



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

**Report on public funding for research,
science and technology
2011/12**

Table of contents

	Page
1. EXECUTIVE SUMMARY	3
2. PURPOSE OF THE REPORT	5
3. KEY FINDINGS	7
4. GOVERNMENT FUNDING FOR THE SCIENCE COUNCILS	13
ANNEXURE 1: SUMMARY OF RST EXPENDITURE 2011/12	17
ANNEXURE 2: A NOTE ON METHODOLOGY	18
NOTES	25
CONTACT INFORMATION	26

List of tables and figures

Table 1: RST expenditure in relation to annual government budget.....	8
Table 2: Expenditure on RST by national government departments	9
Table 3: RST expenditure by accounting expenditure items for 2010/11.....	12
Table 4: National government funding for science council (Parliamentary grant).....	13
Figure 1: Overall government expenditure on RST	7
Figure 2: Parliamentary grant funding to science councils	13

1. EXECUTIVE SUMMARY

The 2011/12 report on publicly funded research, science and technology (RST) provides government and other stakeholders with a holistic and forward looking view of public spending on science and technology (S&T). Information contained in this report is directly obtained from national government departments that either perform or have a budgetary allocation to fund RST.

The report is informed by the Strategic Management Model for the Public Science and Technology System, adopted by Cabinet in 2004. The strategic management model gave effect to recommendations made in 1996 White Paper on Science and Technology and the 2002 National Research and Development Strategy. The strategic management model allocates responsibility for RST across a range of government departments based on the nature of the activities. In addition, the strategic management model enabled sector-focused science councils to report to the relevant line department.

The key findings of the 2011/12 report are as follows:

- The 25 national government departments surveyed invested R26.0 billion towards RST in the 2011/12 financial year. This investment represents 2,9% of the total national government budget appropriation for the same year. Over the previous four years starting in 2008/09, expenditure as a proportion of overall government budget has stagnated at 2,8% and 2,9%.
- Actual expenditure on RST has been growing steadily over the years, in line with overall growth in the budget. The data indicates a compounded annual growth rate (CAGR) over the last four years of 9.05% from R18,4 billion in 2008/09 to R26 billion in 2011/12. Over the next three years, expenditure will increase to R29,4 billion by 2014/15, a lower CAGR of 3,1% when compared to the previous four years.
- The bulk of the expenditure (R23,7 billion or 91,4% of the total in 2011/12) was deployed by national departments as transfers and subsidies to departmental agencies, public corporations and non-profit organisations.
- A further breakdown indicates that about 41,8% (R9,9 billion) of the transfers and subsidies was deployed at universities and universities of technology, followed by

departmental agencies which accounted for 40,4% (R9,6 billion). The remaining 18% is used by provinces and municipalities, foreign governments and international organisations, public corporations and private enterprises, not-for-profit institutions, and households.

The findings highlight a number of critical policy issues that need to be addressed.

Firstly, the need to consider whether the level of public investment on RST, which has stagnated at about 2,9% of the national budget over the past few years and will continue to remain at these levels over the Medium Term Expenditure Framework (MTEF), is adequate in supporting South Africa's long-term development goals.

Secondly, public funding for RST is an important driver for a country's overall level of investment in research and development (R&D). What are the opportunities for using public funding more strategically to unlock other sources of funding?

Thirdly, government departments have not sufficiently prioritised RST. Scientific and technological developments provide both challenges and opportunities for departments in the delivery of their mandates. However, several government departments still do not have strategies for responding to these developments or for funding R&D requirements. Where approved strategies exist, these are not adequately funded.

Fourthly, there continue to be challenges regarding the effective deployment of public funding and to minimise fragmentation. Efforts to facilitate greater coordination have started with the establishment of a functional group, which has been operating for the past two MTEF cycles. This report can provide a basis for improved coordination arrangements to facilitate priority setting and the optimal deployment of government funding for RST.

Finally, during the preparation of this report as well as previous reports on publicly funded RST, gaps were identified with regards to the data collection instrument. Estimates of

National Expenditure do not indicate what is being allocated for S&T. This makes it difficult to monitor and evaluate the use and the impacts of the investments in RST.

2. PURPOSE OF THE REPORT

The 2011/12 report on publicly funded RST provides government and other stakeholders with a holistic and forward-looking view of public investment on S&T. It monitors actual expenditure as well as projected budget allocations (over the MTEF) by government towards RST. Its purpose is –

- to enable regular evaluation of the level of public investment into the S&T system;
- to support planning and coordination of public funding for S&T by various parts of government;
- to support decision making with respect to resource deployment in key priority areas for S&T investment, where government can maximise socio-economic outcomes.

This report was prepared in line with the Strategic Management Model for the Public Science and Technology System in South Africa, adopted by Cabinet in 2004. The Strategic Management Model gave effect to recommendations made in 1996 White Paper on Science and Technology and the 2002 National Research and Development Strategy.

The Strategic Management Model allocates responsibility for RST across a range of range of government departments based on the nature of the activities. In addition, the Strategic Management Model enabled sector-focused science councils to report to the relevant line department. In terms of the Strategic Management Model, the Department of Science and Technology (DST) was required to develop a national S&T expenditure plan.

The statistics presented in this report are different to statistics obtained through the more familiar annual national survey of research and experimental development (the R&D survey) in three respects.

Firstly, statistics in this report include investments in all RST activities of government, including but not limited to investments in R&D that gets counted in the R&D survey,

Secondly, the statistics in this report provide data from the perspective of a funder. In contrast, the R&D survey collects data from R&D-performing units. In the collection of the data for the R&D survey, respondents indicate the source of the funding that they used for R&D activities only where government is listed as one source.

Finally, this report includes statistics on future investment by government whereas the R&D survey can only provide retrospective statistics.

Since 2007/08, the DST has been collecting data from national government departments that either perform or have a budgetary allocation to fund RST. The data collection process followed the guidelines in the Organisation for Economic Cooperation and Development's 2002 *Frascati Manual: Proposed standard practice for surveys on research and experimental development*. In terms of the guidelines, 25 national departments were identified for the collection of data. The data collected and its presentation in the statistical tables in this report have been discussed with all participating departments to validate the accuracy of the information.

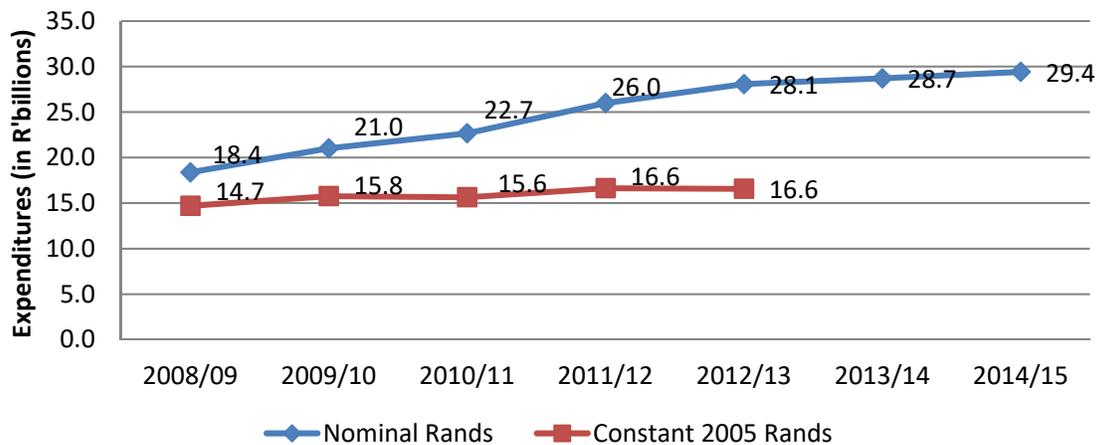
3. KEY FINDINGS

3.1 Overall government expenditure on RST

Total national government expenditure on RST for the 2011/12 financial year is R26 billion, a nominal increase of 14,7% from the R22,7 million recorded in the 2010/11 survey. Government spending on RST has increased steadily over the last few years, with a compounded annual growth rate (CAGR) of 9,05%, which resulted in expenditure increasing from R18,4 billion in 2008/09 to R26 billion in 2011/12.

The medium term appropriations indicate that this expenditure will increase to R29,4 billion by 2014/15, constituting a CAGR OF 3,1%.

Figure 1: Overall government expenditure on RST (nominal and constant 2005 rands in R billions)



Notwithstanding a CAGR of 9,05% over the past few years, overall government expenditure on RST stagnated between 2,8% and 2,9% of the overall government budget between 2008/09 to 2011/12. This indicates that investment in RST was not prioritised as compared to other expenditure items in the National Budget. Establishing timelines and targets for the percentage share of government expenditure on RST when compared to the overall budget is an important policy issue that requires consideration.

Table 1: RST expenditure in relation to annual government budget

R'000	2008/09	2009/10	2010/11	2011/12
Total expenditure on research, science and technology	18,381,038	21,017,456	22,670,215	25,992,156
Total national government budget	635,953,300	747,196,800	812,143,000	884,792,908
% of total expenditure vs. national budget	2.9	2.8	2.8	2.9

A combined 80,6% (R20,9 billion) of the overall government expenditure in RST in 2011/12 is provided by the Department of Health (which invested R10,4 billion), Department of Police (which invested R4,3 billion), DST (which invested R4 billion) and the Department of Higher Education and Training (which invested R2,2 billion).

As expected, departmental spending on RST activities as a proportion of annual budgets differ between the 25 participating departments. This is understandable given that the mandates of departments require different levels of RST activities. In addition, the proportion of spending reflects responsibilities for the funding of departmental agencies and science councils. The DST spent 91,6% of its 2011/12 budget on RST activities (which included parliamentary grant allocations to the National Research Foundation, the Council for Scientific and Industrial Research, the Human Sciences Research Council, the Technology Innovation Agency, and the South African National Space Agency). Other departments that show high proportions of investment for RST included the Department of Communication (at 50,4%), the Department of Health (at 40,6%, which includes funding for the Medical Research Council), Department of Mineral Resources (at 33,9%, which includes funding for Mintek and the Council for Geoscience), and the Department of Agriculture, Forestry and Fisheries (at 17,1%, which includes funding to the Agricultural Research Council).

Table 2¹: Expenditure on RST by national government departments

Vote R thousands	Outcome			Adjusted	Medium-term expenditure estimate		
	2008/09	'2009/10	'2010/11	Appropriation 2011/12	2012/13	'2013/14	2014/15
CENTRAL GOVERNMENT ADMINISTRATION	695,871	801,255	362,402	114,395	114,207	117,530	124,582
3 Cooperative Governance and Traditional Affairs	3,171	3,355	3,550	10,695	10,407	7,502	7,952
4 Home Affairs	214,700	227,900	107,400	103,700	103,800	110,028	116,630
6 Public Works	478,000	570,000	251,452	-	-	-	-
FINANCIAL AND ADMINISTRATIVE SERVICES	2,165,063	1,981,986	203,065	40,799	43,956	46,841	-
10 Public Enterprises	2,127,000	1,946,280	158,600	-	-	-	-
11 Public Service and Administration	38,063	35,706	44,465	40,799	43,956	46,841	-
SOCIAL SERVICES	7,253,084	8,992,162	11,011,506	12,984,581	14,055,329	16,136,605	15,709,510
13 Arts and Culture	148,637	168,674	124,619	186,649	195,935	205,799	218,147
14 Basic Education	61,230	34,106	-	70,000	100,000	105,500	111,830
15 Health	5,488,316	7,018,530	8,848,975	10,445,279	11,304,383	13,224,367	12,648,000
16 Higher Education and Training	1,521,000	1,738,000	2,003,000	2,232,000	2,403,116	2,546,190	2,673,500
17 Labour	13,400	12,700	10,000	9,241	9,495	10,017	10,618
18 Social Development	2,447	838	1,000	-	-	-	-
19 Sport and Recreation South Africa	18,054	19,314	23,912	41,412	42,400	44,732	47,416
JUSTICE, CRIME PREVENTION AND SECURITY	2,360,186	2,680,825	3,885,525	4,854,189	5,333,612	3,886,276	3,975,550
21 Defence and Military Veterans	313,155	301,033	429,414	500,405	499,052	473,913	468,000
24 Police	2,047,031	2,379,792	3,456,111	4,353,784	4,834,560	3,412,363	3,507,550
ECONOMIC SERVICES AND INFRASTRUCTURE	5,906,834	6,561,228	7,207,717	7,998,192	8,529,278	8,519,245	9,603,866
25 Agriculture, Forestry and Fisheries	549,784	577,788	674,859	804,965	906,547	853,425	900,960
26 Communications	288,757	374,359	181,628	952,823	737,499	916,995	823,798
28 Energy	554,726	564,144	594,110	631,134	604,689	614,669	634,008
29 Environmental Affairs	390,119	386,563	403,604	415,657	437,894	476,816	505,425
30 Human Settlements	-	-	12,340	13,080	13,865	14,697	15,579
31 Mineral Resources	258,507	293,785	365,016	351,361	471,218	532,663	548,728
32 Rural Development and Land Reform	219,752	250,968	341,094	475,762	548,103	451,414	477,703
33 Science and Technology	3,402,984	3,821,112	4,306,627	4,032,690	4,501,912	4,339,809	5,368,623
35 Trade and Industry	154,305	211,997	229,552	218,377	211,871	214,000	218,000
36 Transport	12,349	11,185	11,650	9,597	10,159	10,675	11,316
37 Water Affairs	75,551	69,327	87,237	92,746	85,521	94,082	99,727
TOTAL	18,381,038	21,017,456	22,670,215	25,992,156	28,076,382	28,706,497	29,413,509

The departments within the Social Services Cluster invested R12,9 billion on RST in 2011/12, equivalent to 50% of total expenditure. This is followed by the Economic Services and Infrastructure Cluster with 30,8% (R8 billion), the Justice and Protection Services Cluster with 18,7% (R4,9 billion), the Central Government and Administration Cluster with 0,4% (R114 million), and the Financial and Administrative Services Cluster with 0,2% (R41 million).

1 In Table 2, the sign (-) represent a zero, indicating that there were no amounts allocated to RST, e.g. in the case of the Department of Public Enterprises – the Pebble Bed Modular Reactor project has been completed. In the case of the Department of Human Settlements, the department did not have projects related to RST before 2010/11.

(a) Main categories of expenditure on RST

There are three main categories of expenditure on RST. These are Government Budget Appropriation or Outlays on R&D (GBAORD), scientific and technological services (STS) and scientific and technical education and training (STET). The categories have been adopted from the guidelines in the Frascati Manual and customised to the South African environment with the assistance from United Nations Educational Scientific and Cultural Organisation (UNESCO).

GBAORD accounts for 51,2% (R13,3 billion) of the overall government expenditure on RST. This is followed by STS with 37,8% (R9,8 billion) and STET with 11% (R2,9 billion). GBAORD covers all appropriations allocated to R&D and innovation in national government, and includes government-financed R&D and innovation carried out in government entities, as well as business enterprises, higher education and private non-profit sectors.

The statistics for government-funded R&D in this survey do not reconcile with the statistics for the government share of R&D funding reported in the R&D survey. According to the R&D survey, the total investment from government that was reported for the 2010/11 financial year was R9 billion. In contrast, the statistics generated for this report for the same year indicates an investment of R15 billion.

The generation of the statistics reflected in this report is relatively new and no clear explanation has been formulated for the differences in the statistics. Resolving this difference will require further analysis of the statistics generated by both the surveys, as well as a deeper reflection on the methodologies and an assessment of the different methodologies used in generating the two statistics. Over the next year or two this analysis will be undertaken and future reports for the survey on government investment in RST will include the outcomes of the analysis.

Expenditure on STS accounts for 37,8% (R9,8 billion) and includes all activities that are largely concerned with the application of scientific and technical knowledge, such as patenting, geological surveys, standards generation, and the operation of libraries and national scientific databases.

The category of STET accounts for 11% (R2,9 billion) of RST expenditure. This covers activities such as specialised non-university higher education and training, higher education and training leading to a university degree, postgraduate and further training, and organised life-long training for scientists, engineers and technologists.

Box 1: Examples of support for Scientific and Technology Education and Training

The DST has spent R1,3 billion on human capital development initiatives related to RST in 2011/12. This is projected to increase to R1,8 billion by 2014/15. The DST human capital initiatives include funding for bursaries and fellowships, research infrastructure and research grants.

The Department of Higher Education and Training has also spent a substantial amount of money on human capital development for science, engineering and technology students.

(b) Transfers and subsidies

The government expenditure on RST is also categorised in terms of the accounting categories for which it is used, namely current payments, transfers and subsidies, and payments for capital assets.

Table 3 shows that R23,7 billion (or 91,4% of the total) was disbursed by national departments as transfers and subsidies towards activities performed by departmental agencies, public corporations and non-profit organisations. These institutions perform research and scientific work on behalf of government departments. The respective amounts of R1,3 billion and R971 million for "payments to capital assets" and "current payments" represent an undercount, as part of those expenditures are included in the transfers and subsidies made to the departmental agencies and public corporations. A proper account of the amounts spent on these items is not possible in this report.

Table 3: RST expenditure by accounting expenditure items for 2010/11

<i>Economic Classification (R' 000)</i>	<i>GBAORD</i>	<i>STET</i>	<i>STS</i>	<i>TOTALS</i>	<i>% to totals</i>
Current payments					
Sub-total: current payments	212,294	43,972	715,035	971,301	3.74%
Payment for capital assets					
Sub-total: capital assets	21,196	-	1,253,914	1,275,110	4.91%
Transfer and subsidies					
Provinces and municipalities	0	2,047,310	590,385	2,637,695	11.11%
Departmental agencies and accounts	4,293,253	627,565	4,683,084	9,603,902	40.44%
Universities and universities of technology	7,492,962	8,669	2,431,137	9,932,768	41.83%
Foreign governments and international organisations	59,789	0	1,780	61,569	0.26%
Public corporations and private enterprises	967,817	0	119,646	1,087,463	4.58%
Non-profit institutions	266,164	128,867	27,182	422,213	1.78%
Households	0	0	135	135	0.00%
Sub-total: transfer and subsidies	13,079,985	2,812,411	7,853,349	23,745,745	91.36%
Totals	13,313,475	2,856,383	9,822,298	25,992,156	

About 41,8% (R9,9 billion) of transfers and subsidies in 2010/11 was made to universities and universities of technology. Of that amount, R7,5 billion was towards the comprehensive HIV and Aids research grant from the Department of Health.

The category for departmental agencies and accounts received the second largest allocation, with 40,4% (R9,6 billion). The category of departmental agencies includes funding allocations to the science councils and other public research organisations. These organisations perform a wide range of activities including basic and applied research, as well as experimental or technology development. Further details on funding for science councils are presented further on in this report.

The transfers to provinces and municipalities received the third largest allocation of 11,1% (R2,6 billion). The Department of Health indicated that it had transferred about R2 billion of this amount to provinces to fund a conditional grant for the training of health professionals. The expenditure for other categories can be viewed in Table 3, namely, foreign governments, international organisations, public corporations, private enterprises, non-profit institutions and households.

4. GOVERNMENT FUNDING FOR THE SCIENCE COUNCILS

This section presents information of government funding for the various science councils by means of parliamentary grants, and these funds are used to finance the research mandate of the science councils, including the running costs of the institutions.

Table 4: National government funding for science council (Parliamentary grant)²

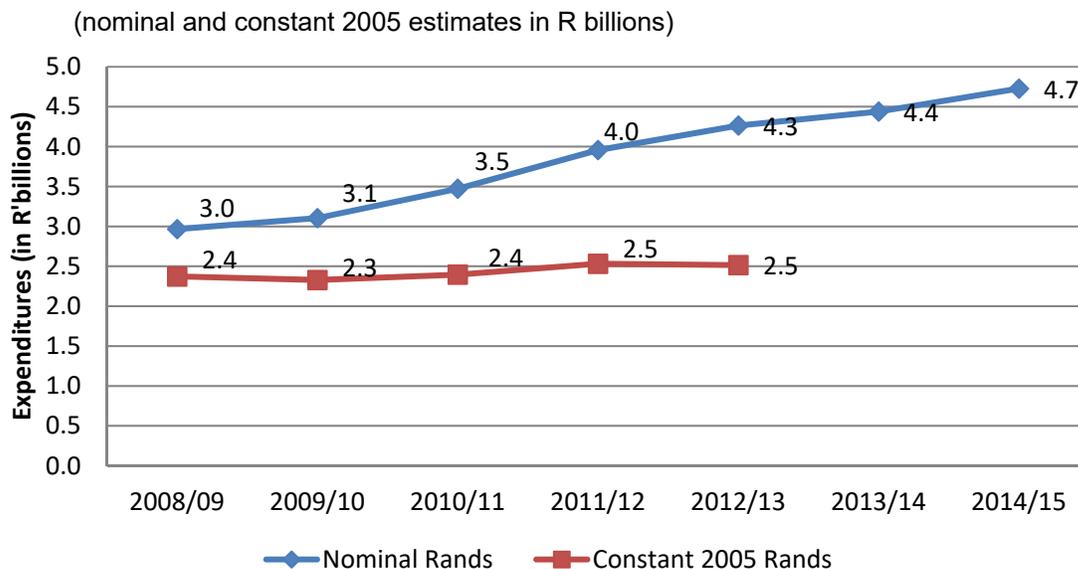
Financial Year	Agricultural Research Council	Council for Scientific and Industrial Research	Human Science Research Councils	National Research Foundation	Medical Research Council	Council for Geoscience	Council for Mineral Technology	South African Nuclear Energy corporation	Total
1997/98	354,321	336,255	98,773	185,472	70,587	66,962	87,574	473,772	1,673,716
1998/99	302,556	325,469	96,465	214,677	78,472	67,262	85,846	287,626	1,458,373
1999/00	281,231	315,649	64,419	251,170	79,566	63,794	81,773	249,814	1,387,416
2000/01	268,378	301,112	61,452	272,844	108,661	60,856	78,007	200,245	1,351,555
2001/02	271,246	302,877	65,492	333,093	127,221	65,945	76,872	180,256	1,423,002
2002/03	275,052	295,751	65,087	367,609	145,498	66,384	76,410	424,947	1,716,738
2003/04	309,013	323,014	70,030	411,080	163,195	72,019	82,439	161,190	1,591,980
2004/05	312,742	348,326	83,336	450,288	167,892	77,606	88,632	179,901	1,708,723
2005/06	341,300	431,600	104,300	516,900	179,300	86,100	108,900	256,800	2,025,200
2006/07	465,700	483,194	121,473	596,671	212,110	124,199	118,664	356,353	2,478,364
2007/08	488,499	517,352	155,949	657,699	223,290	145,511	124,569	388,256	2,701,125
2008/09	514,556	554,687	163,851	683,420	236,509	122,672	135,835	554,726	2,966,256
2009/10	537,153	599,384	166,185	692,131	251,531	132,677	161,108	564,144	3,104,313
2010/11	622,266	685,784	194,293	749,142	281,109	169,176	195,840	574,110	3,471,720
2011/12	755,510	687,169	206,169	1,099,035	271,205	154,405	196,956	586,034	3,956,483
2012/13	935,475	737,491	214,177	1,070,810	279,690	221,150	250,068	554,579	4,263,440
2013/14	931,691	770,460	223,630	1,114,300	302,574	260,668	271,975	564,325	4,439,623
2014/15	1,044,217	810,244	238,523	1,184,867	318,243	291,708	257,020	582,323	4,727,145
Total	9,010,906	8,825,818	2,393,604	10,851,208	3,496,653	2,249,094	2,478,488	7,139,401	46,445,172

The national government parliamentary grant funding for the science councils was R3,9 billion in 2011/12. This constituted 15,2% of the R26 billion of total government investment on RST.

Figure 3 below shows that the funding for science councils had increased from R3,4 billion to R3,9 billion from 2010/11 to 2011/12, which is a nominal increase of 13,9%, but has remained static in constant 2005 rands. The figure is projected to grow to R4,7 billion by 2014/15.

Figure 2: Parliamentary grant funding to science councils

² For the purposes of analysis there are other research institutions (Africa Institute of South Africa, South African National Development Institution, South African Energy Development Institution, National Health Laboratory, Marine Coastal Management, Natal Museum and National Museum).



For the period from 1997/98 to 2014/15, the allocations show a CAGR of 7,47%³. This rate of growth is on par with the increase in overall government funding for RST. The level of funding may have to be scaled up for these institutions to achieve a level of organic growth and support a greater level of contribution that they can make in support of national development goals.

5. CONCLUSION

It is important to have the correct estimation of the quantum of the government investment in support of RST. This has guided the DST since it started producing report on public investment in RST since 2008/09. An analysis of the level of government investment in this area helps to evaluate whether scientific and technological activities are adequately prioritised within the national funding allocations as a key input to achieve

Box 2: Science council funding

It has been noted that the parliamentary grant funding for the science councils ranges from 30% to 50% of the total income of the science councils. Science councils also get income from government contract funding as well as private sector and international funding. Government needs to review the science councils' investment models, as they have an impact in terms of government driving the research agenda for public research institutions to deliver on national priorities.

³ CAGR (7,47%) measures the growth rate of science council investment from 2008/09 to 2011/12, and the 15,2% measures the percentage of science council investment on the overall expenditure of RST for 2011/12.

a range of national ambitions. To have a proper estimation of government investment in this area, all government departments should be covered in the survey, and all relevant expenditure items and key projects should be identified. So far, this aspect has been addressed, and aggregated national data are provided through this report.

Equally important is the need to understand the overall orientation of the expenditure in order to evaluate whether the available resources have been allocated to key national priorities for RST. The work on the analysis of the expenditures with regards to the nomenclature on socio-economic objectives has not yet yielded good results. This was because insufficient information could be collected from the departments at this point. Further work will be conducted and will give clear indications on the purpose or priorities of national government departments in relation to S&T.

At the same time, government should also look at how it can ensure that the limited resources that are currently available are allocated efficiently, given the current fiscal pressures. The DST and the National Treasury are jointly looking at ways of streamlining the allocation of funding for science, technology and innovation, through an S&T functional group as a mechanism to support funding allocation decisions in the MTEF process. The information presented through this report should directly impact on decisions about future funding, namely, at the S&T functional group, Medium Term Expenditure Committee and relevant Cabinet-level discussions.

The DST's strategy to increase R&D investment in South Africa (currently being finalised) recommends that South Africa should maintain annual increases in R&D investment of 11%, or increases that are higher than the nominal increase in the GDP for at least six years for the country to support its growth and development objectives. Various players have been identified to contribute to these investments, including government, business, state-owned entities and foreign sources. Government is expected to contribute at least 50% of the total expenditure. To achieve this goal, government will have to have a systematic and a well-coordinated planning approach. Information in this report should be able to assist government in its planning.

ANNEXURE 1: SUMMARY OF RST EXPENDITURE 2011/12

Cluster	Department	Investment in RST (Rm)	Contribution to total
Central Government and Administration	Cooperative Governance and Traditional Affairs	11	0,04
	Home Affairs	104	0,40
Financial and Administrative Services	Public Service and Administration	41	0,16
Social Services	Arts and Culture	187	0,72
	Basic Education	70	0,27
	Health	10 445	40,19
	Higher Education and Training	2, 232	8,59
	Labour	9	0,04
	Sports and Recreation South Africa	41	0,02
Justice and Protection Services	Defence and Military Veterans	500	1,93
	Police	4 353	16,75
Economic Services and Infrastructure	Agriculture, Forestry and Fisheries	805	3,10
	Communication	953	3,67
	Energy	631	2,43
	Environmental Affairs	416	1,6
	Human Settlements	13	0,05
	Mineral Resources	351	1,35
	Rural Development and Land Reform	476	1,83
	Science and Technology	4,033	15,5
	Trade and Industry	218	0,84
	Transport	10	0,00
	Water Affairs	93	0,36

ANNEXURE 2: A NOTE ON METHODOLOGY

1. Overall approach

In compiling the report on publicly funded RST, the DST adopted the guidelines used in the Frascati Manual.

- **Government Budget Appropriation or Outlays on R&D¹ (GBAORD):** Includes all appropriations allocated to R&D and innovation in central government budgets; provincial or national government data are included when their input is significant. Unless stated otherwise, data include both current and capital expenditure. They cover government-financed R&D and innovation carried out in government establishments and in the business enterprise, higher education and private non-profit sectors.
- **Scientific and technical education and training (STET):** Includes all activities comprising specialised non-university higher education and training, higher education and training leading to a university degree, postgraduate and further training, and organised life-long training for scientists and engineers.
- **Scientific and technological services (STS):** Includes activities concerned with supporting research and experimental development and contributing to the generation, dissemination and application of scientific and technical knowledge. This includes activities such as patenting, geological surveys, standards generation, and the operation of libraries and national scientific databases.

Following the guidelines, a purposeful survey of 25 national government departments that have an underlying science mandate or research unit was conducted. This included studying national government departments' Estimates of National Expenditure documents, their strategic plans, their annual reports, and a spreadsheet questionnaire that they were asked to complete. The data and the presentation of the data in this report have been discussed with all the departments to validate the accuracy of the information.

2. Measurement of public funding for RST vs the measurement of R&D performance

This report collects and analyses data from the funder perspective. This is a key difference between the survey on publicly funded S&T and the R&D survey, which collects data from R&D-performing units, which indicates the sources from which funding for their R&D activities was obtained. The table below outlines some key differences between the two surveys in relation to scope, reference period and key indicators.

Table 5: Contrasts between the R&D survey and the publicly funded RST report

Report	Report on public funding for RST	National Survey of Research and Experimental Development
Conceptual basis	Scientific and technological activities that are funded by government. This includes government funding for R&D.	Focus is on R&D, which is a component of a broader set of S&T activities.
Focus for data collection and analysis	Government departments as funders for S&T	Five sectors as performers of R&D, namely government, science councils, universities, business sector and non-profit sectors
Reference period	Both retrospective and prospective. It published both the actual spending by departments and budget appropriations for the next three years.	Retrospective as it publishes actual spending by R&D-performing units.
Key indicators	<ul style="list-style-type: none"> • Total government expenditure on RST funding • Total government expenditure on RST funding as a percentage of the overall government budget • GBAORD can be estimated directly from budget appropriations • Expenditure on RST by socio-economic objective, department, etc. • Modes/channels for public funding for S&T (i.e. channels for disbursing funds for S&T) 	<ul style="list-style-type: none"> • Gross Expenditure on Research and Development (GERD) as a percentage of GDP • GERD by funding sources (GBAORD can be estimated indirectly/as a derived figure) • GERD by R&D-performing sectors, type of research, field of research, socio-economic objective; etc.

This report publishes both the retrospective and prospective budgets for RST of national government departments and public research entities. The measurement is done from the funder perspective which demonstrates how much government has budgeted and planned for RST. The data collected for this report is the administrative financial data from the departments.

The future work of this report will be to analyse the connections between government funding for R&D as reported in the R&D surveys and the amount budgeted by government for GBAORD as reported in this report. This work will be important to monitor whether the funds that have been budgeted for R&D are being employed in this area.

3. Methodological limitations and improvements from previous report

On compiling this report the DST noted specific methodological limitations, as well as a need to improve data collection during the compilation of the future reports.

3.1 Limitations that were noted on the published 2009/10 and 2010/11 report:

2009/10 Report

- The scope of data collection excluded provincial departments, local government and other national departments whose RST were not that obvious. More work is needed to understand how much of the data has been omitted as a result of this.
- Data on General University Funds have not been included in the data presented in the report. This could be included in future reports once the analysis is clear concerning the composition of that fund in relation to the technical definition used in the Frascati Manual.

2010/11 Report

- Some departments are still underreporting their RST expenditure, and this due to human capacity constraints (either the departments do not have a designated coordinator for this work, or the work is not included in the personnel's key performance areas as this might not be their priority).
- The verification and validation of the RST data has reduced from 18 departments in 2009/10 to 15 in 2010/11 and 10 departments in 2011/12 and this might have an impact on the quality of data if the problem is not get addressed.

3.2 Improvements

The improvements that were made, responding largely to the identified limitations in the 2009/10 report, included the following:

- Significant amount of work has been done in preparing the 2010/11 data to correct the inconsistencies and omissions highlighted in the 2009/10 report. Part of the challenge relates to the identification of expenditure items for RST, largely due to the differences in technical definitions adopted from the Frascati Manual and the structure of financial reporting in government. Considerable effort was made to ensure that relevant officials in the departments understand the technical definitions in order to identify the relevant expenditure items and how they should be categorised.

- The expenditure category of "scientific and technological innovation" was replaced by GBAORD. This change provided more clarity amongst departments and made it easier to identify relevant expenditure items and also enabled better classification of data, thus eliminating the category of 'unspecified' referred to in the 2009/10 report. As a result, the proportion of STS increased from 12,8% in the 2009/10 report to 24,6% in 2010/11, and 38% in 2011/12 report. This is largely due to the improvements on data classification. The end of the Pebble Bed Modular Reactor project also influenced the significant decline between the 2010/11 report and the 2011/12 report.
- Other improvements on classification came from the capturing of the public research institutions, which were captured under the departmental agencies and accounts instead of public corporations and private enterprises. This reduced the public corporations and private enterprises expenditure from R2,7 billion in 2009/10 to R1,1 billion in 2011/12.
- The three departments whose data was been omitted in the 2009/10 report has been captured in the 2011/12 report. The table below indicates the new data that was included from the Department of Health, the Department of Communication and the Department of Police.

Table 6: Major adjustments to data of three departments from 2009/10 to 2010/11

Department	2009/10 report (in R'000)		2010/11 report (in R'000)		2011/12 report (in R'000)	
	2009/10	2010/11	2009/10	2010/11	2009/10	2010/11
Communication	9 346	2 486	384 359	536 841	374 359	181 628
Health	2 338	2 469	6 968	8 837 315	7 018 530	8 848
	517	290	530			975
Police	404 700	576 900	2 110	2 895 744	2 379 792	3 456
			304			111

- Inclusion of the information from these three departments has improved coverage, and resulted in a revision of the reported 2009/10 total of R14,8 billion to R20,8 billion in 2010/11, and R21 billion in the 2011/12 report. The difference over the years is attributed to the expenditure on the HIV/Aids research grants from the Department of Health to universities; the investment on the construction of a forensic laboratory and the criminal record database from the Department of Police; and the investment on information and communication technology by the Department of Communications. Historical data for these departments, starting from 2007/08, were also included and updated.
- Inclusion of the previously omitted data and better classification resulted in shifts in the composition of transfers and subsidies. The 2010/11 and the 2011/12 report indicates that about 43,4% (R8,3 billion) of transfers go to the universities and universities of technology in 2010/11 and 41,8% (R9,9 billion) in 2011/12, whereas in the 2009/10 report it was reported that 44,8% (R5,7 billion) constituted transfers and subsidies to departmental agencies and accounts.

3.3 The activities underway to assist in improving the quality of data presented through this report are as follows:

- The DST will continue to support the departments in identifying their RST activities and in interpreting the technical definitions through workshops and one-on-one meetings.
- There is ongoing work between the National Treasury and the DST to improve the identification of relevant expenditure items. The National Treasury's Standard Chart of Accounts is currently under review and the DST has been invited to provide inputs regarding the manner in which the data on RST should be captured using the Basic Accounting System.
- Identification of the provincial government departments that undertake RST projects. The next step will be to train the provincial departments and then start collecting the data.

- The data is presented at an aggregate level, whereby it is classified into GBAORD, STET and STS. The classification has been adopted from the Frascati Manual. There is work under way to map the government RST data according to the socio-economic objectives in order to understand how the expenditure is prioritised across the key objectives of government.
- The connections between funder perspective GBAORD and the performer perspective of the R&D captured in the R&D survey.

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