



Department of Science and Technology



Corporate Strategy 2007/2008



07/08



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA



TABLE OF CONTENTS

Vision	iv
Mission	iv
Aim	iv
1. Strategic overview and key policy developments	2
1.1 Goals and key deliverables	2
2. Strategic assessment of the contributions of the DST	2
3. Strategic management framework	4
4. Implementing the strategy: targeting investment in specific areas	5
4.1 Engineering, technology, research and innovation skills and human capital	5
4.2 Attractive, world-class, large-scale innovation projects	5
4.3 Essential S&T infrastructure and research equipment	7
4.4 R&D and innovation	7
4.4.1 <i>The South African Space Agency</i>	8
4.4.2 <i>Health innovations</i>	8
4.4.3 <i>ICT research and development</i>	8
4.4.4 <i>Biofuels technologies and R&D</i>	8
4.5 Policy and strategy capacity	8
4.6 Broader S&T impact across government	9
5. Organisation and structure	9
5.1 Expenditure trends	10
5.1.1 <i>Expenditure estimates</i>	10



TABLE OF CONTENT

6. DST programmes	12
6.1 Programme 1: Administration	12
6.1.1 Expenditure estimates	12
6.1.2 Expenditure trends	14
6.2 Programme 2: Research, Development and Innovation	14
6.2.1 Expenditure estimates	14
6.2.2 Expenditure trends	16
6.2.3 Service delivery objectives and indicators	16
6.2.4 Recent outputs	16
6.2.5 Selected medium-term output targets	18
6.3 Programme 3: International Cooperation and Resources	19
6.3.1 Expenditure estimates	19
6.3.2 Expenditure trends	20
6.3.3 Service delivery objectives and indicators	21
6.3.4 Recent outputs	22
6.3.5 Selected medium-term output targets	23
6.4 Programme 4: Human Capital and Knowledge Systems	23
6.4.1 Expenditure estimates	24
6.4.2 Expenditure trends	26
6.4.3 Service delivery objectives and indicators	26
6.4.4 Recent outputs	26
6.4.5 Selected medium-term output targets	28
6.5 Programme 5: Socio-economic Partnerships	31
6.5.1 Expenditure estimates	31
6.5.2 Expenditure trends	33
6.5.3 Service delivery objectives and indicators	33
6.5.4 Recent outputs	34
6.5.5 Selected medium-term output targets	35

7. Public entities and other agencies reporting to the Minister	36
7.1 Human Sciences Research Council	36
7.2 Council for Scientific and Industrial Research	37
7.3 National Research Foundation	38
7.4 Africa Institute of South Africa	40
7.5 Tshumisano Trust	40
7.6 Academy of Science of South Africa	41
7.7 South African National Energy Research Institute	42

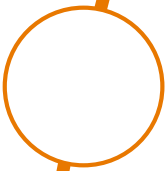
TABLES

Table 1: Science and Technology expenditure since 2003/04	10
Table 2: Expenditure on the Administration programme since 2003/04	12
Table 3: Expenditure on the Research, Development and Innovation programme since 2003/04	14
Table 4: Expenditure on the International Cooperation and Resources programme since 2003/04	19
Table 5: Expenditure on the Human Capital and Knowledge Systems programme since 2003/04	24
Table 6: Expenditure on the Socio-economic Partnerships programme since 2003/04	31
Table 7: Income and expenditure of the HSRC since 2003/04	37
Table 8: Income and expenditure of the CSIR since 2003/04	38
Table 9: Income and expenditure of the NRF since 2003/04	39
Table 10: Income and expenditure of the ASSAf since 2003/04	41
Table 11: A summary of expenditure trends and estimates per programme and economic classification	43
Table 12: A summary of personnel numbers and compensation of employees	44
Table 13: A summary of expenditure on training	45
Table 14: A summary of expenditure on infrastructure	46



VISION

To create a prosperous society that derives enduring and equitable benefits from science and technology.



MISSION

To develop, coordinate and manage a National System of Innovation (NSI) that will bring about maximum human capital, sustainable economic growth and improved quality of life for all.



AIM

The Department of Science and Technology (DST) seeks to realise the full potential of science and technology in social and economic development through the development of human resources, research and innovation.






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I. STRATEGIC OVERVIEW AND KEY POLICY DEVELOPMENTS: 2003/04 – 2009/10



The primary focus of the Department of Science and Technology (DST) is on implementing the National Research and Development Strategy (NRDS), which makes provision for an integrated approach to human resource development, knowledge generation, investment in infrastructure and improving the strategic management of the public science and technology system.

The revised strategic management model for the science and technology system enables the Department to develop emerging and rapidly changing areas of science and technology; and to coordinate and support sector-specific science and technology activities initiated by other government departments.

The programme structure of the Department has therefore been reorganised and it is now poised to respond effectively and strategically to the key elements of the NRDS.

1.1. Goals and key deliverables

The DST's principal goals are laid out in the NRDS of 2002. Broadly speaking, these goals are to:

- ensure that the National System of Innovation (NSI) addresses national growth and development goals in both the first and the second economy;
- develop and maintain a highly competent and representative cohort of scientists in South Africa;
- ensure that South Africa has world-class scientific infrastructure in place;
- administer an optimal set of funding instruments; and
- respond creatively to global and continental challenges.

The DST has established a number of key deliverables under each of these goals. By the end of the five years

covered by this strategic plan, the following targets will have been achieved:

- the development of strong innovation chains in biotechnology, nanotechnology, the hydrogen economy, space science, information technology and manufacturing;
- the development of technologies to address poverty and the poor quality of life of the people of South Africa;
- the development of a healthy and diverse flux of young people seeking and finding careers in science and engineering; and
- the accomplishment of notable successes, for example in astronomy and space science, in turning trends in global science to the national advantage.

It has become clear that economic growth depends on effective sectoral and cluster strategies (in agriculture, manufacturing and telecommunications, among others) and the development of infrastructure (electricity and transport) and key enablers (human resources, research and development). These key deliverables give expression to the country's national goals of economic development and improving the quality of life for all citizens, as outlined in the NSI adopted in the White Paper on Science and Technology.

A critical success factor in achieving the Department's goals will be to know when to lead its sister departments into new areas of development such as "hydrogen economy" and when to support their leadership in cases where technology is a determining factor but not a deliverable in itself.

2. STRATEGIC ASSESSMENT OF THE CONTRIBUTIONS OF THE DST

The National Research and Development Strategy (NRDS) has been well received in the science system and substantial financial resources have already been committed for the necessary attainment of its

objectives. In addition, the responsiveness and scale of the Science and Technology (S&T) system continues to develop. In this regard, about 561 businesses participated in the latest annual Research and Development (R&D) survey. This figure has increased from 511 in the previous year.

The high-level findings of the survey also indicate that business continues to be the major performer of in-house research (56.3%). Furthermore, the DST now has record of some 56 000 researchers and support staff in the public and private sector (i.e. warm bodies). It has nearly 17 000 “full-time equivalent researchers”. Projections of future R&D spending show that in the year 2008 (when GDP is anticipated to be R1991.1 billion), an additional investment of R6 billion in R&D will be required to attain the target of 1% of GDP. This relatively low target is already behind many of the developing countries with which South Africa competes. Government’s share of this R19.91 billion should be in the order of 35%, which amounts to nearly R7 billion.

The 2004/05 R&D survey results show R&D spending to be 0.87% of GDP. Government has committed itself to achieving an investment of 1% of GDP on R&D by 2008. However, to attain this target, both public and private expenditures must continue to increase. This is a critical benchmark of South Africa’s capacity to participate in the modern knowledge-based economy.


The DST will continue to invest in critical and practical areas, as well as in strategic S&T areas that are of vital importance. These areas are integrated into the government’s objectives for higher economic growth such as the Accelerated and Shared Growth Initiative of South Africa (AsgiSA), the National Industrial Policy Framework and various other skills development strategies and initiatives.

Recent initiatives that are directed by specific strategies in science and technology and informed by the NRDS include the following:


- The review of the Biotechnology Regional Innovation Centres (BRICs), which are the result of the DST’s National Biotechnology Strategy. Although the manifestation of the results of biotechnology investment has long lead times (sometimes up to 15 years), some success stories resulting from investments and interventions made by biotechnology institutions are already being realised.
- The establishment of Centres of Excellence (CoEs), which are exceeding their targets for attracting additional research funds and for enrolling postgraduate students. The DST intends to expand the number of CoEs in future, given the early success of this programme.
- The development of the South African Research Chairs Initiative, which is aimed at building much needed human resources for research and development and attracting partners to achieve the objectives of the NRDS.
- The establishment of a programme to promote nanotechnology and nanoscience.
- The launch of the South African Environmental Observation Network (SAEON).
- The continuing implementation of the Indigenous Knowledge Systems (IKS) policy.
- The Department’s participation in competitive international research funding programmes such as the European Union’s framework programmes.

The DST, together with the institutions and instruments it supports, continues to make progress. Internship programmes are providing unemployed graduates with opportunities to work in government departments and science councils, and specialised human capital interventions are paying off.

The CoEs initiated in 2004 have attracted 254 postgraduate students and the DST’s targeted nuclear human capital programme has 78 undergraduate and postgraduate students. This is complemented by increases in the number of firms in incubator and



technology station programmes and new industrial capacity being created by the Innovation Fund, for example.



Over and above these specific developments, the funding and sustaining of research careers for young scientists and engineers continue to increase the Department's capacity to fully harness innovation as a source of economic growth. Its activities also include initiatives to deal with poverty and the impact of poverty on people's lives. The DST has undertaken a number of projects in the domains of job creation and poverty reduction using established and effective technology platforms. These projects have demonstrated that positive results can be achieved by combining technology with the entrepreneurial skills of the people of South Africa.

International cooperation remains an important area, as well as socio-economic partnerships with other government agencies and institutions. The Department's international gains have been considerable with very positive participation in the European framework programmes. About 18% of R&D spending in South Africa originates from abroad – most of it for clinical trials. However, the Department needs a more balanced portfolio, based on attracting inward investments that are sustainable and attract large-scale global science and technology programmes to this region.

3. STRATEGIC MANAGEMENT FRAMEWORK

Challenges faced by the innovation system include the fragmented governance structures of research institutions, inadequate infrastructure and low spending on R&D in both the public and private sectors. A strategic management framework, developed by the Department to address some of these challenges, was approved by Cabinet in October 2004.

The framework classifies into three basic types the technology-related services and R&D activities that are supported by government:

- early stage or highly cross-sectoral generic technology and associated human resources, for which the Department is responsible;
- focused, sectoral and relatively mature technology domains, which are primarily the responsibility of sector-specific departments, with the Department's assistance; and
- standard technology-based services, for which sector-specific departments are responsible.

This strategic framework and the change in approach to the publicly funded portion of South Africa's S&T system have led to a number of concrete organisational and operational changes. These changes are aimed at maximising impact in the Department's focus areas.

The Department's challenge for the future is underpinned by two important reviews:

- A synthesis review of the National System of Innovation, which takes account of the independent reviews of the country's science councils since 2004.
- The national submission to the Organisation for Economic Cooperation and Development (OECD) for the review of the South African National System of Innovation: structures, policies and performance.

These two reviews indicate that South Africa continues to make progress with its S&T system. Strong and effective governance is in place and there are high levels of business expenditure. However, South Africa is still a small player in the global game of research and innovation and cannot automatically assume that it can address the challenges of the global knowledge economy without significantly enhanced public investment.

4. IMPLEMENTING THE STRATEGY: TARGETING INVESTMENT IN SPECIFIC AREAS

A number of key factors need to be highlighted that will guide the DST through the next phase in the development of the National System of Innovation (NSI).

4.1 Engineering, technology, research and innovation skills and human capital

It is clear that South Africa is not producing enough engineers. In addition, research careers are not sufficiently attractive to retain young researchers through the challenging early years of such careers. The impact of this is the gradual and inevitable erosion of South Africa's knowledge base, and the inability to "capture" new industries for South Africa, leading to a dependence on natural resources and resource-based industries.

Scientists, engineers and technologists remain in short supply in most sectors. South Africa is compromised by its ability to develop and harness new knowledge in support of a healthy NSI. The limited supply of scientists, engineers and technologists has also been identified as one of the constraints to the attainment of the goals of AsgiSA and is the focus of the Joint Initiative for Priority Skills Acquisition (JIPSA). The DST has developed two strategies in this regard; the Youth into Science Strategy and the Science, Engineering and Technology Human Capital Development Strategy for the development of a knowledge economy.

The DST and the Department of Education (DoE) in 2006 agreed to collaborate in supporting the implementation of the National Strategy for Mathematics, Science and Technology Education and the Youth into Science Strategy.

To achieve this objective, the two departments adopted a Collaboration Plan with clear roles and respon-

sibilities to be able to address the current low rates of mathematics and science academic achievement in the country.

The number of African pupils studying maths and science needs to increase. A modelling study by the National Advisory Council on Innovation (NACI) estimates that South Africa needs a further 6 000 full-time equivalent researchers by 2008, in addition to the current number of 17 000.

It is essential that this effort starts at school level, with young people enrolled in science programmes that complement the "in school" activities of the DoE. Considerable challenges are still faced and more work needs to be done to ensure that young people are attracted to careers in science, engineering and technology, and that human capital programmes are strengthened and properly financed.

4.2 Attractive, world-class, large-scale innovation projects

Success depends as much on focused initiatives as it does on people. Initiatives in this category (with different time horizons) are the recapitalisation of the Innovation Fund, which is doing excellent work. The Innovation Fund has consolidated its operations and has developed into an excellent instrument that plays a major role in driving the commercialisation of innovation for the benefit of South Africa. Since its inception in 1999, the Innovation Fund has funded 110 large-scale, consortium-driven projects in a variety of economic sectors, and has made five seed-fund investments since 2005. About 72 large-scale R&D projects have been completed and 38 current projects are in various stages of technology development.

Since 2004, the emphasis has been on the creation and exploitation of South African Intellectual Property (IP) for the benefit of South Africa. This resulted in the establishment of dedicated functions to manage and commercialise IP.



The Innovation Fund is successfully meeting its objectives and has the appropriate organisational and funding platforms in place to manage an expansion of its reach and mandate. As an example, the Technology Advancement Programme (TAP) is currently over-subscribed and significant opportunities for developing South African IP may be lost if these opportunities are not captured. However, an area that needs further intensification is R&D innovation. The DST is currently developing a programme to strengthen its involvement in this important cross-cutting field.

South Africa's position is that nuclear energy has to be an integral part of a sustainable energy mix and the Government is committed to increasing the role of nuclear technology in the economy.

The Nuclear Sector Research, Development and Innovation Strategy, currently under development, focuses on nuclear technology application areas.

These include support for nuclear power generation; health and social applications of nuclear technologies; industrial, manufacturing and research support for the nuclear sector; and international and African programmes and relationships in nuclear research and innovation networks.

For this reason, the Department of Science and Technology (DST) is contributing to the rejuvenation and stimulation of this sector through human capital development.

This is why the South African Nuclear Human Asset Research Programme (SANHARP), a programme of the DST, is focusing on developing high level skills to enable this sector with a view to expand to other applications in the medium term.

In terms of the local procurement strategies of the Department of Public Enterprises, there are opportunities for the DST to support the programme through

the sourcing of technology based on country factor conditions or national strengths.

This procurement strategy will allow for innovation around procured technologies for customisation to local conditions and continuous improvement, resulting in an innovative skills base being developed for domestic purposes.

The DST has prioritised the areas of science in which South Africa has a geographical advantage. Astronomy is one of these, and the Department has developed the Astronomy Geographic Advantage Programme (AGAP) to build up astronomy in Southern Africa. The Astronomy Geographic Advantage Bill, which will protect the sensitive astronomy sites and maintain South Africa's geographic advantage, will be submitted to Parliament within the current Medium-term Expenditure Framework (MTEF).

In the area of astronomy and space technology, the construction of the South African Large Telescope (SALT) is complete and brings the country a step closer to creating a hub of astronomy research in southern Africa. In global terms, other initiatives, such as the Group on Earth Observation (GEO) and the current bidding by South Africa for the new Square Kilometre Array (SKA) astronomy facility should open further doors to research and innovation opportunities.

The objective of the GEO is to develop a new comprehensive, coordinated and sustainable Global Earth Observation System of Systems (GEOSS), which will optimally harness Earth Observation as an instrument to address global social, economic and environmental challenges.

Although it has a very low population density, the Northern Cape has basic infrastructure (roads, electricity and telecommunications). The SKA and related projects are part of infrastructure development in the Northern Cape within AsgiSA. The Department is

working closely with the Northern Cape provincial government to ensure the alignment of activities and deliverables in this regard.

The first phase of the Karoo Array Telescope (KAT) and the SKA facility will be major users of South Africa's planned optical fibre data transport backbone and the proposed undersea cable to Europe. The KAT will require a 300GB/s line to Cape Town from the Karoo and up to 100GB/s to Europe. Phase I and the full SKA will require data transmission speed measured in terabit per second (Tb/s) to links up southern Africa, Europe and the rest of the world.

Therefore, there is a need for an associated support for critical investments in enabling bandwidth for South Africa's economy. The bandwidth pricing and the lack of low-cost bandwidth for research and innovation is cutting South Africa off from global research. The plan to set up the South Africa National Research Network (SANReN) addresses this and presents South Africa with an opportunity to provide cost-effective broadband access to global research networks in order to stimulate research and the establishment of academic communities in research and innovation. It will also make South Africa a more attractive destination for multi-national companies that wish to conduct research in this country. The SANReN will assist in keeping pace with global trends in research connectivity; meeting existing obligations in international projects like SALT; and grasping new opportunities such as those presented by the SKA.

In this scenario South Africa is also likely to get the National Aeronautics and Space Administration (NASA) Deep Space Array (400 higher specification antennae) well ahead of Spain. Together, this will represent nearly \$2 billion of new high-tech infrastructure, mainly in the Northern Cape and the Western Cape, and will ensure that South Africa is known as the key science-based economy in the southern hemisphere.


The 10% SKA will create and retain many more high-technology jobs in these provinces. The experience of global mega-science investments is almost universally positive, including the nuclear cluster CERN (the European Organization for Nuclear Research) in France/Switzerland, the biotechnology cluster in southern California and the ICT clusters in California and Seattle.

4.3 Essential S&T infrastructure and research equipment

AsgiSA identifies infrastructure as one of the constraints towards achieving the targeted growth and development figures of 6% by 2008. In terms of S&T, focused investment will position South Africa for enhanced technological innovation and increase its capacity to create new high-tech products and services. The benefits will be on multiple levels, but will largely be in respect of wealth creation and improved quality of life. To accelerate the modernisation of the South African economy from a resource-based one to one that is based on knowledge is an established priority. The call of the National Research Foundation (NRF) last April for proposals for larger university research equipment (R1.1 million per item/facility) was heavily oversubscribed. However, NACI has since produced a working draft report that considers science research and equipment, and technology platforms and infrastructure that are of high economic value. This report shows very serious deficits in current equipment and financing models, and provides the basis for a three-year and a ten-year plan.


4.4 R&D and innovation

A number of strategic processes have matured over the last period, including confirmation by Cabinet of the establishment of a space agency, new science and research to attack the disease burden in South Africa, the ICT R&D strategy to strengthen programmes of the Meraka Institute, biofuels research and innovation, as well as some specific proposals from South



Africa's public entities to extend national capabilities, for example, in cyber-security research.

4.4.1 *The South African Space Agency*



In July 2006, Cabinet approved the establishment of the South African Space Agency as an institutional vehicle to establish space science and technology in South Africa. South Africa is increasingly reliant on space-based services, particularly those underpinning earth observation, communications and navigation, as well as those that will contribute to making the country a regional hub of space science and technology, especially in astronomy. The increasing geo-political implications of national competence in space-related activities can change the future of provinces like the Northern Cape

4.4.2 *Health innovations*

Following discussions and an agreement with the national Department of Health, the DST has developed a Health Innovation Strategy. The new science- and research-driven programme will target the priority of the national Department of Health with research and innovation that leads to the discovery and preclinical phases of new drug and treatment regimes, the preclinical development of new vaccines, new diagnostic methods and novel medical devices. When these reach the stage of clinical development and use, they will be taken up by the Department of Health.

4.4.3 *ICT research and development*

An R&D strategy has been developed for the ICT sector. This strategy is aimed at transforming South Africa from a consumer of ICT to a significant producer of ICT over the next five to ten years. This strategy covers advanced human capital development, international ICT R&D collaboration, large innovation initiatives and grand challenges, infrastructure development and an industry programme for technology incubation. Due to the limited funding in many crucial areas, only modest investments have been made to date and a more

intensive public investment is now required. Over the medium term, the DST wishes to further develop and consolidate programmes in areas that have already been launched, while initiating flagship programmes in new crucial areas.

4.4.4 *Biofuels technologies and R&D*

AsgiSA has identified biofuels as a potential contributor to rural development. This includes the establishment of sustainable rural jobs both in the agricultural sector and in the processing of biofuels. Efforts are thus currently underway to examine the introduction of biofuels in the commercial transport fuel sector as a way of stimulating a biofuels industry in South Africa.

However, such a strategy needs to be complemented by other biofuels-related initiatives that will enable the products to be used beyond the commercial transport fuel sector. One initiative that could create long-term sustainable employment and meet an economic need is the local production of biofuels for local users. Internationally, this has taken the form of the development of a local biofuels industry that supplies fuel for running public transportation (for example, taxis, busses and trains). This project will explore the potential of such an approach through the deployment of appropriate technology and the initiation of support for R&D activities. Results of this project should serve as a benchmark and model for public transportation.

4.5 **Policy and strategy capacity**

The NRDS, approved by Cabinet in 2002, provided a framework of indicators to monitor the performance of the S&T system at macro level, which forms a long-term planning basis for the NSI. The feasibility of an integrated R&D management information system has been established. This system is aimed at capturing statistical information on government expenditure on R&D activities by public entities, including science councils, universities and other government R&D funding agencies.

Ten years have elapsed since the Research and Technology Foresight was conducted. Emergent technologies such as nanotechnology, biotechnology and fuel cell technologies are undergoing rapid development. Furthermore, exciting major innovations of the future will emerge at the confluence of scientific disciplines and technologies. Important sectors such as transport, communications, urbanisation and construction have gained a high degree of importance in economic competitiveness and are highly influential to social development. In addition, significant progress in long-range S&T planning methodologies has been made internationally, especially in industry. These challenges and opportunities have made it necessary for South Africa to create a permanent capacity to evaluate future technology and science development, including foresight, knowledge assessments, technology road-mapping and integration with retrospective analysis (backcasting).

The DST has developed an option for establishing an enhanced national database for the monitoring and evaluation of its public investments in S&T. Over the past two years, it has worked closely with the National Treasury to develop data requirements for such a system. It has, more recently, been approached by a consortium of universities requesting a coordinated approach across the sector for such reporting. This will allow the Department to work optimally with the South African Revenue Service (SARS) and National Treasury on tax incentives and ensure that the national S&T indicator system continues to play a key role in the Department's longer range S&T planning.

4.6 Broader S&T impact across government

Apart from the specific initiatives outlined above, officials of the DST have been collaborating with colleagues in the departments of Agriculture, Transport, Education and Health on skills and human capital development, and R&D initiatives as part of their inter-governmental collaboration.

In addition, South Africa has been selected as the preferred bidder to host the prestigious third component of the International Centre of Genetic Engineering and Biotechnology, a first for the African continent. This will mean that the South African component will participate in a biotechnology network comprising 60 countries, worth approximately R500 million a year. South Africa has already been shortlisted together with Australia in the Square Kilometre Array (SKA) bidding process.

The SKA is expected to cost 1 billion Euros to build, much of which will be spent in the host country. It is also expected to cost about 150 million Euros a year to operate and maintain. The opportunity to host the SKA in southern Africa is a unique opportunity to turn South Africa into a world-leading hub of fundamental physics, astronomy and engineering.

All these developments indicate that South Africa is increasingly being seen as an important destination for global S&T initiatives. The latest R&D survey indicated that some R1.2 billion per annum already enters South Africa as foreign spending on business R&D – a figure that is likely to grow as government shows its commitment to developing next-generation cutting-edge research infrastructure and makes the associated public investments.

5. ORGANISATION AND STRUCTURE

The DST came into being in 2002 when it was separated from the Ministry of Arts, Culture, Science and Technology. Subsequently, Cabinet approved a new Science and Technology Management Framework on 24 October 2004. This high-level functional model for the management of the South African S&T system is based on a classification of activities into three broad areas, including cross-sectoral generic technology and associated human resources; focused, sectoral and relatively mature technology domains; and critical technology-intensive services.

Developing human capital for the National System of Innovation (NSI) is central to implementing the Department's national research and development strategy. Flagship programmes in this area include the South African Research Chairs Initiative (SARChI), the Centres of Excellence (CoEs), the postdoctoral fellowship and professional development programmes, and the Youth into Science Strategy. A science, engineering and technology human capital strategy is being developed to coordinate these and other programmes.

The programmes managed by the DST are as follows:

- Programme 1: Administration
- Programme 2: Research, Development and Innovation
- Programme 3: International Cooperation and Resources
- Programme 4: Human Capital and Knowledge Systems
- Programme 5: Socio-economic partnerships

5.1 Expenditure trends

The former science vote has been replaced with a new planning mechanism that allows government departments to report on their spending on science and technology activities. National expenditure on R&D has increased from 0.8% of the GDP in 2003/04 to 0.9% in 2004/05. It is anticipated that the 2005/06 national R&D survey will show a further improvement to meet the target of 1% by 2008/09. The survey is accredited by the Organisation for Economic Cooperation and Development (OECD) and represents the country's official statistics in terms of the Statistics Act of 1999. In 2006/07, the tax rebate for R&D expenditure was increased from 100% to 150%, and a more favourable regime was created for the depreciation of R&D capital expenditure (50:30:20). The aim is to encourage the private sector to increase its involvement in R&D.

5.1.1 Expenditure estimates

Table 1: Science and Technology expenditure since 2003/04

Programme	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Programme 1: Administration	57 872	62 558	99 641	212 211	217 211	85 322	90 025	97 138
Programme 2: Research, Development and Innovation	300 078	333 499	341 218	405 654	405 654	546 551	788 800	1 026 467
Programme 3: International Cooperation and Resources	40 508	46 170	77 635	127 946	122 946	118 016	144 953	157 701
Programme 4: Human Capital and Knowledge Systems	448 789	521 118	639 021	863 442	863 442	1 257 329	1 422 408	1 571 233
Programme 5: Socio-economic Partnerships	544 335	669 532	883 757	1 007 840	1 007 840	1 135 261	1 193 311	1 235 822
Total	1 391 582	1 632 877	2 041 272	2 617 093	2 617 093	3 142 479	3 639 497	4 088 361
Change to 2006 budget estimate				3 000	3 000	234 000	389 000	

continued to next page

Programme	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Economic classification								
Current payments	105 573	127 140	173 497	204 861	203 061	222 226	256 958	284 196
Compensation of employees	45 710	58 205	65 125	86 957	86 957	112 964	119 047	126 530
Goods and services	59 863	68 727	108 343	117 904	116 104	109 262	137 911	157 666
<i>of which:</i>								
<i>Communication</i>	4 049	4 460	4 700	6 660	6 660	7 471	9 391	9 940
<i>Computer services</i>	2 817	2 965	3 281	2 071	2 071	5 677	6 562	6 951
<i>Consultants, contractors and special services</i>	12 144	12 867	42 306	28 662	28 662	33 424	44 301	48 616
<i>Inventory</i>	5 908	6 219	4 180	5 615	5 615	3 738	3 925	4 160
<i>Maintenance, repairs and running costs</i>	153	160	108	185	185	700	865	914
<i>Operating leases</i>	2 465	5 108	3 626	3 137	3 137	1 491	1 711	1 814
<i>Travel and subsistence</i>	15 613	15 346	24 878	27 368	27 368	26 615	33 445	40 980
Financial transactions in assets and liabilities	–	208	29	–	–	–	–	–
Transfers and subsidies	1 282 827	1 497 448	1 865 086	2 268 551	2 268 551	2 917 799	3 380 159	3 801 644
Provinces and municipalities	139	6 732	193	63	64	–	–	–
Departmental agencies and accounts	748 769	712 761	808 500	1 256 874	1 259 374	1 624 885	1 745 246	1 852 002
Universities and technikons	–	16 289	32 274	12 667	29 667	10 000	10 000	20 000
Public corporations and private enterprises	334 554	489 201	596 962	505 798	585 798	517 352	544 749	571 487
Foreign governments and international organisations	–	11	–	–	–	–	–	–
Non-profit institutions	199 365	263 526	425 816	492 545	392 644	765 562	1 080 164	1 358 155
Households	–	8 928	1 341	604	1 004	–	–	–
Payments for capital assets	3 182	8 289	2 689	143 681	145 481	2 454	2 380	2 521
Buildings and other fixed structures	–	–	–	133 000	133 000	–	–	–
Machinery and equipment	3 182	8 289	2 689	10 681	12 481	2 454	2 380	2 521
Total	1 391 582	1 632 877	2 041 272	2 617 093	2 617 093	3 142 479	3 639 497	4 088 361

6. DST PROGRAMMES

6.1 Programme I: Administration

This programme aims to conduct the overall management of the Department and to provide centralised support services to ensure that funded organisations comply with good corporate governance practices and are aligned with the strategic focus of the NSI; and to monitor and evaluate the science councils. It has three sub-programmes:

- The offices of the Minister, the Deputy Minister and the Executive Committee.
- Corporate Services, which is responsible for finance, communications, human resource management, legal services, information technology systems and support and internal auditing.
- Property Management, which covers functions and funds that have been devolved from the Department of Public Works.

6.1.1 Expenditure estimates

Table 2: Expenditure on the Administration programme since 2003/04

Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Minister 1	746	813	933	885	938	985	1 034
Deputy Minister 2	607	780	776	719	762	801	841
Management	3 808	5 840	4 668	6 375	5 228	5 485	5 831
Corporate Services	49 300	51 337	88 329	197 507	72 037	75 982	82 128
Governance	1 377	1 461	2 416	4 023	3 439	3 625	3 842
Property Management	2 034	2 327	2 519	2 702	2 918	3 147	3 462
Total	57 872	62 558	99 641	212 211	85 322	90 025	97 138
Change to 2006 budget estimate				84 609	(56 650)	(68 642)	

1. Payable as from 1 April 2006. Salary: R 707 956. Car allowance: R 176 988.

2. Payable as from 1 April 2006. Salary: R 575 410. Car allowance: R 143 852.

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Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000

Economic classification

Current payments	55 611	55 391	95 183	66 739	81 648	86 146	93 033
Compensation of employees	26 295	24 182	28 532	35 169	45 635	48 047	50 818
Goods and services	29 316	31 002	66 622	31 570	36 013	38 099	42 215
<i>of which:</i>							
<i>Communication</i>	1 910	2 246	2 282	3 029	1 720	1 806	1 914
<i>Computer services</i>	1 499	1 578	1 618	761	3 626	3 807	4 035
<i>Consultants, contractors and special services</i>	5 729	6 739	31 766	6 764	6 382	6 701	7 103
<i>Inventory</i>	2 181	2 296	2 264	2 562	1 905	2 000	2 120
<i>Operating leases</i>	2 239	4 870	3 053	2 430	739	775	822
<i>Travel and subsistence</i>	7 366	7 445	7 476	8 184	9 717	10 202	10 815
Financial transactions in assets and liabilities	–	207	29	–	–	–	–
Transfers and subsidies	88	83	2 930	2 369	2 184	2 315	2 448
Provinces and municipalities	88	83	87	27	–	–	–
Non-profit institutions	–	–	2 280	2 060	2 184	2 315	2 448
Households	–	–	563	282	–	–	–
Payments for capital assets	2 173	7 084	1 528	143 103	1 490	1 564	1 657
Buildings and other fixed structures	–	–	–	133 000	–	–	–
Machinery and equipment	2 173	7 084	1 528	10 103	1 490	1 564	1 657
Total	57 872	62 558	99 641	212 211	85 322	90 025	97 138

Details of major transfers and subsidies:

Non-profit institutions							
Current	–	–	2 280	2 060	2 184	2 315	2 448
Technology Top 100	–	–	2 280	2 060	2 184	2 315	2 448

6.1.2 Expenditure trends

Expenditure has increased at an annual average rate of 9% from R58 million in 2003/04, to R97 million in 2009/10. In 2006/07 expenditure reached a peak of R212 million due to an allocation of R133 million for the purchase of a building for the DST.

NSI to play a key role in supporting all new areas of research and innovation in South Africa. It has four sub-programmes:

- Space Science, Engineering and Technology
- Hydrogen and Energy
- Biotechnology and Health
- The NACI Secretariat

6.2 Programme 2: Research, Development and Innovation

This programme aims to provide leadership in longer term and cross-cutting research and innovation in the

6.2.1 Expenditure estimates

Table 3: Expenditure on the Research, Development and Innovation programme since 2003/04

Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Space Science, Engineering and Technology	175 346	41 574	153 764	210 670	294 783	487 201	689 390
Hydrogen and Energy	1 117	16 310	21 678	33 788	33 666	62 835	66 116
Biotechnology and Health	118 157	269 115	158 075	152 063	207 560	227 674	259 209
NACI Secretariat	5 458	6 500	7 701	9 133	10 542	11 090	11 752
Total	300 078	333 499	341 218	405 654	546 551	788 800	1 026 467
Change to 2006 budget estimate				(31 317)	60 371	245 448	

Economic classification

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Current payments	12 815	17 331	19 161	23 868	24 936	26 353	29 929
Compensation of employees	4 924	7 959	7 947	10 309	12 960	13 733	14 582
Goods and services	7 891	9 372	11 214	13 559	11 976	12 620	15 347
of which:							
Communication	575	488	574	546	461	484	513
Computer services	413	393	708	160	40	42	45
Consultants, contractors and special services	1 788	1 527	3 499	7 317	4 208	4 418	4 684
Inventory	833	442	927	498	449	471	500
Operating leases	29	18	264	174	147	154	164
Travel and subsistence	1 963	1 801	3 372	3 053	5 166	5 424	5 750
Transfers and subsidies	286 902	315 936	321 467	381 574	521 392	762 212	996 289
Provinces and municipalities	26	39	23	17	–	–	–
Departmental agencies and accounts	161 450	43 412	42 074	143 286	157 568	165 591	169 644
Universities and technikons	–	–	20 929	360	10 000	10 000	20 000
Public corporations and private enterprises	–	122 875	114	–	–	–	–
Non-profit institutions	125 426	149 610	258 041	237 661	353 824	586 621	806 645
Households	–	–	286	250	–	–	–
Payments for capital assets	361	232	590	212	223	235	249
Machinery and equipment	361	232	590	212	223	235	249
Total	300 078	333 499	341 218	405 654	546 551	788 800	1 026 467

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Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Details of major transfers and subsidies:							
Departmental agencies and accounts							
Current	161 450	43 412	42 074	143 286	157 568	165 591	169 644
Space Science	–	–	13 074	93	–	–	–
Innovation Fund	161 450	28 412	–	128 193	141 818	148 990	152 295
South African Aids Vaccine Initiative	–	15 000	20 000	15 000	15 750	16 601	17 349
Square Kilometer Array	–	–	8 000	–	–	–	–
Institutional and programme support	–	–	1 000	–	–	–	–
Universities and technikons							
Current	–	–	20 929	360	10 000	10 000	20 000
Institutional and programme support	–	–	529	360	–	–	–
Space Science	–	–	20 200	–	–	–	–
Biotechnology Strategy	–	–	200	–	–	–	–
International Centre for Genetic Engineering and Biotechnology	–	–	–	–	10 000	10 000	20 000
Public corporations	–	–	–	–	–	–	–
Other transfers	–	–	–	–	–	–	–
Current	–	122 875	114	–	–	–	–
Biotechnology Strategy	–	122 875	–	–	–	–	–
Institutional and programme support	–	–	114	–	–	–	–
Non-profit institutions							
Current	125 426	149 610	258 041	217 661	243 824	266 121	277 220
Institutional and programme support	9 425	5 899	1 794	1 479	–	–	–
Space Science	–	–	–	21 286	19 024	20 100	21 208
Square Kilometer Array	–	–	–	19 435	24 121	25 496	13 322
Hydrogen Strategy	–	–	–	10 000	18 180	19 071	20 382
Innovation Projects	–	–	–	3 500	4 601	4 510	5 159
Health Innovation	–	–	–	9 334	10 000	20 000	40 000
Biotechnology Strategy	116 001	143 711	154 650	148 680	166 515	175 507	175 629
Innovation Fund	–	–	101 597	3 947	–	–	–
Women in Science	–	–	–	–	1 383	1 437	1 520
Capital	–	–	–	20 000	110 000	320 500	529 425
Space Science	–	–	–	20 000	20 000	15 000	15 000
Square Kilometer Array	–	–	–	–	80 000	265 000	471 900
Hydrogen Strategy	–	–	–	–	10 000	40 500	42 525



6.2.2 Expenditure trends

Expenditure increased at an annual average rate of 11% from R300 million in 2003/04, to R406 million in 2006/07 as a result of an increase in biotechnology and other initiatives. Expenditure continues to grow at an annual average rate of 39%, mainly due to capital funding of R500 million for the Square Kilometre Array (SKA) facility over the 2007 Medium-term Expenditure Framework (MTEF).

6.2.3 Service delivery objectives and indicators

6.2.3.1 Space Science, Engineering and Technology

This sub-programme includes large-scale astronomy facilities, satellite programmes and the potential development of the Northern Cape as a launch site. It offers advantages to South Africa's security, development, economic growth and informed future planning.

6.2.3.2 Hydrogen and Energy

This sub-programme drives the development of a targeted research programme towards a science and knowledge base that will ensure broader socio-economic benefits for South Africa from the nascent global hydrogen economy. There are key comparative advantage pillars for South Africa in the future hydrogen economy. These include platinum resources, the PBMR technology beneficiation to process heat production and the Sasol coal gasification technology.

6.2.3.3 Biotechnology and Health

This sub-programme focuses on the development of cross-cutting research, development and innovation support services, structures and platforms for biotechnology and health innovation interventions in the NSI. It also focuses on the harmonisation of the research and development activities of industry, academia and research institutions. It comprises two units: Health Innovation and Biotechnology.

6.2.3.4 The NACI Secretariat

This sub-programme provides secretarial support to NACI. NACI provides policy advice to the Minister of

Science and Technology on the role and contribution of innovation in promoting and achieving national objectives. These national objectives include improving the quality of life of South Africans and promoting sustainable economic growth and international competitiveness.

6.2.4 Recent outputs

A major achievement for the Biotechnology and Health sub-programme was the inward licensing of internationally competitive technologies by both CapeBio and BioPAD in partnership with biotechnology companies. This considerably strengthened an already strong programme of investment.

Cabinet approved the PBMR Human Capital and Innovation Frontier Programme, which is designed to expand local know-how along the entire technology value chain of PBMR development. Two university chairs have been established and bursary awards have been made to undergraduate and postgraduate students. The awareness programme included a National Youth Nuclear Conference and school-based programmes. The next phase of implementation will see the growth of the programmes for the awarding of bursaries and the establishment of university chairs.

6.2.4.1 Innovation Fund Commercialisation Office

This financial year witnessed the continued expansion of the activities of the Innovation Fund in support of innovative R&D by SMMEs, with the inclusion of broad-based BEE as a targeted outcome. In this respect, the Innovation Fund Commercialisation Office (IFCO) has made the following inroads:

- **Red Five Labs:** The Innovation Fund, in partnership with HBD Venture Capital, has co-invested in the creation of breakthrough software that will allow applications developed for mobile phones running on Microsoft software to run unchanged on Symbian phones. This will create significant new markets. The idea was conceived and

executed by a small team of software developers in Johannesburg.

- **Development of a robotics product concept:** Similarly, the SMME, Robonica, aims to develop educational robotics technology. Primed for global markets, this will boost empowerment by involving black engineers in a highly specialised field. The Innovation Fund is covering the first three years of development, after which co-investment will be sought to fund the initial manufacturing start-up and commercialisation activities.
- **Centre for Quantum Cryptography:** This centre will focus on developing local infrastructure and expertise in this area, which is at the cutting edge of computer science globally. The flagship project is the development of a low-cost quantum key exchange unit that provides absolute security in the transfer of information.
- **Improvement of indigenous abalone through genetics:** The Innovation Fund is partnering with major players in the local seafood sector to invest in the improvement of indigenous abalone through genetics. The project will address the decrease in the supply of abalone from natural fisheries due to over-fishing and illegal trade and improve South Africa's competitiveness in the aquaculture industry. It aims to produce novel strains of abalone that will improve profitability within the industry and establish a sustainable aquatic biotechnology platform. The project is being led by Dr Danie Brink of the University of Stellenbosch and industrial partners Irvin & Johnson (Pty) Ltd, Aquafarm Development Company (Pty) Ltd, HIK Abalone (Pty) Ltd, and Abagold (Pty) Ltd.

6.2.4.2 Intellectual Property Management Office (IPMO)

A total of R2.6 million was paid out in 2005 under the Patent Support Fund, and R1.2 million under the Patent Incentive Fund. A total of R7 million in payments has been made under these two instruments since their inception in 2004.

The IPMO has been strengthened with the addition of a second patent attorney with extensive experience in commercial practice. This has resulted in the organisation increasingly playing a key role in conducting novelty opinions for the Innovation Fund.

The training and development of black candidates as patent attorneys has progressed well. Three candidates have spent combined periods of up to six months with the IP law firms Adams & Adams and Spoor and Fisher, as well as the University of Stellenbosch, where they received experiential training in various aspects of patent attorney practice. The candidates also made meaningful progress in their studies. Two of the three candidates are expected to complete their LLB degree by the end of 2006.

The IPMO also led the drafting of the Innovation Fund's terms of reference for the establishment of technology transfer offices or IP management offices at various higher education institutions. Discussions were underway for the creation of such capacity at the universities of KwaZulu-Natal and at the Nelson Mandela Metropolitan Municipality before the end of 2006.

6.2.4.3 NACI Secretariat

NACI has considerably strengthened its policy capacity in the past year. A major deliverable was the South African country report for the review of South Africa's NSI by the Organisation for Economic Cooperation and Development (OECD). The international review team visited South Africa in September 2006. A final report of the outputs of the research, human capital and innovation components of the system is being finalised and will be provided to the Minister for submission to Cabinet in the first quarter of 2007. Advice was provided to the Minister on, among others, S&T infrastructure, the quality of publications and journals, the envisaged approach to IPR from publicly financed research, the issue of women in science and technology and the current organising arrangements in the NSI.

6.2.5 Selected medium-term output targets

Sub-programme	Output	Measure/indicator	Target
Space	Establish and operate the South African Space Agency	Agency established and operational	December 2007
	Launch and operate SumbandilaSAT	Launch completed and mission control TTC in place	July 2007
Innovation Priorities and Instruments	SKA/KAT – establish 10% programme	International partnerships and agreed programme	March 2008
	Foundation for Technological Innovation (FTI)	FTI established	December 2007
Biotechnology and Health	Establish a biosafety platform that can assist in the development of the biosafety requirements for South African biotechnology developments	Plantbio to establish a biosafety platform – full business plan and resource	August 2007
	Develop structural biology as a programme that underpins rational drug design and other fields of biotechnology	Strategy/plan for structural biology to develop as a programme	October 2007
	Health innovation Strategy	Tuberculosis Research and Health Innovation Strategy approved	October 2008
Hydrogen and Energy	Hydrogen and Fuel Cell Technologies Strategy	Strategy approved by Cabinet	May 2007
	Agreements with private sector on jointly funded flagship projects	Three joint DST/ private sector funded projects	August 2007
	Develop competence centres	Two consortium- based competence hubs established, programmes evaluated, prioritised and funded	June 2007
National Advisory Council on Innovation	High-quality Secretariat function	As evaluated by the Council	

6.3 Programme 3: International Cooperation and Resources

This programme aims to develop and monitor bilateral and multilateral relationships and agreements in science and technology to strengthen the NSI and enable a flow of knowledge, capacity and resources into both South Africa and its African neighbours. It has three sub-programmes:

- Bilateral Cooperation
- Multilaterals and Africa
- International Resources

6.3.1 Expenditure estimates

Table 4: Expenditure on the International Cooperation and Resources programme since 2003/04

Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Multilaterals and Africa	27 554	28 954	57 529	80 763	68 473	92 735	102 350
International Resources	4 864	8 715	9 517	29 791	31 281	32 970	34 948
Bilateral Cooperation	8 090	8 501	10 589	17 392	18 262	19 248	20 403
Total	40 508	46 170	77 635	127 946	118 016	144 953	157 701
Change to 2006 budget estimate				28 525	7 399	21 328	

Economic classification

Current payments	20 474	24 320	31 777	65 127	51 411	74 644	85 650
Compensation of employees	7 899	10 361	13 411	16 410	21 105	22 266	23 550
Goods and services	12 575	13 959	18 366	48 717	30 306	52 378	62 100
of which:							
Communication	880	924	843	1 677	4 279	6 039	6 388
Computer services	555	584	443	652	1 663	2 348	2 483
Consultants, contractors and special services	2 641	2 773	2 886	8 030	4 209	11 355	12 577
Inventory	1 687	1 776	541	1 981	680	714	757
Operating leases	135	143	213	159	406	573	606
Travel and subsistence	3	3	9		3	9	15
	395	565	797	9 668	598	278	362
Transfers and subsidies	19 625	21 326	45 395	62 670	66 459	70 155	71 888

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Table 4: Expenditure on the International Cooperation and Resources programme since 2003/04 (continued)

Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Provinces and municipalities	11	25	37	11	–	–	–
Departmental agencies and accounts	11 713	16 325	25 168	28 847	26 530	27 830	27 122
Universities and technikons	–	–	1 855	1 149	–	–	–
Public corporations and private enterprises	–	–	10 173	9 024	–	–	–
Foreign governments and international organisations	–	11	–	–	–	–	–
Non-profit institutions	7 901	4 965	7 997	23 603	39 929	42 325	44 766
Households	–	–	165	36	–	–	–
Payments for capital assets	409	524	463	149	146	154	163
Machinery and equipment	409	524	463	149	146	154	163
Total	40 508	46 170	77 635	127 946	118 016	144 953	157 701

Details of major transfers and subsidies:
Departmental agencies and accounts
Current

	11 713	16 325	25 168	28 847	26 530	27 830	27 122
Africa Institute of South Africa	11 713	16 325	18 968	24 954	26 530	27 830	27 122
Global Science	–	–	6 200	3 893	–	–	–

Universities and technikons
Current

	–	–	1 855	1 149	–	–	–
Global Science	–	–	1 855	1 149	–	–	–

Public corporations
Other transfers
Current

	–	–	10 173	9 024	–	–	–
Global Science	–	–	10 173	9 024	–	–	–

Foreign governments and international organisations
Current

	–	11	–	–	–	–	–
Global Science	–	11	–	–	–	–	–

Non-profit institutions
Current

	7 901	4 965	7 997	23 603	39 929	42 325	44 766
Global Science	7 901	4 965	7 997	23 603	39 929	42 325	44 766

6.3.2 Expenditure trends

Expenditure increased at an annual average rate of 47% from R41 million in 2003/04, to R128 million in 2006/07. This is due to an increase in funding for leveraging international resources through matched

funding. Expenditure is expected to rise further over the 2007 MTEF due to increased participation in African science and technology, which relates to NEPAD projects, reaching R157 million in 2009/10. This will represent an annual average increase of 18%.

6.3.3 Service delivery objectives and indicators

6.3.3.1 Bilateral Cooperation

This sub-programme ensures cooperation with countries outside Africa to promote an information society and a knowledge economy. These cooperative relationships are an important resource in developing human capacity in science, engineering and innovation. As an example, a French-South African electronics technology institute (FSATIE) has been established. A multi-sectoral regional human capacity programme, including a South African chapter of the African Institute for Capacity Development (AICAD), has been established to generate local resources for research and development.

The Department hosted a successful international science innovation and technology exhibition, INSITE 2006. This biennial event is the only one of its kind in Africa and draws participants from the SADC countries and overseas. The cooperative arrangement between India, Brazil and South Africa (IBSA) was elevated through the first summit meeting in Brasilia on 13 September 2006. Four new S&T agreements were signed to enhance north-south and south-south cooperation in areas of importance for South Africa and the continent in general.

6.3.3.2 Multilaterals and Africa

This sub-programme coordinates the Department's participation in S&T-related multilateral organisations. It focuses specifically on those that are of benefit to South Africa.

The Committee for Scientific and Technological Policy of the Organisation for Economic Cooperation and Development (OECD) performed a peer review of the DST's NSI. This will inform the establishment of the proposed Foundation for Technological Innovation (FTI) and the development of a national industrial policy.

South African students participated in the UNESCO international summer school for young physicists in 2006. The UN Commission for Science and Technology for Development nominated South Africa to coordinate the establishment of a working group for Africa.

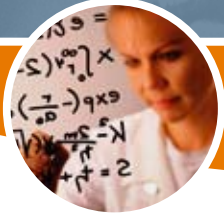
The Department promotes the further development and implementation of Africa's Consolidated Science and Technology Plan of Action (CPA). Support was given to the three AU/NEPAD flagship nodes based in South Africa: the African Institute for Mathematical Sciences (AIMS), the African Laser Centre (ALC) and the Southern African Biosciences Network (SANBio).

The Department also instituted a scholarship fund for postgraduate research students, tenable at South African institutions, while the Regional Science and Technology Fund was established to support multi-country joint research projects in Africa. The number of formal bilateral agreements has risen to twelve.

6.3.3.3 International Resources

This sub-programme provides the Department with the opportunity to leverage substantial funding from the EU's sixth framework programme through the European South African Science and Technology Advancement Programme (ESASTAP). ESASTAP has significantly enhanced South Africa's preparation for the EU's seventh framework programme.

The Cooperation Framework on Innovation Systems (COFISA) was signed with the Government of Finland. As co-chairs of the Group on Earth Observations (GEO), South Africa played a significant role in developing an implementation plan for the Global Earth Observation System of Systems (GEOSS) and the South African Earth Observation Strategy (SAEOS). The Department successfully established the capacity to monitor and evaluate new international technology and trends, and to leverage South Africa's competitive advantage internationally.



6.3.4 Recent outputs

South Africa increased its participation in the EU's sixth framework programme (FP6). There was also greater progress with proposals for dedicated funding for S&T from the European Programme for Reconstruction and Development. The second Ministerial Conference on Science and Technology was held, where the Consolidated Plan of Action for Science and Technology in Africa was adopted. South Africa also deepened relationships with France, the United Kingdom, Germany, Belgium, Norway and Japan.

The International Cooperation and Resources programme successfully completed South Africa's bid to host the world's largest radio telescope, the Square Kilometre Array (SKA), and also prepared South Africa's successful bid to host the third component of the International Centre for Genetic Engineering and Biotechnology (ICGEB). The ICGEB is currently housed at the University of Cape Town, and future location plans will be considered. This centre will bring immense financial and biotechnology and genetic engineering resources into the country and bolster South Africa's commitment to support regional cooperation.

Furthermore, the programme successfully hosted two important conferences. The Regional Impact of Information Society Technologies in Africa (IST-Africa) Conference was held in partnership with Finland and

the European Commission, while the Knowledge for Africa Conference was held with Finland and the World Bank. The programme also signed new bilateral agreements with Slovakia, Argentina, Mozambique and Mali. On the multilateral front, the DST, together with the Department of Foreign Affairs, the Academy of Sciences for the Developing World (TWAS) and the G77 Secretariat, hosted and chaired a G77 S&T Ministerial. This was the only sector-specific ministerial to be hosted by South Africa in its year of chairing the group. This meeting decided to launch the Consortium on Science, Technology and Innovation for the South (COSTIS) as called for in the Doha Plan of Action.

The International Cooperation and Resources programme also played a significant role in penetrating and taking science, technology and innovation issues to the NSI of the Organisation for Economic Cooperation and Development (OECD) for review, which resulted in the completion of the sustainable development commitments. The EU's account is positive with the new senior S&T representative moving to Brussels. Further achievements include solid preparation for the EU's seventh framework programme (FP7) with the European South African Science and Technology Advancement Programme (ESASTAP) and the S&T Europe-Africa Programme (STEAP) having completed the sector budget support proposal and penetration of other director-generals.

6.3.5 Selected medium-term outputs targets

Measurable objectives: To increase flows of scientific knowledge and resources to South Africa through participation in joint programmes.

Sub-programme	Output	Measure/Indicator	Target
Multilaterals and Africa	Deepen and strengthen African cooperation in S&T	Number of south-south partnerships and global science programmes	Five new partnerships or programmes
		Number of bilateral partnership programmes in all five regions in Africa	Ten new bilateral projects developed
International Resources	International resources (such as international research funding, foreign investment, donor support, location of global infrastructure, knowledge, etc) for science and technology in South Africa and Africa	Increase by 50% in the international funds won through leveraging and participation in comparison with the previous year	R50 million in new funds from international sources
Bilateral Cooperation	Country-to-country cooperation outside Africa, as well as development partnerships	Increased cooperation with countries in Eastern Europe and the Gulf region/Asia; increased development partnerships, especially with the Nordic countries	Ten new bilateral projects/programmes

6.4 Programme 4: Human Capital and Knowledge Systems

This programme aims to develop and implement national programmes to produce knowledge and develop human capital and associated infrastructure, equipment and public research services to produce the required human sources to sustain the country's system of innovation. It has three sub-programmes:

- Human Capital and Science Missions
- Emerging Research Areas and Infrastructure
- Indigenous Knowledge Systems

6.4.1 Expenditure estimates

Table 5: Expenditure on the Human Capital and Knowledge Systems programme since 2003/04

Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Human Capital and Science Missions	440 322	507 872	631 443	855 245	923 713	1 031 962	1 098 945
Indigenous Knowledge Systems	6 908	11 417	5 277	4 268	11 195	10 628	22 168
Emerging Research Areas and Infrastructure	1 559	1 829	2 301	3 929	322 421	379 818	450 120
Total	448 789	521 118	639 021	863 442	1 257 329	1 422 408	1 571 233
Change to 2006 budget estimate				45 099	346 828	404 838	
Economic classification							
Current payments	8 354	17 351	16 486	24 972	21 755	22 874	24 194
Compensation of employees	2 802	9 755	9 682	13 414	14 665	15 402	16 290
Goods and services	5 552	7 595	6 804	11 558	7 090	7 472	7 904
of which:							
Communication	442	518	647	584	372	391	414
Computer services	117	137	171	434	148	155	165
Consultants, contractors and special services	402	669	1 834	2 352	375	394	417
Inventory	1 025	1 005	256	328	312	328	347
Operating leases	11	18	22	48	49	51	55
Travel and subsistence	1 988	1 778	2 913	3 645	4 795	5 035	5 337
Financial transactions in assets and liabilities	–	1	–	–	–	–	–
Transfers and subsidies	440 353	503 480	622 522	838 439	1 235 364	1 399 313	1 546 805
Provinces and municipalities	5	11	30	3	–	–	–
Departmental agencies and accounts	411 080	454 288	564 016	759 210	1 052 099	1 159 403	1 256 629
Universities and technikons	–	–	4 761	10 534	–	–	–
Public corporations and private enterprises	–	–	22 748	1 807	–	–	–
Non-profit institutions	29 268	49 181	30 643	66 883	183 265	239 910	290 176
Households	–	–	324	2	–	–	–
Payments for capital assets	82	287	13	31	210	221	234
Machinery and equipment	82	287	13	31	210	221	234
Total	448 789	521 118	639 021	863 442	1 257 329	1 422 408	1 571 233

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Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Details of major transfers and subsidies:							
Departmental agencies and accounts							
Current	404 239	450 288	548 776	709 210	1 002 099	1 018 297	1 059 970
National Research Foundation	404 239	446 288	512 641	586 671	650 299	685 847	692 671
Frontier Science and Technology	–	–	8 896	13 272	–	–	–
Science Themes	–	–	14 639	28 957	–	–	–
Human Resource Development	–	–	12 600	54 607	183 500	236 810	266 143
Learnerships	–	4 000	–	3 703	6 300	6 640	7 023
South African National Research Network	–	–	–	22 000	162 000	89 000	94 133
Capital	6 841	4 000	15 240	50 000	50 000	141 106	196 659
National Research Foundation	6 841	4 000	4 240	–	–	–	–
Research and development infrastructure	–	–	–	50 000	50 000	141 106	196 659
Equipment placement	–	–	11 000	–	–	–	–
Universities and technikons							
Current	–	–	4 761	3 200	–	–	–
Science and Youth	–	–	681	–	–	–	–
Frontier Science and Technology	–	–	3 400	–	–	–	–
Science Themes	–	–	680	3 200	–	–	–
Capital	–	–	–	7 334	–	–	–
Frontier Science and Technology	–	–	–	7 334	–	–	–
Public corporations							
Other transfers							
Current	–	–	22 748	1 807	–	–	–
Frontier Science and Technology	–	–	12 362	1 066	–	–	–
Science Themes	–	–	7 252	–	–	–	–
Learnerships	–	–	3 134	741	–	–	–
Non-profit institutions							
Current	29 268	49 181	30 643	34 217	78 265	95 410	136 167
Learnerships	–	–	1 866	–	–	–	–
Academies	2 290	2 500	2 500	3 000	4 274	4 820	6 815
Frontier Science and Technology	–	–	3 734	1 166	–	–	–
Science Themes	13 983	25 681	3 143	6 513	39 991	42 132	58 151
Science and Youth	7 294	11 000	15 900	20 038	29 000	43 188	54 525
Indigenous Knowledge Systems	5 701	10 000	3 500	3 500	5 000	5 270	16 676
Capital	–	–	–	32 666	105 000	144 500	154 009
Frontier Science and Technology	–	–	–	32 666	105 000	144 500	154 009



6.4.2 Expenditure trends

Expenditure increased at an average annual rate of 24% from R449 million in 2003/04, to R863 million in 2006/07 due to increased support for human capital initiatives. The trend from 2007/08 shows steady growth of 11% over the 2007 MTEF. The growth is mainly due to new and increased support for science, engineering and technology human capital, as well as for research and development infrastructure.

6.4.3 Service delivery objectives

6.4.3.1 Human Capital and Science Missions

This sub-programme conceptualises, formulates and implements programmes that address the availability of human capital for science, technology and innovation; produces new knowledge to build the knowledge resources of the country (through science investment in areas of geographic advantage – the science missions); and interfaces positively with the institutions that are key in the production of S&T knowledge and human resources for the NSI. It seeks to contribute to these outcomes by addressing the building blocks that lead to the necessary conditions for technological innovation.

6.4.3.2 Emerging Research Areas and Infrastructure

This sub-programme steers the advancement of novel and cross-cutting research areas and the establishment of world-class research infrastructure in the NSI. It drives the strategic direction to synergise opportunities for emerging research areas, infrastructure, large-scale facilities and the development of critical mass. Complementing initiatives among stakeholders in the public and private sector will be facilitated to develop a competitive research nucleus.

6.4.3.3 Indigenous Knowledge Systems

Through the National Indigenous Knowledge Systems Office (NIKSO), this sub-programme focuses on the development of indigenous knowledge and its integration into the NSI through the development and implementation of policy and the undertaking of strategic projects.

6.4.4 Recent outputs

6.4.4.1 Science and Youth

As a unit that is at the upstream end of the human capital development pipeline, initiatives in this area are of extreme importance in the long-term sustainability of all efforts to increase the availability of scientists and researchers in the South African science system.

The Youth into Science Strategy, which has been under development for the past year, has been finalised with widespread consultation with stakeholders. The policy on the Network of Science Centres, which was adopted during 2005, has been further enhanced by the development and approval of a 25-year implementation plan. This envisages at least one full-service science centre in each province and at least one limited service science centre in each district.

The collaboration with the Department of Education (DoE) has borne fruit, with most of the initiatives in this unit fully supported and enhanced by the involvement of the DoE at national and provincial levels. One of the new highlights for 2005/06 was the teacher workshops held with the aim of assisting teachers with the new mathematics and physical science curricula.

6.4.4.2 African Origins Platform

South Africa's rich heritage in palaeontology has been highlighted in the NRDS as one of the country's geographical advantages. This platform seeks to exploit this for the benefit of new knowledge production; the training of the next generation of experts in this area; the fostering of innovations based on new and applied knowledge in palaeontology and archaeology; and the establishment of research collaborations in Africa and throughout the world.

In a process that commenced during 2004, the development of a strategy for supporting research in this area was completed during 2006, with support from a wide variety of stakeholders. The consultations

included an evolution in thinking from the human palaeontology focus in the NRDS, to a comprehensive strategy including all the sub-disciplines of palaeontology and archaeology in an effort to tell the entire story of African origins. The finalisation and approval of this strategy has been a major output and creates the environment for research, human capital development and innovation to thrive in this area. It has now become much clearer what South Africa needs to be doing to consolidate this area of geographical advantage.

6.4.4.3 Human Capital Development

The establishment of the South African Research Chairs Initiative (SARChI) is one of the significant interventions in the area of human capital development. The response from the targeted higher education sector has been extremely positive and indicates that this initiative is set to be one of the most significant in the revitalisation of the NSI through an injection of expertise and funding in key areas aligned with government strategy.

Programmes aimed at other mid-stream points of the human capital pipeline, such as a bursary initiative for honours students, a professional development programme and a postdoctoral fellowship, have been developed and are being implemented. The existing CoEs continue to foster the exploitation of cross-disciplinary and cross-institutional collaborations among researchers and institutions respectively. Furthermore, the CoEs continue to improve the number of students up to doctoral level and to attract postdoctoral researchers. The consolidation of the Department's endeavours in human capital will culminate in the Science, Engineering and Technology Human Capital Strategy, which will articulate its aspirations for the building of a robust human capital base in the country.

6.4.4.4 Nanoscience and Nanotechnology

The National Nanotechnology Strategy was approved by Cabinet and launched in March 2006. The implementation plan of the strategy has been developed and is being implemented. The National

Nanotechnology Equipment Programme is being rolled out in partnership with the NRF as part of the research and development infrastructure. This will provide investigators with the tools to conduct this specialised research.

Plans are being developed to establish two nanotechnology centres. These centres will provide a concentrated effort to conduct world-class research and development in nanoscience and technology and will champion the development of human resources in this emerging area.

6.4.4.5 Cyber Infrastructure

A High Performance Computing Centre (HPC) is being established as a joint initiative by the DST, the Meraka Institute at the CSIR and the University of Cape Town to provide computing power for research and innovation activities. The installation of the first phase of the infrastructure was initiated in December 2006, with the centre being commissioned in March 2007.

The South African National Research Network (SANReN) will provide national broadband networks and global connectivity for the transmission of research data. The National Equipment Programme (NEP) is geared to support the acquisition, or to upgrade the equipment to state-of-the-art instrumentation to enable national research institutions to undertake world-class research and to provide infrastructure for research capacity development. The implementation of the programme in the first year supported the acquisition of instrumentation in a variety of science areas.

6.4.4.6 Indigenous Knowledge Systems

The national effort for the recognition, protection, development and promotion of Indigenous Knowledge Systems (IKS) is underway and gathering momentum in South Africa. A national IKS office was established in April 2006 for the implementation of the IKS policy. This was a significant milestone.

The office has a three-tier structure: Advocacy and Policy Development (which focuses on the mobilisation and management of a variety of stakeholders), Knowledge Development (which concentrates on research and development in IKS) and Knowledge Management (which is tasked with the integration and management of all IKS-related databases, the registration and certification of knowledge-holders, and the auditing, monitoring and evaluation of the indigenous

knowledge being generated within the entire NSI). Another notable milestone is the establishment of an IKS laboratory on traditional medicines.

6.4.5 Selected medium-term output targets

Measurable objective: To utilise the resources of the DST and institutions to develop and maintain a thriving, expanding and representative human capital base.

Sub-programme	Output	Measure/indicator	Target
Human Capital and Science Missions	The South African Research Chairs Initiative	First 20 research chairs established and funded	Twenty research chairs in place and fully functional and funded at higher education institutions by June 2007
		New research chairs identified	Thirty-five candidate research chairs from science systems outside South Africa identified by April 2008
			Fifty new research chair candidates by April 2009
		Sixty new research chair candidates by April 2010	
	Centres of excellence	Two new centres of excellence established	By 2010
The Youth into Science Strategy increases a pool of disadvantaged youth in science, technology, engineering and mathematics		Two-fold increase of youth participating in National Science Week	Annual increase of 25 000 youth participating in National Science Week
		Two-fold increase of disadvantaged youth pursuing careers in SET	Annual increase of 750 disadvantaged youth participating in activities of the Youth into Science Strategy
		Provided unemployed graduates with opportunities to develop critical skills through youth service programmes	Internships and mentorships benefit 100 interns and mentors annually
		Mathematics and science educators are equipped to support curriculum-delivery and learners participating in competitions and olympiads	Annually, mathematics and science educators from 450 schools are equipped with knowledge and skills to support curriculum-delivery and learners participating in competitions and olympiads
		Capacity of the Network of Science Centres is strengthened to support the delivery of the Youth into Science Strategy	Capacity-building programme benefits 15 science centres annually Programmatic support is given to 15 science centres annually
Science engineering and technology (SET) human capital programmes		Supported programmes for mid-stream human capital pipeline; supported honours students	Two hundred students supported by December 2007
		Established life skills support programmes and reference group	June 2007
		Established support programme for unemployed science and engineering graduates	New programmes implemented

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Sub-programme	Output	Measure/indicator	Target
Human Capital and Science Missions	Science engineering and technology (SET) human capital programmes	Established support programme for engineering skills	Concept approved and implemented: January 2008
		Extension of the professional development programme	Concept approved and implemented: June 2007
	Science missions and platforms	Decadal plan for Astronomy Geographical Advantage Strategy developed and approved	Plan presented for approval: December 2007
		Palaeo-sciences (African Origins) research development plan approved and funded	Grants under the African Origins platform strategy given to individuals and groups of researchers: September 2007
		Marine Research Strategy incorporating ACEP developed and approved	Research grants funded for ACEP: June 2007 Research grants for the rest of the strategy funded: December 2007
Emerging Research Areas and Infrastructure	Successful implementation of the National Nanotechnology Strategy	Established nanotechnology characterisation centres	Two centres established and funded: October 2007
	Feasibility of establishing a national institute of nanotechnology	Completed assessment and finalised feasibility report.	Report in place: December 2007
	Continue the roll-out of the National Nanotechnology Equipment Programme	Increased availability of critical instruments for nanotechnology	Ongoing: progress assessed annually to guide subsequent years' roll-out plan
	Development of new research areas	A plan for the establishment and development of the photonics research area completed	Plan finalised: July 2007
		Structural Biology Plan completed	Plan finalised: December 2007
		National Theoretical Physics Institute: full proposal developed	Proposal for the development of the institute finalised: January 2008
		Developed the aptamer research area	Proposal finalised: May 2007
		Feasibility study of a pre-clinical trial platform	Study completed: December 2007
	Cyber Infrastructure: establishment of a Centre for High Performance Computing	First fully functional node of the centre for high performance computing in Cape Town	Cape Town node commissioned and operational: April 2007
		Established a second node in Tshwane, Gauteng	Gauteng node commissioned and operational: February 2009
Cyber Infrastructure: national broadband network for research	Layout of the physical infrastructure for SANReN - Phase I	Phase I network functional: March 2009	
National Equipment Programme: roll-out national equipment programme	Developed a database of equipment purchased and received by researchers	Database in place and functional: December 2007	

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Sub-programme	Output	Measure/indicator	Target
Indigenous Knowledge Systems: Advocacy and Policy Development	Strong participation of IKS in National Science Week	Increased number of learners pursuing IKS careers	Double the number: November 2010
	Development of regulatory framework on medicinal plants	Feasibility study conducted and policy developed and implemented	Approved by Cabinet: December 2008
	Public awareness campaign	IKS policy awareness programme in place	Awareness programme with performance measurement system in place: December 2008
	Development of provincial nodes	Nodes developed and established	Nine established: December 2008
Knowledge Development	Coordinate national IKS research agenda	Identified IKS priority research areas	Two workshops with IK-holders and traditional leaders – IKS research plan finalised: May 2008
		Funding programme for IKS research projects established and funded	March 2008
	Establish IKS research laboratories	Study on IKS areas that need to be developed through IKS laboratories, e.g., medicine, food, cosmetics, jewellery	Study completed: December 2007
		Establish and fund IKS laboratories by 2010	Eight IKS laboratories established and funded: December 2008
	Establish IKS research chairs	Identify priority areas to be interfaced within higher education institution, e.g. health systems, medicine, natural sciences	Establish and fund nine chairs: May 2010
	Establish IKS Centres of Excellence	Identify and call for proposals on the establishment of Centres of Excellence by 2010, e.g. education, public health, natural science, IK technologies	Establish six IKS Centres of Excellence: March 2010
Knowledge Management	Establish IKS centres	Pilot and establish IKS centres to collect, document and disseminate IK	Nine IKS centres established: February 2010
	Develop and maintain IKS databases/databank	Audit of existing IKS databases; develop IKS databases, software, portals, search engines, patent classification and protection measures	A databank and IKS digital library connecting developed: July 2010
	Establish IKS recordable systems	Obtain a hardware multimedia recording system to capture synchrotextual documentation	A fully functional recording system: June 2010
	Registration of IKS-holders and practitioners	Develop databases/registries of IK-holders and practitioners	An active GPS containing an accreditation of IK-holders and practitioners: August 2010
Develop a populated Geographic Positioning System on IK-holders and practitioners		Register of IK-holders and practitioners: December 2010	

6.5 Programme 5: Socio-economic Partnerships

This programme aims to lead and support other government departments in sector-specific research and development, technology and directed human capital programmes. It has three sub-programmes:

- Science and Technology for Economic Impact
- Science and Technology for Social Impact
- Science and Technology Investments

6.5.1 Expenditure estimates

Table 6: Expenditure on the Socio-economic Partnerships programme since 2003/04

Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Science and Technology for Economic Impact	435 445	510 016	714 965	781 118	855 252	904 275	945 726
Science and Technology for Social Impact	102 570	157 381	166 106	219 304	257 143	262 503	261 180
Science and Technology Investment	6 320	2 135	2 686	7 418	22 866	26 533	28 916
Total	544 335	669 532	883 757	1 007 840	1 135 261	1 193 311	1 235 822
Change to 2006 budget estimate				(123 917)	(123 948)	(213 973)	

Economic classification

Current payments	8 319	12 747	10 890	24 155	42 476	46 941	51 390
Compensation of employees	3 790	5 948	5 553	11 655	18 599	19 599	21 290
Goods and services	4 529	6 799	5 337	12 500	23 877	27 342	30 100
<i>of which:</i>							
Communication	242	284	354	824	639	671	711
Computer services	233	273	341	64	200	210	223
Consultants, contractors and special services	1 584	1 159	2 321	4 199	18 250	21 433	23 835
Inventory	182	700	192	246	392	412	436
Operating leases	51	59	74	326	150	158	167
Travel and subsistence	901	757	1 320	2 818	3 339	3 506	3 716
Transfers and subsidies	535 859	656 623	872 772	983 499	1 092 400	1 146 164	1 184 214
Provinces and municipalities	9	6 574	16	5	–	–	–
Departmental agencies and accounts	164 526	198 736	177 242	325 531	388 688	392 422	398 607
Universities and technikons	–	16 289	4 729	624	–	–	–
Public corporations and private enterprises	334 554	366 326	563 927	494 967	517 352	544 749	571 487
Non-profit institutions	36 770	59 770	126 855	162 338	186 360	208 993	214 120
Households	–	8 928	3	34	–	–	–
Payments for capital assets	157	162	95	186	385	206	218
Machinery and equipment	157	162	95	186	385	206	218
Total	544 335	669 532	883 757	1 007 840	1 135 261	1 193 311	1 235 822

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Table 6: Expenditure on the Socio-economic Partnerships programme since 2003/04 (continued)

Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Details of major transfers and subsidies:							
Municipalities							
Current	9	6 574	16	5	–	–	–
Regional Services Council levies	9	13	16	5	–	–	–
Technology for Poverty Alleviation	–	6 561	–	–	–	–	–
Departmental agencies and accounts							
Current	164 526	198 736	177 242	325 531	388 688	392 422	398 607
Technology Planning and Diffusion	46 176	47 900	6 470	67 858	49 339	53 922	59 108
Advanced Manufacturing Technology Strategy	2 750	21 000	–	51 800	62 400	56 204	59 445
South African National Energy Research Institute	–	10 000	–	40 000	42 000	44 268	46 260
National Public Assets	30 000	35 000	43 000	43 000	43 000	45 322	47 936
Human Sciences Research Council	70 030	83 336	104 293	119 873	155 949	156 706	149 858
Indicators	4 500	–	–	–	–	–	–
Leveraging Services Strategy	–	–	–	3 000	–	–	–
Resource-based Industries	–	–	650	–	–	–	–
Centres of Excellence	11 070	1 500	20 000	–	–	–	–
Technology for Poverty Alleviation	–	–	1 479	–	–	–	–
Technology for Sustainable Livelihoods	–	–	1 350	–	–	–	–
Tshumisano Trust	–	–	–	–	36 000	36 000	36 000
Universities and technikons							
Current	–	16 289	4 729	624	–	–	–
Technology for Sustainable Livelihoods	–	16 289	2 447	624	–	–	–
South African National Energy Research Institute	–	–	500	–	–	–	–
Information Communication Technology	–	–	282	–	–	–	–
Technology for Poverty Alleviation	–	–	1 500	–	–	–	–
Public corporations							
Other transfers							
Current	334 554	366 326	563 927	494 967	517 352	544 749	571 487
Technology for Sustainable Livelihoods	–	–	31 051	–	–	–	–
Technology Planning and Diffusion	–	–	5 000	–	–	–	–
Advanced Manufacturing Technology Strategy	–	–	41 515	–	–	–	–
Resource-based Industries	–	–	15 050	642	–	–	–
Information Communication Technology	–	–	13 741	–	–	–	–
Council for Scientific and Industrial Research	323 014	348 326	431 649	483 194	517 352	544 749	571 487
Council for Scientific and Industrial Research: National Laser Centre	11 540	18 000	18 000	–	–	–	–
Technology for Poverty Alleviation	–	–	7 921	11 131	–	–	–

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Sub-programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Non-profit institutions							
Current	36 770	59 770	126 855	162 338	186 360	208 993	214 120
Resource-based Industries	650	10 000	4 380	29 358	31 500	33 201	35 116
Technology Planning and Diffusion	–	–	68 824	19 500	–	–	–
Information Communication Technology	4 856	9 000	–	29 200	54 210	69 977	68 148
Technology for Poverty Alleviation	9 263	24 200	2 000	31 904	40 000	42 160	44 268
Technology for Sustainable Livelihoods	22 001	16 570	12 151	52 376	55 650	58 655	61 588
Nuclear Energy Corporation of South Africa: Fluoro chemicals	–	–	20 000	–	–	–	–
South African National Energy Research Institute	–	–	19 500	–	–	–	–
Biofuels	–	–	–	–	5 000	5 000	5 000
Households							
Other transfers							
Current	–	8 928	3	34	–	–	–
Technology for Sustainable Livelihoods	–	8 928	–	–	–	–	–
Gifts and donations	–	–	3	34	–	–	–

6.5.2 Expenditure trends

Expenditure growth in the past three years was fairly robust at 23%, from R544 million in 2003/04, to R1 billion in 2006/07 due to an increase in support for energy initiatives, the Advanced Manufacturing Technology Strategy and the CSIR. Thereafter it increased at a steady rate of 5% over the 2007 MTEF period. The 2007 budget includes additional budgets of R25 million for ICT R&D, as well as R65 million for science and technology planning, monitoring and evaluation.

6.5.3 Service delivery objectives and indicators

6.5.3.1 Science and Technology for Economic Impact

This sub-programme leads and supports a number of strategic science and technology interventions requiring interdepartmental and government and industry cooperation to achieve government's strategic economic growth and development objectives.

6.5.3.2 Science and Technology for Social Impact

The objective of this sub-programme is to introduce and promote innovative technology and management systems to support the creation of sustainable jobs and wealth opportunities in areas of deprivation and, with a focus on sustainability, to contribute to issues of human settlement. It focuses on technologies and systems that are mature, but do not have widespread application and are seen to have the potential to achieve government's broad objectives. The activities require interdepartmental cooperation for extending scientific research and applying technology to address identified priorities in different sectors and those expressed in the context of the millennium development goals. It does this by providing leadership in strategic research and in building partnerships with other government departments in applied research and technology development and by developing programmes and institutional capacity.



6.5.3.3 *Science and Technology Investments*

This sub-programme leads and supports the development of S&T indicators, monitors national S&T expenditure and plans and implements programmes to enhance private sector expenditure on R&D.



6.5.4 *Recent outputs*

6.5.4.1 *New national research strategies*

Progress has included the development of an energy research and development strategy and an associated action plan. There is worldwide acknowledgement that science and technology will play a key role in climate change policies and efforts. A climate change R&D strategy has been developed to guide South Africa's efforts in both mitigation and adaptation technologies, as well as to create a framework for building human capital in this area.

A comprehensive ICT R&D strategy was developed in close consultation with key role-players. Over the next few years, the Department will establish critical mass research programmes in all areas identified in the ICT R&D strategy in partnership with the Meraka Institute. The Department also contributed to the development of proposals on research, development and technical standards for the biofuels industrial strategy.

Implementation of the Advanced Manufacturing Technology Strategy (AMTS) and the Advanced Metals Initiative (AMI) came under review by independent panels of experts. The strategic refocusing of these two research programmes is designed to impact much more strongly on the economy.

6.5.4.2 *Local level science and technology interventions*

The DST works closely with provinces to identify technological interventions that can support provincial growth and development. On this basis, a study was finalised that examined the cold chain and post-harvesting technology needs of the fresh fruit industry. Based on the study, a technology intervention plan

is being finalised to enhance the competitiveness of the South African fresh fruit industry in a number of provinces to meet international standards and to compete globally.

6.5.4.3 *Fablabs*

Fabrication laboratories (Fablabs) are a group of off-the-shelf, industrial-grade fabrication and electronics tools, wrapped in open-source software and programmes available to communities, particularly the youth. The first fablab opened its doors at the Innovation hub in June 2005. Two fablabs are functional (in Soshanguwe and Bloemfontein), with a further two at an advanced stage of preparation. The initial fablabs have generated huge interest among the youth, with the facilities in constant use.

6.5.4.4 *Agro-processing*

Essential oils is one of the major interventions and involves the application of indigenous knowledge, agricultural science, chemistry, medical science and improved mature manufacturing technology to build bridges from the second economy and integrate with first economy industries such as pharmaceuticals. Another major area of focus for the DST is aquaculture activities.

6.5.4.5 *Integrated planning*

The DST, in collaboration with the National Treasury, has made considerable progress in structuring a framework for reporting, across government, on S&T expenditure. This framework includes a survey instrument with internationally benchmarked definitions on S&T activities. It will allow the expenditure reporting by all government departments to be integrated into the Estimates of national Expenditure (ENE) reports in the future. Once this comes into operation, the DST will be in a position to analyse the expenditure reports across government and prepare a holistic view on S&T expenditure by the government. This information will be consolidated into a supplement to the ENE to provide a broad view of public S&T expenditure according to sector.

6.5.5 Selected medium-term output targets

Measurable objective: To build partnerships and programmes to ensure the appropriate contribution of science and technology within different sectors.

Sub-programme	Output	Measure/Indicator	Target
Science and Technology for Economic Impact	Directed science, engineering and technology programmes demonstrating potential for positive economic results	The number of new flagship programmes of advanced manufacturing technology that are rolled out	Roll-out of additional flagship programmes of AMTS initiated in 2006/07
		Number of new flagships programmes under the ICT research and development strategy	The establishment of an additional flagship programme that will advance the 2006 ICT R&D strategy
		Number of new chairs of energy research and development under the South African National Energy Research Institute (SANERI)	Establish an additional three new chairs of energy research and development under SANERI in 2007
		Number of technology interventions that support provincial growth and development strategies	Initiate two additional provincially-based technology interventions
Science and Technology for Social Impact	Establish institutional capacity to implement activities that apply science and technology to address the challenges of poverty eradication	All the necessary actions required to consolidate the diverse range of poverty reduction projects under the implementation of one agency, a proposed public benefit foundation	Finalise by June 2007
	Special policy research projects on enhancing understanding of poverty and unemployment in the country	Research report, workshops and a conference on issues relating to the definitions of poverty and underdevelopment	Report by May 2007, workshop by June 2007 and conference by August 2007
		Research report and workshops on scenarios for reducing unemployment	Draft report by May 2007, workshop for Social and Economic Cluster and other stakeholders thereafter and final report by August 2007
	Special policy research projects on analytical modelling for integrated and sustainable development planning	Research report, workshops and conference on findings of special study	Draft report by June 2007, workshops with stakeholder departments before and after conference in early October 2007
Activities to support decision-making across government	Reports on and demonstrations of alternative, more affordable and effective technology solutions in government service delivery	Five technology reports during 2007/08 and one technology demonstration contributing to government's Project Consolidate	

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Sub-programme	Output	Measure/Indicator	Target
Science and Technology Investments	Science and Technology Expenditure Plan	Publish government Science and Technology Expenditure Plan; Science and Technology Investment Management System accessible to all public research and development institutions and users (Phase II and III)	The 2006/07 budgeting cycle and annually thereafter
	Effective planning and efficient investment on science and technology by government departments	Research and development plans and strategic plans approved by Cabinet	By 2007/08
	Reports on performance of S&T indicators	R&D survey report; innovation survey report	By 2007/08
	Evaluation of the R&D tax incentives programme	Monitor the uptake/awareness of the R&D tax incentives; monitor and evaluate the impact of the R&D Tax Incentives Scheme as described in the Income Tax Act (amended)	By 2007/08 and annually thereafter

7. PUBLIC ENTITIES AND OTHER AGENCIES REPORTING TO THE MINISTER

The allocation of funds to science council and financial instruments begins with the National Treasury's budget guidelines. Science councils then interact with the DST on national development priorities and make three-year budget submissions. From these, the DST coordinates a consolidated submission to the National Treasury. The resulting government allocation for the respective councils is then distributed to each individual science council, in line with advice from the National Advisory Council on Innovation (NACI), and included in the MTEF allocation of the DST.

7.1 Human Sciences Research Council

The Human Sciences Research Council (HSRC) is a statutory body established in 1968 to support development in South Africa and Africa by conducting applied social science research projects and coordinating research in terms of the Human Sciences Research Act (1968).

As a result of a policy shift to focus more on the public purpose of human sciences research, a new HSRC Bill was introduced to Cabinet in December 2006. The HSRC subsequently primarily conducts large, policy-relevant research projects for public sector users, NGOs and international development agencies.

The HSRC has aligned its research structures and activities to major development priorities, with the focal areas covering technology and education, democracy and governance, integrated rural and regional development and the social aspects of HIV/Aids and health. Future research work includes understanding the extent of poverty in rural areas, the impact of HIV/Aids, and how to leverage the service sector for better economic growth.

Allocations for the MTEF period are R130 million, R137 million and R143 million. In addition, the HSRC has received ring-fenced allocations of R28 million, R29 million and R29 million for the MTEF period, giving rise to an increase of over 140% between 2002/03 and 2007/08. Compensation of employees amounts to 43% of the total expenditure.

Table 7: Income and expenditure of the HSRC since 2003/04

	Audited outcome			Estimated outcome	Medium-term estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Revenue							
Non-tax revenue	64 510	91 949	125 170	74 770	84 229	88 187	97 007
Sale of goods and services other than capital assets	51 053	75 359	111 353	58 029	65 370	68 442	75 287
<i>of which:</i>							
Social science research revenue	51 053	75 359	111 353	58 029	65 370	68 442	75 287
Other non-tax revenue	13 457	16 590	13 817	16 741	18 859	19 745	21 720
Transfers received	122 643	145 459	91 833	186 756	214 911	226 653	236 941
Total revenue	187 153	237 407	217 003	261 526	299 140	314 840	333 948
Expenses							
Current expenses	184 507	229 056	214 889	258 222	295 463	310 974	329 696
Compensation of employees	70 777	82 816	83 230	110 808	127 389	134 496	142 112
Goods and services	108 036	140 058	126 275	140 881	160 802	168 834	179 175
Depreciation	5 694	6 182	5 384	6 533	7 272	7 644	8 409
Transfers and subsidies	2 856	3 558	595	3 304	3 677	3 866	4 252
Total expenses	187 363	232 614	215 484	261 526	299 140	314 840	333 948
Surplus / (Deficit)	(210)	4 793	1 519	-	-	-	-
Balance sheet data							
Carrying value of assets	57 930	49 494	48 988	85 698	104 583	116 926	121 650
Investments	39 352	29 070	14 273	14 940	15 687	16 472	17 295
Inventory	1 724	1 474	1 312	2 124	2 230	2 342	2 459
Receivables and prepayments	27 679	33 731	37 345	22 539	23 666	24 850	26 092
Cash and cash equivalents	8 995	1 305	1 781	1 758	1 846	1 938	2 035
Total assets	135 680	115 074	103 699	127 059	148 012	162 527	169 531
Capital and reserves	53 419	46 994	44 275	80 291	94 305	104 365	108 791
Trade and other payables	74 707	60 608	50 680	38 278	44 792	48 801	50 911
Provisions	7 554	7 472	8 744	8 490	8 915	9 361	9 829
Total equity and liabilities	135 680	115 074	103 699	127 059	148 012	162 527	169 531

Source: Human Sciences Research Council

7.2 Council for Scientific and Industrial Research

The Council for Scientific and Industrial Research (CSIR) is governed by the Scientific Research Council Act (1988), as amended. Its mandate is to foster industrial and scientific development in the national interest, through multidisciplinary research and technological innovation, either by itself or in partnership with public and private sector institutions.

It generates about 60.7% of total revenue from own income, 59.4% of which is generated through sales of goods and services. The allocations for the MTEF period are R507 million, R535 million and R562 million. In addition, the CSIR has received ring-fenced allocations of R19 million, R23 million and R22 million for the MTEF period. Compensation of employees is at 56% of total expenditure. It is projecting a surplus of about R24 million for 2007/08 and has consistently reported surpluses in the past, peaking at R78 million in 2004/05.

Table 8: Income and expenditure of the CSIR since 2003/04

	Audited outcome			Estimated outcome	Medium-term estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Revenue							
Non-tax revenue	654 239	724 265	740 786	716 255	717 010	751 808	788 348
Sale of goods and services other than capital assets	638 931	646 777	612 156	689 179	689 631	724 112	760 318
<i>of which:</i>							
Scientific research revenue	638 931	646 777	612 156	689 179	689 631	724 112	760 318
Other non-tax revenue	15 308	77 488	128 630	27 076	27 379	27 696	28 030
Transfers received	321 996	356 992	391 077	423 854	445 046	469 078	492 532
Total revenue	976 235	1 081 257	1 131 863	1 140 109	1 162 056	1 220 886	1 280 880
Expenses							
Current expenses	938 136	1 004 888	1 072 623	1 116 584	1 137 016	1 194 238	1 252 902
Compensation of employees	539 741	567 621	634 196	640 875	646 381	678 700	712 635
Goods and services	360 390	394 753	398 046	433 017	445 426	462 360	479 117
Depreciation	37 788	42 272	40 239	41 560	43 916	51 819	59 724
Interest, dividends and rent on land	217	242	142	1 131	1 294	1 359	1 427
Transfers and subsidies	–	–	–	892	902	948	995
Total expenses	938 291	1 003 805	1 073 744	1 117 476	1 137 919	1 195 185	1 253 897
Surplus / (Deficit)	37 944	77 452	58 119	22 634	24 137	25 701	26 983
Balance sheet data							
Carrying value of assets	218 884	228 950	300 139	336 617	354 961	376 142	398 618
Investments	39 150	29 895	17 842	17 832	18 724	19 660	20 643
Inventory	50 032	65 504	46 866	59 307	70 273	73 786	77 475
Receivables and prepayments	149 512	143 157	159 980	180 631	189 577	198 989	208 859
Cash and cash equivalents	214 108	304 209	294 011	292 544	291 080	294 314	292 386
Total assets	671 686	771 715	818 838	886 931	924 615	962 891	997 981
Capital and reserves	183 975	262 388	319 932	342 562	366 700	392 403	419 387
Post retirement benefits	148 224	107 307	14 897	14 897	14 897	14 897	14 897
Trade and other payables	268 246	343 160	418 709	461 190	473 966	482 837	487 055
Provisions	71 241	58 860	65 300	68 282	69 052	72 754	76 642
Total equity and liabilities	671 686	771 715	818 838	886 931	924 615	962 891	997 981

Source: Council for Scientific and Industrial Research

7.3 National Research Foundation

The National Research Foundation (NRF) was established by the National Research Foundation Act (1998). As the government's national agency responsible for promoting and supporting research, the NRF aims to uphold excellence in its investment in knowledge, people and infrastructure. The Foundation's task is

to advance research in all fields of the humanities, the social and natural sciences, engineering and technology.

The NRF's main sources of income are government transfers and tendered contract research. The growth in transfers averaged an annual 60% between 2003/04

and 2009/10, and is projected at 65% over the MTEF period. The NRF receives about 49% from the DST as a parliamentary grant. Included under goods and services are items such as operating expenses for grants, the Innovation Fund and the Technology and Human Resources for Industry Programme (THRIP).

Allocations over the MTEF period are R624 million, R657 million and R686 million. In addition, the NRF

has received ring-fenced allocations of R54 million, R66 million and R44 million for the MTEF period. The allocations to the Innovation Fund, including VAT, are R142 million (R9 million for VAT), R149 million (R9 million for VAT) and R152 million (R6 million for VAT) over the MTEF period. Compensation of employees is about 19.5% of total expenses.

Table 9: Income and expenditure of the NRF since 2003/04

	Audited outcome			Estimated outcome	Medium-term estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Revenue							
Non-tax revenue	353 850	500 639	458 783	701 810	715 626	808 563	804 077
Sale of goods and services other than capital assets	9 872	34 928	40 545	48 230	50 272	53 288	56 486
<i>of which:</i>							
Administration fees	9 872	28 071	32 886	39 772	40 967	43 425	46 031
Zoo sales	–	6 857	7 659	8 458	9 305	9 863	10 455
Contributions received	343 978	465 711	418 238	653 580	665 354	755 275	747 592
Transfers received	378 966	413 669	535 373	589 157	678 599	722 525	729 740
Total revenue	732 816	914 308	994 156	1 290 967	1 394 225	1 531 088	1 533 817
Expenses							
Current expenses	244 892	326 277	433 819	491 019	494 480	525 998	554 820
Compensation of employees	142 985	174 206	245 931	245 534	272 193	290 454	306 351
Goods and services	84 422	133 189	176 624	222 203	198 951	210 808	222 249
Depreciation	17 380	18 642	11 102	23 273	23 336	24 736	26 220
Interest, dividends and rent on land	105	240	162	9	–	–	–
Transfers and subsidies	491 763	592 657	614 369	833 355	899 745	1 005 090	978 997
Total expenses	736 655	918 934	1 048 188	1 324 374	1 394 225	1 531 088	1 533 817
Surplus / (Deficit)	(3 839)	(4 626)	(54 032)	(33 407)	–	–	–
Balance sheet data							
Carrying value of assets	130 394	131 856	163 078	169 582	179 757	190 542	201 975
Investments	71 969	97 453	96 318	100 103	104 484	109 200	114 273
Inventory	1 878	2 801	2 863	2 980	3 159	3 348	3 549
Receivables and prepayments	682 142	722 811	738 304	749 165	794 115	841 762	884 268
Cash and cash equivalents	456 925	426 407	311 506	280 000	296 800	314 608	333 484
Total assets	1 343 308	1 381 328	1 312 069	1 301 830	1 378 315	1 459 461	1 537 549

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Table 9: Income and expenditure of the NRF since 2003/04 (continued)

	Audited outcome			Estimated outcome	Medium-term estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Revenue							
Capital and reserves	250 138	192 035	169 095	142 498	152 673	163 458	174 891
Borrowings	–	135	852	744	789	836	886
Post retirement benefits	35 725	94 624	88 060	90 996	96 456	102 243	108 378
Trade and other payables	866 518	1 022 072	1 035 213	1 046 483	1 106 021	1 169 206	1 228 253
Provisions	10 247	14 535	15 729	16 800	17 808	18 876	20 009
Managed funds	180 680	57 927	3 120	4 309	4 568	4 842	5 132
Total equity and liabilities	1 343 308	1 381 328	1 312 069	1 301 830	1 378 314	1 459 461	1 537 548
Contingent liabilities	2 500	–	–	–	–	–	–

Source: National Research Foundation

7.4 Africa Institute of South Africa

The Africa Institute of South Africa (AISA), established under the Africa Institute of South Africa Act (2001), is a statutory body that does in-depth analysis of Africa's current affairs and gathers intelligence on the future of Africa, the AU and NEPAD. It focuses primarily on political, socio-economic, international and development issues in contemporary Africa, and contributes to the goals of the NSI because its research programmes have an impact on knowledge generation and human resource development.

The AISA is mandated to do research, support policy development, run training programmes, and establish, participate in and maintain networks for peace, development and prosperity in Africa. Much of this work has been done through the publication of research reports.

It generates about 98% of its total revenue from sales of goods and services. The allocations over the MTEF period are R27 million, R28 million and R27 million, resulting in a growth of about 23% between 2002/03 and 2007/08. Compensation of employees is at 64% of total projected expenditure. No surplus or deficit is envisaged at the end of 2007/08.

7.5 Tshumisano Trust

The Tshumisano Trust was registered by the former Committee of Technikon Principals. The Trust is a joint venture, funded by the DST and the Department of Labour, universities of technology (former technikons), and the German government's funding agency, GTZ. Its focus is to leverage skills and product development support in universities of technology to create technology stations that can provide this support to small and medium-sized businesses.

The number of SMMEs that the trust supports through the Technology Stations Programme has grown from 60 SMMEs in 2001/02 to well over 800 in 2005/06. In addition to housing the Technology Stations Programme, the Tshumisano Trust also facilitates the establishment of three institutes of advanced tooling as supporting an internship programme. A highlight in 2006/07 was the hosting of the first All Africa Technology Diffusion Conference, which attracted over 350 participants from more than 10 African countries.

Allocations to the Tshumisano Trust for the MTEF period are R36 million for each year. In addition, the trust has received ring-fenced allocations of R13.5 million, R13.5 million and R8.5 million over the MTEF period, which will be used for the advanced tooling institutes and internship programmes.

7.6 Academy of Science of South Africa

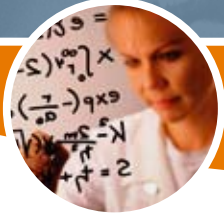
The Academy of Science of South Africa (ASSAf) was established through the Academy of Science of South Africa Act (2001). The Academy's objectives are to promote common ground for scientific thinking across all disciplines; to promote innovative and independent scientific thinking; to promote the development of the intellectual capacity of all people; and to link South Africa with scientific communities at the highest levels, in particular in Africa. The Academy publishes scientific reports, investigates matters of public interest about science and manages South African journals.

Allocations over the MTEF period are R3.2 million, R3.3 million and R3.5 million. In addition, the Academy has received ring-fenced allocations of R0.3 million, R0.5 million and R0.5 million over the MTEF period for supporting Quest magazine. A total of 6% of total revenue is generated through sales of goods and services. Compensation of employees is at 33.2% of total expenditure. The Academy projects a surplus of about R61 000 the end of 2007/08 year.

Table 10: Income and expenditure of the ASSAf since 2003/04

	Audited outcome			Estimated outcome	Medium-term estimate		
	2003/04 R '000	2004/05 R '000	2005/06 R '000	2006/07 R '000	2007/08 R '000	2008/09 R '000	2009/10 R '000
Revenue							
Non-tax revenue	181	402	544	600	675	765	827
Sale of goods and services other than capital assets	48	246	305	350	415	492	541
<i>of which:</i>							
Admin fees	48	46	42	50	55	60	66
Sales by market establishments	–	200	263	300	360	432	475
Other non-tax revenue	133	156	239	250	260	273	286
Transfers received	2 433	2 547	4 048	5 500	6 400	6 820	7 003
Total revenue	2 614	2 949	4 592	6 100	7 075	7 585	7 830
Expenses							
Current expenses	1 314	2 509	4 687	6 050	7 014	7 520	7 813
Compensation of employees	502	1 370	1 702	1 960	2 352	2 587	2 845
Goods and services	806	1 125	2 960	4 075	4 644	4 911	4 942
Depreciation	6	14	25	15	18	22	26
Transfers and subsidies	–	–	56	–	–	–	–
Total expenses	1 314	2 509	4 743	6 050	7 014	7 520	7 813
Surplus / (Deficit)	1 300	440	(151)	50	61	65	17
Balance sheet data							
Carrying value of assets	53	82	173	208	240	268	292
Cash and cash equivalents	3 556	4 390	5 103	3 536	3 565	3 602	3 595
Total assets	3 612	4 472	5 276	3 744	3 805	3 870	3 887
Capital and reserves	3 406	3 847	3 694	3 744	3 805	3 870	3 887
Trade and other payables	206	625	1 582	–	–	–	–
Total equity and liabilities	3 612	4 472	5 276	3 744	3 805	3 870	3 887

Source: Academy of Science of South Africa



7.7 South African National Energy Research Institute

A Cabinet decision, in terms of existing legislation, enabled the South African National Energy Research Institute (SANERI) to be established as a subsidiary of the Central Energy Fund (Pty) Ltd. SANERI's main aim is to build research capacity by funding research at universities and in the science councils. In 2006/07, SANERI was operationalised under the SANERI board.

A key future focus for SANERI is to ensure that South Africa's energy research continues to be globally competitive by increasing the scale and improving the focus of SANERI's research. This will build on and complement initiatives to establish centres, postdoctoral fellowships and graduate assistance programmes in South Africa. Allocations over the MTEF period are R42 million, R44 million and R46 million.



ADDITIONAL TABLES

Table 11: A summary of expenditure trends and estimates per programme and economic classification

Programme	Appropriation		Audited outcome	Appropriation			Revised estimate
	Main	Adjusted		Main	Additional	Adjusted	
	2005/06	2005/06	2005/06	2006/07	2006/07	2006/07	2006/07
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Programme 1: Administration	96 974	99 796	99 641	211 582	629	212 211	217 211
Programme 2: Research, Development and Innovation	332 086	341 750	341 218	415 654	(10 000)	405 654	405 654
Programme 3: International Co-operation and Resources	75 557	77 756	77 635	131 946	(4 000)	127 946	122 946
Programme 4: Human Capital and Knowledge Systems	621 918	640 018	639 021	850 071	13 371	863 442	863 442
Programme 5: Socio-economic Partnerships	860 104	885 135	883 757	1 004 840	3 000	1 007 840	1 007 840
Total	1 986 639	2 044 455	2 041 272	2 614 093	3 000	2 617 093	2 617 093

Economic classification

Current payments	156 607	164 156	173 497	180 770	24 091	204 861	203 061
Compensation of employees	80 196	80 196	65 125	93 107	(6 150)	86 957	86 957
Goods and services	76 411	83 960	108 343	87 663	30 241	117 904	116 104
Financial transactions in assets and liabilities	–	–	29	–	–	–	–
Transfers and subsidies	1 829 227	1 879 494	1 865 086	2 299 469	(30 918)	2 268 551	2 268 551
Provinces and municipalities	229	229	193	26	37	63	64
Departmental agencies and accounts	942 742	940 340	808 500	1 221 549	35 325	1 256 874	1 259 374
Universities and technikons	–	22 036	32 274	–	12 667	12 667	29 667
Public corporations and private enterprises	449 649	479 166	596 962	483 194	22 604	505 798	585 798
Non-profit institutions	141 857	202 898	425 816	594 700	(102 155)	492 545	392 644
Households	294 750	234 825	1 341	–	604	604	1 004
Payments for capital assets	805	805	2 689	133 854	9 827	143 681	145 481
Buildings and other fixed structures	–	–	–	133 000	–	133 000	133 000
Machinery and equipment	805	805	2 689	854	9 827	10 681	12 481
Total	1 986 639	2 044 455	2 041 272	2 614 093	3 000	2 617 093	2 617 093

Table 12: A summary of personnel numbers and compensation of employees

	Audited outcome			Adjusted ap- propriation	Medium-term expenditure estimates		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Permanent and full-time contract employees							
Compensation (R thousand)	45 705	58 199	65 119	86 951	112 956	119 041	126 523
Unit cost (R thousand)	199	278	277	289	375	395	398
Personnel numbers (head count)	230	209	235	301	301	301	318
Part-time and temporary contract employees							
Compensation (R thousand)	5	6	6	6	8	6	7
Personnel numbers (head count)	25	28	31	33	33	35	37
Total for department							
Compensation (R '000)	45 710	58 205	65 125	86 957	112 964	119 047	126 530
Unit cost (R '000)	179	246	245	260	338	354	356
Personnel numbers (head count)	255	237	266	334	334	336	355

Table 13: A summary of expenditure on training

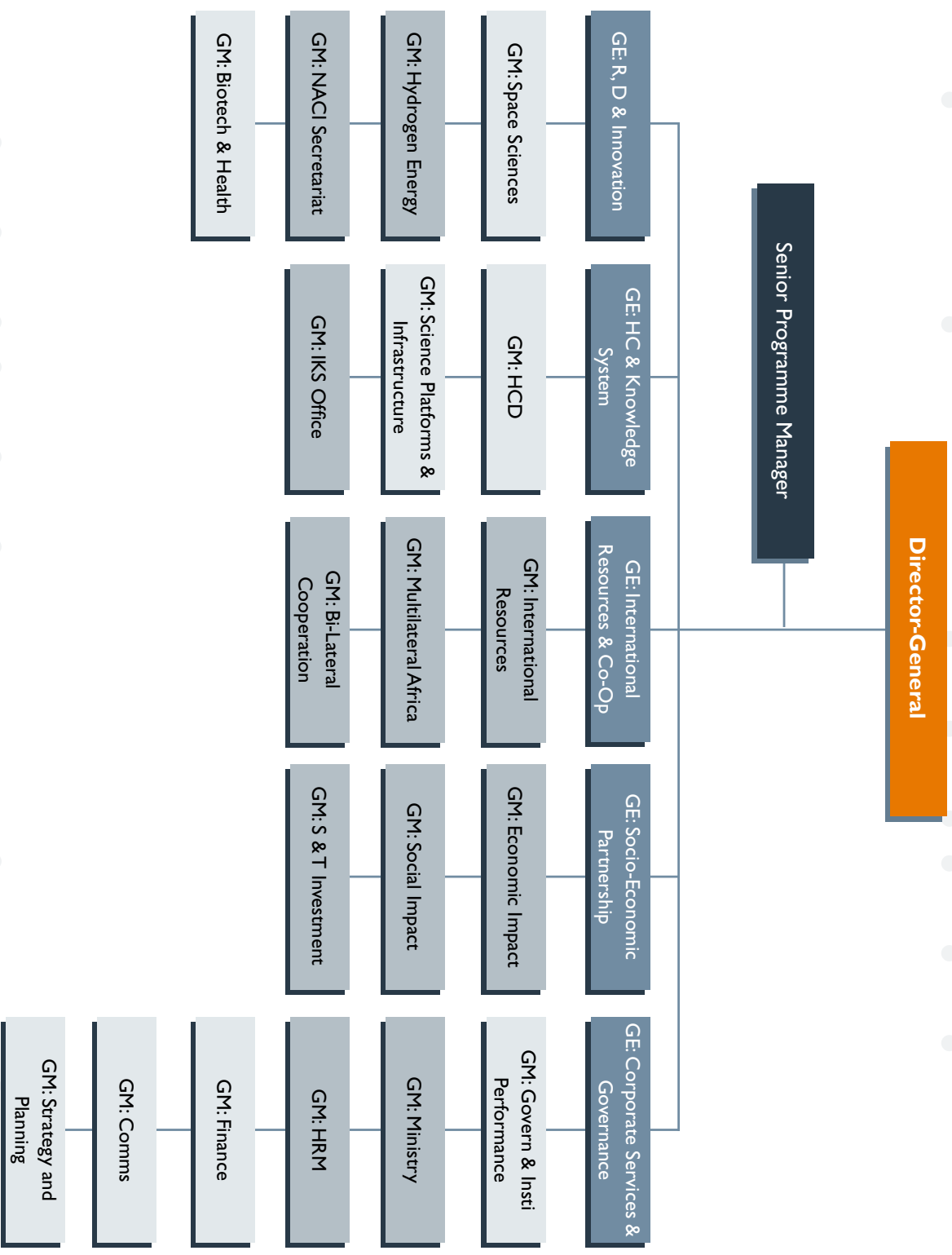
	Audited outcome			Adjusted ap- propriation	Medium-term expenditure estimates		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Training and staff development							
Expenditure (R '000)	2 313	2 519	4 225	4 670	4 715	4 996	5 293
Number of employees trained (head count)	62	67	113	120	127	135	146
Bursaries (employees)							
Expenditure per programme (R '000)	139	162	254	270	286	303	595
Number of employees (head count)	20	22	37	38	41	43	48
Total	2 452	2 681	4 479	4 940	5 001	5 299	5 888
Number of employees	82	89	150	158	168	178	194

Table 14:A summary of expenditure on infrastructure

Service delivery outputs	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Other large infrastructure projects (Over R20 million)	-	-	-	133 000	-	-	-
Science and Technology head office building	-	-	-	50 000	50 000	141 106	196 659
Research and development infrastructure	-	-	-	40 000	105 000	144 500	154 009
Frontier science and technology infrastructure	-	-	-	-	-	-	471 900
Square Kilometre Array infrastructure	-	-	-	-	80 000	265 000	-
Space infrastructure	-	-	-	20 000	20 000	15 000	15 000
Infrastructure transfers to other spheres, agencies and departments							
Research equipment: science systems	-	-	-	50 000	50 000	70 000	-
Research and development infrastructure	-	-	-	60 000	215 000	315 000	-
Total	-	-	-	353 000	520 000	950 606	837 568



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