3	1,46%	-29.04%
15: Mathematics and Statistics	23,32	1,02%	29,21	1,32%	25.26%
18: Psychology	41,45	1,82%	21,51	0,97%	-48.11%
06: Computer and Information Sciences	24,17	1,06%	18,69	0,85%	-22.67%
01: Agriculture, Agricultural Operations and Related Sciences	6,23	0,27%	18,17	0,82%	191.65%
16: Military Sciences	4,5	0,20%	15,61	0,71%	246.89%
02: Architecture and the Built Environment	27,41	1,20%	15,37	0,70%	-43.93%
10: Family Ecology and Consumer Sciences	0,58	0,03%	0,00%	0,00%	-100.00%
<b>TOTAL</b>	<b>2275,57</b>	<b>100%</b>	<b>2207,94</b>	<b>100%</b>	<b>-2.97%</b>

Comparatively, the CESM categories that have the highest shares in journal publications have relatively fewer shares in book publications. Analysis shows that each subject area; discipline or even field of study has a different pattern, in the form of the types of publications produced, including those not covered by the Policy, for communicating its research and research findings. Some fields prefer certain types of publications more than others.

Humanities produced the majority (69.92%) of book publications in 2017, followed by the SET (14.70%), Education (11.14%), and Business and Commerce (4.24%); see **Figure 3**. This has been the pattern since the start of analysis of book publications research outputs more than ten years ago. Fluctuations and patterns that develop in the CESM categories will be monitored in the future.

*Figure 3: Book Publications by Broad Fields, 2017*



## 5. PUBLISHED CONFERENCE PROCEEDINGS OUTPUT UNITS

Publications in conference proceedings have been on a steady increase from 2013 to 2015. In 2017, conference proceedings decreased by 5.34% compared to a smaller decrease in 2016 of 1.73% from the previous year. The total number of conference publications units for 2017 amounted to 1275.91 units, a decrease of 71.96 units from 2016. **Table 8** shows the number of conference publication units accrued to each university from 2013 to 2017.

It could be that the recent policy changes in book publications are affecting publishing in other publishing media, conference proceedings and journals. The Department is monitoring publication patterns for any such possible impact, that is, on influencing publishing patterns or the distribution of units or both. This is the second analysis after the policy change of 2016.

*Table 8: Published Conference Proceedings Units per Institution, 2013 - 2017*

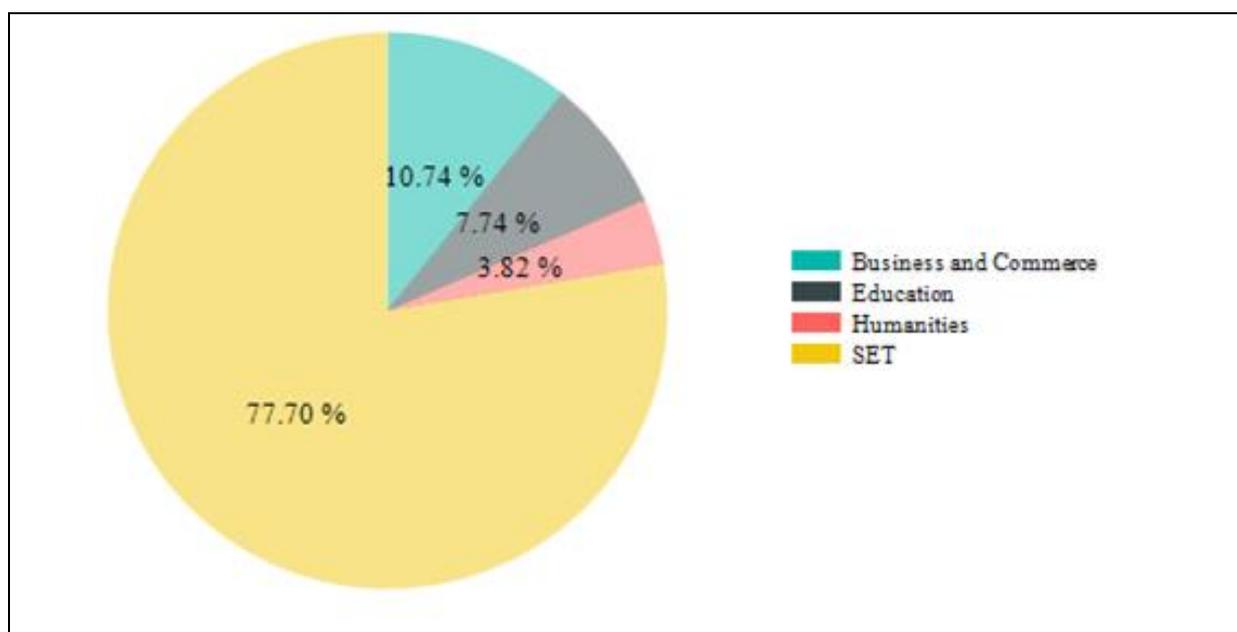
Institution	No. of Units					% increase / decrease from 2013 to 2017
	2013	2014	2015	2016	2017	
UJ	182.5	253.47	288.44	304.15	303.72	66.42%
UP	119.64	147.04	151.02	139.83	111.86	-6.50%
SUN	126.74	103.51	82.64	115.61	105.17	-17.01%
UCT	122.48	117.29	102.62	103.94	104.46	-14.71%
WITS	68.46	77.94	86.38	79.06	102.94	50.36%
NWU	119.98	107.34	126.8	90.13	82.37	-31.34%
UKZN	58.34	52.35	51.21	61.03	67.08	14.98%
UNISA	68.13	78.61	87.73	85.15	57.94	-14.95%
NMU	84.16	77.39	63.64	84.09	54.23	-35.56%
TUT	65.37	58.63	44.43	47.92	49.5	-24.27%
CUT	13.02	13.65	30.85	44.89	44.23	239.70%
UFS	33.02	39.59	46.34	33.42	39.71	20.26%
RU	28.69	29.8	34.6	29.45	23.8	-17.04%
CPUT	41.79	46.5	33.44	32.6	23.4	-44.00%
VUT	13.01	29.85	13.28	18.21	22.86	75.71%
DUT	17.37	10.93	31.82	8.73	21.25	22.33%
UFH	11.26	14.75	8.85	15.99	17.91	59.05%
UL	23.83	9.21	33.01	17.78	15.99	-32.89%
UNIVEN	9.15	13.68	9.08	13.08	8.9	-2.73%
UWC	16.73	10.06	6.82	10.41	7.25	-56.66%
UNIZULU	7.00	6.85	11.33	6.78	5.59	-20.14%
MUT	2.25	1.63	1.25	2.87	0.25	-88.88%
WSU	4.00	1.00	2.5	2.75	4.00	-
UMP	-	-	-	-	1.5	-
SMU	-	0.25	1.5	-	-	-
<b>TOTAL</b>	<b>1236.92</b>	<b>1301.32</b>	<b>1349.58</b>	<b>1347.87</b>	<b>1275.91</b>	<b>3.15%</b>

### 5.1. Published Conference Proceedings Output Units by Classification of Education Subject Matter (CESM) Category

The largest share of units for published conference proceedings in 2017 are in Engineering at 51.49% (CESM 8); followed by Computer & Information Sciences at 14.22% (CESM 6); and Business, Economics and Management Studies at 10.74% (CESM 4). These are research fields with a high turnover and turnaround time of invention and innovation.

**Figure 4** shows that the highest proportion of published conference proceedings in 2017 accrued to the SET field (77.70%); then followed by Business and Commerce (10.74%); Humanities (3.82%); and Education (7.74%). The SET field increased from 69.36% in 2016 to 73.52% in 2017, whereas the Business and Commerce field decreased from 11.59% to 10.74%; Education from 8.25% to 7.74% and Humanities from 10.80% to 3.82%. The SET field is the major contributor to conference proceedings and this is largely through outputs in Engineering (CESM 8) and Computer & Information Sciences (CESM 6).

*Figure 4: Published Conference Proceedings Output by Broad Field, 2017*



**Table 9** shows the number conference publications units accrued in each CESM category and the percentage proportion for each. There is a decrease of 5.34% in the total number of conference proceedings output units in 2017 with a total of 1275.91 units compared to 2016 with a total of 1347.87 units.

Table 9: Conference Proceedings Output Units by CESM Category, 2016 and 2017

CESM Category	2016		2017		% increase / decrease from 2016 to 2017
	No. of Units	% of Total	No. of Units	% of Total	
08: Engineering	592.76	43.98%	656.93	51.49%	10.83%
06: Computer and Information Sciences	235.29	17.46%	181.47	14.22%	-22.87%
04: Business, Economics and Management Studies	154.65	11.47%	137.00	10.74%	-11.41%
07: Education	110.21	8.18%	98.81	7.74%	-10.34%
14: Physical Sciences	73.79	5.47%	80.16	6.28%	8.63%
02: Architecture and the Built Environment	83.63	6.20%	53.34	4.18%	-36.22%
03: Visual and Performing Arts	6.54	0.49%	13.84	1.08%	111.62%
15: Mathematics and Statistics	16.03	1.19%	12.23	0.96%	-23.71%
19: Public Management and Services	16.85	1.25%	10.05	0.79%	-40.36%
11: Languages, Linguistics and Literature	6.83	0.51%	9.37	0.73%	37.19%
20: Social Sciences	12.62	0.94%	5.05	0.40%	-59.98%
01: Agriculture, Agricultural Operations and Related Sciences	6.19	0.46%	4.78	0.37%	-22.78%
17: Philosophy, Religion and Theology	8.50	0.63%	4.17	0.33%	-50.94%
12: Law	8.75	0.65%	3.50	0.27%	-60.00%
05: Communication, Journalism and Related Studies	4.75	0.35%	2.25	0.18%	-52.63%
13: Life Sciences	4.90	0.36%	1.93	0.15%	-60.61%
16: Military Sciences	0.50	0.04%	0.50	0.04%	0.00%
18: Psychology	1.00	0.07%	0.50	0.04%	-50.00%
09: Health Professions and Related Clinical Sciences	2.58	0.19%	0.03	0.00%	-98.84%
10: Family Ecology and Consumer Sciences	1.50	0.11%		0.00%	-100.00%
<b>TOTAL</b>	<b>1347.87</b>	<b>100.00%</b>	<b>1275.91</b>	<b>100.00%</b>	<b>-5.34%</b>

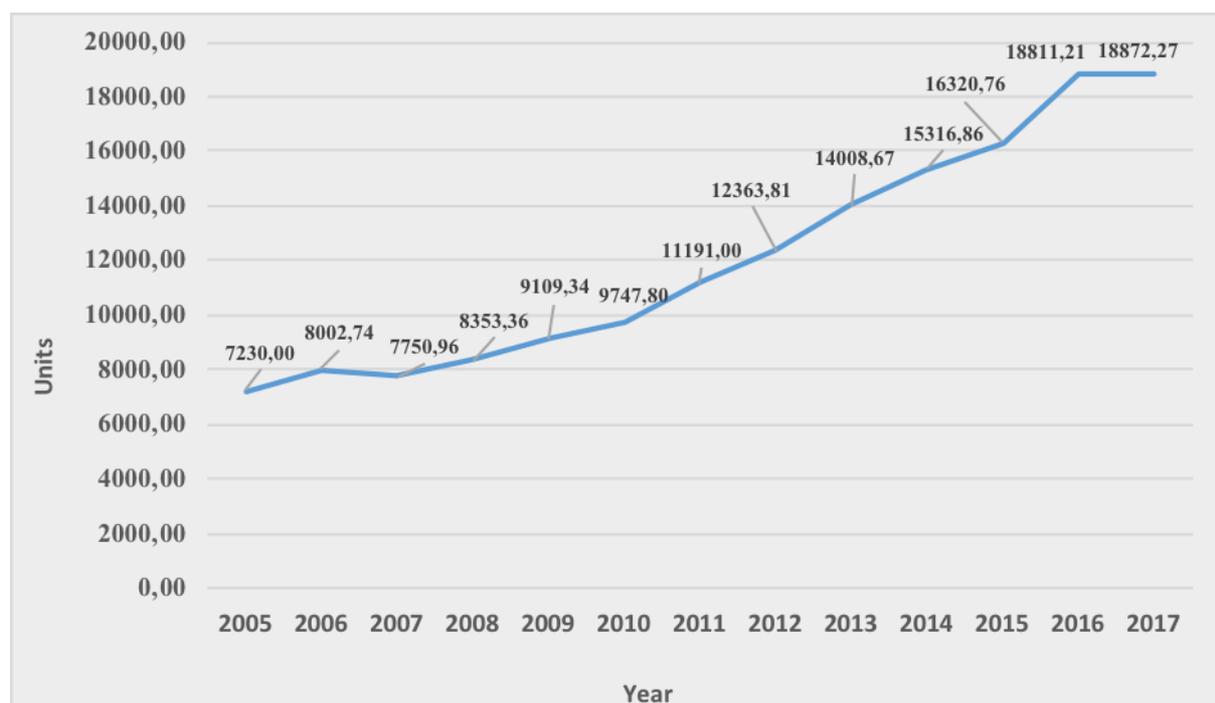
CESM 08 (Engineering) increased from 592.76 units in 2016 to 656.93 in 2017, a 10.83% growth. While growth of greater than 30% is recorded in CESM 11 (Languages, Linguistics and Literature); CESM 03 (Visual and Performing Arts) had an increase of 111.62% which is not significant in the actual number of units considering the small number of units for both 2016 and 2017.

## 6. OVERALL RESEARCH PUBLICATION OUTPUT UNITS

### 6.1. Overall Research Publications Outputs

Overall, there has been an increase in publication outputs in 2017 from the previous years. **Figure 5** shows research publications outputs since 2005 which is the year the research outputs policy first came into place and with its improvement in 2016. Research publications outputs have been on a steady rise in South Africa since the introduction of the policy. The greatest increases in research publication outputs occurred from 2010 to 2016, with an increase of above 1000 units year on year. During this period the largest increase occurred between 2015 and 2016, by 2490.45 units. It is worth noting that this increase was a result of the change in the research outputs policy in 2015. The next highest increase between 2012 and 2013, with an increase of 1644.86 units. In the years before 2010 the increases were not more than 800 units in any given year.

Figure 5: Overall Research Publications Outputs, 2005-2017



The total approved publications research outputs for 2017 amounted to 18 872.27 units, an increase of 3.56% from the 2016 units. Journal articles increased from 14 612.27 units in 2016 to 15 388.42 units in 2017 (5.31% growth). Published conference proceedings decreased from 1326.18 units in 2016 to 1275.91 units in 2017 ( a decrease of 3,79%). Book publications also decreased from 2269.07 in 2016 to 2207.94 in 2017, a decrease of 2.69%.

A list of all institutions (excluding SPU which did not submit their outputs) with their respective research publications outputs for 2017 is presented in **Table 10**. The table is arranged according to the volume or overall institution's publication output units, from the highest to the lowest number of units.

A pattern of academic publishing for each institution begins to emerge with an analysis of types of publications produced and the fields that are dominant in academic publishing. Despite the predominance of journal publishing, interestingly, UP, WITS, SUN, UJ, UCT and UWC accrued more or less balanced proportions between book and journal publications. Academic publishing at these institutions was almost equally balanced between book and journal publications. This balance use of publication types seems to be the strength as these six institutions collectively accrued the majority publication units overall (52.53% of overall sector publications units). Book publications at UFS, RU and UNIZULU dominated while at the rest of the institutions journal publications were predominant. Further analyses of these patterns in future should provide, not only publication preferences but also an indication of strengths within each institution.

Table 10: Overall Publication Output Units Per Institution, 2017

Institution	Book Publications		Published Conference Proceedings		Journal Publications		Overall units in 2017	% of Overall Sector Publications Units
	Units	% of total institutional units	Units	% of total institutional units	Units	% of total institutional units		
UP	237.67	10.76%	111.86	8.77%	1713.41	11.13%	2062.94	10.93%
UKZN	128.09	5.80%	67.08	5.26%	1833.63	11.92%	2028.80	10.75%
WITS	286.36	12.97%	102.94	8.07%	1620.28	10.53%	2009.58	10.65%
SUN	266.02	12.05%	105.17	8.24%	1511.34	9.82%	1882.53	9.98%
UJ	326.54	14.79%	303.72	23.80%	1111.15	7.22%	1741.41	9.23%
UCT	185.98	8.42%	104.46	8.19%	1441.18	9.37%	1731.62	9.18%
NWU	110.03	4.98%	82.37	6.46%	1107.64	7.20%	1300.04	6.89%
UNISA	117.61	5.33%	57.94	4.54%	1107.95	7.20%	1283.50	6.80%
UFS	239.20	10.83%	39.71	3.11%	716.31	4.65%	995.22	5.27%
RU	99.22	4.49%	23.80	1.87%	456.02	2.96%	579.04	3.07%
UWC	53.18	2.41%	7.25	0.57%	422.55	2.75%	482.98	2.56%
UFH	13.81	0.63%	17.91	1.40%	382.94	2.49%	414.66	2.20%
NMU	22.52	1.02%	54.23	4.25%	312.33	2.03%	389.08	2.06%
TUT	6.47	0.29%	49.50	3.88%	265.54	1.73%	321.51	1.70%
UL	21.41	0.97%	15.99	1.25%	278.28	1.81%	315.68	1.67%
DUT	28.58	1.29%	21.25	1.67%	210.03	1.36%	259.86	1.38%
CPUT	25.84	1.17%	23.40	1.83%	206.77	1.34%	256.01	1.36%
UNIZULU	24.90	1.13%	5.59	0.44%	161.28	1.05%	191.77	1.02%
UNIVEN	8.38	0.38%	8.90	0.70%	158.91	1.03%	176.19	0.93%
VUT	0.00	0.00%	22.86	1.79%	103.90	0.68%	126.76	0.67%
CUT	3.21	0.15%	44.23	3.47%	59.78	0.39%	107.22	0.57%
SMU	1.00	0.05%	0.00	0.00%	93.38	0.61%	94.38	0.50%
WSU	1.14	0.05%	4.00	0.31%	68.94	0.45%	74.08	0.39%
MUT	0.78	0.04%	0.25	0.02%	23.19	0.15%	24.22	0.13%
UMP	0.00	0.00%	1.50	0.12%	21.69	0.14%	23.19	0.12%
Total	2207.94	11.70%	1275.91	6.76%	15388.42	81.54%	18872.27	100.00%

The proportion of the total publication output units awarded to each institution over the nine years from 2009 to 2017, expressed as a percentage of overall publications outputs by the sector, is shown in **Table 11**. Table 11 clusters institutions according to traditional universities; universities officially designated as historically disadvantaged; and the universities of technology. A decline of 1.78 units in the proportion of publications output units among traditional universities can be observed between 2013 and 2017. During this period the majority of traditional universities (UP, UKZN, SUN, UCT, NWU, UNISA, RU and NMU) experienced a decline, albeit some more pronounced than others, while a few (Wits, UJ and UFS) experienced growth. The net result, though, is the overall decline with the cluster of traditional universities some of which are generally research-led.

Notably, Wits and UFS have had a decline in the four years prior 2013 (as shown in Table 11), while UJ has been on a growth trajectory for the past eight years. These institution's research strategies and plans, therefore, may be useful to study especially by institutions that are interested in improving their research outputs.

Table 11: Percentage of Total Output Units per Institution, 2009 – 2017

Institution	2009	2010	2011	2012	2013	2014	2015	2016	2017
UP	13.0%	12.2%	11.7%	11.5%	11.53%	10.95%	11.26%	10.94%	10.93%
UKZN	12.2%	11.8%	11.2%	11.5%	11.62%	11.16%	10.80%	10.98%	10.75%
WITS	10,1%	9,6%	9,3%	9,0%	9.28%	9.67%	9.53%	9.78%	10.65%
SUN	11.5%	10.6%	10.3%	10.7%	10.54%	10.15%	8.68%	9.48%	9.98%
UJ	5,1%	6,3%	6,9%	7,1%	6.41%	7.02%	7.84%	8.39%	9.23%
UCT	13.0%	12.9%	11.7%	11.2%	11.06%	10.60%	10.13%	9.83%	9.18%
NWU	4.9%	6.0%	6.6%	7.0%	8.35%	7.36%	7.66%	7.59%	6.89%
UNISA	6.9%	7.5%	7.1%	7.2%	7.35%	7.66%	8.14%	7.66%	6.80%
UFS	5,6%	5,1%	5,1%	5,2%	4.77%	4.96%	4.36%	5.04%	5.27%
RU	3.9%	3.3%	3.2%	3.3%	3.24%	3.21%	2.99%	2.66%	3.07%
NMU	2.5%	2.6%	3.1%	2.5%	2.44%	2.39%	2.44%	2.31%	2.06%
<b>Sub-Total</b>	<b>88.70%</b>	<b>87.90%</b>	<b>86.20%</b>	<b>86.20%</b>	<b>86.59%</b>	<b>85.13%</b>	<b>83.83%</b>	<b>84.66%</b>	<b>84.81%</b>
UWC	3.1%	2.7%	3.1%	3.0%	2.90%	3.14%	3.05%	3.03%	2.56%
UL	0.8%	1.0%	1.3%	1.8%	1.62%	1.59%	1.69%	1.57%	1.67%
UFH	1.5%	1.5%	1.6%	1.7%	1.68%	1.83%	2.06%	1.95%	2.20%
UNIZULU	0.8%	0.7%	0.6%	0.6%	0.64%	0.72%	0.80%	0.72%	1.02%
UNIVEN	0.6%	0.8%	1.2%	1.0%	1.06%	1.47%	1.66%	1.29%	0.93%
SMU	0.00%	0.00%	0.00%	0.00%	0.00%	0.61%	0.68%	0.67%	0.50%
WSU	0.3%	0.5%	0.4%	0.5%	0.35%	0.17%	0.30%	0.32%	0.39%
UMP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.16%	0.12%
<b>Sub-Total</b>	<b>7.10%</b>	<b>7.21%</b>	<b>8.20%</b>	<b>8.60%</b>	<b>8.25%</b>	<b>9.53%</b>	<b>10.34%</b>	<b>9.71%</b>	<b>9.39%</b>
TUT	1.4%	1.9%	2.2%	1.9%	1.99%	1.84%	1.85%	1.86%	1.70%
DUT	0.5%	0.5%	0.8%	0.7%	0.91%	0.99%	1.44%	1.19%	1.38%
CPUT	1.4%	1.6%	1.3%	1.4%	1.05%	1.12%	1.30%	1.20%	1.36%
VUT	0.4%	0.5%	0.7%	0.6%	0.59%	0.72%	0.47%	0.56%	0.67%
CUT	0.4%	0.4%	0.4%	0.5%	0.49%	0.57%	0.65%	0.73%	0.57%
MUT	0.0%	0.1%	0.2%	0.1%	0.13%	0.10%	0.11%	0.09%	0.13%
<b>Sub-Total</b>	<b>4.20%</b>	<b>4.90%</b>	<b>5.6%</b>	<b>5.20%</b>	<b>5.16%</b>	<b>5.34%</b>	<b>5.82%</b>	<b>5.63%</b>	<b>5.81%</b>

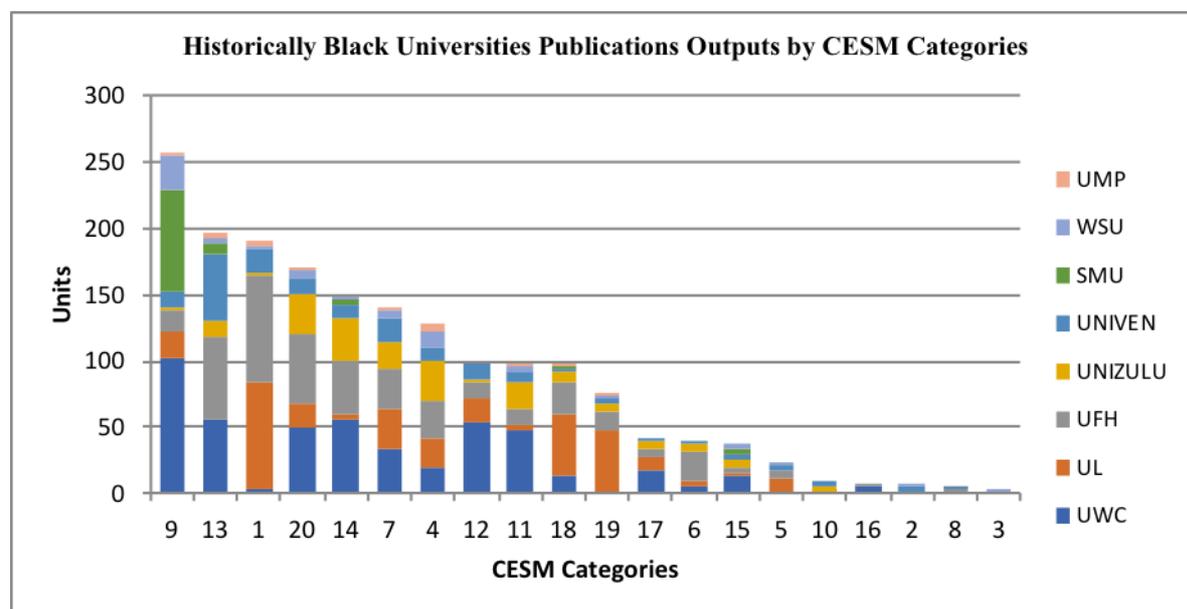
## **6.2. The Historically Black Universities**

In 2017, the Historically Black Universities produced 9.39% of overall publications outputs. Despite some fluctuations in research publications outputs in the period between 2013 and 2017, individual institutions generally experienced a steady increase. In fact, research publications output units at the HBUs have been on a steady rise since 2009 (8.6%). Detailed analysis of research outputs by the HBUs needs to focus, among others, on their individual areas of strengths so that they attend to the subject areas and fields where development and growth should be channeled.

Combining the analysis with information illustrated in **Figure 6** and data contained in Tables 13, 14 and 15, HBUs have relatively more publications outputs in the fields of Health Professions and Related Clinical Sciences (CESM 09); Life Sciences (13); Agriculture, Agricultural Operations and Related Sciences (01); Social Sciences (20); Physical Sciences (14); Education (7) and Business, Economics and Management Studies (04). The quantity of research output units in the above fields could be an indication of HBU's fields of strengths in research, and that could be verified by empirical evidence and other types of research outputs.

The data illustrated in Figure 6, shows that most of the above fields are offered at the majority of the HBUs. In other words, these are the areas of fields of relatively stronger research strength within the HBUs. Whether these fields are correctly the focus or are indeed supposedly the focus of HBUs is a question that should be determined by programme and mission differentiation of institutions, which should be partly based on contextual demand.

Figure 6: Historically Black Universities Publication Outputs by CESM Categories



On publications alone, each of these fields staked more than 5% proportion of the 2017 overall publications units as shown in **Table 13**. The table shows research publications units by each CESM category for both 2016 and 2017 publications outputs cycles.

### 6.3. Publications by Classification of Education Subject Matter (CESM) Categories

Analysis of the CESM categories aggregated for all publications types (journals, books and conference proceedings), shows the most research active subject areas in general and per institution. This information can assist individual institutions to focus their efforts in developing their niche or areas of potential. In analysing research outputs by CESM categories, consideration should be given to the fact that research publications can be affected by different patterns of authorship; frequency of publications; the time it takes to complete research and the publication waiting period for some publications, especially journals and books. This categorisation should be regarded as an indicator rather than be taken as an absolute, particularly if the analysis is over a number of years. The Department began this categorisation in its analysis of publication outputs in 2010.

The purpose of the categorisation is not necessarily to compare the sub-fields as there may be differences in the number of academics or researchers; the development and resourcing

of the relevant fields by institutions and other factors. Instead, it should be used to identify potential for possible improvements and resource allocation at institutional level to strategically position the institution. The total publication output units by CESM categories in descending order for 2016 and 2017 are shown in **Table 12**.

*Table 12: Total Publicaiton Output Units by CESM Categories, 2016 and 2017*

CESM Category	2016		2017		% increase / decrease from 2016 to 2017
	Units	% of Total	Units	% of Total	
09: Health Professions and Related Clinical Sciences	2808.12	14.93%	2867.12	15.19%	2.10%
08: Engineering	1699.03	9.03%	1879.05	9.96%	10.60%
20: Social Sciences	1938.33	10.30%	1763.70	9.35%	-9.01%
04: Business, Economics and Management Studies	1717.56	9.13%	1629.75	8.64%	-5.11%
14: Physical Sciences	1723.21	9.16%	1610.97	8.54%	-6.51%
13: Life Sciences	1598.02	8.50%	1607.16	8.52%	0.57%
01: Agriculture, Agricultural Operations and Related Sciences	897.02	4.77%	1218.42	6.46%	35.83%
17: Philosophy, Religion and Theology	1156.40	6.15%	1190.54	6.31%	2.95%
07: Education	1245.52	6.62%	1181.81	6.26%	-5.12%
12: Law	899.09	4.78%	833.00	4.41%	-7.35%
11: Languages, Linguistics and Literature	779.12	4.14%	830.33	4.40%	6.57%
15: Mathematics and Statistics	596.68	3.17%	532.51	2.82%	-10.75%
06: Computer and Information Sciences	487.08	2.59%	465.74	2.47%	-4.38%
18: Psychology	391.11	2.08%	370.88	1.97%	-5.17%
19: Public Management and Services	248.76	1.32%	256.63	1.36%	3.16%
03: Visual and Performing Arts	183.84	0.98%	225.46	1.19%	22.64%
02: Architecture and the Built Environment	207.96	1.11%	174.75	0.93%	-15.97%
05: Communication, Journalism and Related Studies	150.15	0.80%	141.32	0.75%	-5.88%
16: Military Sciences	47.80	0.25%	64.95	0.34%	35.88%
10: Family Ecology and Consumer Sciences	36.41	0.19%	28.18	0.15%	-22.60%
<b>TOTAL</b>	<b>18811.21</b>	<b>100.00%</b>	<b>18872.27</b>	<b>100.00%</b>	<b>0.32%</b>

**Table 13** shows the five most research active CESM categories within each publication type. Among journals, research activity is highest among CESM categories 9, 13, 14, 4 and 20, with the SET being predominant. The five sub fields in which most publications are found take up a proportion of 60% of all research publication outputs.

*Table 13: Percentage of Overall Publications from the Five Highest CESM categories*

Publication Type	Five highest CESM categories Five most Publishing CESMs/Fields	Field	Units	Percentage within publication type	Percentage of Overall Publications
Journal Units	09: Health Professions and Related Clinical Sciences	SET	2834.79	18.42%	15.02%
	13: Life Sciences	SET	1557.35	10.12%	8.25%
	14: Physical Sciences	SET	1494.59	9.71%	7.92%
	04: Business, Economics and Management Studies	Business & Commerce	1399.07	9.09%	7.41%
	20: Social Sciences	Humanities	1231.36	8.00%	6.52%
	<b>Sub-Total</b>			<b>8517.16</b>	<b>55.35%</b>
Books	20: Social Sciences	Humanities	527.29	23.88%	2.79%
	17: Philosophy, Religion and Theology	Humanities	375.35	17.00%	1.99%
	11: Languages, Linguistics and Literature	Humanities	287.87	13.04%	1.53%
	7: Education	Education	245.88	11.14%	1.30%
	12: Law	Humanities	187.77	8.50%	0.99%
	<b>Sub-Total</b>			<b>1624.16</b>	<b>73.56%</b>
Conferences	8: Engineering	SET	656.93	51.49%	3.48%
	6: Computer and Information Sciences	SET	181.47	14.22%	0.96%
	04: Business, Economics and Management Studies	Business & Commerce	137	10.74%	0.73%
	14: Physical Sciences	SET	80.16	6.28%	0.42%
	7: Education	Education	98.81	7.74%	0.52%
	<b>Sub-Total</b>			<b>1154.37</b>	<b>90.47%</b>
Five highest CESM categories Total of Five most Publishing CESMs/Fields			11295.69	59.85%	59.85%
Overall Publication Units			18872.27		100.00%

The five sub fields in conference proceedings which most publications are found take up a proportion of 6.12% of all research publication outputs. These are in the following CESMS: 8, 6, 4, 14 and 7. Among book publications CESM categories 20, 17, 11, 7 and 12 are the five sub fields which most publications are found making up 8.61% proportion of overall research publications units.

The proportion of overall publications output units is highly skewed towards SET field as shown in **Figure 7**. Analysis of the 2017 output units by broad scientific field of study shows that more than half (53.52%) are produced in the Science, Engineering and Technology (SET) fields, followed by Humanities (31.16%), Business and Commerce (8.88%) and Education (6.44%).

*Figure 7: Proportion of Publication by Broad Fields, 2017*

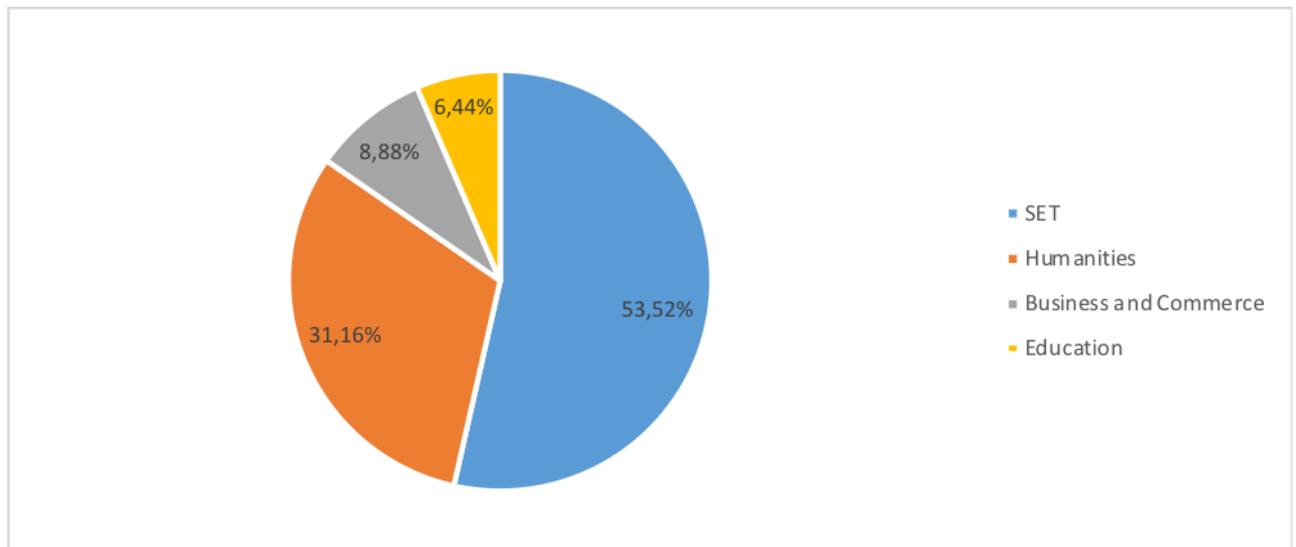


Table 14: Research Publications by Institution per CESM Categories

Institution	NUMBER OF UNITS PER CESM CATEGORY																				Total
	01	02	03	04	05:	06	07	08	09	10	11:	12	13	14	15	16	17	18	19	20	
UP	334,39	26,79	9,23	155,67	0,27	82,86	66,94	278,84	250,6	3	44,26	110,46	60,42	96,97	65,46	0	304,53	12,67	12,2	147,38	2062,94
UKZN	381,24	2	14	141,61	9,96	30,41	85,17	167,78	443,8	1	50,02	39,27	203,86	132,99	78,06	0	49,51	19,42	14,44	164,11	2028,65
WITS	3,42	39,7	25,06	134,21	16,24	7,32	82,98	196,41	569,12	0,07	71,9	68,94	167,19	152,14	92,06	0	13,84	44,88	29,64	294,46	2009,58
SUN	140,29	0	19,72	102,17	7,12	16,72	80,77	227,04	270,72	0	174,94	65,02	218,99	151,01	39,91	40,31	155,1	58,32	24,1	90,28	1882,53
UJ	1,83	2,08	67,38	167,08	40,37	43	112,97	431,87	55,29	0	47,44	112,6	99,17	196,1	38,55	0	55,14	7,91	29,32	233,31	1741,41
UCT	7,09	29,54	14,5	91,5	3,71	58,58	77,84	175,69	669,42	0	46,25	86,71	170,64	111,72	23,46	0	26,69	35,24	8,66	94,38	1731,62
NWU	24,53	1,4	9	218,51	5	24,5	86,37	60,57	132,71	3,75	55,02	53,89	31,58	154,94	51,61	0	210,28	10,99	10,5	154,89	1300,04
UNISA	24,48	0	6	198,9	12,75	55,74	142,34	74,7	49,54	3,92	78,92	133,11	16,84	86,75	23,13	3	163,53	45,81	26,64	137,4	1283,5
UFS	47,33	15,17	11,63	25,46	5,5	11,1	95,01	0	75,34	1,66	97,52	41,12	76,85	126,8	40,63	10,48	161,24	17,52	11,45	123,41	995,22
RU	15,84	2	12,2	17,24	4,42	21,06	59,7	0	11,97	0	41,61	8,93	170,69	114,1	7,1	0	4,13	4,3	0	83,75	579,04
NMU	4,63	22,83	3,5	57,32	0,33	34,03	24,75	20,17	26,15	1	7	11,14	88,45	42,18	7,22	0,33	2	7,98	4	24,07	389,08
Sub-Total	985,07	141,51	192,22	1309,67	105,67	385,32	914,84	1633,07	2554,66	14,4	714,88	731,19	1304,68	1365,7	467,19	54,12	1145,99	265,04	170,95	1547,44	16003,61
UWC	3,43	0	0	19,48	1,81	5,17	33,74	0	102,55	1	47,73	53,65	55,6	56,23	13,59	6,5	16,72	14,05	1,3	50,43	482,98
UL	81,06	0	0	23,06	9	4,16	30,79	0	18,84	0,33	3,33	18,5	0	4,33	2,27	0	11,17	45,69	45,99	17,16	315,68
UFH	79,23	0,5	0	26,84	7,58	22,33	28,5	2,67	17,48	0,33	12,42	11,5	62,02	39,19	4,5	0,33	6,74	23,44	15,5	53,56	414,66

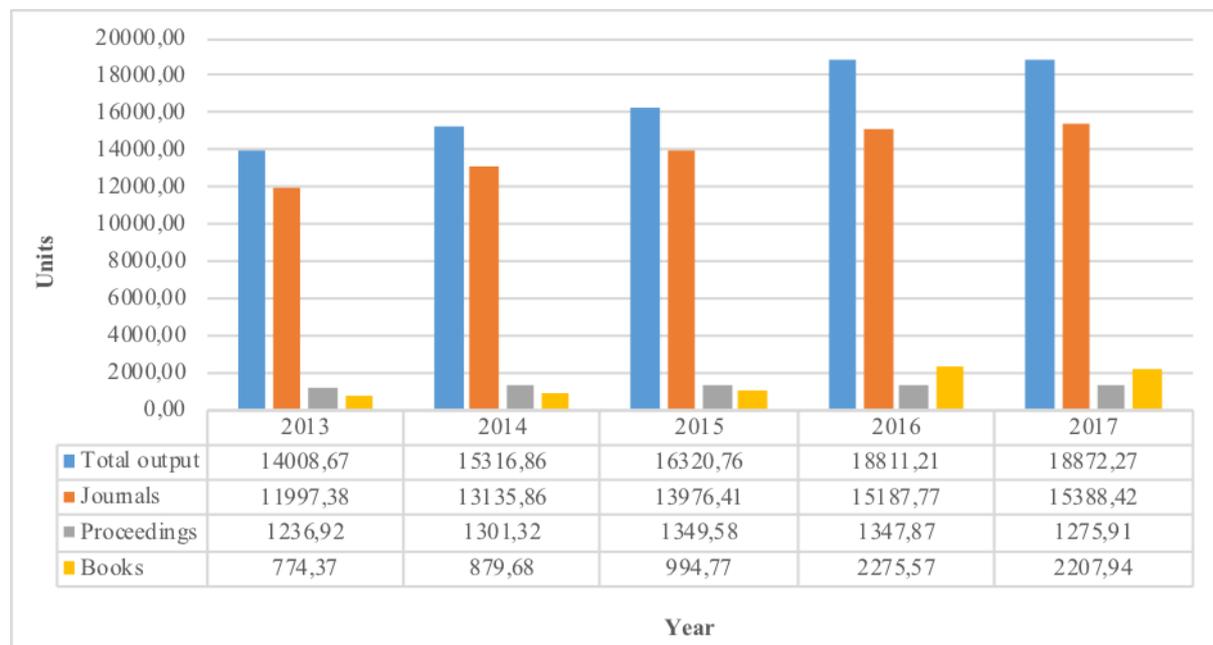
Institution	NUMBER OF UNITS PER CESM CATEGORY																				Total
	01	02	03	04	05:	06	07	08	09	10	11:	12	13	14	15	16	17	18	19	20	
UNIZULU	2,11	0	1	31,06	0	7	20,19	0,12	2,12	4,34	20	3	13,2	32,45	5,76	0	5,67	8,75	6,08	28,92	191,77
UNIVEN	18,47	6	0	8,75	4,03	1	19,61	1,99	10,66	3,45	8,17	11,16	49,75	10,83	3,5	0	2	2	2,4	12,42	176,19
SMU	0	0	0	0		0	0	0	77,32	0	0	0	7,35	3,38	5	0	0	1,33	0	0	94,38
WSU	2,5	0,25	1,5	13,17	0,75	0	5	0	26,95	0	5	0	5,45	2,62	3,25	0	0	0	2	5,64	74,08
UMP	4,5	0	0	6,07	0	0	2,5	0	1,5	0	1,16	0	2,71	0	0	0	0	1,75	1,5	1,5	23,19
Sub-Total	191,3	6,75	2,5	128,43	23,17	39,66	140,33	4,78	257,42	9,45	97,81	97,81	196,08	149,03	37,87	6,83	42,3	97,01	74,77	169,63	1772,93
TUT	8,77	5,5	12,79	55,18	4,92	18,73	7	121,27	7,98	0	9,67	0	43,66	4,84	9,2	4	0	7	1	0	321,51
DUT	1	0,6	1,78	29,88	2,5	4,78	33,31	17,27	17,02	2	3	0	48,31	47,59	8,36	0	0,25	1	7,08	34,13	259,86
CPUT	27,18	1,5	13	39,84	4	9,17	64,79	46,62	14,28	2,33	3,97	0,00	1,05	13,78	1,75	0	2	0	1,08	9,67	256,01
VUT	1,78	0	3,17	44,21	0	5,5	0,58	14,94	0,83	0	1	4	11	28,1	7,99	0	0	0,83	0	2,83	126,76
CUT	1,66	18,06	0	21,21	0	2,25	20,29	32,45	6,99	0	0	0	2,38	1,93	0	0	0	0	0	0	107,22
MUT	1,66	0,83	0	1,33	1,06	0,33	0,67	8,65	7,94	0	0	0	0	0	0	0	0	0	1,75	0	24,22
Sub-Total	42,05	26,49	30,74	191,65	12,48	40,76	126,64	241,2	55,04	4,33	17,64	4	106,4	96,24	27,3	4	2,25	8,83	10,91	46,63	1095,58
TOTAL	1218,42	174,75	225,46	1629,75	141,32	465,74	1181,81	1879,05	2867,12	28,18	830,33	833	1607,16	1610,97	532,36	64,95	1190,54	370,88	256,63	1763,7	18872,12
	6,46	0,93	1,19	8,64	0,75	2,47	6,26	9,96	15,19	0,15	4,40	4,41	8,52	8,54	2,82	0,34	6,31	1,97	1,36	9,35	100,00

Overall, research publications outputs by CESH categories per institution are shown in Table 14. The table is divided into the traditional universities; the HBUs and the UOTs. The predominant CESH categories in each classification are clearly identifiable in the table. As shown in Table 14, a proportion of 5.81% publications accrued to the UOTs. The UOTs experienced modest growth, if not plateauing, between 2013 and 2017. The UOTs have been staking relatively a proportion of 5% since 2010. As with the HBUs, the UOT's research areas of strengths need to be determined so as to focus their development on their relevant missions and supporting their current relevant capacity and critical mass.

#### 6.4 Research Output units by type of publication

Research publications are largely in journals. The pattern for the overall research publications units per sub-field is influenced by journal publications which take up 81.54% of all the publication outputs. Moreover, SET mainly uses journals and conferences to publish its research. Book publications are predominantly produced by Humanities. The education field mainly publishes in book and conference publications.

Figure 8: Research Output units by type of publication



**Figure 8** shows publications outputs in the past five years by type of publications. Despite fluctuations in-between, conference proceedings increased by 3.15% while book publications increased by 183.06%. The significant growth in book publications is certainly as a result of the change in the number of units awarded for book publications since 2016.

7. OVERALL (WEIGHTED) RESEARCH OUTPUTS (PUBLICATIONS, RESEARCH MASTERS AND DOCTORATE GRADUATES)

The Research Output subsidy is allocated to public higher education institutions based on the overall research outputs which include units for approved academic publications; research Masters and Doctorate graduates. **Table 15** shows the overall per capita output units (i.e. publications output units per permanently employed academic/research staff per annum) as well as overall weighted per capita research output units (i.e. weighted overall research output units -Doctorate graduates weighted by 3 units each, publications, Research Masters-weighted with 1 unit each-per permanently employed academic/research staff per annum).

Table 15: Overall/Weighted Research Per Capita Output, 2017

Institution	Headcount of permanently employed academics (a)	Research Publications Units (1)	Per Capita Research Publications Units	Research Masters Graduates Units (2)	Doctorate Graduates Units (3)	Overall Research Output Units (1+2+3)	Overall per capita Research Outputs (1+2+3)/a
UP	1236	2062.94	1.67	1049	1062	4173.94	3.38
SUN	1152	1882.53	1.63	928	915	3725.53	3.23
RU	322	579.04	1.80	189	261	1029.04	3.20
WITS	1195	2009.58	1.68	832	849	3690.58	3.09
UKZN	1341	2028.80	1.51	792	1164	3984.80	2.97
UFH	365	414.66	1.14	205	351	970.66	2.66
UCT	1208	1731.62	1.43	551	831	3113.62	2.58
UJ	1234	1741.41	1.41	471	378	2590.41	2.10
NWU	1510	1300.04	0.86	600	705	2605.04	1.73
UWC	658	482.98	0.73	275	360	1117.98	1.70
UFS	1000	995.22	1.00	266	381	1642.22	1.64
NMU	607	389.08	0.64	304	276	969.08	1.60
UNISA	1796	1283.50	0.71	532	858	2673.50	1.49
UNIZULU	316	191.77	0.61	70	96	357.77	1.13
UNIVEN	455	176.19	0.39	167	126	469.19	1.03
UL	565	315.68	0.56	170	45	530.68	0.94
DUT	581	259.86	0.45	129	99	487.86	0.84
TUT	969	321.51	0.33	232	165	718.51	0.74
CUT	305	107.22	0.35	48	60	215.22	0.71
CPUT	843	256.01	0.30	86	51	393.01	0.47
VUT	402	126.76	0.32	40	15	181.76	0.45
SMU	610	94.38	0.15	67	45	206.38	0.34
UMP	90	23.19	0.26	0	0	23.19	0.26
WSU	580	74.08	0.13	8	27	109.08	0.19
MUT	205	24.22	0.12	0	0	24.22	0.12
TOTAL	19545	18872.27	0.97	8011	9120	36003.27	1.84

**NB:** The Sol Plaatje University (SPU) does not yet have research outputs and is therefore, not included in the table. However, SPU is included in the calculation of national averages of academics with Masters and Doctorates as highest qualifications.

Universities should analyse their research outputs in order to determine their strengths and also to identify areas for development and where they need to enhance their respective missions and relevant targets on research. The identified areas may relate to their policies or strategies or even on their research funding distribution or all these aspects.

The national average of academics with Doctorates as highest qualification is 46% (i.e. including the 86 academics of SPU not shown in Table 15), 36% of academics have Masters as their highest qualification. **Figure 9** shows the overall number of units (publications, research Masters and Doctorates) against the number of permanently employed academics (Instruction and research staff) per institution.

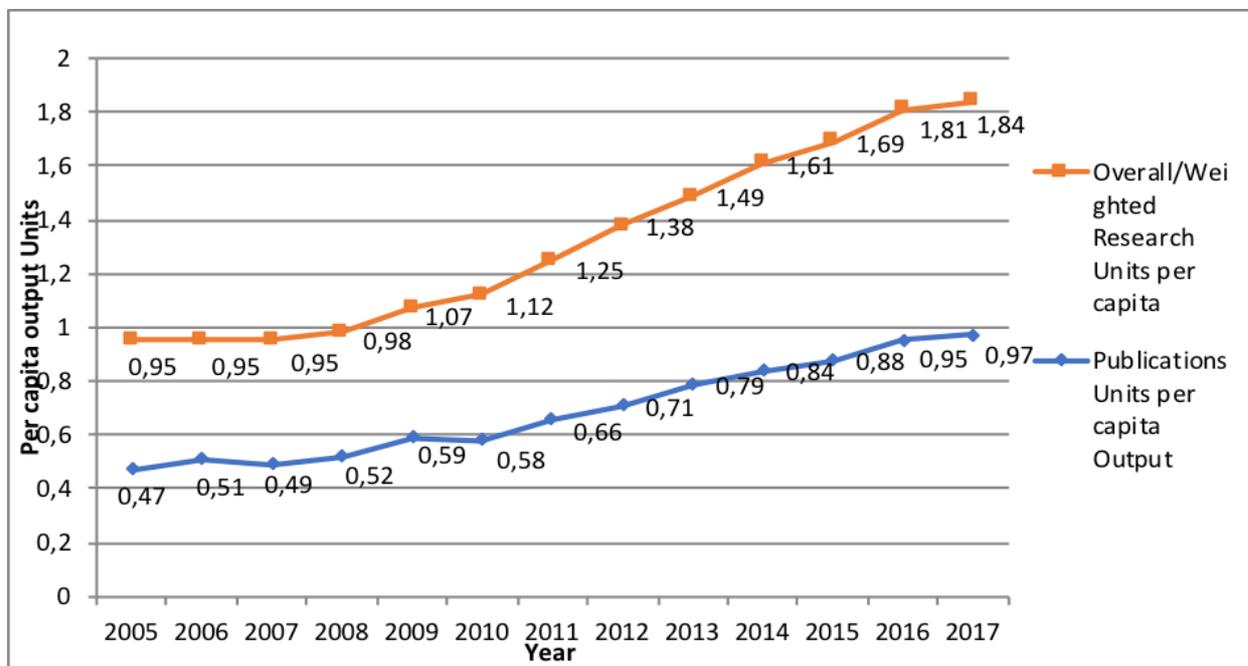
Table 16: Permanently employed academics by qualification, 2017

Institution	Academics with Masters as Highest Qualifications	Academics with Doctorate as Highest Qualifications	Overall Units (publications, Masters & Doctorates)	Number of Instruction/ Research Professionals	Institutional % Masters	Institutional % Doctorates	Weighted Per Capita Output
UP	369	810	4173.94	1236	29.85	65.53	3.38
UKZN	471	679	3984.80	1341	35.12	50.63	2.97
SU	284	647	3725.53	1152	24.65	56.16	3.23
WITS	312	777	3690.58	1195	26.11	65.02	3.09
UCT	338	773	3113.62	1208	27.98	63.99	2.58
UNISA	578	894	2673.50	1796	32.18	49.78	1.49
NWU	414	791	2605.04	1510	27.42	52.38	1.73
UJ	534	592	2590.41	1234	43.27	47.97	2.10
UFS	435	436	1642.22	1000	43.50	43.60	1.64
UWC	192	374	1117.98	658	29.18	56.84	1.70
RU	119	171	1029.04	322	36.96	53.11	3.20
UFH	126	173	970.66	365	34.52	47.40	2.66
NMU	218	281	969.08	607	35.91	46.29	1.60
TUT	410	288	718.51	969	42.31	29.72	0.74
UL	215	198	530.68	565	38.05	35.04	0.94
DUT	287	140	487.86	581	49.40	24.10	0.84
UNIVEN	190	176	469.19	455	41.76	38.68	1.03
CPUT	415	214	393.01	843	49.23	25.39	0.47
UNIZULU	137	151	357.77	316	43.35	47.78	1.13
CUT	145	113	215.22	305	47.54	37.05	0.71
SMU	294	110	206.38	610	48.20	18.03	0.34
VUT	182	78	181.76	402	45.27	19.40	0.45
WSU	219	79	109.08	580	37.76	13.62	0.19
MUT	106	30	24.22	205	51.71	14.63	0.12
UMP	25	27	23.19	90	27.78	30.00	0.26
SPU	34	30	0.00	86	39.53	34.88	0.00
<b>OVERALL TOTALS</b>	<b>7049</b>	<b>9032</b>	<b>36003.27</b>	<b>19631</b>	<b>35.91</b>	<b>46.01</b>	<b>1.83</b>

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. This observation is the basis for development funding from the Department, especially with respect to the University Capacity Development Programme (UCDP).

**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 2017. 2005 is the year the research outputs policy came into effect. Despite a tentative start in the growth of both publications and overall/weighted research outputs, there has been growth of research output units across the universities. The average total publication output units per permanent academic staff member (or per capita output) for all institutions for 2017 was 0.97 units, a small decrease from 0.98 units in 2016. Generally, the average per capita output over the years and across institutions has been on the increase. **Figure 9** shows the trajectory of growth.

Figure 9: Overall/Weighted and Publication per Capita Output 2005 – 2017



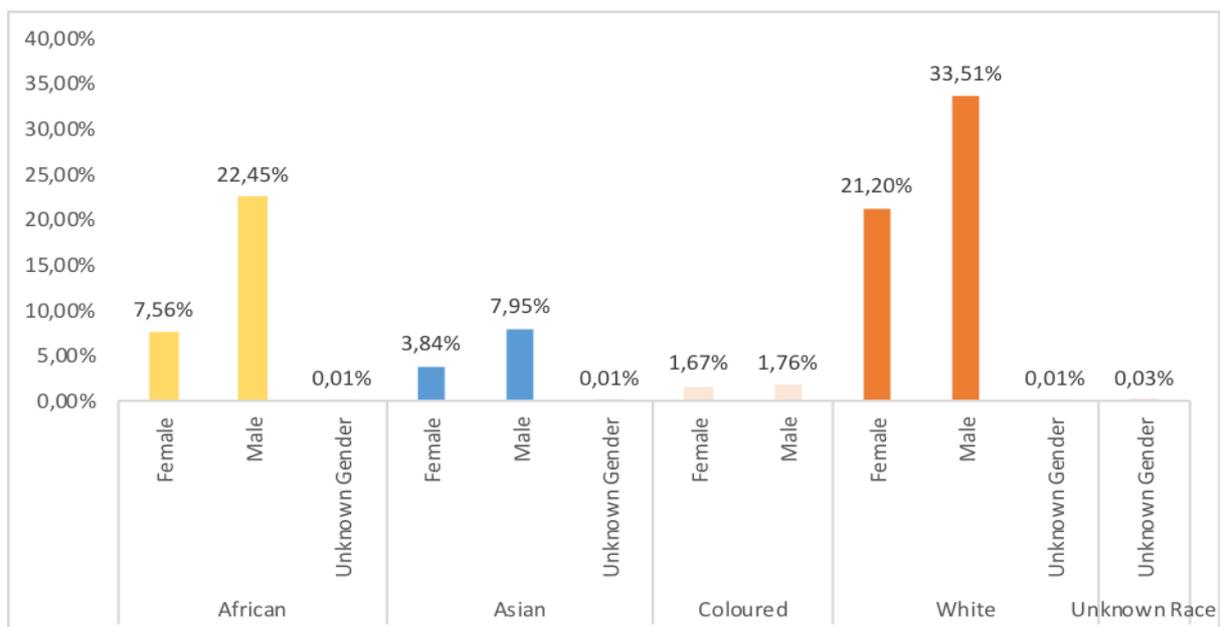
The graph shows that in the past 11 years (2007 – 2017) the average research publications per capita output grew by 51% while overall research outputs grew by 52%. This statement refers to the national average, individual institutions would show their respective performances.

## 7.1. Breakdown of Overall/Weighted Units by Race and Gender

The Department seeks to gather demographic information of all authors for the purposes of monitoring and improving on 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 feed into the policy development process. This is the second year the research outputs submissions sought to gather data on race and gender. There is indeed improvement in the quality and relative reliability of the data, however, there are still some improvements which can be introduced over time.

**Figure 10** shows the number of academics (research/instruction staff) by race and number of authors in the 2017 academic publications output cycle. The graph shows that, of the permanent 19 631 academics in the university sector in 2017, on average, the 8745 (45%) White academics were responsible for 30 223 (55%) authorships. Africans, who comprise 7511 (38%) of academics in the sector were, on average, responsible for 16 585 (30%) authorships; academics classified as Asian who comprise 1 619 (8%), on average, accounted for 6 520 (12%) authorships; and academics classified as Coloured 1 347 (7%), on average, accounted for 1898 (3%) authorships. The reason there are more authorships than the number of academics is due to multiple-authorships by some academics.

*Figure 10 Author proportion contribution by race and gender, 2017*



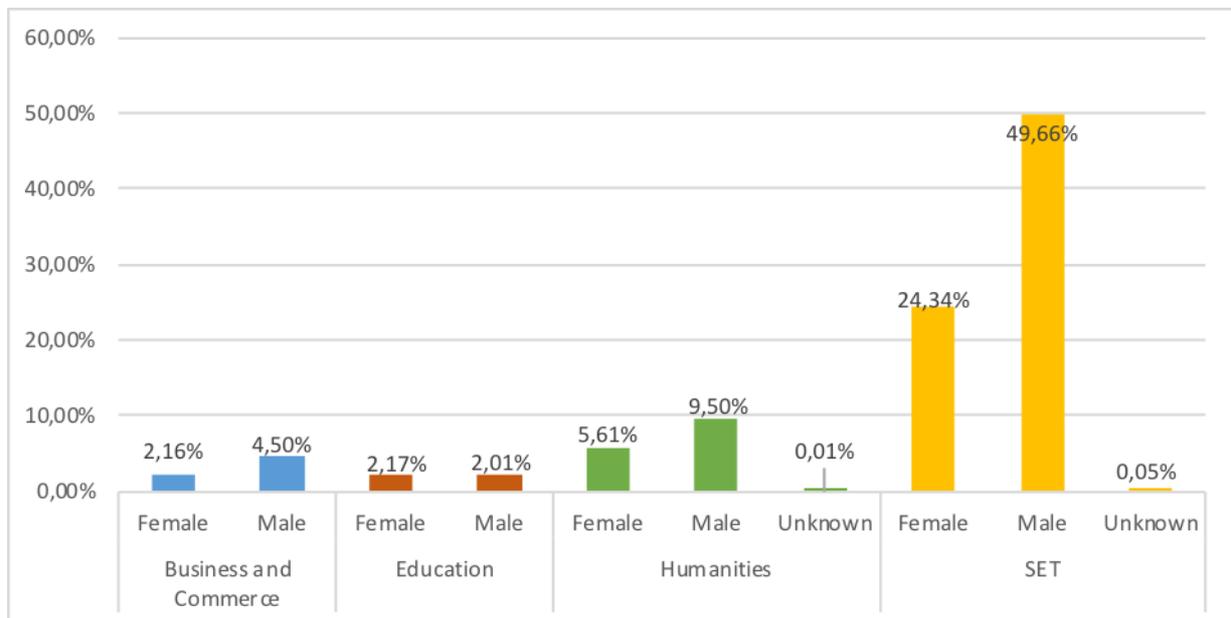
**Figure 11** shows outputs by gender and broad field of study. Data shows that male researchers are producing the majority of outputs in the system (65.67%). The weighted author proportion of White male authors contributing to the total publications is 33.51%; followed by African males with 22.45%; White females 21.20%; Asian males 7.95%; African females 7.56%; Asian females 3.84%; Coloured males 1.76%; and, Coloured females 1.67%.

Female researchers produced slightly higher than males in the Education field while males produced higher in the other three broad fields (Science, Engineering and Technology, Humanities and Business and Commerce).

It will be noted that in 2017, the number of White researchers at universities was higher than that of other races at 44.54% of the total number; followed by Africans 38.26%; Asians 8.24% and Coloureds 6.90%.

The majority of the 2017 research outputs were in Science, Engineering and Technology (SET) at 74.% of the total; followed by Humanities at 15.11%; Business and Commerce at 6.66%; and Education at 4.18%.

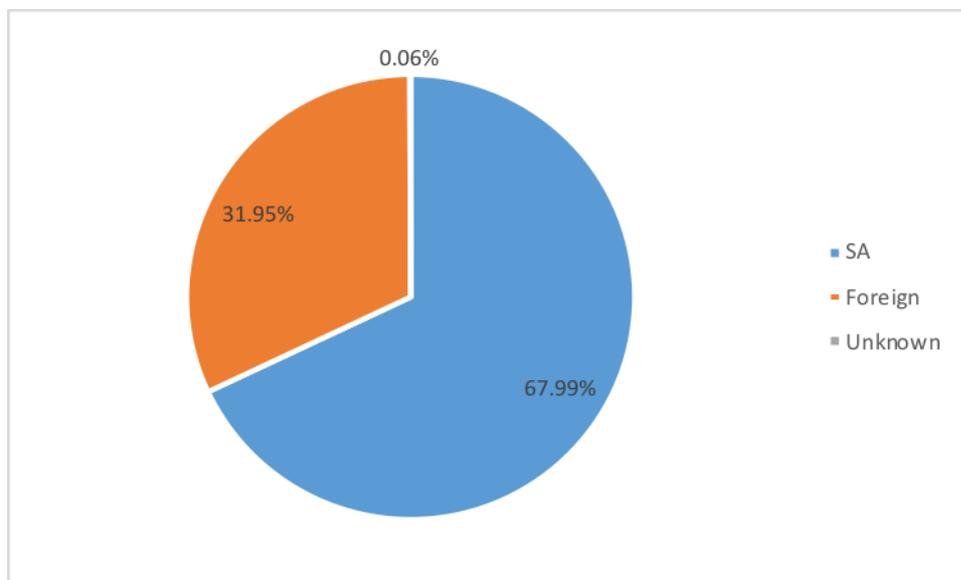
*Figure 11: Authorships by Gender of Permanently Employed Instruction/Research Staff*



Generally, the proportion of White academics/researchers in the higher education sector in 2017 was higher than that of other races, at 44.54% of the total number; followed by Africans at 38.26%; Asians at 8.24% and Coloureds at 6.90%. It follows, therefore, that the highest number of research output publications would be expected to be produced by White researchers.

In terms of the Nationality of Authors, 67.99% of authors were South African, and 31,95% of authors were of foreign nationality as shown in **Figure 12**.

*Figure 12: Percentage of Outputs by Nationality, 2017*



NB: SA includes permanent residents

## 8. GENERAL OBSERVATIONS AND CONCLUSIONS

Research productivity has been on a steady increase across all universities over the past eleven years, particularly publications in journals. The continued increase in productivity could be attributed to a number of factors including an increase in the number of researchers; the ability of institutions and researchers to attract research funding from various sources; improved infrastructure and, of course, institutional strategies and policies. Institutions are encouraged to analyse their institutional research output data, together with the Higher Education Management Information System (HEMIS) data in order to better understand the patterns and use this to influence targeted development. The analysis

contained in this report should provide the basis for broader and deeper institutional analysis for use in sharpening institutional plans and strategies.

Global exposure of local research is important for the benefit of our higher education system and, as such, it is encouraged. While there is no set balance between locally and internationally listed journals, it is good to see growth of publications in internationally listed journals, even when the journals are of South African origin.

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 males producing the highest proportion and outputs. The Department expects all institutions to provide data on the demographics of the claiming author(s) to enable the Department to seek ways to steer transformation of the sector with regard to knowledge production. Analysis of this aspect of information will be incomplete without all the universities providing the required information.

The policy supports and encourages scholarship. Institutions and academics must remember the importance of the research integrity and ethics when implementing the policy and are urged to focus on quality research and not maximum accrual of subsidy. The Department reserves the right to withhold payment of research output subsidy in respect of any publication published 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.

The Department is aware of the challenge of predatory journals and deeply condemns publishing in predatory journals since such a practice is not only unethical but also tarnishes the integrity of research as well as our institutions. If publications are identified as predatory, the Department verifies with the owners of the index in question and upon confirmation, the journal is removed from the list. The Department encourages anyone with knowledge of (possible) predatory journals to communicate it to the Department so that a quick action can be taken. The Department will withdraw subsidies for publications in these journals.

The Department has also noted with concern the increase in individual claims for conference proceedings. We would like to caution researchers against “serial” conferencing. The Department will continue to monitor this pattern.

Institutions are required to make use of the Research Outputs Submission System when submitting claims. The Department looks forward to the submission of 2018 research outputs through the Research Outputs Submission System.