

# REPORT ON THE EVALUATION OF THE 2023 UNIVERSITIES' RESEARCH OUTPUT

January 2025

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



**higher education  
& training**

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## FOREWORD BY THE DIRECTOR-GENERAL

This sectoral report presents the outcomes of the evaluation of 2023 publications submitted by universities to the Department of Higher Education and Training (the Department) for subsidy. I am pleased to announce the total number of publications has increased from 7 230 units in 2005 to 23 777.63 units in 2023 which translates into a compound average annual growth rate (CAGR) of 6.84%. Aside from the outcomes, the report also analyses the performance of universities in the production of the weighted research outputs, which includes publications, research Masters and PhD graduates as well as demographic trends in the system.

Although the policy aims to encourage quality research from universities, studies by the Centre for Research on Evaluation, Science and Technology (CREST), the Academy of Science of South Africa (ASSAf), and other institutions have revealed unintended negative consequences. These studies, along with the Department's own evaluations, highlight that some academics exploit the system in various ways. These include publishing in predatory or questionable journals, listing ghost affiliations in their work, and using salami slicing to increase submissions for subsidies. This poses a significant concern for the Department, as it undermines the policy's objective of fostering high-quality research in South African universities.

In the 2022/2023 financial year, the Department introduced the Publication Quality Framework (PQF) project, funded through the University Capacity Development Programme (UCDP) to investigate ways in which the current research outputs policy can be improved, and revised to address unethical and questionable publication practices observed within the system. I must emphasise that the Department acknowledges that not all academics and universities are involved in these practices but note with concern that this is a growing trend which requires urgent attention.

The PQF project provides an opportunity to collectively address the challenges and seek mechanisms to improve the policy to prevent the persistence and recurrence of these problems in the future. As this is a system-wide issue, meaningful dialogue and collaboration with universities are essential to developing a shared solution. Compromising the research rewarding system affects everyone, not just those engaged in malpractice, but it also skews the true reflection of quality research performance in the South African Higher education sector. Through collective engagement, we can further enhance our system, and it will be based on rewarding research excellence from universities, while identifying and penalising unethical practices effectively.

As we continue in our pursuit of improving the higher education sector, I would like to thank officials in the University Education Branch: University Research Support and Policy Development Directorate for the administrative support and planning of the annual evaluations. Furthermore, I would also like to thank the advisory and sub-panel members who work tirelessly to provide a service to the department in evaluating the 2023 publications to ensure there is allocation of subsidy by the Department to institutions. Finally, I am grateful to the National Research Foundation (NRF) for the continued support and CREST for making contributions to this important work.

Dr Mkosinathi Sishi

Director-General: Department of Higher Education and Training

Date: 2025 / 03 / 25

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## ACRONYMS

CAGR	Compound Average Growth Rate
CESM	Classification of Educational Subject Matter
CPUT	Cape Peninsula University of Technology
CUT	Central University of Technology
DHET/ the Department	Department of Higher Education and Training
DOAJ	Directory of Open Access Journal
DUT	Durban University of Technology
HEMIS	Higher Education Management Information System
IBSS	International Bibliography of Social Science
ISBN	International Standard Book Number
ISI	Institute of Science Information
MUT	Mangosuthu University of Technology
NMU	Nelson Mandela University
NRF	National Research Foundation
NWU	North West University
ROSS	Research Outputs Submission System
RU	Rhodes University
SciELO SA	Scientific Electronic Library Online South Africa
SMU	Sefako Makgatho Health Sciences University
SPU	Sol Plaatje University
SU	Stellenbosch University
TUT	Tshwane University of Technology
UCT	University of Cape Town
UFH	University of Fort Hare
UFS	University of the Free State
UJ	University of Johannesburg
UKZN	University of KwaZulu-Natal
UL	University of Limpopo
UNISA	University of South Africa
UNIVEN	University of Venda
UNIZULU	University of Zululand
UP	University of Pretoria
UWC	University of the Western Cape
VUT	Vaal University of Technology
WITS	University of the Witwatersrand
WoS	Web of Science
WSU	Walter Sisulu University

List of CESM Categories

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

## 1. INTRODUCTION: PROCESS AND PROCEDURE

### 1.1. The process

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

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

All 26 universities submitted their 2023 research publication outputs on or before 15 May 2024 for the purposes of subsidy claims. The Directorate: University Research Support and Policy Development together with the National Research Foundation (NRF) administered the process and evaluated the technical compliance of all submissions. The Research Outputs Submission System (ROSS) that has been developed and managed by the NRF facilitates the online research outputs submissions and their processing through to the outcomes of the evaluations by the relevant field-specific expert peer review sub-panels. The sub-panels use pre-determined evaluation criteria in line with the Research Output Policy. The sub-panellists, who are drawn from the university sector, are expert practitioners in their respective fields. The sub-panels conducted evaluations of book publications and conference proceedings under the guidance of the Research Output Evaluation Panel (the Panel), whose members chair the respective sub-panels.

The online research outputs submissions and evaluation process has proven to be convenient and efficient because the evaluations were, completed by 9 August 2024. It also allowed for a longer and more thorough process of evaluations.

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

The process followed for evaluating the 2023 research outputs was as follows:

- a) The Department received all electronic copies of publications in the form of Books, Conferences and Journals and the required supporting documentation in May 2024.

- b) The Department screened all the submissions for eligibility and according to the technical criteria as per the policy.
- c) Field-specific expert peer review sub-panels were convened from 22 July to 9 August 2024 and evaluated the research outputs according to predetermined criteria and scholarship of the publications. This was the first time that the evaluations were carried out that earlier. Usually, they could only be conducted between August and October. The efficiency was due to the online system of evaluation that is facilitated through ROSS.
- d) The Department, supported by the NRF, analysed the outcomes of the sub-panels and calculated the number of units allocated to each institution for publications in books and conference proceedings.
- e) Audited claims for publications in accredited journals submitted by universities were checked and verified against the approved journal indexes and lists and final unit allocations for each institution were calculated.
- f) Individual institutional reports were developed by the Department and sent to the respective institutions in December 2024.
- g) This report on the evaluation of 2023 Universities' research outputs was drafted by the Department, with the assistance of the Centre for Research, Evaluation, Science and Technology (CREST) on statistical analysis and quality.

Late publications for the year 2021 ( $n-2$ ) were considered where valid and legitimate reasons for late submission were provided and accepted, but publications dating on or before 2020 ( $n-3$  and beyond) were not considered, as stipulated in the policy. For the sake of pattern analysis and improving its systems, the Department will in future request a separate submission of  $n-3$  publications and articles appearing in non-approved publications, however, they will still not be considered for subsidy.

## 1.2. Methodological notes

Several methodological clarifications are in order with regard to-

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

### 1.2.1 *Publication output units and publication outputs*

This report makes a distinction between publication output **units** and publication **outputs**. The former refers to the subsidy units awarded for each approved publication (according to the criteria set out in the policy) based on the submissions made in a particular year. This means that a university is awarded a total subsidy amount based on the calculation of all submissions made in, for example, 2024 for the preceding year (2023). However, as the policy allows for late submissions accompanied by valid reasons (i.e. 2022 – 1 year or year  $n$  minus 1), the result is that the total subsidy units awarded in 2024 for 2023 publications will invariably include a small proportion of publications that had been published in 2022. In this report, the total number of subsidy units (or output units) that have been awarded to universities based on the submissions made in 2024 are reported at the beginning of each section. When the results are reported by scientific field, journal index or demographics, the analyses are based on the actual **publication year** of each output instead of the submission year of publication output.

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

The analysis of outputs by scientific field is based on an international standard that of high-level scientific field which are typically used in bibliometric databases such as Web of Science and Scopus. The outputs as submitted have been matched to CREST's field classification framework which is a customised version of the international classification systems.

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

The results of analyses of four normalized indicators are included in the report:

- Per capita research **publication output** (where the total number of publications by a university is divided by the headcount of the permanent instructional and research staff in the same year). The result is the number of publications per permanently employed academics per annum.
- Weighted per capita **research output** (where all research output - including research masters and doctoral graduates - is calculated against set norms and divided by the headcount of academic staff in the same year). Each research masters graduate has a weight of 1 unit while a doctoral graduate has a weight of 3 units.
- Proportion of academic staff with PhD degrees (included as a proxy of staff quality).
- Proportion of doctoral graduates per doctorate academic staff (included as a proxy of supervisory capacity at a university).

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

This report includes several analyses related to demographic shifts in the publication outputs of universities. The report includes four demographic variables used in these analyses:

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

The analyses of the above categories are based on data sourced from the most recent submissions. It is important to point out that coverage of these variables in the current version of the database varies (for example, 'gender of author' is much better covered than the 'nationality of the author'). However, in all cases, information about these variables is available for more than 90% of the individual records on which the final analyses were conducted.

The purpose of analysing the demographic patterns assists the Department in monitoring the trends in the transformation of knowledge production in the university sector, particularly the development of young academics into experienced researchers. Such knowledge assists the Department in designing the necessary interventions as, for example, in the University Capacity Development Plan. The understanding of shifts in the above-stated demographics over time is imperative if the Department and the individual institutions are to contribute to the redress and transformation of our country.

## 1.3. Quality and Integrity of Research Outputs

The Department remains committed to ensuring that an appropriate framework is in place to assure the quality and integrity of academic publications. There is currently such an initiative (The University-led Collaborative Programme on a Publication Quality Framework under the auspices of the UCDP and led by CREST at Stellenbosch University) to strengthen existing frameworks and procedures. The

Department will continue to communicate with the sector on these initiatives and any changes that may be required in the future to ensure that the subsidy system is guarded against abuse and only publications of high quality and ethical integrity are subsidised. As stated before, the Department reserves the right to withhold payment of research output subsidy in respect of any publication unit that does not meet the criteria as outlined in the research output policy and violate international rules about research integrity and ethics, as well as not upholding the acceptable academic practices of good scholarship.

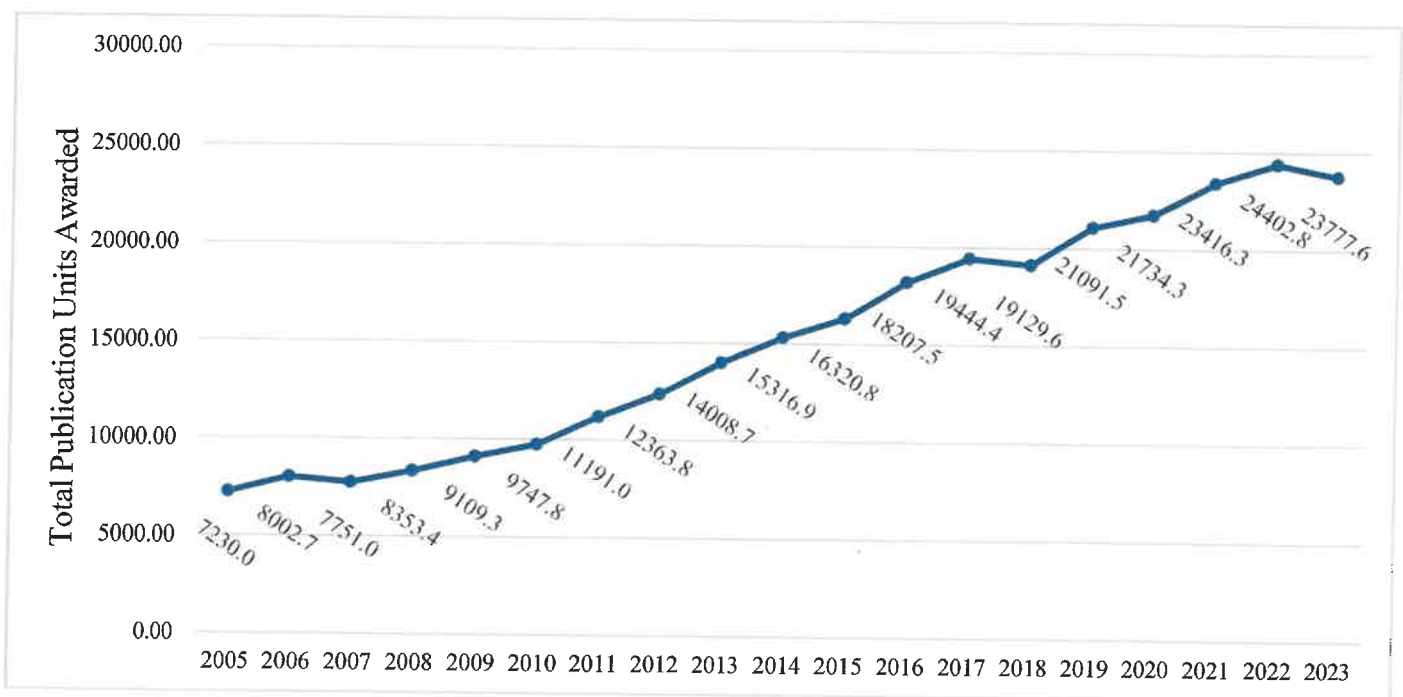
The purpose of the Research Outputs Policy is to “encourage research productivity by rewarding quality research outputs at public higher education institutions”. The emphasis must be put on ‘quality’ research and publications. Each year the Department scrutinises the quality of submissions made by institutions. Such scrutiny has assisted in improving the policy; processes and procedures for submission and determination of subsidy allocations.

Institutional reports for the 2024 submissions carry some information about the publication units that were withheld from the 2023 submissions (2022 publications), pending an investigation. Based on subsequent analyses and further investigations some submissions were declined in 2023 and also do not form part of the analysis in this report.

## 2. OVERALL RESEARCH PUBLICATIONS OUTPUT

### 2.1. Overview and trends

A total of 23 777.63 publication subsidy units in all publication categories (journal articles, books, book chapters and published conference proceedings) were awarded to universities for the 2024 submission cycle (2023 publication year). This constitutes a 2.56% decrease from the 2022 publication units, from 24 402.84 to 23 777.63 units (or a decrease of 625.21 units). **Figure 1** presents the timeline of approved publications units generated by the university sector for the past 19 years. The recent four years have witnessed a slowing in the growth of output units and specifically a decline from 2022 to 2023. This may simply be a short-term trend but could also be indicative that the university sector is reaching a ceiling in the number of publications it can produce given very little growth in its human resources capacity



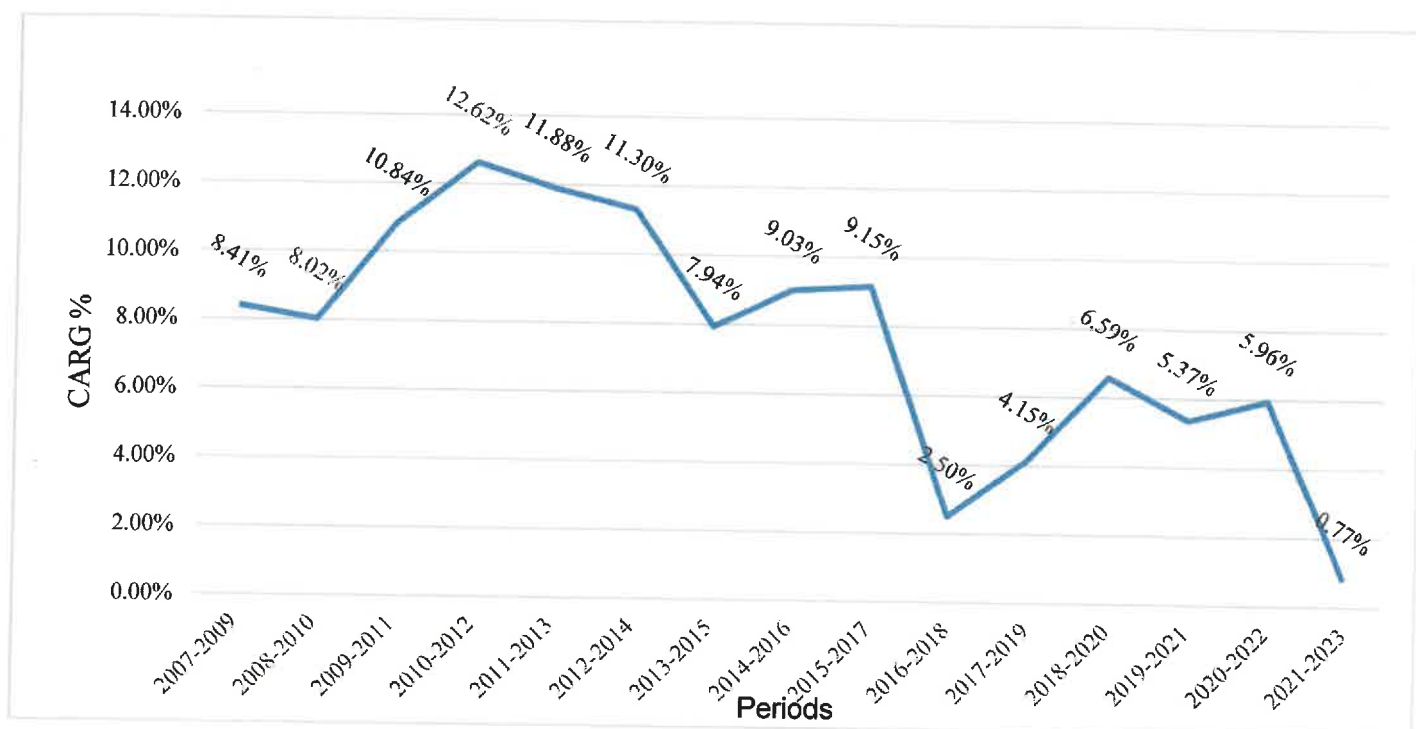
**Figure 1: Total Publication Units awarded, 2005 – 2023**

A better understanding of the overall trend can be achieved by focusing on the rate of growth in publications as measured by the Compound Average Growth Rate (CAGR) shown in **Figure 2**. The CAGR (equivalent to exponential growth rate) factors the previous percentages of growth and is reported here in three-year periods.

The overall percentage growth rate (CAGR) of research publications outputs from 2005 to 2023 was 6.84%.

The year-to-year growth in publication outputs over the past 19 years peaked at 14.81% in 2011. Further disaggregation of the CAGR into three-year time frames (**Figure 2**) explains the differences in trends in publication output over the past 19 years. The CAGR bar for 2008, for instance, represents compounded growth between 2005 to 2008, and so on. The compounded growth rate of publications

output peaked at 12.62% between 2010 and 2012, following a period of strong growth, with double-digit annual growth recorded in 2011 and 2012. Since then the rate steadily decreased, except for a moderate growth between 2016 and 2020. For the last three-year period (20.21-2023), the CAGR decreased sharply to just 0.77%.



**Figure 2: Percentage Growth Rate and 3-year Cycles of CAGR, 2005 - 2023**

## 2.2. Publications units by publication type

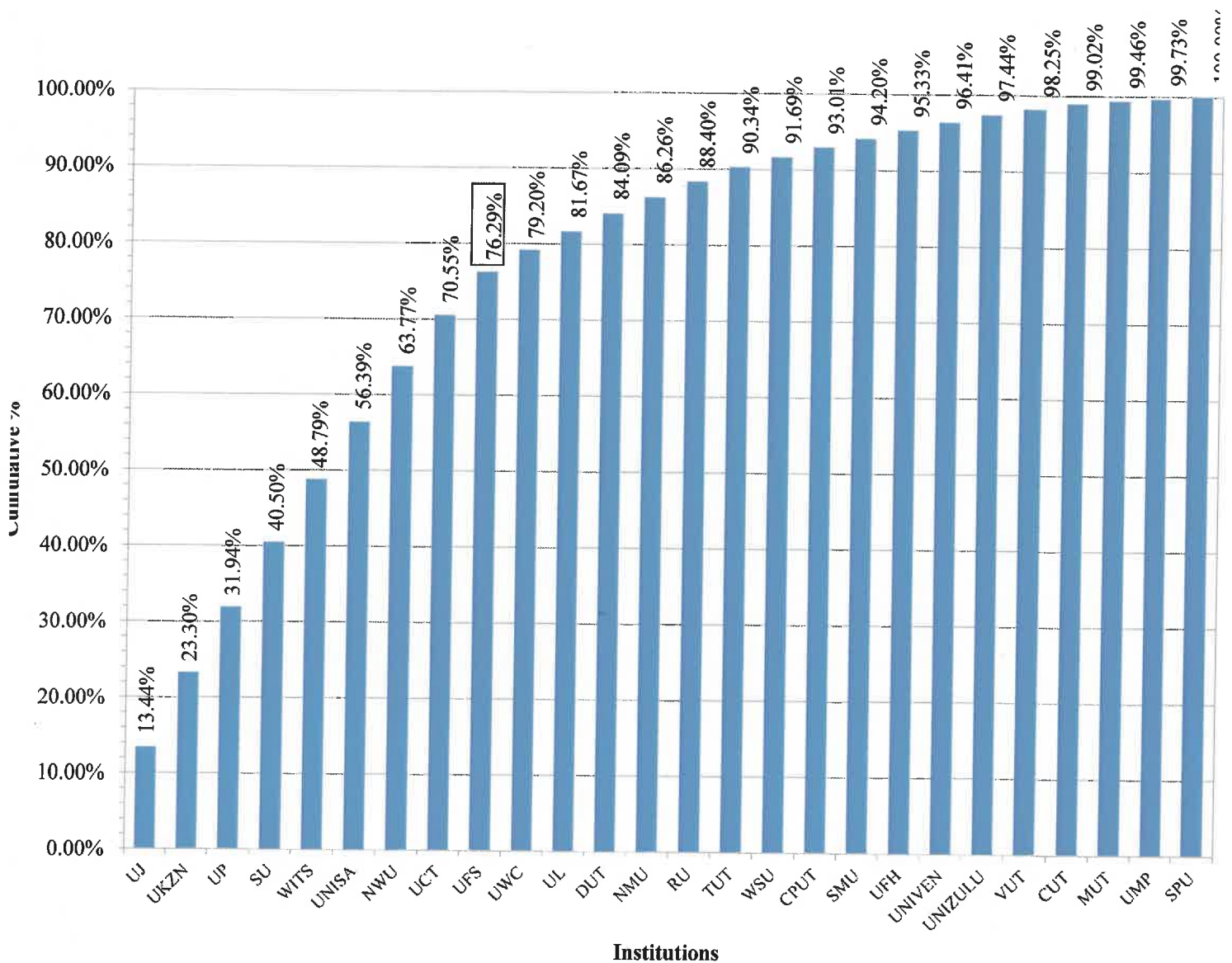
The Research Outputs policy recognises book publications (i.e. books and book chapters); published peer-reviewed conference proceedings and journal articles in an approved list of journals. The output units awarded in 2023 by each type and by university are listed in **Table 1** (in descending order of overall sector units of 2023).

**Table 1: Publication output units by publication type by universities, 2023**

Institution	Books		Conferences		Journals		Overall Institutional units 2022	Overall Institutional units 2023	% Share of Overall Sector units 2022
	Units	% of institutional units	Units	% of institutional units	Units	% of institutional units			
UJ	463.9	15.51%	280.1	24.38%	2451.1	12.48%	3143.7	3195.1	13.44%
UKZN	261.9	8.76%	38.6	3.36%	2043.9	10.41%	2562.7	2344.4	9.86%
UP	290.1	9.70%	96.4	8.39%	1669.5	8.50%	2305.2	2056.0	8.65%
SU	364.3	12.18%	116.7	10.16%	1553.8	7.91%	2255.1	2034.8	8.56%
WITS	254.9	8.52%	55.1	4.80%	1659.7	8.45%	2206.4	1969.7	8.28%
UNISA	237.4	7.94%	64.8	5.64%	1505.0	7.66%	1521.5	1807.2	7.60%

NWU	276.8	9.25%	106.4	9.27%	1371.6	6.98%	1706.2	1754.8	7.38%
UCT	132.9	4.44%	66.3	5.78%	1414.4	7.20%	1777.3	1613.6	6.79%
UFS	266.7	8.92%	28.4	2.48%	1070.2	5.45%	1406.4	1365.4	5.74%
UWC	112.2	3.75%	14.4	1.25%	563.8	2.87%	696.6	690.4	2.90%
UL	13.0	0.43%	16.7	1.46%	558.5	2.84%	461.6	588.2	2.47%
DUT	39.8	1.33%	54.0	4.70%	481.6	2.45%	564.2	575.4	2.42%
NMU	56.8	1.90%	27.4	2.39%	432.7	2.20%	550.0	516.9	2.17%
RU	46.8	1.57%	20.0	1.74%	441.1	2.25%	549.6	507.9	2.14%
TUT	13.0	0.43%	49.7	4.32%	398.9	2.03%	453.4	461.5	1.94%
WSU	21.2	0.71%	12.1	1.05%	288.0	1.47%	331.8	321.3	1.35%
CPUT	21.7	0.73%	22.5	1.96%	267.9	1.36%	329.2	312.1	1.31%
SMU	2.5	0.08%	2.6	0.23%	279.0	1.42%	230.2	284.2	1.20%
UFH	15.6	0.52%	5.4	0.47%	246.9	1.26%	291.9	267.9	1.13%
UNIVEN	27.8	0.93%	6.4	0.56%	222.3	1.13%	337.8	256.4	1.08%
UNIZULU	26.7	0.89%	12.2	1.06%	208.0	1.06%	205.3	246.8	1.04%
VUT	15.4	0.52%	20.2	1.76%	156.2	0.80%	120.9	191.7	0.81%
CUT	9.2	0.31%	27.3	2.38%	145.4	0.74%	181.9	181.9	0.77%
MUT	1.7	0.06%	1.3	0.11%	101.6	0.52%	82.4	104.6	0.44%
UMP	6.9	0.23%	0.0	0.00%	58.2	0.30%	82.0	65.1	0.27%
SPU	11.6	0.39%	3.5	0.31%	49.2	0.25%	49.5	64.3	0.27%
<b>Total</b>	<b>2990.6</b>	<b>100.00%</b>	<b>1148.6</b>	<b>100.00%</b>	<b>19638.5</b>	<b>100.00%</b>	<b>24402.8</b>	<b>23777.6</b>	<b>100.00%</b>

A graphic presentation of the cumulative relative share to sector output by individual universities is presented in **Figure 3**. The graph shows that half (48.79%) of the research publications output units were produced by five universities in the sector whilst more than three-quarters (76.29%) of all output was produced by only nine universities. These trends, which have not changed fundamentally over the past two decades, show the large differentiation in the knowledge-productive capacity of the sector. Although there have been major changes to the entire sector, such as the overall phenomenal growth in the publications outputs since the policy came into effect (past 19 years), the proportional contribution of institutions has remained mostly unchanged.



**Figure 3: Relative cumulative share to sector output by individual universities**

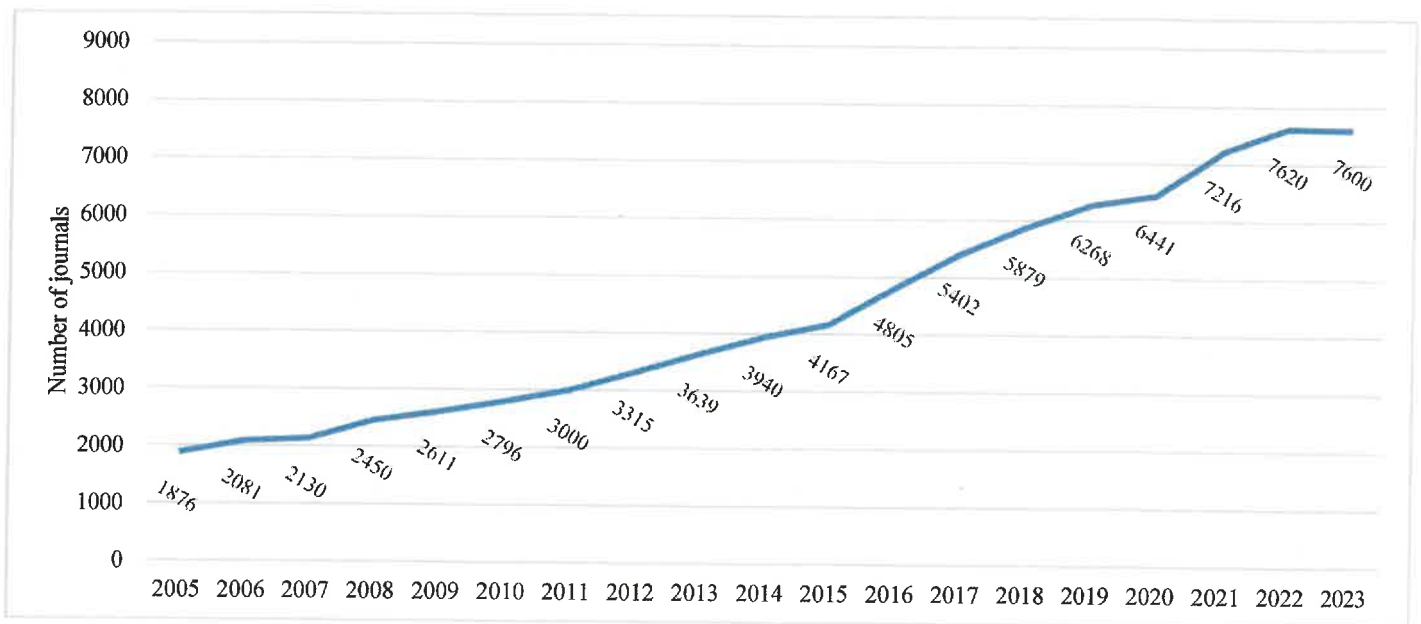
The specific areas of performance of the system are captured in the following sub-sections of the report.

### 3. JOURNAL ARTICLE OUTPUTS

#### 3.1. Overview of journal articles

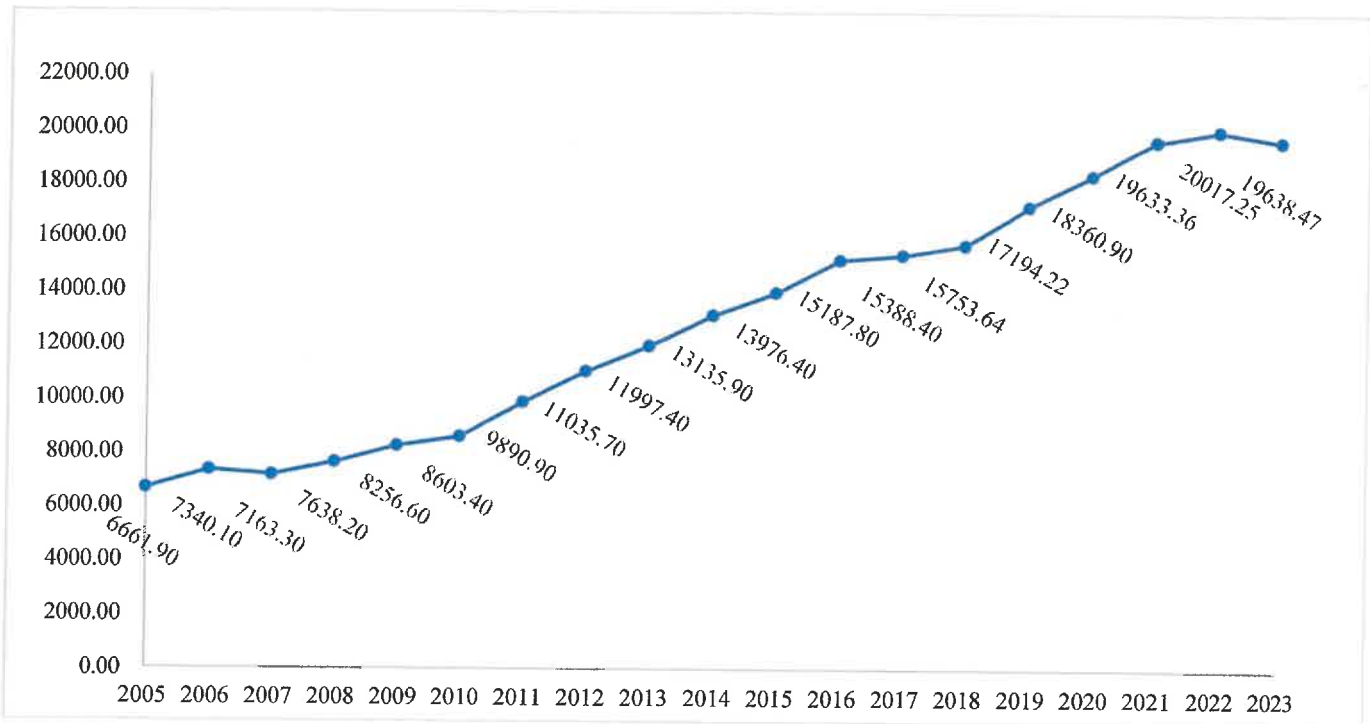
Coupled with the growth of publication outputs from the sector, the addition of more journal indexes and lists in the 2015 revision of the policy provided academics with a broader range of publication outlets for journal articles. **Figure 4** shows the increase in the number of journals in which SA academics have published in the past 19 years. The inclination of the graph from 2016 is a function of the inclusion of new indexes (Scopus predominantly) as well as the expansion of journals indexed in

all indexes. It is of interest, that the total number of journals which South African academics published in 2023 (7600) represents only 14% of the overall number of journals in, hitherto, recognised seven indexes (WoS, IBSS, Scopus, Norwegian List, SciELO SA, DOAJ and DHET List).



**Figure 4: Increase in the number of journals in which SA academics published (2005 - 2023)**

Journal articles are the predominant mode of knowledge dissemination across most scientific fields and disciplines. **Figure 5** shows the trend of units awarded for journal article outputs since 2005. A marked increase in the number of article units was recorded from 2019 (journal publications of 2018) to 2020 (publications of 2019), that is, two years after the addition of new indexes. The new indexes started to be analysed in the 2017 report (publications of 2016). This shows that the expansion of the indexes, with additional journals, introduced in 2016 did not have an immediate impact on the number of units (which could have been observed in the 2017 report of 2016 publications). However, the increase in the annual number of articles published peaked in 2022 and decreased slightly in the most recent year (2023).



**Figure 5: Trend in the number of journal article output units, 2005 – 2023**

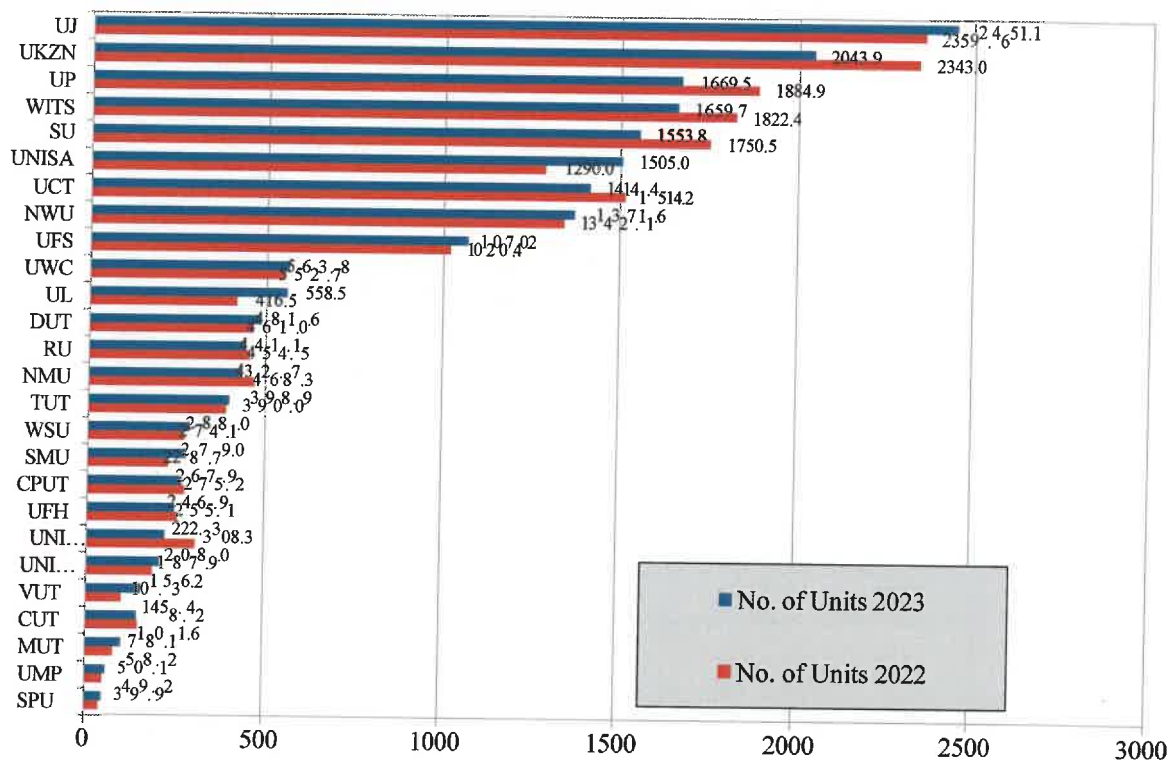
The Compound Average Growth Rate (CAGR)-values over this period are presented in **Table 2**. The three-year periodical CAGR presented in Table 2 provides an overview of the article output performance trends, including the changes in publication outputs in past 19 years.

**Table 2: CAGR by rolling three-year windows for journal articles, 2007–2023**

Publication Year	Journal Article Units	Annual Growth	3Yr CAGR
2005	6661.90		
2006	7340.10	10.18%	
2007	7163.30	-2.41%	
2008	7638.20	6.63%	4.66%
2009	8256.60	8.10%	4.00%
2010	8603.40	4.20%	6.30%
2011	9890.90	14.97%	9.00%
2012	11035.70	11.57%	10.15%
2013	11997.40	8.71%	11.72%
2014	13135.90	9.49%	9.92%
2015	13976.40	6.40%	8.19%
2016	15187.80	8.67%	8.18%
2017	15388.40	1.32%	5.42%

2018	15753.64	2.37%	4.07%
2019	17194.22	9.14%	4.22%
2020	18360.90	6.79%	6.06%
2021	19633.36	6.93%	7.61%
2022	20017.25	1.96%	5.20%
2023	19638.47	-1.89%	2.27%

The number of article subsidy units awarded is shown in **Figure 6**. It is noteworthy that apart from UJ and UNISA, which experienced moderate annual growth, all the universities in the top seven positions showed a significant decline in the production of journal article units from 2022 to 2023.



**Figure 6: Comparing article units awarded by university for 2023 and 2022**

### 3.2. Journal articles disaggregated by Index or Journal List

The inclusion of new indexes after the 2016 review of the policy started having a clear effect on the publication output from 2019 onwards. The newly added indexes from 2016 are **Scopus**; Scientific Electronic Library Online South Africa (**SciELO SA**) and the Norwegian Register for Scientific Journals, Series and Publishers and since 2021, the Directory of Open Access Journals (**DOAJ**). **Table 3** presents the breakdown of journal output by journal index or list.

**Table 3: Articles by Index, 2023 (n=29 878)**

DHET	WoS	Scopus	DOAJ	IBSS	SciELO	Norwegian List*	Number of articles	Percentage
YES	YES	YES	YES	YES	YES		56	0.19
YES	YES	YES	YES	YES			1	0
YES	YES	YES	YES		YES		435	1.46
YES	YES	YES	YES				29	0.1
YES	YES	YES		YES			63	0.21
YES	YES	YES			YES		60	0.2
YES	YES	YES					224	0.75
YES		YES	YES	YES	YES		75	0.25
YES		YES	YES	YES			60	0.2
YES		YES	YES		YES		617	2.07
YES		YES	YES				308	1.03
YES		YES		YES			57	0.19
YES		YES			YES		8	0.03
YES		YES					347	1.16
YES			YES	YES			4	0.01
YES			YES		YES		390	1.31
YES			YES				109	0.37
YES				YES			77	0.26
YES					YES		152	0.51
YES							<b>906</b>	<b>3.04</b>
	YES	YES	YES	YES			54	0.18
	YES	YES	YES		YES		231	0.77
	YES	YES	YES			YES	541	1.81
	YES	YES	YES				5516	18.49
	YES	YES		YES		YES	212	0.71
	YES	YES		YES			735	2.46
	YES	YES			YES		39	0.13
	YES	YES				YES	1992	6.68
	YES	YES					7186	24.08
	YES		YES				15	0.05
	YES			YES			4	0.01
	YES					YES	10	0.03
	YES						<b>99</b>	<b>0.33</b>
		YES	YES	YES	YES		66	0.22
		YES	YES	YES			120	0.4

DHET	WoS	Scopus	DOAJ	IBSS	SciELO	Norwegian List*	Number of articles	Percentage
		YES	YES		YES		17	0.06
		YES	YES			YES	1	0
		YES	YES				2235	7.49
		YES		YES		YES	3	0.01
		YES		YES			477	1.6
		YES			YES		4	0.01
		YES				YES	27	0.09
		YES					<b>3153</b>	<b>10.57</b>
			YES	YES			149	0.5
			YES		YES		9	0.03
			YES				<b>2401</b>	<b>8.05</b>
				YES	YES		10	0.03
				YES			<b>450</b>	<b>1.51</b>
					YES		<b>48</b>	<b>0.16</b>
						YES	2	<b>0.01</b>
							94	0.32

\* Norwegian Register for Scientific Journals, Series and Publishers

All journal articles are linked to a specific journal that is indexed or listed in one or more of the DHET-approved journal indexes or lists. The results show the dominance of two indexes: Scopus and the <sup>CA</sup>Web of Science. More than half (58%) of all journal articles in 2023 were published in either of these indexes. Articles published in Scopus-listed journals **only** constitute 10.57% of all articles published. The next single largest component is the DOAJ-listed journals (8.05%). The Norwegian list again included the fewest index unique articles published at 0.01% of the total journal articles. Publications exclusive to the DHET-listed journals declined from 5.16% in 2020 to 3.04% in 2023. It is significant to note that 83.5% of all publications overlap with Scopus and 58.6% overlap with WoS.

The inclusion of DOAJ in 2021 has had a significant impact, having 8.05% exclusive publications and 45% publication overlap with other indexes.

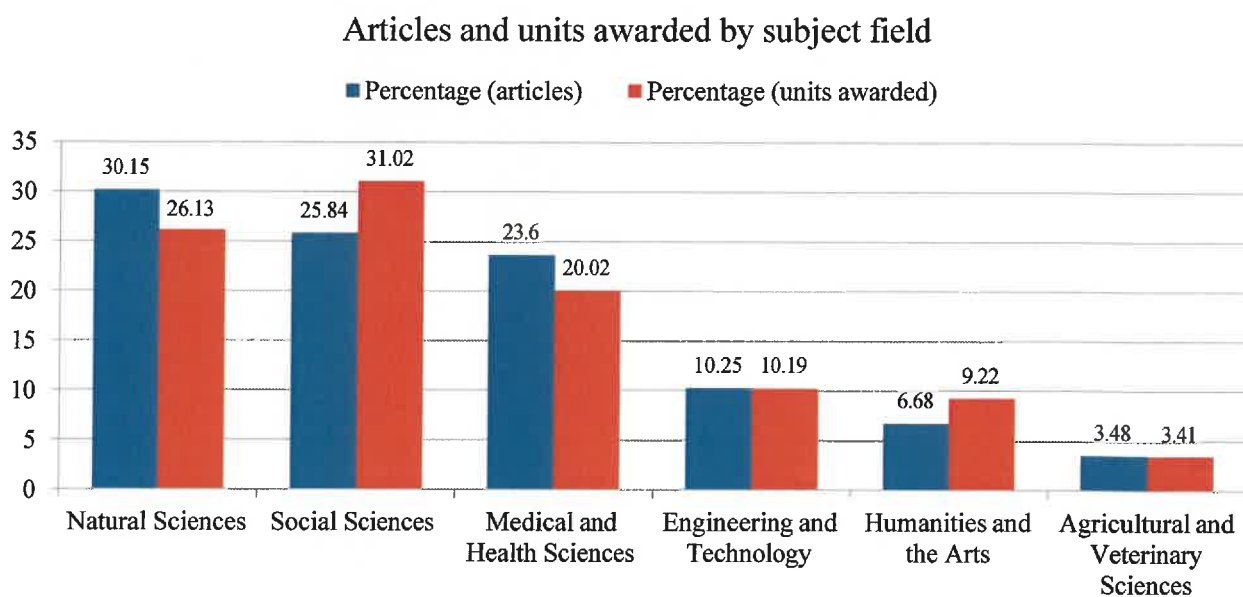
### 3.3. Journal articles by scientific field

Table 4 (overleaf) presents the number of articles by scientific fields. The number of Articles assigned to the Social Sciences continued to increase in 2023, while articles in Engineering, Humanities and arts and Agricultural sciences remained constant. It is noteworthy that the decline in 2023 publication outputs can be attributed to declines in Natural Sciences and Medical and Health Sciences.

**Table 4: Number of Articles by Scientific Fields, 2015 to 2023**

Domains	2005	2010	2015	2022	2023	CAGR (2005-2023)
Agricultural sciences	644	937	1341	1363	1070	2.86%
Engineering	741	1264	2217	3323	3156	8.38%
Medical and Health Sciences	2118	3589	5766	7937	7263	7.09%
Humanities and arts	1507	2089	2483	1954	2057	1.74%
Natural sciences	2322	4019	6272	9895	9280	8.00%
Social sciences	1849	3009	5776	7009	7954	8.44%
<b>Grand Total</b>	<b>9226</b>	<b>15093</b>	<b>24473</b>	<b>31481</b>	<b>30780</b>	

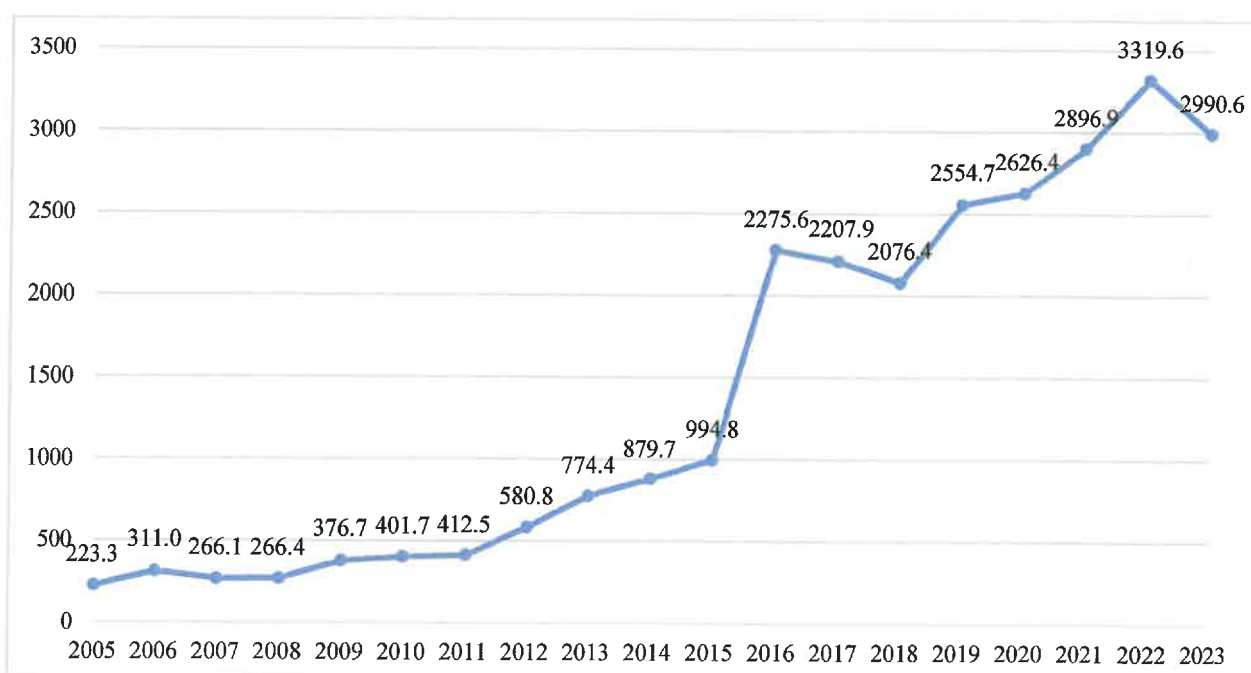
**Figure 7: Comparing articles units awarded with articles by main subject field**



## 4. BOOK AND BOOK CHAPTER OUTPUTS

### 4.1. Overview and trends

Research publication units in scholarly books for 2023 amounted to 2990.6 units, a decrease of 329 units from 3319.6 units in 2022 (a 9.9% decrease). The longer-term trend of book publication outputs is presented in **Figure 8**. The trend in output in this category over the past 19 years is interesting. The steep increase in 2016 is evidently to be attributed to the increase in the monetary value linked to book and chapter subsidy units introduced in the revised 2015 Research Output policy. Since then, the annual increase has remained reasonably stable although the smaller numbers produce year-on-year fluctuations. The decline from 2022 to 2023 may be a short-term phenomenon although the DHET has also become more strict in not awarding subsidy to publishing which have been deemed to be predatory or vanity and self-publishing.



**Figure 8: Trend in book and book chapter output from 2005 to 2023**

The trend of growth in book publications over the years is illustrated by the CAGR-values for three-year window periods from 2005 as shown in **Table 5**. The highest CAGRs were recorded in 2016 and 2017. These two years followed the introduction of the doubling of the monetary value awarded to books in the 2015 new policy.

**Table 5: CAGR by rolling three-year windows for books and chapters, 2007-2023**

Year	Books & Chapter Units	Annual Growth	3Yr CAGR
2005	223.3		
2006	311.0	39.27%	

Year	Books & Chapter Units	Annual Growth	3Yr CAGR
2007	266.1	-14.44%	
2008	266.4	0.11%	6.06%
2009	376.7	41.40%	6.60%
2010	401.7	6.64%	14.71%
2011	412.5	2.69%	15.69%
2012	580.8	40.80%	15.53%
2013	774.4	33.33%	24.46%
2014	879.7	13.60%	28.72%
2015	994.8	13.08%	19.65%
2016	2275.6	128.75%	43.23%
2017	2207.9	-2.98%	35.90%
2018	2076.4	-5.96%	27.80%
2019	2554.7	23.04%	3.93%
2020	2626.4	2.81%	5.96%
2021	2896.9	10.30%	11.74%
2022	3319.6	14.59%	9.12%
2023	2990.6	-9.91%	4.42%
CAGR (2005-2023)	15.51%		

In 2023 book publications constituted 12.6% of overall publication units, compared with journal articles which accounted for 82.6% of all outputs. Conference proceedings (4.8%) constituted the remainder.

#### 4.2. Book and book chapter outputs by university

The distribution of book publications units by university for the past two years is presented in **Table 6**. The results are organized in descending order by the relative share of each university of the 2023 book publications output units.

**Table 6: Percentage of book publications output units by university, 2022 and 2023**

Institution	2022		2023		Difference (year to year)	% Growth
	No. of Units	% of Total	No. of Units	% of Total		
CPUT	28.243	0.85	21.718	0.73%	-6.525	-23.10%
CUT	4.979	0.15	9.165	0.31%	4.186	84.07%
DUT	76.189	2.3	39.822	1.33%	-36.367	-47.73%
MUT	1.004	0.03	1.706	0.06%	0.701	69.83%

Institution	2022		2023		Difference (year to year)	% Growth
	No. of Units	% of Total	No. of Units	% of Total		
NMU	48.977	1.48	56.778	1.90%	7.801	15.93%
NWU	272.618	8.21	276.754	9.25%	4.136	1.52%
RU	77.241	2.33	46.841	1.57%	-30.399	-39.36%
SMU	0.659	0.02	2.526	0.08%	1.867	283.50%
SPU	7.712	0.23	11.611	0.39%	3.899	50.56%
SU	397.538	11.98	364.270	12.18%	-33.267	-8.37%
TUT	28.061	0.85	12.989	0.43%	-15.071	-53.71%
UCT	208.130	6.27	132.874	4.44%	-75.257	-36.16%
UFH	25.039	0.75	15.594	0.52%	-9.445	-37.72%
UFS	333.617	10.05	266.681	8.92%	-66.936	-20.06%
UJ	507.017	15.27	463.914	15.51%	-43.103	-8.50%
UKZN	205.400	6.19	261.889	8.76%	56.489	27.50%
UL	25.264	0.76	12.965	0.43%	-12.299	-48.68%
UMP	31.422	0.95	6.935	0.23%	-24.488	-77.93%
UNISA	172.164	5.19	237.377	7.94%	65.213	37.88%
UNIVEN	28.466	0.86	27.759	0.93%	-0.708	-2.49%
UNIZULU	10.396	0.31	26.704	0.89%	16.309	156.88%
UP	346.313	10.43	290.099	9.70%	-56.214	-16.23%
UWC	128.596	3.87	112.166	3.75%	-16.431	-12.78%
VUT	1.835	0.06	15.417	0.52%	13.582	740.27%
WITS	323.581	9.75	254.880	8.52%	-68.701	-21.23%
WSU	29.091	0.88	21.162	0.71%	-7.929	-27.26%
<b>TOTAL</b>	<b>3319.551</b>		<b>2990.596</b>		<b>-328.955</b>	<b>-9.91%</b>

The longer-term trend in the production of books and book chapters by university is presented in **Table 7**. The table is organized in descending order of the CAGR-values. Institutions moving from a relatively low base and experiencing significant growth have higher percentages of CAGR. However, there are also institutions with a significantly higher book publication output levels with significantly higher growth rates. It will also be noted that the output of the recently established universities do not have a long enough span that cover the period presented in the table.

**Table 7: CAGR of book publications units by university, 2015 - 2023**

Institution	2015	2016	2017	2018	2019	2020	2022	2023	CAGR
WSU	0.08	1.00	1.14	0.73	4.50	12.78	29.09	21.16	100.82%
CUT	1.11	9.89	3.21	6.19	9.50	4.64	4.98	9.16	30.20%
UNIZULU	4.52	5.17	24.90	17.38	19.10	16.18	10.40	26.70	24.86%
NWU	48.84	118.99	110.03	131.85	189.20	233.43	272.62	276.75	24.21%
NMU	10.05	30.84	22.52	35.48	21.00	67.06	48.98	56.78	24.17%
UFH	2.99	18.60	13.81	12.05	7.60	11.00	25.04	15.59	22.93%
UJ	92.37	228.20	326.54	220.42	359.00	344.64	507.02	463.91	22.35%
SU	78.00	284.93	266.02	280.51	327.70	444.45	397.54	364.27	21.25%
TUT	3.02	10.52	6.47	3.86	8.20	0.39	28.06	12.99	20.00%
UKZN	66.47	275.47	128.09	176.05	156.80	131.22	205.40	261.89	18.70%
UWC	29.34	94.33	53.18	45.43	68.00	32.24	128.60	112.17	18.25%
CPUT	5.99	11.87	25.84	13.90	32.00	12.30	28.24	21.72	17.47%
UL	3.66	1.59	21.41	2.71	13.10	13.22	25.26	12.97	17.13%
UFS	79.08	178.22	239.20	182.55	305.90	320.68	333.62	266.68	16.41%
UNISA	71.79	238.71	117.61	146.56	125.60	149.92	172.16	237.38	16.12%
UP	101.10	195.24	237.67	266.81	296.00	301.06	346.31	290.10	14.08%
UNIVEN	10.80	23.29	8.38	10.76	6.70	12.63	28.47	27.76	12.52%
DUT	16.59	23.77	28.58	49.66	33.70	48.40	76.19	39.82	11.57%
WITS	159.40	241.68	286.36	196.46	272.40	235.21	323.58	254.88	6.04%
RU	48.10	47.22	99.22	94.87	65.80	54.53	77.24	46.84	-0.33%
UCT	161.47	223.56	185.98	169.63	220.00	165.61	208.13	132.87	-2.41%
MUT	0.00	1.33	0.78	0.00	0.50	0.42	1.00	1.71	
SMU	0.00	0.65	1.00	0.00	1.20	1.00	0.66	2.53	
SPU	0.00	0.00	0.00	0.00	4.60	2.29	7.71	11.61	
UMP	0.00	0.00	0.00	3.33	1.70	2.95	31.42	6.93	
VUT	0.00	4.00		2.74	4.70	8.15	1.83	15.42	
<b>TOTAL</b>	<b>994.77</b>	<b>2269.07</b>	<b>2207.94</b>	<b>2069.93</b>	<b>2554.50</b>	<b>2626.40</b>	<b>3319.55</b>	<b>2990.60</b>	<b>14.75%</b>

In Figure 9 below we compare the changes in units awarded for the two most recent years by university.

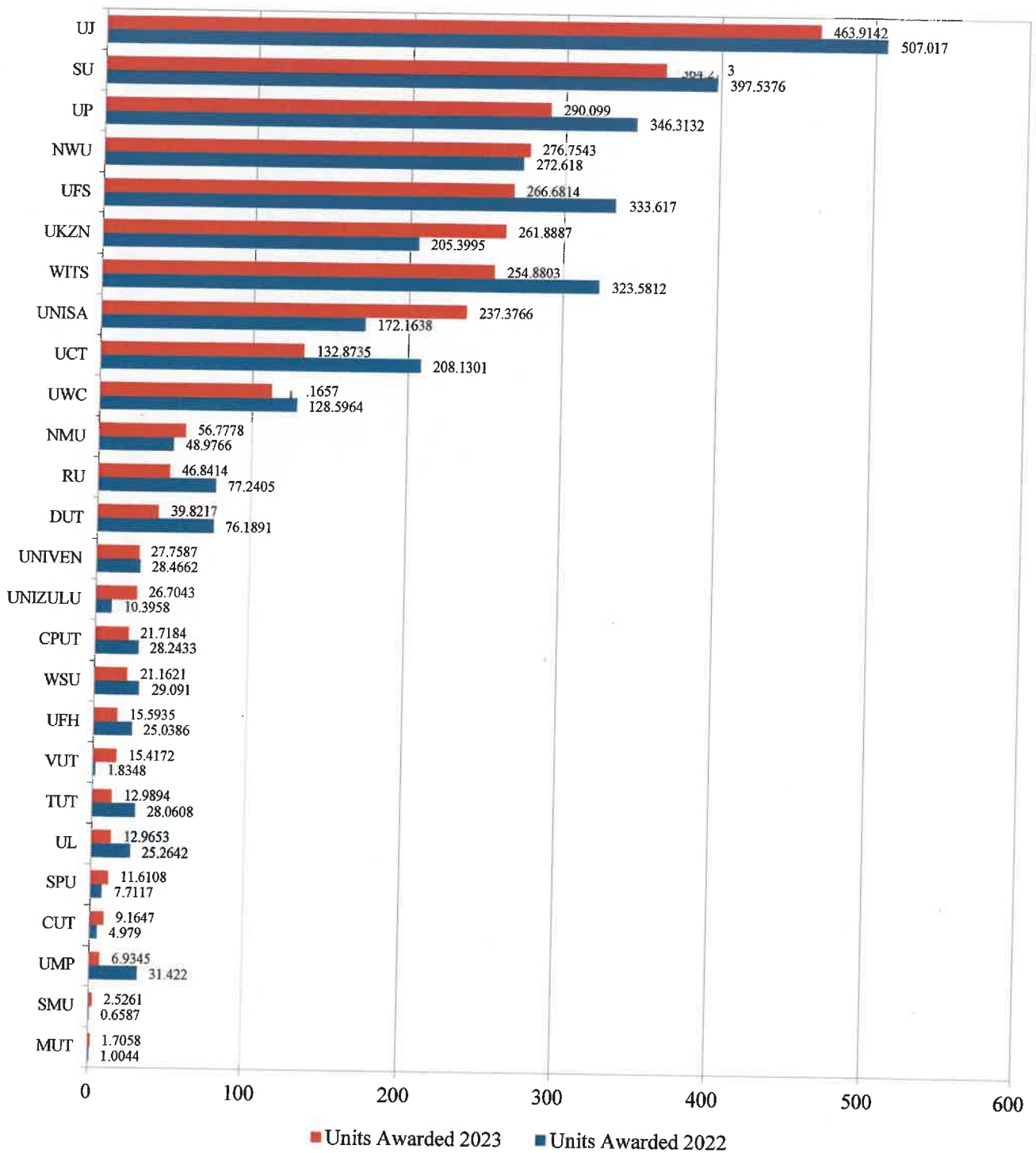
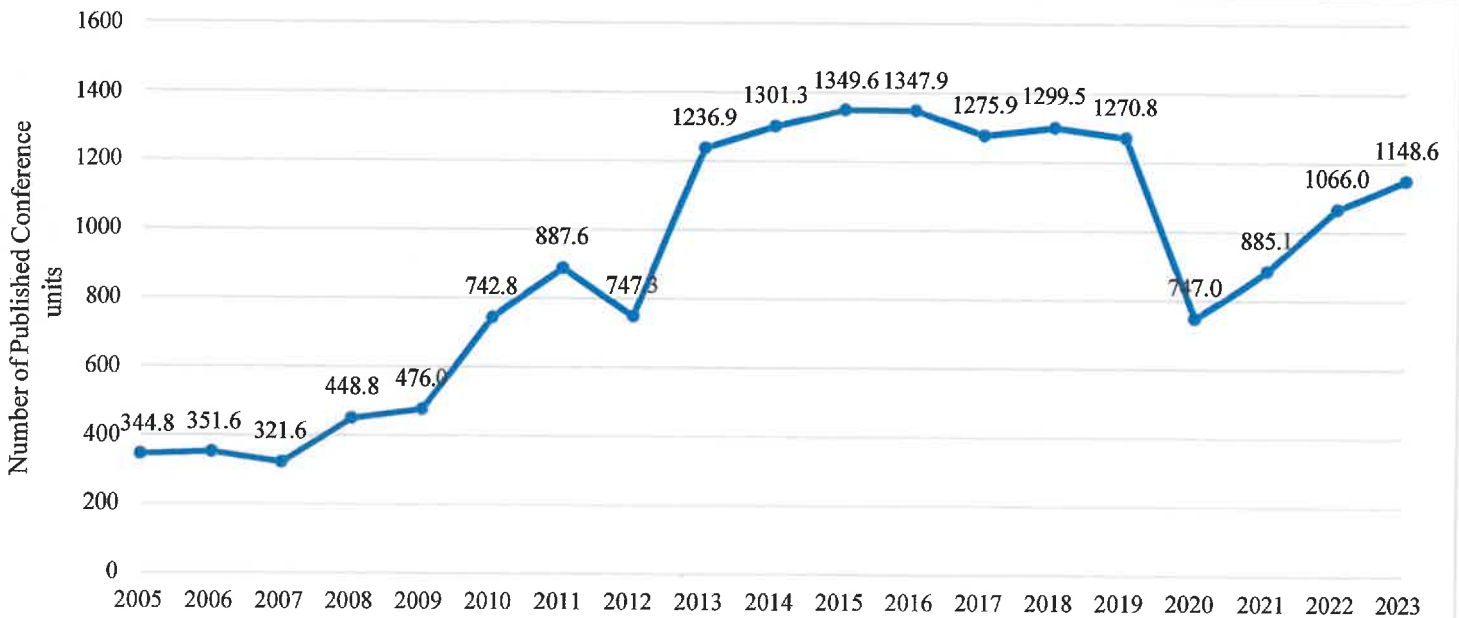


Figure 9: Comparing book and book chapter units awarded for 2022 and 2023 by university

## 5. PUBLISHED CONFERENCE PROCEEDINGS

### 5.1. Overview and trends

The trend line of published conference proceedings (**Figure 10**) reveals interesting fluctuations. The inclusion of additional indexes (most notably Scopus) in 2015) accounts for the increase in proceeding units from around 2012 to 2013 and up to around 2019. During this period the units remained fairly stable around 1300 units per year. The decline from 2019 to 2020 reflects stricter controls on submitted claims. Since 2020 we witness a steep increase to former average values.



**Figure 10: Trends in the production of published conference proceedings between 2005 and 2023**

**Table 8** presents the CAGR values for the corresponding time frames.

**Table 8: CAGR values for growth rates in annual published conference proceedings (2007 to 2023)**

Year	Conference Proceedings Units Awarded	Annual Rate of Growth	3Yr CAGR
2005	344.8		
2006	351.6	1.97%	
2007	321.6	-8.53%	
2008	448.8	39.55%	9.18%
2009	476	6.06%	10.62%
2010	742.8	56.05%	32.19%
2011	887.6	19.49%	25.52%
2012	747.3	-15.81%	16.22%

Year	Conference Proceedings Units Awarded	Annual Rate of Growth	3Yr CAGR
2013	1236.9	65.52%	18.53%
2014	1301.3	5.21%	13.60%
2015	1349.6	3.71%	21.78%
2016	1347.9	-0.13%	2.91%
2017	1275.9	-5.34%	-0.65%
2018	1299.5	1.85%	-1.25%
2019	1270.8	-2.21%	-1.94%
2020	747	-41.22%	-16.34%
2021	885.0543	18.48%	-12.02%
2022	1066.0406	20.45%	-5.69%
2023	1148.6184	7.75%	15.42%
<b>CAGR</b>	<b>6.91%</b>		

The compound growth rate of published and approved conference proceedings units per institution – for the past 9 years - is summarized in **Table 9**. Conference publications have consistently constituted the smallest percentage of all publication outputs (4.83% in 2023).

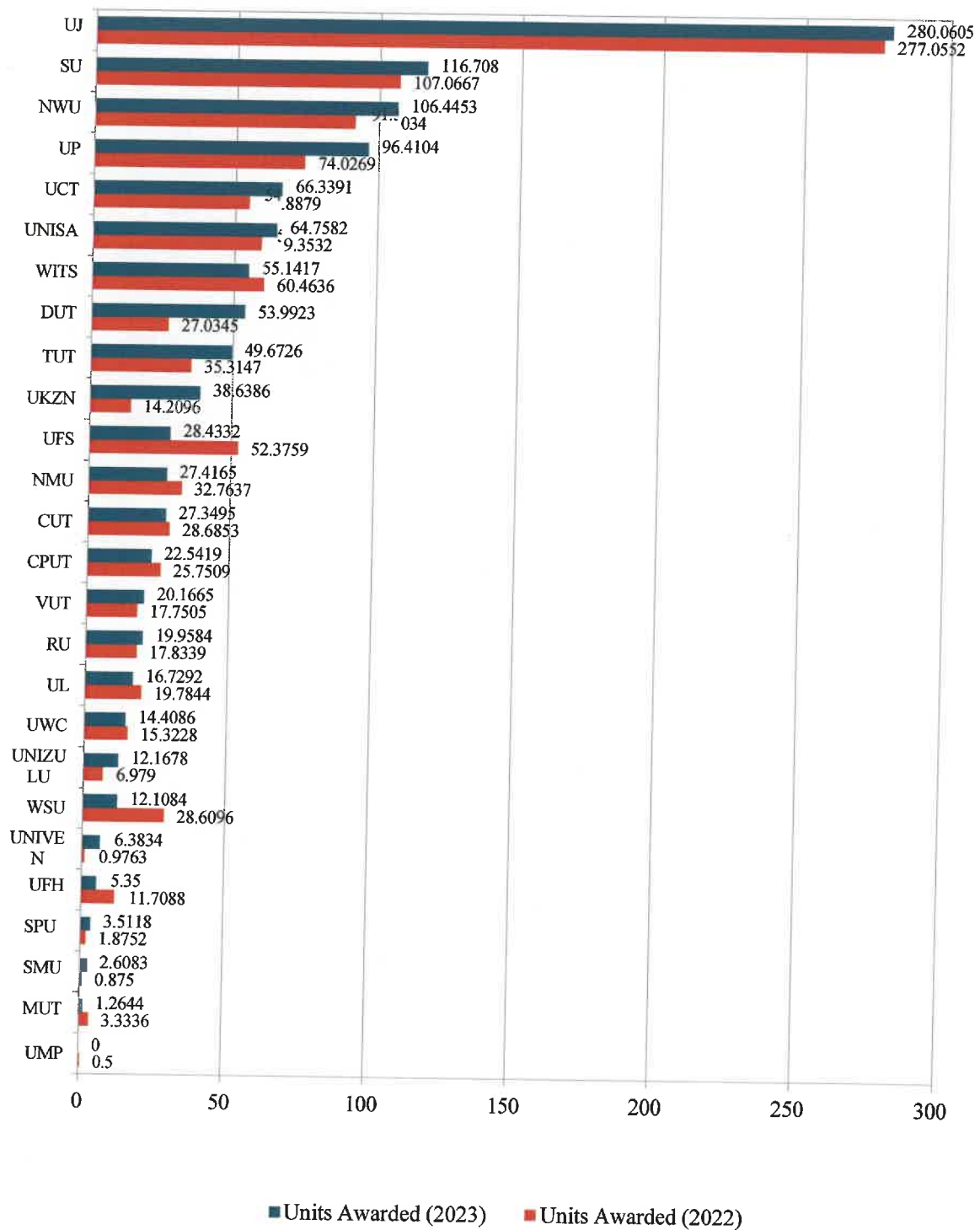
**Table 9: Published Conference Proceedings Units per university, 2015 – 2023**

Institution	Units per year								CAGR
	2015	2016	2017	2018	2019	2020	2022	2023	
UJ	288.4	301.7	303.7	301.1	294.8	173.7	277.0552	280.0605	-0.37%
SU	82.6	115.2	105.2	97.6	110.2	74.6	107.0667	116.7080	4.42%
NWU	126.8	89.1	82.4	133.4	118.8	38.8	91.5034	106.4453	-2.16%
UP	151	138.6	111.9	85.2	82.2	49.1	74.0269	96.4104	-5.45%
UCT	102.6	103.9	104.5	101.2	79.9	63	54.8879	66.3391	-5.30%
UNISA	87.7	84.7	57.9	75.1	73.1	37.7	59.3532	64.7582	-3.72%
WITS	86.4	79	102.9	83.4	68.5	50.8	60.4636	55.1417	-5.46%
DUT	31.8	8.5	21.3	18.5	19.5	30.1	27.0345	53.9923	6.84%
TUT	44.4	47.9	49.5	41.3	58.4	22.1	35.3147	49.6726	1.41%
UKZN	51.2	61	67.1	46.6	61.9	29.2	14.2096	38.6386	-3.46%
UFS	46.3	27.3	39.7	27	52.3	31.3	52.3759	28.4332	-5.91%
NMU	63.6	83.1	54.2	41.9	49.6	24.9	32.7637	27.4165	-9.98%
CUT	30.9	40.4	44.2	58.9	49.1	38.8	28.6853	27.3495	-1.51%
CPUT	33.4	32.6	23.4	41.9	32.6	18.3	25.7509	22.5419	-4.80%
VUT	13.3	18.2	22.9	40.6	29.9	14.7	17.7505	20.1665	5.34%

<b>RU</b>	34.6	29	23.8	12.8	21.7	6.1	17.8339	19.9584	<b>-6.65%</b>
<b>UL</b>	33	15.4	16	31.4	25.9	7.4	19.7844	16.7292	<b>-8.14%</b>
<b>UWC</b>	6.8	10.4	7.3	11.3	12.3	10.9	15.3228	14.4086	<b>9.84%</b>
<b>UNIZUL U</b>	11.3	6.3	5.6	8.2	17.2	6.9	6.979	12.1678	<b>0.93%</b>
<b>WSU</b>	2.5	2.3	4	3.9	4	9.5	28.6096	12.1084	<b>21.80%</b>
<b>UNIVEN</b>	9.1	12.9	8.9	5.4	1.4	1.2	0.9763	6.3834	<b>-4.34%</b>
<b>UFH</b>	8.9	16	17.9	2.8	1.5	2	11.7088	5.3500	<b>-6.16%</b>
<b>SPU</b>	0	0	0	0	2.4	3	1.8752	3.5118	
<b>SMU</b>	1.5	0	0	0.6	0	1.2	0.875	2.6083	<b>7.16%</b>
<b>MUT</b>	1.3	2.9	0.3	1.9	0.4	1.3	3.3336	1.2644	<b>-0.35%</b>
<b>UMP</b>	0	0	1.5	0.8	3.1	0.4	0.5	0.0000	
<b>TOTAL</b>	<b>1349.6</b>	<b>1326.2</b>	<b>1275.9</b>	<b>1272.8</b>	<b>1270.7</b>	<b>747</b>	<b>1066.0406</b>	<b>1148.5646</b>	<b>-2.00%</b>

The percentage share of total conference publications for 2023 for the sector is presented in **Figure 11**.

**Figure 11: Comparison of conference proceeding units awarded for 2022 and 2023 by university**



## 6. NORMALIZED RESEARCH OUTPUT INDICATORS

The results presented in this report thus far represented absolute numbers of subsidy-units awarded irrespective of the size and knowledge productive capacity of the respective universities. In this section, we report on four indicators where the data are normalized to enable a fairer comparison of the ‘research performance’ of South African universities.

- *Per capita research publication output* - the total number of publications (all document types) by a university is divided by the headcount of the permanently employed instructional and research staff.
- *Normalized Weighted per capita research output* - the sum of the total number of publications (all document types) together with the number of research masters graduates and doctoral graduates (weighted by a factor of 3) produced divided by the headcount of the permanently employed instructional and research staff.

The first two indicators can be interpreted as proxy indicators of the research publication intensity and research intensity of SA universities respectively<sup>1</sup>.

The third indicator – the percentage of academic staff with doctoral degrees – can be interpreted as a proxy for doctoral quality at a university. The fourth indicator included here is defined as ‘the ratio of doctoral graduates to doctorate academic staff’ which can be interpreted as a research productivity measure.

### 6.1. *Per capita* research publication output

The average per capita research publication output for all universities in 2023 was 1.14 units which constitutes a decrease from the previous year of 1.19 publication units per staff member (**Table 10**). This means that the average permanently employed academic in the sector produced just more than one research publication unit in 2023, or an equivalent of a peer-reviewed article in a journal or a research masters graduate. Academics at eight universities (UKZN, SU, UJ, UP, UCT, WITS, RU and UFS) on average produced research publications higher than the sector average.

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<sup>1</sup> It is important to note that the first indicator is referred to as the per capita **publication** output and the second as the weighted pe capita **research** output, as the latter combines publications with the production of post-graduate students as forms of research output.

**Table 10: Per capita research publications outputs, 2023**

Institution	Headcount of permanently employed academics	Research Publications Units	Per Capita Research Publications Units
	(A)	(B)	(B/A)
UJ	1359.00	3195.05	2.35
UKZN	1169.00	2344.40	2.01
UP	1275.00	2056.02	1.61
SU	1313.00	2034.75	1.55
UFS	890.00	1365.36	1.53
WITS	1295.00	1969.73	1.52
RU	369.00	507.93	1.38
UCT	1178.00	1613.64	1.37
<b>Sector Average</b>		<b>1.14</b>	
NWU	1692.00	1754.76	1.04
UNISA	1858.00	1807.18	0.97
UWC	715.00	690.36	0.97
UFH	309.00	267.86	0.87
DUT	678.00	575.40	0.85
UL	702.00	588.18	0.84
UNIZULU	329.00	246.85	0.75
NMU	723.00	516.91	0.71
VUT	331.00	191.75	0.58
CUT	321.00	181.93	0.57
TUT	855.00	461.52	0.54
UNIVEN	485.00	256.42	0.53
SPU	142.00	64.34	0.45
MUT	238.00	104.62	0.44
CPUT	847.00	312.15	0.37
SMU	777.00	284.16	0.37
WSU	902.00	321.25	0.36
UMP	194.00	65.14	0.34

## 6.2. Weighted *per capita* research output

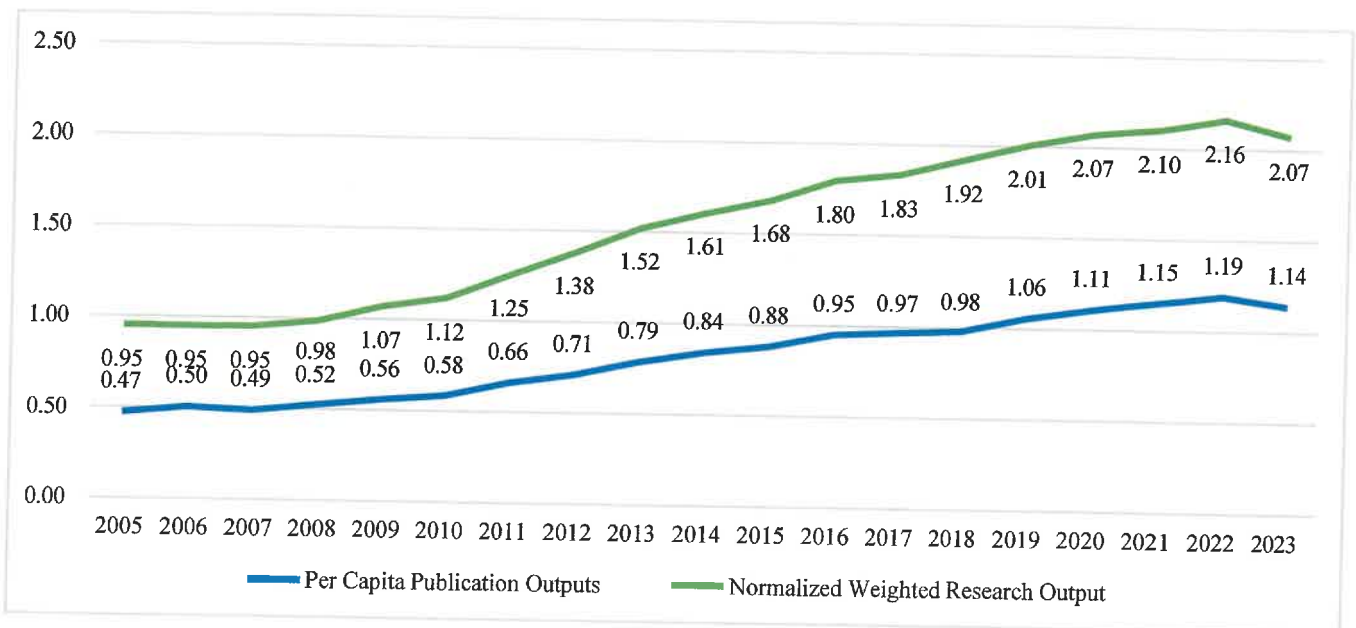
The weighted per capita research output indicator sums the publications in all categories (journal articles, books, book chapters and published conference proceedings) with the number of research masters graduates and doctoral graduates and divides the total research publication output units by the headcount of permanently employed academic (instructional and research) staff at a university. The results as presented in **Table 11** shows that the average weighted per capita research output value across all universities in 2023 was 2.07 units. This constitutes a slight decrease from the previous year (average of 2.16 units). However, the results re-affirm the very uneven performance across the sector with only eight universities (UKZN, UP, WITS, UJ, SU, RU, UCT and UFS) recording a score above the sector average.

**Table 11: Weighted per capita research output (2023)**

Institution	Headcount of permanently employed academics	Research Publications Units	Research Masters Graduates Units	Doctoral Graduates Units	Total Weighted Output Units (1+2+3)	Normalized weighted output (1+2+3)/A
	(A)	-1	-2	-3		
UJ	1359	3195.05	863.45	843	4901.50	3.61
UP	1275	2056.02	1151.17	1272	4479.19	3.51
UKZN	1169	2344.40	541.71	1107	3993.11	3.42
WITS	1295	1969.73	982.97	984	3936.69	3.04
SU	1313	2034.75	977.14	948	3959.89	3.02
RU	369	507.93	204.10	327	1039.03	2.82
UCT	1178	1613.64	772.12	741	3126.76	2.65
UFS	890	1365.36	402.00	567	2334.36	2.62
<b>Sector Average</b>						<b>2.07</b>
UWC	715	690.36	325.00	438	1453.36	2.03
NWU	1692	1754.76	547.52	831	3133.28	1.85
UNIZULU	329	246.85	117.05	240	603.90	1.84
UNISA	1858	1807.18	448.45	1098	3353.63	1.80
DUT	678	575.40	180.50	249	1004.90	1.48
UFH	309	267.86	57.05	108	432.91	1.40
NMU	723	516.91	203.68	279	999.59	1.38
UL	702	588.18	206.26	102	896.43	1.28
TUT	855	461.52	299.25	216	976.77	1.14
UNIVEN	485	256.42	67.00	216	539.42	1.11
CUT	321	181.93	61.00	72	314.93	0.98
VUT	331	191.75	45.00	33	269.75	0.81

CPUT	847	312.15	169.17	117	598.31	0.71
SMU	777	284.16	106.30	39	429.46	0.55
UMP	194	65.14	36.00	0	101.14	0.52
SPU	142	64.34	5.00	0	69.34	0.49
WSU	902	321.25	73.54	33	427.80	0.47
MUT	238	104.62	0.60	0	105.22	0.44

**Figure 12** presents the trend in the values of the two normalized indicators (**per capita research publication output** and the **weighted per capita research output** of the past 19 years. The results clearly show that the higher education sector has continued to improve its research performance consistently over this period. SA universities have more than doubled both their average publication and research output from 2005 to 2023. The only cautionary note refers to the decline for the most recent year (as pointed out below). It remains to be seen if this is an exception to the ‘rule’ or the beginning of a declining trend that requires action.



**Figure 6: Trend in Per Capita Publications Output and Weighted Research and Normalized Weighted Research Output 2005 – 2023**

### 6.3. Proportion of academic staff with doctorates

The proportion of academic staff with doctorates is generally used as a proxy for the ‘quality’ of academic staff. It is also an indicator which correlates strongly with the research publication output of a university. Over the years it has been shown that universities with a higher proportion of academics with doctoral degrees are typically more research-active than other institutions with a smaller percentage of doctorate staff.

**Table 12** presents the data of permanently employed academics by their highest qualifications in the reporting year of 2023 (The percentage of staff with a doctorate as the highest qualification per university is arranged in descending order from highest to lowest). The average number of academics with a doctorate as the highest qualification in the sector in 2023 was 53.8%, a slight increase from 52.4% in 2022.

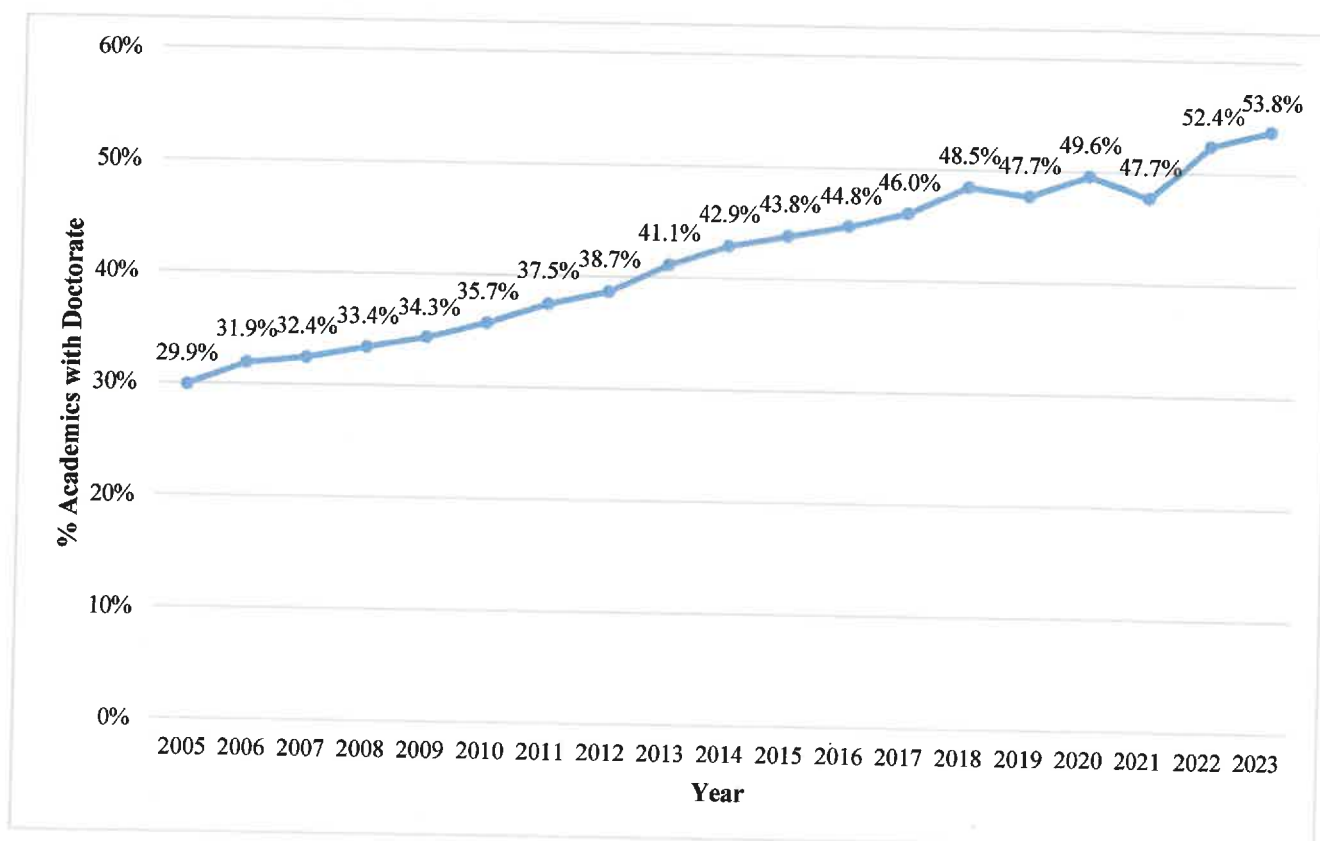
**Table 12: Number of permanently employed academics by highest qualification, 2023**

Institution	Total Instructional/ Research Staff	Academics with Doctorate as Highest Qualifications		Weighted Research Output Units
		Headcount	% of Institutional Total Academics	
UP	1275	953	74.75%	4479.19
WITS	1295	907	70.04%	3936.69
SPU	142	95	66.90%	69.34
SU	1313	860	65.50%	3959.89
RU	369	234	63.41%	1039.03
UCT	1178	738	62.65%	3126.76
UWC	715	447	62.52%	1453.36
UKZN	1169	730	62.45%	3993.11
UNISA	1858	1128	60.71%	3353.63
UFS	890	530	59.55%	2334.36
UJ	1359	806	59.31%	4901.50
NWU	1692	971	57.39%	3133.28
<b>Sector Average</b>			<b>53.78%</b>	
UFH	309	156	50.49%	432.91
UNIZULU	329	164	49.85%	603.90
UMP	194	94	48.45%	101.14
NMU	723	338	46.75%	999.59
UNIVEN	485	225	46.39%	539.42
CUT	321	137	42.68%	314.93
UL	702	276	39.32%	896.43
TUT	855	334	39.06%	976.77
DUT	678	250	36.87%	1004.90
CPUT	847	292	34.47%	598.31
WSU	902	257	28.49%	427.80
MUT	238	62	26.05%	105.22
SMU	777	201	25.87%	429.46

Institution	Total Instructional/ Research Staff	Academics with Doctorate as Highest Qualifications		Weighted Research Output Units
		Headcount	% of Institutional Total Academics	
VUT	331	79	23.87%	269.75
<b>Total or Average</b>	<b>20946</b>	<b>11264</b>	<b>53.78%</b>	<b>43480.66</b>

As shown in **Table 12**, twelve universities (UP, WITS, SPU, SU, RU, UCT, UWC, UKZN, UNISA, UFS, UJ, NWU) recorded an above-sector average number of academics with a doctorate as the highest qualification.

**Figure 13** presents the time series data of academics with a doctorate as the highest qualification in the sector for the period 2005 to 2023. The overall trend has been a consistent, linear increase in the percentage of staff with doctoral degrees from only about 30% of all staff in possession of a PhD in 2005 to the latest percentage of nearly 54%. The ‘dip’ in 2021 can be due to many factors: natural retirement cycles, appointments of staff without doctorates replacing doctorate staff, and so on. More analysis of this trend is currently being conducted in the PQFP.



**Figure 13: Trend in percentage of staff with doctorate degrees from 2005 to 2023.**

#### 6.4. Ratio of doctoral graduates to academics with a doctorate

The final indicator we report on is an indicator of research productivity and specifically the production of highly-skilled and doctoral graduates. The ratio of doctoral graduates to academics with a doctoral degree as the highest qualification is calculated as the number of registered doctoral candidates to academics with a doctoral degree as the highest qualification at a university. **Table 13** shows that the sector average of academics with doctorate and doctoral candidates in 2023 was 0.324.

**Table 13** presents an analysis of the ratio of doctoral graduates per permanent doctorated academic by university. In 2023, twelve universities recorded values above the national average, up from only eight universities in 2022.

**Table 13: Ratio of doctoral graduates to doctorate staff member by university (2023)**

Institution	Number of academics with Doctorate	Number of Doctoral graduates	Ratio
UKZN	730	369	0.505
UNIZULU	164	80	0.488
RU	234	109	0.466
UP	953	424	0.445
SU	860	316	0.367
WITS	907	328	0.362
UFS	530	189	0.357
UJ	806	281	0.349
UCT	738	247	0.335
DUT	250	83	0.332
UWC	447	146	0.327
UNISA	1128	366	0.324
<b>Sector Average</b>			<b>0.324</b>
UNIVEN	225	72	0.320
NWU	971	277	0.285
NMU	338	93	0.275
UFH	156	36	0.231
TUT	334	72	0.216
CUT	137	24	0.175
VUT	79	11	0.139
CPUT	292	39	0.134
UL	276	34	0.123
SMU	201	13	0.065
WSU	257	11	0.043

MUT	62	0	0.000
SPU	95	0	0.000
UMP	94	0	0.000

The ratio of doctoral graduates to academics with doctorates as the highest qualification can be used as a proxy for 'supervisory carrying load'. The ratio refers to the number of doctoral candidates per supervisor per academic year. However, the ratio used above does not provide an accurate overview of the **supervisory carrying load** as it excludes research masters graduates. The simple ratio as applied above only factors headcount graduates and not the units. The use of units is much more accurate, particularly in the case of doctoral graduates which are weighed by a factor of 3, which is based on the assumption that the supervision of doctoral candidates utilises relatively more resources. Therefore, a relatively accurate formula would include research masters and make use of units rather than the actual number of graduates (which does not distinguish between masters and doctoral graduates). **Table 14** combines all the above elements and presents the supervisory carrying capacity per institution in 2023.

**Table 14: Supervisory load per doctorate academic staff by university (2023)**

Institution	Research Graduates Output Units			Academics with Doctorate as Highest Qualifications		Supervisory Capacity = Ratio (C/D)
	Masters units (A)	Weighted Doctoral units (B)	Total M+D units (C)	Headcount (D)	% of Institutional Total Academics	
UP	1151.17	1272.00	2423.17	953	74.7%	2.54
RU	204.1	327.00	531.10	234	63.4%	2.27
UKZN	541.708	1107.00	1648.71	730	62.4%	2.26
SU	977.143	948.00	1925.14	860	65.5%	2.24
UNIZULU	117.053	240.00	357.05	164	49.8%	2.18
WITS	982.965	984.00	1966.97	907	70.0%	2.17
UJ	863.45	843.00	1706.45	806	59.3%	2.12
UCT	772.122	741.00	1513.12	738	62.6%	2.05
UFS	402	567.00	969.00	530	59.6%	1.83
<b>Sector Average</b>						<b>1.75</b>
DUT	180.5	249.00	429.50	250	36.9%	1.72
UWC	325	438.00	763.00	447	62.5%	1.71
TUT	299.248	216.00	515.25	334	39.1%	1.54
NMU	203.683	279.00	482.68	338	46.7%	1.43
NWU	547.523	831.00	1378.52	971	57.4%	1.42
UNISA	448.446	1098.00	1546.45	1128	60.7%	1.37

Institution	Research Graduates Output Units			Academics with Doctorate as Highest Qualifications		Supervisory Capacity = Ratio (C/D)
	Masters units (A)	Weighted Doctoral units (B)	Total M+D units (C)	Headcount (D)	% of Institutional Total Academics	
UNIVEN	67	216.00	283.00	225	46.4%	1.26
UL	206.255	102.00	308.26	276	39.3%	1.12
UFH	57.05	108.00	165.05	156	50.5%	1.06
VUT	45	33.00	78.00	79	23.9%	0.99
CPUT	169.167	117.00	286.17	292	34.5%	0.98
CUT	61	72.00	133.00	137	42.7%	0.97
SMU	106.3	39.00	145.30	201	25.9%	0.72
WSU	73.542	33.00	106.54	257	28.5%	0.41
UMP	36	0.00	36.00	94	48.5%	0.38
SPU	5	0.00	5.00	95	66.9%	0.05
MUT	0.6	0.00	0.60	62	26.1%	0.01
<b>Total</b>	<b>8843.03</b>	<b>10860.00</b>	<b>19703.03</b>	<b>11264.00</b>	<b>53.8%</b>	<b>1.75</b>

## 7. DEMOGRAPHIC TRENDS

### 7.1. Publication outputs by gender of author

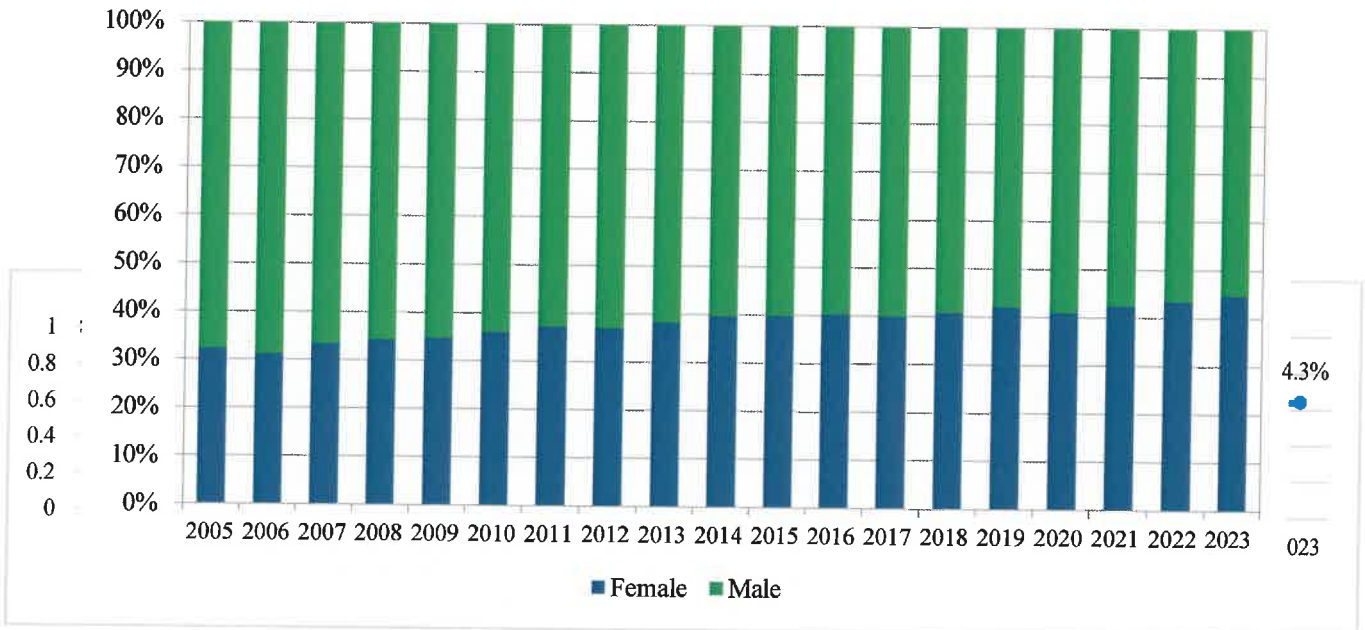
The Department gathers demographic information of all authors to monitor the national trends in the interest of the transformation of higher education in South Africa. Such information is required to assist the Department as well as the individual universities to do better planning and policy development.

There has been a relative improvement in the quality and reliability of the data since the Department began gathering biographical data about eight years ago.

**Figure 14** presents the trend by gender in the contribution to the overall publication outputs of the sector since 2005. The figure shows that the contribution of female academics grew to about 44.6% in 2023. As had been noted before, the growth of publications published by women must be read against the background that there have been more female enrolments in the sector for the past two decades. The percentage of women academics (permanent staff) at SA universities

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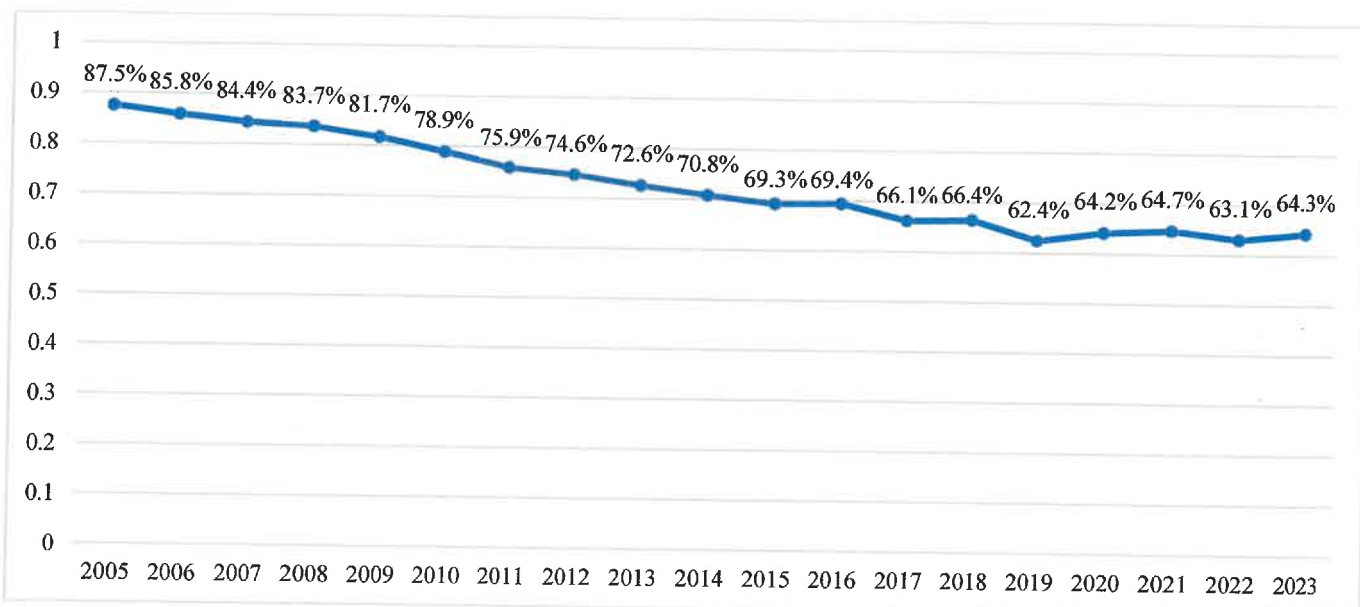
percentage of women academics (permanent instructional and research staff) in 2022 was 55% which indicates that there is still some way to go for female-authored publications to be representative of the academic population.



**Figure 14: Gender of authors of journal articles: 2005 - 2023**

### 7.2. Publication outputs by country of birth of the author

The focus of this demographic indicator is on establishing trends in the contributions of South African academics (SA, naturalised citizens and permanent residents) in comparison to the contribution of non-South Africans employed at SA universities. The trend exhibited in **Figure 15** shows a decreasing contribution by SA nationals to overall sector output, from 87.5% in 2005 to around 62% in 2018 after which it increased and stabilized at around 64%. The main conclusion to be drawn from these trends is the fact that South African universities over time increasingly relied on non-South African nationals (both those who are appointed on a temporary basis at the universities, as well as foreign post-doctoral fellows and visiting research fellows and associates for its research publication output. The obvious contributions made by non-South African nationals are to be applauded, but at the same time the trend re-affirms the imperative that we grow and nurture our own ‘timber’.



**Figure 15: Percentage of authorships produced by South African nationals: 2005 to 2023**

### 7.3. Publication outputs by race of author

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

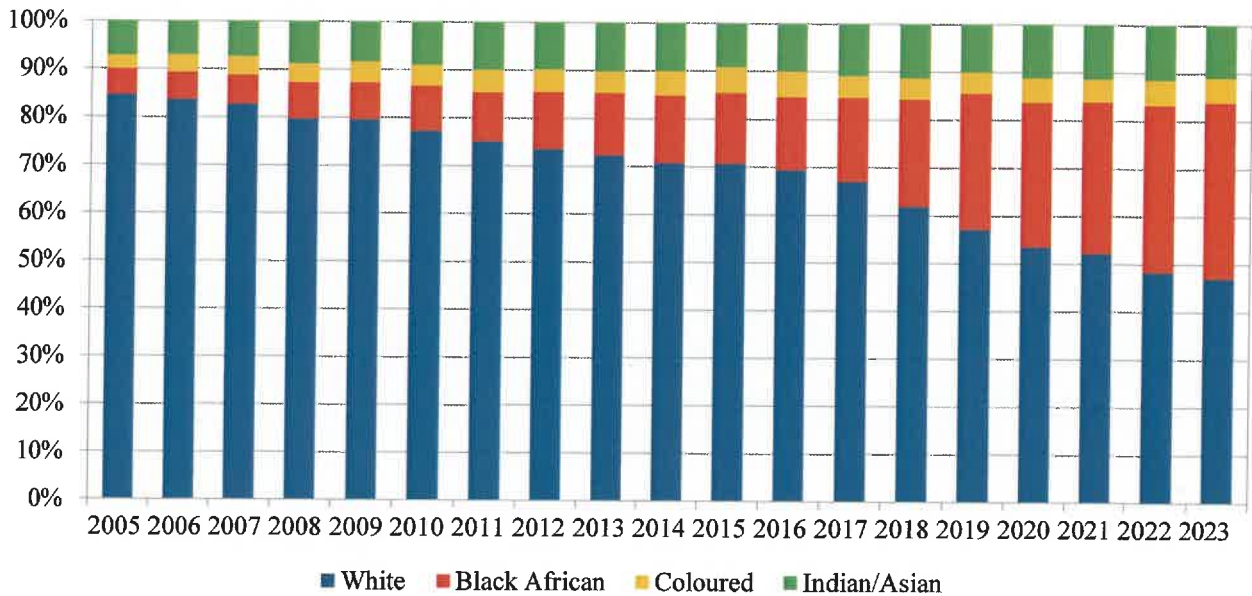
All universities are required to provide data to enable the Department to interpret transformation patterns and trends in knowledge production at universities. The reliability and quality of the data on the demographics of the claiming authors, however, must still be improved.

**Table 15: Trend in race of authors 2005 to 2023**

Race of author	2005	2010	2015	2020	2023
Black African	5,3%	9,4%	14,8%	30,3%	36,8%
Coloured	2,9%	4,5%	5,5%	5,2%	5,3%
Indian/Asian	7,2%	8,9%	9,1%	11,8%	11,0%
White	84,6%	77,2%	70,7%	53,4%	47,0%

**Figure 16** below presents a trend in the relative contribution by each of the ‘race groups’ to overall publication output between 2005 and 2023. The trend shows the gradual increase of the publication contribution by Black (African, Coloured and Indian/Asian) academics to the sector’s knowledge production. The contribution by black academics surpassed 50% of the overall contributions for the first time in 2022, having increased from 15% in 2005 to 53% in 2023. Again, it is worth comparing this proportion with the percentage of Black academics at SA universities. In 2022, they constituted 62% of the permanent research and instructional staff. As is the case with the gender distribution, it

shows that the publication output – despite a steady and strong increase in proportional contribution – is not yet representation of all academics.

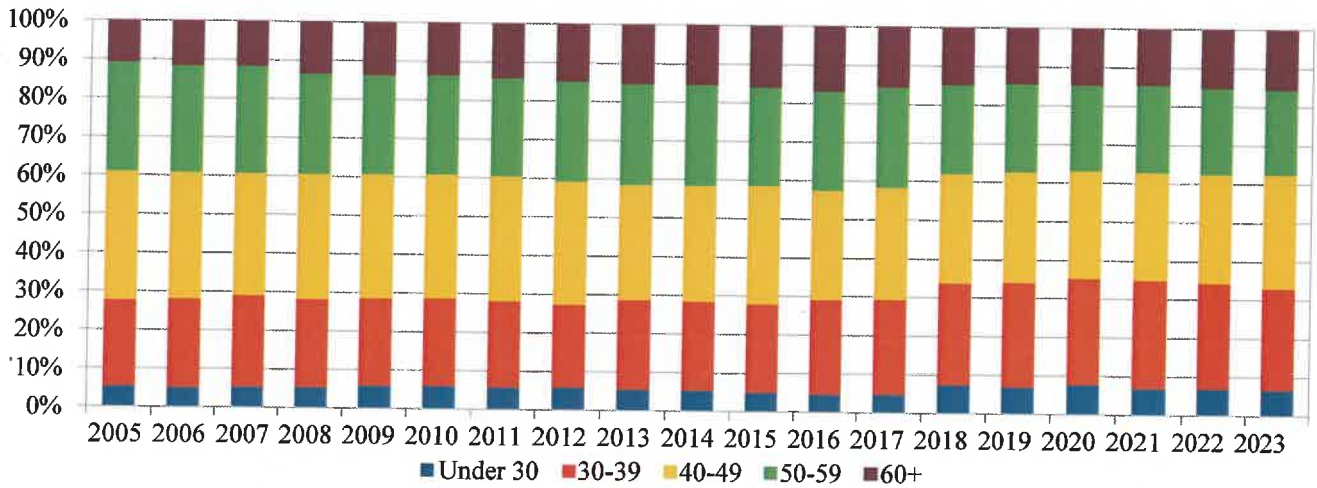


**Figure 16: Percentage of authors by race (SA nationals only) between 2005 and 2023**

#### 7.4. Publication outputs by age of author

**Figure 17** shows the shifts in time of the age of authors (age at date of publication recoded into age intervals) for all the publications from 2005 to 2023. This graph aims to illustrate shifts in the average ages of actively publishing academics. This information is important when considering the imperative to build the next generation of academics in South Africa. This means that it is important to follow the relative contributions of younger academics over time (under the age of 30 as well as between 30 and 39). At the same time, the contributions made by older generations should not be ignored or discarded. The older generations may be contributing more than this report can measure, especially regarding the mentoring of the younger generations.

The general trend shows an increase over time of younger academics: under the age of 30: the percentage increased from 5,3% in 2005 to 7,6% in 2020 and then slightly decreased to 6.5% in 2023. A commensurate increase for the group in the age interval between 30 and 39 is evident: from 22.2% in 2005 to 26.3% in 2023. The combined increase in the youngest age groups ('emerging scholars) means that they produced about one third of all publications. It is, therefore, perhaps not surprising that the contribution of more established academics in the age interval between 40 and 49% recorded a decline from 33,5% in 2005 to 29.6% in 2023. Having said this, it is interesting to note that the relative contribution of academics over the age of 60 increased from 10.8% in 2005 to 15.6% in 2023 which is probably explained by the fact that increasing numbers of universities attempt to retain their productive senior staff after retirement.



**Figure 17: Trend in age of authors 2005 to 2023**

**Table 16: Trend in age of authors 2005 to 2023**

Year	under 30	30 to 39	40 to 49	50 to 59	60+
2005	5.27%	22.23%	33.49%	28.17%	10.83%
2006	5.04%	22.89%	32.93%	27.45%	11.69%
2007	5.22%	23.63%	31.78%	27.70%	11.66%
2008	5.24%	22.79%	32.54%	25.93%	13.49%
2009	5.80%	22.56%	32.33%	25.54%	13.77%
2010	5.84%	22.68%	32.24%	25.61%	13.62%
2011	5.72%	22.33%	32.33%	25.49%	14.12%
2012	5.79%	21.42%	31.97%	25.95%	14.87%
2013	5.35%	23.17%	30.02%	26.07%	15.39%
2014	5.24%	23.06%	30.14%	26.11%	15.46%
2015	4.87%	22.93%	30.69%	25.54%	15.98%
2016	4.51%	24.51%	28.42%	25.69%	16.87%
2017	4.72%	24.44%	29.17%	25.95%	15.73%
2018	7.25%	26.32%	28.52%	23.02%	14.89%
2019	6.89%	27.02%	28.73%	22.83%	14.54%
2020	7.63%	27.42%	27.99%	22.23%	14.73%
2021	6.79%	27.95%	28.11%	22.56%	14.59%
2022	6.74%	27.31%	28.40%	22.22%	15.32%
2023	6.53%	26.33%	29.58%	22.01%	15.56%

## 8. GENERAL OBSERVATIONS AND CONCLUSIONS

The report shows again that the continued increase in the research publication outputs for the past 19 years is partly a result of the positive impact of the Research Outputs Policy. A correlation between the policy and the performance of the sector has been drawn by some analysts. The Department continues to strive for a better quality and efficient system of processing research publication outputs. The continuous efforts to improve the policy and the processing of the research outputs are meant to facilitate a positive impact on the research productivity of the higher education sector and, most importantly, improve quality in the entire pipeline. Moreover, the Department hopes that its regular improvements to the policy and the system of processing research outputs are replicated at the institutional level so that there is synergy and a common purpose in the higher education sector.

The Department, however, is aware of the existence and even increase in forms of unethical practices in the publication of research outputs. As recommended in the policy, institutional research integrity committees together with the research offices are urged to put more effort into weeding out unethical practices in research publications and claiming of subsidy. Such practices are better dealt with at the institutional level rather than the Departmental level. The Department has therefore subsequently decided to support the funding of a national collaborative research project (the Publication Quality Framework Project) to investigate these issues in order to ensure that the quality and integrity of university research publications are maintained. However, this does not stop institutions from taking institution-specific initiatives to deal decisively with unethical practices in research publications.

The claims that were identified to be unethical were, once again, identified from the 2023 submissions. Institutional reports provide further detail in this regard. The Department extends an invitation for dialogues with the affected individual institutions. In this regard, it is also worth reminding institutions that the Department reserves the right to withhold payment of research output subsidy in respect of claims that do not meet the criteria as outlined in the research output policy and where the Department has found evidence of unethical conduct relating to the claims.

Research subsidy to the sector is an important component of government funding to the higher education sector. It is upon the sector to guard this resource by whatever means possible and to make sure that it is not open to abuse and unethical practices. The end goal must be that it remains sustainable and provides sustained impetus to research productivity in the higher education sector. By this report, the Department hopes that it provides a complete mirror of research performance by the sector, albeit being reliant on proxies. It is hoped that the universities find it useful in many respects.

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