

Vote 30

Science and Technology

Budget summary

R million	2017/18				2018/19	2019/20
	Total	Current payments	Transfers and subsidies	Payments for capital assets	Total	Total
MTEF allocation						
Administration	383.7	349.2	13.5	21.0	401.6	349.3
Technology Innovation	1 073.6	65.9	1 007.8	–	1 129.4	1 195.0
International Cooperation and Resources	128.7	64.9	63.8	–	135.2	144.4
Research, Development and Support	4 348.9	48.0	4 300.9	–	4 467.1	4 757.0
Socioeconomic Innovation Partnerships	1 622.3	47.8	1 574.5	–	1 782.8	1 745.7
Total expenditure estimates	7 557.2	575.8	6 960.5	21.0	7 916.0	8 191.4
Executive authority	Minister of Science and Technology					
Accounting officer	Director General of Science and Technology					
Website address	www.dst.gov.za					

The Estimates of National Expenditure e-publications for individual votes are available on www.treasury.gov.za. These publications provide more comprehensive coverage of vote specific information, particularly about goods and services, transfers and subsidies, personnel, entities, donor funding, public private partnerships, conditional grants to provinces and municipalities, and expenditure information at the level of site service delivery, where appropriate.

Vote purpose

Realise the full potential of science and technology in social and economic development by developing human resources, research and innovation.

Mandate

The Department of Science and Technology executes its mandate through the implementation of the 1996 White Paper on Science and Technology, the national research and development strategy, and the 10-year innovation plan. The plan aims to make science and technology a driving force in enhancing productivity, economic growth and socioeconomic development.

Selected performance indicators

Table 30.1 Performance indicators by programme and related outcome

Indicator	Programme	Outcome	Past			Current	Projections		
			2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Number of instruments funded in support of knowledge utilisation per year ¹	Technology Innovation	Outcome 4: Decent employment through inclusive growth	–	3	6	25	19	21	19
Number of commercial outputs in designated areas per year	Technology Innovation		15	1	3	8	4	3	3
Amount of international funds directly invested in research, science, technology and innovation human capital development programmes, as well as research infrastructure investments in South Africa, accounted for as part of cooperation initiatives implemented by the department, per year	International Cooperation and Resources	Outcome 5: A skilled and capable workforce to support an inclusive growth path	–	–	R619m	R400m	R420m	R440m	R480m
Number of PhD students awarded bursaries, as reflected in National Research Foundation and relevant entities project reports per year	Research, Development and Support		2 265	2 845	3 404	3 136	3 100	3 100	3 100
Number of pipeline postgraduate (BTech, honours and masters) students awarded bursaries through programmes managed by the National Research Foundation and relevant entities per year	Research, Development and Support		6 853	7 711	10 996	10 996	10 800	10 800	10 800
Number of researchers awarded research grants through programme managed by the National Research Foundation as reflected in the foundation's project reports per year	Research, Development and Support		3 569	4 064	4 315	4 539	4 500	4 500	4 500
Number of knowledge and innovation products added to the intellectual property portfolio through fully funded or co-funded research initiatives per year ²	Socioeconomic Innovation Partnerships	Outcome 4: Decent employment through inclusive growth	16	29	38	35	15	18	20

1. Instruments include space science, energy, bio-innovation, nanotechnology, robotics, photonics, indigenous knowledge systems, intellectual property management, and technology transfer and commercialisation.

2. Knowledge and innovation products include patents, prototypes, technology demonstrators or technology transfer packages.

Expenditure analysis

To build an economy that grows at a sustainable rate and contributes significantly to socioeconomic development, as envisaged in the National Development Plan (NDP), South Africa needs a better skilled and more innovative population. The Department of Science and Technology is pivotal to realising this goal, particularly as it relates to innovation for energy and food security, poverty alleviation, and health care. The department plans to direct most of its allocation of R23.7 billion over the medium term to investment in producing new knowledge, developing human capital, and building infrastructure for research and innovation. The bulk of these funds are to be transferred to the Council for Industrial and Scientific Research and the National Research Foundation, which foster, promote and support industrial and scientific research and technology innovation.

Following a Cabinet-approved reduction of R11 million over the medium term to expenditure on compensation of employees, the department expects to fill only critical vacant posts in the period ahead.

Investing in new knowledge

The *Technology Innovation* programme is allocated R3.4 billion over the medium term, or 14.2 per cent of the department's total budget, to invest in the production of new knowledge. Of this amount, R1.3 billion will be transferred to the Technology Innovation Agency, which funds strategic technological innovation, emerging technologies and knowledge innovation products, including nanotechnology research, with the aim of commercialising them. The agency has allocated R719 million of this transfer to technology innovation funding for small and medium enterprises to help them commercialise new technological products and services. The department also plans to transfer R150.4 million over the medium term to the National Intellectual Property Management Office to ensure that publicly funded intellectual property is protected and used to create products, processes and services that improve the quality of life in South Africa. This transfer is projected to grow at an average annual rate of 25.8 per cent over the medium term to fund an estimated 18 additional posts at the entity.

The department seeks to use bio-innovation to contribute to the achievement of government's industrial, health and social development goals, as well as to the development of indigenous knowledge applications. Spending on bio-innovation in the *Bioeconomy* subprogramme is projected to amount to R527 million over the medium term. This will allow the department to strengthen the research and innovation competencies that form the strategic foundation for the bio-based scientific innovation, and develop and support strategic research and innovation programmes.

A further R27 million in 2017/18, R60 million in 2018/19 and R63 million in 2019/20 is allocated to mining research and development for technological solutions that improve safety, profitability and competitiveness.

Developing human capital

The department plans to increase the number of high-quality researchers produced by the national research system. This will allow the country to compete globally, and attract international research and development funding. It will also improve the country's position in global innovation value chains, which should help to address low growth, and pressing social and environmental problems. Over the medium term, a projected R8.1 billion will be transferred to the National Research Foundation for this purpose and will be used to provide research grants or bursaries to at least 55 200 researchers and students. The department is set to receive additional allocations of R215.2 million in 2017/18 and R165 million in 2018/19 to support new programmes at the Council for Scientific and Industrial Research that aim to improve the employability of science, engineering and technology graduates and postgraduates by providing them with accelerated work experience, and encouraging the private sector to co-invest with government in research and development innovation.

An amount of R1.5 billion over the medium term in the *Human Capital and Science Promotion* subprogramme in the *Research, Development and Support* programme is allocated to the research chairs initiative. The initiative currently supports 200 research chairs and 6 more are to be added in 2017/18 through support from the Department of Higher Education and Training.

Funding research, innovation and infrastructure

Over the medium term, the Council for Scientific and Industrial Research plans to spend R9.3 billion on relevant research and development in health, energy, industry (advanced manufacturing and mining), the built environment, defence and security, the natural environment, scientific equipment and infrastructure. The source of funding for this includes revenue the entity generates itself in addition to transfers received from the department. The council's planned expenditure will support these areas and activities. This will ensure an increase in new technology and patents, and create decent employment.

A key contributor to future research and development is the department's main infrastructure project, the Square Kilometre Array, which will be the world's largest and most sensitive radio telescope. Construction is set to begin in 2018 and end in 2023. The department has an allocation of R2.2 billion over the medium term for the project.

Expenditure trends

Table 30.2 Vote expenditure trends by programme and economic classification

Programmes														
1. Administration														
2. Technology Innovation														
3. International Cooperation and Resources														
4. Research, Development and Support														
5. Socioeconomic Innovation Partnerships														
Programme	Annual budget	Adjusted appropriation	Audited outcome	Annual budget	Adjusted appropriation	Audited outcome	Annual budget	Adjusted appropriation	Audited outcome	Annual budget	Adjusted appropriation	Revised estimate	Average: Outcome/Annual budget (%)	Average: Outcome/Adjusted appropriation (%)
R million	2013/14			2014/15			2015/16			2016/17			2013/14 - 2016/17	
Programme 1	268.2	245.7	257.5	291.0	291.9	278.4	299.8	300.5	302.0	304.0	345.1	345.1	101.7%	100.0%
Programme 2	1 627.1	1 653.6	1 150.4	991.6	1 008.9	974.0	1 008.8	1 008.5	1 063.3	1 007.1	1 005.4	1 005.4	90.5%	89.7%
Programme 3	148.4	145.4	104.5	119.7	119.3	107.6	122.0	121.4	115.0	124.5	124.5	124.5	87.8%	88.4%
Programme 4	2 476.8	2 475.8	3 198.8	3 503.8	3 496.9	3 489.8	4 247.1	4 238.8	4 218.9	4 200.6	4 171.0	4 171.0	104.5%	104.8%
Programme 5	1 677.6	1 677.6	1 458.2	1 564.1	1 562.8	1 539.2	1 804.5	1 796.9	1 738.3	1 792.9	1 783.0	1 783.0	95.3%	95.6%
Total	6 198.2	6 198.2	6 169.5	6 470.2	6 479.9	6 389.0	7 482.1	7 466.1	7 437.5	7 429.0	7 429.0	7 429.0	99.4%	99.5%
Change to 2016 Budget estimate														
Economic classification														
Current payments	454.1	414.1	402.6	486.7	494.5	445.9	496.4	495.0	464.8	509.7	532.3	532.3	94.8%	95.3%
Compensation of employees	260.7	251.4	241.6	283.8	284.9	276.0	291.3	295.3	301.1	309.2	313.8	313.8	98.9%	98.9%
Goods and services	193.3	162.7	161.0	202.9	209.6	169.8	205.1	199.7	163.7	200.5	218.5	218.5	88.9%	90.2%
Transfers and subsidies	5 741.9	5 754.4	5 703.9	5 981.2	5 983.1	5 936.9	6 983.4	6 968.8	6 956.1	6 917.0	6 872.2	6 872.2	99.4%	99.6%
Departmental agencies and accounts	4 174.9	4 179.4	3 762.9	4 409.3	4 393.7	4 032.6	5 466.0	5 457.1	5 040.3	5 344.7	5 311.4	5 311.4	-	-
Higher education institutions	-	-	88.6	21.4	38.9	167.3	114.6	114.6	68.6	-	-	-	238.7%	211.5%
Foreign governments and international organisations	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-
Public corporations and private enterprises	1 034.2	1 034.2	1 698.0	1 140.8	1 145.5	1 573.1	1 253.3	1 249.8	1 577.6	1 307.4	1 299.4	1 299.4	129.8%	130.0%
Non-profit institutions	532.8	540.8	152.2	409.7	405.0	159.5	149.6	147.3	268.7	264.9	261.4	261.4	62.0%	62.2%
Households	-	-	1.7	-	-	4.4	-	-	0.8	-	-	-	-	-
Payments for capital assets	2.2	29.7	63.0	2.3	2.3	6.2	2.3	2.3	16.5	2.3	24.5	24.5	1 210.1%	187.5%
Machinery and equipment	2.2	2.2	8.2	2.3	2.3	6.2	2.3	2.3	16.5	2.3	24.5	24.5	607.6%	177.0%
Software and other intangible assets	-	27.5	54.9	-	-	-	-	-	-	-	-	-	-	199.5%
Payments for financial assets	-	-	-	-	-	0.1	-	-	0.1	-	-	-	-	-
Total	6 198.2	6 198.2	6 169.5	6 470.2	6 479.9	6 389.0	7 482.1	7 466.1	7 437.5	7 429.0	7 429.0	7 429.0	99.4%	99.5%

Expenditure estimates

Table 30.3 Vote expenditure estimates by programme and economic classification

Programmes									
1. Administration									
2. Technology Innovation									
3. International Cooperation and Resources									
4. Research, Development and Support									
5. Socioeconomic Innovation Partnerships									
Programme	Revised estimate	Average growth rate (%)	Average: Expenditure/ Total (%)	Medium-term expenditure estimate			Average growth rate (%)	Average: Expenditure/ Total (%)	
R million	2016/17	2013/14 - 2016/17		2017/18	2018/19	2019/20	2016/17 - 2019/20		
Programme 1	345.1	12.0%	4.3%	383.7	401.6	349.3	0.4%	4.8%	
Programme 2	1 005.4	-15.3%	15.3%	1 073.6	1 129.4	1 195.0	5.9%	14.2%	
Programme 3	124.5	-5.1%	1.6%	128.7	135.2	144.4	5.1%	1.7%	
Programme 4	4 171.0	19.0%	55.0%	4 348.9	4 467.1	4 757.0	4.5%	57.1%	
Programme 5	1 783.0	2.1%	23.8%	1 622.3	1 782.8	1 745.7	-0.7%	22.3%	
Total	7 429.0	6.2%	100.0%	7 557.2	7 916.0	8 191.4	3.3%	100.0%	
Change to 2016 Budget estimate				(5.3)	159.7	(6.0)			
Economic classification									
Current payments	532.3	8.7%	6.7%	575.8	611.3	584.3	3.2%	7.4%	
Compensation of employees	313.8	7.7%	4.1%	315.5	327.7	352.7	4.0%	4.2%	
Goods and services	218.5	10.3%	2.6%	260.2	283.6	231.6	2.0%	3.2%	
Transfers and subsidies	6 872.2	6.1%	92.9%	6 960.5	7 292.5	7 604.4	3.4%	92.4%	
Departmental agencies and accounts	5 311.4	8.3%	66.2%	5 204.3	5 424.2	5 639.4	2.0%	69.4%	
Public corporations and private enterprises	1 299.4	7.9%	22.4%	1 420.1	1 462.4	1 539.1	5.8%	18.4%	
Non-profit institutions	261.4	-21.5%	3.1%	336.1	405.8	426.0	17.7%	4.6%	
Payments for capital assets	24.5	-6.2%	0.4%	21.0	12.2	2.7	-52.2%	0.2%	
Machinery and equipment	24.5	124.0%	0.2%	21.0	12.2	2.7	-52.2%	0.2%	
Total	7 429.0	6.2%	100.0%	7 557.2	7 916.0	8 191.4	3.3%	100.0%	

Goods and services expenditure trends and estimates

Table 30.4 Vote goods and services expenditure trends and estimates

	Audited outcome			Adjusted appropriation	Average growth rate (%)	Average: Expenditure/ Total (%)	Medium-term expenditure estimate			Average growth rate (%)	Average: Expenditure/ Total (%)
	2013/14	2014/15	2015/16				2016/17	2017/18	2018/19		
R thousand	2013/14	2014/15	2015/16	2016/17	2013/14 - 2016/17		2017/18	2018/19	2019/20	2016/17 - 2019/20	
Administrative fees	6 427	3 826	1 877	20 282	46.7%	4.5%	6 254	6 586	6 955	-30.0%	4.0%
Advertising	16 467	23 223	22 792	17 707	2.4%	11.2%	20 308	21 397	20 949	5.8%	8.1%
Minor assets	293	630	537	579	25.5%	0.3%	608	644	680	5.5%	0.3%
Audit costs: External	4 548	4 761	5 061	6 383	12.0%	2.9%	8 702	10 869	7 488	5.5%	3.4%
Bursaries: Employees	1 201	1 256	1 067	2 495	27.6%	0.8%	2 620	5 540	2 927	5.5%	1.4%
Catering: Departmental activities	2 755	3 221	5 138	2 800	0.5%	2.0%	3 069	3 246	3 426	7.0%	1.3%
Communication	5 364	5 064	7 540	9 630	21.5%	3.9%	13 051	14 666	11 545	6.2%	4.9%
Computer services	7 398	12 728	10 418	8 162	3.3%	5.4%	8 571	9 067	9 573	5.5%	3.6%
Consultants: Business and advisory services	7 281	5 603	3 762	16 534	31.4%	4.7%	20 618	21 512	15 137	-2.9%	7.4%
Legal services	2 707	-	-	949	-29.5%	0.5%	997	1 054	1 113	5.5%	0.4%
Science and technological services	-	2 801	580	-	-	0.5%	-	-	-	-	-
Contractors	4 446	6 771	7 547	8 558	24.4%	3.8%	14 640	14 544	9 560	3.8%	4.8%
Agency and support/outsourced services	13 539	8 053	8 135	16 243	6.3%	6.4%	16 702	17 639	18 593	4.6%	7.0%
Entertainment	707	735	1 021	5 148	93.8%	1.1%	5 332	5 608	5 923	4.8%	2.2%
Fleet services (including government motor transport)	541	978	764	-	-100.0%	0.3%	-	-	-	-	-
Inventory: Clothing material and accessories	286	1 028	48	-	-100.0%	0.2%	-	-	-	-	-
Inventory: Fuel, oil and gas	-	10	72	129	-	-	136	144	152	5.6%	0.1%
Inventory: Materials and supplies	31	319	103	-	-100.0%	0.1%	-	-	-	-	-
Inventory: Medical supplies	-	-	1	-	-	-	-	-	-	-	-
Inventory: Other supplies	2	-	1	1 175	737.5%	0.2%	1 270	1 343	1 417	6.4%	0.5%
Consumable supplies	2 710	1 940	993	-	-100.0%	0.8%	-	-	-	-	-
Consumables: Stationery, printing and office supplies	4 434	3 244	2 660	5 015	4.2%	2.2%	8 792	10 098	5 885	5.5%	3.0%
Operating leases	5 176	5 488	2 906	3 749	-10.2%	2.4%	7 534	9 762	4 397	5.5%	2.6%
Rental and hiring	1 004	8 368	6 657	-	-100.0%	2.2%	-	-	-	-	-
Property payments	2 658	-	-	7 017	38.2%	1.4%	18 207	18 853	8 164	5.2%	5.3%
Transport provided: Departmental activity	-	41 566	38 249	-	-	11.2%	-	-	-	-	-
Travel and subsistence	40 418	3 411	13 416	47 697	5.7%	14.7%	54 224	60 126	52 631	3.3%	21.6%
Training and development	6 075	11 438	7 919	5 303	-4.4%	4.3%	7 968	8 291	6 221	5.5%	2.8%
Operating payments	9 873	12 141	11 311	7 325	-9.5%	5.7%	7 691	8 138	8 593	5.5%	3.2%
Venues and facilities	14 635	1 246	3 148	25 661	20.6%	6.3%	32 948	34 520	30 257	5.6%	12.4%
Total	160 976	169 849	163 723	218 541	10.7%	100.0%	260 242	283 647	231 586	2.0%	100.0%

Transfers and subsidies expenditure trends and estimates

Table 30.5 Vote transfers and subsidies trends and estimates

R thousand	Audited outcome			Adjusted appropriation 2016/17	Average growth rate (%) 2013/14 - 2016/17	Average: Expenditure/ Total (%) 2013/14 - 2016/17	Medium-term expenditure estimate			Average growth rate (%) 2016/17 - 2019/20	Average: Expenditure/ Total (%) 2016/17 - 2019/20
	2013/14	2014/15	2015/16				2017/18	2018/19	2019/20		
Departmental agencies and accounts											
Departmental agencies (non-business entities)											
Current	2 944 267	3 041 163	3 903 856	3 985 572	10.6%	54.5%	3 791 656	4 026 074	4 129 545	1.2%	55.5%
Various institutions: Institutional and programme support research	11 231	3 500	4 000	–	-100.0%	0.1%	–	–	–	–	–
Various institutions: Biofuels	–	6 000	–	–	–	–	–	–	–	–	–
Various institutions: Technology transfer offices (support of research units)	4 657	2 199	–	–	-100.0%	–	–	–	–	–	–
Various institutions: Implementation of biotechnology strategy	11 613	13 290	–	–	-100.0%	0.1%	–	–	–	–	–
Various institutions: Energy grand challenge research	32 500	24 396	33 733	34 904	2.4%	0.5%	35 149	37 049	40 946	5.5%	0.5%
Various institutions: Health innovation research	36 909	36 000	–	–	-100.0%	0.3%	–	–	–	–	–
HIV treatment and prevention technologies	1 817	22 596	24 535	23 753	135.6%	0.3%	23 711	24 588	27 866	5.5%	0.3%
Various institutions: Hydrogen strategy research	16 800	16 005	–	–	-100.0%	0.1%	–	–	–	–	–
Various institutions: Innovation projects research	–	1 122	29 612	31 977	–	0.2%	27 911	29 529	35 318	3.4%	0.4%
International Centre for Genetic Engineering and Biotechnology	–	–	12 125	12 186	–	0.1%	12 795	13 537	14 295	5.5%	0.2%
Various institutions: Space science research (Economic competitiveness and support package)	30 500	40 000	71 978	29 653	-0.9%	0.7%	28 860	9 200	–	-100.0%	0.2%
National Research Foundation: Indigenous knowledge systems	10 000	–	–	–	-100.0%	–	–	–	–	–	–
Technology Innovation Agency	481 081	338 386	385 188	382 364	-7.4%	6.2%	396 732	420 322	443 860	5.1%	5.7%
South African National Space Agency	123 708	118 298	124 355	124 977	0.3%	1.9%	131 226	138 837	146 612	5.5%	1.9%
Various institutions: Emerging research areas	21 000	–	–	–	-100.0%	0.1%	–	–	–	–	–
National Research Foundation: Research and development in indigenous knowledge systems	–	2 896	–	4 385	–	–	4 604	4 871	5 144	5.5%	0.1%
National Research Foundation: Global science (bilateral cooperation)	12 203	12 935	13 530	13 598	3.7%	0.2%	14 130	14 948	15 952	5.5%	0.2%
Various institutions: Global science (international multilateral agreements)	1 622	1 656	22 354	–	-100.0%	0.1%	–	–	–	–	–
Various institutions: Global science (African multilateral agreements)	3 800	–	958	–	-100.0%	–	–	–	–	–	–
Academy of Science of South Africa	–	21 577	–	24 106	–	0.2%	25 261	25 668	27 105	4.0%	0.4%
Various institutions: Astronomy research and development	25 129	19 107	25 155	27 950	3.6%	0.4%	29 348	31 050	32 789	5.5%	0.4%
Various institutions: Policy development on human and social development dynamics	11 098	9 838	10 283	10 483	-1.9%	0.2%	26 012	27 409	28 896	40.2%	0.3%
National Research Foundation: Human resources development for science and engineering	410 034	465 658	835 665	884 262	29.2%	10.2%	833 804	889 172	950 582	2.4%	12.4%
National Research Foundation	1 112 879	851 286	878 399	882 805	-7.4%	14.6%	925 964	979 670	1 034 532	5.4%	13.3%
Various institutions: Science awareness, research and initiatives to encourage youth participation in science	40 332	53 103	57 766	69 541	19.9%	0.9%	73 018	77 253	81 579	5.5%	1.0%
National Research Foundation: South African research chairs initiative to develop human resources in science	74 045	451 779	470 446	482 243	86.7%	5.8%	500 875	530 274	566 305	5.5%	7.2%
Various institutions: Strategic science platforms for research and development	125 105	138 044	149 943	201 880	17.3%	2.4%	199 572	208 325	220 176	2.9%	2.9%
Various institutions: Local manufacturing capacity research and technical support (Economic competitiveness and support package)	–	–	–	–	–	–	80 000	80 000	–	–	0.6%
Various institutions: Local systems of innovation for the cold chain technologies project (Economic competitiveness and support package)	–	–	–	–	–	–	–	62 000	–	–	0.2%
Various institutions: Innovative research and development	8 330	16 678	38 731	46 440	77.3%	0.4%	41 823	39 890	44 249	-1.6%	0.6%
Human Sciences Research Council	258 867	276 010	288 706	290 149	3.9%	4.4%	304 656	305 495	322 603	3.6%	4.3%
Various institutions: Local manufacturing capacity research and technical support	40 000	43 712	187 508	214 779	75.1%	1.9%	3 311	25 864	28 689	-48.9%	0.9%
Various institutions: Local systems of innovation for the cold chain technologies project	25 000	33 000	204 737	153 043	82.9%	1.6%	35 781	10 632	11 793	-57.4%	0.7%
Various institutions: Resource-based industries research and development	–	1 000	–	–	–	–	–	–	–	–	–
National Research Foundation: Research information management system	4 519	6 850	12 240	7 201	16.8%	0.1%	3 781	4 000	8 448	5.5%	0.1%
Human Science Research Council: Develop and monitor science and technology indicators	9 488	9 657	5 446	9 533	0.2%	0.1%	9 437	9 984	12 404	9.2%	0.1%
Various institutions: Environmental innovation	–	4 585	16 463	23 360	–	0.2%	23 895	26 507	29 402	8.0%	0.4%

Table 30.5 Vote transfers and subsidies trends and estimates

R thousand	Audited outcome			Adjusted appropriation 2016/17	Average growth rate (%) 2013/14 - 2016/17	Average: Expenditure/Total (%)	Medium-term expenditure estimate			Average growth rate (%) 2016/17 - 2019/20	Average: Expenditure/Total (%)
	2013/14	2014/15	2015/16				2017/18	2018/19	2019/20		
Capital	818 658	991 450	1 136 449	1 325 849	17.4%	16.8%	1 412 632	1 398 133	1 509 816	4.4%	19.7%
Various institutions: National nanotechnology research	-	2 500	-	-	-	-	-	-	-	-	-
Various institutions: Infrastructure projects for research and development	398 551	343 751	449 034	673 093	19.1%	7.3%	718 701	688 721	740 016	3.2%	9.8%
National Research Foundation: Square Kilometre Array (capital contribution to research)	420 107	645 199	687 415	652 756	15.8%	9.4%	693 931	709 412	769 800	5.7%	9.8%
Higher education institutions											
Current	73 030	134 455	36 413	-	-100.0%	1.0%	-	-	-	-	-
Various institutions: Institutional and programme support research	1 324	410	4 640	-	-100.0%	-	-	-	-	-	-
Various institutions: Technology transfer offices (support of research units)	-	36 560	-	-	-	0.1%	-	-	-	-	-
Various institutions: Implementation of biotechnology strategy	7 524	8 006	-	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Energy grand challenge research	3 100	5 550	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Health innovation research	1 865	700	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Hydrogen strategy research	14 839	15 923	-	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Indigenous knowledge systems	-	894	-	-	-	-	-	-	-	-	-
Various institutions: Innovation projects research	-	5 884	-	-	-	-	-	-	-	-	-
National Research Foundation: Indigenous knowledge systems	1 932	-	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Emerging research areas	5 604	12 806	-	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Global science (international multilateral agreements)	13 133	15 666	11 186	-	-100.0%	0.2%	-	-	-	-	-
Various institutions: Global science (African multilateral agreements)	3 900	4 320	1 937	-	-100.0%	-	-	-	-	-	-
National Research Foundation: Human resources development for science and engineering	551	4 940	3 736	-	-100.0%	-	-	-	-	-	-
Various institutions: Science awareness	8 805	9 652	8 118	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Strategic science platforms for research and development	6 069	5 467	6 796	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Astronomy research and development	-	612	-	-	-	-	-	-	-	-	-
Various institutions: Advanced manufacturing technology strategy implementation	169	2 321	-	-	-100.0%	-	-	-	-	-	-
Council for Scientific and Industrial Research	1 001	-	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Innovative research and development	-	631	-	-	-	-	-	-	-	-	-
Various institutions: Local manufacturing capacity research and technical support	549	747	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Local systems of innovation for the cold chain technologies project	1 150	2 366	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Resource-based industries research and development	1 515	1 000	-	-	-100.0%	-	-	-	-	-	-
Capital	15 600	32 806	32 175	-	-100.0%	0.3%	-	-	-	-	-
Various institutions: Infrastructure projects for research and development	15 600	32 806	32 175	-	-100.0%	0.3%	-	-	-	-	-
Foreign governments and international organisations											
Current	452	-	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Institutional and programme support research	452	-	-	-	-100.0%	-	-	-	-	-	-
Public corporations and private enterprises											
Subsidies on products and production (pc)											
Current	781 996	825 740	820 204	872 043	3.7%	13.0%	915 645	968 752	1 023 002	5.5%	13.2%
Council for Scientific and Industrial Research	781 996	825 740	820 204	872 043	3.7%	13.0%	915 645	968 752	1 023 002	5.5%	13.2%
Public corporations and private enterprises											
Other transfers to public corporations											
Current	347 750	322 642	220 817	162 100	-22.5%	4.1%	217 688	190 169	193 450	6.1%	2.7%
Various institutions: Institutional and programme support research	300	1 425	600	-	-100.0%	-	-	-	-	-	-
Various institutions: Implementation of biotechnology strategy	10 378	7 822	-	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Energy grand challenge research	2 179	1 500	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Health innovation research	4 750	5 000	-	-	-100.0%	-	-	-	-	-	-
South African Medical Research Council	19 500	-	-	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Hydrogen strategy research	800	1 500	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Indigenous knowledge systems	-	1 000	8 864	-	-	-	-	-	-	-	-
Various institutions: Innovation projects research	-	100	-	-	-	-	-	-	-	-	-

Table 30.5 Vote transfers and subsidies trends and estimates

R thousand	Audited outcome			Adjusted appropriation 2016/17	Average growth rate (%) 2013/14 - 2016/17	Average: Expenditure/ Total (%)	Medium-term expenditure estimate			Average growth rate (%) 2016/17 - 2019/20	Average: Expenditure/ Total (%)
	2013/14	2014/15	2015/16				2017/18	2018/19	2019/20		
Various institutions: Space science research	12 824	-	-	-	-100.0%	0.1%	-	-	-	-	-
National Research Foundation: Indigenous knowledge systems	2 000	-	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Emerging research areas	25 600	33 130	42 002	45 364	21.0%	0.6%	37 344	39 510	41 723	-2.8%	0.6%
Various institutions: Technology transfer offices for support of research units	6 485	14 647	-	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Global science (international multilateral agreements)	9 382	16 198	5 338	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Global science (African multilateral agreements)	-	-	3 138	-	-	-	-	-	-	-	-
National Research Foundation: Human resources development for science and engineering	-	-	33 505	-	-	0.1%	-	-	-	-	-
National Research Foundation: Human resources development for science and engineering (Economic competitiveness and support package)	-	-	-	-	-	-	51 140	13 800	-	-	0.2%
National Research Foundation: Square Kilometre Array (research and development)	-	723	2 000	-	-	-	-	-	-	-	-
Various institutions: Strategic science platforms for research and development	4 688	700	4 500	-	-100.0%	-	-	-	-	-	-
Various institutions: Advanced manufacturing technology strategy implementation	22 642	25 649	45 219	43 575	24.4%	0.5%	51 215	53 678	59 542	11.0%	0.7%
Council for Scientific and Industrial Research	20 167	24 208	26 144	26 327	9.3%	0.4%	31 960	34 738	38 533	13.5%	0.5%
Various institutions: Innovative research and development	37 835	20 827	-	-	-100.0%	0.2%	-	-	-	-	-
Various institutions: Local manufacturing capacity research and technical support	71 398	68 034	-	-	-100.0%	0.5%	-	-	-	-	-
Various institutions: Local systems of innovation for the cold chain technologies project	57 688	51 422	-	-	-100.0%	0.4%	-	-	-	-	-
Various institutions: Resource-based industries research and development	39 134	38 494	49 507	46 834	6.2%	0.7%	46 029	48 443	53 652	4.6%	0.7%
Various institutions: Environmental innovation	-	10 263	-	-	-	-	-	-	-	-	-
Capital	520 672	421 331	536 613	265 227	-20.1%	6.8%	286 777	303 526	322 635	6.7%	4.1%
Various institutions: National nanotechnology research	45 835	32 215	50 429	50 681	3.4%	0.7%	63 504	67 187	70 949	11.9%	0.9%
Council for Scientific and Industrial Research: Cyber infrastructure research and development	192 382	204 045	213 479	214 546	3.7%	3.2%	223 273	236 339	251 686	5.5%	3.2%
Various institutions: Infrastructure projects for research and development	74 455	185 071	272 705	-	-100.0%	2.1%	-	-	-	-	-
Square Kilometre Array	208 000	-	-	-	-100.0%	0.8%	-	-	-	-	-
Public corporations and private enterprises											
Other transfers to private enterprises											
Current	47 556	3 353	-	-	-100.0%	0.2%	-	-	-	-	-
Various institutions: Technology transfer offices (support of research units)	255	-	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Innovation projects research	7 000	-	-	-	-100.0%	-	-	-	-	-	-
South African Association of Science and Technology Centres: Technology Top 100 Awards	3 163	3 353	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Global science (international multilateral agreements)	6 935	-	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Strategic science platforms for research and development	2 780	-	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Advanced manufacturing technology strategy implementation	15 142	-	-	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Innovative research and development	12 281	-	-	-	-100.0%	-	-	-	-	-	-
Non-profit institutions											
Current	83 902	98 712	205 140	197 520	33.0%	2.3%	269 004	334 869	351 028	21.1%	4.0%
Various institutions: Institutional and programme support research	228	4 356	5 325	12 860	283.5%	0.1%	13 503	14 286	15 086	5.5%	0.2%
Various institutions: Biofuels	-	-	6 490	6 137	-	-	5 348	7 245	7 651	7.6%	0.1%
Various institutions: Technology transfer offices (support of research units)	10 234	-	42 747	15 544	14.9%	0.3%	36 000	39 000	41 184	38.4%	0.5%
Various institutions: Implementation of biotechnology strategy	6 805	3 810	32 954	36 321	74.8%	0.3%	36 112	37 742	41 651	4.7%	0.5%
Various institutions: Energy grand challenge research	3 720	2 350	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Health innovation research	200	-	43 618	42 710	497.7%	0.3%	44 691	46 947	51 160	6.2%	0.6%
Various institutions: Hydrogen strategy research	-	-	36 012	36 192	-	0.3%	38 002	40 206	42 458	5.5%	0.5%
Various institutions: Innovation projects research	8 380	2 755	-	-	-100.0%	-	-	-	-	-	-
International Centre for Genetic Engineering and Biotechnology	10 936	36 280	-	-	-100.0%	0.2%	-	-	-	-	-
Various institutions: Space science research	1 676	-	-	-	-100.0%	-	-	-	-	-	-
South African Association of Science and Technology Centres: Technology Top 100 Awards	-	-	3 507	-	-	-	3 701	3 916	4 135	-	-

Table 30.5 Vote transfers and subsidies trends and estimates

R thousand	Audited outcome			Adjusted appropriation 2016/17	Average growth rate (%) 2013/14 - 2016/17	Average: Expenditure/Total (%) 2013/14 - 2016/17	Medium-term expenditure estimate			Average growth rate (%) 2016/17 - 2019/20	Average: Expenditure/Total (%) 2016/17 - 2019/20
	2013/14	2014/15	2015/16				2017/18	2018/19	2019/20		
South African National AIDS Council	-	-	-	-	-	-	15 000	30 000	31 680	-	0.3%
Various institutions: Emerging research areas	4 500	5 800	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Global science (international multilateral agreements)	272	28	147	39 220	424.4%	0.2%	40 775	43 139	46 009	5.5%	0.6%
Various institutions: Global science (African multilateral agreements)	-	-	723	8 536	-	-	8 872	9 388	10 014	5.5%	0.1%
Academy of Science of South Africa	20 744	-	23 229	-	-100.0%	0.2%	-	-	-	-	-
National Research Foundation: Human resources development for science and engineering	-	80	5 578	-	-	-	-	-	-	-	-
Various institutions: Science awareness	2 200	3 200	3 310	-	-100.0%	-	-	-	-	-	-
Square Kilometre Array	-	2 000	-	-	-	-	-	-	-	-	-
Various institutions: Strategic science platforms for research and development	1 300	3 000	1 500	-	-100.0%	-	-	-	-	-	-
Various institutions: Advanced manufacturing technology strategy implementation	-	100	-	-	-	-	-	-	-	-	-
Various institutions: Innovative research and development	2 502	19 644	-	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Local systems of innovation for the cold chain technologies project	10 000	13 397	-	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Resource-based industries research and development	205	1 222	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Environmental innovation	-	690	-	-	-	-	-	-	-	-	-
Council for Scientific and Industrial Research: Mining research and development	-	-	-	-	-	-	27 000	63 000	60 000	-	0.5%
Capital	68 332	60 772	63 568	63 886	-2.2%	1.0%	67 080	70 971	74 945	5.5%	1.0%
Various institutions: Hydrogen strategy research - capital	57 332	60 772	63 568	63 886	3.7%	1.0%	67 080	70 971	74 945	5.5%	1.0%
Various institutions: Infrastructure projects for research and development	11 000	-	-	-	-100.0%	-	-	-	-	-	-
Households											
Social benefits											
Current	670	830	573	-	-100.0%	-	-	-	-	-	-
Households	670	830	573	-	-100.0%	-	-	-	-	-	-
Other transfers to households											
Current	988	3 618	250	-	-100.0%	-	-	-	-	-	-
Households	433	3 293	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Policy development on human and social development dynamics	125	125	125	-	-100.0%	-	-	-	-	-	-
National Research Foundation: Human resources development for science and engineering	-	-	125	-	-	-	-	-	-	-	-
Various institutions: Science awareness	430	-	-	-	-100.0%	-	-	-	-	-	-
Various institutions: Strategic science platforms for research and development	-	200	-	-	-	-	-	-	-	-	-
Total	5 703 873	5 936 872	6 956 058	6 872 197	6.4%	100.0%	6 960 482	7 292 494	7 604 421	3.4%	100.0%

Personnel information

Table 30.6 Vote personnel numbers and cost by salary level and programme¹

Programmes																			
1. Administration																			
2. Technology Innovation																			
3. International Cooperation and Resources																			
4. Research, Development and Support																			
5. Socioeconomic Innovation Partnerships																			
Science and Technology	Number of funded posts	Number of posts additional to the establishment	Number and cost ² of personnel posts filled / planned for on funded establishment												Number				
			Actual			Revised estimate			Medium-term expenditure estimate						Average growth rate (%)	Average: Salary level/Total (%)			
			2015/16		Unit cost	2016/17		Unit cost	2017/18		Unit cost	2018/19		Unit cost			2019/20		Unit cost
Number	Cost	Unit cost	Number	Cost	Unit cost	Number	Cost	Unit cost	Number	Cost	Unit cost	Number	Cost	Unit cost	2016/17 - 2019/20				
Salary level	-	-	493	301.1	0.6	478	313.8	0.7	449	315.5	0.7	432	327.7	0.8	416	352.7	0.8	-4.5%	100.0%
1 - 6	-	-	103	18.7	0.2	101	19.5	0.2	97	19.8	0.2	94	20.6	0.2	91	22.2	0.2	-3.4%	21.6%
7 - 10	-	-	137	54.0	0.4	132	56.8	0.4	122	56.6	0.5	117	59.5	0.5	112	64.9	0.6	-3.3%	27.2%
11 - 12	-	-	139	101.2	0.7	135	108.0	0.8	127	109.4	0.9	124	116.3	0.9	121	127.4	1.1	-3.6%	28.6%
13 - 16	-	-	114	127.3	1.1	110	129.5	1.2	103	129.7	1.3	97	131.3	1.4	92	138.2	1.5	-5.8%	22.6%
Programme	-	-	493	301.1	0.6	478	313.8	0.7	449	315.5	0.7	432	327.7	0.8	416	352.7	0.8	-4.5%	100.0%
Programme 1	-	-	282	151.7	0.5	275	154.5	0.6	260	152.7	0.6	249	158.6	0.6	238	170.7	0.7	-4.7%	57.6%
Programme 2	-	-	55	39.8	0.7	54	43.5	0.8	53	44.4	0.8	52	46.2	0.9	51	49.7	1.0	-1.9%	11.8%
Programme 3	-	-	59	41.3	0.7	56	46.2	0.8	51	47.3	0.9	49	49.1	1.0	47	52.9	1.1	-5.7%	11.4%
Programme 4	-	-	47	31.1	0.7	45	31.8	0.7	43	32.4	0.8	41	33.7	0.8	40	36.3	0.9	-3.9%	9.5%
Programme 5	-	-	50	37.1	0.7	48	37.8	0.8	42	38.6	0.9	41	40.1	1.0	40	43.2	1.1	-5.9%	9.6%

1. Data has been provided by the department and may not necessarily reconcile with official government personnel data.

2. Rand million.

Departmental receipts

Table 30.7 Departmental receipts by economic classification

	Audited outcome			Adjusted estimate	Revised estimate	Average growth rate (%)	Average: Receipt item/ Total (%)	Medium-term receipts estimate			Average growth rate (%)	Average: Receipt item/ Total (%)
	2013/14	2014/15	2015/16					2016/17	2017/18	2018/19		
R thousand												
Departmental receipts	1 658	1 602	514	7 000	7 000	61.6%	100.0%	242	248	254	-66.9%	100.0%
Sales of goods and services produced by department	47	50	51	29	29	-14.9%	1.6%	29	29	29	-	1.5%
Other sales	47	50	51	29	29	-14.9%	1.6%	29	29	29	-	1.5%
of which:												
Services rendered: Commission on insurance.	47	50	51	29	29	-14.9%	1.6%	28	28	28	-1.2%	1.5%
Replacement of security cards	-	-	-	-	-	-	-	1	1	1	-	-
Interest, dividends and rent on land	8	3	6	8	8	-	0.2%	8	8	8	-	0.4%
Interest	8	3	6	8	8	-	0.2%	8	8	8	-	0.4%
Sales of capital assets	-	-	-	-	-	-	-	121	127	133	-	4.9%
Transactions in financial assets and liabilities	1 603	1 549	457	6 963	6 963	63.2%	98.1%	84	84	84	-77.1%	93.2%
Total	1 658	1 602	514	7 000	7 000	61.6%	100.0%	242	248	254	-66.9%	100.0%

Programme 1: Administration

Programme purpose

Provide strategic leadership, management and support services to the department.

Expenditure trends and estimates

Table 30.8 Administration expenditure trends and estimates by subprogramme and economic classification

Subprogramme	Audited outcome			Adjusted appropriation	Average growth rate (%)	Average: Expenditure/ Total (%)	Medium-term expenditure estimate			Average growth rate (%)	Average: Expenditure/ Total (%)
	2013/14	2014/15	2015/16				2016/17	2017/18	2018/19		
R million											
Ministry	3.4	4.0	4.3	4.4	8.7%	1.4%	4.5	4.6	5.0	4.5%	1.2%
Management	78.5	81.7	90.1	105.4	10.3%	30.1%	108.6	113.6	121.2	4.7%	30.3%
Corporate Services	164.6	183.9	200.1	221.5	10.4%	65.1%	256.3	268.4	207.1	-2.2%	64.4%
Governance	7.8	7.6	7.5	9.3	5.9%	2.7%	9.6	10.0	10.7	4.7%	2.7%
Office Accommodation	3.2	1.3	-	4.6	13.0%	0.8%	4.8	5.0	5.3	5.2%	1.3%
Total	257.5	278.4	302.0	345.1	10.3%	100.0%	383.7	401.6	349.3	0.4%	100.0%
Change to 2016 Budget estimate				41.2			67.4	70.7	(3.3)		
Economic classification											
Current payments	235.1	262.2	270.5	307.8	9.4%	90.9%	349.2	375.1	331.5	2.5%	92.2%
Compensation of employees	123.0	140.1	151.7	154.5	7.9%	48.1%	152.7	158.6	170.7	3.4%	43.0%
Goods and services ¹	112.2	122.1	118.8	153.4	11.0%	42.8%	196.5	216.5	160.8	1.6%	49.1%
of which:											
Advertising	15.6	23.1	22.8	16.9	2.7%	6.6%	19.2	20.2	19.7	5.3%	5.1%
Consultants: Business and advisory services	4.0	3.3	3.1	6.5	18.3%	1.4%	13.8	14.4	7.6	5.2%	2.9%
Contractors	4.3	6.8	7.5	8.6	26.1%	2.3%	14.6	14.5	9.6	3.8%	3.2%
Property payments	2.5	-	-	6.2	35.2%	0.7%	17.4	18.0	7.3	5.5%	3.3%
Travel and subsistence	17.2	3.4	5.0	23.5	11.0%	4.1%	30.0	34.8	25.9	3.3%	7.7%
Venues and facilities	7.7	0.9	1.4	17.4	31.6%	2.3%	24.2	25.2	20.5	5.5%	5.9%
Transfers and subsidies¹	14.3	10.2	14.9	12.9	-3.4%	4.4%	13.5	14.3	15.1	5.5%	3.8%
Departmental agencies and accounts	11.2	3.5	4.0	-	-100.0%	1.6%	-	-	-	-	-
Higher education institutions	1.3	0.4	4.6	-	-100.0%	0.5%	-	-	-	-	-
Foreign governments and international organisations	0.5	-	-	-	-100.0%	-	-	-	-	-	-
Public corporations and private enterprises	0.3	1.4	0.6	-	-100.0%	0.2%	-	-	-	-	-
Non-profit institutions	0.2	4.4	5.3	12.9	283.5%	1.9%	13.5	14.3	15.1	5.5%	3.8%
Households	0.8	0.5	0.3	-	-100.0%	0.1%	-	-	-	-	-
Payments for capital assets	8.0	6.0	16.5	24.5	44.9%	4.6%	21.0	12.2	2.7	-52.2%	4.1%
Machinery and equipment	8.0	6.0	16.5	24.5	44.9%	4.6%	21.0	12.2	2.7	-52.2%	4.1%
Payments for financial assets	-	-	0.1	-	-	-	-	-	-	-	-
Total	257.5	278.4	302.0	345.1	10.3%	100.0%	383.7	401.6	349.3	0.4%	100.0%
Proportion of total programme expenditure to vote expenditure	4.2%	4.4%	4.1%	4.6%	-	-	5.1%	5.1%	4.3%	-	-
Details of selected transfers and subsidies											
Non-profit institutions											
Current	0.2	4.4	5.3	12.9	283.5%	1.9%	13.5	14.3	15.1	5.5%	3.8%
Various institutions: Institutional and programme support research	0.2	4.4	5.3	12.9	283.5%	1.9%	13.5	14.3	15.1	5.5%	3.8%

1. Estimates of National Expenditure data tables are available and can be downloaded from www.treasury.gov.za. These data tables contain detailed information by goods and services, and transfers and subsidies item by programme.

Programme 2: Technology Innovation

Programme purpose

Enable research and development in space science and technology, energy security and the bioeconomy, and in the emerging and converging areas of nanotechnology, robotics, photonics and indigenous knowledge systems, to promote the realisation of commercial products, processes and services. Promote the protection and utilisation of intellectual property, technology transfer and technology commercialisation through the implementation of enabling policies and interventions along the entire innovation value chain.

Objectives

- Facilitate and resource strategic investments in space science and technology, energy, the bioeconomy, nanotechnology, robotics, photonics, indigenous knowledge systems, intellectual property management, technology transfer and technology commercialisation, by 31 March 2020, by:
 - funding 59 instruments to support the use of knowledge
 - generating 446 knowledge products (including peer-reviewed scientific articles published in scientific publications, and filings/applications or the registration/granting of intellectual property rights)
 - developing and approving 17 science, technology and innovation strategic policy directives to enhance understanding and analyses that support the implementation of relevant interventions
 - developing 6 decision support interventions to improve the delivery of government services or functions
 - making 81 regulatory recommendations for decision support by government.
- Oversee, monitor and regulate key policy initiatives in the strategic areas of space science and technology, energy, bio-innovation, nanotechnology, robotics and photonics, including the oversight of agencies, by 31 March 2020, by:
 - developing 36 evaluation and assessment reports in the area of strategic and emerging science and technology
 - overseeing 855 new disclosures reported by publicly funded institutions.
- Coordinate and support high-end skills development by supporting 1 040 masters and doctoral students and 720 trainees through department-funded research and development initiatives by 31 March 2020.
- Support, promote and advocate the development and translation of scientific research and development outputs into commercial products, processes and services that will contribute towards economic growth and better quality of life by 31 March 2020, by:
 - supporting 17 knowledge application products, including prototypes, technology demonstrators and pilots
 - supporting 10 commercial outputs, including licences, assignments, options, new companies, products, processes and services.

Subprogrammes

- *Space Science* supports the creation of an environment conducive to the implementation of the national space strategy and South African earth observation strategy, and that addresses the development of innovative applications and human capital to respond to national priorities and support socioeconomic development.
- *Hydrogen and Energy* provides policy leadership in research, development and innovation initiatives in the energy sector. This subprogramme plays a key role in developing a sustainable and globally competitive South African energy knowledge base and industry.
- *Bioeconomy* leads the implementation of the national bioeconomy strategy approved by Cabinet in 2013.
- *Innovation Priorities and Instruments* supports and strengthens the innovation policy package aimed at creating and sustaining an enabling environment for innovation, technology and development, and the commercialisation of publicly funded research and development initiatives.
- *National Intellectual Property Management Office* is the implementing agency established to provide for the more effective utilisation of intellectual property emanating from publicly financed research and development.

Expenditure trends and estimates

Table 30.9 Technology Innovation expenditure trends and estimates by subprogramme and economic classification

Subprogramme	Audited outcome			Adjusted appropriation	Average growth rate (%)	Average Expenditure/ Total (%)	Medium-term expenditure estimate			Average growth rate (%)	Average Expenditure/ Total (%)
	2013/14	2014/15	2015/16				2016/17	2017/18	2018/19		
R million					2013/14 - 2016/17					2016/17 - 2019/20	
Space Science	230.6	168.5	209.1	166.9	-10.2%	18.5%	173.4	161.9	161.5	-1.1%	15.1%
Hydrogen and Energy	139.9	143.8	156.6	152.2	2.9%	14.1%	156.8	167.2	178.5	5.4%	14.9%
Bioeconomy	139.4	150.1	127.2	138.1	-0.3%	13.2%	156.1	177.7	193.2	11.8%	15.1%
Innovation Priorities and Instruments	608.8	447.4	518.1	521.4	-5.0%	50.0%	540.5	572.3	608.6	5.3%	50.9%
National Intellectual Property Management Office	31.7	64.2	52.4	26.8	-5.5%	4.2%	46.8	50.3	53.3	25.8%	4.0%
Total	1 150.4	974.0	1 063.3	1 005.4	-4.4%	100.0%	1 073.6	1 129.4	1 195.0	5.9%	100.0%
Change to 2016 Budget estimate				(1.7)			(10.9)	(2.1)	(0.8)		
Economic classification											
Current payments	45.3	51.8	51.6	64.4	12.5%	5.1%	65.9	68.7	73.5	4.5%	6.2%
Compensation of employees	30.9	35.6	39.8	43.5	12.1%	3.6%	44.4	46.2	49.7	4.5%	4.2%
Goods and services ¹	14.3	16.2	11.7	20.8	13.3%	1.5%	21.4	22.6	23.8	4.5%	2.0%
<i>of which:</i>											
<i>Communication</i>	0.8	0.4	0.7	0.7	-4.2%	0.1%	0.9	0.9	1.0	11.7%	0.1%
<i>Consultants: Business and advisory services</i>	1.5	1.3	0.2	1.6	2.1%	0.1%	1.6	1.7	1.8	3.7%	0.2%
<i>Agency and support/outourced services</i>	0.9	1.9	1.0	6.4	93.0%	0.2%	6.4	6.7	7.1	3.4%	0.6%
<i>Entertainment</i>	-	-	-	3.6	430.7%	0.1%	3.7	3.9	4.1	4.5%	0.3%
<i>Travel and subsistence</i>	5.5	-	-	5.5	-0.4%	0.3%	5.2	5.4	5.7	1.4%	0.5%
<i>Venues and facilities</i>	1.5	-	-	1.8	5.3%	0.1%	2.0	2.1	2.2	8.0%	0.2%
Transfers and subsidies¹	1 050.1	922.2	1 011.7	941.0	-3.6%	93.6%	1 007.8	1 060.7	1 121.6	6.0%	93.8%
Departmental agencies and accounts	770.6	623.7	681.5	644.2	-5.8%	64.9%	661.0	677.9	714.0	3.5%	61.3%
Higher education institutions	34.9	86.3	-	-	-100.0%	2.9%	-	-	-	-	-
Public corporations and private enterprises	140.8	100.3	101.3	96.0	-12.0%	10.5%	100.8	106.7	112.7	5.5%	9.5%
Non-profit institutions	103.8	111.8	228.9	200.8	24.6%	15.4%	245.9	276.0	294.9	13.7%	23.1%
Households	0.1	0.2	-	-	-100.0%	-	-	-	-	-	-
Payments for capital assets	55.0	0.1	-	-	-100.0%	1.3%	-	-	-	-	-
Machinery and equipment	0.1	0.1	-	-	-100.0%	-	-	-	-	-	-
Software and other intangible assets	54.9	-	-	-	-100.0%	1.3%	-	-	-	-	-
Total	1 150.4	974.0	1 063.3	1 005.4	-4.4%	100.0%	1 073.6	1 129.4	1 195.0	5.9%	100.0%
Proportion of total programme expenditure to vote expenditure	18.6%	15.2%	14.3%	13.5%	-	-	14.2%	14.3%	14.6%	-	-
Details of selected transfers and subsidies											
Departmental agencies and accounts											
Departmental agencies (non-business entities)											
Current	770.6	621.2	681.5	644.2	-5.8%	64.8%	661.0	677.9	714.0	3.5%	61.3%
Various institutions: Biofuels	-	6.0	-	-	-	0.1%	-	-	-	-	-
Various institutions: Technology transfer offices (support of research units)	4.7	2.2	-	-	-100.0%	0.2%	-	-	-	-	-
Various institutions: Implementation of biotechnology strategy	11.6	13.3	-	-	-100.0%	0.6%	-	-	-	-	-
Various institutions: Energy grand challenge research	32.5	24.4	33.7	34.9	2.4%	3.0%	35.1	37.0	40.9	5.5%	3.4%
Various institutions: Health innovation research	36.9	36.0	-	-	-100.0%	1.7%	-	-	-	-	-
HIV treatment and prevention technologies	1.8	22.6	24.5	23.8	135.6%	1.7%	23.7	24.6	27.9	5.5%	2.3%
Various institutions: Hydrogen strategy research	16.8	16.0	-	-	-100.0%	0.8%	-	-	-	-	-
Various institutions: Innovation projects research	-	1.1	29.6	32.0	-	1.5%	27.9	29.5	35.3	3.4%	2.8%
International Centre for Genetic Engineering and Biotechnology	-	-	12.1	12.2	-	0.6%	12.8	13.5	14.3	5.5%	1.2%
Various institutions: Space science research (Economic competitiveness and support package)	30.5	40.0	72.0	29.7	-0.9%	4.1%	28.9	9.2	-	-100.0%	1.5%
National Research Foundation: Indigenous knowledge systems	10.0	-	-	-	-100.0%	0.2%	-	-	-	-	-
Technology Innovation Agency	481.1	338.4	385.2	382.4	-7.4%	37.8%	396.7	420.3	443.9	5.1%	37.3%
South African National Space Agency	123.7	118.3	124.4	125.0	0.3%	11.7%	131.2	138.8	146.6	5.5%	12.3%
Various institutions: Emerging research areas	21.0	-	-	-	-100.0%	0.5%	-	-	-	-	-
National Research Foundation: Research and development in indigenous knowledge systems	-	2.9	-	4.4	-	0.2%	4.6	4.9	5.1	5.5%	0.4%

Table 30.9 Technology Innovation expenditure trends and estimates by subprogramme and economic classification

	Audited outcome	Adjusted appropriation	Average growth rate (%)	Average Expenditure/ Total (%)	Medium-term expenditure estimate	Average growth rate (%)	Average Expenditure/ Total (%)
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2017 Estimates of National Expenditure

R million	2013/14	2014/15	2015/16	2016/17	2013/14 - 2016/17		2017/18	2018/19	2019/20	2016/17 - 2019/20	
Non-profit institutions											
Current	46.4	51.0	165.3	136.9	43.4%	9.5%	178.9	205.1	219.9	17.1%	16.8%
Various institutions: Biofuels	–	–	6.5	6.1	–	0.3%	5.3	7.2	7.7	7.6%	0.6%
Various institutions: Technology transfer offices (support of research units)	10.2	–	42.7	15.5	15.1%	1.6%	36.0	39.0	41.2	38.4%	3.0%
Various institutions: Implementation of biotechnology strategy	6.8	3.8	33.0	36.3	74.8%	1.9%	36.1	37.7	41.7	4.7%	3.4%
Various institutions: Energy grand challenge research	3.7	2.4	–	–	-100.0%	0.1%	–	–	–	–	–
Various institutions: Health innovation research	0.2	–	43.6	42.7	497.7%	2.1%	44.7	46.9	51.2	6.2%	4.2%
Various institutions: Hydrogen strategy research	–	–	36.0	36.2	–	1.7%	38.0	40.2	42.5	5.5%	3.6%
Various institutions: Innovation projects research	8.4	2.8	–	–	-100.0%	0.3%	–	–	–	–	–
International Centre for Genetic Engineering and Biotechnology	10.9	36.3	–	–	-100.0%	1.1%	–	–	–	–	–
Various institutions: Space science research	1.7	–	–	–	-100.0%	–	–	–	–	–	–
South African Association of Science and Technology Centres: Technology Top 100 Awards	–	–	3.5	–	–	0.1%	3.7	3.9	4.1	–	0.3%
South African National AIDS Council	–	–	–	–	–	–	15.0	30.0	31.7	–	1.7%
Various institutions: Emerging research areas	4.5	5.8	–	–	-100.0%	0.2%	–	–	–	–	–
Capital	57.3	60.8	63.6	63.9	3.7%	5.9%	67.1	71.0	74.9	5.5%	6.3%
Various institutions: Hydrogen strategy research - capital	57.3	60.8	63.6	63.9	3.7%	5.9%	67.1	71.0	74.9	5.5%	6.3%
Public corporations and private enterprises											
Public corporations											
Other transfers to public corporations											
Current	84.5	64.6	50.9	45.4	-18.7%	5.9%	37.3	39.5	41.7	-2.8%	3.7%
Various institutions: Implementation of biotechnology strategy	10.4	7.8	–	–	-100.0%	0.4%	–	–	–	–	–
Various institutions: Energy grand challenge research	2.2	1.5	–	–	-100.0%	0.1%	–	–	–	–	–
Various institutions: Health innovation research	4.8	5.0	–	–	-100.0%	0.2%	–	–	–	–	–
South African Medical Research Council	19.5	–	–	–	-100.0%	0.5%	–	–	–	–	–
Various institutions: Hydrogen strategy research	0.8	1.5	–	–	-100.0%	0.1%	–	–	–	–	–
Various institutions: Indigenous knowledge systems	–	1.0	8.9	–	–	0.2%	–	–	–	–	–
Various institutions: Space science research	12.8	–	–	–	-100.0%	0.3%	–	–	–	–	–
National Research Foundation: Indigenous knowledge systems	2.0	–	–	–	-100.0%	–	–	–	–	–	–
Various institutions: Emerging research areas	25.6	33.1	42.0	45.4	21.0%	3.5%	37.3	39.5	41.7	-2.8%	3.7%
Various institutions: Technology transfer offices for support of research units	6.5	14.6	–	–	-100.0%	0.5%	–	–	–	–	–
Capital	45.8	32.2	50.4	50.7	3.4%	4.3%	63.5	67.2	70.9	11.9%	5.7%
Various institutions: National nanotechnology research	45.8	32.2	50.4	50.7	3.4%	4.3%	63.5	67.2	70.9	11.9%	5.7%
Higher education institutions											
Current	34.9	85.4	–	–	-100.0%	2.9%	–	–	–	–	–
Various institutions: Technology transfer offices (support of research units)	–	36.6	–	–	–	0.9%	–	–	–	–	–
Various institutions: Implementation of biotechnology strategy	7.5	8.0	–	–	-100.0%	0.4%	–	–	–	–	–
Various institutions: Energy grand challenge research	3.1	5.6	–	–	-100.0%	0.2%	–	–	–	–	–
Various institutions: Health innovation research	1.9	0.7	–	–	-100.0%	0.1%	–	–	–	–	–
Various institutions: Hydrogen strategy research	14.8	15.9	–	–	-100.0%	0.7%	–	–	–	–	–
Various institutions: Innovation projects research	–	5.9	–	–	–	0.1%	–	–	–	–	–
National Research Foundation: Indigenous knowledge systems	1.9	–	–	–	-100.0%	–	–	–	–	–	–
Various institutions: Emerging research areas	5.6	12.8	–	–	-100.0%	0.4%	–	–	–	–	–

1. Estimates of National Expenditure data tables are available and can be downloaded from www.treasury.gov.za. These data tables contain detailed information by goods and services, and transfers and subsidies item by programme.

Programme 3: International Cooperation and Resources

Programme purpose

Strategically develop, promote and manage international partnerships that strengthen the national system of innovation. Enable an exchange of knowledge, capacity and resources between South Africa and its international partners, with a focus on supporting science, technology and innovation capacity building in Africa. Support South African foreign policy through science diplomacy.

Objectives

- Complement South Africa's national investments in science, technology and innovation, including access to resources for departmental initiatives that require external investment, by securing international funding of R1.3 billion over the medium term.
- Enhance South Africa's national science, technology and innovation capabilities to contribute to the attainment of the department's targets for human capital development by accessing international knowledge and resources through securing the participation of 1 680 South African researchers in international postgraduate training programmes by 31 March 2020.
- Build capacity in and support initiatives for the Southern African Development Community (SADC) and African Union (AU) to advance Africa's growth and development agenda by strengthening cooperation in science, technology and innovation in Africa through technical and financial support for 53 approved SADC and AU science, technology and innovation initiatives and programmes by 31 March 2020.
- Support South Africa's foreign policy objectives of creating a better South Africa and contributing to a better Africa and a better world by maximising South Africa's strategic interests in international science, technology and innovation cooperation through interventions that ensure South Africa occupies 16 new leadership positions in international science, technology and innovation governance structures by 31 March 2020.

Subprogrammes

- *Multilateral Cooperation and Africa* advances and facilitates South Africa's participation in: bilateral science, technology and innovation cooperation initiatives with other African partners; African multilateral programmes, especially SADC and AU programmes; and broader multilateral science, technology and innovation partnerships with a strategic focus on South-South cooperation.
- *International Resources* works to increase the flow of international funding into South African science, technology and innovation initiatives, and African regional and continental programmes, through concerted efforts to promote foreign investment, and the fostering of strategic partnerships with partners such as the European Union, philanthropic foundations and organisations, and the multinational private sector.
- *Overseas Bilateral Cooperation* promotes and facilitates South Africa's bilateral science, technology and innovation cooperation with partners in Europe, the Americas, Asia and Australasia, especially for human capital development, and collaborative research and innovation; and secures partner support for joint cooperation with other African partners.

Expenditure trends and estimates

Table 30.10 International Cooperation and Resources expenditure trends and estimates by subprogramme and economic classification

Subprogramme	Audited outcome			Adjusted appropriation 2016/17	Average growth rate (%) 2013/14 - 2016/17	Average: Expenditure/ Total (%) 2016/17 - 2019/20	Medium-term expenditure estimate			Average growth rate (%) 2016/17 - 2019/20	Average: Expenditure/ Total (%) 2016/17 - 2019/20
	2013/14	2014/15	2015/16				2017/18	2018/19	2019/20		
R million											
Multilateral Cooperation and Africa	25.3	22.2	25.7	28.7	4.3%	22.5%	29.6	31.0	33.2	4.9%	23.0%
International Resources	50.4	54.0	56.6	57.5	4.5%	48.4%	59.5	62.6	66.9	5.2%	46.3%
Overseas Bilateral Cooperation	28.9	31.4	32.7	38.3	9.9%	29.1%	39.6	41.5	44.4	5.0%	30.7%
Total	104.5	107.6	115.0	124.5	6.0%	100.0%	128.7	135.2	144.4	5.1%	100.0%
Change to 2016 Budget estimate							(1.3)	(1.4)	(0.8)		

Table 30.10 International Cooperation and Resources expenditure trends and estimates by subprogramme and economic classification

Economic classification	Audited outcome			Adjusted appropriation 2016/17	Average growth rate (%) 2013/14 - 2016/17	Average: Expenditure/Total (%) 2013/14 - 2016/17	Medium-term expenditure estimate			Average growth rate (%) 2016/17 - 2019/20	Average: Expenditure/Total (%) 2016/17 - 2019/20
	2013/14	2014/15	2015/16				2017/18	2018/19	2019/20		
R million											
Current payments	53.2	53.3	55.6	63.1	5.8%	49.9%	64.9	67.7	72.5	4.7%	50.3%
Compensation of employees	33.2	36.8	41.3	46.2	11.6%	34.9%	47.3	49.1	52.9	4.6%	36.7%
Goods and services ¹	20.0	16.6	14.4	17.0	-5.4%	15.0%	17.6	18.6	19.6	4.9%	13.7%
<i>of which:</i>											
Communication	0.6	0.5	0.7	1.3	28.0%	0.7%	1.4	1.5	1.5	5.8%	1.1%
Agency and support/outourced services	0.7	0.3	0.7	0.6	-2.0%	0.5%	0.7	0.7	0.7	5.5%	0.5%
Entertainment	0.2	0.2	0.3	0.7	59.9%	0.3%	0.8	0.8	0.9	5.5%	0.6%
Travel and subsistence	11.2	-	-	7.5	-12.4%	4.1%	7.7	8.1	8.5	4.1%	6.0%
Operating payments	1.0	3.9	1.2	1.1	3.4%	1.6%	1.1	1.2	1.2	5.5%	0.9%
Venues and facilities	3.8	0.4	-	3.7	-1.0%	1.8%	3.9	4.1	4.4	5.5%	3.0%
Transfers and subsidies¹	51.3	54.1	59.3	61.4	6.1%	50.1%	63.8	67.5	72.0	5.5%	49.7%
Departmental agencies and accounts	17.6	14.6	36.8	13.6	-8.3%	18.3%	14.1	14.9	16.0	5.5%	11.0%
Higher education institutions	17.0	20.0	13.1	-	-100.0%	11.1%	-	-	-	-	-
Public corporations and private enterprises	16.3	16.2	8.5	-	-100.0%	9.1%	-	-	-	-	-
Non-profit institutions	0.3	-	0.9	47.8	460.0%	10.8%	49.6	52.5	56.0	5.5%	38.7%
Households	0.1	3.3	-	-	-100.0%	0.8%	-	-	-	-	-
Payments for capital assets	-	0.1	-	-	-	-	-	-	-	-	-
Machinery and equipment	-	0.1	-	-	-	-	-	-	-	-	-
Total	104.5	107.6	115.0	124.5	6.0%	100.0%	128.7	135.2	144.4	5.1%	100.0%
Proportion of total programme expenditure to vote expenditure	1.7%	1.7%	1.5%	1.7%	-	-	1.7%	1.7%	1.8%	-	-
Details of selected transfers and subsidies											
Departmental agencies and accounts											
Departmental agencies (non-business entities)											
Current	17.6	14.6	36.8	13.6	-8.3%	18.3%	14.1	14.9	16.0	5.5%	11.0%
National Research Foundation: Global science (bilateral cooperation)	12.2	12.9	13.5	13.6	3.7%	11.6%	14.1	14.9	16.0	5.5%	11.0%
Various institutions: Global science (international multilateral agreements)	1.6	1.7	22.4	-	-100.0%	5.7%	-	-	-	-	-
Various institutions: Global science (African multilateral agreements)	3.8	-	1.0	-	-100.0%	1.1%	-	-	-	-	-
Non-profit institutions											
Current	0.3	-	0.9	47.8	460.0%	10.8%	49.6	52.5	56.0	5.5%	38.7%
Various institutions: Global science (international multilateral agreements)	0.3	-	0.1	39.2	424.4%	8.8%	40.8	43.1	46.0	5.5%	31.7%
Various institutions: Global science (African multilateral agreements)	-	-	0.7	8.5	-	2.1%	8.9	9.4	10.0	5.5%	6.9%
Public corporations and private enterprises											
Public corporations											
Other transfers to public corporations											
Current	9.4	16.2	8.5	-	-100.0%	7.5%	-	-	-	-	-
Various institutions: Global science (international multilateral agreements)	9.4	16.2	5.3	-	-100.0%	6.8%	-	-	-	-	-
Various institutions: Global science (African multilateral agreements)	-	-	3.1	-	-	0.7%	-	-	-	-	-
Higher education institutions											
Current	17.0	20.0	13.1	-	-100.0%	11.1%	-	-	-	-	-
Various institutions: Global science (international multilateral agreements)	13.1	15.7	11.2	-	-100.0%	8.9%	-	-	-	-	-
Various institutions: Global science (African multilateral agreements)	3.9	4.3	1.9	-	-100.0%	2.2%	-	-	-	-	-

1. Estimates of National Expenditure data tables are available and can be downloaded from www.treasury.gov.za. These data tables contain detailed information by goods and services, and transfers and subsidies item by programme.

Programme 4: Research, Development and Support

Programme purpose

- Provide an enabling environment for research and knowledge production that promotes the strategic development of basic sciences and priority science areas, through the promotion of science, human capital development, and the provision of research infrastructure and relevant research support, in pursuit of South Africa's transition to a knowledge economy.

Objectives

- Contribute to the development of representative, high-level human capital able to pursue locally relevant, globally competitive research and innovation activities over the medium term by:

- awarding 9 300 bursaries to PhD students
- awarding 32 400 bursaries to postgraduate (BTech, honours and masters) students
- placing 1 700 graduates and students in department-funded work preparation programmes in science, engineering and technology institutions.
- Ensure the availability of and access to internationally comparable research and innovation infrastructure in order to generate new knowledge and train new researchers by:
 - maintaining the number of research infrastructure grants at 60 per year over the MTEF period
 - increasing the total available broadband capacity provided by the South African National Research Network site from 3 200 Gbps in 2017/18 to 3 500 Gbps in 2019/20, which will assist in providing more efficient transmission of data to all research and academic institutions and national projects.
- Support and promote research that develops basic sciences through the production of new knowledge and relevant training opportunities over the medium term by:
 - maintaining the total number of researchers awarded research grants through programmes managed by the National Research Foundation at above 13 500
 - maintaining the number of Web of Science accredited research articles published by researched funded by the National Research Foundation at 21 000.
- Strategically develop priority science areas in which South Africa enjoys a competitive advantage by promoting internationally competitive research and training activities and outputs by:
 - maintaining the total number of commissioned single-polarisation array antennas at 64 in 2017/18
 - ensuring that a functional climate change research network is in place and two reports on the state of climate change in South Africa are approved by Cabinet by 2018/19.
- Promote public engagement on science, technology and innovation by increasing the total number of participants in science awareness and engagement programmes to 6 million over the medium term.

Subprogrammes

- *Human Capital and Science Promotions* formulates and implements policies and strategies that address the availability of human capital for science, technology and innovation, and fundamental support for research activities.
- *Science Missions* promotes the development of research, the production of scientific knowledge, and the development of human capital within scientific areas in which South Africa enjoys a geographic advantage. These areas include the dynamics of climate change and its impact on Earth systems, Antarctic and marine research, the palaeosciences, and indigenous knowledge systems.
- *Basic Science and Infrastructure* facilitates the strategic implementation of research and innovation equipment and facilities to promote knowledge production in areas of national priority, and sustain research and development-led innovation.
- *Astronomy* supports the development of astronomical sciences around a multi-wavelength research strategy, and provides strategic guidance and support to relevant astronomy institutions in the implementation of strategic astronomy programmes.

Expenditure trends and estimates

Table 30.11 Research, Development and Support expenditure trends and estimates by subprogramme and economic classification

Subprogramme	Audited outcome			Adjusted appropriation	Average growth rate (%)	Average: Expenditure/ Total (%)	Medium-term expenditure estimate			Average growth rate (%)	Average: Expenditure/ Total (%)
	2013/14	2014/15	2015/16				2016/17	2017/18	2018/19		
R million					2013/14 - 2016/17		2017/18	2018/19	2019/20	2016/17 - 2019/20	
Human Capital and Science Promotions	1 683.1	1 872.8	2 331.8	2 357.4	11.9%	54.7%	2 424.8	2 531.2	2 676.5	4.3%	56.3%
Science Missions	151.3	159.5	177.0	215.5	12.5%	4.7%	213.0	222.3	235.1	2.9%	5.0%
Basic Science and Infrastructure	710.2	783.7	987.0	906.5	8.5%	22.5%	976.6	961.4	1 030.2	4.4%	21.8%
Astronomy	654.2	673.8	723.0	691.5	1.9%	18.2%	734.5	752.2	815.1	5.6%	16.9%
Total	3 198.8	3 489.8	4 218.9	4 171.0	9.2%	100.0%	4 348.9	4 467.1	4 757.0	4.5%	100.0%
Change to 2016 Budget estimate				(29.6)			(71.0)	(94.3)	(60.6)		

Table 30.11 Research, Development and Support expenditure trends and estimates by subprogramme and economic classification

Economic classification	Audited outcome			Adjusted appropriation 2016/17	Average growth rate (%) 2013/14 - 2016/17	Average: Expenditure/ Total (%) 2016/17	Medium-term expenditure estimate			Average growth rate (%) 2016/17 - 2019/20	Average: Expenditure/ Total (%) 2016/17 - 2019/20
	2013/14	2014/15	2015/16				2017/18	2018/19	2019/20		
R million											
Current payments	32.4	37.7	43.8	47.3	13.4%	1.1%	48.0	50.0	53.5	4.2%	1.1%
Compensation of employees	24.5	29.4	31.1	31.8	9.1%	0.8%	32.4	33.7	36.3	4.5%	0.8%
Goods and services ¹	7.9	8.3	12.6	15.5	25.2%	0.3%	15.5	16.4	17.2	3.6%	0.4%
<i>of which:</i>											
<i>Catering: Departmental activities</i>	0.1	0.1	0.2	0.5	92.4%	–	0.6	0.6	0.6	5.5%	–
<i>Communication</i>	0.4	0.3	0.2	0.6	9.5%	–	0.6	0.7	0.7	8.7%	–
<i>Consultants: Business and advisory services</i>	0.7	0.4	0.4	1.6	33.8%	–	1.4	1.4	1.5	-2.5%	–
<i>Agency and support/outourced services</i>	1.1	0.9	1.5	0.8	-9.4%	–	0.9	0.9	1.0	5.6%	–
<i>Travel and subsistence</i>	3.9	0.1	5.4	8.5	29.5%	0.1%	8.5	8.9	9.4	3.2%	0.2%
<i>Venues and facilities</i>	0.4	–	1.1	1.9	64.3%	–	2.0	2.1	2.2	5.5%	–
Transfers and subsidies¹	3 166.4	3 452.0	4 175.1	4 123.7	9.2%	98.9%	4 300.9	4 417.1	4 703.5	4.5%	98.9%
Departmental agencies and accounts	2 617.3	2 999.3	3 564.1	3 909.1	14.3%	86.8%	4 026.5	4 167.0	4 451.8	4.4%	93.3%
Higher education institutions	31.0	53.5	50.8	–	-100.0%	0.9%	–	–	–	–	–
Public corporations and private enterprises	482.3	390.5	526.2	214.5	-23.7%	10.7%	274.4	250.1	251.7	5.5%	5.6%
Non-profit institutions	35.2	8.3	33.6	–	-100.0%	0.5%	–	–	–	–	–
Households	0.6	0.4	0.4	–	-100.0%	–	–	–	–	–	–
Payments for capital assets	–	0.1	–	–	–	–	–	–	–	–	–
Machinery and equipment	–	0.1	–	–	–	–	–	–	–	–	–
Payments for financial assets	–	0.1	–	–	–	–	–	–	–	–	–
Total	3 198.8	3 489.8	4 218.9	4 171.0	9.2%	100.0%	4 348.9	4 467.1	4 757.0	4.5%	100.0%
Proportion of total programme expenditure to vote expenditure	51.8%	54.6%	56.7%	56.1%	–	–	57.5%	56.4%	58.1%	–	–
Details of selected transfers and subsidies											
Departmental agencies and accounts											
Departmental agencies (non-business entities)											
Current	1 798.6	2 010.4	2 427.7	2 583.3	12.8%	58.5%	2 613.9	2 768.8	2 942.0	4.4%	61.5%
Academy of Science of South Africa	–	21.6	–	24.1	–	0.3%	25.3	25.7	27.1	4.0%	0.6%
Various institutions: Astronomy research and development	25.1	19.1	25.2	28.0	3.6%	0.6%	29.3	31.1	32.8	5.5%	0.7%
Various institutions: Policy development on human and social development dynamics	11.1	9.8	10.3	10.5	-1.9%	0.3%	26.0	27.4	28.9	40.2%	0.5%
National Research Foundation: Human resources development for science and engineering	410.0	465.7	835.7	884.3	29.2%	17.2%	833.8	889.2	950.6	2.4%	20.1%
National Research Foundation	1 112.9	851.3	878.4	882.8	-7.4%	24.7%	926.0	979.7	1 034.5	5.4%	21.5%
Various institutions: Science awareness, research and initiatives to encourage youth participation in science	40.3	53.1	57.8	69.5	19.9%	1.5%	73.0	77.3	81.6	5.5%	1.7%
National Research Foundation: South African research chairs initiative to develop human resources in science	74.0	451.8	470.4	482.2	86.7%	9.8%	500.9	530.3	566.3	5.5%	11.7%
Various institutions: Strategic science platforms for research and development	125.1	138.0	149.9	201.9	17.3%	4.1%	199.6	208.3	220.2	2.9%	4.7%
Capital	818.7	989.0	1 136.4	1 325.8	17.4%	28.3%	1 412.6	1 398.1	1 509.8	4.4%	31.8%
Various institutions: Infrastructure projects for research and development	398.6	343.8	449.0	673.1	19.1%	12.4%	718.7	688.7	740.0	3.2%	15.9%
National Research Foundation: Square Kilometre Array (capital contribution to research)	420.1	645.2	687.4	652.8	15.8%	16.0%	693.9	709.4	769.8	5.7%	15.9%
Non-profit institutions	24.2	8.3	33.6	–	-100.0%	0.4%	–	–	–	–	–
Current	20.7	–	23.2	–	-100.0%	0.3%	–	–	–	–	–
Academy of Science of South Africa	20.7	–	23.2	–	-100.0%	0.3%	–	–	–	–	–
National Research Foundation: Human resources development for science and engineering	–	0.1	5.6	–	–	–	–	–	–	–	–
Various institutions: Science awareness	2.2	3.2	3.3	–	-100.0%	0.1%	–	–	–	–	–
Square Kilometre Array	–	2.0	–	–	–	–	–	–	–	–	–
Various institutions: Strategic science platforms for research and development	1.3	3.0	1.5	–	-100.0%	–	–	–	–	–	–
Capital	11.0	–	–	–	-100.0%	0.1%	–	–	–	–	–
Various institutions: Infrastructure projects for research and development	11.0	–	–	–	-100.0%	0.1%	–	–	–	–	–

Table 30.11 Research, Development and Support expenditure trends and estimates by subprogramme and economic classification

R million	Audited outcome			Adjusted appropriation 2016/17	Average growth rate (%) 2013/14 - 2016/17	Average: Expenditure/ Total (%)	Medium-term expenditure estimate			Average growth rate (%) 2016/17 - 2019/20	Average: Expenditure/ Total (%)
	2013/14	2014/15	2015/16				2017/18	2018/19	2019/20		
Public corporations and private enterprises											
Public corporations											
Other transfers to public corporations											
Current	4.7	1.4	40.0	-	-100.0%	0.3%	51.1	13.8	-	-	0.4%
National Research Foundation: Human resources development for science and engineering	-	-	33.5	-	-	0.2%	-	-	-	-	-
National Research Foundation: Human resources development for science and engineering (Economic competitiveness and support package)	-	-	-	-	-	-	51.1	13.8	-	-	0.4%
National Research Foundation: Square Kilometre Array (research and development)	-	0.7	2.0	-	-	-	-	-	-	-	-
Various institutions: Strategic science platforms for research and development	4.7	0.7	4.5	-	-100.0%	0.1%	-	-	-	-	-
Capital	474.8	389.1	486.2	214.5	-23.3%	10.4%	223.3	236.3	251.7	5.5%	5.2%
Council for Scientific and Industrial Research: Cyber infrastructure research and development	192.4	204.0	213.5	214.5	3.7%	5.5%	223.3	236.3	251.7	5.5%	5.2%
Various institutions: Infrastructure projects for research and development	74.5	185.1	272.7	-	-100.0%	3.5%	-	-	-	-	-
Square Kilometre Array	208.0	-	-	-	-100.0%	1.4%	-	-	-	-	-
Higher education institutions											
Current	15.4	20.1	18.7	-	-100.0%	0.4%	-	-	-	-	-
National Research Foundation: Human resources development for science and engineering	0.6	4.9	3.7	-	-100.0%	0.1%	-	-	-	-	-
Various institutions: Science awareness	8.8	9.7	8.1	-	-100.0%	0.2%	-	-	-	-	-
Various institutions: Strategic science platforms for research and development	6.1	5.5	6.8	-	-100.0%	0.1%	-	-	-	-	-
Capital	15.6	32.8	32.2	-	-100.0%	0.5%	-	-	-	-	-
Various institutions: Infrastructure projects for research and development	15.6	32.8	32.2	-	-100.0%	0.5%	-	-	-	-	-

1. Estimates of National Expenditure data tables are available and can be downloaded from www.treasury.gov.za. These data tables contain detailed information by goods and services, and transfers and subsidies item by programme.

Programme 5: Socioeconomic Innovation Partnerships

Programme purpose

Enhance the growth and development priority areas of government through targeted science and technology-based innovation interventions, and the development of strategic partnerships with other government departments, industry, research institutions and communities.

Objectives

- Inform and influence how science and technology can be used to achieve inclusive development through knowledge, evidence and learning over the medium term by:
 - publishing 18 knowledge products on innovation for inclusive development
 - maintaining and improving 10 decision support systems
 - generating 27 learning interventions.
- Identify, grow and sustain niche high-potential science, technology and innovation capabilities for sustainable development and the greening of society and the economy by fully funding and co-funding 233 honours, masters and doctoral students, and adding 12 knowledge and innovation products to the intellectual property portfolio over the medium term.
- Identify, grow and sustain niche, high-potential science, technology and innovation capabilities that improve the competitiveness of existing industries with growth potential in aerospace, advanced manufacturing, chemicals, advanced metals, mining, ICT and sector innovation funds, and facilitate the development of new targeted industries over the medium term by:
 - fully funding or co-funding 870 masters and doctoral students, and 360 interns
 - adding 53 knowledge and innovation products to the intellectual property portfolio

- funding 9 instruments in support of increased localisation, competitiveness, and research and development-led industry development.
- Strengthen provincial and rural innovation and production systems through analysis and catalytic interventions over the medium term by funding or co-funding six interventions that strengthen provincial or rural innovation systems.
- Enhance understanding and analysis that support improvements in the functioning and performance of the national system of innovation through executive committee approval by publishing 18 reports and policy briefings on the national system of innovation and innovation policy over the medium term.
- Introduce and manage interventions and incentive programmes that increase the level of private-sector investment in scientific or technological research and development by providing pre-approval decisions within 90 days of the date of receipt of applications for the research and development tax incentive over the medium term.

Subprogrammes

- *Sector Innovation and Green Economy* provides policy, strategy and direction for research and the development-led growth of strategic sectors of the economy; and supports the transition to a green economy.
- *Innovation for Inclusive Development* supports the development of science and technology-based innovations for tackling poverty, including the creation of sustainable jobs and human settlements, and the enhanced delivery of basic services.
- *Science and Technology Investment* leads and supports the development of indicators and instruments for monitoring investments in science and technology, as well as the performance of the national system of innovation, and ways of strengthening policy in relation to the national system of innovation.
- *Technology Localisation, Beneficiation and Advanced Manufacturing* funds technology and innovation development programmes to advance strategic medium- and long-term sustainable economic growth and sector development priorities, as well as public service delivery.

Expenditure trends and estimates

Table 30.12 Socioeconomic Innovation Partnerships expenditure trends and estimates by subprogramme and economic classification

Subprogramme	Audited outcome			Adjusted appropriation	Average growth rate (%)	Average: Expenditure/ Total (%)	Medium-term expenditure estimate			Average growth rate (%)	Average: Expenditure/ Total (%)
	2013/14	2014/15	2015/16				2016/17	2017/18	2018/19		
R million											
Sector Innovation and Green Economy	812.8	875.7	873.9	932.7	4.7%	53.6%	982.7	1 041.7	1 103.4	5.8%	58.6%
Innovation for Inclusive Development	325.1	340.1	334.5	349.5	2.4%	20.7%	356.6	355.9	378.2	2.7%	20.8%
Science and Technology Investment	25.4	29.9	32.3	28.5	4.0%	1.8%	25.3	26.5	34.3	6.4%	1.7%
Technology Localisation, Beneficiation and Advanced Manufacturing	295.0	293.5	497.7	472.3	17.0%	23.9%	257.8	358.6	229.8	-21.3%	19.0%
Total	1 458.2	1 539.2	1 738.3	1 783.0	6.9%	100.0%	1 622.3	1 782.8	1 745.7	-0.7%	100.0%
Change to 2016 Budget estimate				(9.9)			10.6	186.7	59.4		
Economic classification											
Current payments	36.5	40.9	43.3	49.7	10.8%	2.6%	47.8	49.8	53.4	2.4%	2.9%
Compensation of employees	30.0	34.2	37.1	37.8	8.1%	2.1%	38.6	40.1	43.2	4.5%	2.3%
Goods and services ¹	6.5	6.7	6.2	11.9	22.0%	0.5%	9.2	9.7	10.2	-4.9%	0.6%
of which:											
Advertising	0.2	–	–	0.2	-7.5%	–	0.2	0.2	0.2	7.1%	–
Catering: Departmental activities	0.2	0.1	0.1	0.3	13.0%	–	0.3	0.3	0.3	5.4%	–
Communication	0.4	0.3	0.3	0.9	27.8%	–	1.0	1.0	1.1	6.1%	0.1%
Consultants: Business and advisory services	0.8	0.5	–	6.4	98.0%	0.1%	3.5	3.7	3.8	-15.8%	0.3%
Travel and subsistence	2.6	–	3.0	2.7	1.3%	0.1%	2.8	3.0	3.2	5.2%	0.2%
Venues and facilities	1.2	–	0.5	0.8	-11.9%	–	0.8	0.9	1.0	5.5%	0.1%
Transfers and subsidies¹	1 421.7	1 498.3	1 695.0	1 733.3	6.8%	97.4%	1 574.5	1 733.0	1 692.3	-0.8%	97.1%
Departmental agencies and accounts	346.2	391.5	753.8	744.5	29.1%	34.3%	502.7	564.4	457.6	-15.0%	32.7%
Higher education institutions	4.4	7.1	–	–	-100.0%	0.2%	–	–	–	–	–
Public corporations and private enterprises	1 058.3	1 064.6	941.1	988.8	-2.2%	62.2%	1 044.8	1 105.6	1 174.7	5.9%	62.2%
Non-profit institutions	12.7	35.1	–	–	-100.0%	0.7%	27.0	63.0	60.0	–	2.2%
Households	0.1	0.1	0.1	–	-100.0%	–	–	–	–	–	–
Total	1 458.2	1 539.2	1 738.3	1 783.0	6.9%	100.0%	1 622.3	1 782.8	1 745.7	-0.7%	100.0%
Proportion of total programme expenditure to vote expenditure	23.6%	24.1%	23.4%	24.0%	–	–	21.5%	22.5%	21.3%	–	–

Table 30.12 Socioeconomic Innovation Partnerships expenditure trends and estimates by subprogramme and economic classification

Details of selected transfers and subsidies											
R million	Audited outcome			Adjusted appropriation	Average growth rate (%)	Average: Expenditure/ Total (%)	Medium-term expenditure estimate			Average growth rate (%)	Average : Expenditure/ Total (%)
	2013/14	2014/15	2015/16				2016/17	2013/14 - 2016/17	2017/18		
Departmental agencies and accounts											
Departmental agencies (non-business entities)											
Current	346.2	391.5	753.8	744.5	29.1%	34.3%	502.7	564.4	457.6	-15.0%	32.7%
Various institutions: Local manufacturing capacity research and technical support (Economic competitiveness and support package)	-	-	-	-	-	-	80.0	80.0	-	-	2.3%
Various institutions: Local systems of innovation for the cold chain technologies project (Economic competitiveness and support package)	-	-	-	-	-	-	-	62.0	-	-	0.9%
Various institutions: Innovative research and development	8.3	16.7	38.7	46.4	77.3%	1.7%	41.8	39.9	44.2	-1.6%	2.5%
Human Science Research Council	258.9	276.0	288.7	290.1	3.9%	17.1%	304.7	305.5	322.6	3.6%	17.6%
Various institutions: Local manufacturing capacity research and technical support	40.0	43.7	187.5	214.8	75.1%	7.5%	3.3	25.9	28.7	-48.9%	3.9%
Various institutions: Local systems of innovation for the cold chain technologies project	25.0	33.0	204.7	153.0	82.9%	6.4%	35.8	10.6	11.8	-57.4%	3.0%
Various institutions: Resource-based industries research and development	-	1.0	-	-	-	-	-	-	-	-	-
National Research Foundation: Research information management system	4.5	6.9	12.2	7.2	16.8%	0.5%	3.8	4.0	8.4	5.5%	0.3%
Human Science Research Council: Develop and monitor science and technology indicators	9.5	9.7	5.4	9.5	0.2%	0.5%	9.4	10.0	12.4	9.2%	0.6%
Various institutions: Environmental innovation	-	4.6	16.5	23.4	-	0.7%	23.9	26.5	29.4	8.0%	1.5%
Non-profit institutions											
Current	12.7	34.3	-	-	-100.0%	0.7%	27.0	63.0	60.0	-	2.2%
Various institutions: Innovative research and development	2.5	19.6	-	-	-100.0%	0.3%	-	-	-	-	-
Various institutions: Local systems of innovation for the cold chain technologies project	10.0	13.4	-	-	-100.0%	0.4%	-	-	-	-	-
Various institutions: Resource-based industries research and development	0.2	1.2	-	-	-100.0%	-	-	-	-	-	-
Council for Scientific and Industrial Research: Mining research and development	-	-	-	-	-	-	27.0	63.0	60.0	-	2.2%
Public corporations and private enterprises											
Public corporations											
Other transfers to public corporations											
Current	248.9	238.9	120.9	116.7	-22.3%	11.1%	129.2	136.9	151.7	9.1%	7.7%
Various institutions: Advanced manufacturing technology strategy implementation	22.6	25.6	45.2	43.6	24.4%	2.1%	51.2	53.7	59.5	11.0%	3.0%
Council for Scientific and Industrial Research	20.2	24.2	26.1	26.3	9.3%	1.5%	32.0	34.7	38.5	13.5%	1.9%
Various institutions: Innovative research and development	37.8	20.8	-	-	-100.0%	0.9%	-	-	-	-	-
Various institutions: Local manufacturing capacity research and technical support	71.4	68.0	-	-	-100.0%	2.1%	-	-	-	-	-
Various institutions: Local systems of innovation for the cold chain technologies project	57.7	51.4	-	-	-100.0%	1.7%	-	-	-	-	-
Various institutions: Resource-based industries research and development	39.1	38.5	49.5	46.8	6.2%	2.7%	46.0	48.4	53.7	4.6%	2.8%
Various institutions: Environmental innovation	-	10.3	-	-	-	0.2%	-	-	-	-	-
Public corporations and private enterprises											
Private enterprises											
Other transfers to private enterprises											
Current	27.4	-	-	-	-100.0%	0.4%	-	-	-	-	-
Various institutions: Advanced manufacturing technology strategy implementation	15.1	-	-	-	-100.0%	0.2%	-	-	-	-	-
Various institutions: Innovative research and development	12.3	-	-	-	-100.0%	0.2%	-	-	-	-	-
Public corporations and private enterprises											
Public corporations											
Public corporations (subsidies on products and production)											
Current	782.0	825.7	820.2	872.0	3.7%	50.6%	915.6	968.8	1 023.0	5.5%	54.5%
Council for Scientific and Industrial Research	782.0	825.7	820.2	872.0	3.7%	50.6%	915.6	968.8	1 023.0	5.5%	54.5%

1. Estimates of National Expenditure data tables are available and can be downloaded from www.treasury.gov.za. These data tables contain detailed information by goods and services, and transfers and subsidies item by programme.

Entities

Comprehensive coverage of the following entities is provided with the more detailed information for the vote at www.treasury.gov.za under the budget information link.

- The **Academy of Science of South Africa** links South Africa with scientific communities at the highest levels in the SADC region, the rest of Africa and internationally; promotes common ground in scientific thinking across all disciplines; encourages and promotes innovative and independent scientific thinking; promotes the development of intellectual capacity in all people; provides effective scientific, evidence-based advice; and facilitates appropriate action in the public interest. The academy's total budget for 2017/18 is R29.7 million.
- The **Council for Scientific and Industrial Research** fosters industrial and scientific research in the national interest through multidisciplinary research and technological innovation. The council's total budget for 2017/18 is R2.9 billion.
- The **Human Sciences Research Council** undertakes, promotes and coordinates research in the human and social sciences. The council's total budget for 2017/18 is R540.1 million.
- The **National Research Foundation** is an independent statutory agency that promotes and supports research. It also conducts research at, and provides access to, national research facilities. The foundation provides funding and services to the research community through higher education institutions with a view to generating knowledge and promoting high-level research capacity development. The foundation's total budget for 2017/18 is R4 billion.
- The **South African National Space Agency** was established under the South African National Space Agency Act (2008) and came into existence in December 2010. The agency aims to be a key contributor to the South African earth observation strategy by providing space-based data platforms in collaboration with other entities that focus on in situ observation measurements such as the South African earth observation network. The agency's total budget for 2017/18 is R315.1 million.
- The **Technology Innovation Agency** draws its mandate from the Technology Innovation Agency Act (2008) and came into operation in April 2010. The agency was established as an intervention to improve research and development from higher education institutions, scientific councils, public entities, private companies and commercialisation, thereby increasing technological innovation in the economy. The agency's total budget for 2017/18 is R548.5 million.

Additional table: Summary of expenditure on infrastructure

Project name R million	Service delivery outputs	Current project stage	Total project cost	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
				2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Infrastructure transfers to other spheres, agencies and departments										
Mega projects (total project cost of at least R1 billion over the project life cycle)										
Square Kilometre Array	Construction of telescopes	Construction	1 649.2	328.1	645.2	–	652.8	693.9	709.4	769.8
Large projects (total project cost of at least R250 million but less than R1 billion over the project life cycle)										
Space infrastructure	Construction of a satellite	Construction	290.8	45.0	40.0	31.4	29.7	28.9	–	9.2
Hydrogen strategy	Purchase of equipment	Various	440.7	57.2	60.8	63.6	63.9	67.1	71.0	74.9
National nanotechnology centres	Equipping of centres	Various	310.0	46.8	34.7	50.4	50.7	63.5	67.2	70.9
Cyber infrastructure	Creation of broadband network connectivity and high performance computing	Various	833.2	101.9	204.0	213.5	214.5	223.3	236.3	251.7
Total			3 523.8	579.1	984.7	358.9	1 011.5	1 076.6	1 083.9	1 176.6

