

REPORT ON THE EVALUATION OF THE 2016 UNIVERSITIES' RESEARCH OUTPUT

MARCH 2018

Evaluated in terms of the Research Outputs Policy, 2015



higher education
& training

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FOREWORD BY THE DIRECTOR-GENERAL

I am pleased to present this annual report on the evaluation of the 2016 universities' research outputs. The report provides analysis of research units awarded to institutions for subsidy-earning research outputs in accredited journals, books and approved published conference proceedings.

Through the implementation of the *Research Outputs Policy 2015*, the Department of Higher Education and Training continues to encourage research productivity by rewarding quality research outputs at public higher education institutions. The data and pattern-analyses presented in this report show positive growth of publications, as it has been the case for many years now. We can only hope that this positive growth also reflects well on the quality of curriculum content, as well as teaching. Also, it is assumed that this is good reflection of growth of research activity across our university system. 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.

A number of studies suggests that some academics are falling into predatory publications traps due to the pressure to publish, for its sake and that of accruing maximum subsidy as well as the so-called academic reputation. Institutions and academics are urged to remember the importance of the research integrity, ethics and the importance of academic publication which is about knowledge dissemination rather than accruing incentive funding. Together we can combat this conduct that diminishes the quality of our research by also safeguarding against predatory journals.

The Department appreciates the support of the National Research Foundation for the development of the Research Outputs Submission System which will assist the Department to improve its efficiency of the research outputs process.

This report is a collaborative effort, and the Department expresses its appreciation to the Research Outputs 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

A handwritten signature in black ink, appearing to be 'GF Qonde', written in a cursive style.

.....

Mr GF Qonde

Director-General: Department of Higher Education

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Abbreviations

ASSAf	Academy of Science of South Africa
CESM	Classification of Educational Subject Matter
CPUT	Cape Peninsula University of Technology
CUT	Central University of Technology
DHET	Department of Higher Education and Training
DST	Department of Science and Technology
DUT	Durban University of Technology
DVC	Deputy Vice Chancellor
HDI	Historically Disadvantaged Institutions
HE	Higher Education
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
RDG	Research Development Grant
RIMS	Research Information Management System
ROE	Research Outputs Evaluation
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
SUN	Stellenbosch University
TUT	Tshwane University of Technology
UCT	University of Cape Town
UFH	University of Fort Hare
UFS	University of the Free State
WITS	University of the Witwatersrand
WoS	Web of Science
UJ	University of Johannesburg
UKZN	University of KwaZulu-Natal
UL	University of Limpopo
UoTs	Universities of Technology
UNIVEN	University of Venda
UNISA	University of South Africa
UNIZULU	University of Zululand
UP	University of Pretoria
UWC	University of the Western Cape
VUT	Vaal University of Technology
WSU	Walter Sisulu University

1. INTRODUCTION

Through the *Research Outputs Policy (2015)*, the Department of Higher Education and Training (DHET) 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”.

According to the policy, all public higher education institutions must annually submit their research outputs subsidy claims to the DHET. Based on calculations of units for approved publications, the Department allocates research subsidy. The rewarding of quality research output at public higher education institutions forms the basis for sustaining current research and promoting increased productivity of research and other knowledge outputs required to meet national development needs. The research outputs policy is a goal-oriented and performance-related mechanism that directly links the allocation of funds for research output, thus contributing to the social and economic development of the country.

All research publications outputs submitted to the DHET 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 system around the globe, and these include “peer-review” and “scholarliness” of the published works. All institutions must have 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 developed. This report therefore should be read in conjunction with, and construed in accordance with the *Research Outputs Policy (2015)*.

This report constitutes a detailed and up to date analysis of the processes, procedures and outcomes of the research publication outputs for 2016. Late publications for the year 2015 (n-2) were also considered where valid and legitimate reasons for late submission were provided and accepted, but submissions dating before 2015 (n-3 and beyond) were not considered, as stipulated in the Policy. For the sake of pattern analysis and improving our systems, the Department will in future request a separate submission of these publications, however, they will still not be considered for subsidy.

This report provides an analysis of the number of units awarded to institutions for subsidy-earning research outputs in accredited journals; approved book publications and approved conference proceedings published in 2016.

The Department continues to work on improving the quality of publications. In the process of carrying out such improvement of quality, some 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 respective institutions in December 2017, on the allocation of research output units for 2016 publications. The lists have since been withdrawn and communication sent to the institutions in this regard. The Department has all the records and information pertaining to the articles published in the affected journals for each institution, and we will incorporate the relevant units into the 2017 evaluation process.

However, the Department continues the work on quality publications and at any given stage will communicate its findings to the sector in this regard. 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.

2. PROCESS AND PROCEDURES

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 sit to assess all 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 15 May of each reporting year.

Of the 26 public Higher Education Institutions (HEIs), 25 HEIs submitted their 2016 research outputs publications for the purposes of subsidy claims.

The Directorate: University Policy and Development Support 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 respective institutions before further evaluation.

It is indeed encouraging to note that two of the three new universities, established in 2013, are already participating in research activities. All universities are encouraged to identify their research niche areas and develop the research potential where it shows.

To bring credibility and transparency in the process, and to improve the evaluation process, the research outputs (books and conference proceedings) for the 2016 reporting years were evaluated by field-specific peer review panels using pre-determined evaluation criteria in line with the *Research Output Policy*. The field-specific sub-panels conducted evaluations of books and conference proceedings under the guidance of the Research Outputs Evaluation Panel. 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 DHET recognises the following indices: Scopus, Scientific Electronic Library Online (SciELO) SA, the Norwegian Register for Scientific Journals, Thomson Reuters Web of Science, the ProQuest IBSS and the DHET/SA journal list.

The Department together with the National Research Foundation (NRF) are in a process of developing the Research Outputs Submission System (ROSS) which is an electronic system for capturing and evaluation of research publications that are submitted for the purposes of allocating research outputs subsidy to 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 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 initial testing of the ROSS was done through the evaluation of the 2016 research outputs. In preparation for the 2017 submission using the ROSS, a national workshop was held with all institutions to introduce the system.

The process followed in the evaluation of the 2016 research outputs can be summarised as follows:

- a) DHET received all institutional claims for outputs in Books, Conferences and Journals in May 2017.
- b) DHET screened all the submissions for eligibility and according to the technical criteria as per the Policy.
- c) Expert or discipline-based evaluation panels were appointed.
- d) The evaluation panels evaluated the submitted research outputs according to predetermined criteria and made recommendations regarding acceptance or rejection.
- e) DHET officials analysed the outcomes of the research outputs process 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 the universities were also checked and verified against the journals in the approved indices (Scopus, SciELO SA, Norwegian Register for Scientific Journals, Web of Science, IBSS and DHET/SA list) of approved journals and the final unit allocations for each institution were calculated.
- g) Individual institutional reports were developed by the DHET and sent to the respective institutions in December 2017
- h) This report on the evaluation of 2016 Universities' research outputs was developed by the DHET and reviewed and endorsed by the Research Output Evaluation Panel.

3. JOURNAL PUBLICATION OUTPUT UNITS

In the majority of academic fields, publication 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 HEIs follow a similar pattern.

Three journal indices (Scopus, Scientific Electronic Library Online (SciELO) SA and Norwegian Register for Scientific Journals) were included since 2016 bringing the total indices to six, including the three which were already recognised. These are Thomson Reuters Web of Science, the ProQuest IBSS and the DHET/SA journal list. This is the first time the Research Outputs Policy includes all the six journal indices.

Table 1 shows the breakdown of journal publications across the different indices per institution, for 2016. The numbers show that in 2016, publications in journals continued to grow as in the previous years. Journal publication output units increased from 13 976.41 units in 2015 to 14 612.27 in 2016; a 4.5% growth. This growth is, however, lower than the 6.4% growth observed between 2014 and 2015.

Table 1: Journal Publication Output Units by Index, 2016 (arranged from the highest to the lowest total number of units in journals – last column)

Institution	1 WoS	2 DHET	3 Scopus	4 IBSS	5 SciELO SA	6 Norwegian Register for Scientific Journals	Total International		Total South African Journals	Total Outputs published in Journals
							Units	%		
UP	1172.01	194.94	187.74	105.14	46.69	0.54	1465.43	85.85%	241.63	1707.06
UKZN	1040.64	378.95	110.93	129.05	8.60	0	1280.62	76.77%	387.55	1668.17
UCT	1149.27	92.87	174.23	61.62	28.37	10.01	1395.13	92.00%	121.24	1516.37
WITS	1078.39	203.27	103.70	115.37	0	0	1297.46	86.46%	203.27	1500.73
SU	906.38	247.56	173.91	40.82	0	4.33	1125.44	81.97%	247.56	1373.00
NWU	489.53	222.16	207.50	134.93	92.42	1.85	833.81	72.61%	314.58	1148.39
UNISA	327.68	278.10	191.24	229.70	23.83	0.22	748.84	71.27%	301.93	1050.77
UJ	30.56	203.45	703.07	73.05	18.33	1.23	807.91	78.46%	221.78	1029.69
UFS	406.93	137.13	71.28	61.27	44.16	1.00	540.48	74.88%	181.29	721.77
UWC	94.58	111.76	175.19	46.81	18.50	0.50	317.08	70.88%	130.26	447.34
RU	316.10	40.50	31.40	30.50	2.30	0.50	378.50	89.84%	42.80	421.30
NMU	190.26	83.53	28.03	10.17	3.00	0.25	228.71	72.55%	86.53	315.24
TUT	120.29	49.80	72.27	40.06	1.89	0	232.62	81.82%	51.69	284.31
UL	29.96	81.21	79.65	52.71	7.00	4.40	166.72	65.40%	88.21	254.93
UFH	102.96	33.69	34.09	31.24	6.67	1.00	169.29	80.75%	40.36	209.65

DUT	54.75	27.81	67.39	18.66	4.00	4.26	145.06	82.02%	31.81	176.87
CPUT	72.71	49.35	17.13	32.24	0	0.07	122.15	71.22%	49.35	171.50
UNIVEN	36.21	43.34	16.75	36.94	19.42	0	89.90	58.89%	62.76	152.66
SMU	14.45	58.34	28.70	18.92	0	0	62.07	51.55%	58.34	120.41
UNIZULU	44.73	34.15	10.98	21.58	0	0	77.29	69.36%	34.15	111.44
VUT	17.92	15.12	17.67	28.03	1.00	0	63.62	79.78%	16.12	79.74
CUT	13.71	24.28	9.75	17.74	0.33	1.00	42.20	63.16%	24.61	66.81
WSU	13.30	21.95	6.08	5.83	0	0	25.21	53.46%	21.95	47.16
UMP	14.54	5.83	0	4.00	0.50	0	18.54	74.55%	6.33	24.87
MUT	6.76	2.50	2.83	0	0	0	9.59	79.32%	2.50	12.09
Total	7744.62	2641.59	2521.51	1346.38	327.01	31.16	11643.67		2968.60	14612.27
Percentage	53.00%	18.08%	17.26%	09.22%	02.24%	00.22%		79.68%	20.32%	

A cursory glance at the columns on the ‘Total of South African Journals’; ‘Total International Units’ and ‘Total Number of Units in Journals’ shows tapering from the largest number of units, with the largest number of units accrued to UKZN which, in turn, accrued the second highest number of overall journal units. The tapering indicates a proportional pattern of publication in local and international journals or indices.

Seven institutions had at least 80% of their journal publications in international indices and these were UP, WITS, RU, SUN, TUT, DUT and UFH. Eleven institutions had 70-79% of their publications in international indices and these were UKZN, NWU, UNISA, UJ, NMU, UFS, UWC, CPUT and VUT. This is good for global exposure of South African researchers. All other intuitions had between 50% and 69% of their journal publications in international journals.

Publications in international indices make up 79.68% of overall journal publications. Impressively, many HDIs and UOTs have the largest proportion of journal publications in international indices. It stands to be determined whether there is a healthy balance or not between international (79.68%) and local publishing (20.32%). However, Editors-in-Chief of local journals are encouraged to seek international listing of their journals in reputable indices.

3.1. Journal Publication Output Units by Broad Academic Fields

The distribution of journal publications by broad academic fields has been consistent in the past few years, with over half of the journal publications units accrued to the Science, Engineering and Technology (SET) field (58.44%), and within SET, predominantly the Health Sciences; followed by Humanities with 27.27%; Business and Commerce with 9.00%; and Education with 5.28% (see **Figure 1**).

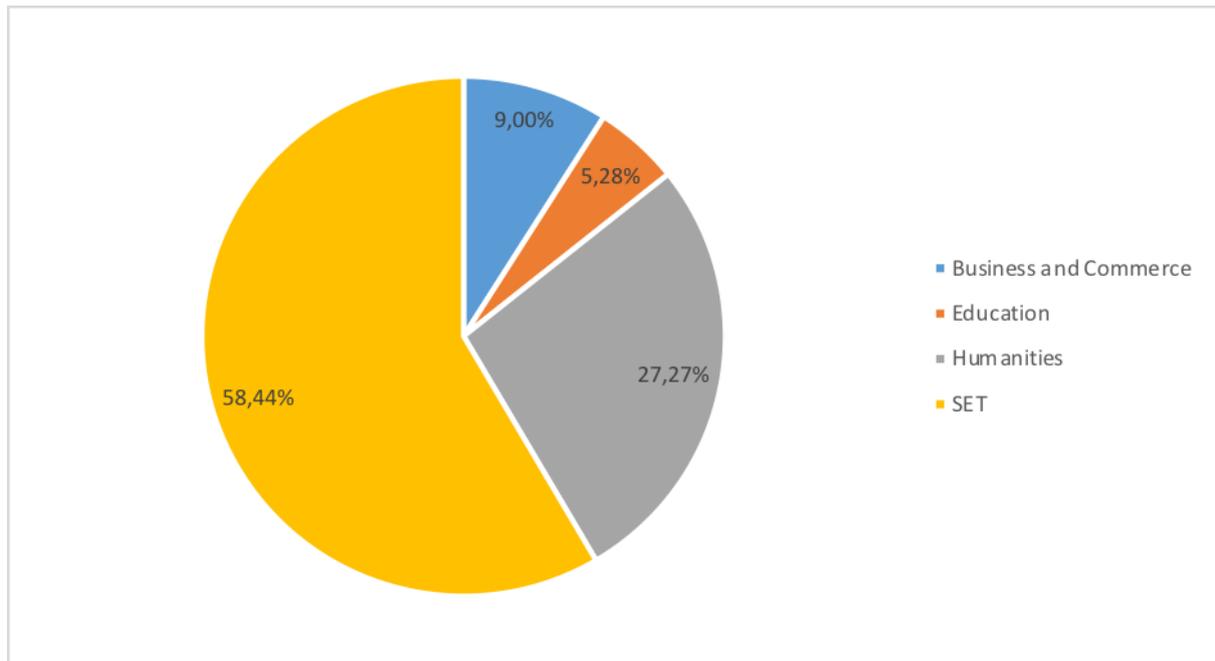


Figure 1: Proportion of Journal Publications Units by Broad Academic Field, 2016

Note. The CESM categories in each broad field are:

Science, Engineering and Technology (SET): CESM 1, 6, 8, 9, 10, 13, 14, 15 and 16

Humanities: CESM 2, 3, 5, 11, 12, 17, 18, 19 and 20

Education: CESM 7

Business and commerce: CESM 4

Over and above the proportional distribution of units by the academic fields, further analysis below shows that the new indices largely benefitted the SET more than the other academic fields.

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

Table 2 shows journal publication output units by Classification of Educational Subject Matter (CESM) categories for 2015 and 2016 publications units allocations. It will be noted that the relatively large increases took place in CESM categories 1; 6; 8; 13; 14; and 15. These are all within the broader field of Science, Engineering and Technology (SET).

Together with the other CESM categories (9, 10 and 16) which comprise the SET field they accrued 58.43% of journal publications units. The highest proportion of journal publications are in CESM 9 (Health Care & Health Sciences) with 18.75% of all journal publication output units in 2016.

Table 2: Journal publication output units by CESM Category, 2015 and 2016

CESM Category	2015		2016		% increase / decrease from 2015 to 2016
	No. of Units	% of Total	No. of Units	% of Total	
09: Health Professions and Related Clinical Sciences	2628.70	18.81%	2740.01	18.75%	4.23%
14: Physical Sciences	1273.58	9.11%	1594.28	10.91%	25.18%
13: Life Sciences	1356.37	9.70%	1515.65	10.37%	11.74%
04: Business, Economics and Management Studies	1348.88	9.65%	1315.80	9.00%	-2.45%
20: Social Sciences	1200.80	8.59%	1186.45	8.12%	-1.20%
08: Engineering	823.32	5.89%	1001.43	6.85%	21.63%
01: Agriculture, Agricultural Operations and Related Sciences	706.88	5.06%	845.26	5.78%	19.58%
17: Philosophy, Religion and Theology	817.81	5.85%	836.46	5.72%	2.28%
07: Education	905.75	6.48%	771.77	5.28%	-14.79%
12: Law	758.63	5.43%	633.66	4.34%	-16.47%
15: Mathematics and Statistics	422.48	3.02%	551.59	3.77%	30.56%
11: Languages, Linguistics and Literature	516.63	3.70%	496.53	3.40%	-3.89%
18: Psychology	366.86	2.62%	335.82	2.30%	-8.46%
06: Computer and Information Sciences	192.16	1.37%	220.42	1.51%	14.71%
19: Public Management and Services	211.30	1.51%	170.33	1.17%	-19.39%
03: Visual and Performing Arts	137.15	0.98%	124.82	0.85%	-8.99%
05: Communication, Journalism and Related Studies	122.93	0.88%	107.69	0.74%	-12.40%
02: Architecture and the Built Environment	99.79	0.71%	92.92	0.64%	-6.88%
16: Military Sciences	39.66	0.28%	42.80	0.29%	7.92%

10: Family Ecology and Consumer Sciences	46.73	0.33%	28.58	0.20%	-38.84%
TOTAL	13976.41	100.00 %	14612.27	100.00 %	4.55 %

CESM categories 2, 3, 4, 5, 7, 10, 11, 12, 18, 19 and 20 experienced negative growth from their 2015 publications units accruals. Many factors must be considered when analysing research outputs by CESM category. 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. Furthermore, the varying proportions per CESM 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. Full analysis would include patents and creative research outputs and all graduates from a respective field.

Figure 2 is the graphic presentation of the journal publications units by Indices and CESM categories for 2016 publications units allocations.

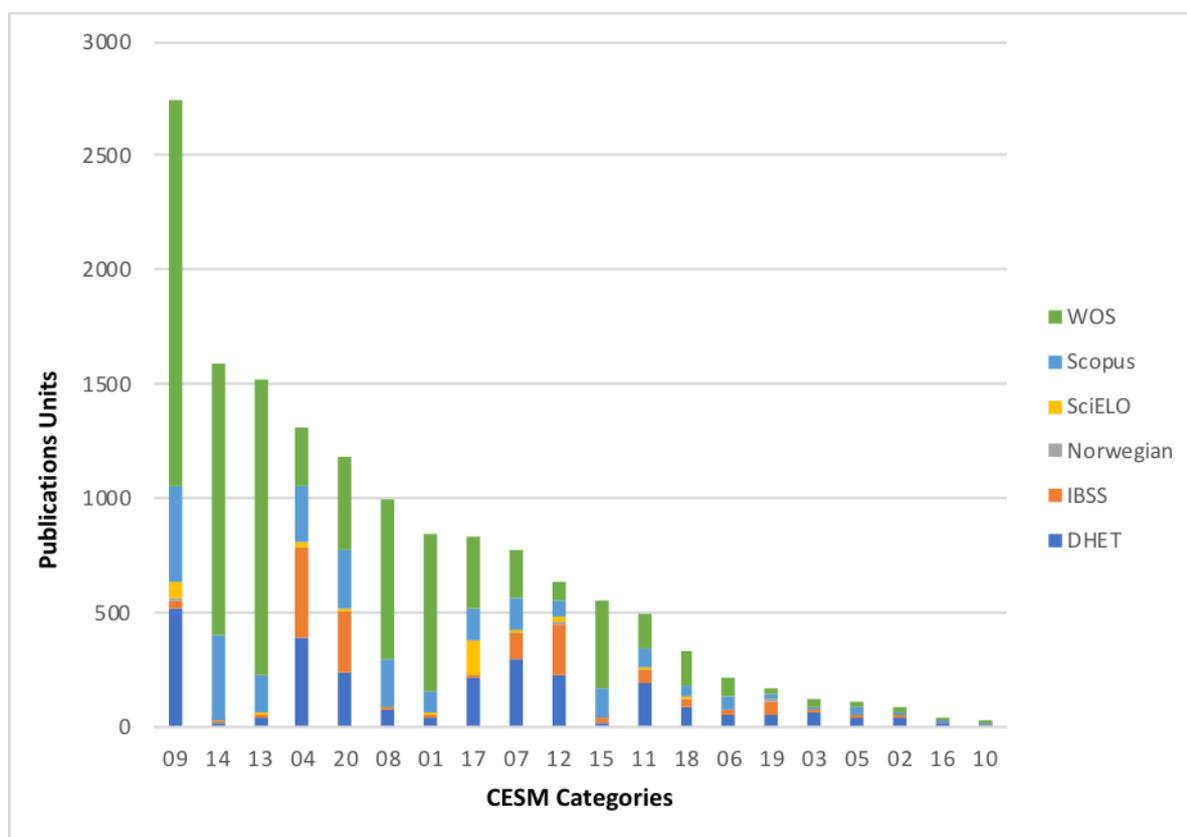


Figure 2: Journal Output Publications by Indices and CESM Categories, 2016

The largest number of outputs published in journals are in the World of Science (WoS) 53%; followed by the DHET List 18%; then Scopus 17%; IBSS 9%; SciELO SA 2% and the Norwegian List 0.2%. The new indices (Scopus, SciELO SA and the Norwegian List) comprise 19.2% of the total journal publications outputs. That means there are now 19% 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 motivation for 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” (DHET 2020 analysis for additional journal indices).

As much as the DHET List and SciELO SA represent 20.32% of local journals, it will be recalled that there are some South African journals that are listed in the international indices, which 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.

Significantly, the WoS journals are predominantly used in CESM categories 1, 6, 8, 9, 10, 13, 14, 15, 16, 17, 18 and 20. Apart from the latter three, these all encompass SET. That is, the majority of journal publications in SET are in WoS journals. The DHET List is largely utilised for publications in CESM categories 2, 3, 5, 7, 9 and 16.

4. BOOK PUBLICATION OUTPUT UNITS

The Research Outputs Policy takes cognisance of the relatively long process it takes to produce book publications, compared to other types of publications outputs recognised by the Policy. As such, for a full book the number of units was increased to ten. Partly as a result of this change, research publications in scholarly books for 2016 amounted to 2269.07 units, up from 994.77 units in 2015.

Table 3: Proportion of Book Publication Output Units per Institution, 2014 - 2016

Institution	2014		2015		2016	
	Units	%	Units	%	Units	%
SU	116,25	13,22%	78	7,84%	284,93	12,56%
UKZN	53,79	6,11%	66,47	6,68%	275,47	12,14%
WITS	131,71	14,97%	159,4	16,02%	241,68	10,65%
UNISA	66,56	7,57%	71,79	7,22%	238,71	10,52%
UJ	59,52	6,77%	92,37	9,29%	228,2	10,06%
UCT	133,75	15,20%	161,47	16,23%	223,56	9,85%
UP	69,09	7,85%	101,1	10,16%	195,24	8,60%
UFS	92,58	10,52%	79,08	7,95%	178,22	7,85%
NWU	38,9	4,42%	48,84	4,91%	118,99	5,24%
UWC	26,03	2,96%	29,34	2,95%	94,33	4,16%
RU	56,8	6,46%	48,1	4,84%	47,22	2,08%
NMU	7,21	0,82%	10,05	1,01%	30,84	1,36%
DUT	5,44	0,62%	16,59	1,67%	23,77	1,05%
UNIVEN	7,12	0,81%	10,8	1,09%	23,29	1,03%
UFH	5,4	0,61%	2,99	0,30%	18,6	0,82%
CPUT	2,45	0,28%	5,99	0,60%	11,87	0,52%
TUT	4,43	0,50%	3,02	0,30%	10,52	0,46%
CUT	0,69	0,08%	1,11	0,11%	9,89	0,44%
UNIZULU	0,68	0,08%	4,52	0,45%	5,17	0,23%
VUT	0	0,00%	0	0,00%	4	0,18%
UL	0,53	0,06%	3,66	0,37%	1,59	0,07%
MUT	0,53	0,06%	0	0,00%	1,33	0,06%
WSU	0	0,00%	0,08	0,01%	1	0,04%
SMU	0,22	0,03%	0	0,00%	0,65	0,03%
UMP	0	0,00%	0	0,00%	0	0,00%
TOTAL	879,68	100,00%	994,77	100,00%	2269,07	100,00%

Almost all the institutions significantly increased their book publications. On the basis of the relatively long time it takes to produce a book publication, it would have been expected that the effect of the policy changes, which are meant to promote book publications, would lead to a gradual increase of claims for book publications. The increase observed in Table 3, for almost all the institutions and between 2015 and 2016 is rather very steep and sudden.

Prior the policy change of 2015, submission of claims towards research publications outputs, book publications averaged 4% of overall publications outputs per year. In 2016 book publication output units have tripled to 12.46% of the overall output units.

The rate of increase in book publications will be further observed and scrutinised. In this 2016 Research Outputs Report, there were 167 books and 1589 chapters which were accepted. This totalled 1051.94 and 1217.13 units awarded respectively (2269.07 units in total). There were 198 books that were submitted – 84.34% were approved; 14.65 % rejected; 1.01% not yet reviewed. There were 1912 chapters that were submitted – 83.11% approved, 16.05% rejected, 0.84% not yet reviewed. These could be regarded as baseline numbers for future analyses to measure acceptance/rejection ratio and rate, to determine efficiency of the system and improvement of book publications or not.

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

Table 4: Book Publications output units by CESM Categories, 2016

CESM No.	CESM Category	2016	
		No. of Units	% of Total
20	Social Sciences	613.44	27.03%
17	Philosophy, Religion and Theology	309.44	13.63%
11	Languages, Linguistics and Literature	264.44	11.65%
12	Law	248.68	10.95%
07	Education	194.66	8.57%
04	Business, Economics and Management Studies	121.54	5.35%
08	Engineering	103.42	4.55%
13	Life Sciences	67.65	2.98%
14	Physical Sciences	52.14	2.29%
03	Visual and Performing Arts	50.48	2.22%
09	Health Professions and Related Clinical Sciences	45.52	2.00%
18	Psychology	41.45	1.82%
19	Public Management and Services	35.62	1.56%
05	Communication, Journalism and Related Studies	34.38	1.51%

02	Architecture and the Built Environment	27.41	1.20%
06	Computer and Information Sciences	24.17	1.06%
15	Mathematics and Statistics	23.32	1.02%
01	Agriculture, Agricultural Operations and Related Sciences	6.23	0.27%
16	Military Sciences	4.50	0.19%
10	Family Ecology and Consumer Sciences	0.58	0.02%
	TOTAL	2269.07	100.00%

The CESM categories that have the highest shares under journal publications, have a lesser share in book publications. This is an indication that each CESM has differing strengths which vary according to the types of publications including those not covered by the Policy. Moreover, some fields make use of certain types of publication more than the others.

Book publications in 2016 were highest in the Humanities (71.63%), followed by the SET (14.43%), Education (8.58%), and Business and Commerce (5.36%); see **Figure 3**. This has been the pattern since the start of analysis of book publications research outputs. Fluctuations and patterns that develop in the CESM categories shall be monitored and sought to be interpreted.

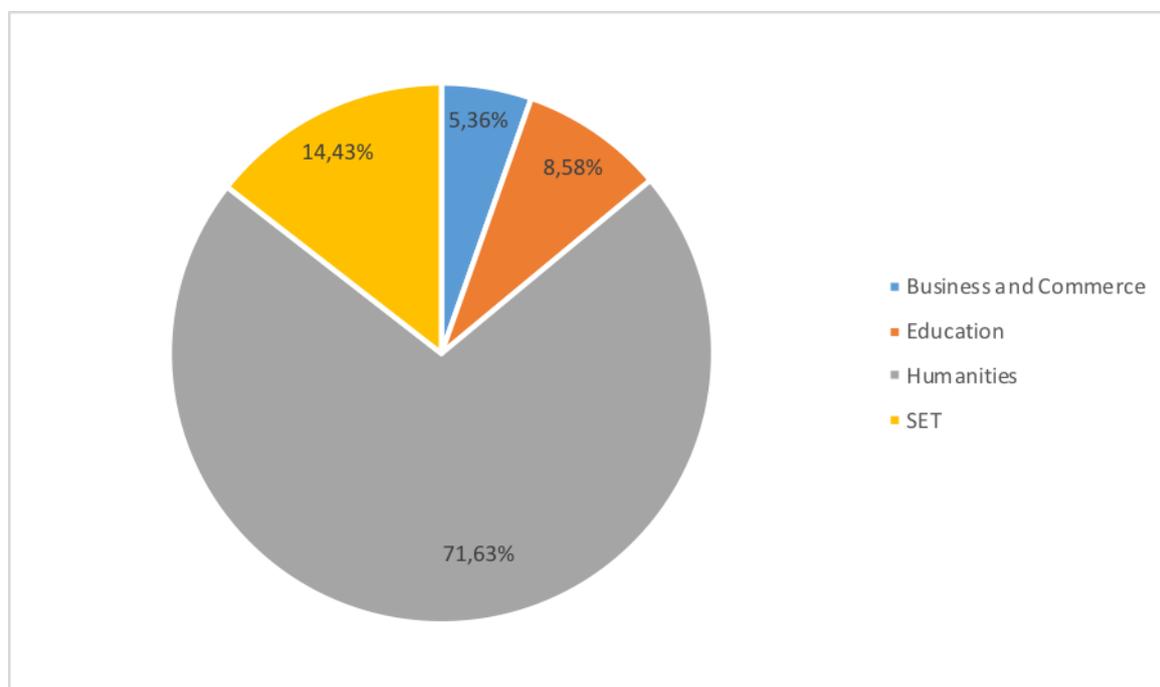


Figure 3: Book publications by broad field, 2016

5. PUBLISHED CONFERENCE PROCEEDINGS OUTPUT UNITS

Publications in conference proceedings in 2016 decreased by 1.73%, yet there was an increase of 3.7% in 2015. The total number of conference publications units for 2016 amounted to 1326.18 units, a decrease of 23.4 units from 2015. **Table 5** shows the number of conference publications units accrued to each university. A number of institutions had an increased number of approved units for conference proceedings.

Table 5: Units in conference proceedings per institution, 2015 and 2016

Institution	2015		2016		% increase / decrease
	No. of Units	% of Total	No. of Units	% of Total	
UJ	288.44	21.37%	301.65	22.75%	4.58%
UP	151.02	11.19%	138.58	10.45%	-8.24%
SUN	82.64	6.12%	115.20	8.69%	39.40%
UCT	102.62	7.60%	103.94	7.84%	1.29%
NWU	126.80	9.40%	89.09	6.72%	-29.74%
UNISA	87.73	6.50%	84.65	6.38%	-3.51%
NMU	63.64	4.72%	83.09	6.27%	30.56%
WITS	86.38	6.40%	78.98	5.96%	-8.57%
UKZN	51.21	3.79%	61.03	4.60%	19.18%
TUT	44.43	3.29%	47.92	3.61%	7.86%
CUT	30.85	2.29%	40.39	3.05%	30.92%
CPUT	33.44	2.48%	32.60	2.46%	-2.51%
RU	34.60	2.56%	28.95	2.18%	-16.33%
UFS	46.34	3.43%	27.30	2.06%	-41.09%
VUT	13.28	0.98%	18.21	1.37%	37.12%
UFH	8.85	0.66%	15.99	1.21%	80.68%
UL	33.01	2.45%	15.40	1.16%	-53.35%
UNIVEN	9.08	0.67%	12.92	0.97%	42.29%
UWC	6.82	0.51%	10.41	0.78%	52.64%
DUT	31.82	2.36%	8.48	0.64%	-73.35%
UNIZULU	11.33	0.84%	6.28	0.47%	-44.57%
MUT	1.25	0.09%	2.87	0.22%	129.60%
WSU	2.50	0.19%	2.25	0.17%	-10.00%
SMU	1.50	0.11%	0.00	0.00%	-100.00%
UMP	0.00	0.00%	0.00	0.00%	0%
TOTAL	1349.58	100.00%	1326.18	100.00%	-1.73%

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

The largest share of units for published conference proceedings in 2016 were: Engineering at 44.46% (CESM 8); followed by Computer & Information Sciences at 17.59% (CESM 6); and Business, Economics and Management Studies at 11.59% (CESM 4). These are research fields with a high turnover of invention and innovation.

Figure 4 shows that the highest proportion of conference proceedings in 2016 accrued to the SET field (69.36%); then Business and Commerce (11.59%); Humanities (10.80%); and Education (8.25%). The SET field increased from 65% in 2015 to 69.36% in 2016, whereas the Business and Commerce field decreased from 12% to 11.59%; Education from 11% to 8.25% and Humanities from 12% to 10.80%. 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).

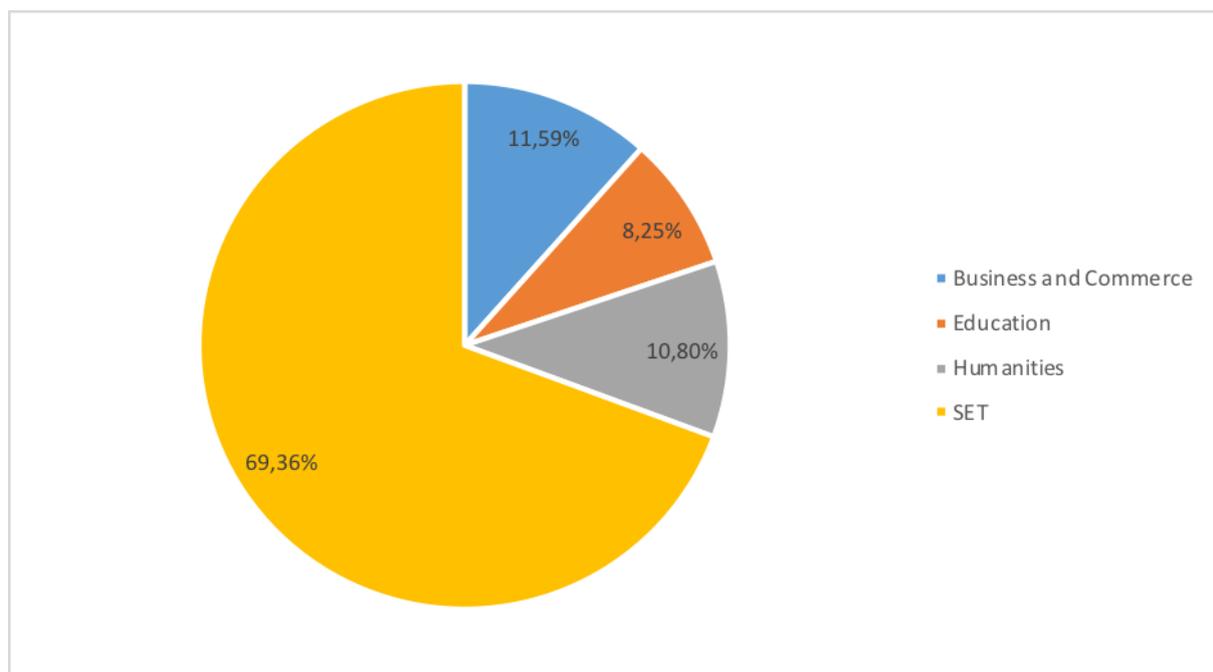


Figure 4: Conference proceedings outputs by broad field, 2016

Table 6 shows the number of units accrued to each CESM category and the percentage proportion of each. There is a slight decrease of 1.73% in the total number of conference proceedings output units by CESM in 2016 with a total of 1326.18 output units compared to 2015 with a total of 1349.58 output units. CESM 08 (Engineering) had growth from 501.71

units in 2015 to 589.68 in 2016, a 17.53% growth while growth of greater than 30% is seen in CESM 1 (Languages, Linguistics and Literature), CESM 13 (Life Sciences) and CESM 02 (Architecture and the Built Environment).

Table 6: Conference Proceeding Output Units by CESM Category, 2015 and 2016

CESM No.	CESM Category	2015		2016		% increase / decrease
		No. of Units	% of Total	No. of Units	% of Total	
08	Engineering	501.71	37.18%	589.68	44.46%	17.53%
06	Computer and Information Sciences	225.15	16.68%	233.21	17.59%	3.58%
04	Business, Economics and Management Studies	164.07	12.16%	153.74	11.59%	-6.30%
07	Education	146.30	10.84%	109.38	8.25%	-25.24%
02	Architecture and the Built Environment	60.28	4.47%	78.88	5.95%	30.86%
14	Physical Sciences	88.15	6.53%	65.25	4.92%	-25.98%
15	Mathematics and Statistics	28.79	2.13%	16.03	1.21%	-44.32%
19	Public Management and Services	30.73	2.28%	15.85	1.20%	-48.42%
20	Social Sciences	19.73	1.46%	12.62	0.95%	-36.04%
12	Law	8.00	0.59%	8.75	0.66%	9.38%
17	Philosophy, Religion and Theology	10.67	0.79%	8.00	0.60%	-25.02%
11	Languages, Linguistics and Literature	5.00	0.37%	6.83	0.52%	36.60%
03	Visual and Performing Arts	19.33	1.43%	6.54	0.49%	-66.17%
01	Agriculture, Agricultural Operations and Related Sciences	27.10	2.01%	6.19	0.47%	-77.16%
13	Life Sciences	3.72	0.28%	4.90	0.37%	31.72%
05	Communication, Journalism and Related Studies	5.25	0.39%	4.75	0.36%	-9.52%
09	Health Professions and Related Clinical Sciences	2.60	0.19%	2.58	0.19%	-0.77%
10	Family Ecology and Consumer Sciences	0.00	0.00%	1.50	0.11%	-
18	Psychology	2.50	0.19%	1.00	0.08%	-60.00%
16	Military Sciences	0.50	0.04%	0.50	0.04%	0.00%
	TOTAL	1349.58	100.00%	1326.18	100.00%	-1.73%

6. OVERALL RESEARCH PUBLICATION OUTPUT UNITS

Overall, there has been an increase in overall publication outputs in 2016. The total approved research outputs for 2016 amounted to 18207.52 units, an increase of 11.56% from the 2015 units. Journal articles increased from 13 976.41 units in 2015 to 14 612.27 units in 2016 (4.54% growth), while conference proceedings decreased from 1349.58 units in 2015 to 1326.18 units in 2016, a decrease of 1.73%. Books had a substantial increase from 994.77 units to 2269.07 units (128.09% growth), mainly due to the change in the units allocation of book publications.

A list of all the institutions with their respective research publications outputs for 2016 is presented in **Table 7**. Institutions have been listed according to the volume of their publication output units, from the highest to the lowest number of units. **Table 7** shows a pattern from 2015 where eight institutions accrued more than 1200 publications units, whereas in previous years, only 5 institutions did.

The 8 institutions make up 75.65% of the overall publications units, totalling 13774.08 units out of 18207.52 units. The remaining 17 institutions make up 24.35% with a total of 4433.44 units. The continued increase in the number of research productive institutions can only mean that the research capacity in the sector is indeed expanding.

Table 7: Overall Publication Output Units per Institution, 2016

Institution	Book Units		Conference Proceedings Units		Journal Units		Overall units in 2016	% Overall Sector Units
	Actual Units	% of total institutional units	Actual Units	% of total institutional units	Actual Units	% of total institutional units		
UP	195.24	8.60%	138.58	10.45%	1707.06	11.68%	2040.88	11.21%
UKZN	275.47	12.14%	61.03	4.60%	1668.17	11.42%	2004.67	11.01%
UCT	223.56	9.85%	103.94	7.84%	1516.37	10.38%	1843.87	10.13%
WITS	241.68	10.65%	78.98	5.96%	1500.73	10.27%	1821.39	10.00%
SUN	284.93	12.56%	115.20	8.69%	1373.00	9.40%	1773.13	9.74%
UJ	228.20	10.06%	301.65	22.75%	1029.69	7.05%	1559.54	8.57%
UNISA	238.71	10.52%	84.65	6.38%	1050.77	7.19%	1374.13	7.55%
NWU	118.99	5.24%	89.09	6.72%	1148.39	7.86%	1356.47	7.45%
UFS	178.22	7.85%	27.30	2.06%	721.77	4.94%	927.29	5.09%
UWC	94.33	4.16%	10.41	0.78%	447.34	3.06%	552.08	3.03%

RU	47.22	2.08%	28.95	2.18%	421.30	2.88%	497.47	2.73%
NMU	30.84	1.36%	83.09	6.27%	315.24	2.16%	429.17	2.36%
TUT	10.52	0.46%	47.92	3.61%	284.31	1.95%	342.75	1.88%
UL	1.59	0.07%	15.40	1.16%	254.93	1.74%	271.92	1.49%
UFH	18.60	0.82%	15.99	1.21%	209.65	1.43%	244.24	1.34%
CPUT	11.87	0.52%	32.60	2.46%	171.50	1.17%	215.97	1.19%
DUT	23.77	1.05%	8.48	0.64%	176.87	1.21%	209.12	1.15%
UNIVEN	23.29	1.03%	12.92	0.97%	152.66	1.04%	188.87	1.04%
UNIZULU	5.17	0.23%	6.28	0.47%	111.44	0.76%	122.89	0.67%
SMU	0.65	0.03%	0.00	0.00%	120.41	0.82%	121.06	0.66%
CUT	9.89	0.44%	40.39	3.05%	66.81	0.46%	117.09	0.64%
VUT	4.00	0.18%	18.21	1.37%	79.74	0.55%	101.95	0.56%
WSU	1.00	0.04%	2.25	0.17%	47.16	0.32%	50.41	0.28%
UMP	0.00	0.00%	0.00	0.00%	24.87	0.17%	24.87	0.14%
MUT	1.33	0.06%	2.87	0.22%	12.09	0.08%	16.29	0.09%
Total	2269.07	12.46%	1326.18	7.28%	14612.27	80.25%	18207.52	100.00%

The proportion of the total output units awarded to each institution in 2016, expressed as a percentage, is shown in Table 8.

Table 8: Percentage of total output units produced by each institution (2012-2016)

Institution	2012	2013	2014	2015	2016
UP	11.52%	11.53%	10.95%	11.26%	11.21%
UKZN	11.52%	11.62%	11.16%	10.80%	11.01%
UCT	11.25%	11.06%	10.60%	10.13%	10.13%
WITS	9.01%	9.28%	9.67%	9.53%	10.00%
SUN	10.70%	10.54%	10.15%	8.68%	9.74%
Sub-Total	54.00%	54.03%	52.53%	50.40%	52.09%
UJ	7.07%	6.41%	7.02%	7.84%	8.57%
UNISA	7.22%	7.35%	7.66%	8.14%	7.55%
NWU	7.03%	8.35%	7.36%	7.66%	7.45%
UFS	5.21%	4.77%	4.96%	4.36%	5.09%
UWC	2.97%	2.90%	3.14%	3.05%	3.03%
RU	3.32%	3.24%	3.21%	2.99%	2.73%
NMU	2.52%	2.44%	2.39%	2.44%	2.36%
Sub-Total	35.34%	35.46%	35.74%	36.48%	36.78%

TUT	1.86%	1.99%	1.84%	1.85%	1.88%
UL	1.77%	1.62%	1.59%	1.69%	1.49%
UFH	1.69%	1.68%	1.83%	2.06%	1.34%
CPUT	1.35%	1.05%	1.12%	1.30%	1.19%
DUT	0.65%	0.91%	0.99%	1.44%	1.15%
UNIVEN	1.03%	1.06%	1.47%	1.66%	1.04%
Sub-Total	8.35%	8.31%	8.84%	10.00%	8.09%
UNIZULU	0.59%	0.64%	0.72%	0.80%	0.67%
SMU	0.00%	0.00%	0.61%	0.68%	0.66%
CUT	0.48%	0.49%	0.57%	0.65%	0.64%
VUT	0.61%	0.59%	0.72%	0.47%	0.56%
WSU	0.49%	0.35%	0.17%	0.30%	0.28%
UMP	0.00%	0.00%	0.00%	0.10%	0.14%
MUT	0.14%	0.13%	0.10%	0.11%	0.09%
Sub-Total	2.21%	2.20%	2.89%	3.11%	3.03%

Each of the first five institutions in **Table 8** generally and regularly attain 10% and above of the overall publications outputs of the sector. Collectively, however, the total percentage of these institutions has been declining in the past five years from 54.00% in 2012 to 52.09% in 2016. The next set of institutions generally attain between 2% and 9% of the overall total of publications outputs each. Their collective total portion has slightly increased in the past five years from 35.34% in 2012 to 36.78% in 2016. The third set are institutions that generally attain between 1% and 1.9% of the overall publications outputs each. Their collective publications outputs has seemingly remained at 8% of the overall publications outputs in the past five years. The majority of HDIs and all the UOTs are the final set of institutions. Collectively, in the past five years there has been an increase in the total share of the final set of institutions from 2.21% in 2012 to 3.03% in 2016.

7. OVERALL RESEARCH PUBLICATIONS AND WEIGHTED OUTPUTS UNITS

There has been an overall increase in research publications output units over the years. **Figure 5** shows the proportion of each of the three publication types. Between 2012 and 2016, journal publications output units have increased by 32.40%. During the same period conference proceedings increased by 77.46% while book publications increased by 290.68% and this significant increase is as a result of the increase in the number of units for book publications.



Figure 5: Total Research Output by type of publication, 2012-2016

7.1 Overall Publications Output Units by Classification of Education Subject Matter (CESM) Category

Analysis of the CESM categories aggregated for all publications types (journals, books and conference proceedings), shows the CESM categories with the most to least publications outputs, per institution. indicates the most productive research output 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 category, 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 publications outputs in 2010.

The purpose of the categorisation is not necessarily to compare CESM categories as there may be differences in the number of academics; the development and resourcing of the relevant fields by institutions and other factors. Instead, it should be used to identify potential for possible policy improvement and resource allocation at institutional level. The total publication output units by CESM categories for 2015 and 2016 are shown in **Table 9**.

Table 9: Total Research Output Units by CESM Categories, 2015 and 2016

CESM No.	CESM Category	2015		2016		% increase / decrease
		No. of Units	% of Total	No. of Units	% of Total	
09	Health Professions and Related Clinical Sciences	2667.90	16.35%	2788.11	15.31%	4.51%
20	Social Sciences	1517.75	9.30%	1812.51	9.95%	19.42%
14	Physical Sciences	1393.12	8.54%	1711.67	9.40%	22.87%
08	Engineering	1345.65	8.25%	1694.53	9.31%	25.93%
04	Business, Economics and Management Studies	1553.91	9.52%	1591.08	8.74%	2.39%
13	Life Sciences	1374.41	8.42%	1588.20	8.72%	15.56%
17	Philosophy, Religion and Theology	945.19	5.79%	1153.90	6.34%	22.08%
07	Education	1134.36	6.95%	1075.81	5.91%	-5.16%
12	Law	869.02	5.32%	891.09	4.89%	2.54%
01	Agriculture, Agricultural Operations and Related Sciences	743.79	4.56%	857.68	4.71%	15.31%
11	Languages, Linguistics and Literature	621.89	3.81%	767.80	4.22%	23.46%
15	Mathematics and Statistics	461.42	2.83%	590.94	3.25%	28.07%
06	Computer and Information Sciences	427.24	2.62%	477.80	2.62%	11.83%
18	Psychology	388.21	2.38%	378.27	2.08%	-2.56%
19	Public Management and Services	267.18	1.64%	221.80	1.22%	-16.98%
02	Architecture and the Built Environment	173.66	1.06%	199.21	1.09%	14.71%

03	Visual and Performing Arts	196.17	1.20%	181.84	1.00%	-7.30%
05	Communication, Journalism and Related Studies	139.46	0.85%	146.82	0.81%	5.28%
16	Military Sciences	48.40	0.30%	47.80	0.26%	-1.24%
10	Family Ecology and Consumer Sciences	52.03	0.32%	30.66	0.17%	-41.07%
	TOTAL	16320.76	100.00%	18207.52	100.00%	11.56%

The order, from highest to lowest, of the overall research publications units per CESM has not changed from the one observed under journal output units, since 80.25% of the publication output units emanates from the journals. **Figure 6** shows a graphical representation of the CESM trend in 2015 and 2016. The pattern has remained although there are some fields that have significant increases than the others in 2016.

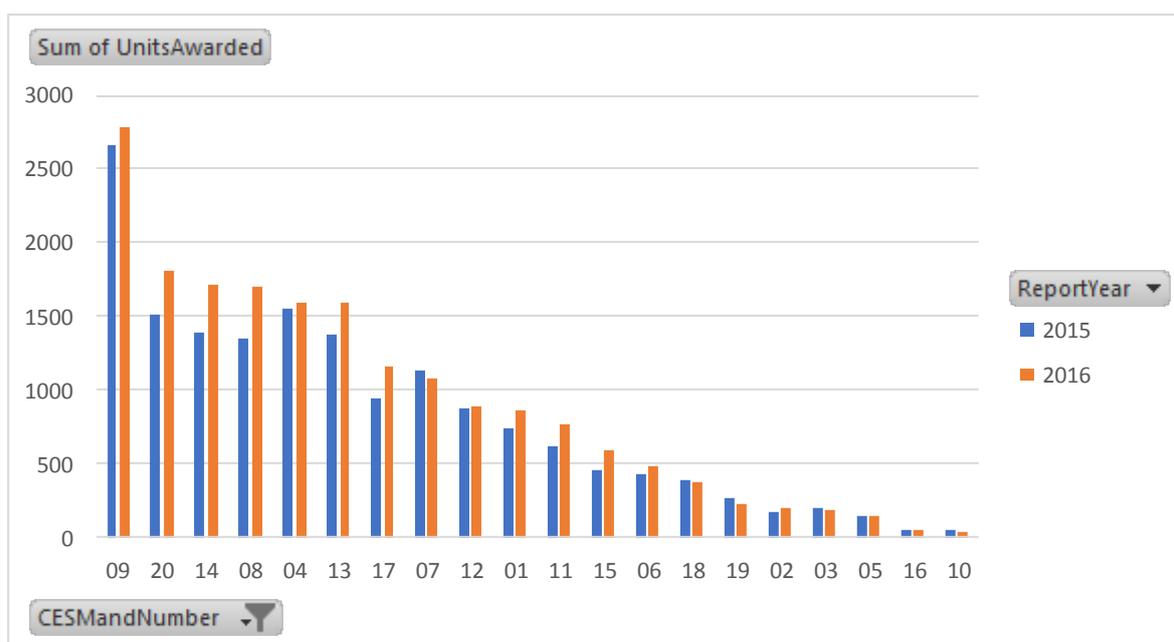


Figure 6: Total output by Classification of Education Subject Matter (CESM) Category

The CESM categories that have experienced relatively larger increases between 2015 and 2016 are almost all that have larger portions of journal publications outputs. That implies, significant increases between 2015 and 2016 occurred in journal outputs than in other publications outputs. It still has to be seen if the increases in units for book publications will lead increases in publications on certain CESM categories than on others.

7.2 Overall Publication Output Units by Broad Field of Study

The proportion of overall publication output units is highly skewed towards the SET field as shown in **Figure 7** below. Analysis of the 2016 output units by broad scientific field of study shows that more than half (53.75%) of all output units are produced in the Science, Engineering and Technology (SET) fields, followed by Humanities (31.60%), Business and Commerce (8.74%) and Education (5.91%).

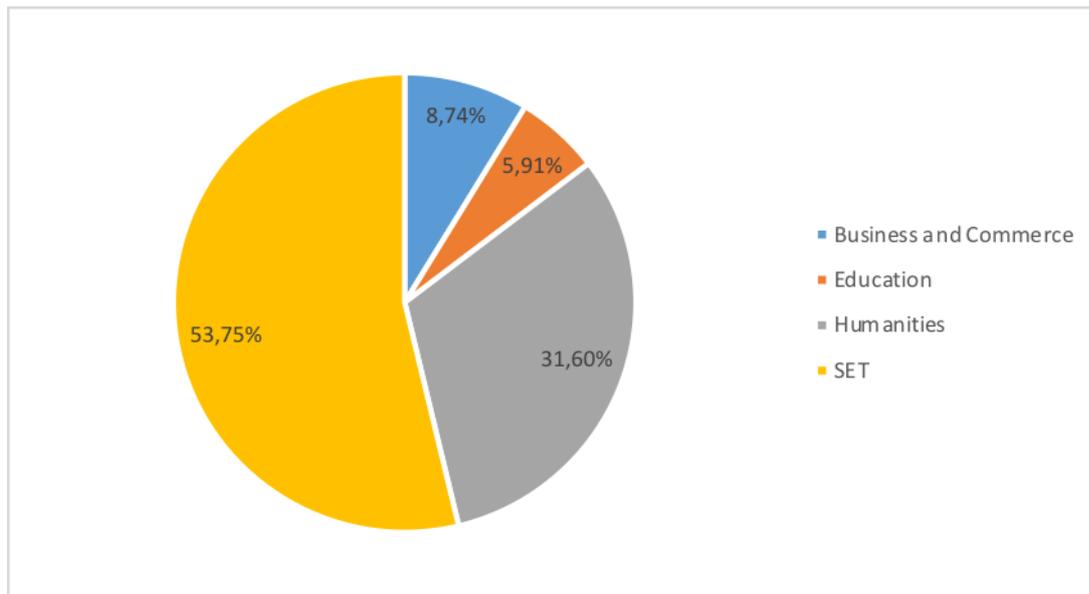


Figure 7: Proportion of publication output units by broad field (2016)

7.3 Overall Research Output Units by Institution

The Research Output subsidy is allocated to public higher education institutions based on the overall research output units which include units for publication outputs, research Masters and Doctorate graduates. **Table 10** below shows both the per capita output units (i.e. publications output units per permanently employed academic per annum) as well as the weighted per capita research output units (i.e. output units per permanently employed academic per annum, including publications, Research Masters and PhD graduates).

Table 10: Weighted Research Per Capita Output According to the Norms, 2016

Institution	Headcount of permanently employed academics (a)	Research Publications in Units (1)	Per Capita Research Publications Units (1/a)	Research Masters Graduates in Units (2)	Doctorate Graduates in Units (3)	Total Weighted Research Output (1+2+3)	Weighted Output per capita (1+2+3)/a
SUN	1122	1773.13	1.58	878	834	3485.13	3.11
RU	318	497.47	1.56	240	252	989.47	3.11
UP	1271	2040.88	1.61	948	906	3894.88	3.06
UKZN	1341	2004.67	1.49	853	1083	3940.67	2.94
WITS	1192	1821.39	1.53	701	684	3206.39	2.69
UCT	1202	1843.87	1.53	648	699	3190.87	2.65
UFH	371	244.24	0.66	226	327	797.24	2.15
UJ	1166	1559.54	1.34	465	357	2381.54	2.04
UFS	841	927.29	1.10	297	318	1542.29	1.83
NWU	1470	1356.47	0.92	539	714	2609.47	1.78
UNISA	1794	1374.13	0.77	655	888	2917.13	1.63
NMU	623	429.17	0.69	292	285	1006.17	1.62
UWC	678	552.08	0.81	216	276	1044.08	1.54
UNIZULU	306	122.89	0.40	74	96	292.89	0.96
UNIVEN	434	188.87	0.44	131	84	403.87	0.93
DUT	583	209.12	0.36	138	120	467.12	0.80
UL	563	271.92	0.48	138	39	448.92	0.80
CUT	297	117.09	0.39	55	63	235.09	0.79
TUT	961	342.75	0.36	206	195	743.75	0.77
CPUT	842	215.97	0.26	156	48	419.97	0.50
SMU	551	121.06	0.22	84	33	238.06	0.43
UMP	70	24.87	0.36	0	0	24.87	0.36
VUT	387	101.95	0.26	23	9	133.95	0.35
WSU	571	50.41	0.09	8	36	94.41	0.17
MUT	201	16.29	0.08	0	0	16.29	0.08
TOTAL	19155	18207.52	0.95	7971	8346	34524.52	1.80

Universities should analyse their research outputs in order to determine their strengths and where they should improve where they have weaknesses, and in what manner should they enhance their respective missions and relevant targets on research. These requirements may relate to their policies or strategies or even on their research funding distribution or all of these aspects.

Figure 8 below shows the publication output units per permanent academic staff member from 2007 to 2016. The average total publication output units per permanent academic staff member (or per capita output) for all institutions for 2016 was 0.95 units, an increase from 0.88 units in 2015. Generally, the per capita output across institutions has been on the increase, albeit at a slow pace for some institutions. There is no remarkably different increase in 2016 that is different from the previous years which is as a result of the new indices. Perhaps such a difference will still be observed in the years to come. The expectation is that the increases from 2016 onward would show a 20% increase all around as it is the case with overall increases in journal outputs, due to the additional new indices.

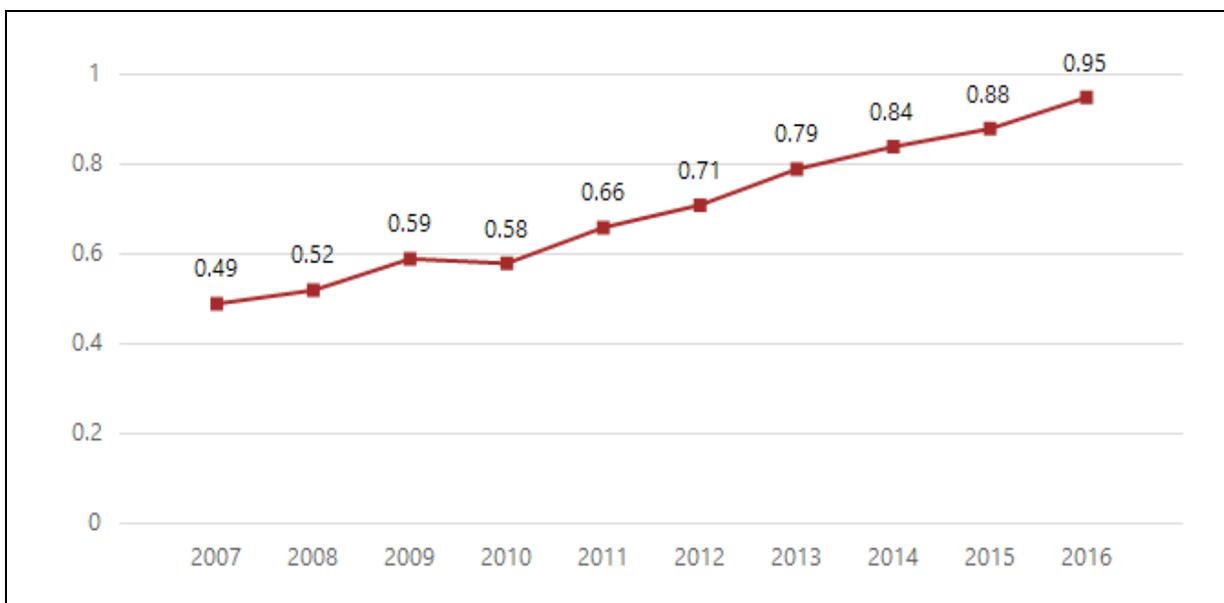


Figure 8: Per capita output units (2007-2016)

The per capita output units show a 94% increase between 2007 and 2016. This reflects an average annual growth of 9.4%. Not all Higher Education Institutions in South Africa are at the same level of research activity and when institutional data is compared there are huge differences in performance between institutions.

Table 11 shows permanently employed research staff with a Masters or PhD as highest qualification in 2015 and 2016. As it has always been the case, generally, institutions with the higher proportion of academics with doctorate as the highest qualification, compared to academics with Masters as highest qualification, have relatively higher research output than institutions where the proportion of academics with masters as highest qualification is higher than those with doctorate.

The University of Zululand (UNIZULU) in **Table 11** marks the switch in the proportion of institutions with the higher proportion of academics with doctorate, as highest qualification, to those with academics with masters as the higher proportion. Although there are some institutions that have slightly dropped in the number of academics with doctorate as the highest qualification, overall, there has been an increase of the proportion to from 55% in 2015 to 56% in 2016.

Table 11: Permanently employed academics by qualification, 2015 and 2016

Institution	Permanently Employed Academics by Highest Qualification										
	2015					2016					Academics with Masters and PhD as Highest Qualifications
	Academics with Masters as Highest Qualifications		Academics with PhD as Highest Qualifications		Total 2015	Academics with Masters as Highest Qualifications		Academics with PhD as Highest Qualifications		2016	
	Head count	% of total staff	Head count	% of total staff		Head count	% of total staff	Head count	% of total staff		
SU	260	29%	646	71%	906	262	29%	636	71%	898	
UCT	309	28%	787	72%	1096	326	29%	785	71%	1111	
WITS	329	32%	701	68%	1030	340	31%	740	69%	1080	
UP	360	32%	754	68%	1114	384	32%	820	68%	1204	
NWU	435	37%	734	63%	1169	405	35%	767	65%	1172	
RU	104	37%	175	63%	279	101	37%	174	63%	275	
UWC	200	36%	358	64%	558	217	37%	372	63%	589	
UNISA	532	42%	732	58%	1264	574	41%	834	59%	1408	
UKZN	480	42%	655	58%	1135	491	42%	667	58%	1158	
NMU	210	43%	276	57%	486	220	44%	282	56%	502	
UFH	138	49%	145	51%	283	138	46%	161	54%	299	
UFS	363	48%	396	52%	759	343	46%	397	54%	740	
UJ	462	49%	484	51%	946	505	48%	542	52%	1047	
UNIZULU	118	51%	113	49%	231	126	51%	122	49%	248	
UMP	16	94%	1	6%	17	17	52%	16	48%	33	
UNIVEN	173	57%	130	43%	303	186	55%	153	45%	339	
UL	217	61%	139	39%	356	214	56%	170	44%	384	
TUT	386	60%	258	40%	644	387	59%	267	41%	654	
CUT	123	57%	92	43%	215	144	59%	99	41%	243	
CPUT	386	67%	187	33%	573	402	66%	210	34%	612	
DUT	291	70%	125	30%	416	286	68%	134	32%	420	
WSU	210	73%	79	27%	289	206	72%	82	28%	288	
VUT	164	74%	59	26%	223	178	72%	68	28%	246	
SMU	183	71%	76	29%	259	272	76%	84	24%	356	
MUT	91	78%	25	22%	116	93	78%	26	22%	119	
TOTAL	6540	45%	8127	55%	14667	6817	44%	8608	56%	15425	

7.4 Breakdown of publications by Race and Gender

The Department aims to collect the demographic information of all authors for the purposes of improving on transformation of higher education in South Africa. A first attempt on this collection was introduced in 2016. **Figure 9** below shows the demographic breakdown of authors for all publication types by race and gender in the 2016 publications. However, the analysis is incomplete as the data was itself incomplete. Thus, a better analysis of the demography of authors would be better with better collection of data, which the Department aims to improve henceforth.

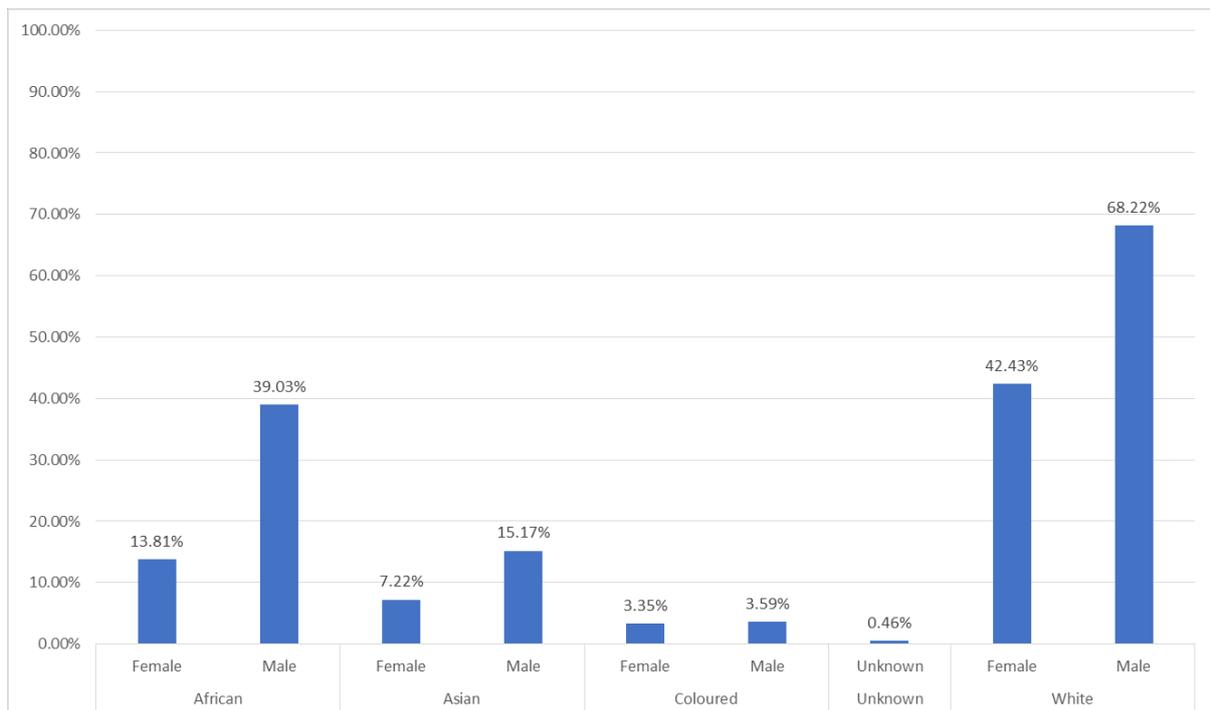


Figure 9: Weighted author proportion contribution by race and gender, 2016

The weighted author proportion of White male authors contributing to the total publications is 68.22%, White females proportion at 42.43%, African males proportion at 39.03%, Asian males proportion at 15.17% African females proportion at 13.81%, Asian females proportion at 7.22%, Coloured males proportion at 3.59%, and, and Coloured females proportion at 3.35%.

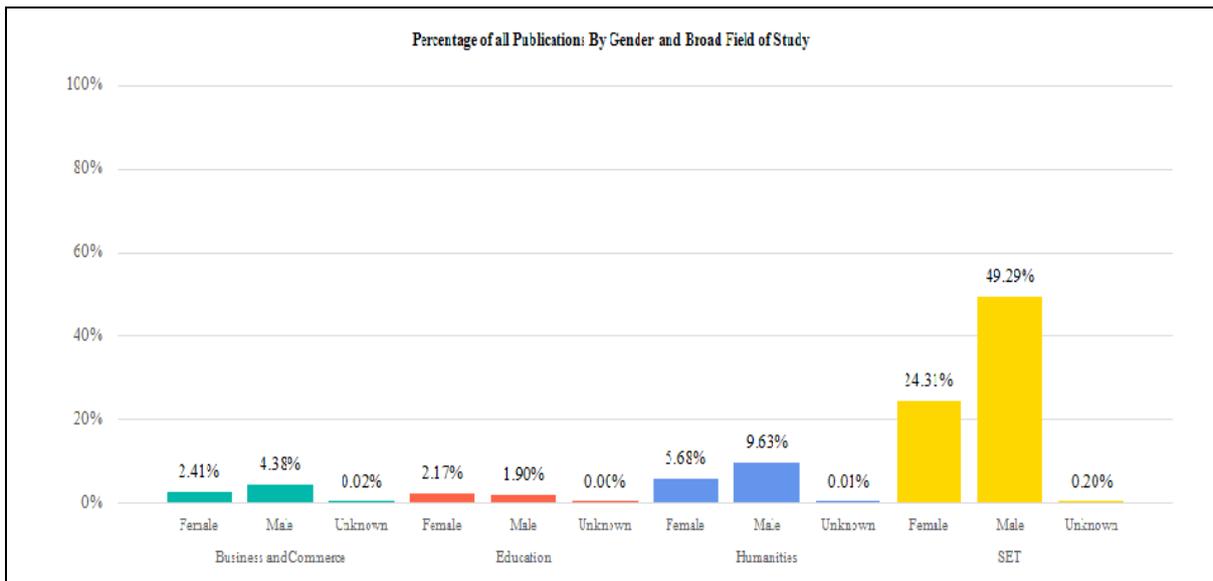


Figure 10: Percentage of all publications by gender and broad field of study, 2016

The majority of the 2016 research outputs publications produced by both males and females were on Science, Engineering and Technology (SET) at 73.6% of the total, followed by Humanities at 15.32%; Business and Commerce at 6.79%; and Education at 4%. Female researchers produce slightly higher than males in the Education field while males produced higher in the other three broad field (Science, Engineering and Technology, Humanities and Business and Commerce).

It should be noted that, in 2016, the number of white researchers in the public HEIs was higher than that of other races at 46.10% of the total number followed by Africans at 36.78%, Asians at 8.22% and coloureds at 6.82%. As a result, the highest number of research output publications were produced by white researchers.

Figure 11 shows that in 2016, South African researchers produced 65.59 % of the total research publications output with the rest being produced by non-South African researchers.

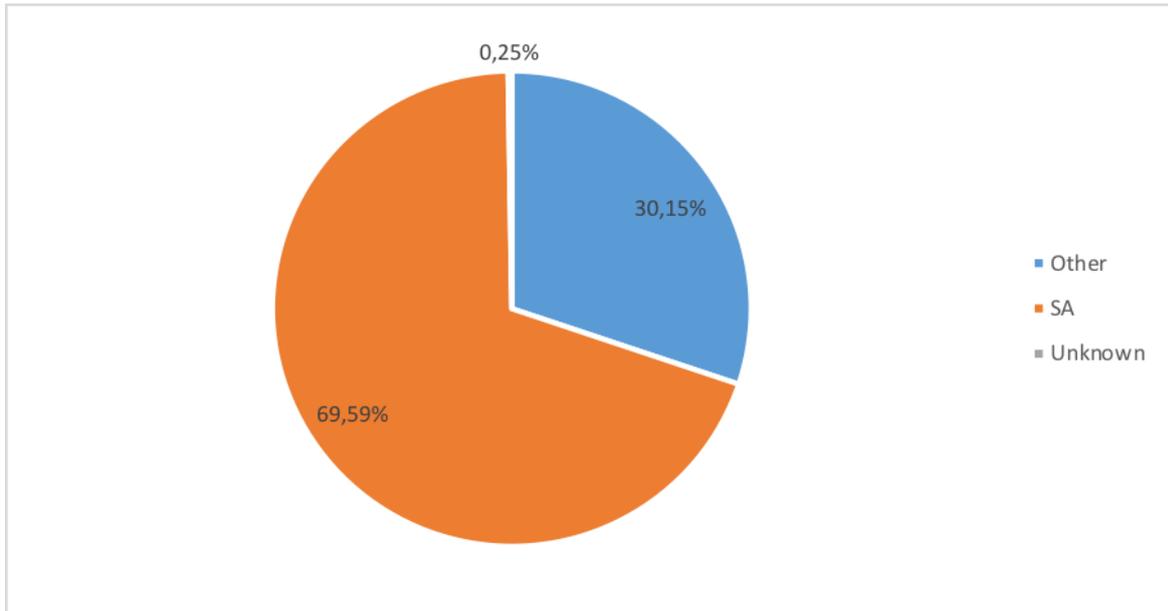


Figure 11: Percentage of all publications by Nationality, 2016

8. GENERAL OBSERVATIONS AND CONCLUSIONS

Research productivity has been on a steady rise across all institutions, at least over the past ten 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 with doctorates as highest qualifications; the ability of institutions and researchers to attract research funding from various sources locally and abroad; 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 learn patterns and influence targeted development.

For reporting of 2016 research outputs, institutions were required to provide data on the demographics of the claiming author(s) to enable the Department to understand transformation patterns on knowledge production by all public HEI. 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 being the ones producing the highest. The Department still expects all institutions to provide data on the demographics of the claiming author(s) to enable the Department to seek to steer transformation of the sector with regard to knowledge production by the public universities.

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 increasing 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 the institutions. When 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 is working on identifying predatory publications and will communicate its findings timeously. The Department encourages anyone with knowledge of (possible) predatory journals to communicate it to the Department so that a quick action can be taken.

For reporting of 2017 research outputs and onwards, institutions are required to make use of the Research Outputs Submission System when submitting claims. The Department looks forward to the submission of 2017 research outputs through the Research Outputs Submission System.