CORPORATE STRATEGY
2008/2009

science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

TABLE OF CONTENTS

ABBREVIATIONS

ACEP	African Coelacanth Ecosystem Programme
AICAD	African Initiative for Capacity Development
AISA	Africa Institute of South Africa
AMCOST	African Ministers Council on Science and Technology
AMI	Advanced Metals Initiative
AMT	Advanced Manufacturing technologies
AMTS	Advanced Manufacturing Technology Strategy
AsgiSA	Accelerated and Shared Growth Initiative of South Africa
ASSAf	Academy of Science of South Africa
AU	African Union
BIC	biotechnology innovation centre
CERN	European Organization for Nuclear Research
CHPC	Centre for High Performance Computing
CoE	centre of excellence
COFISA	Cooperation Framework on Innovation Systems between Finland and South Africa
CPA	Consolidated Science and Technology Plan of Action
CSIR	Council for Scientific and Industrial Research
DME	Department of Minerals and Energy
DST	Department of Science and Technology
DTI	Department of Trade and Industry
EU	European Union
GEO	Group on Earth Observation
HSRC	Human Sciences Research Council
ICGEB	International Centre for Genetic Engineering and Biotechnology
ICT	information and communication technologies
IKS	indigenous knowledge systems
IPR	intellectual property rights
KAT	Karoo Array Telescope

MTEF	Medium-term Expenditure Framework
NACI	National Advisory Council on Innovation
NECSA	Nuclear Energy Corporation of South Africa
NIKSO	National Indigenous Knowledge Systems Office
NMC	Nuclear Manufacturing Centre
NRDS	National Research and Development Strategy
NRF	National Research Foundation
NSI	National System of Innovation
OBC	Overseas Bilateral Cooperation Unit
OECD	Organization for Economic Cooperation and Development
R&D	research and development
RBI	resource-based industries
RDI	research, innovation and development
RIMS	Research Information Management System
S&T	science and technology
SADC	Southern African Development Community
SALT	Southern African Large Telescope
SANERI	South African National Energy Research Institute
SANReN	South African National Research Network
SARChI	South African Research Chairs Initiative
SARS	South African Revenue Service
SET	science, engineering and technology
SKA	Square Kilometre Array
SOE	state-owned enterprise
SMMEs	small, medium and micro-enterprises
TBP	technology balance of payments
TIA	Technology Innovation Agency
UNICEF	United Nations Children's Fund

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 that will bring about maximum human capital, sustainable economic growth and improved quality of life for all.

AIM

To realise the full potential of science and technology in social and economic development through the development of human resources, research and innovation.

01 CORPORATE STRATEGY

1. Strategic overview and key policy developments: 2004/05-2010/11

The primary focus of the Department of Science and Technology (DST) has been on implementing the National Research and Development Strategy (NRDS) which provides an integrated approach to human resource development, knowledge generation, investment in science and technology (S&T) infrastructure, and improving the strategic management of the public S&T system towards achieving the twin objectives of wealth creation and an improved quality of life. In July 2007, Cabinet approved the DST's plan for South Africa from 2008 to 2018, *Innovation towards a Knowledge-Based Economy* (the Ten-Year Innovation Plan). This aims to help drive South Africa's transformation towards a knowledge-based economy in which the production and dissemination of knowledge leads to economic benefits and enriches all fields of human endeavour. To this extent, success will be measured by the degree to which S&T play a driving role in enhancing productivity, economic growth and socio-economic development.

The Ten-Year Innovation Plan proceeds from government's broad socio-economic mandate – particularly the need to accelerate and sustain economic growth – and is built on the foundation of the National System of Innovation (NSI). It recognises that while the country's S&T system has made important progress, there is a tremendous gap between South Africa and the countries identified as knowledge-driven economies. To close this gap, the NSI must, among other things, urgently confront South Africa's failure to commercialise the results of scientific research, and our inadequate production (in both a qualitative and quantitative sense) of knowledge workers capable of building a globally competitive economy.

The Plan builds on previous work undertaken by the DST, mainly that done towards implementing the NRDS. It is not, however, a compendium of existing programmes. Instead, it is a high level presentation of the principal challenges identified by the DST, starting not from where South Africa is today, but from where it should be a decade from now. It addresses an array of social, economic, political, environmental, scientific and technological benefits, and is designed to stimulate multidisciplinary thinking and to challenge our country's researchers to answer existing questions, create new disciplines and develop new technologies.

1.1 Goals and key deliverables

DST's five principal goals are to -

- develop the innovation capacity of the science system and contribute to economic growth;
- develop appropriate human capital for research, development and innovation (RDI);
- build world-class RDI infrastructure;
- position South Africa as a strategic international RDI partner and destination;
- develop South Africa's knowledge-generation capacity.

The DST has a number of key deliverables under each of these goals. These include -

- 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 so many of South Africa's people;
- the development of a healthy and diverse flux of young people seeking and finding careers in science and engineering;
- the accomplishment of notable successes in turning trends in global science to the national advantage, for example in astronomy and space science.

1.2 Grand challenges

The achievement and realisation of these goals and deliverables are crucial to the success of the Ten-Year Innovation Plan. The Plan sets out core projections, which are summarised as South Africa's "grand challenges" in S&T. The grand challenge areas are -

- the "Farmer to Pharma" value chain – over the next decade South Africa should strengthen its bio-economy to become a world leader in biotechnology and pharmaceuticals, using the nation's indigenous resources and an expanding knowledge base;
- space S&T – South Africa should become a key contributor to global space S&T, with a National Space Agency, a growing satellite industry, and a range of innovations in space sciences, earth observation, communication, navigation and engineering;
- energy security – the race is on for safe, clean, affordable and reliable energy supply, and South Africa should meet its medium-term energy supply requirements while innovating for the long term in clean coal technologies, nuclear energy, renewable energy and the promise of the "hydrogen economy";
- S&T in response to climate change – South Africa should exploit its geographic position, which enables us to play a leading role in climate change science;
- human and social dynamics – as a leading voice among developing countries, South Africa should contribute to a greater global understanding of shifting social dynamics, and the role of science in stimulating growth and development.

Effective implementation of the Plan will require policy leadership from the DST and other government departments, and strengthened cooperation in all S&T matters.

2. Strategic assessment of the contributions of the DST

The 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 S&T system continues to develop. In this regard, about 561 businesses participated in the latest annual research and development (R&D) survey, up from 511 in the previous year.

The 2005/06 R&D survey results show R&D spending to be 0,92 percent of GDP. Government has committed itself to achieving an investment of one percent of GDP on R&D by 2008. This relatively low target is already behind many of the developing countries with which South Africa competes. However, to attain this target, both public and private expenditure must continue to increase. This is a critical benchmark of South Africa's capacity to participate in the modern knowledge-based economy.

The high-level findings of the survey indicate that business continues to be the major performer of in-house research (58,3%). The country has some 57 000 researchers and support staff in the public and private sectors, with nearly 17 000 full-time equivalent researchers. This fundamentally important area of human capital development is one of the DST's main focus areas, and there is a concerted effort to increase innovation and engineering skills.

The DST will continue to invest in critical and practical areas, as well as in S&T areas of vital importance. These strategic 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 S&T and informed by the NRDS include the following:

- The review of the biotechnology regional innovation centres, which are the result of the DST's National Biotechnology Strategy. Although biotechnology investment can take many years to bear fruit, sometimes up to 15 years, some success stories resulting from investments and interventions made by biotechnology institutions are already being realised.
- The establishment of the African component of the International Centre for Genetic Engineering and Biotechnology (ICGEB) hosted by the University of Cape Town. This will assist in addressing development challenges such as HIV/Aids, malaria etc.
- The establishment of centres of excellence (CoEs), which are exceeding their targets for attracting additional research funds and for enrolling postgraduate students. Given the early success of this programme, the DST intends to expand the number of CoEs.
- The development of the South African Research Chairs Initiative (SARChI), which is aimed at building much-needed human resources for R&D 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.
- The continuing implementation of the Indigenous Knowledge Systems (IKS) policy.
- The DST'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 CoE programme, initiated in 2004, has attracted 313 postgraduate students, and the DST's targeted nuclear human capital programme has 78 students (undergraduate and postgraduate). 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 country's capacity to harness innovation as a source of economic growth continues to increase because of the Department's funding and sustaining of research careers for young scientists and engineers. The DST has also undertaken a number of initiatives to deal with poverty and its impact on people's lives, using established and effective technology platforms in the domain of job creation. 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 does socio-economic partnership 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 percent of R&D spending in South Africa originates from abroad – most of it for clinical trials. However, South Africa needs a more balanced portfolio of investments, and the DST is working to attract sustainable and large-scale global S&T programmes to this region.

3. Strategic management framework

The NSI faces many challenges, including the fragmented governance structures of research institutions, inadequate infrastructure and low spending on R&D in both the public and the private sectors. To address some of these challenges, the DST developed a strategic management framework, which was approved by Cabinet in October 2004. The framework classifies the technology-related services and R&D activities supported by government into three basic groups, namely:

- early stage or highly cross-sectoral generic technology and associated human resources, for which the DST is responsible;
- focused, sectoral and relatively mature technology domains, which are primarily the responsibility of sector-specific departments, with the DST'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, aimed at maximising impact in the DST's focus areas.

The Department's strategic approach for the future is underpinned by -

- a synthesis review of the NSI, which takes account of the independent reviews of the country's science councils since 2004;
- a review by the Organization for Economic Cooperation and Development (OECD) of the NSI's structures, policies and performance.

These two important reviews indicate that South Africa's science system has strong and effective governance and high levels of business expenditure, but that we are still a small player in the global game of research and innovation and should not assume that we can meet the challenges of the global knowledge economy without significantly increased public investment.

4. Implementing the strategy: Targeting investment in specific areas

A number of key factors will guide the DST through the next phase in the development of the NSI.

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

Our country is not producing enough engineers, and careers in research are not sufficiently attractive to keep young South Africans in research through the challenging early years of such careers. South Africa's knowledge base is being gradually eroded, and with it our ability to attract new industries to the country, leading to a dependence on natural resources and resource-based industries (RBIs).

Scientists, engineers and technologists remain in short supply in most sectors, compromising the country's ability to develop and harness new knowledge in support of a healthy NSI. The skills shortage is also one of the constraints to the attainment of the goals of AsgiSA, and is a key focus of the Joint Initiative for Priority Skills Acquisition. The DST has developed two strategies in this regard; the Youth into Science Strategy and the Science, Engineering and Technology Human Capital Development Strategy.

The DST and the Department of Education have agreed that the DST has a responsibility to address the current low rates of academic achievement in Mathematics and Science in the country. It is particularly necessary to increase the number of African learners

studying the subjects. 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 17 000.

It is essential that this effort starts at school level, with learners being enrolled in science programmes that complement the "in school" activities of the Department of Education. There are considerable challenges to be faced, and much work still needs to be done to ensure that young people are attracted to careers in science, engineering and technology (SET), as well as 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) include the recapitalisation of the Innovation Fund, which is doing excellent work. The Fund has consolidated its operations and developed into an 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 173 different projects (R900 million) in various sectors, including health, agriculture, manufacturing, mining, education, safety and security, ICT and biotechnology.

Since 2004, there has been emphasis on the creation and exploitation of South African intellectual property for the benefit of South Africa. This resulted in the establishment of dedicated functions to manage and commercialise intellectual property.

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. However, the Technology Advancement Programme is currently over-subscribed and significant opportunities for developing South African intellectual property may be lost if these opportunities are not captured. In this regard, the imminent establishment of TIA will strengthen DST's involvement in this important cross-cutting field.

In addition, there is the stimulation of South Africa's nuclear industry, the main focus areas being the Pebble-Bed Modular Reactor, the Nuclear Energy Corporation of South Africa (NECSA) and the country's nuclear manufacturing technology base.

Given the urgency of South Africa's energy needs, the option of an additional pressure water reactor to supplement Koeberg will involve foreign procurement with a "local content" requirement. Unless a focused innovation and training programme is established with the required facilities, suppliers will exploit the excuse of poor manufacturing standards in order to source all components and work from foreign sources. South Africa's local manufacturing industries are not currently geared for the high-quality production of nuclear components, but NECSA is able to provide the basic platform for developing manufacturing design and can supply sectors in the South African nuclear industry in a targeted technology capacity programme.

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 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, has been approved by Parliament.

In the area of astronomy and space technology, the construction of the Southern 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.

Although it has a very low population density, the Northern Cape has basic infrastructure (roads, electricity and telecommunications). The SKA and related AsgiSA projects are part of infrastructure development in the Northern Cape. The DST 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 link to Cape Town and Europe. Phase 1 and the full SKA will require high bandwidth connections within southern Africa and with the rest of the world.

Support for critical investments in enabling bandwidth for South Africa's economy is therefore needed. The lack of low-cost bandwidth for research and innovation is cutting South Africa off from global research. The South Africa National Research Network (SANReN) will address this, presenting 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 our country a more attractive destination for multinational companies that wish to conduct research. 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.

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

4.3 Essential S&T infrastructure and research equipment

AsgiSA identifies infrastructure as vital for achieving the targeted growth and development figures of six percent 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. This will have benefits at several levels, mainly in respect of wealth creation and improved quality of life. Accelerating the modernisation of the South African economy from a resource-based economy to a knowledge-based one, is a priority.

4.4 Research, development and innovation

Progress has been made in the establishment of a national space agency, the establishment of the Technology Innovation Agency, new research to combat disease, the ICT R&D strategy to strengthen the Meraka Institute's programmes, research and innovation in the field of biofuels, as well as with some specific proposals from South Africa's public entities to extend national capabilities, for example, in cybersecurity research.

The high risk and complexity of R&D investments make funding the major obstacle to the commercialisation of technological innovations. Creative funding mechanisms that could help address this problem are emerging in some public-private partnerships. It is expected that these partnerships will help to close the financing gap, and become effective vehicles for financing medium-high tech and high-tech innovations.

Among other things, the establishment of the Technology Innovation Agency will address the innovation chasm, and the fragmentation of funding instruments. In partnership with industry and public research institutions, it will establish a network of competence centres focused on market opportunities. TIA's broad objectives would be to -

- act as a technological agency that will provide funding and complimentary services to bridge the gap between the formal knowledge base and the real economy;
- stimulate development of technology-based services and products;
- support development of technology-based enterprises – both public and private;
- provide an intellectual property support platform;
- stimulate investment (venture capital, foreign direct investment, etc.);
- facilitate the development of human capital for innovation.

In the medium term, the DST will be driving the implementation of the Ten-Year Innovation Plan, which identifies the grand challenges discussed below.

(a) Space Science and Technology

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 S&T, especially in astronomy. The increasing geopolitical implications of national competence in space-related activities could change the future of provinces like the Northern Cape.

Space applications are essential to address social, economic and environmental challenges in the coming decades. With this in mind, in July 2006, Cabinet approved the establishment of the National Space Agency as an institutional vehicle to establish space S&T in South Africa. The strategic focus of Agency will be on -

- environment and resource management;
- safety and security;
- innovation and economic growth.

South Africa will work towards becoming a key contributor to global space S&T through the development of more systematic monitoring of the earth's systems.

(b) Farmer to Pharma

Combining the benefits of a new set of technologies in the fields of molecular biology and genetics with South Africa's indigenous knowledge and rich biodiversity will create the capacity for our country to participate competitively in the emerging knowledge-based bio-economy. This will involve integrating a number of technologies, research domains, economic infrastructures, and government practices. Areas where public policy can be effective in removing barriers, encouraging innovation, and improving understanding and cooperation among the various stakeholders need to be identified. The focus is on cross-cutting issues to which a horizontal and multidisciplinary approach is suited.

(c) Energy Security

South Africa has been experiencing the longest period of sustained economic growth in its history and, through AsgiSA, the government aims to raise the growth rate to six percent by 2010. Even at current levels of economic activity, however, South Africa's energy supply is inadequate. To ensure accelerated and sustainable growth, energy supply infrastructure must be increased, together with the R&D capacity

to sustain it. In this regard, the Department will invest in R&D for the energy sector, with specific focus on expanding the knowledge base for nuclear energy, renewables and the promise of the hydrogen economy.

(d) Climate Change

Given its proximity to the Antarctic, the Southern Ocean, and the Agulhas and Benguela currents, South Africa is positioned to serve as a unique laboratory for climate change R&D, and to make a major contribution to understanding this phenomenon. The projected effects of climate change in Africa include increased incidence of malaria, schistosomiasis and other vector-borne diseases. Urgent responses are required, including research on prevention and early warning systems, field detection and treatment, public health infrastructure requirements, and treatment regimes.

The country is also well positioned to lead research on the continent in terms of understanding and projecting changes to the physical system and the impact of these changes, as well as mitigating their long-term effects.

(e) Human and Social Dynamics

The focus here is on multidisciplinary examinations of the dynamics of human behaviour (for example the way individuals and organisations - including families and other informal organisations - create, grow, learn, change, and act under the impetus of internal and external stimuli); the influence organisational, community, and environmental structures and processes have on these dynamics; the interplay of evolutionary forces and human behavioural change; and individual cognitive, computational, linguistic, developmental, social, biological, and other processes as dynamic, evolving systems. These processes include systems of coordination and control in the behaviour of individuals, the dynamics of coordination between individuals, and the dynamics of change across the life span of individuals and organisations.

4.5 International relations and technology transfer strategies

To make progress with these challenges, South Africa needs to strengthen its international partnerships – both to enhance its knowledge and to create an environment conducive to the transfer of technology. Knowledge-based economies are connected through a growing international research and cooperation network. International cooperation will be used in -

- providing a base for cooperation in the development of human capital;
- leveraging foreign direct investment through South Africa's extensive bilateral and global research networks and the existing international competencies; and
- strengthening South Africa's infrastructure development through appropriate international connections.

4.6 Policy and strategy capacity

The NRDS, approved by Cabinet in 2002, provides a long-term planning basis for the NSI in the form of a framework of indicators to monitor the performance of the S&T system at macro level. The feasibility of an integrated R&D management information system has been established. The Department has also been approached by a consortium of universities requesting a coordinated approach across the sector for such reporting system. 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. The development and implementation of the InfoEd Research Information Management System is now in progress.

Ten years have elapsed since the research and technology foresight project was conducted. Currently nanotechnology, biotechnology and fuel cell

technologies are undergoing rapid development, and major innovations of the future will emerge at the confluence of scientific disciplines and technologies. Important sectors such as transport, communications, and construction have gained a high degree of importance in economic competitiveness and have an enormous influence on social development. Significant progress in long-range S&T planning methodologies has been made internationally, especially in industry. These emerging challenges and opportunities have made it necessary for South Africa to create permanent capacity to evaluate future technology and science development, including foresight, knowledge assessments, technology road mapping and integration with retrospective analysis.

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 few years, it has worked closely with the National Treasury to develop data requirements for such a system. In 2007, the Department introduced the R&D Tax Incentive Programme to encourage private sector investment in R&D activities. This allows DST to work optimally with the South African Revenue Service and the National Treasury on tax incentives and ensure that the national S&T indicator system continues to play a key role in the Department's long-term S&T planning.

4.7 Broader S&T impact across government

The knowledge-based economy assumes a greater degree of intergovernmental and interdepartmental cooperation and coordination. The core elements of the Cabinet-approved strategic management framework include a renewed focus on frontier S&T programmes, sustainability of the national research base, strong alignment with sector innovation, and S&T services to enhance service delivery. The devolution of S&T budgets allows departments to fund sector-specific programmes that boost research capability. Some national departments have made progress in developing medium-term R&D priority plans, but these are not yet fully funded.

In addition, several other areas will receive urgent attention over the medium term, including interdepartmental S&T initiatives, enhanced innovation and growth in priority sectors, and the use of public procurement to support SMME innovation. To encourage innovation, the DST will also partner with provincial governments and facilitate the development of regional innovation systems.

5. Performance indicators

Over the medium term, DST will be focusing on attaining the goals set out below. These performance indicators will be expanded in the coming years to cover and guide the efforts of the Department over a broader spectrum as the implementation of the Ten-Year Innovation Plan gets underway.

Selected performance indicators

Indicator	Annual performance						
	Past			Current	Projected		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Amount leveraged from international sources	R30m	R54m	R70m	R94.1m	R189m	R246m	R313m
Number of new international bilateral projects	46	55	60	64	86	106	124
Number of learners who attend the science week awareness programme	70 000	172 895	204 950	175 905	190 000	210 000	220 000
Number of students on the innovative bursary programme	–	–	–	280	415	470	550
Number of interns supported	–	–	49	68	100	110	130
Total number of CoEs established	6	7	7	7	8	8	8
Total number of research chairs established	–	–	21	72	72	72	72
Number of PhDs and postdoctoral fellowships supported at science councils and higher education institutions	–	–	113	107	155	180	200
Number of joint S&T project activities between the DST and other departments	–	–	2	6	14	14	14
Number of flagship projects supporting strategic areas of R&D	–	3	6	11	13	14	15

6. 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 management framework for S&T.

Developing human capital for the NSI is central to implementing the NRDS. Flagship programmes in this area include SARChI, the CoEs, the postdoctoral fellowship and professional development programmes, and the Youth into Science Strategy. A SET human capital strategy is being developed to coordinate these and other programmes. The DST is made up of the following:

- 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 Partnership

7. Expenditure trends

Over the MTEF period, expenditure is expected to grow at an average annual rate of 13,1 percent to reach R4,5 billion in 2010/11. Larger increases are evident in the Programme: Research, Development and Innovation, owing to capital expenditure on the Square Kilometre Array (SKA) telescope, and the Programme: Human Capital and Knowledge Systems, owing to investment in research and development infrastructure, capital injections into frontier science and technology, and human resource development.

The 2008 Budget sets out additional allocations of R69,5 million in 2008/09, R114,7 million in 2009/10 and R221,6 million in 2010/11. The allocations will provide primarily for the increased demand for human capital development and knowledge production, building the innovation platforms, additional expenditure on S&T infrastructure, and personnel and non-personnel inflation adjustments.

The Department has identified efficiency savings of R5 million for 2008/09 and R6 million in both 2009/10 and 2010/11 through to cost-saving measures (mainly on travel and subsistence expenditure and telephone usage). Infrastructure spending constitutes transfers to departmental agencies for the procurement of S&T equipment, ICT infrastructure, and the construction and refurbishment of S&T facilities.

Transfers for infrastructure spending started in 2006/07 with a R353-million allocation, and increase from R530 million in 2007/08 to R1,1 billion in 2010/11, at an average annual rate of 25,7 percent. The main increase is attributable to R&D infrastructure and the SKA project. Additional allocations of R10 million in 2008/09, R20 million in 2009/10 and R40 million in 2010/11 are to align S&T infrastructure with the requirements of the Ten-Year Innovation Plan.

Expenditure estimates

Table 1. Science and technology expenditure since 2004/05

Programme	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08		2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000	R'000
1. Administration	62 558	99 641	217 244	115 062	115 062	105 505	123 197	133 496
2. Research, Development and Innovation	333 499	341 218	404 767	541 301	534 301	873 097	1 139 004	1 227 005
3. International Cooperation and Resources	46 170	77 635	124 304	103 776	103 776	129 315	132 339	139 354
4. Human Capital and Knowledge Systems	521 118	639 021	876 121	1 252 079	1 252 079	1 449 024	1 614 422	1 769 155
5. Socio-Economic Partnership	669 532	883 757	990 563	1 132 011	1 132 011	1 147 031	1 188 098	1 280 229
Total	1 632 877	2 041 272	2 612 999	3 144 229	3 137 229	3 703 972	4 197 060	4 549 239
Change to 2007 Budget estimate				1 750	(5 250)	64 475	108 699	215 576

Programme	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08		2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Economic classification								
Current payments	127 140	173 497	174 004	246 934	246 934	226 629	253 562	269 645
Compensation of employees	58 204	65 125	83 743	114 861	114 861	130 170	135 219	139 707
Goods and services	68 728	108 343	90 173	132 073	132 073	96 459	118 343	129 938
of which:								
Communication	4 460	4 700	6 414	8 713	8 713	7 927	8 338	8 756
Computer services	2 965	3 281	1 862	5 092	5 092	5 967	6 301	6 649
Consultants, contractors and special services	12 867	42 306	22 899	42 804	42 804	21 576	22 788	24 102
Inventory	6 219	4 180	5 880	4 124	4 124	4 141	4 375	4 617
Maintenance, repairs and running costs	160	108	186	15 728	15 728	383	405	428
Operating leases	5 108	3 626	2 990	4 344	4 344	1 524	1 612	1 700
Travel and subsistence	15 346	24 878	32 993	28 650	28 650	34 113	36 294	38 256
Financial transactions in assets and liabilities	208	29	88	–	–	–	–	–
Transfers and subsidies	1 497 448	1 865 086	2 293 388	2 894 611	2 887 611	3 475 082	3 941 105	4 277 057
Provinces and municipalities	171	193	64	–	–	–	–	–
Departmental agencies and accounts	730 761	809 189	1 160 159	1 639 354	1 632 354	1 927 672	2 060 740	2 299 924
Universities and universities of technology	16 289	32 274	45 972	13 219	13 219	10 000	20 000	21 200
Public corporations and private enterprises	471 201	596 981	740 719	589 739	589 739	550 861	578 560	614 376
Foreign governments and international organisations	11	–	–	–	–	–	–	–
Non-profit institutions	270 087	425 816	345 490	651 653	651 653	986 549	1 281 805	1 341 557
Households	8 928	633	984	646	646	–	–	–
Payments for capital assets	8 289	2 689	145 607	2 684	2 684	2 261	2 393	2 537
Buildings and other fixed structures	–	–	133 174	–	–	–	–	–
Machinery and equipment	8 289	2 689	12 433	2 684	2 684	2 261	2 393	2 537
Total	1 632 877	2 041 272	2 612 999	3 144 229	3 137 229	3 703 972	4 197 060	4 549 239

8. Programmes

8.1 Programme 1: Administration

This Programme is responsible for the overall management of the Department and for providing centralised support services to ensure that funded organisations comply with good corporate governance practices and are aligned with the strategic focus of the NSI, as well as monitoring and evaluating the science councils. It has three subprogrammes:

- The offices of the Minister, the Deputy Minister and the Director-General.
- Corporate Services, which is responsible for finance, strategy and planning, communications, human resource development, 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.

(a) Expenditure estimates

Table 2. Expenditure on the Programme: Administration since 2004/05

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Minister[1]	813	933	1 038	951	1 019	1 072	1 127
Deputy Minister[2]	780	776	865	773	828	871	916
Management	5 840	4 668	4 491	5 228	5 847	5 974	6 105
Corporate Services	51 337	88 329	206 364	99 570	89 415	106 017	115 335
Governance	1 461	2 416	2 636	5 622	5 249	5 801	6 204
Property Management	2 327	2 519	1 850	2 918	3 147	3 462	3 809
Total	62 558	99 641	217 244	115 062	105 505	123 197	133 496
Change to 2007 Budget estimate				29 740	15 480	26 059	30 529

1. Payable as from 1 April 2007. Salary: R761 053. Car allowance: R190 262.
2. Payable as from 1 April 2007. Salary: R618 566. Car allowance: R154 641.

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Economic classification							
Current payments	55 391	95 183	70 538	109 174	101 626	119 092	129 145
Compensation of employees	24 181	28 532	33 835	47 630	57 455	59 777	61 758
Goods and services	31 003	66 622	36 615	61 544	44 171	59 315	67 387
of which:							
Communication	2 246	2 282	3 029	2 894	1 806	1 914	2 029
Computer services	1 578	1 618	761	2 066	3 807	4 035	4 277
Consultants, contractors and special services	6 739	31 766	6 764	12 742	10 859	11 510	12 201
Inventory	2 296	2 264	2 562	2 182	2 000	2 120	2 247
Maintenance, repairs and running costs	23	86	25	15 645	338	358	379
Operating leases	4 870	3 053	2 430	3 632	775	822	871
Travel and subsistence	7 445	7 476	8 184	8 719	10 202	10 815	11 464
Financial transactions in assets and liabilities	207	29	88	–	–	–	–
Transfers and subsidies	83	2 930	2 619	4 188	2 315	2 448	2 595
Provinces and municipalities	83	87	28	–	–	–	–
Departmental agencies and accounts	–	427	–	–	–	–	–
Public corporations and private enterprises	–	8	–	–	–	–	–
Non-profit institutions	–	2 280	2 060	4 184	2 315	2 448	2 595
Households	–	128	531	4	–	–	–
Payments for capital assets	7 084	1 528	144 087	1 700	1 564	1 657	1 756
Buildings and other fixed structures	–	–	133 174	–	–	–	–
Machinery and equipment	7 084	1 528	10 913	1 700	1 564	1 657	1 756
Total	62 558	99 641	217 244	115 062	105 505	123 197	133 496

(b) Expenditure trends

Expenditure in Programme 1 increased from R62,6 million in 2004/05 to R115,1 million in 2007/08, an average annual increase of 22,5 percent, mainly due to increased capacity in Corporate Services. This is evident in the number of posts, which increase from 69 in 2004/05 to 138 in 2007/08, and the concomitant average annual increase of 25,4 percent in the compensation of employees. Over the medium term, the budget grows at an average annual rate of 5,1 percent, to R133,5 million in 2010/11 to cater for inflation.

8.2 Programme 2: Research, Development and Innovation

This Programme provides policy leadership in the DST's long-term cross-cutting RDI initiatives. It has five subprogrammes:

- Space Science and Technology
- Hydrogen and Energy
- Biotechnology and Health Innovation
- Innovation Instruments and Planning
- The NACI Secretariat

Programme 2 focuses on the following:

- Providing strategic direction for the implementation of the National Biotechnology Strategy through the biotechnology innovation centres.
- Developing appropriate space technology platforms and promoting the use of space applications for socio-economic benefits.
- Providing strategic direction towards the construction of the SKA demonstrator telescope and other activities to ensure that South Africa is well positioned to host the SKA.
- Providing strategic direction in the development, implementation and evaluation of a national strategy for health innovation, specifically the development of new drugs, vaccines, devices and diagnostics, as well as new techniques in process engineering and manufacturing.
- Driving strategic interventions to address the innovation chasm by creating policies and instruments.
- Driving strategic intervention to stimulate innovation towards energy security for South Africa and the region.

(a) Expenditure estimates

Table 3. Expenditure on the Programme: Research, Development and Innovation since 2004/05

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Space Science	41 574	153 764	204 237	293 533	331 238	539 818	537 892
Hydrogen and Energy	16 310	21 678	13 618	31 966	300 650	325 925	400 219
Biotechnology and Health	269 115	158 075	178 114	206 560	231 430	262 689	278 125
NACI	6 500	7 701	8 798	9 242	9 779	10 572	10 769
Total	333 499	341 218	404 767	541 301	873 097	1 139 004	1 227 005
Change to 2007 Budget estimate				(5 250)	84 297	112 537	138 950

Economic classification							
Current payments	17 331	19 161	22 291	28 635	27 369	30 706	31 746
Compensation of employees	7 959	7 947	9 435	16 351	14 747	15 309	15 802
Goods and services	9 372	11 214	12 856	12 284	12 622	15 397	15 944
of which:							
Communication	488	574	535	488	484	513	544
Computer services	393	708	46	303	42	45	48
Consultants, contractors and special services	1 527	3 499	4 882	5 888	4 418	4 684	4 965
Inventory	442	927	520	389	471	500	530
Maintenance, repairs and running costs	5	10	4	4	4	4	4
Operating leases	18	264	170	147	154	164	174
Travel and subsistence	1 801	3 372	5 993	3 583	5 424	5 750	6 095
Transfers and subsidies	315 936	321 467	382 038	512 443	845 493	1 108 051	1 194 997
Provinces and municipalities	39	23	17	–	–	–	–
Departmental agencies and accounts	43 412	42 149	151 000	172 976	214 859	221 690	265 891
Universities and universities of technology	–	20 929	27 324	10 000	10 000	20 000	21 200
Public corporations and private enterprises	122 875	125	30 254	–	5 000	5 786	7 033
Non-profit institutions	149 610	258 041	173 191	329 448	615 634	860 575	900 873
Households	–	200	252	19	–	–	–
Payments for capital assets	232	590	438	223	235	247	262
Machinery and equipment	232	590	438	223	235	247	262
Total	333 499	341 218	404 767	541 301	873 097	1 139 004	1 227 005

Details of major transfers and subsidies

Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	43 412	42 149	151 000	172 976	214 859	221 690	265 891
Innovation Fund	28 412	–	131 260	141 818	148 990	152 295	191 432
Institutional and programme support	–	1 000	100	–	–	–	–
HIV/Aids prevention and treatment technologies	15 000	20 000	–	15 750	16 601	17 349	18 390
Space Science	–	13 074	205	6 033	5 000	5 786	7 033
SKA	–	8 000	19 435	9 375	–	–	–
SANERI	–	–	–	–	44 268	46 260	49 036
Gifts and donations	–	75	–	–	–	–	–
Universities and universities of technology							
Current	–	20 929	18 038	10 000	10 000	20 000	21 200
Biotechnology Strategy	–	200	–	–	–	–	–
Institutional and programme support	–	529	885	–	–	–	–
ICGEB	–	–	–	10 000	10 000	20 000	21 200
Biotechnology							
Space Science	–	20 200	5 819	–	–	–	–
Hydrogen Strategy	–	–	6 000	–	–	–	–
Health Innovation	–	–	5 334	–	–	–	–
Capital	–	–	9 286	–	–	–	–
Space Science	–	–	9 286	–	–	–	–
Public corporations and private enterprises							
Public corporations							
Other transfers							
Current	122 875	125	21 540	–	5 000	5 786	7 033
Biotechnology Strategy	122 875	–	–	–	–	–	–
Institutional and programme support	–	114	–	–	–	–	–
Gifts and donations	–	11	–	–	–	–	–
Space Science	–	–	14 350	–	–	–	–
Innovation projects	–	–	3 190	–	–	–	–
Hydrogen Strategy	–	–	4 000	–	5 000	5 786	7 033
Capital	–	–	8 714	–	–	–	–
Space Science	–	–	8 714	–	–	–	–

Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Non-profit institutions							
Current	149 610	258 041	171 191	228 823	295 134	311 150	307 682
Biotechnology Strategy	143 711	154 650	148 080	161 763	175 507	175 629	186 167
Health Innovation	–	–	4 000	9 000	20 000	40 000	42 400
Hydrogen Strategy	–	–	–	17 147	39 071	45 382	21 605
Innovation Fund	–	101 597	–	–	–	–	–
Innovation projects	–	–	–	4 601	4 510	5 159	5 459
Institutional and programme support	5 899	1 794	937	–	–	–	–
Space Science	–	–	3 174	11 558	25 100	26 208	32 480
SKA	–	–	–	24 121	25 496	13 322	14 121
Women in Science (NACI)	–	–	–	633	–	–	–
Biofuels	–	–	–	–	5 000	5 000	5 000
HIV/Aids prevention and treatment technologies	–	–	15 000	–	–	–	–
Women in Science	–	–	–	–	450	450	450
Capital	–	–	2 000	100 625	320 500	549 425	593 191
Hydrogen Strategy	–	–	–	10 000	40 500	42 525	45 077
Space Science	–	–	2 000	20 000	15 000	35 000	47 900
SKA	–	–	–	70 625	265 000	471 900	500 214

(b) Expenditure trends

Expenditure is dominated by current and capital transfers and subsidies to departmental agencies and non-profit institutions, which increased at an average annual rate of 17,5 percent, from R333,5 million in 2004/05 to R541,3 million in 2007/08. This was due to a seven-fold increase in transfers to the Subprogramme: Space Science, from R41,6 million in 2004/05 to R293,5 in 2007/08, including a R70,6 million transfer in 2007/08 for the SKA and the development of the South African Environmental Observation Network and other satellite programmes. In addition, the Innovation Fund allocation increases by an average annual rate of 70,9 percent, from R28,4 million in 2004/05 to R141,8 million in 2010/11.

Over the medium term, Programme 2's budget grows at an average annual rate of 31,4 percent, to R1,2 billion in 2010/11. Higher expenditure in the medium term is attributable to increased spending associated with

implementing the Ten-Year Innovation Plan, which includes more investment in S&T infrastructure. This is evident in the significant transfers for capital investment in the SKA, which increase at an average annual rate of 92 percent over the MTEF period to R500 million in 2010/11, and expanding support to the Subprogramme: Hydrogen and Energy through allocations to the hydrogen strategy and the establishment and funding of the South African National Energy Research Institute (SANERI).

(c) Service delivery objectives and indicators

(i) Space Science, Engineering and Technology

The Subprogramme focuses on two aspects critical for a viable space programme, namely, the development of relevant and appropriate space technology platforms, and ensuring that space applications deliver in a wide array of key priority areas, including earth observation, in the most cost-effective manner. Attached to the Subprogramme is the Radio Astronomy Advances function, which is responsible for developing strategies to optimise South Africa's chances of winning the international SKA bid.

(ii) Hydrogen and Energy

The Subprogramme is focusing on the development of a comprehensive master plan for energy RDI in South Africa. The master plan will articulate short, medium and long-term interventions to address energy challenges facing the country as well as opportunities for South Africa to export energy solutions to regional and global markets. The Subprogramme has three components, namely, Power, Transport Fuels and Technologies, and Demand Side Management. The National Hydrogen and Fuel Cell Technologies RDI Strategy, approved by Cabinet in May 2007, will be integrated into the master plan.

(iii) Biotechnology and Health

The Subprogramme strategises for the development of a world-class bio-economy in South Africa. For the past four years, the Subprogramme has focused on the implementation of the National Biotechnology Strategy of 2002. The establishment of biotechnology innovation centres (BICs) has changed the biotechnology sector in South Africa, resulting in a number of national biotechnology platforms (infrastructure), start-up companies and biotechnology products. Thus far, the DST investment in the BICs has been used to leverage an additional 33 percent funding in for such projects.

The Framework for Science and Technology for Health Innovation was developed in 2005. In strengthening its policy leadership, the Subprogramme will build on synergies with indigenous knowledge systems as well as biodiversity research grouping to deliver on the Ten-Year Innovation Plan's Farmer to Pharma grand challenge.

(iv) Innovation Instruments and Planning

The Subprogramme focuses on institutional and programmes implementation challenges that perpetuate the innovation chasm phenomenon. One leg of the Subprogramme focuses on major initiatives involving the development of key policies, strategies and implementation instruments to enable the NSI to translate research outcomes into mainstream products and services, as well as to establish local technological enterprises through commercialisation of technology.

The second leg focuses on planning modalities and systematic internal analysis to ensure smooth business processes and optimal interface with stakeholders and international partners. This will involve analysing the productive (formal) economy, as well as both the public and private procurement systems, to identify technological gaps and opportunities (especially in terms of imported goods and services that result in rand outflow). The aim is to develop policies and strategies to enable South Africa to establish local technological capabilities to produce its own goods and services,

to improve competitiveness in key sectors, to reduce reliance on imported technologies, and to become a net exporter of local high-tech products and services.

(v) National Advisory Council on Innovation

Programme 2 provides secretariat services to NACI, which advises the Minister of Science and Technology on all issues pertaining to innovation. The number of advisory notes depends on the project cycle and on the Council's term. More than one note can be generated per project. Some studies span more than one financial year. In 2006/07 NACI produced advice on five evidence-based studies and there were three advisory notes.

(d) Recent outputs

Major achievements in biotechnology include the launch of the Metagenomics and Metabolomics Platforms by the BioPAD Biotechnology Regional Innovation Centre. The Metagenomics Platform will be instrumental in tapping into unique genetic material from within South Africa's extreme biomes, with the objective of discovering new genes and their products by applying modern genetic and microbiological technologies. The Metabolomics Platform aims to establish robust diagnostics and metabolite screening delivery systems for various drugs. PlantBio's highlights in the past few months include the following:

- The beginning of the implementation process for the Biosafety Platform.
- The successful completion, in collaboration with the RIKEN institute in Japan, of the second year of the Cyclotron Mutagenesis project by the African Centre for Crop Improvement, based at the University of KwaZulu-Natal, to generate variants of maize, millet and sorghum.
- Citrogold SA, which PlantBio has invested in since 2006, has reached profit breakeven. Part of the BioGold International group, it is a horticultural intellectual property management company, which is having a positive impact on emerging farmers and foreign currency generation. It has acquired and licensed a number of speciality cultivars to South African growers, and will provide a useful platform to assist plant-breeding programmes to access local and global markets.
- Prof. Chrissie Rey, of the University of the Witwatersrand, is to be named as co-inventor on an international patent application as a result of her research, in a project funded by PlantBio, on producing virus-resistant cassava varieties.

Cape Biotech's noteworthy successes include the imminent spin-out of SunBio, which conducts yeast and wine-related research, development and commercialisation, from Stellenbosch University. Cape Biotech has also given financial assistance to Shimoda, a leading South African biopharmaceutical discovery company that focuses on the development of innovative, proprietary drug delivery systems employing cyclodextrin chemistry, and the development of novel anti-cancer therapeutic compounds. Shimoda is waiting for approval to access European markets. Cape Biotech is preparing to offer an in-house incubation service from 2008 on.

Major achievements of the East Coast Biotechnology Regional Innovation Centre, LIFElab, include the complete sequencing of the genome of a strain of extremely drug resistant tuberculosis, the launch and commissioning of LIFElab's Bioprocessing Platform, the establishment of three drug discovery companies working on compounds for the potential treatment of HIV and TB (Elevation Biotech, Arvir and iThemba Pharmaceuticals), and the establishment of a black economic empowerment clinical research organisation (African Clinical Research Organisation).

(i) Biotechnology and Health

The DST's Biotechnology Unit outputs include the commissioning and completion of the second biotechnology audit. The South African Malaria Initiative and the Telemedicine Intervention Strategy were high points for the Health Innovation Unit. South African malaria researchers formed the South African Malaria Initiative consortium. International malaria experts assisted in identifying three key areas for research in the global and local malaria research context: (1) the discovery of new drug targets and lead molecules; (2) the development of robust rapid malaria diagnostics tests suited to the endemic high transmission areas of Africa; and (3) improved molecular epidemiology and understanding of the vector-parasite interaction. All three research programmes are currently under way.

In January 2007 the Telemedicine Intervention Strategy in KwaZulu-Natal was approved for funding for four years. The project's objective is to establish a telemedicine service to deliver healthcare to rural populations in KwaZulu-Natal. The intention is to link academic sites in Durban to 16 rural hospitals, and to provide the hospitals with telemedicine diagnostic instruments and units. In addition, appropriate specialist medical services will be acquired to give telemedicine support to the 16 sites in this project and to another 27 sites in the province with telemedicine capacity. The project aims to provide a working model for telemedicine which can be adapted for use in the rest of South Africa, and which provides viable solutions that are exportable to other developing countries. It will also provide rural areas with broadband connectivity that can be used for e-education, e-governance, medical informatics and epidemiological research and monitoring.

(ii) Space Science, Engineering and Technology

During 2007/08 the Subprogramme: Space Science's outputs included the following:

- In November 2007 South Africa hosted the 4th Ministerial Summit of the Intergovernmental Group on Earth Observation (GEO) in Cape Town.
- The South African Earth Observation System Strategy was launched during the GEO Ministerial Summit.
- South Africa took over the chair of the Committee on Earth Observation Satellites in November 2007.
- Two independent space capabilities audits were conducted on a number of potential stakeholders in the space arena.

The construction of a 15m reflector antenna, a meerKAT prototype, at the Hartebeesthoek Radio Astronomy Observatory in Gauteng has been completed. This prototype is currently being optimised for operation prior to the meerKAT telescope construction in the Northern Cape, which is due to start in the last quarter of 2008.

(iii) Hydrogen and Energy

The Hydrogen and Fuel Cell Technologies RDI Strategy was approved by Cabinet May 2007. Three competence centres were established to realise the vision articulated in the Strategy. Each of these centres has a different mandate to fulfill. The competence centres are for catalysis (at the University of Cape Town and Mintek), for infrastructure (at North-West University and the Council for Science and Industrial Research), and for system integration and technology validation (at the University of the Western Cape). The Subprogramme has also been instrumental in the establishing of six research chairs, a vehicle to develop high-level human capital in areas of interest. The South African National Energy Research Institute (SANERI) is a subsidiary of the Central Energy Fund which was jointly established by the Department of Minerals and Energy (DME)

and the DST in 2004. SANERI's mandate is to develop human capital in the energy research sector and fund fundamental and applied public interest research. SANERI established four research chairs in 2007. The South African Nuclear Human Asset and Research Programme is a DST agency which has the objective of developing human capital for the nuclear sector. It has established two research chairs.

(iv) The NACI Secretariat

A final report on the international review of the NSI by the OECD was submitted to the Minister to present to Cabinet. A task team was appointed to interrogate the approximately 50 recommendations that emanated from the final OECD report, and to advise the Minister on how best to proceed with the implementation of the report's recommendations. The Cabinet-requested Tracking Study on Research and Development Expenditure in South Africa is awaiting final approval by the NACI Council, after which advice to the Minister will be formulated. Three other projects are due for completion in the 2008/09 financial year, namely, an overview of the state of the NSI, a review of the state of S&T policy interactions in Africa and their implications for South Africa, and advice on the South African science system.

(e) Selected medium-term output targets

Subprogramme	Output	Measure/Indicator	Target
Space S&T	Establishment of the National Space Agency	The National Space Agency established and operational	March 2009
	Launch and implement the National Space S&T Strategy	The National Space S&T Strategy approved and launched and its implementation rolled out	April 2008
	Launch SumbandilaSAT	Satellite launched	June 2009
	Comprehensive funding plan and long-term innovation programme for the South African SKA initiative	Plans approved by the Director-General	Dec 2008
Innovation Instruments and Planning	TIA and IPR Bills in place as key enablers for the NSI to innovate and commercialise locally	Functioning TIA in place IPR Bill in place TIA business case approved by National Treasury HR migration strategies for DST innovation agencies implemented	Aug 2008 March 2009 Aug 2008 Aug 2008
	Management of Innovation Instruments and DST interface	Monitoring and evaluation as well as progress reports	Ongoing
	Sector analysis reports, international sector competitiveness case studies and benchmarking reports	Policy and strategies developed as key enablers as well as significant progress towards implementation	Ongoing

Subprogramme	Output	Measure/Indicator	Target
Hydrogen and Energy	Energy RDI master plan	Master plan approved by the Director-General	May 2008
		Biofuels Strategy	May 2008
		2010 Green Transport Plan	April 2008
		Launch of National Hydrogen and Fuel Cell Technologies RDI Strategy	April 2008
	Research master plan implementation	Implementation plan approved by the Director-General	Aug 2008
Biotechnology and Health Innovation	Development of a health innovation strategy	Health Innovation Strategy for South Africa	Oct 2008
	Revised Biotechnology Strategy	Revised Biotechnology Strategy approved by the Minister	Sep 2008
	Develop a coordinated biotechnology implementation R&D agenda	Implementation strategy approved by the Director-General	Sep 2008
	Bio-economy implementation framework	Detailed implementation framework approved by the Director-General	May 2008
NACI	An overview of the state of the NSI	Report approved by the Council Advice to Minister	Feb 2009 March 2009
	Review of the state of S&T policy interactions in Africa and their implications for South Africa	Report approved by the Council Advice to Minister	Nov 2008 Feb 2009
	South African science system advice	Report approved by the Council Advice to Minister	Sep 2008 Nov 2008

8.3 Programme 3: International Cooperation and Resources

This Programme aims to develop and monitor bilateral and multilateral relationships and agreements in S&T to strengthen the NSI and enable a flow of knowledge, capacity and resources into South Africa and neighbouring countries. It has three subprogrammes:

- Overseas Bilateral Cooperation
- Multilateral Cooperation and Africa
- International Resources

(a) Expenditure estimates

Table 4. Expenditure on the Programme: International Cooperation and Resources since 2004/05

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Multilaterals and Africa	28 954	57 529	68 857	50 174	50 163	53 319	55 535
International Resources	8 715	9 517	27 285	32 101	50 029	48 758	52 022
Bilateral Cooperation	8 501	10 589	28 162	21 501	29 123	30 262	31 797
Total	**46 170**	**77 635**	**124 304**	**103 776**	**129 315**	**132 339**	**139 354**
Change to 2007 Budget estimate				(14 240)	(15 638)	(25 362)	(27 809)
Economic classification							
Current payments	**24 320**	**31 777**	**42 005**	**44 606**	**47 007**	**48 888**	**51 296**
Compensation of employees	10 361	13 411	17 401	19 616	21 912	22 713	23 467
Goods and services	13 959	18 366	24 604	24 990	25 095	26 175	27 829
of which:							
Communication	924	843	1 677	4 341	4 575	4 786	5 001
Computer services	584	443	652	1 663	1 753	1 833	1 916
Consultants, contractors and special services	2 773	2 886	8 030	3 209	3 382	3 538	3 697
Inventory	1 776	541	1 981	882	930	972	1 016
Maintenance, repairs and running costs	126	4	141	25	26	28	29
Operating leases	143	213	159	366	386	404	422
Travel and subsistence	3 565	9 797	9 668	9 684	10 207	10 676	11 157
Transfers and subsidies	**21 326**	**45 395**	**81 791**	**59 004**	**82 154**	**83 288**	**87 885**
Provinces and municipalities	25	37	11	–	–	–	–
Departmental agencies and accounts	16 325	25 324	29 564	26 816	28 941	28 408	30 311
Universities and universities of technology	–	1 855	3 188	3 201	–	–	–
Public corporations and private enterprises	–	10 173	28 692	14 750	–	–	–
Foreign governments and international organisations	11	–	–	–	–	–	–
Non-profit institutions	4 965	7 997	20 172	14 226	53 213	54 880	57 574
Households	–	9	164	11	–	–	–
Payments for capital assets	**524**	**463**	**508**	**166**	**154**	**163**	**173**
Machinery and equipment	524	463	508	166	154	163	173
Total	**46 170**	**77 635**	**124 304**	**103 776**	**129 315**	**132 339**	**139 354**

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Details of major transfers and subsidies							
Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	16 325	25 324	29 564	26 816	28 941	28 408	30 311
AISA	16 325	18 968	24 954	26 530	28 941	28 408	30 311
Global Science - Multilaterals and Africa	–	6 200	4 610	286	–	–	–
Gifts and donations	–	156	–	–	–	–	–
Universities and universities of technology							
Current	–	1 855	3 188	3 201	–	–	–
Global Science - Multilaterals and Africa	–	1 855	3 188	3 201	–	–	–
Public corporations and private enterprises							
Public corporations							
Other transfers							
Current	–	10 173	28 692	14 750	–	–	–
Global Science - Multilaterals and Africa	–	10 173	28 692	14 750	–	–	–
Foreign governments and international organisations							
Current	11	–	–	–	–	–	–
Global Science - Multilaterals and Africa	11	–	–	–	–	–	–
Non-profit institutions							
Current	4 965	7 997	20 172	14 226	53 213	54 880	57 574
Global Science - Multilaterals and Africa	4 965	7 997	20 172	14 226	13 203	13 616	14 285
Global Science - Bilateral Cooperation	–	–	–	–	11 688	12 055	12 646
Global Science - International Resources	–	–	–	–	28 322	29 209	30 643

(b) Expenditure trends

Between 2004/05 and 2007/08, expenditure increased from R46,2 million to R103,8 million, at an average annual rate of 31 percent. Over the medium term, growth in expenditure slows to an average annual 10,3 percent, reaching R139,4 million in 2010/11. Expenditure in Programme 3 increases as the Department aims to benefit from cross-border flows of knowledge, innovation, capacity and resources through increased international cooperation. The increase in the Subprogramme: Multilaterals and Africa is attributable to the DST's expanded involvement in the New Economic Partnership for Africa's Development's (NEPAD) African S&T Programme.

(c) Service delivery objectives and indicators

(i) Overseas Bilateral Cooperation

The Subprogramme promotes and facilitates collaborative activities as well as leveraging resources in support of the NSI from countries outside Africa, with specific focus on developing a knowledge-driven economy. Through the implementation of the new International Cooperation Strategy, these relationships will be realigned in order to address the grand challenges and associated cross-cutting areas set out in the Ten-Year Innovation Plan.

In terms of the Plan, the Overseas Bilateral Cooperation Unit (OBC) will promote: (1) leveraging of foreign direct investment; (2) functional bilateral relationships; (3) an innovation culture; (4) an increased number of large-scale research projects; and (5) access to international skills and big science facilities. OBC will focus on obtaining support for existing policies as well as the development and implementation of new strategies in pursuing the grand challenges and other DST initiatives. This will include international cooperative support for the space agency and the Technology Innovation Agency. The Unit will also focus on human capital development, knowledge generation, knowledge infrastructure and research excellence, using instruments such as the Science and Technology Agreements Fund, SARChI, the CoEs and the centres of competence. DST successfully concluded an S&T agreement between Switzerland and South Africa, and Switzerland has declared South Africa a favoured strategic partner outside of the EU. Enhanced S&T cooperation with Germany saw the hosting of the world-famous Science Tunnel in Johannesburg for a period of three months. This served the dual purpose of bringing science to the general public and encouraging young people to study SET.

South Africa was promoted as a preferred country for S&T cooperation through, for example, the 10-year celebrations of relations between South Africa and Norway. The DST successfully held bilateral negotiations with a number of partner countries (including Belarus, Germany, Hungary, Italy, Norway, Poland, Romania, Slovakia, Sweden and Switzerland), which led to the elevation of S&T cooperation between South Africa and these countries. Additional resources were secured and South African research priorities were captured as focus areas for cooperation.

(ii) Multilateral Cooperation and Africa

This Subprogramme advances and facilitates South Africa's participation in strategic bilateral agreements and multilateral organisations on science, technology and innovation, to strengthen the NSI and to achieve shared economic and social development in the region and the continent.

To assist in the implementation the Ten-Year Innovation Plan, the Subprogramme will work to -

- attract foreign direct investment, expertise and knowledge into the science system, and to enlarge research and innovation networks, through functional strategic bilateral and multilateral partnerships;
- find opportunities for South Africa in multilateral S&T organisations and to leverage resources with third partners in the quest to collaborate with other African partners and to participate in global projects;
- deepen regional integration in science, technology and innovation to support the implementation of the Consolidated Science and Technology Plan of Action (CPA) and the SADC Protocol, including providing support in the establishment of an SADC S&T Desk.

The Africa Cooperation Unit will continue to strengthen current bilateral agreements and promote South Africa's strategic bilateral relations in the SADC region. In this regard, the Unit will continue to expand

and leverage financial resources for the Southern African Regional Cooperation Fund and the African Scholarship for Innovation Studies, as well as instituting new funding instruments aimed at enhancing Africa Cooperation.

The Multilateral Cooperation Unit will promote and support AU and NEPAD programmes, especially the implementation of the CPA, and will continue to participate in AMCOST to influence S&T policy in Africa. South Africa will support the implementation of the Regional Indicative Strategic Development Plan and the Protocol through enhancing the capacity of the SADC S&T Desk at the SADC Secretariat. The Multilateral Cooperation Unit maximises opportunities for South African participation in S&T multilateral organisations through the United Nations family of organisations, follow-ups on key summits, global science projects, and South-South organisations. Participation is geared towards lobbying for common positions at regional and continental level to strengthen international negotiations. The multilateral organisations are used to impact on Africa's goals to the benefit of South Africa's scientific community, among others. The Unit will continue to explore the potential of multilateral organisations to assist the DST to achieve its goals.

(iii) International Resources

This Subprogramme provides the DST with opportunities to leverage funding, human capital and knowledge, and to access international research facilities for the benefit of the NSI. In the next five years, the Subprogramme will intensify its effort in this regard with a special emphasis on innovation and close-to-market focus. This is in line with the Ten-Year Innovation Plan.

The Subprogramme works to increase the flow of international resources into the country by creating conditions for access to international science, technology and innovation skills, and global projects. This includes maintaining highly functional relationships with international partners at bilateral and multilateral level, and brokering these at institutional level for the benefit of all NSI institutions. Organised groups, such as the African Diaspora, will be leveraged as key partners, particularly in terms of human capital and skills, and programmes to facilitate positive knowledge flows into South Africa are to be formulated and implemented. The efforts of the Subprogramme will be supported by the development of dedicated competence in research, which will increase the effective targeting of appropriate partners.

(d) Recent outputs

(i) Overseas Bilateral Cooperation

The Subprogramme has achieved the implementation of over 400 R&D projects in areas such as energy, space, ICT and biotechnology. International bilateral agreements served as a basis for implementing cooperation in the India-Brazil-South Africa Framework and other flagship projects such as Biota South (capacity development in mapping biodiversity). INSITE, the International Science, Innovation and Technology Exhibition, also falls under this Subprogramme. The first government involvement in the French South African Technical Institute in Electronics has secured the platform for expanding the existing relationships and utilising this capacity development model in other scientific areas. The South African chapter of the African Institute for Capacity Development (AICAD) is at an advanced stage of development and will provide for the generation, coordination and dissemination of knowledge, as well as international training opportunities.

(ii) Multilateral Cooperation and Africa

Regional cooperation will be supported through integrated projects under the auspices of the SADC and NEPAD through instruments such as trilateral engagements and international consortia. South Africa's participation in the OECD's Committee for Scientific

and Technological Policy resulted in the finalisation of the peer review of the NSI.

South Africa won the bid to host the third component of the ICGEB in Cape Town. This honour was made possible through the support of the G8 countries, the NEPAD S&T Steering Committee and the African Ministers Council on Science and Technology (AMCOST). The component was officially inaugurated by the President of the Republic of South Africa on 10 September 2007. The hosting of this facility will go a long way towards providing research facilities for biotechnology in health-related research activities and projects aimed at the sustainable application of biotechnology to combat prevalent diseases such as HIV/Aids, hepatitis, rotavirus diarrhoea infections in children, malaria, tuberculosis and dengue fever. The component will assist in promoting integrated regional and continental research collaboration.

South Africa signed bilateral agreements with Malawi, Zambia and Zimbabwe. In order to strengthen regional S&T cooperation and integration, South Africa hosted a regional workshop at which the SADC Protocol on Science, Technology and Innovation was drafted. The Protocol was later adopted by the SADC Ministerial Conference on Science and Technology. The Africa Cooperation Unit successfully hosted the First African Union Conference on Women in Science and Technology, another contribution to building expertise, knowledge and research networks in Africa.

(iii) International Resources

The Department has successfully bid for funding from the European Commission's Sector Budget in support of S&T from the EU's Programme for Reconstruction and Development. This funding will allow DST to address poverty, underdevelopment and marginalisation. The DST launched the European-South African Science and Technology Advancement Programme, a dedicated platform for the advancement of S&T cooperation between the EU and South Africa. The Programme has significantly enhanced South Africa's participation in the recently launched Seventh Framework Programme.

The DST recently signed a South Africa-Finland Knowledge Partnership on ICT agreement, which aims to implement projects for the creation and delivery models of ICT-based service applications that are suitable for local conditions, supporting innovation and knowledge generation in the field of information society technologies in South Africa. The Cooperation Framework on Innovation Systems between Finland and South Africa (COFISA) is playing a significant role in assessing the feasibility of science parks in the three pilot provinces, namely Gauteng, the Eastern Cape and the Western Cape. South Africa continues to play as significant role in the implementation of Global Earth Observation System of Systems. The DST has also entered into a knowledge partnership with the World Bank which will allow the Bank and the Department to share experiences and best practices towards building a knowledge economy in South Africa and the rest of the region.

(e) Selected medium-term outputs targets

Subprogramme	Output	Measure/Indicator	Target
Bilateral Cooperation	Realigned and expanded functional relationships	Focused relationships for the achievement of the grand challenges with countries outside Africa	Ten bilateral agreements realigned or expanded Five new agreements/ cooperative instruments signed
	Support for capacity development	Expanded graduate model	Five entities in new areas established
		Functional AICAD platform	200 new scientists trained Roll-out of AICAD into the SADC
		Access to large science facilities	Five research programmes supported
	Improved cooperation and integration with other NSI players	Joint projects with other programmes in DST and other NSI players	60 new projects initiated
Multilaterals and Africa	Maximise participation in S&T multilateral organisations	Enhanced participation in multilateral organisations SA promoted as a preferred S&T destination for global projects	Two new global projects secured to support implementation of the Ten-Year Innovation Plan
	Deepen and strengthen African cooperation in S&T.	Functional bilateral agreements established in each of the regional economic communities of the AU and active participation in SADC and AU structures	Five new bilateral projects/ programmes
International Resources	International resources such as research funds, location of global infrastructure, knowledge, and human capital for S&T in South Africa.	International funds leveraged for SA S&T	R50 million in funds and in kind from international sources

8.4 Programme 4: Human Capital and Knowledge Systems

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

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

(a) Expenditure estimates

Table 5: Expenditure on the Programme: Human Capital and Knowledge Systems since 2004/05

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Human Capital and Science Platforms	507 872	631 443	751 937	928 613	1 053 198	1 141 435	1 267 975
IKS	11 417	5 277	8 382	10 445	11 512	23 274	24 580
Emerging Research Areas and Infrastructure	1 829	2 301	115 802	313 021	384 314	449 713	476 600
Total	**521 118**	**639 021**	**876 121**	**1 252 079**	**1 449 024**	**1 614 422**	**1 769 155**
Change to 2007 Budget estimate				(5 250)	26 616	43 189	103 648

Economic classification							
Current payments	**17 351**	**16 486**	**17 934**	**20 154**	**22 945**	**24 018**	**25 044**
Compensation of employees	9 755	9 682	10 206	12 665	15 951	16 547	17 105
Goods and services	7 595	6 804	7 728	7 489	6 994	7 471	7 939
of which:							
Communication	518	647	432	421	391	414	439
Computer services	137	171	171	460	155	165	175
Consultants, contractors and special services	669	1 834	435	715	394	417	442
Inventory	1 005	256	362	334	328	347	368
Maintenance, repairs and running costs	2	3	2	42	2	2	2
Operating leases	18	22	56	49	51	55	58
Travel and subsistence	1 778	2 913	5 563	3 585	5 035	5 337	5 657
Financial transactions in assets and liabilities	1	–	–	–	–	–	–
Transfers and subsidies	**503 480**	**622 522**	**857 900**	**1 231 715**	**1 425 925**	**1 590 241**	**1 743 938**
Provinces and municipalities	11	30	3	–	–	–	–
Departmental agencies and accounts	454 288	564 047	774 932	1 075 416	1 180 515	1 294 487	1 435 660
Universities and universities of technology	–	4 761	6 529	18	–	–	–
Public corporations and private enterprises	–	22 748	47 146	20 445	–	–	–
Non-profit institutions	49 181	30 643	29 287	135 335	245 410	295 754	308 278
Households	–	293	3	501	–	–	–
Payments for capital assets	**287**	**13**	**287**	**210**	**154**	**163**	**173**
Machinery and equipment	**287**	**13**	**287**	**210**	**154**	**163**	**173**
Total	521 118	639 021	876 121	1 252 079	1 449 024	1 614 422	1 769 155

Details of major transfers and subsidies

Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	**450 288**	**548 807**	**704 932**	**1 025 416**	**1 039 409**	**1 097 828**	**1 227 201**
Frontier S&T	–	8 896	15 000	–	–	–	–
Human Resource Development	–	12 600	55 000	183 500	256 810	302 714	384 178
Learnerships	4 000	–	–	3 855	6 640	7 023	7 444
National Research Foundation	446 288	512 641	596 671	650 299	686 959	693 958	735 798
Science Themes	–	14 639	33 261	29 012	–	–	–
SANReN	–	–	–	158 750	89 000	94 133	99 781
Gifts and donations	–	31	–	–	–	–	–
Science and Youth	–	–	2 500	–	–	–	–
IKS	–	–	2 500	–	–	–	–
Capital	**4 000**	**15 240**	**50 000**	**50 000**	**141 106**	**196 659**	**208 459**
Equipment placement	–	11 000	–	–	–	–	–
National Research Foundation	4 000	4 240	–	–	–	–	–
R&D infrastructure	–	–	50 000	50 000	141 106	196 659	208 459
Universities and universities of technology							
Current	**–**	**4 761**	**6 529**	**18**	**–**	**–**	**–**
Frontier S&T	–	3 400	682	–	–	–	–
Science and Youth	–	681	1 297	–	–	–	–
Science Themes	–	680	3 350	18	–	–	–
Human Resource Development	–	–	1 000	–	–	–	–
IKS	–	–	200	–	–	–	–

Audited outcome				Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Public corporations and private enterprises							
Public corporations							
Other transfers							
Current	–	22 748	27 146	20 445	–	–	–
Frontier S&T	–	12 362	402	18 000	–	–	–
Learnerships	–	3 134	4 444	2 445	–	–	–
Science Themes	–	7 252	300	–	–	–	–
SANReN	–	–	22 000	–	–	–	–
Non-profit institutions							
Current	49 181	30 643	29 287	53 335	100 910	141 745	145 028
Academics	2 500	2 500	3 000	4 274	5 320	7 393	7 924
Frontier S&T	–	3 734	5 300	–	–	–	–
IKS	10 000	3 500	790	5 000	5 270	16 676	17 667
Learnerships	–	1 866	–	–	–	–	–
Science and Youth	11 000	15 900	16 438	28 100	43 188	54 525	57 797
Science Themes	25 681	3 143	3 759	15 961	47 132	63 151	61 640
Capital	**–**	**–**	**–**	**82 000**	**144 500**	**154 009**	**163 250**
Frontier S&T	–	–	–	82 000	144 500	154 009	163 250

(b) Expenditure trends

Expenditure increased at an average annual rate of 33,9 percent, from R521,1 million in 2004/05 to R1,3 billion in 2007/08. Over the medium term, the budget grows at an average annual rate of 12,2 percent, to R1,8 billion in 2010/11. Throughout the period under review, expenditure growth is evident in the Subprogramme: Human Capital and Science Platforms, which increases at an average annual rate of 10,9 percent over the MTEF period. This is due to more support for SET human capital initiatives, mainly through increasing allocations to the National Research Foundation and more funding for human resource development.

Growth is also evident in the Subprogramme: Emerging Research Areas and Infrastructure, with spending rising at an average annual rate of 15 percent over the MTEF period. Allocations are for establishing and funding SANReN and capital expenditure for R&D infrastructure. Capital expenditure on frontier S&T grows by an average annual 25,8 percent between 2007/08 and 2010/11.

Within the transfers to the NRF, additional allocations were made in the 2008 Budget for the expansion of SARChI, as well as the honours, master's and doctoral programmes. The allocations are R26 million in 2008/09, R43 million in 2009/10 and R104 million in 2010/11.

(c) Service delivery objectives and indicators

(i) Human Capital and Science Platforms

This Subprogramme 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 with the institutions that are key in the production of S&T knowledge and human resources for the NSI. Focus areas include astronomy, human palaeontology, research chairs at South African universities, CoEs and a postdoctoral fellowship programme.

(iii) Emerging Research Areas and Infrastructure

This Subprogramme 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. Complementary initiatives among stakeholders in the public sector will be facilitated to develop a competitive research nucleus.

(iii) Indigenous Knowledge Systems

This Subprogramme 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. It works through networks of science councils, universities and civil society organisations. Museums and science centres have also begun to play key roles in the interfacing of indigenous knowledge through public awareness campaigns.

(d) Recent outputs

(i) Human Capital and Science Platforms

SARChI has awarded 72 research chairs in key areas aligned to government strategies, and is set to revitalise the NSI through the injection of expertise and funding. The Innovation Honours Bursary supported 280 students in 2007, with 83 percent of all awards made to black students and 55 percent to women. Most importantly, and fundamental to long-term knowledge worker development, 70 percent of the students supported intend to do a master's degree.

The Professional Development Programme is aimed at increasing research capacity among young professionals, and enabling them to develop research careers. So far, it has placed 62 researchers in science councils. The postdoctoral fellowship programme has supported 71 postdoctoral fellows at various NSI institutions. The seven existing CoEs continue to foster the exploitation of cross-disciplinary and cross-institutional collaboration among researchers and institutions. To date, 313 postgraduate students have been trained through the CoEs, and 218 articles have been published in peer-reviewed journals.

The Youth into Science Strategy was approved by Cabinet in March 2007 and launched in September 2007. It is implemented through the -

- National Science Week plan (2005-2009);
- national roll-out plan for the establishment of a network of science centres in South Africa;
- national plan to place and support graduates;
- national plan for Olympiads, and competitions and camps;
- Mathematics, Science and Technology educators support plan;
- national supplementary tuition plan.

A national youth service programme is also incorporated into the roll-out of the Youth into Science Strategy. Through this programme, a total of 125 unemployed SET graduates have been deployed at 22 centres countrywide to assist in the delivery of the Youth into Science Strategy. The Unemployed Science Graduates Database, aimed at addressing unemployment among science graduates, was officially launched in May 2007. The database will provide stakeholders in knowledge generation and human resource development with organised information on the realities of unemployment among SET graduates. The information from the database could also be used to measure the extent and determine the dynamics of unemployment in the SET fields.

African Origins Platform: The NRDS highlighted South Africa's rich heritage in palaeontology as one of the country's geographical advantages, which the DST is working to consolidate. A comprehensive strategy for supporting research in this area, including all the subdisciplines of palaeontology and archaeology, was developed between 2004 and 2006, with support from a wide variety of stakeholders. The African Origins Platform's objectives are knowledge production, the training of the next generation of experts in these fields, 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.

(ii) Emerging Research Areas

Nanoscience and Nanotechnology: Significant progress has been made towards the implementation of the National Nanotechnology Strategy. The National Nanotechnology Equipment Programme, which aims to acquire research equipment for research institutions, continues to be rolled out and has impacted positively on the development of nanotechnology nationally. The country's first two nanotechnology innovation centres, based at Mintek and the Council for Scientific and Industrial Research (CSIR), have been established. These centres will play a central role in the implementation of the Nanotechnology Strategy and are expected to provide to a platform for world-class research in the fields of nanoscience and nanotechnology.

A plan is being developed to increase public awareness of the technology and its developments. In addition, a research plan has been developed to focus the research questions in this field to deliver on the objectives of the National Nanotechnology Strategy.

Cyberinfrastructure, in the form of a primary node of the Centre for High Performance Computing (CHPC), has been established in Cape Town. This is a joint initiative between by the DST, the Meraka institute and the University of Cape Town. The main purpose of the CHPC, launched in May 2007 and now operational, is to provide researchers with the computing power they need to undertake sophisticated research and innovation. The process for the layout of the first phase of the physical infrastructure for SANReN is under way. This infrastructure will provide national broadband networks and global connectivity for the transmission of research data.

The National Equipment Programme continues to provide new equipment and upgrade existing equipment for research institutions to enable them to undertake world-class research and provide infrastructure for research capacity development. The second year of the Programme was characterised by the acquisition of state-of-the-art equipment in a variety of science areas.

(iii) Indigenous Knowledge Systems

During the past financial year, the National IKS Office (NIKSO) has exercised oversight over the ring-fenced research funds previously administered by the NRF and, together with the NRF, revised the IKS research management models. These will be piloted in early

2008, and implemented fully in 2010. The establishment of IKS research chairs in the NSI continues, with a research chair on traditional medicines and health systems awarded to the University of KwaZulu-Natal. Key stakeholders for the CoE in IKS, which will bring together the Universities of Venda, Limpopo and North-West, have been identified, and the centre will be grown from the bottom up. The South African Qualifications Authority is assisting NIKSO and the three universities to develop and register a new qualification – Bachelor of IKS. In 2007 NIKSO also approved a concept document on IKS centres, contracted the University of Zululand to establish the first IKS centre, and undertook a comprehensive audit of IKS-related databases in government and research agencies and higher education institutions.

During the course of this year NIKSO showcased the timely establishment of a Ministerial Advisory Committee, which will comprise IKS holders and practitioners, communities, institutions and other stakeholders. Additional committees for science councils and interdepartmental interests have been established to represent a diverse stakeholder involvement in NIKSO. In unfolding its advocacy strategy, NIKSO participated collaboratively with the Science and Youth Unit in presenting IKS to learners during the National Science Week. In the past year NIKSO has focused on initiating institutional collaboration with provinces and key institutions.

(e) Selected medium-term output targets

Subprogramme	Output	Measure/Indicator	Target
Human Capital and Science Platforms	Youth into Science Strategy implemented	Increased participation of youth and general public in National Science Week	250 000 people to visit National Science Week sites countrywide
		Increased number of unemployed science graduates participating in National Youth Service Programme	250 youth volunteers in 2008
		Access to all Science and Youth programmes by learners and educators in schools dedicated to Mathematics and Science	18 Dinaledi Schools to be adopted by DST
		Maths and Science camps conducted in all nine provinces and best learners selected for tertiary studies support	1 800 learners from across the country to participate in Mathematics and Science camps 18 bursaries to be awarded for first-year students in science-based degree studies
		Increased number of educators supported to contribute towards improved quality of Mathematics and Science teaching	400 educators to participate in educator support programme
		Widened distribution and access of science-based career materials	40 000 career booklets to be distributed countrywide.

Subprogramme	Output	Measure/Indicator	Target
Human Capital and Science Platforms		Learners' access to science centre programmes improved	18 existing science centres to receive grants from DST.
			60 officials from existing science centres to be trained
	The South African Research Chairs Initiative	Number of new candidate research chairs awarded by December 2008	70 new research chairs to be awarded
	Professional Development Programme	Development of a concept paper on the implementation of the Professional Development Programme at CoEs	June 2008
	Innovation Honours Bursary programme	Number of students funded at higher education institutions by June 2008	281 students
	Internship Programme	Number of interns placed at the various NSI institutions by April 2008	90 interns
	CoEs	Another CoE established by November 2008	1 new CoE established
	Science Themes	Ten-Year Plan for Astronomy Geographical Advantage Strategy developed and approved	Plan to be approved by May 2008
		Palaeo-sciences (African Origins) research development plan approved and funded	6 million continuous grants under the African Origins Platform Strategy to be given for 2008
		Marine Research Strategy incorporating the African Coelacanth Ecosystem Programme (ACEP) developed and approved.	Research grants for Marine Research Strategy funded by March 2008 (except for ACEP research, for which funds were granted in Dec 2007)
Emerging Research Areas and Infrastructure	Continued implementation of the National Nanotechnology Strategy	Research plan finalised	Finalisation of the plan by May 2008.
		Public Awareness Plan	Ongoing programme from 2008/09 to 2009/10 Impact assessment study completed by Dec. 2009
	National Equipment Programme	Continued roll-out of the National Equipment Programme Developed a database of equipment purchased and received by researchers	Ongoing The Database in place and functional by December 2008
		Flagship projects identified and supported	Ongoing support for nanotechnology flagship project

Subprogramme	Output	Measure/Indicator	Target
Emerging Research Areas and Infrastructure	Development of new research areas	Photonics Strategy developed and approved	December 2008
		Synthetic Biology Plan • Development of the National Plan for Synthetic Biology • Workshop with stakeholders • Presentation for approval • Implementation	Plan to be approved by March 2009. Implementation to commence in 2010/11.
	Cyberinfrastructure: CHPC	Establishment of a second node Feasibility study for the establishment of the second CHPC node in Gauteng. The outcome will be a report detailing the extent of the need, proposal for establishment (including infrastructure acquisition) and appropriate location.	A report on the feasibility study to be completed by Dec 2008. The process of establishing the node to commence in 2009/10, and be phased in over a number of years.
		Layout of the physical infrastructure for SANReN (Phase I)	Phase I network functional: March 2009
Indigenous Knowledge Systems	Public awareness of IKS through the National Science Week programme. Conduct an expo on IKS with other departments	100 posters distributed Exhibitors: • Five science councils • Five natural science museums • 100 knowledge holders	To have 200 000 students visiting National Science Week sites To reach 10 000 knowledge holders
	Legislation on the protection of IKS	Task team appointed and convened three times	Task team established and draft legislation presented to DST
	Ministerial Advisory Committee on IKS Review and recommendations of IKS Policy	Advisory Committee convened three times	Cabinet memo on review of implementation of IKS Policy

8.5 Programme 5: Socio-economic Partnership

This Programme aims to provide policy, strategy and direction-setting support for R&D-led growth. Its strategic focus is informed by government's Micro-Economic Reform Strategy, the National Industrial Policy Framework and the Ten-Year Innovation Plan. Interventions are aimed at promoting growth in public and private investments in R&D, and advancing national growth objectives through sustainable, value-added exploitation of the natural capital of the country and by supporting the greater use of ICT applications in government and society. National objectives of growing the base of SMMEs, black-owned businesses (particularly engineering companies), job creation and poverty reduction are key considerations in the design and implementation of interventions. Programme 5 has three subprogrammes:

- S&T for Economic Impact
- S&T for Social Impact
- S&T Investments

(a) Expenditure estimates

Table 6: Expenditure on the Programme: Socio-Economic Partnership since 2004/05

Subprogramme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Science and Technology for Economic Impact	510 016	714 965	769 045	852 552	1 013 581	1 048 719	1 117 480
Science and Technology for Social Impact	157 381	166 106	216 047	256 593	109 768	115 742	139 916
Science and Technology Investment	2 135	2 686	5 471	22 866	23 682	23 637	22 833
Total	**669 532**	**883 757**	**990 563**	**1 132 011**	**1 147 031**	**1 188 098**	**1 280 229**
Change to 2007 Budget estimate				(3 250)	(46 280)	(47 724)	(29 742)

Economic classification							
Current payments	12 747	10 890	21 236	44 365	27 682	30 858	32 414
Compensation of employees	5 948	5 553	12 866	18 599	20 105	20 873	21 575
Goods and services	6 799	5 337	8 370	25 766	7 577	9 985	10 839
of which:							
Communication	284	354	741	569	671	711	743
Computer services	273	341	232	600	210	223	233
Consultants, contractors and special services	1 159	2 321	2 788	20 250	2 523	2 639	2 797
Inventory	700	192	455	337	412	436	456
Maintenance, repairs and running costs	4	5	14	12	13	13	14
Operating leases	59	74	175	150	158	167	175
Travel and subsistence	757	1 320	3 585	3 079	3 245	3 716	3 883
Transfers and subsidies	**656 623**	**872 772**	**969 040**	**1 087 261**	**1 119 195**	**1 157 077**	**1 247 642**
Provinces and municipalities	13	16	5	–	–	–	–
Departmental agencies and accounts	216 736	177 242	204 663	364 146	503 357	516 155	568 062
Universities and universities of technology	16 289	4 729	8 931	–	–	–	–
Public corporations and private enterprises	348 326	563 927	634 627	554 544	545 861	572 774	607 343
Non-profit institutions	66 331	126 855	120 780	168 460	69 977	68 148	72 237
Households	8 928	3	34	111	–	–	–
Payments for capital assets	**162**	**95**	**287**	**385**	**154**	**163**	**173**
Machinery and equipment	162	95	287	385	154	163	173
Total	**669 532**	**883 757**	**990 563**	**1 132 011**	**1 147 031**	**1 188 098**	**1 280 229**

Details of major transfers and subsidies

Provinces and municipalities							
Municipalities							
Municipal bank accounts							
Current	13	16	5	–	–	–	–
Regional Services Council levies	13	16	5	–	–	–	–
Departmental agencies and accounts							
Departmental agencies (non-business entities)							
Current	216 736	177 242	204 663	364 146	503 357	516 155	568 062
AMTS	21 000	–	–	42 808	48 000	50 000	52 000
SANERI	10 000	–	–	42 000	–	–	–
CoEs	1 500	20 000	–	–	–	–	–
CSIR: National Laser Centre	18 000	–	–	–	–	–	–
HSRC	83 336	104 293	121 473	155 949	157 818	151 145	160 416
Leveraging Services Strategy	–	–	1 739	–	–	–	–
National public assets	35 000	43 000	43 000	43 000	–	–	–
RBIs	–	650	–	–	33 201	35 116	37 223
Technology for Poverty Alleviation	–	1 479	6 151	4 500	23 660	25 768	28 424
Technology for Sustainable Livelihoods	–	1 350	–	–	32 155	33 088	32 783
Technology Planning and Diffusion	47 900	6 470	19 300	39 889	–	–	–
Tshumisano Trust	–	–	–	36 000	36 600	36 694	39 000
SARChI	–	–	–	–	18 500	18 500	18 500
Sciences							

Audited outcome				Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
ICT	–	–	13 000	–	–	–	–
Local systems of innovation	–	–	–	–	6 912	7 758	8 604
Local manufacturing capacity	–	–	–	–	28 179	26 900	28 550
Global change S&T	–	–	–	–	17 000	25 000	32 000
Natural resources and public assets	–	–	–	–	52 832	55 686	59 062
Human and social development dynamics	–	–	–	–	26 500	28 500	49 500
Science and technology indicators	–	–	–	–	3 000	7 000	10 000
Research Information Management System	–	–	–	–	14 000	10 000	6 000
Quality of life nuclear technologies	–	–	–	–	5 000	5 000	6 000

Audited outcome				Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Universities and universities of technology							
Current	16 289	4 729	8 931	–	–	–	–
ICT	–	282	–	–	–	–	–
SANERI	–	500	–	–	–	–	–
Technology for Poverty Alleviation	–	1 500	–	–	–	–	–
Technology for Sustainable Livelihoods	16 289	2 447	8 298	–	–	–	–
Leveraging Services Strategy	–	–	633	–	–	–	–
Public corporations and private enterprises							
Public corporations							
Other transfers							
Current	348 326	563 927	634 627	554 544	545 861	572 774	607 343
AMTS	–	41 515	41 800	19 592	–	–	–
CSIR	348 326	431 649	483 194	517 352	545 861	572 774	607 343
ICT	–	13 741	14 200	–	–	–	–
RBI	–	15 050	24 208	17 600	–	–	–
Technology for Poverty Alleviation	–	7 921	20 098	–	–	–	–
Technology for Sustainable Livelihoods	–	31 051	44 702	–	–	–	–
Technology Planning and Diffusion	–	5 000	6 425	–	–	–	–
CSIR: National Laser Centre	–	18 000	–	–	–	–	–
Non-profit institutions							
Current	66 331	126 855	120 780	168 460	69 977	68 148	72 237
ICT	9 000	–	–	54 210	69 977	68 148	72 237
NECSA: Fluorochemicals	–	20 000	–	–	–	–	–
RBIs	10 000	4 380	5 458	13 900	–	–	–
SANERI	–	19 500	40 000	–	–	–	–
Technology for Poverty Alleviation	6 561	–	–	–	–	–	–
Technology for Poverty Alleviation	24 200	2 000	8 986	35 500	–	–	–
Technology for Sustainable Livelihoods	16 570	12 151	–	53 100	–	–	–
Technology Planning and Diffusion	–	68 824	55 708	6 750	–	–	–
AMTS	–	–	10 000	–	–	–	–
Leveraging Services Strategy	–	–	628	–	–	–	–
Biofuels	–	–	–	5 000	–	–	–

(b) Expenditure trends

Expenditure increased from R669,5 million in 2004/05 to R1,1 billion in 2007/08, at an average annual rate of 19,1 percent, primarily in the Subprogramme: Science and Technology for Economic Impact, which accounted for 18,7 percent of Programme 5 expenditure between 2004/05 and 2007/08. Transfer allocations increased for a wide variety of institutions, including the CSIR, which accounted for an average of 48,4 percent of all Programme spending between 2004/05 and 2007/08, and the HSRC, which has experienced a 23,2 percent growth in expenditure, from R83,3 million in 2004/05 to R156 million in 2007/08.

Expenditure growth moderates considerably over the MTEF period, rising at an average annual rate of 4,2 percent, to R1,3 billion in 2010/11. Over this period, in addition to continued large allocations to institutions such as the CSIR and HSRC, the Department will fund a variety of new research programmes on issues that include local manufacturing capacity (R29 million allocation in 2010/11), global change S&T (R32 million in 2010/11), natural resources and public assets (R59 million in 2010/11), and human and social development dynamics (R50 million in 2010/11).

(c) Service delivery objectives and indicators

The Subprogramme: Science and Technology for Economic Impact leads and supports a number of strategic S&T interventions requiring cooperation between departments and between government and industry to achieve government's strategic economic growth and development objectives.

The Subprogramme: Science and Technology for Social Impact introduces and promotes 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, as well as those expressed in the context of the Millennium Development Goals. The Subprogramme does this by providing leadership in strategic research, building partnerships with other government departments in applied research and technology development, and developing programmes and institutional capacity.

The Subprogramme: Science and Technology Investments 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.

(d) Recent outputs

The Information and Communications Technologies (ICT) RDI Programme implemented by the Meraka Institute received a major boost with the initiation of three additional 'critical mass' flagship programmes in Human Language Technologies, Inclusive Environments, and Information Security. These complement the existing programmes in Geometrics, ICT in Education and Wireless Communication Technologies. Initial wireless mesh networking results will be used to inform DST, CSIR, Meraka and Sentech strategies to increase broadband and Internet access in rural and marginalised communities.

The DST seed-funded critical mass research in a number of ICT domains during 2007/08. Two of the major breakthroughs were in the wireless mesh networking and in ICT in Education

(i) Wireless Mesh Network Technologies

- Research and technology development in this area led to the implementation of a pilot project in Peebles Valley in Mpumalanga. The technology was used to address the problems of telecommunication costs and lack of Internet connectivity associated with rural areas. Using a combination of wireless mesh technology for 'First-Inch First-Mile' – as opposed to last mile connectivity - and satellite communications for long and backhaul, connectivity was achieved between an HIV clinic in a poor rural village in Peebles Valley, and other health points in the province. Local farmers also benefited from this initiative by obtaining cost-effective Internet connectivity.
- The methodology used in this project has been documented and released under **"creative commons licence",** an open-source software licensing model, for replication and improvement by all role players and beneficiaries across the globe.

(ii) ICT in Education – the MobileEd Project

- MobileEd project involves the development of technology applications to enhance teaching and learning using cellphone communication and network technology. This project was initially piloted with the participation of a previously disadvantaged school and a more affluent school. The application allows for peer collaborative learning among learners by using cellphones to source learning content from Wikipedia (a free online encyclopaedia). The project also incorporates other technologies such as human language technologies. Learners can send their queries about any subject or concept and the system will automatically dial back with an answer, either voice or text depending on the learner's choice.
- An offshoot of the MobileEd platform was its groundbreaking application (for communication) by UNICEF during the hurricanes in the Caribbean in early 2007.

Following a detailed review of the approach and research priorities under the Advanced Manufacturing Technology Strategy (AMTS) in 2006, the existing flagship priority areas received a major boost with R&D grants for an additional 23 projects finalised. Participants in the projects include private companies, state agencies, SMMEs, universities and universities of technology. Projects approved are in the areas of advanced composites, advanced light metals, advanced sensors, high-performance machining of light materials, and reconfigurable manufacturing systems.

The DST has committed to a major development programme for establishing a local industry base in titanium metals and product development. Some aspects of the programme are already showing promising results. Through the AMTS, a large programme of work has commenced on titanium investment casting. This has so far involved extensive upgrading and refurbishment of an industrial-scale vacuum furnace and robotic mould dipping and handling system at the CSIR. The basic technology for the production of investment casting moulds for titanium has been established. This is a major achievement, as the technology is proprietary and therefore carefully guarded by the few organisations around the world that are able to cast titanium successfully. Through the Advanced Metals Initiative, a major R&D programme has been set up to develop a novel, continuous and cost-competitive process for the commercial production of primary titanium metal. The CSIR, NECSA and Mintek comprise the core DST-supported R&D performers. The targeted markets lie in the aerospace, automotive and medical device sectors. To date, more than six different novel routes for the production of primary titanium metal

have been conceptualised and tested. Laboratory facilities have been established in preparation for the further development of the chosen process.

The DST launched the Post-harvest and Cold Chain Technologies Innovation Programme in partnership with the Fresh Produce Exporters Forum and the Agricultural Research Council. Priorities that will receive attention include technology gaps in integrated packaging solutions, container technology, temperature and humidity control, alternative solutions to current post-harvest disease control products and processes, irradiation technology, non-destructive fruit quality assessment techniques and control (mitigation) methods and systems for sanitary and phytosanitary compliance.

A manufacturing opportunity has emerged in the nuclear energy sector. The local manufacturing base will benefit from the new Nuclear Manufacturing Centre (NMC) that the DST has established with NECSA at Pelindaba. The functionality and effectiveness of the NMC is an important vehicle for wider supplier development in this sector. The Department will take this forward with the DTI, the DME and the Department of Public Enterprises in the development of a competitive supplier development package for firms in the nuclear manufacturing industry.

Systems and processes were put in place to ensure the effective implementation of the R&D tax incentives that were introduced at the end of 2006. The first National Innovation Survey has been completed, as well as the 2005 National R&D Survey by the Human Sciences Research Council (HSRC)/Centre for Science, Technology and Innovation Indicators. The R&D survey has been officially recognised by Statistics SA. These are very useful instruments for government development planning and will be augmented in the next year or two with a National Technology Balance of Payments (TBP) report (monitoring the extent to which the economy is dependent on technology imports) and a nationally agreed set of indicators on monitoring progress towards a knowledge economy. There has been considerable progress with the integration of government reporting on S&T expenditure within the national accounts reporting framework. This will now be published on an annual basis. The DST has also supported much of the investment in establishing a common system for science councils' information on R&D activities (the Research Information Management System).

The DST continued to extend its efforts in facilitating empowerment and small-scale industry development, using proven technologies. This includes progress on the final stages of support for cage-net aquaculture technology. Strong partnerships have been established with industry, universities (particularly Stellenbosch University), provincial government departments and the Department of Water Affairs and Forestry. Projects include the growing of abalone in Hondeklip Bay in the Northern Cape, Silver Cob in the Eastern Cape, and indigenous freshwater fish (tilapia and catfish) in irrigation waterworks in Limpopo, Mpumalanga, KwaZulu-Natal, the Eastern Cape, the Northern Cape, the Free State and North West

(e) Selected medium-term output targets

Subprogramme	Output	Measure/Indicator	Target
S&T for Economic Impact	Support provided for transition of manufacturing competencies higher up the supply chain of state-owned enterprises (SOEs) and global original equipment manufacturers (partnership in the Competitive Supplier Development Programme)	DST/government-agreed plan of action for redirecting and upscaling DST instruments in AMTS, Advanced Metals Initiative (AMI), tooling, technology planning and diffusion and centres of competence to support the development of local equipment Manufacturers to exploit 20% of the SOEs' (Eskom and Transnet) capital procurement	Technical support needs identified by May 2008 and resources made available for development of local equipment manufacturing suppliers Companies identified by July and development programme started by the end of Aug. 2008
	Support provided for development of local manufacturing firms to exploit the share of engineering work packages from the nuclear build programme, radio astronomy infrastructure investment and the opportunities in the pharmaceutical industry.	DST/government-agreed plan of action drawing on AMTS, AMI, tooling and centres of competence to make it possible for local engineering companies to exploit opportunities from the expansion plans in public infrastructure.	Plans finalised and integrated into Industrial Policy Action Plan for implementation by July 2008 Clusters of companies identified by Oct 2008 and development programme started by Jan 2009
		Special project: Partnership with Department of Provincial and Local Government, COFISA and provinces on regional innovation planning and assessment	Project consultations and agreement by June 2008 and implementation to the end of 2009
	Directed SET programmes advancing implementation of the NRDS technology missions	RBIs: Development of a local titanium industry. National investment plan and centre of competence model adopted. Incubation plan for industry value-chain elements finalised and operationalised.	Finalised by May 2008 Oct 2008 Competency for metal production demonstrated by 2011, industry development ongoing over 10-year period
S&T for Economic Impact		Research results, reports and advocacy activities in the technology mission areas of advanced manufacturing technologies (AMT), ICT, chemicals and related industries, and RBIs	End of 2009 for 70% of research and technology development targets in each of the three-year agreements with the research intermediaries for implementing national strategies on AMT, ICT, chemicals and RBI 100% of deliverables in both the annual programmes of work on policy studies and advocacy activities
		Special project: All the necessary actions required to establish and operationalise a centre of competence in the area of information security	Finalise by May 2008 Directed R&D activities and product development led by CSIR/Meraka as per three-year agreement

Subprogramme	Output	Measure/Indicator	Target
S&T for Economic Impact		All the necessary actions required to finalise and operationalise a national programme of work as defined as the Global Change grand challenge in the Ten-Year Innovation Plan.	Finalise by May 2008.
S&T for Social Impact	Directed, large-scale scientific research programmes set up to address the challenges of human and social dynamics in development.	Implementation framework for this component of the Ten-Year Innovation Plan. National R&D programme of work in the social sciences and humanities. Special policy research projects, research advocacy through networks, and dissemination of information aimed at enhancing understanding of development, poverty and unemployment.	Finalised and under implementation by June 2008 National research priorities in humanities and social sciences finalised by Aug 2008 100% of deliverables in both the annual programmes of work on policy studies and advocacy activities.
	Directed technology programmes contributing to learning and decision-making for sustainable livelihoods and sustainable human settlements	Technology demonstrations, case study reports and advocacy activities implemented in partnership with TIA.	70% of research and technology development targets in the three-year agreement with TIA 100% of deliverables by DST in both the annual programmes of work on case studies and advocacy activities
S&T Investments	A portfolio of directed monitoring, assessment and reporting activities on science, technology and innovation investments and performance	National R&D survey	R&D survey report produced annually
		Government S&T Expenditure Plan	Report on government S&T expenditure by Aug 2008
		National innovation survey	Innovation survey report, 2008 and 2010
		TBP assessment facility	TBP derived from available statistics 2008 and calculated from approved model by 2009
		Indicators for transition to a knowledge economy	National approach and methodology adopted in 2008 Baseline determined and assessment during 2009/10
	Evaluation of the R&D Tax Incentive Programme	Report and advocacy activities to promote increased R&D investments by the private sector	Report to be submitted to Cabinet every year 100% of deliverables committed to in the annual business plan on advocacy activities, particularly for small manufacturing companies.

9. Public entities and other agencies reporting to the Minister

The allocation of funds to science councils 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 compiles a consolidated submission to National Treasury. The resulting government allocation for the respective councils is included in the DST's MTEF allocation and is distributed to each individual science council in line with advice from the National Advisory Council on Innovation (NACI).

9.1 Council for Scientific and Industrial Research

The CSIR is governed by the Scientific Research Council Act, 1988. 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.

The CSIR generates about 60 percent of its total revenue from R&D contract income. Baseline allocations (including VAT) for the 2007/08, 2008/09 and 2009/10 financial years are R487 million, R514 million and R539 million, respectively. The CSIR will receive additional ring-fenced allocations (including VAT) of R213 million, R251 million and R245 million for the 2007/08, 2008/09 and 2009/10 financial years. Over the medium term, the CSIR's estimated revenue is set to grow from R1 189 million in 2006/07 to R1 734 million in 2010/11.

Selected performance indicators

Indicators	Annual performance						
		Past		Current		Projected	
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Number of new technology packages available for transfer	–	–	–	23	28	35	36
Publication equivalents	–	–	–	259	307	365	400
New invention disclosures	–	–	–	27	34	44	46
Number of substantial collaborative research activities	–	–	–	55	60	65	70
Number of SET staff with PhD-level qualifications	–	–	–	242	264	288	290
Number of postdoctoral grants awarded	–	–	–	26	36	49	50

(a) Expenditure estimates

Table 7. Expenditure of the Council for Scientific and Industrial Research

Audited outcome				Estimated outcome	Medium-term estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Revenue							
Non-tax revenue	696 491	709 118	728 925	750 167	808 877	913 886	1001171
Sale of goods and services other than capital assets	617 917	581 602	660 587	693 564	753 904	858 697	940 273
of which:							
Research revenue	617 917	581 602	660 587	693 564	753 904	858 697	940 273
Other non-tax revenue	78 574	127 516	68 338	56 603	54 973	55 189	60 898
Transfers received	385 852	421 631	460 443	614 532	670 640	687 789	732 496
Total revenue	1 082 343	1 130 749	1 189 368	1 364 699	1 479 518	1 601 675	1 733 667
Expenses							
Current expense	1 004 083	1 072 623	1 162 732	1 336 588	1 448 998	1 570 120	1 700 226
Compensation of employees	567 621	634 196	594 974	684 220	742 379	805 481	873 947
Goods and services	386 698	380 790	510 700	586 140	623 653	663 567	706 035
Depreciation	42 272	40 239	50 682	58 333	74 565	92 134	110 734
Interest, dividends and rent on land	7 492	17 398	6 376	7 895	8 401	8 938	9 510
Total expenses	1 004 086	1 072 630	1 162 835	1 336 588	1 448 998	1 570 120	1 700 226
Surplus / (Deficit)	78 257	58 119	26 533	28 111	30 520	31 555	33 441
Balance sheet data							
Carrying value of assets	228 950	300 139	314 205	355 872	301 357	309 791	305 421
of which: Acquisition of assets	54 730	119 734	66 443	100 000	115 120	100 568	106 364
Investments	29 895	17 842	200 000	50 000	100 000	100 000	200 000
Inventory	65 504	46 866	43 203	45 363	49 310	56 164	61 499
Receivables and prepayments	143 157	159 980	146 906	154 387	167 583	190 059	207 756
Cash and cash equivalents	304 209	294 011	379 243	426 687	359 637	403 912	364 902
Total assets	771 715	818 838	1 083 557	1 032 309	977 887	1 059 926	1 139 578
Capital and reserves	262 388	319 929	347 716	375 827	406 347	437 901	471 342
Post-retirement benefits	107 307	14 897	12 751	10 589	8 662	6 495	4 387
Trade and other payables	343 160	418 712	650 842	567 504	477 825	523 248	563 723
Provisions	58 860	65 300	72 248	78 389	85 052	92 282	100 126
Total equity and liabilities	771 715	818 838	1 083 557	1 032 309	977 887	1 059 926	1 139 578

(b) Expenditure trends

The CSIR is funded by transfers (as a core grant) from the DST, as well as ring-fenced allocations for the laser loan programme, the Centre of Excellence on Climate Change, the centres of competence, light metals research, ICT/demonstration in government, and the Meraka Institute.

The CSIR generates about 60 percent of its total revenue from R&D contract income. Baseline allocations (including VAT) for 2008/09, 2009/10 and 2010/11 are R559,3 million, R595,5 million and R639,1 million. The CSIR will receive additional ring-fenced allocations (including VAT) of R111,3 million, R92,3 million and R93,4 million for 2008/09, 2009/10 and 2010/11. Over the medium term, the CSIR's estimated revenue is set to grow at an average annual rate of 8,2 percent, from R1,5 billion in 2008/09 to R1,7 billion in 2010/11.

9.2 National Research Foundation

The National Research Foundation (NRF) was established by the National Research Foundation Act, 1998. Its objective is to support and promote research through funding, human resource development and the provision of the necessary research facilities for the creation of knowledge, innovation and development in all fields of S&T, including indigenous knowledge. In this way the NRF contributes to the improvement of the quality of life of all South Africans.

The NRF performs an agency function on behalf of the DST and currently acts as a service provider for the Department of Environmental Affairs and Tourism for marine research, the DTI for the Technology and Human Resources for Industry Programme, and the Department of Labour for the Scarce Skills Development Fund.

The activities of the NRF include participating in the research and innovation support and advancement cluster and managing national research facilities in areas such as astro science, space science and the geosciences (for example the South African Astronomical Observatory), biodiversity and conservation (for example the South African Institute for Aquatic Biodiversity), and nuclear sciences (for example the iThemba laboratory). The research and innovation support and advancement cluster includes programmes that the NRF manages as a service provider to other departments and the South African Agency for Science and Technology Advancement.

Selected performance indicators

Indicators	Annual performance						
	Past			Current	Projected		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Human resource development:							
Number of students supported:							
- BSc	589	662	662	232	488	345	Block grants
- MSc	2 049	2 148	2 003	1 604	1 920	1 883	1 996
- PhD	1 100	1 197	1 179	1 080	1 258	1 300	1 378
Transformation in profile of researchers supported:							
- black	387	473	494	445	650	743	788
- female	508	600	670	634	873	977	1 036
Number of researchers supported	1 481	1 617	1 680	1 547	1857	1 954	2 071
Number of MSc and PhD students supervised by NRF staff	–	146	167	163	214	246	261
Facilities knowledge production:							
Number of peer-reviewed publications by researchers funded through the research and innovation support and advancement cluster	2 335	3 024	2 534	–	4 004	4405	4 669
Number of refereed journal articles by NRF staff	–	119	164	90	178	202	214
Value of investment (grants) in focus area and development programme	R163,9m	R173,m	R195,8m	–	R203,4m	R203,9m	R216,1m

NRF Expenditure estimates

Table 8. Expenditure of the National Research Foundation

Audited outcome				Estimated outcome	Medium-term estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Revenue							
Non-tax revenue	**464 081**	**447 342**	**608 837**	**919 582**	**981 914**	**1 088 349**	**1 196986**
Sale of goods and services other than capital assets of which:	6 857	7 659	9 474	8 809	9 000	9 500	10 000
Sales by market establishments	6 857	7 659	9 474	8 809	9 000	9 500	10 000
Other non-tax revenue	457 224	439 683	599 363	910 773	972 914	1 078 849	1 186 986
Transfers received	**450 288**	**542 144**	**596 671**	**620 467**	**686 959**	**693 958**	**735 798**
Total revenue	**914 369**	**989 486**	**1 205 508**	**1 540 049**	**1 668 873**	**1 782 307**	**1 932 784**
Expenses							
Current expense	322 337	393 839	448 225	528 248	547 550	585 876	628 531
Compensation of employees	168 080	203 582	229 986	260 561	282 709	302 492	323 728
Goods and services	135 375	178 993	202 502	246 173	242 541	259 234	278 903
Depreciation	18 642	11 103	15 074	21 514	22 300	24 150	25 900
Interest, dividends and rent on land	240	161	663	–	–	–	–
Transfers and subsidies	**596 658**	**636 857**	**747 369**	**1 042 848**	**1 121 323**	**1 196 431**	**1 304 253**
Total expenses	**918 995**	**1 030 696**	**1 195 594**	**1 571 096**	**1 668 873**	**1 782 307**	**1 932 784**
Surplus / (Deficit)	**(4 626)**	**(41 210)**	**9 914**	**(31 047)**	**–**	**–**	**–**
Balance sheet data							
Carrying value of assets	131 856	163 078	210 559	240 026	275 626	312 326	351 276
of which: Acquisition of assets	20 661	43 351	62 754	51 346	58 000	61 000	65 000
Investments	76 558	85 800	97 949	100 981	120 000	150 000	200 000
Inventory	2 801	2 863	2 696	3 500	3 500	3 500	3 500
Loans	–	3 051	3 462	–	–	–	–
Receivables and prepayments	743 706	745 719	802 070	767 301	750 000	700 000	500 000
Cash and cash equivalents	426 407	311 506	482 351	384 427	300 000	300 000	250 000
Total assets	**1 381 328**	**1 312 017**	**1 599 087**	**1 496 235**	**1 449 126**	**1 465 826**	**1 304 776**

Audited outcome				Estimated outcome	Medium-term estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Capital and reserves	192 035	161 022	217 316	216 101	251 801	288 651	327 751
Borrowings	135	9 787	(491)	3 000	3 000	3 000	3 000
Post-retirement benefits	–	–	–	90 000	92 000	95 000	100 000
Trade and other payables	1 022 072	1 037 419	1 273 387	1 135 135	1 071 575	1 054 676	851 776
Provisions	109 159	103 789	108 875	18 000	18 750	19 500	20 250
Managed funds	57 927	–	–	34 000	12 000	5 000	2 000
Total equity and liabilities	1 381 328	1 312 017	1 599 087	1 496 235	1 449 126	1 465 826	1 304 776

(b) Expenditure trends

The NRF is funded by transfer payments (as a core grant) from the DST, as well as ring-fenced allocations and contracts. Allocations for the MTEF period (before deferred income) are R591,6 million, R611 million and R647,7 million. There are additional ring-fenced allocations of R128,3 million, R116,2 million and R124,1 million over the MTEF period. The entity's budget is set to grow at an annual average of 7,6 percent, from R1,7 billion in 2008/09 to R1,9 billion in 2010/11. The most significant growth is in 2010/11, at 8,4 percent, largely reflecting spending on the SKA.

9.3 Human Sciences Research Council

The Human Sciences Research Council (HSRC) is a statutory body mandated to undertake, promote and coordinate policy-relevant, problem-oriented research in the human and social sciences. The public purpose mandate of the HSRC is derived from the Human Sciences Research Act, 1968, which also mandates the HSRC to undertake contract research on any subject in the field of the human sciences and to charge fees for research conducted or services provided.

The HSRC aligns its research activities and structures to South Africa's national development priorities, notably poverty reduction through economic development, skills enhancement, job creation, the elimination of discrimination and inequalities, and effective service delivery. The HSRC is poised to play a key role in the implementation of the Cabinet-approved Ten-Year Innovation Plan (2008-2018), particularly in relation to the grand challenge of human and social dynamics.

The HSRC measures its performance using indicators grouped under the acronym PAITECS: the public purpose mandate of the organisation, international collaboration (with particular emphasis on research in Africa), the implementation and impact of research, ongoing and deepened transformation of the organisational workforce, excellence and capacity building in research, and sustainability through securing external funding to supplement the parliamentary grant in order to support long-term, large-scale research projects and programmes.

Selected performance indicators

Indicators	Annual performance						
	Past			Current	Projected		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Public purpose: Number of African research fellows at the HSRC	–	–	4	12	10	12	15
Capacity building:							
Number of interns enrolled in a master's programme	25	17	29	38	35	36	36
Number of interns enrolled in a PhD programme	25	17	20	26	20	22	24
Number of postdoctoral fellowships	–	–	4	8	9	9	10

(a) Expenditure estimates

Table 9. Expenditure of the Human Sciences Research Council

Audited outcome				Estimated outcome	Medium-term estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Revenue							
Non-tax revenue	148 378	112 710	124 270	131 359	148 095	172 972	174 823
Sale of goods and services other than capital assets of which:	136 469	99 733	110 608	116 877	132 744	156 701	157 575
Research revenue	136 469	99 733	110 608	116 877	132 744	156 701	157 575
Other non-tax revenue	11 909	12 977	13 662	14 482	15 351	16 272	17 248
Transfers received	**83 336**	**104 293**	**121 473**	**155 949**	**157 818**	**151 145**	**160 416**
Total revenue	**231 714**	**217 003**	**245 743**	**287 308**	**305 913**	**324 117**	**335 239**
Expenses							
Current expense	**226 369**	**214 207**	**240 482**	**287 308**	**305 913**	**324 117**	**335 239**
Compensation of employees	108 995	112 623	121 153	159 177	168 727	178 851	189 582
Goods and services	111 191	97 479	115 535	124 662	133 253	141 356	141 637
Depreciation	6 183	4 105	3 794	3 470	3 932	3 910	4 020
Transfers and subsidies	**551**	**–**	**–**	**–**	**–**	**–**	**–**
Total expenses	226 920	214 207	240 482	287 308	305 913	324 117	335 239
Surplus / (Deficit)	**4 794**	**2 796**	**5 261**	**–**	**–**	**–**	**–**
Balance sheet data							

Audited outcome				Estimated outcome	Medium-term estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Carrying value of assets	57 023	90 424	89 420	103 125	108 577	109 806	113 921
of which: Acquisition of assets	4 642	4 743	2 832	17 175	9 383	5 139	8 134
Inventory	1 474	2 023	3 268	3 464	3 672	3 892	4 126
Receivables and prepayments	33 731	21 466	34 393	36 457	38 644	40 963	43 420
Cash and cash equivalents	30 375	15 903	29 393	17 170	13 291	13 726	11 378
Total assets	122 603	129 816	156 474	160 216	164 183	168 387	172 845
Capital and reserves	59 526	89 606	94 105	94 105	94 105	94 104	94 104
Trade and other payables	55 605	32 124	52 621	55 778	59 125	62 672	66 433
Provisions	7 472	8 086	9 748	10 333	10 953	11 610	12 307
Total equity and liabilities	**122 603**	**129 816**	**156 474**	**160 216**	**164 183**	**168 386**	**172 843**

(b) Expenditure trends

The HSRC is funded by transfer payments (as a core grant) from the DST, as well as ring-fenced allocations. Between 2004/05 and 2007/08, expenditure increased at an average annual rate of 8,2 percent from R226,9 million to R287,3 million. The largest increase, of 19 percent in 2007/08, was primarily due to significant increases in ring-fenced allocations for: the establishment of a policy analysis unit; the institutionalisation and expansion of research capacity development work, notably through a research internship scheme; and time-limited support for urgent capital requirements. Upward trends in the value of assets reflected in the balance sheet for 2008/09 are attributable to refurbishments that took place with the help of the capital grant funding received for 2007/08.

Allocations over the MTEF period are R156,7 million, R149,9 million and R158,8 million (including VAT). In addition to the MTEF allocation, the HSRC has received ring-fenced allocations of R32 million, R24,3 million and R25,8 million for the same period. The entity's budget is projected to grow from R287,3 million in 2007/08 to R335,2 million in 2010/11, at an average annual rate of 8 percent.

9.4 Africa Institute of South Africa

The Africa Institute of South Africa (AISA) is a statutory body established in terms of the AISA Act, 2001. It focuses primarily on political, socio-economic, international and development issues in contemporary Africa, and contributes to the goals of the NSI through research programmes which impact on knowledge production, human resource development (especially developing capacity in African studies, a scarce resource in South Africa), social science, and innovation.

AISA's key role is to conduct research and support policy development; embark on training programmes; and establish, participate in and maintain networks for peace, development and prosperity in Africa. AISA's research also ensures the quality of policy decision making.

Selected performance indicators

Indicators	Annual performance						
	Past			Current	Projected		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Number of books published	6	1	3	11	12	14	16
Number of collaborative books published	4	1	1	3	4	6	8
Number of journal articles published	2	4	4	3	4	4	4
Number of monographs published	5	2	2	8	72	80	100
Number of occasional papers published	-	4	2	5	36	40	50
Number of reference works published	1	1	3	3	4	5	5
Number of e-monographs	9	2	2	8	72	80	100
Number of newsletters published	5	5	3	4	5	8	12

Allocations for the MTEF period are R27,8 million in 2008/09, R28,1 million in 2009/10 and R30,5 million in 2010/11. Included in all these is R1,5 million for the presidential projects. Over the medium term, the entity's budget is set to grow from R30,7 million in 2008/09 to R36,3 million in 2010/11, an average annual rate of 8,7 percent, with the most significant growth in 2010/11 at 8,4 percent. In 2007/08, rollovers of R12,5 million were approved by National Treasury and allocated for non-recurrent projects, including the development of policies and the acquisition of infrastructure assets such as new library shelves.

9.5 Tshumisano Trust

The Tshumisano Trust was registered by the former Committee of Technikon Principals. The Trust is a joint venture, funded by the DST, with participation by the Department of Labour, universities of technology (former technikons), and the German government's funding agency, GTZ.

The core focus of Tshumisano Trust is to leverage skills and product development support within universities of technology so that technology stations can provide support to SMMEs. The number of technology stations has expanded rapidly over the past few years to support previously underserviced provinces, from the original three in 2002 to 12 in 2007. The technology stations increased assistance to SMMEs by more than 37 percent in 2006/07. The Trust has also rolled out three institutes for advanced tooling, in Soshanguve (training and SMME development), East London (design) and Stellenbosch (R&D). This is an important development given the skills shortage and innovation gap in the tooling industry.

Selected performance indicators

Indicators	Annual performance						
	Past			Current		Projected	
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Number of projects and services	716	1 200	1 836	2 000	2 600	3 100	3 720
Number of SMMEs assisted	448	787	1 083	533	1 500	1 800	2 160
Number of female-owned SMMEs	100	155	221	66	318	381	460
Number of SMMEs owned by previously disadvantaged individuals	154	355	200	117	290	350	420
Number of SMMEs trained	197	107	332	157	400	450	550
Number of DST-funded internship programmes	–	45	87	191	230	280	336

Allocations over the MTEF period are R41,4 million in 2008/09, R49,7 million in 2009/10 and R54,2 million in 2010/11. There are additional ring-fenced allocations of R13,5 million, R8,5 million and R7,5 million for each year. The entity's budget is set to grow from R55,5 million in 2008/09 to R62,2 million in 2010/11, at an average annual rate of 5,9 percent, with the most significant growth in 2010/11.

9.6 South African National Energy Research Institute

A Cabinet decision, in terms of existing legislation, enabled the South African National Energy Research Institute 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 fellows and graduate assistant programmes in South Africa.

Allocations for the 2008 MTEF period are R44,3 million, R46,3 million and R49,3 million. Over the medium term, the entity's budget is set to grow from R42 million in 2006/07 to R49,3 million in 2010/11.

9.7 Academy of Science of South Africa

The Academy of Science of South Africa (ASSAf) was established through the ASSAf Act, 2001. Its 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, particularly in Africa. The Academy publishes scientific reports, investigates matters of public interest about science, and manages South African journals.

Selected performance indicators

Indicators	Annual performance						
	Past			Current	Projected		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Issues of South African Journal of Science	6	6	6	6	6	6	6
Number of awards: Medals, prizes and fellowships	2	3	3	–	4	4	5

(a) Expenditure trends

Table 10. Expenditure of the Academy of Science of South Africa

Audited outcome				Estimated outcome	Medium-term estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Revenue							
Non-tax revenue	402	544	1 002	1 175	1 218	1 282	1 345
Sale of goods and services other than capital assets of which:	246	305	730	775	808	862	915
Sales by market establishments	246	305	730	775	808	862	915
Other non-tax revenue	156	239	272	400	410	420	430
Transfers received	2 547	4 048	4 960	5 643	5 454	5 637	5 847
Total revenue	**2 949**	**4 592**	**5 962**	**6 818**	**6 672**	**6 919**	**7 192**
Expenses							
Current expense	**2 509**	**4 743**	**5 957**	**6 818**	**6 672**	**6 919**	**7 192**
Compensation of employees	1 370	1 702	2 065	2 560	2 816	3 098	3 407
Goods and services	1 121	3 016	3 869	4 235	3 828	3 791	3 753
Depreciation	14	25	23	23	28	30	32
Interest, dividends and rent on land	4	–	–	–	–	–	–
Total expenses	**2 509**	**4 743**	**5 957**	**6 818**	**6 672**	**6 919**	**7 192**
Surplus / (Deficit)	**440**	**(151)**	**5**	**–**	**–**	**–**	**–**
Balance sheet data							
Carrying value of assets	82	173	169	176	188	200	212
of which: Acquisition of assets	43	117	84	30	40	42	44
Cash and cash equivalents	4 390	5 104	4 337	3 748	4 042	3 721	4 073
Total assets	**4 472**	**5 277**	**4 506**	**3 924**	**4 230**	**3 921**	**4 285**
Capital and reserves	3 846	3 695	3 700	3 700	3 724	3 724	3 748
Trade and other payables	626	1 582	806	224	506	197	537
Total equity and liabilities	**4 472**	**5 277**	**4 506**	**3 924**	**4 230**	**3 921**	**4 285**

10. Additional tables

Summary of personnel numbers and compensation of employees

Audited outcome				Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
A. Permanent and full-time contract employees							
Compensation (R'000)	58 198	65 119	83 737	114 854	130 170	135 219	139 707
Unit cost (R'000)	278	277	278	382	360	374	386
Personnel numbers (headcount)	209	235	301	301	362	362	362
B. Part-time and temporary contract employees							
Compensation (R'000)	6	6	6	7	–	–	–
Unit cost (R'000)	0	0	0	0	–	–	–
Personnel numbers (headcount)	28	31	33	33	_	–	–
Total for Department							
Compensation (R'000)	58 204	65 125	83 743	114 861	130 170	135 219	139 707
Unit cost (R'000)	246	245	251	344	360	374	386
Personnel numbers (headcount)	237	266	334	334	362	362	362

Infrastructure expenditure

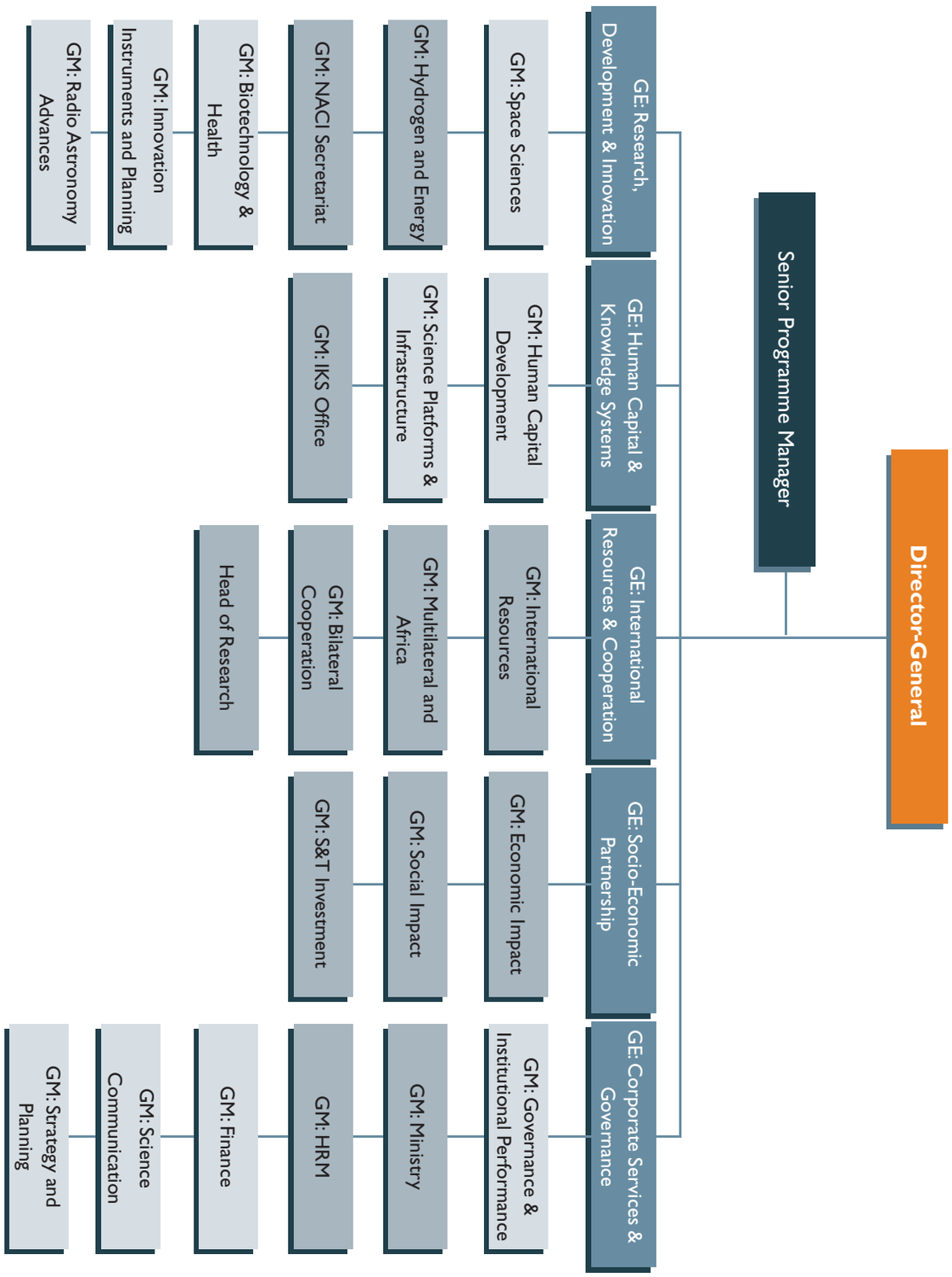
	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Research equipment	–	–	50 000	50 000	70 000	74 200	78 652
R&D infrastructure	–	–	110 000	265 000	436 106	196 659	208 459
DST head office building	–	–	133 000	–	–	–	–
Frontier S&T infrastructure	–	–	40 000	105 000	144 500	154 009	163 250
Space infrastructure	–	–	20 000	20 000	15 000	15 000	15 900
Square Kilometer Array infrastructure	–	–	–	80 000	265 000	471 900	500 214
Hydrogen strategy	–	–	–	10 000	40 500	42 525	45 077
Ten-Year Innovation Plan	–	–	–	-	10 000	20 000	40 000
Total infrastructure expenditure	–	–	353 000	530 000	981 106	974 293	1 051 552

Departmental receipts

The Department's receipts include miscellaneous items such as debt repayments and recovery of private telephone costs.

	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Departmental receipts	302	229	1 029	63	70	71	76
Sales of goods and services produced by department	17	43	301	55	61	62	66
Sales of capital assets	–	–	57	–	–	–	–
Financial transactions in assets and liabilities	285	186	671	8	9	9	10
Total	302	229	1 029	63	70	71	76

11. Organogram



Department of Science and Technology, Building 53, Meiring Naude Road
Scientia Campus, (CSIR) South Gate Entrance
Brummeria, Pretoria, 0001, South Africa
Tel. +27 (12) 843 6300
Fax. +27 (12) 349 1030
www.dst.gov.za

www.PROFIT CREATIVE.co.za P-4433