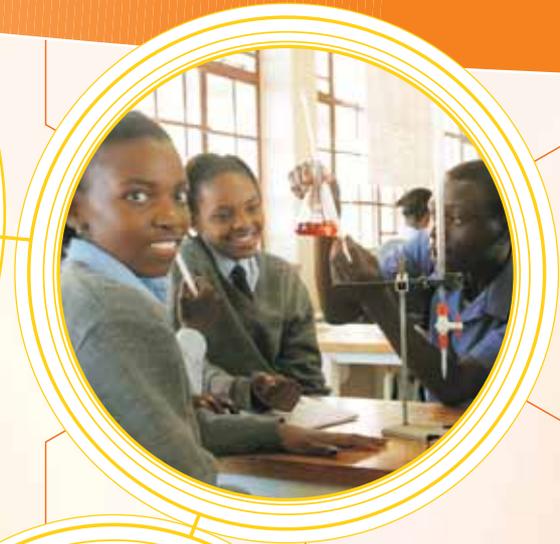
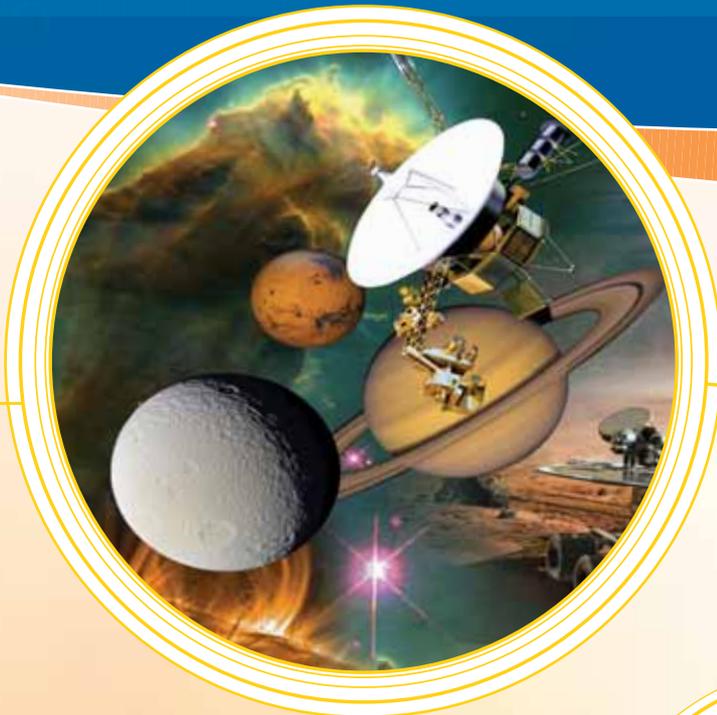


DEPARTMENT OF SCIENCE & TECHNOLOGY STRATEGIC PLAN FOR THE FISCAL YEARS

2011-2016



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

Official sign off

It is hereby certified that this Strategic Plan and Annual Performance Plan:

- Were developed by the management of the Department of Science and Technology under the guidance of Minister Naledi Pandor;
- Take into account all the relevant policies, legislation and other mandates for which the Department of Science and Technology is responsible; and
- Accurately reflect the strategic outcome oriented goals and objectives which the Department of Science and Technology will endeavour to achieve over the period 2011/12 to 2011/16.

Ms Malekgoloane Malapane
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Executive Authority

Signature: _____



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The South African science and technology sector grows stronger each year. Over the past decade research and development expenditure has grown fivefold from R4 billion to R21 billion. There are now some 14 000 scientists, engineers, technologists, technicians, managers and other technical staff directly involved in research and development. South African universities train more and more scientists each year and we are proud to see that some 30% of our current science PhD students are from the rest of Africa. With their help South Africa will be able to spend R45 billion on research and development by 2014 and reach its target for gross expenditure on research and development of 1, 5% of GDP.

Last year the Department launched the Technology Innovation Agency, the objective of which is to encourage and fund South African innovation. I have great confidence in the future success of the Agency. It has made great progress in taking stock of all the projects in the institutions it inherited and has been able to identify many marketable products from research that was in incubation.

The Agency is one of seven public entities that receive funds from the Department's 2011 budget of R4, 4 billion. The seven entities receive the following sums: the Technology Innovation Agency (R433,8 million), the National Research Foundation (R1,1 billion), the Council for Scientific and Industrial Research (R687,2 million), the Human Sciences Research Council (R206,2 million), the South African National Space Agency (R93,6 million), the Africa Institute of South Africa (R32,4 million), and the Academy of Science of South Africa (R11,1 million). This year these entities receive 58% of the Department's budget and their individual budgets have not been cut; Treasury's efficiency savings have been absorbed by the Department itself.

The Department has strengthened its interaction with business leaders of companies that invest heavily in science and technology. I have begun a conversation with them about our programmes and the policies that impact on them, particularly the Research and Development Tax Incentive Programme. The tax incentive has been available for three years and companies have claimed R632 million back from SARS. However, far more should be claimed and we intend to make the incentive more easily available to small and medium enterprises. Business finds the process of applying for the tax incentive very bureaucratic and companies are unable to cope with the administrative burden it places on them. We have discussed this and I shall be making proposals to Treasury to consider business concerns and make changes to the requirements.

This year the strategic plan replaces the corporate strategy of old so that all government departments' plans are in the same format. I would like to thank the policy planning governance monitoring and evaluation unit in the DG's office for designing this change and hope that South African citizens now find our proposals clearer to read and easier to understand.

A handwritten signature in black ink that reads "Naledi Pandor". The signature is written in a cursive, flowing style.

Naledi Pandor MP
Minister of Science and Technology

Introduction

Socio-economic progress is strongly linked to science and technology capacity in any modern economy. This is the case in South Africa, where research and development activities are increasingly being positioned for long-term impact on the economy and improving South Africans' quality of life.

Numerous local examples can be cited to illustrate this point, such as the recent launch of SumbandilaSat as part of the systematic development of South Africa's satellite technology capability, which will create a platform for the development of a space industry in the country. Similarly, South African researchers recently made a globally-acknowledged breakthrough in the fight against HIV/Aids by demonstrating the effective use of antiretrovirals in a gel form to prevent HIV transmissions. It is hoped that this will allow the establishment of new manufacturing capacity in South Africa.

The Department is also championing several advanced high-technology programmes intended to leverage South Africa's competitive global advantage through the mineral resources it controls and has access to. Such programmes are aimed at developing skills and technology locally to address niche markets in relevant commercial technologies or products. For example, South Africa's work on fuel cell technology leverages on the country's dominance as a world supplier of platinum, while work on lightweight metal engineering components for the aerospace industry is linked to South Africa's titanium resources, which are second only to those of Australia.

The work of the Department is not limited to high-technology sectors, but also targets innovation in traditional sectors of the economy, particularly sectors with high potential for retaining and creating jobs. An example of such a sector is fresh produce exports. In order to survive and contribute to employment, the export of fresh produce requires new technologies and innovations on an ongoing basis to remain competitive and retain market share. Maintaining market share is essential to prevent job losses. Through the Post-Harvest Innovation Programme government is working closely with business and research institutions to introduce technology and innovation that can address the challenges facing fresh produce exporters.

The Department has also supported projects demonstrating the application of technology in marine aquaculture, with a specific focus on empowering economically marginalised communities to establish viable commercial aqua-farming initiatives. These examples demonstrate the far-reaching impact of science and technology, as drivers of socio-economic development.

Internationally, the concept of a national system of innovation has been crafted around attempts to understand the interaction between a nation's science and technology base and its socio-economic system. The concept has evolved into an organising principle comprising public and private institutions involved in science and technology, as well as a suite of relevant funding instruments and policy frameworks aimed at maximising the contribution of science and technology to socio-economic development.

In South Africa, the national system of innovation (NSI) concept was introduced into the Department's planning processes by the 1996 White Paper on Science and Technology, and further elaborated in the 2002 National Research and Development Strategy and 2007 the Ten-Year Innovation Plan. While the centrality of its NSI to the modernisation of South Africa's economic base and the optimisation of public services may be intuitively obvious, its full realisation has not yet been achieved.

For example, a fully functional NSI extends considerably beyond the Department of Science and Technology's formal remit, and requires extensive partnerships with other government departments and entities (especially research councils reporting to other line departments, such as the Medical Research Council, the Agricultural Research Council, and the Water Research Commission), and with a wide range of business organisations, international institutions, and universities.

Parts of the system, especially those relating to research and development activities, are well established. For example, according to the 2007 OECD review of the NSI, South Africa is a world leader (in the top 1% of all universities) in several fields such as environment/ecology, social science, engineering, plant and animal sciences, and clinical medicine (OECD Innovation Review, pp 213-214). South Africa is certainly the leading research performer on the African continent. In the decade to 2008, South Africa produced nearly 47 000 papers, Egypt followed with nearly 30 000 papers, and Nigeria produced over 10 000 papers. South Africa led in 15 of the 21 main disciplines, Egypt in five and Nigeria in one (agricultural sciences). South Africa's largest share of any of the 21 main disciplines was in plant and animal sciences, with 4 179 papers constituting 1,55% of world output in the field (Global Research Report: Africa).

However, gaps remain in the integration of research and development activities of institutions outside the Department's structural remit into the NSI. Also, the OECD review suggested an urgent need to extend the policy framework's applicability to the private sector in order to ensure a seamless flow of innovations from research and development, through technology transfer, to commercialisation. Prompted by such considerations, the Minister is initiating a conceptual review of the Department's role in respect of promoting research, development and innovation (RDI) across all socio-economic sectors and constituent organisations, which should make considerable progress in the coming year, and can be expected to prompt the Department to reconsider its high-level purpose.

1. Vision

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

2. 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.

3. Strategic Oriented Goal Outcomes

The Department pursues the following strategic objectives in support of its mission:

- To develop the innovation capacity of the NSI and thereby contribute to socio-economic development.
- To enhance South Africa's knowledge-generation capacity in order to produce world-class research outputs and turn some advanced findings into innovation products and processes.
- To develop appropriate science, technology and innovation (STI) human capital to meet the needs of society.
- To build world-class STI infrastructure to extend the frontiers of knowledge, train the next generation of researchers and enable technology development and transfer as well as knowledge interchange.
- To position South Africa as a strategic international RDI partner and destination through the exchange of knowledge, capacity and resources between South Africa and its regional and other international partners, thereby strengthening the NSI.

4. Values

The Department seeks at all times to adhere to and promote professionalism, competence, integrity and transparency.

5. Legislative and other mandates

5.1 Constitutional mandates

Not applicable

5.2 Legislative mandates

(a) Intellectual Property Rights from Publicly Financed Research and Development (IPR) Act, 2008

This Act provides for the more effective use of intellectual property emanating from publicly financed research and development, through the establishment of the National Intellectual Property Management Office (NIPMO), the Intellectual Property Fund, and offices of technology transfer at institutions.

(b) Technology Innovation Act, 2008

This Act is intended to promote the development and exploitation, in the public interest, of discoveries, inventions, innovations and improvements, and for that purpose establishes the Technology Innovation Agency (TIA).

(c) South African National Space Agency Act, 2008

This Act establishes the South African National Space Agency to promote space science research, cooperation in space-related activities, and the creation of an environment conducive to the development of space technologies by industry.

(d) Natural Scientific Professions Act, 2003

This Act establishes the South African Council for Natural Scientific Professions, and legislates the registration of professional natural scientists, natural scientists-in-training, natural science technologists and natural science technologists-in-training.

(e) National Research Foundation Act, 1998

This Act establishes the National Research Foundation to promote basic and applied research, as well as the extension and transfer of knowledge in the various fields of science and technology.

(f) National Advisory Council on Innovation Act, 1997

This Act establishes the National Advisory Council on Innovation to advise the Minister of Science and Technology on the role and contribution of science, mathematics, innovation and technology in promoting and achieving national objectives.

(g) Africa Institute of South Africa Act, 2001

This Act establishes the Africa Institute of South Africa to promote knowledge and understanding of African affairs by encouraging leading social scientists to act in concert and across all disciplines, and by collecting and disseminating information on African affairs.

(h) Human Sciences Research Council Act, 2008

This Act provides for the continued existence of the Human Sciences Research Council, which carries out research that generates critical and independent knowledge relative to all aspects of human and social development.

(i) The Scientific Research Council Act, 1988

This Act refers to the activities of the Council for Scientific and Industrial Research, one of the leading scientific and technological research, development and implementation organisations in Africa, which undertakes directed research and development for socio-economic growth in areas including the built environment, defence, the environmental sciences, and biological, chemical and laser technologies.

(j) Astronomy Geographic Advantage Act, 2007

The Act provides for the preservation and protection of areas in South Africa that are uniquely suited to optical and radio astronomy, and for intergovernmental cooperation and public consultation on matters concerning nationally significant astronomy advantage areas.

5.3 Policy mandate

The Department's major policy documents are the White Paper on Science and Technology (1996), the 2002 National Research and Development Strategy (NRDS), the "New Strategic Management Model" for South Africa's science and technology system (2004) - with its "Policy on Governance Standards for Science, Engineering and Technology Institutions and Framework for the Development of a National Science and Technology Expenditure Plan" - and the 2007 Ten-Year Innovation Plan (TYIP).

The White Paper laid the foundations for an NSI. The core vision was to "harness the diverse aspects of science and technology through the various institutions where they are developed, practised or utilised". A prime objective of the NSI was "to enhance the rate and quality of technology transfer from the SET sector by the provision of quality human resources, effective hard technology transfer mechanisms, and the creation of more effective and efficient users of technology in the business and government sectors".

The White Paper also set out the institutions to be established in order to promote the development of a well-functioning NSI. These were to be the national Ministry and Department of Science and Technology, the National Advisory Council on Innovation, the National Research Foundation, the Innovation Fund, and national research facilities managed by government. While these institutions have all been established, a recommended Ministers' Committee on Science and Technology, to be the principal policy-coordinating body for science and technology matters across government, met only a few times. However, in 2004 a Ministry and Department of Science and Technology were established to manage the development of the NSI.

The National Research and Development Strategy, established (a) a new set of technology platforms (biotechnology, information technology, technology for advanced manufacturing, technology for and from natural resource sectors, and technology for poverty reduction) and (b) a new set of science missions (in areas in which South Africa has an obvious geographic advantage, such as astronomy, human palaeontology and biodiversity, as well as in areas in which South Africa has a clear knowledge advantage, such as indigenous knowledge and deep mining). These missions and platforms were expanded under the Ten-Year Innovation Plan to include "grand challenges" in space science and technology, energy security, human and social dynamics in development, global change, and the bioeconomy. The responsibility for addressing the grand challenges is spread across many government departments.

The Ten-Year Innovation Plan also set long-term goals based on these challenges. They included becoming one of the top three emerging

economies in the global pharmaceutical industry, based on innovative use of South Africa's indigenous knowledge and rich biodiversity; deploying satellites that provide a range of scientific, security and specialised services for all spheres of government, the public and the private sector; achieving a 25% share of the global hydrogen and fuel cell market with novel platinum group metal catalysts; becoming a world leader in climate science and responding effectively to the multiple challenges associated with global and climate change; and meeting the 2014 Millennium Development Goal to halve poverty. The Department has set indicators for each of these goals.

The Department's policy framework is embedded within and aligned to broader government priorities and policy, as enunciated, for example, in the Medium Term Strategic Framework (MTSF) and the New Growth Path. Most recently, the finalisation of government's 12 Key Outcomes has provided several important reference points to the Department, whose activities support many of the Outcomes fairly directly. However, the Department is explicitly required to contribute directly to Outcomes 4 ("decent employment through inclusive economic growth") and 5 ("a skilled and capable workforce to support an inclusive growth path").

With regard to Outcome 4, the Department is expected to contribute to the achievement of two targets, that is, (i) improving the country's global competitiveness rating (the current ranking is 54 out of 134 countries) and (ii) developing a strategy to increase the country's gross expenditure on research and development (GERD) as a percentage of GDP to 1,5% by 2014. With regard to Outcome 5, the Department has committed to contribute towards four outputs which are: increase access to high level occupationally directed programs in needed areas; research, development and innovation in human capital for growing knowledge economy; provide support to industry-university partnerships and; increase investment in research and development, especially in the science, engineering and technology sector.

Both the content and format of this strategic plan have been strongly affected by the monitoring and evaluation framework for government departments that is emerging from the Presidency, as well as various helpful inputs received from the Auditor-General about the Department's performance management and reporting.

In the coming period the Department will reflect on the effectiveness of its policy framework as a response to the increasing focus by government on its 12 Key Outcomes, and – especially – as a means of promoting innovation as a fundamental driver in national socio-economic development. The role of a wide range of institutions within the system will need to be assessed and understood, and appropriate interfaces created between the Department and stakeholders in the NSI. The Department commits itself to continuous improvement in the policies, processes, structures and instruments that have been put place in pursuit of an effective NSI whose contribution to national development is being optimised.

5.4 Relevant court rulings

Not applicable

5.5 Planned policy initiatives

The DST's policy initiatives are guided mainly by the White Paper on Science and Technology, the National Research and Development Strategy, and the Ten-Year Innovation Plan. All these policies are aimed at assisting the country to modernise its economy through the use of science, technology and innovation. In order to achieve this, the DST needs to enhance the capacity of South African institutions, to ensure adequate infrastructure and the provision of skilled science, engineering and technology human capital to generate and exploit knowledge.

The Department will therefore, for the next three to five years, focus its activities on these three priority domains, i.e. research and development, human capital development, and infrastructure.

It is important to remember that the knowledge enterprise is an international one, and that South Africa therefore needs to develop international linkages that include the rest of the African continent in support of the three central priorities.

The White Paper introduced the concept of a national system of innovation as an organising framework for the activities of government and relevant institutions. Over the past few years elements of the system have been put in place, and several new building blocks are currently being considered to enhance the country's innovation capacity.

(a) Human capital development

Significant investment is required in both human resources and research infrastructure at universities to improve the quality of learning and teaching, and to support the development of research capacity at all universities. Attention must be given to research and development at formerly black universities and universities of technology. The significant expansion of the supervisory and research capacity of universities is dependent on the number of academics and researchers with doctoral degrees. Currently only 34% of all university academics have a doctoral degree (2008 HEMIS data). It will require significant and sustained investment to achieve the long-term target of 80% of all university academics having a doctoral degree.

In cooperation with the Department of Higher Education and Training, a national staff development strategy is planned for universities. The Department has adopted a pipeline approach in its own human capital development initiatives and current programmes, including bursaries (from honours to doctoral levels) and fellowships at postdoctoral level.

The Department is in the process of finalising the Human Capital Development Strategy for Research and Innovation. The aim of the strategy is to ensure the provision of human capital to support research and innovation, while ensuring greater race and gender equity in the RDI workforce. Pending the finalisation of the strategy, the Department

has identified three important thrusts for its work in human capital development, namely –

- growing the next generation of researchers and academics, i.e. supporting more postgraduate students and postdoctoral fellows;
- developing and supporting emerging researchers, i.e. supporting more new-generation researchers and translating them into established researchers; and
- supporting and maximising the output of established researchers, i.e. increasing the number of active researchers and ensuring that they produce the required knowledge and innovation outputs and supervise the next generation of researchers.

The major challenge that the Department faces is to scale up the interventions listed above. The Department of Science and Technology and the Department of Higher Education and Training are engaging the Department of Home Affairs in developing a skills-importation strategy for scarce and exceptional skills. Furthermore, the Department plans to improve the linkages between the national research facilities and universities. The national research facilities provide additional laboratory space and equipment to cognate departments in universities, and their research-active staff could be used to extend the capacity of university researchers to enrol master's and doctoral students.

(b) Global and Africa collaboration

The modernisation of South Africa's economy must be accompanied by a modernisation of the economies of its key continental economic partners – one-sided development would reduce future opportunities as markets fail to grow in line with South Africa's productive capability. Hence, it is in the country's national interest to facilitate the modernisation of African economies, and the development of their national science, technology and innovation capacities is central to this objective. In alignment with this rationale, the Department has actively and strategically established close STI cooperation with several African countries, seeking to demonstrate South African partnerships in science and technology.

Bilateral cooperation forms the backbone of African partnerships in science and technology and is a critical component of the Department's overall strategy to promote STI for development, enhance political and economic regional integration, and encourage the mobility of scientists and the exchange of information on science and technology. The Department has entered into approximately 17 formal bilateral agreements with other African countries in the area of science and technology. Many of these agreements are focused within the Southern African Development Community (SADC) in an effort to advance regional integration in STI, and most are aligned to the Department of International Relations and Cooperation's strategic African anchor states.

South Africa hosts several SADC and African science and technology flagship institutions, including the African Institute for Mathematical Sciences, the SADC Biotechnology Network, and the SADC/African Union Commission Water Flagship.

Science is an intrinsically international endeavour, and international cooperation is a key driver in its development. Science and technology links to developed countries thus constitute a very important source

of science and technology resources to South Africa, in the form of human capital, research infrastructure, and research finance. (Eight per cent of South Africa's gross expenditure on research and development is from foreign sources.) The Department has maintained an aggregate leverage factor of at least 2 across all its international engagements with developed country partners – meaning that for every rand invested in international cooperation, partner countries have invested twice as much to facilitate access by South African researchers to their domestic research and development institutions. Enhanced investment in international cooperation can therefore generate returns on investment of at least 100% within two to three-year cycles.

(c) Research and development

South Africa's contribution to global research output has not grown at the same rate as that of key emerging economies and some of its international competitors, including African countries. This is cause for concern inasmuch as research output is an important international indicator and also constitutes an important input into a modern, knowledge-based economy. Although several departmental interventions are linked to an increase of 25% in South Africa's research output over the past three years, more needs to be done to ensure the renewal of the country's knowledge base and the capacity to generate new research output.

The Department plans to engage with South Africa's strong financial, banking and business sectors to encourage increased research and development investment in science, technology and social upliftment. The contribution of the private sector is essential in achieving a target of 1,5% of GDP invested in research and development by 2014. Government introduced the research and development tax incentive in 2006, which is administered by the Department and the South African Revenue Service (SARS), and the venture capital tax company incentive in 2009, administered by SARS, to boost research and development and early-stage project funding. Both of these interventions are being reassessed to make them more effective.

In growing its knowledge base, South Africa also needs to build on its niche strengths, especially those in which it has a geographic or natural advantage, such as astronomy, biodiversity, Antarctic research, minerals processing and palaeontology.

The Department's strong focus on research and development is manifested in two main sets of linked activities: the strengthening of relevant structural interventions, and the establishment of focused, high-level, cutting-edge research and development platforms. Structural interventions include the Centres of Excellence (CoE) Programme and the South African Research Chairs Initiative (SARChI). Research platforms have been established around the social sciences and humanities, biotechnology and health innovation, space science and technology, and global and climate change, for instance.

Additional policy initiatives include the finalisation of the revised African Origins Platform (the strategy for the development of archaeology and palaeontology) and the establishment of the Astronomy Desk, mandated to advise the Minister of Science and Technology on substantive policy

and strategic matters regarding the development of astronomy and related sciences.

(d) Innovation

South Africa has a well developed research and development system, which has been fairly effective in producing a number of research papers. However, the number of patents filed outside South Africa has remained stagnant for a while. In comparison with other countries, South Africa has not substantially improved its performance in local or international patenting over the past decade. More particularly, the patent patterns for South African institutions show very low levels of patenting by institutions that are publicly financed.

The Department is in the process of establishing the National Intellectual Property Management Office (NIPMO). This is a new institutional intervention aimed not only at putting a mechanism in place to enable government to encourage, monitor and quantify intellectual property that is the result of publicly funded research and development, but also to develop capacity at the level of universities and public research institutions to identify, protect and, where appropriate, commercialise such intellectual property. This will be achieved through the establishment of offices of technology transfer in research-performing institutions.

The Technology Innovation Agency (TIA) complements NIPMO by actively promoting commercialisation and technology transfer by and at South African research institutions. Other entities have also been established as platforms intended to develop new or strengthen emerging industrial sectors, like satellite and space, aerospace, new and advanced materials and biotechnology.

The high risk and complexity associated with new industrial development require a long-term approach to strategic public financing that can convert promising research and development results into innovations that can be commercialised. Over the past few years, the DST has nurtured close partnerships with relevant national and provincial economic development departments to support the success of high-potential research and development-led industrial development initiatives. Creative funding mechanisms that could help to address some of these problems have also emerged, including the increased use of innovative public-private partnerships. These partnerships are expected to help close the financing gap, and become effective vehicles for financing medium and high-tech innovations. For instance, in partnership with industry and public research institutions, the agency will establish a network of centres of competence focused on market opportunities to build a competitive technology edge for South Africa.

(e) Infrastructure

Investment in researchers also requires a concomitant investment in high quality research equipment and infrastructure. To this end, the Department has identified the following areas as critical in investing and building adequate and sustainable infrastructure for the system:

- Scientific equipment, which includes discrete, free-standing or mounted, desk-top to large, dedicated or multipurpose usage research tools.

- Specialised facilities, which include physical and/or organisational structures of a capital nature, providing a controlled environment for specialised experiments and ensuring the optimal performance of research equipment.
- Cyberinfrastructure, which includes ICT-based infrastructures such as high performance computing, research networks, and data storage and management systems.
- High-end infrastructure, which refers to infrastructure at the interface between research and development, and commercialisation; an example could be a pilot-scale, proof-of-concept plant.
- Global infrastructure, which includes international large infrastructure, both single-sited and distributed, linked by high-speed networks for the optimal sharing of data and resources.

During the MTEF period the Department will prioritise the development of a sustainability model for the ongoing development and roll-out of cyberinfrastructure and an investment and growth strategy for the provision of scientific equipment to support research and innovation within the NSI.

6. Recent achievements

The Department has initiated numerous projects to demonstrate the application of science and technology to improved industrial performance and competitiveness, meeting social needs such as poverty alleviation and job creation, and being an engine for new industry development. These interventions use established and effective technology platforms combined with the entrepreneurial skills of the people of South Africa.

Job opportunities have been created in aquaculture, the extraction of essential oils, and demonstration agronomy for indigenous medicinal plants with scientifically-proven efficacy. In another example, the roll-out of rural broadband connectivity using a wireless mesh network benefited about 150 schools in the Nkangala District Municipality in Limpopo, and the Department (together with partners) has developed an e-based toolkit to enhance integrated planning and accelerate community infrastructure planning and service delivery. The toolkit provides capabilities to integrate the profiling of past and current development needs and to stimulate future development. Similar education spin-off benefits are also accruing in the Northern Cape around the sites of the MeerKAT and Square Kilometre Array (SKA) developments, where a laboratory housing 45 computers has recently been established at Carnarvon High School, and various teacher-development interventions are being implemented in association with the province's Department of Education, Science and Technology.

The development of the MeerKAT radio telescope as a prototype for South Africa's bid to host the international SKA radio-astronomy facility is proceeding apace, with all seven dishes of the KAT-7 (a MeerKAT precursor) having been completed in January 2010. However, the funding for the SKA bid for the 2010/11 financial year (amounting to R508m) has been reallocated across the 2011/12 and 2012/13 financial years, to be closely aligned in support of the bid decision, expected at some time during this period.

Significant improvements in scientific productivity seem to be emerging from SARChI and the CoE programme. Under SARChI, for example, the number of publications by research chairs in peer-reviewed journals rose from 162 in 2008/09 to 477 in 2009/10. In the same period, the number of books published by research chairs increased from four to 10, and the number of book chapters from 13 to 62. The CoEs supported 371 postgraduate students and published 409 articles in peer-reviewed journals in 2009/10.

The Department has increased its support for postgraduate students through its bursary programme. The total number of postgraduate students supported through the National Research Foundation increased from 5 131 in 2009 to 5 644 in 2010. This increase has been coupled with significant increases in bursary values for all levels of postgraduate studies. Support for researchers also increased, with 2 519 researchers receiving research grants in 2010, compared to 2 422 in 2009.

The announcement of the discovery of *Australopithecus sediba* in 2010 constitutes another significant milestone for both the palaeosciences and humankind. The finding established the pre-eminence of the University of the Witwatersrand as a world-class South African research institution. *Australopithecus sediba* reaffirmed Africa's position as the birthplace of our species, and made the Cradle of Humankind World Heritage Site a place of pilgrimage for all humankind.

The Department, through LifeLAB (now part of the Technology Innovation Agency), co-funded the Centre for the AIDS Programme of Research (CAPRISA) 004 Phase II clinical trials. This trial studied the safety and effectiveness of an antiretroviral (Tenofovir, which forms part of existing treatment for HIV and Aids) as a preventative microbicide. The groundbreaking results of the clinical trials revealed that not only is Tenofovir effective for HIV treatment, but that a 1% Tenofovir microbicide gel reduces HIV infections in women by 39%.

To support the Department's Hydrogen and Fuel Cell Research, Development and Innovation Strategy, Anglo Platinum launched a R100 million Platinum Development Fund for the beneficiation of platinum metals for commercial application.

The Human Sciences Research Council (HSRC) has demonstrated the relevance of human and social sciences in addressing fundamental questions relating to national development. For example, the HSRC has acquired a national and international reputation for research on HIV/Aids, education, poverty, large wealth disparities, and unemployment. Specifically, for example, the HSRC (i) performed groundbreaking analyses to track the HIV/Aids epidemic and investigate social and behavioural practices and attitudes on South Africa's HIV prevalence; (ii) investigated factors underpinning success and failure in secondary school education, identified impediments and possible solutions, and interrogated the question of equity of access to the various levels of education; (iii) devoted a great deal of scholarly attention to issues of employment, economic growth, and socio-economic equity, and successfully devised employment scenarios designed to anticipate needs of the economy and identify areas requiring enhanced coherence and alignment; and (iv) conducted studies which have focused on policy interventions relating to early childhood development, rural poverty, food security, and social exclusion.

7. Organisational and performance environment

Three agencies (the National Research Foundation, the Technology Innovation Agency, and the South African National Space Agency), three research councils (the Council for Scientific and Industrial Research, the Human Sciences Research Council, and the Africa Institute of South Africa), the National Advisory Council on Innovation, the Academy of Science of South Africa and the South African Council for Natural Scientific Professions, are accountable to the Ministry of Science and Technology through the Department. All agencies and councils have their own performance indicators, agreements, and governance bodies.

In addition to the agencies and research councils that report to the Department of Science and Technology, there are several other science councils under other line departments, such as the Agricultural Research Council, the Medical Research Council, and the Water Research Commission. In principle, a coordination function for the Department of Science and Technology with respect to these councils is outlined in the "New Strategic Management Model" for South Africa's science and technology system (2004), and in practice there exist several operational links to these councils. This Strategic Management Model was intended to clarify the respective functions of the Department and the relevant line departments; in this context the model was conceptualised as a driver or framework for coordinating the National System of Innovation.

In response to a need for enhanced interdepartmental coordination around the Strategic Management Model, the Department in 2006 introduced a 'Knowledge Economy Forum' to manage science activities across broader government in accordance with the principles of the model. The Forum's mandate is to strengthen the capacity of scientific and technological activities within government departments. The Department has memoranda of agreement with the Departments of

Trade and Industry, Minerals and Energy (since divided), Defence, Transport, Agriculture, Water Affairs and Forestry (since divided), Environmental Affairs, and Housing. In each case, provision has been made for joint coordination committees drawn from the participating departments. These structural initiatives were meant to effect the model, but as part of improving governance of the National System of Innovation, the framework and its implementation will be reviewed.

All South African public and several private universities undertake research activities that receive support from the Department of Science and Technology through the National Research Foundation or the Technology Innovation Agency, and have often established research partnerships with the Department of Science and Technology science councils.

The Department enjoys strategic partnerships with a number of local and international institutions and organisations, as well as businesses and corporations, such as Eskom, Anglo American, Transnet, Sasol, UNESCO, the European Centre for Nuclear Research (CERN, in Geneva), the International Centre for Genetic Engineering and Biotechnology (ICGEB, in Trieste), the Group on Earth Observation (GEO, in Geneva), and many others.

Internally, the Department comprises the following programmes:

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

8. Programme 1: Administration

Purpose: 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. It has the following components:

- The offices of the Minister, the Deputy Minister and the Director General.
- Finance, which is responsible for DST finance, and supply chain management.
- Policy, Planning, Governance and Monitoring and Evaluation.
- Communication.
- Human Resources.
- Legal Services.
- Information Technology Systems and Support.
- Internal Auditing.
- Knowledge, Information and Records Management.
- Property Management, which covers functions and funds that have been devolved from the Department of Public Works.

9. Programme 2: Research, Development and Innovation

Purpose: This programme facilitates knowledge generation and exploitation through research and development in key priority areas, namely, space science, bio-economy, and energy. It also promotes the exploitation of our knowledge stock through stimulating the development of innovative products and services, and the commercialisation thereof, where appropriate.

Strategic objectives:

- To support research, development and innovation (RDI) initiatives in strategic research areas (i.e. space, energy, biosciences and innovation research) to enhance South Africa's knowledge and skills base.
- To create and support multidirectional policy and institutional linkages between research and development (R&D) and commercialisation in order to increase the commercialisation potential of R&D outcomes.
- To promote coordination among NSI institutions in space, energy and bioscience-related research that will enable the effective and efficient use of resources and the pooling of expertise.

Subprogrammes:

- *Space Science and Technology* focuses on creating the necessary strategic and institutional regimes for creating and developing a viable space programme and an earth observation system. This includes providing strategic direction on key aspects linked to the construction of the SKA demonstrator telescope and related activities to ensure that Africa is well positioned to host the SKA. Targeted national space initiatives are intended to harness the benefits of space science and technology for socio-economic growth and sustainable development.
- *Hydrogen and Energy* provides policy leadership in the long term and cross-cutting RDI in the energy sector. It plays a key role in developing a sustainable and globally competitive South African energy knowledge base and industry that will ensure broader socio-economic benefits for the country from the nascent global hydrogen economy.
- *Biotechnology and Health Innovation* provides policy leadership for developing a world-class bioeconomy in South Africa. This will be achieved through innovation instruments that provide financial, intellectual property and innovation management support.
- *Innovation Instruments and Planning* drives strategic interventions that will enable South Africa to translate a greater proportion of its scientific knowledge outputs into commercial technology products and services. This is achieved through designing and creating policy and institutional structures that facilitate technology development and its progression into national and international markets.

9.3 Strategic Objectives

Table 1: Programme 2: Research, Development and Innovation strategic objectives

Strategic objective 1	Enhancing South Africa's knowledge-generation capabilities in frontier areas of science.
Objective statement	To support RDI initiatives in strategic research areas (i.e. space, energy, biosciences and innovation research) to enhance South Africa's knowledge and skills base.
Baseline	<ul style="list-style-type: none"> ◆ 584 students (graduate and postgraduate) supported since 2007/08. ◆ The Karoo Array prototype KAT-7 has been completed. ◆ 26 jobs created. ◆ 6 publications ◆ Number of undergraduate and postgraduate students funded in space, energy and bioscience-related research.
Indicator	<ul style="list-style-type: none"> ◆ Number of new research chairs and Centre of Competence (CoC) supported in space, energy and bioscience-related research. ◆ Number of MeerKAT antennae constructed. ◆ Number of construction jobs created. ◆ Number of publications.
Justification	In transforming the primary economy to a knowledge economy, support will be extended for capacity building and infrastructure in strategic research areas that have a potential to increase South Africa's knowledge stock and research capabilities.
Links	<p>Outcome 2: A long and healthy life for all South Africans. This will be achieved through targeted support of biotechnology and health innovation initiatives.</p> <p>Outcome 5: A skilled and capable workforce to support an inclusive growth path. This will be supported through increased support to graduate and postgraduate students in science, engineering and technology-related disciplines.</p>

Strategic objective 2	Facilitating the commercialisation of R&D outcomes.
Objective statement	To create and support multidirectional policy and institutional linkages between R&D and commercialisation in order to increase the commercialisation potential of R&D outcomes.
Baseline	<ul style="list-style-type: none"> ◆ 3 offices of technology transfer (OTT) established. ◆ 3 centres of competence (CoCs) established and 4 technology demonstrators supported. ◆ SANSa caretaker CEO appointed
Indicator(s)	<ul style="list-style-type: none"> ◆ Number of offices of technology transfer established. ◆ Number of new technology-based enterprises supported. ◆ Number of new CoCs and technology demonstrators supported ◆ Number of new technology products/ processes/ or services developed for commercialisation. ◆ Number of prototypes developed and patents registered. ◆ Number of candidates trained in IP and technology transfer specialised skills. ◆ Number of requests for satellite datasets honoured ◆ SANSa fully operationa ◆ NIPMO fully operational
Justification	A systemic challenge in the NSI is the disconnect between R&D and the commercial market. Programme 2 will therefore strive to create an enabling environment that fosters linkages between these two sectors.
Links	<p>Outcome 4: Decent employment through inclusive economic growth.</p> <p>Outcome 5: A skilled and capable workforce to support an inclusive growth path.</p>

Strategic objective 3	Promoting coordination among relevant stakeholders in the NSI
Objective statement	To promote coordination among NSI institutions in space, energy and bioscience-related research that will enable the effective and efficient use of resources and the pooling of expertise.
Baseline	<ul style="list-style-type: none"> ◆ 5 policy instruments introduced since 2007/08.
Indicator(s)	<ul style="list-style-type: none"> ◆ Number of policy briefs and concept documents developed in space, energy, bioscience and technology commercialisation-related fields.
Justification	Optimisation of the NSI is necessary to ensure that policy objectives are realised. This requires appropriate policy directives, and institutional arrangements and linkages across the NSI.
Links	Outcome 4: Decent employment through inclusive economic growth.

Risk Management:

Strategic Objective 1: To Support RDI initiatives in strategic research areas (i.e. space, energy, biosciences and innovation research) to enhance South Africa's knowledge and skills base.

The realisation of the strategic objective requires human capital and infrastructure, both of which are contingent upon appropriate funding levels. If funding is not optimal then the knowledge-generation capabilities will be suboptimal, resulting in a prolonged transformation to a knowledge economy. This obviously has adverse implications for the growth potential of the economy, as economic opportunities will be foregone and the competitiveness of the South African economy will be diminished. To avoid the funding risks, regular engagements will be entered into with the relevant stakeholders (for example the Portfolio Committee on Science and Technology, National Cabinet and National Treasury) in highlighting the importance of appropriately funded mandates, and their outcomes, through policy briefs, reviews and enhanced communications.

Strategic Objective 2: To Create and support multidirectional policy and institutional linkages between R&D and commercialisation in order to increase the commercialisation potential of R&D outcomes

The willingness of the R&D and commercial sectors to work together in bridging the innovation chasm is a certain risk, as these two sectors have different philosophies and cultures. If this risk is not avoided, R&D will remain disconnected from the commercial market, resulting in marginal exploitation of R&D outcomes for socio-economic development. To minimise this risk, appropriate incentives, such as funding and

strategic partnerships, through the envisaged NIPMO, OTTs, CoCs, and the TIA, for example, will be put in place or, where they already exist, enhanced to support an enabling environment in which intellectual property is capitalised and appropriate linkages are forged.

Strategic Objective 3: To promote coordination among NSI institutions in space, energy and bioscience-related research that will enable the effective and efficient use of resources and the pooling of expertise

Maximising the delivery of RDI through coordination and optimisation across the NSI will require dedicated and longer-term commitments from all stakeholders. Poor coordination among NSI stakeholders within the DST sphere of influence, especially at the inter-institutional and inter-agency level, could erode the efficacy of RDI interventions resulting in overlap and duplication of efforts. A consequence of this risk is the inefficient use of available resources and the loss of opportunities, which would not have been the case if these resources had been redeployed to other initiatives. To obviate this risk, existing stakeholder forums (for example, the interdepartmental SKA group) will be strengthened through appropriate working groups. New forums will be put in place to ensure convergence of similar initiatives, and a multidisciplinary and interdisciplinary approach where necessary. Regular engagements at executive level between the DST and its entities will also be formalised to ensure that the entities and their programmes remain aligned to the DST objectives and mandate, thus promoting coordination and optimisation in the NSI.

10. Programme 3: International Cooperation and Resources

Purpose: This Programme aims to strategically develop, promote and manage international relationships, opportunities and science and technology agreements that strengthen the NSI and enable an exchange of knowledge, capacity and resources between South Africa and its regional and international partners.

Strategic objectives:

- To increase leverage of foreign STI funds that will stimulate international technology transfer and knowledge production, and enhance innovation in pursuit of research-led socio-economic development.
- To increase South African and foreign funds spent on science and technology-based socio-economic development in Africa.
- To increase access to global knowledge and STI networks that will result in international technology transfer and a competent and equitable pool of science, engineering and technology (SET) skills to support the NSI.

To increase the number of South African students participating in international cooperative STI research projects that will contribute to a competent and equitable pool of science, engineering and technology skills in support of the NSI.

Subprogrammes:

- *Overseas Bilateral Cooperation* promotes and facilitates collaborative activities and leverages resources in support of the NSI from countries outside Africa, with a specific focus on developing a knowledge-driven economy.
- *Multilateral Cooperation and Africa* advances and facilitates South Africa's participation in strategic African bilateral agreements and multilateral organisations on STI, so as to strengthen the NSI and to achieve shared economic and social development in the region and the continent.
- *International Resources* works to increase the flow of international resources into the country by creating conditions for access to international STI skills and global projects.

Table : Programme 3: International Cooperation and Resources strategic objectives

Strategic objective 1	Leverage foreign STI funds
Objective statement	To increase leverage of foreign STI funds that will stimulate international technology transfer and knowledge production, and enhance innovation in pursuit of research-led socio-economic development.
Baseline	A total of R868 million leveraged by the end of 2009/10.
Indicator(s)	Amount of foreign STI funds leveraged.
Justification	Pursuit of this objective will increase the percentage of foreign contributions to gross expenditure on R&D (GERD), and enhance international knowledge and technology transfer.
Links	<p>This objective supports the following DST strategic objectives:</p> <ul style="list-style-type: none"> ◆ To develop the innovation capacity of the NSI and thereby contribute to socio-economic development. ◆ To enhance South Africa's knowledge-generation capacity in order to produce world-class research papers and turn some advanced findings into innovation products and processes. ◆ To develop appropriate STI human capital to meet the needs of society. ◆ To build world-class STI infrastructure to extend the frontiers of knowledge, train the next generation of researchers and enable technology development and transfer as well as knowledge interchange. ◆ To position South Africa as a strategic international RDI partner and destination through the exchange of knowledge, capacity and resources between South Africa and its regional and other international partners, thereby strengthening the NSI.

Strategic objective 2	Increase funding of STI development in Africa.
Objective statement	To increase South African and foreign funds spent on science and technology-based socio-economic development in Africa.
Baseline	R49, 8 million spent by the end of 2009/10.
Indicator(s)	Amount of South African and foreign funds spent on science and technology-based socio-economic development in Africa.
Justification	Pursuit of this objective will facilitate scientific, technical and socio-economic development of regional and continental partners, thereby enhancing economic relations and regional integration.
Links	<p>This objective supports the following DST strategic objectives:</p> <ul style="list-style-type: none"> ◆ To develop the innovation capacity of the NSI and thereby contribute to socio-economic development. ◆ To enhance South Africa's knowledge-generation capacity in order to produce world-class research papers and turn some advanced findings into innovation products and processes. ◆ To develop appropriate STI human capital to meet the needs of society. ◆ To build world-class STI infrastructure to extend the frontiers of knowledge, train the next generation of researchers and enable technology development and transfer as well as knowledge interchange. ◆ To position South Africa as a strategic international RDI partner and destination through the exchange of knowledge, capacity and resources between South Africa and its regional and other international partners, thereby strengthening the NSI.

Strategic objective 3	Increase access to global knowledge and STI networks.
Objective statement	To increase access to global knowledge and STI networks that will result in international technology transfer and a competent and equitable pool of SET skills to support the NSI.
Baseline	8 742 foreign participants by the end of 2009/10.
Indicator(s)	Number of foreign participants in global knowledge and STI networks.
Justification	Pursuit of this objective will expand the international knowledge networks tapped into by the NSI, enhance international technology transfer, and facilitate the further development of high-level SET skills.
Links	<p>This objective supports the following DST strategic objectives:</p> <ul style="list-style-type: none"> ◆ To develop the innovation capacity of the NSI and thereby contribute to socio-economic development. ◆ To enhance South Africa's knowledge-generation capacity in order to produce world-class research papers and turn some advanced findings into innovation products and processes. To develop appropriate STI human capital to meet the needs of society. ◆ To build world-class STI infrastructure to extend the frontiers of knowledge, train the next generation of researchers and enable technology development and transfer as well as knowledge interchange. ◆ To position South Africa as a strategic international RDI partner and destination through the exchange of knowledge, capacity and resources between South Africa and its regional and other international partners, thereby strengthening the NSI.

Strategic objective 4	Increase participation of South African students in international cooperative STI research projects
Objective statement	To increase the number of South African students participating in international cooperative STI research projects that will contribute to a competent and equitable pool of SET skills in support of the NSI.
Baseline	1 292 South African students participated in international cooperative STI research projects by end of 2009/10
Indicator(s)	Number of South African students participating in international cooperative STI research projects.
Justification	Pursuit of this objective will promote the involvement of the next generation of researchers in international knowledge networks, thus contributing to the development of a skilled future workforce able to promote the NSI.
Links	<p>This objective supports the following DST strategic objectives:</p> <ul style="list-style-type: none"> ◆ To develop the innovation capacity of the NSI and thereby contribute to socio-economic development. ◆ To enhance South Africa's knowledge-generation capacity in order to produce world-class research papers and turn some advanced findings into innovation products and processes. ◆ To develop appropriate STI human capital to meet the needs of society. ◆ To position South Africa as a strategic international RDI partner and destination through the exchange of knowledge, capacity and resources between South Africa and its regional and other international partners, thereby strengthening the NSI.

Risk Management:

Strategic Objective 1: To increase leverage of foreign STI funds that will stimulate international technology transfer and knowledge production, and enhance innovation in pursuit of research-led socio-economic development

The biggest source of risk for this objective is possible cut-backs in the budgets for international cooperation and/or development assistance of partner countries from the developed world. The DST has no control whatsoever over the budgeting process of international partners, but nonetheless seeks to mitigate this risk by negotiating jointly agreed budgets for collaboration activities as early as possible in the research lifecycle, thus maximising the lead time available for approaching alternative donors and/or downscaling plans. The risk nevertheless remains high, especially considering the financial constraints currently dominating the public fiscal everywhere.

Strategic Objective 2: To increase South African and foreign funds spent on science and technology-based socio-economic development in Africa

The biggest source of risk for this objective is possible cut-backs in donor funding for STI development in Africa. As in the case of Strategic Objective 1, the Programme has no control over budgeting processes in donor countries and organisations. However, in order to mitigate the risk, the Programme is actively seeking to diversify its development funding partners. A second source of risk is insufficient knowledge of development opportunities among donors. To mitigate this risk, Programme 3 regularly hosts well-attended development partner forums at which initiatives that present funding opportunities for donors are highlighted.

Strategic Objective 3: To increase access to global knowledge and STI networks that will result in international technology transfer and a competent and equitable pool of SET skills to support the NSI

As in the case of Strategic Objective 1, the biggest source of risk lies in possible cut-backs in the budgets for international cooperation. The availability of funds to support international collaboration is the single most important driver for established researchers in partner countries to collaborate with South African peers. The Programme's attempts to mitigate this risk are as outlined above. The Programme is actively seeking to diversify its development funding partners.

A second source of risk in this respect lies in the possible lack of interest among researchers abroad to collaborate with South African researchers. To mitigate this risk, the Programme regularly promotes South African science and technology through technical and scoping visits to key partner countries, supporting attendance by South Africans at international STI events, organising marketing efforts abroad, and using the Department's international networks to promote South Africa as a desirable destination for STI collaboration.

Strategic Objective 4: To increase the number of South African students participating in international cooperative STI research projects that will contribute to a competent and equitable pool of SET skills in support of the NSI

The biggest source of risk for this objective lies in insufficient funds to support South African students associated with international cooperation projects. To mitigate this risk, the Programme actively seeks support from international and development partners, and is in the process of diversifying its donor network. Secondly, Programme 3 is leveraging funds from other DST Programmes to promote the involvement of South African students in international cooperation projects in support of the human capital development targets linked to their respective priorities.

11. Programme 4: Human Capital and Knowledge Systems

Purpose: The purpose of the Programme is to provide leadership in the creation of an innovative and competitive society with highly skilled human capital, cutting-edge knowledge and research infrastructure.

Strategic objectives:

- To build a SET human capital pipeline to ensure increased availability of researchers and innovators for South Africa's global competitiveness.
- To promote and enhance research productivity to increase South Africa's world share of knowledge outputs.
- To identify and support the development of new and emerging research areas and technologies for their application in the improvement of quality of life and enhancement of economic competitiveness.
- To ensure the availability of appropriate infrastructure for the enhancement of RDI competitiveness.
- To promote and develop RDI in indigenous knowledge systems (IKS) for improved quality of life.

Subprogrammes:

- *Human Capital and Science Platforms* conceptualises, formulates and implements programmes that address the availability of human capital for STI, produces new knowledge to build the knowledge resources of the country, and interfaces positively with the institutions that are key in the production of science and technology knowledge

and human resources for the NSI. Focus areas include astronomy, archaeology and palaeontology. The Research Chairs at South African universities, CoEs, and a postdoctoral fellowship programme are instruments that the department will use in these focus areas.

- *Indigenous Knowledge Systems* promotes the role of IKS in national R&D programmes to strengthen their contribution to STI. The focus is on providing an appropriate regulatory and policy environment, the development of a national recordal system, an appropriate accreditation and certification system for indigenous knowledge holders, and a bioprospecting and product development platform for indigenous knowledge.
- *Emerging Research Areas and Infrastructure* subprogramme facilitates the strategic implementation of research equipment and infrastructure to promote knowledge production in areas of national priority and to sustain R&D-led innovation. The subprogramme also promotes the development of new and emerging research areas through supporting the requisite research and infrastructure capacity in these areas. Funding is provided to institutions and national programmes such as the South African National Research Network, the Centre for High Performance Computing, the national nanotechnology innovation centres, the National Equipment Programme, emerging research areas (nanotechnology, photonics and synthetic biology) and new research areas such as aptamers.

Table 3: Programme 4 Human capital and Knowledge Systems strategic objectives

Strategic objective 1	Building a SET human capital pipeline
Objective statement	To build a SET human capital pipeline to ensure increased availability of researchers and innovators for South Africa's competitiveness.
Baseline	<ul style="list-style-type: none"> ◆ 5 131 postgraduate students (including postdoctoral fellows) supported per annum in 2009/10 (Proportion of Honours: Masters: Doctoral students supported (Honours:Masters:Doctoral 1 663; 2 201:1 265 in 2009/10) ◆ 238 543 people participated in science awareness, engagement programmes and initiatives
Indicator	<ul style="list-style-type: none"> ◆ Number of postgraduate students supported. ◆ Number of people reached through DST-funded initiatives.
Justification	South Africa needs to increase the production of scientists, engineers and technologists to support research and development activity.
Links	Outcome 5: Skilled and capable workforce to support an inclusive growth path.

Strategic objective 2	Increase South Africa's world share of knowledge outputs.
Objective statement	To promote and enhance research productivity to increase South Africa's world share of knowledge outputs.
Baseline	2 422 researchers supported in 2009/10.
Indicator	Number of researchers supported.
Justification	Support to researchers increases the capacity for increased research productivity, including training of postgraduate students.
Links	Outcome 5: Skilled and capable workforce to support an inclusive growth path.

Strategic objective 3	Development of new and emerging research areas.
Objective statement	To identify and support the development of new and emerging research areas and technologies for their application in the improvement of quality of life and enhancement of economic competitiveness.
Baseline	<ul style="list-style-type: none"> ◆ 3 formal patent disclosures. ◆ 15 publications. ◆ 23 postgraduate students supported. ◆ 7 nanotechnology research flagship projects launched in 2008/09. ◆ National photonics strategy approved.
Indicator	<ul style="list-style-type: none"> ◆ Number of research and innovation outputs (prototypes and publications) produced by NICs ◆ Number of postgraduate students supported ◆ Number of flagship projects developed and supported. ◆ Number of teaching and training platforms established
Justification	The technologies and research outputs from identified ERAs are intended to improve the quality of life in areas of health, water and energy
Links	Outcome 2 a long and healthy life for all South Africans. Outcome 4 decent employment through inclusive economic growth; and Outcome 5 a skilled and capable workforce to support an inclusive growth path .

Strategic objective 4	Availability of appropriate infrastructure.
Objective statement	To ensure the availability of appropriate infrastructure for enhancement of RDI competitiveness.
Baseline	120 research equipment grants awarded by end of 2009/10. 32 sites connected to SANReN by 2009/10.
Indicator	<ul style="list-style-type: none"> ◆ Number of research equipment grants. ◆ Increased availability of broadband connectivity for RDI.
Justification	Research infrastructure is necessary to increase research performance through increased research output and to contribute to human capital development.
Links	Outcome 5 a skilled and capable workforce to support an inclusive growth path.

Strategic objective 5	Research, development and innovation in indigenous knowledge systems.
Objective statement	To promote and develop RDI in IKS for improved quality of life.
Baseline	<ul style="list-style-type: none"> ◆ Policy for the development of IKS has been developed and programmes such as a bioprospecting and product development platform, an accreditation and certification framework and a National. ◆ Recordal System Catalogue system have been developed. Data collection work has commenced.
Indicator	<ul style="list-style-type: none"> ◆ A legislation for the protection and preservation of IK. ◆ An appropriate accreditation and certification system in place. ◆ Number of provinces with functional national recordal system (NRS) in place. ◆ An integrated biosprospecting platform.
Justification	Indigenous knowledge carries the potential to increase the country's wealth by adding to the expanding knowledge base of the economy and thus must be protected for the benefit of the country and society, including knowledge holders.
Links	Outcome 2 a long and healthy life for all South Africans, outcome 4 decent employment through inclusive economic growth” and outcome 7 Vibrant, equitable and sustainable rural communities and food security.

Risk Management:

Strategic Objective 1: To build a SET human capital pipeline to ensure increased availability of researchers and innovators for South Africa's global competitiveness

It is a major risk that graduates may be compelled to opt for employment instead of continuing with postgraduate studies if the cost-carrying capacity of the bursaries is inadequate. The DST will contribute towards the improvement of the NRF bursary/fellowship packages, including encouraging other stakeholders to contribute, e.g. Department of Higher Education and Training

Strategic Objective 2: To promote and enhance research productivity to increase South Africa's world share of knowledge outputs

Retention of emerging and established researchers within the SET environment remains a major risk, since these researchers are attracted to industry and government by higher salary packages and incentives. The Department of Science and Technology will work with the Department of Higher Education and Training on initiatives that will serve as incentives to retain these researchers in the SET environment.

Strategic Objective 3: To identify and support the development of new and emerging research areas and technologies for their application in the improvement of the quality of life and enhancement of economic competitiveness

The main risks associated with this objective are lack of sufficient number of students registering for the programmes offered within the respective teaching platforms; and insufficient research project management and student supervision.

To ensure availability of students to register for programmes, a comprehensive awareness campaign will be embarked upon. To address the project management and student supervision risk, the pool of researchers, including the number of postdoctoral fellows, will be expanded.

Strategic Objective 4: To ensure the availability of appropriate infrastructure for enhancement of RDI competitiveness

The main risk for this objective is insufficient funding to support the backlog and growing demand for research infrastructure.

To mitigate this risk, additional funding will be solicited from National Treasury through the departmental annual budget options exercise.

Strategic Objective 5: To promote and develop RDI in IKS for improved quality of life

The biggest risk for this objective is getting experts in the respective communities of practice to deliver on the proposed legislation for the protection of IKS and the development of an accreditation system in good time. There will be an extensive and inclusive consultative process, as well as an aggressive public awareness roll-out, from the Portfolio Committee to the practitioner in the community.

12. Programme 5: Socio-Economic Partnerships

Purpose: This programme enhances the growth and development priorities of government through targeted science and technology interventions and the development of strategic partnerships with other government departments, industry, research institutions, and communities. Interventions include high potential R&D-led industrial development programmes, technology support programmes for industry, introducing new approaches to government service delivery and planning, strengthening science-based policy development and decision-making, demonstrating technology-led opportunities for creating sustainable jobs and wealth creation, and strengthening the contribution of technology in sustainable human settlements.

Strategic objectives:

- To demonstrate strategic technology-based interventions for poverty reduction in order to support the creation of sustainable job and wealth opportunities, and contribute to sustainable human settlements and enhanced service delivery in areas of deprivation.
- To grow and strengthen a portfolio of niche high-potential but neglected science and technology capabilities, as well as actively facilitate the exploitation of both existing and new capabilities to support sustainable development priorities and the non-energy green economy ambitions of South Africa.
- To contribute to improving government decision making on science and technology investments and to promoting the private sector R&D activities in order to increase GERD as a percentage of GDP.
- To grow and strengthen a portfolio of niche high potential R&D capabilities that support the development of new industries in advanced manufacturing, chemicals, advanced metals and ICT.

Subprogrammes:

- *Science and Technology for Economic Impact* advances strategic economic growth and sector development priorities as well as government service delivery through three value-adding functions. These are as follows:
 - Investing in the long-term knowledge generation capabilities of the NSI in targeted innovation areas.
 - In partnership with other government departments and economic

- actors, spearheading focused efforts that exploit knowledge capabilities for economic benefit. Economic benefit includes the development of advanced industries, improved government service delivery, improving productivity and competitiveness, and technology transfer and support to small and medium enterprises as well as
- manufacturing firms in the supply chains of large-scale public infrastructure development programmes. Providing strategic innovation policy and planning support to economic actors in priority economic sectors and sub-national governments.
- *Science and Technology for Social Impact* leads and supports knowledge generation in human and social dynamics in development, and promotes technology transfer for poverty reduction to support the creation of sustainable job and wealth opportunities and to contribute to creating sustainable human settlements in areas of deprivation. It focuses on mature technologies that do not yet have widespread application, but are seen as having the potential to achieve government's broad development objectives. It does this by building partnerships with other government departments focusing on research, technology demonstration and technology transfer.
- *Science and Technology Investment* leads and supports the development of science and technology indicators, monitors national science and technology expenditure and planning, leads the implementation of a web-based tool to capture statistical information on R&D activities by the public research institutions, and implements section 11D of the Income Tax Act, 1962. This involves administering reporting by private companies on R&D claims against the tax allowance. By 31 March 2013/14 it is estimated that 34 public research institutions will be participating in the Research Information management System (RIMS), with the RIMS data platform fully operational and supporting the DST indicator reports, e.g. the national surveys on research and experimental development.

12.3. Strategic Objectives

Table : Programme 5 Socio-Economic Partnerships strategic objectives

Strategic objective 1	Technology for poverty reduction
Objective statement	To demonstrate strategic technology-based interventions for poverty reduction in order to support the creation of sustainable job and wealth opportunities and contribute to sustainable human settlements and enhanced service delivery in areas of deprivation.
Baseline	<ul style="list-style-type: none"> ◆ 1020 households benefiting from technology based interventions in 2010. ◆ 600 job opportunities created in 2010/11 financial year.
Indicator	<ul style="list-style-type: none"> ◆ Number of households benefiting from technology-based interventions ◆ Number of new job opportunities created
Justification	The DST supports the testing of approaches that reduce poverty through the application of science and technology. It provides investment support to implementing agencies, including government departments, aimed at demonstrating or testing a technology-based intervention. Priorities for support are identified through an evaluation of needs identified by individual government departments or the Government Cluster System (most notably the Social Protection and Community Development and the Economic and Employment Clusters). To support widespread diffusion and mainstreaming of technology-based interventions, the role of the DST includes documentation of projects, critical impact assessment, and support to government departments responsible for large-scale diffusion.
Links	It is directly linked to Government Outcome 4 decent employment through inclusive economic growth and Outcome 7 Vibrant, equitable and sustainable rural food security. The objective addresses the DST strategic goal of demonstrating the potential of Research Development and Innovation (RDI)-led socio-economic development.

Strategic objective 2	Science and Technology Capability for sustainable development and a green economy
Objective statement	To grow and strengthen a portfolio of niche high-potential but neglected science and technology capabilities as well as actively facilitate the exploitation of both existing and new capabilities to support sustainable development priorities and the non-energy green economy ambitions of South Africa
Baseline	<ul style="list-style-type: none"> ◆ 84 Honours, Masters, PhD, and post-docs funded or co-funded in 2010/11 ◆ 23 publications generated through funded or co-funded research programmes in 2010/11 ◆ 3 patents, prototypes, or demonstrators added to the Intellectual Property portfolio through funded or co-funded research programmes in 2010/11
Indicator	<ul style="list-style-type: none"> ◆ Number of Masters and PhD students funded or co-funded in designated niche areas annually ◆ Number of publications generated annually in identified niche areas ◆ Number of patents, prototypes, and technology demonstrators added to the Intellectual Property portfolio annually from funded or co-funded research programmes
Justification	South Africa is committed to a long-term development trajectory that is economically, socially, and environmentally sustainable. This commitment includes support for green industries to support growth and job creation. Scale-critical scientific, technological and innovation capabilities, supported through strategic public investment, are essential for achieving South Africa's sustainable development priorities and green economy ambitions.
Links	<p>Strong capability will contribute positively to three of the 12 priority outcomes of government.</p> <p>Outcome 4: Decent employment through inclusive economic growth. Creating new long-term opportunities within the green economy strategy of government.</p> <p>Outcome 5: A skilled and capable workforce to support an inclusive growth path. Support high-level skills development in scarce skills areas that are required to support a growing knowledge-based economy.</p> <p>Improve science-based decision-making and action on priority interventions that aim to enhance and protect South Africa's natural and environmental assets.</p>

Strategic objective 3	Promoting growth in public and private sector investments in science and technology and R&D
Objective statement	Contribute to improving government decision making on science and technology as productive investments and to promote the private sector R&D activities in order to increase Gross Expenditure on R&D (GERD) as a percentage of GDP.
Baseline	◆ 7 statistical and analytical reports produced in the 2010/ 11 financial year
Indicator	◆ Number of statistical and analytical reports published for the Minister, Cabinet and the Public
Justification	<ul style="list-style-type: none"> ◆ Reliable and timely analytical input is required to support policy decision making regarding the capacity and performance of the national system of innovation. ◆ Systems for the production of statistical and analytical reports should be sustainable and be well positioned to impact effectively on decision making processes of Cabinet and the government departments that have significant mandate for science and research. ◆ Various data collection tools for public investment in science and research need to be harmonised to improve quality and utility of statistical outputs.
Links	The strategic objective is focused towards supporting Outcome 4 “decent employment through inclusive economic growth” by improving the long-term competitiveness of the South African economy. It also addresses the DST strategic goal of increasing R&D investment in South Africa.

Strategic objective 4	Support the development of new industries in advanced manufacturing, chemicals, advanced metals, and ICTs
Objective statement	Grow and strengthen a portfolio of niche high-potential R&D capabilities that support the development of new industries with high growth potential in advanced manufacturing, chemicals, advanced metals, and ICT's.
Baseline	<ul style="list-style-type: none"> ◆ 182 Masters and PhD students funded or co-funded in 2010/11 ◆ 11 patents generated through funded or co-funded research initiatives in 2010/11 ◆ 24 companies provided with Technology Assistance Packages (TAP) in the 2010/11 financial year ◆ 1594 small and medium enterprises receiving technology support through the Technology Stations Programme in the 2009/10 financial year
Indicator	<ul style="list-style-type: none"> ◆ Number of high-level research graduates funded or co-funded (Masters and PhD students) supported in niche areas annually ◆ Number of patents, prototypes, and technology demonstrators added annually to the Intellectual Property portfolio through funded or co-funded research initiatives ◆ Number of companies provided with Technology Assistance Packages (TAP) ◆ Number of small and medium-enterprising receiving technology support through the Technology Stations Programme
Justification	Long-term sustainable growth requires a constant supply of new innovations that support the development of new firms or even entirely new industry sectors or sub-sectors. Over the last few years, a number of high growth potential R&D-led industry development opportunities in advanced manufacturing, metals, ICT's and chemicals have been identified for long-term public investment and support.
Links	The strategic objective is entirely focused towards supporting Outcome 4 “decent employment through inclusive economic growth” by improving the long-term competitiveness of the South African economy. It addresses the DST strategic goals of creating a critical mass of science, engineering, technology and innovation (SETI) human capital to meet the needs of society; demonstrating the potential of Research Development and Innovation (RDI)-led socio-economic development; and increasing and enhancing South Africa's knowledge generation capability

Risk Management:

Strategic Objective 1: To demonstrate strategic technology-based interventions for poverty reduction in order to support the creation of sustainable job and wealth opportunities and contribute to sustainable human settlements and enhanced service delivery in areas of deprivation

The key risks related to this strategic objective include the failure by implementing agencies to meet contractual obligations, including the development of poorly designed business plans and failure to match delivery with available capacities. The risk is mitigated and managed through regular meetings with the implementing agencies for the purpose of monitoring the project's progress according to the project schedule, and identifying hindrances that should be addressed by the Department. Discussions with the implementing agencies will be initiated to address the design of their business plans and to ensure that there is compatibility with the goals and the objectives of the Department.

Strategic Objective 2: To grow and strengthen a portfolio of niche high-potential but neglected science and technology capabilities, as well as actively facilitate the exploitation of both existing and new capabilities to support sustainable development priorities and the non-energy green economy ambitions of South Africa

The green economy is a new area of focus for South Africa and is a major priority for a range of government departments, research institutions and private sector organisations. The major strategic risk that has to be managed over the next three years is misalignment between the work of the Department and other initiatives, coupled with the lack of adequate intelligence-gathering systems in the Department to position its initiatives within the broader system of innovation. The risk will be mitigated and managed by the establishment of a green economy task team for the Department and its entities, active engagement and the shaping of green economy coordination structures, and the development of appropriate information and intelligence-gathering systems.

Strategic Objective 3: To contribute to improving government decision making on science and technology productive investments and to promote private sector R&D activities in order to increase GERD as a percentage of GDP

The key risks related to this strategic objective could be that key science and technology projects are not receiving appropriate public investments; inadequate levels of private sector and international investment; and/or inadequate absorption capacity for additional investment in science and R&D.

Mitigating steps will include the possible establishment of an interdepartmental process for the prioritisation of public investment into science and research as part of the strategy to increase GERD in South Africa, and increased attention to expanding the scientific infrastructure and human capital devoted to science and R&D.

Strategic Objective 4: To grow and strengthen a portfolio of niche high-potential R&D capabilities that support the development of new industries with high growth potential in advanced manufacturing, chemicals, advanced metals, and ICTs

This strategic objective is geared towards the creation of new firms and industries over the medium to long term on the basis of technology breakthroughs. The key strategic risks relate to managing short-term investments where the returns may be significant but will only come through in the long term. During the period of the strategic plan, a number of Department of Science and Technology investments in R&D made over the past five years are expected to mature. Converting these investments into new industry activity will be at risk without appropriate long-term stable public financing, commercialisation experience, and systems to support market access. The identified risk will be largely mitigated by enhancing the functioning of existing interdepartmental task teams, elevating strategic issues to the Director-General and Minister, and developing structured strategies for raising the required funding.

13. Public entities

Table : DST Public entities outputs

Name of public entity	Mandate	Outputs	Current annual budget (R'000)	Date of next evaluation
Council for Scientific and Industrial Research (CSIR)	To foster, in the national interest and in the fields which in its opinion should receive preference, industrial and scientific development, either by itself or in cooperation with principals from the public or private sector, and thereby contribute to the improvement of the quality of life of the people of South Africa, and to perform any other functions that may be assigned to it by or under the Scientific Research Council Act.	<ul style="list-style-type: none"> Developing the new CSIR R&D strategy, which will include the research impact areas. Increasing the capacity for technology foresighting and intelligence. Building on the partnership with the local, African and international public and private sector, local state-owned enterprises and other local and international funding agencies. Improving the quality of R&D infrastructure and equipment. Building a strategic portfolio of intellectual property that optimises opportunities for technology transfer and improves success with licensing and earning of royalty income. 	687,169	2014

Name of public entity	Mandate	Outputs	Current annual budget (R'000)	Date of next evaluation
Technology Innovation Agency (TIA)	To support the state in stimulating and intensifying technological innovation in order to improve economic growth and the quality of life of all South Africans by developing and exploiting technological innovations.	<ul style="list-style-type: none"> • Establishment of new companies or entities. • Partnerships with industry (e.g. CoCs and cooperative programmes). • Funding to persons and entities for technological innovation and exploitation differentiated in terms of the following: <ul style="list-style-type: none"> • Strategic investments – fast-tracked technology innovation products that are less than three years from market success and that have a disproportionately high potential for social and economic impact. • Technology development – typically fund higher education institutions and science councils for pre-competitive end-stage R&D projects. • Industry matching funds – investments for small and medium enterprises provided as matched funding (from any source) for a royalty, matching loans or preference shares. • Equity investments – into start-up companies with a prototype or similar driving technology innovation. • Ideas development – limited funding provided to assist with patenting costs and/or enable development of a fundable proposal or business plan. • Venture capital – investigate the possibility of a future programme to catalyse the venture capital industry in South Africa. 	433,816	New entity

Name of public entity	Mandate	Outputs	Current annual budget (R'000)	Date of next evaluation
National Research Foundation (NRF)	To support and promote research through funding, human resource development and the provision of the necessary research facilities in order to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including indigenous knowledge, and thereby contribute to the improvement of the quality of lives of all the people of South Africa.	<ul style="list-style-type: none"> • Maintain seven DST-NRF CoEs. • Consolidate new CoEs or CoE-like platforms. • Establish new CoEs or CoE-like platforms. • Support the transition of the South African National Antarctic Programme to a new polar research entity 2010-2012. Implement changes to the Blue Skies Research Programme. 	108,903.5	2015
Human Sciences Research Council (HSRC)	<ul style="list-style-type: none"> • To initiate, undertake and foster strategic basic and applied research in human sciences, and to gather, analyse and publish data relevant to developmental challenges in South Africa, elsewhere in Africa and in the rest of the world, especially by means of projects linked to public-sector-oriented collaborative programmes. • To inform the effective formulation and monitoring of policy and evaluate the implementation of policy. • To stimulate public debate through the effective dissemination of fact-based research results. • To help build research capacity and infrastructure for the human sciences in South Africa and elsewhere in Africa. • To foster and support research collaboration, networks and institutional linkages within the human sciences research community. • To respond to the needs of vulnerable and marginalised groups in society by researching and analysing developmental problems, thereby contributing to the improvement of the quality of their lives. • To develop and make publicly available new datasets to underpin research, policy development and public discussions of the key issues of development, and develop new and improved methodologies for use in their development. 	<ul style="list-style-type: none"> • Prioritise multidisciplinary and cutting-edge research to identify and address important questions of human and social dynamics in the 10 priority areas identified in the MTSF, and more particularly, in education, health, rural development, decent work and crimes. • Develop proposals to access funding for large-scale, collaborative and (where appropriate) internationally comparative research projects in the area of human and social dynamics. • Contribute to the refinement and roll-out of the Work Plan of the Human and Social Dynamics in Development Grand Challenge and play a leading role in its implementation. • Establish the Centre for Africa's Social Progress to provide a platform to share information and stimulate collaborative research and public dialogue involving African counterparts. 	206,169	2015

Name of public entity	Mandate	Outputs	Current annual budget (R'000)	Date of next evaluation
Africa Institute of South Africa (AISA)	<ul style="list-style-type: none"> To promote knowledge and understanding of African affairs through leading social scientists acting in concert and across all disciplines, and through training and education on African affairs. To collect, process and disseminate information on African affairs, give effective advice and facilitate appropriate action in relation to the collective needs, opportunities and challenges of all South Africans. To promote awareness and consciousness of Africa at grassroots level. 	<ul style="list-style-type: none"> Develop high-level research-outputs-based fieldwork (6 outputs per researcher) to influence both policy making and implementation processes. Augment AISA research by commissioning 70 outputs annually, from AISA network of African affairs experts. Enhance research networks and collaboration by employing 8 fellows per annum to boost AISA research and related activities. Hold 8 Library and Documentation Service consultations with significant institutions that participate in the exchange of information materials at relevant national and international conferences and symposiums per annum. 	32,440	2015

14. Overview of the 2011/12 budget and MTEF expenditure estimates

14.1 Expenditure Estimates

Table 6: Department of Science and Technology

Programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2007/08	2008/09	2009/10		2011/12	2012/13	2013/14
R million							
Administration							
Research, Development and Innovation	125.3	141.0	159.1	185.7	192.1	202.0	220.6
International Resources and Cooperation	528.6	853.0	1 141.4	826.8	854.6	1 112.4	1 272.8
Human Capital and Knowledge Systems	95.6	136.3	117.5	136.0	137.2	145.9	157.2
Socio-Economic Partnerships	1 273.8	1 454.7	1 591.4	1 764.0	1 950.4	2 045.5	2 406.3
Total	3 127.3	3 703.5	4 183.9	4 128.0	4 404.6	4 887.4	5 510.1
Economic classification							
Compensation of employees	102.1	141.6	167.5	223.7	225.3	237.6	259.6
Goods and services	108,6	118.3	116.8	146.4	144.5	152.1	164.3
Transfers and subsidies	2 908.6	3 440.2	3 891.9	3 752.8	4 031.6	4 494.3	5 082.7
Payments for capital assets	7.9	3.3	7.7	5.1	3.3	3.4	3.6
Total	3 127.3	3 703.5	4 183.9	4 128.0	4 404.6	4 887.4	5 510.1

14.2 Expenditure trends to strategic outcome oriented goals

Over the medium term, the spending focus will be on human capital development and knowledge generation and exploitation. The department will continue to invest in initiatives that will increase the number and diversity of young people entering and remaining in careers in science and technology. The number of chairs under the South African Research Chairs Initiatives will be increased. The initiative is succeeding in contributing to the transformation of South Africa's cohort of scientists. The number of postgraduate students supported by research chairs grants will be used as a measure to monitor this objective.

Expenditure increased from R3.1 billion to R4.1 billion, at an average annual rate of 9.7 per cent between 2007/08 and 2010/11. This was mainly due to the substantial allocations for projects in the Research, Development and Innovation programme, human capital development initiatives and increases in funding for initiatives such as the South African National Research Network, the National Research Foundation in the Human Capital and Knowledge Systems programmes, the Council for Scientific and Industrial Research, and the Human Sciences Research Council in the Socio Economic Partnerships programmes.

Over the medium term, expenditure is expected to increase to R5,5 billion in 2013/14, at an average annual rate of 10,1 per cent. The growth is attributed to additional allocations in the 2011 Budget for improved conditions of service (23,6 million), bursaries for postgraduate students (R358 million), the establishment of an intellectual property office (R27 million), and the purchase of scientific equipment (R150 million). The rescheduling of funding for the Square Kilometre Array project from 2011/12 to 2012/13 and 2013/14 has also increased expenditure.

15 Programme and Subprogramme plans

15.1 Programme 1: Administration

Purpose: 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. It has the following components:

- The offices of the Minister, the Deputy Minister and the Director General.
- Finance, which is responsible for DST finance, and supply chain management.
- Policy, Planning, Governance and Monitoring and Evaluation.
- Communication.
- Human Resources.
- Legal Services.
- Information Technology Systems and Support.
- Internal Auditing.
- Knowledge, Information and Records Management.
- Property Management, which covers functions and funds that have been devolved from the Department of Public Works.

15.1.1 Reconciling performance targets with the Budget and MTEF

Programme	Audited outcome			Adjusted appropriation	Medium-term expenditure estimate		
	2007/08	2008/09	2009/10		2011/12	2012/13	2013/14
R million							
Ministry	2.1	2.9	3.2	3.3	3.5	3.7	3.9
Management	47.7	56.6	58.2	67.6	72.1	77.4	85.9
Corporate Service	67.5	76.6	90.3	101.8	104.5	108.3	117.6
Governance	3.8	3.4	5.8	9.2	8.0	8.4	8.8
Office Accommodation	4.3	1.4	1.7	3.3	4.0	4.2	4.4
Total	125.3	141.0	159.1	185.7	192.1	202.0	220.6
Economic classification							
Compensation of employees	47.4	60.7	82.6	108.4	111.0	116.5	125.7
Goods and services	69.5	77.4	68.9	72.8	78.1	82.4	91.6
Transfers and subsidies	1.4	0.6	1.0	1.0	1.0	1.0	1.1
Payments for capital assets	7.0	2.2	6.5	3.5	2.0	2.1	2.2
Total	125.3	141.0	159.1	185.7	192.1	202.0	220.6

15.1.2 Expenditure trends

Expenditure increased from R125.3 million in 2007/08 to R185.7 million in 2010/11, at an average annual rate of 14 per cent. This is attributed to the expansion of the information management, internal audit services, as well as the creation of administrative support for deputy directors general.

Expenditure is expected to increase to R220.6 million over the MTEF period, at an average annual rate of 5.9 per cent. The increase is attributed to inflationary adjustments to spending in compensation of employees and on goods and services.



Programme 2



Table 8: Strategic objectives and performance indicators and annual targets for 2011

Strategic objective	Support research, development and innovation initiatives in strategic research areas, namely, space, energy, biosciences and innovation research to enhance our knowledge and skills base									
	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets			
Output			2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	
Human capital development in physical sciences and engineering	Number of undergraduates and postgraduates students funded in space, bioscience, and energy-related research	780 graduate and postgraduate students and technicians funded by March 2014	159 students	196 students	229 students	251 new and additional students and technicians funded	220 undergraduate and postgraduate students and technicians funded by 31 March 2012	274 undergraduate and postgraduate students and technicians funded by 31 March 2013	286 undergraduate and postgraduate students and technicians funded by 31 March 2014	
MeerKAT antennae and infrastructure layout and construction jobs created	Number of MeerKAT antennae constructed	5 MeerKAT antennae completed and infrastructure layout constructed	Experimental development models completed	Karoo Array prototype KAT-7 completed	Preparation of KAT-7 infrastructure and construction facilities completed	MeerKAT Concept Design Review was completed.	Roads, electrical reticulation and MeerKAT construction site camp contracts awarded by 31 March 2012	First SKA designed aligned MeerKAT antennae completed by 31 March 2013	4 MeerKAT antennae completed by 31 March 2014	
	Number of jobs created	400 construction jobs created in the Northern Cape		480	112	26	100 construction jobs created in Northern Cape by 31 March 2012	200 construction jobs created by 31 March 2013	100 construction jobs created by 31 March 2014	

To support research, development and innovation initiatives in strategic research areas (i.e space, energy, biosciences and innovation research) to enhance our knowledge and skills base

Strategic objective	Performance indicator	Strategic target	Audited/actual performance				Estimated performance	Medium-term targets		
			2007/08	2008/09	2009/10	2010/11		2011/12	2012/13	2013/14
Output	Research Chairs and CoCs in space and bioscience-related research supported	16 research chairs and 4 CoCs in space, energy and bioscience-related fields supported by 31 March 2014	-	-	-	2010/11	5 research chairs supported by 31 March 2012	6 research chairs and 2 CoCs supported by 31 March 2013	5 research chairs and 2 CoCs supported by 31 March 2014	
Publications as a result of R&D-funded initiatives	Number of Publications as a result of R&D-funded initiatives	18 publications by 31 March 2014	-	-	-	6 publications as a result of HySA related CoC activity	6 publications resulting from R&D-funded initiatives by 31 March 2012	6 publications resulting from R&D funded initiatives by 31 March 2013	6 publications resulting from funded R&D initiatives by 31 March 2014	
Strategic objective	To create and support multi-directional policy and institutional linkages between R&D and commercialisation in order to increase the commercialisation potential of R&D outcomes									
Output	Performance indicator	Strategic target	Audited/actual performance				Estimated performance	Medium-term targets		
			2007/08	2008/09	2009/10	2010/11		2011/12	2012/13	2013/14
Research, development and innovation institutions (SANSa, TIA and NIPMO) supported	SANSa fully operational	Fully operational SANSa by 31 March 2013	-	Establishment office funded	Caretaker CEO appointed	SANSa board appointed and inaugurated. SANSa CEO appointed.	SANSa foundational operating phase finalised by 31 March 2012			

To create and support multi-directional policy and institutional linkages between R&D and commercialisation in order to increase the commercialisation potential of R&D outcomes

Strategic objective	Audited/actual performance					Estimated performance	Medium-term targets		
	Performance indicator	Strategic target	2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
Output	NIPMO fully operational	Fully operational NIPMO as a government component by 31 March 2013				Appointment of key staff members for NIPMO	NIPMO interim operational phase completed by 31 March 2012	NIPMO fully operational as a government component	
	Number of feasibility studies conducted toward the establishment of TIA regional offices	4 feasibility studies conducted on the establishment of TIA regional offices by 31 March 2013		TIA legislation enacted	TIA board and CEO appointed	4 TIA regional offices launched (in Gauteng, KwaZulu-Natal, the Western Cape and the Eastern Cape)	4 feasibility studies conducted for the establishment of TIA regional offices in Northern Cape, Mpumalanga, Limpopo and the Free State by 31 March 2012	8 TIA regional offices fully established by 31 March 2013	
OTTs established/recapitalised	Number of new OTTs established/recapitalised	14 OTTs established and/or recapitalised by 2014				4 OTTs established (at University of Johannesburg and University of Western Cape, with regional offices in the Eastern Cape and KwaZulu-Natal)	4 OTTs established and/or recapitalised by 31 March 2012	6 OTTs established and/or recapitalised by 31 March 2013	4 OTTs established and/or recapitalised by 31 March 2014
Technology-based enterprises supported	Number of new technology-based enterprises supported	28 new technology-based enterprises supported by 31 March 2014					14 new technology-based enterprises supported by 31 March 2012	7 new technology-based enterprises supported by 31 March 2013	7 new technology-based enterprises supported by 31 March 2014

To create and support multi-directional policy and institutional linkages between R&D and commercialisation in order to increase the commercialisation potential of R&D outcomes

Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
Technology products/ processes/ or services developed for commercialisation	Number of new technology products/ processes/ or services developed for commercialisation	120 new technology products/processes/services developed for commercialisation by 31 March 2014						35 new technology products/processes/ or services developed for commercialisation by 31 March 2012	40 new technology products/processes/ or services developed for commercialisation by 31 March 2013	45 new technology products/processes/ or services developed for commercialisation by 31 March 2014
Centres of competence (CoCs) and demonstration plants conceptualised and funded for establishment	Number of new CoCs and/or technology demonstrators supported	11 CoCs and/or technology demonstrators established by 31 March 2014	1 CoC/demonstrator supported	1 CoC/demonstrator supported	1 CoC/demonstrator supported	1 hydrogen and energy CoC/demonstrator supported	4 CoCs/technology demonstrators supported by 31 March 2012	4 CoCs/technology demonstrators supported by 31 March 2013	3 CoCs/technology demonstrators supported by 31 March 2014	
Candidates trained in IP and technology transfer specialised skills	Number of candidates trained in IP and technology transfer specialised skills	120 candidates trained in IP and technology transfer specialised skills by 31 March 2014	-	-	-	101 candidates trained in IP and technology transfer specialised skills	40 candidates trained in IP and technology transfer specialised skills by 31 March 2012	40 candidates trained in IP and technology transfer specialised skills by 31 March 2013	40 candidates trained in IP and technology transfer specialised skills by 31 March 2014	
Prototypes developed and patents registered	Number of prototypes developed and patents registered	3 prototypes developed and 3 patents registered resulting from HySA related CoCs by 31 March 2014	-	-	-	1 prototype developed and 1 patent registered through HySA-related CoCs	1 prototype developed and 1 patent registered by 31 March 2012	1 prototype developed and 1 patent registered by 31 March 2013	1 prototype developed and 1 patent registered by 31 March 2014	

To create and support multi-directional policy and institutional linkages between R&D and commercialisation in order to increase the commercialisation potential of R&D outcomes

Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
Honoured requests for datasets required for R&D and decision-making	Number of requests for satellite datasets honoured	15 000 requests for datasets honoured by 31 March 2014	-	-	-	3 000 requests for datasets honoured	4 000 requests for satellite data honoured by 31 March 2012	5 000 requests for satellite data honoured by 31 March 2013	6 000 requests for satellite data honoured by 31 March 2014	

To promote coordination among NSI institutions in space, energy and bioscience-related research that will enable the effective and efficient use of resources and the pooling of expertise

Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
				2007/08	2008/09	2009/10		2011/12	2012/13	2013/14
Strategic objective	Policy briefs and concept documents on key RDI technology missions	Number of policy briefs and concept documents developed in space, energy, bioscience and technology commercialisation-related fields	10 strategic documents and/or policy briefs to enable the effective implementation of key technology missions in space science, energy, biosciences, and technology commercialisation developed by 2014	-	-	-	Regulations gazetted IP policy guidelines drafted	4 policy briefs and concept documents developed by 31 March 2012	3 policy briefs and concept documents developed by 31 March 2012 (HYSA review; 1 biotechnology and health innovation policy brief; 1 revised costing model for bioscience/biotechnology platforms)	3 policy briefs and concept documents developed by 31 March 2014 (Review of South African energy research landscape; 1 biotechnology and health innovation policy brief; 1 revised costing model for bioscience/biotechnology platforms)

Strategic objective: Enhance the vertical and horizontal integration among National System of Innovation (NSI) institutions in space, energy and bioscience-related research through the establishment of and support to key interdepartmental coordination platforms																				
Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets												
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13	2013/14									

(1 IP policy guidelines on MeerKAT and SKA-related research; 1 government supported venture capital concept document; 1 revised costing model for bioscience/biotechnology platforms; 1 policy brief to harmonise biotechnology and health-related legislation)

15.2.1 Reconciling performance targets with the Budget and MTEF

Table 9 Expenditure estimates

PROGRAMME NAME: Research, Development and Innovation detail by subprogramme							
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Rand thousand	Outcome			Adjusted Appropriation	Medium Term estimates		
					MTEF Baseline		
Space Science	148.0	341.0	575.2	102.8	116.3	336.1	451.3
Hydrogen and Energy	39.1	139.7	146.8	132.3	142.4	147.9	155.5
Biotechnology and Health	193.5	228.4	253.9	155.2	124.3	131.5	139.4
Innovation Planning and Instruments	148.1	143.9	165.5	436.5	471.7	496.9	526.6
Total of sub-programmes	528.6	853.0	1 141.4	826.8	854.6	1 112.4	1 272.8
Compensation of employees	8.8	13.6	17.1	25.7	31.7	31.1	33,7
Goods and services	6.1	9.9	15.4	20.9	22.6	22.9	23,8
Total transfer and subsidies	513.4	829.3	1 108.5	779.9	800.1	1 058.2	1 215.1
Total payments for capital assets	0.3	0.2	0.3	0.4	0.2	0.2	0.2
Total	528.6	853.0	1 141.4	826.8	854.6	1 112.4	1 272.8

Performance and expenditure trends

The spending focus over the medium term will be on the Technology Innovation Agency, with an allocation of R1, 4 billion over the MTEF period to achieve the technological innovation strategic objective. Expenditure increased substantially from R528, 6 million in 2007/08 to R826, 8 million in 2010/11, at an average annual rate of 16.1 per cent. The increase is ascribed to the introduction of programmes that bolster the bioeconomy, renewable energy, space science and innovation instruments initiatives. The 82,1 per cent decrease in 2010/11 in the Space Science was due to the capital budget being reduced by R508 million for the Square Kilometre Array project due to the refinements in the design of dishes. These refinements are meant to strengthen South Africa's bid for SKA.

Over the medium term, expenditure is expected to increase to R1, 3 billion in 2013/14, at an average annual rate of 15, 5 per cent. The increase is mainly due to the rescheduling of the funding for the Square Kilometre Array project from 2011/12, to 2012/13 and 2013/14.

15.3 Programme 3: International Cooperation and Resources

Table .10: Strategic objectives and performance indicators and annual targets for 2011

Strategic objective	To increase leverage of foreign STI funds that will stimulate international technology transfer and knowledge production, and enhance innovation in pursuit of research-led socio-economic development								
	Performance indicator	Strategic target	Audited/actual performance		Estimated performance	Medium-term targets			
Output			2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Foreign STI funds leveraged	Amount of foreign STI funds	R660 million Foreign STI funds leveraged by 31 March 2014	R216 million	R180 million	R472 million	R327 million	R285 million foreign STI funds leveraged by 31 March 2012	R200 million foreign STI funds leveraged by 31 March 2013	R175 million foreign STI funds leveraged by 31 March 2014
Strategic objective	To increase South African and foreign funds spent on science and technology-based socio-economic development in Africa								
Output	Performance indicator	Strategic target	Audited/actual performance		Estimated performance	Medium-term targets			
South African and foreign funds spent on science and technology-based socio-economic development in Africa	Amount of South African and foreign funds spent on science and technology-based socio-economic development in Africa	R194million South African and foreign funds spent on science and technology-based socio-economic development in Africa by 31 March 2014	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
			R16,8 million	R12,4 million	R20,6 million	R40.8 million	R45 million South African and foreign funds spent on science and technology-based socio-economic development in Africa by 31 March 2012	R65 million South African and foreign funds spent on science and technology-based socio-economic development in Africa by 31 March 2013	R82 million South African and foreign funds spent on science and technology-based socio-economic development in Africa by 31 March 2014

To increase access to global knowledge and STI networks that will result in international technology transfer and a competent and equitable pool of science, engineering and technology skills to support the NSI										
Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
Strategic objective	Foreign participants in global knowledge and STI networks	Number of foreign participants in global knowledge and STI networks	8 100 foreign participants in global knowledge and STI networks by 31 March 2014	2 631	2 231	3 880	2 513	3 380 foreign participants in global knowledge and STI networks by 31 March 2012	3 100 foreign participants in global knowledge and STI networks by 31 March 2013	1 620 foreign participants in global knowledge and STI networks by 31 March 2014
				To increase the number of South African students participating in international cooperative STI research projects that will contribute to a competent and equitable pool of science, engineering and technology skills in support of the NSI						
Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
Strategic objective	South African students participating in international cooperative STI research projects	Number of South African students participating in international cooperative STI research projects	1,640 South African students participating in international cooperative STI research projects by 31 March 2014	258	401	633	514	730 South African students participating in international cooperative STI research projects by 31 March 2012	590 South African students participating in international cooperative STI research projects by 31 March 2013	320 South African students participating in international cooperative STI research projects by 31 March 2014
				To increase the number of South African students participating in international cooperative STI research projects that will contribute to a competent and equitable pool of science, engineering and technology skills in support of the NSI						

15.3.1 Reconciling performance targets with the Budget and MTEF

Table 11: Expenditure estimates

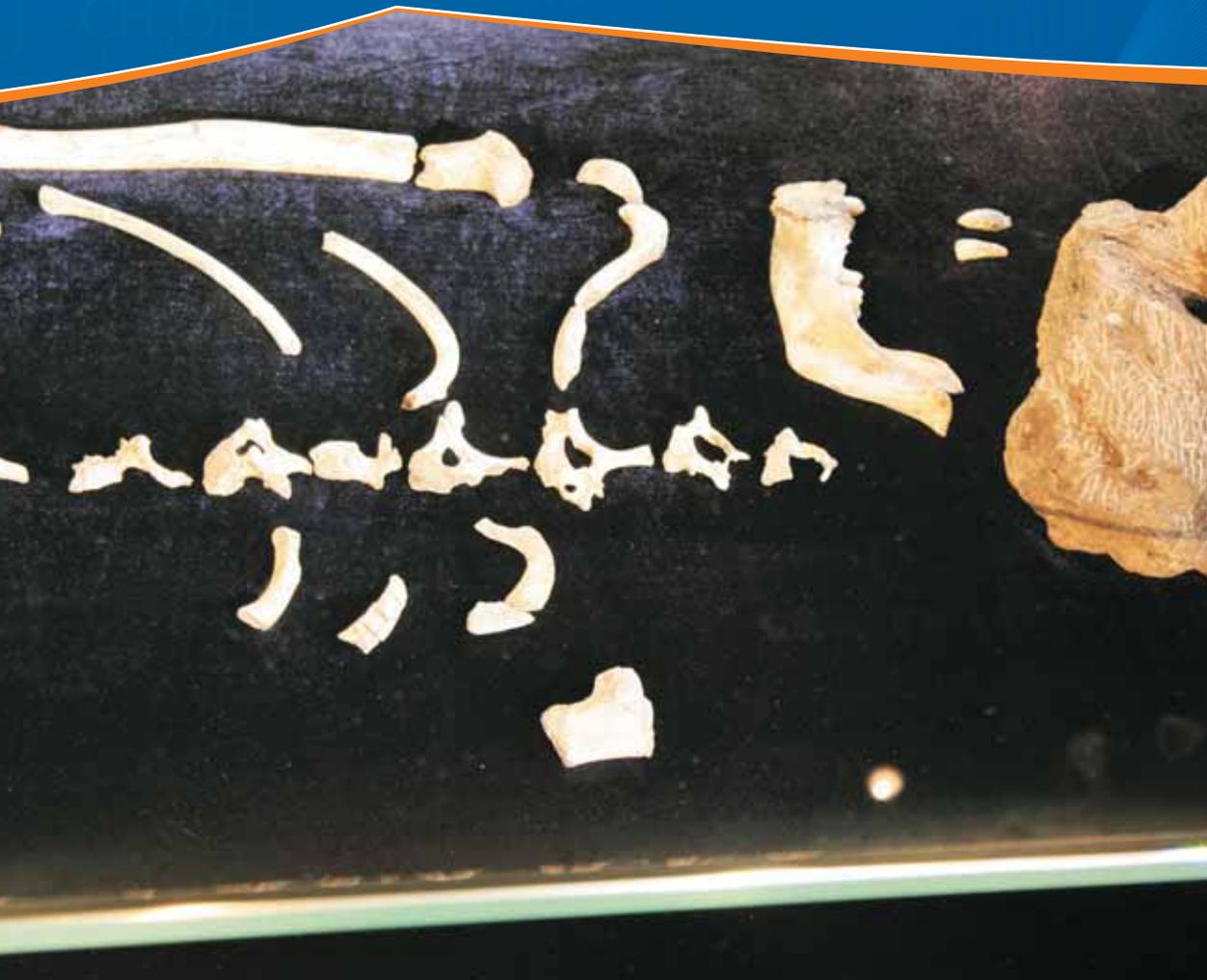
PROGRAMME NAME: International Cooperation and Resources detail by subprogramme							
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Rand thousand	Outcome			Adjusted Appropriation	Medium Term estimates		
					MTEF Baseline		
Multilateral Cooperation and Africa	44.9	57.2	54.6	56.6	60.0	63.5	67.4
International Resources	31.8	42.2	39.2	49.3	47.2	50.6	53.3
Overseas Bilateral Cooperation	19.0	37.0	23.6	29.9	30.0	31.8	36.5
Total of sub-programmes	95.6	136.3	117.5	136.0	137.2	145,9	157.2
Compensation of employees	19.9	30.4	27.9	34.1	30.5	35.5	41.0
Goods and services	16.5	18.5	13.7	24.0	24.8	26.1	27.5
Total transfer and subsidies	59.0	86.9	75.6	77.3	81.4	83.8	88.2
Total payments for capital assets	0.3	0.5	0.2	0.5	0.5	0.5	0.6
Total	95.6	136.3	117.5	136.0	137.2	145,9	157.2

Performance and expenditure trends

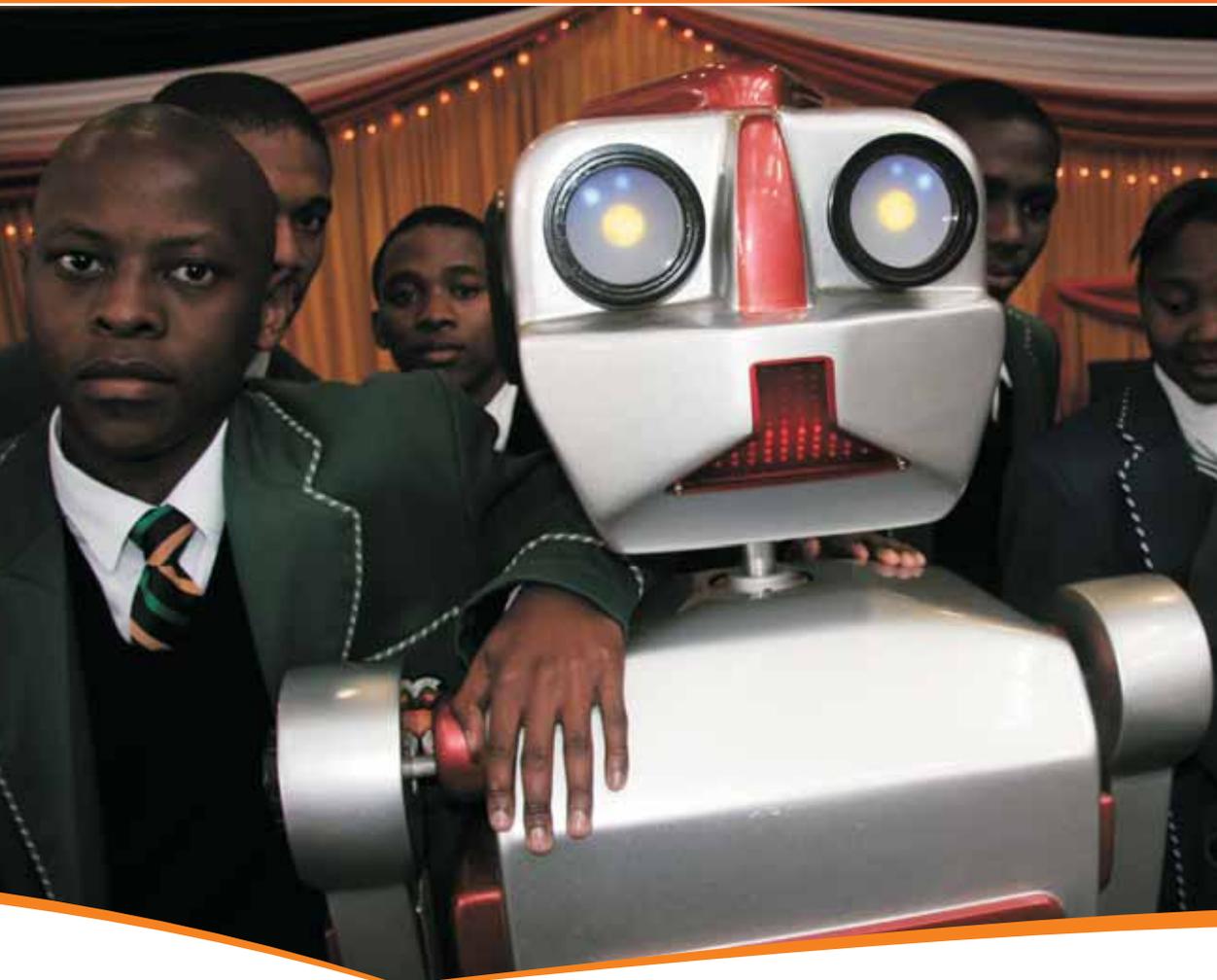
The spending focus over the medium term will be on advancing and facilitating South Africa's participation in strategic bilateral and multilateral agreements, and leveraging off resources that support the national systems of innovation through global science initiatives.

Expenditure increased from R95, 6 million in 2007/08 to R136 million in 2010/11, at an annual average rate of 12.5 per cent. The increase of 45.4 per cent in 2008/09 is attributable to the expansion of projects aimed at strengthening bilateral and multilateral cooperation and leveraging off international resources.

Over the medium term, expenditure is expected to increase marginally to R157, 2 million in 2013/14, at an average annual rate of 5 per cent for inflationary adjustment.



Programme 4



15.4 Programme 4: Human Capital and Knowledge Systems

Table 12: Strategic objectives and performance indicators and annual targets for 2011

Strategic objective	To build a SET human capital pipeline to ensure increased availability of researchers and innovators for South Africa's global competitiveness.									
	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets			
Output			2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	
Postgraduate research students supported	Number of postgraduate research students supported	21 100 postgraduate students supported by 2014	5 207	5 060	5 131	5 644	2 310 Honours, 2 574 Master's and 1 716 PhD students supported by 31 March 2012	2 450 Honours, 2 450 Master's and 2 100 PhD students supported by 31 March 2013	2 625 Honours, 2 625 Master's and 2 250 PhD students supported by 31 March 2014	
People participating in science awareness and engagement programmes and initiatives	Number of people reached through DST-funded initiatives	1 155 000 people reached through DST-funded initiatives	318 441	339 082	238 543	206 025	375 000 people participating in science awareness, engagement programmes and initiatives by 31 March 2012	385 000 people participating in science awareness, engagement programmes and initiatives by 31 March 2013	395 000 people participating in science awareness, engagement programmes and initiatives by 31 March 2014	
Strategic objective	To promote and enhance research productivity to increase South Africa's world share of knowledge outputs.									
Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets			
Researchers supported	Total number of researchers supported	7 650 researchers supported	2 030	2 054	2 422	2 519	2 500 researchers supported by 31 March 2012	2 550 researchers supported by 31 March 2013	2 600 researchers supported by 31 March 2014	

To identify and support the development of new and emerging research areas and technologies for their application in the improvement of quality of life and enhancement of economic competitiveness

Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets					
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13	2013/14		
Established nanoscience, photonics and synthetic biology teaching platforms	Number of teaching and training platforms established	Three nanoscience, photonics and synthetic biology teaching and training platform	National Nanotechnology Innovation Centres launched	7	Nanotechnology Research Flagship Projects approved	National photonics strategy approved	Draft Synthetic Biology Strategy approved	1	nanoscience teaching platform established by 31 December 2011	1	photonics teaching platform established by March 2013	1	synthetic biology teaching platform established by March 2014
	Number of flagship projects developed and/ supported	10 flagship projects developed											
Flagship projects (5 in photonics and 5 Synthetic Biology supported	Number of research and innovation outputs (prototypes and publications produced by NICs	3 prototypes 2 patents filed and 30 publications		3	formal patent disclosure and 15 publications			1	prototype and 10 publications resulting from research and innovation by 31 March 2012	1	prototype, and 10 Publications resulting from research and innovation by 31 March 2013	1	prototype, 10 publications and 2 patents filed resulting from research and innovation by 31 March 2014
	Number of postgraduate students supported	30 postgraduate student supported		23	postgraduate students graduated supported			10	postgraduate students supported by 31 March 2012	10	postgraduate students supported by 31 March 2013	10	postgraduate students supported by 31 March 2014

To ensure the availability of appropriate infrastructure for enhancement of RDI competitiveness

Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
Research equipment grants awarded	Number of research equipment grants awarded	180 research equipment grants awarded	40 research equipment grants awarded per annum	40 research equipment grants awarded per annum	40 research equipment grants per annum awarded	50 research equipment grants awarded	50 research equipment grants awarded by 31 March 2012	60 research equipment grants awarded by 31 March 2013	70 research equipment grants awarded by 31 March 2014	
Operational broadband network for all research and academic institutions	Increased availability of broadband connectivity for RDI	94 academic and research sites connected	Planning, design and roll-out of SANReN	32 sites connected to SANReN	32 sites connected to SANReN	Connection of 39 academic and research sites by 31 March 2011	27 academic and research sites connected by 31 March 2012	28 academic and research sites connected by 31 March 2013	39 academic and research sites connected by 31 March 2014	

To promote and develop RDI in Indigenous Knowledge System for the improved quality of life.

Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
A Bill for the protection and preservation of Indigenous Knowledge (IK)	A legislation for the protection and preservation of IK	Approved IK Bill	Participation in working groups of Department of trade and industry (DTI) on the development of an IP policy for IK	Submission of comments to DTI on IP amendment Bill	Draft legislative framework developed and submitted to Minister for approval	Minister approves draft policy framework and draft Bill	Approved Cabinet Memo by Minister by 31 March 2012	Approved legislation on the protection of IK for country wide public consultation and hearing by Cabinet by 31 March 2013	Bill on the protection of IK signed off by the President by 31 March 2014	

To promote and develop RDI in Indigenous Knowledge System for the improved quality of life.

Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13
Formal recognition of IK holders and practitioners in IKS	An approved accreditation and certification system in place	An approved accreditation and certification system in place	-	-	Draft legislative framework developed and submitted to Minister for approval	A draft legislature framework presented to Minister and public consultation completed	Approved legislature framework by 31 March 2012	Cabinet approved accreditation and certification system by 31 March 2013	Approved regulations infrastructure by 31 March 2014	
A functional National Recordal System (NRS)	Number of provinces with functional NRS in place	A functional NRS in place in seven provinces	Conceptual framework developed	Multilingual solution requirement specification completed NIKSO content management system website completed and operational Ideal IKS centre study model completed	Draft accreditation and certification concept developed NRS conceptual framework approved NRS catalogue system developed and implemented	NRS catalogue system developed and data collection work implemented in four provinces (North West, KwaZulu-Natal, Northern Cape and Limpopo)	A pilot National IKS Management System (NIKMAS) and IKSDC function in two provinces (KwaZulu-Natal and Limpopo) by 31 March 2012	Functional NRS in Western Cape (1), in Free State (1) and in Gauteng (1) by 31 March 2013	Functional NRS in two other provinces (Eastern Cape and Mpumalanga) by 31 March 2014	
A fully functioning and product development platform for the bio-economy	An integrated biospecting platform as the building block for the bio-economy	A fully functioning and product development platform for the bio-economy	IKS data centre (IKSDC) established at University of Zululand IKS biospecting stakeholders identified	IKS biospecting platform established	3 projects funded under the IKS biospecting platform	Programme 2 and 4 funding of the projects and development and finalisation of conceptual framework for an integrated biospecting platform for the bioeconomy	An integrated biospecting platform approved by EXCO by December 2012	Established infrastructure and human capital allocation for establishment of institute by 31 March 2013	Established platform of vehicles and strategic RDI projects by 31 March 2014	

15.4.1 Reconciling performance targets with the Budget and MTEF

Table 13 Expenditure estimates

PROGRAMME NAME: Human Capital and Knowledge Systems detail by subprogramme							
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Rand thousand	Outcome			Adjusted Appropriation	Medium Term estimates		
					MTEF Baseline		
Human Capital and Science Platforms	944.5	1 062.0	1 119.1	1 248.8	1 395.8	1 443.2	1 723.0
Indigenous Knowledge Systems	10.5	12.1	23.5	27.6	27.1	28.4	31.2
Emerging Research Areas and Infrastructure	318.7	380.6	448.7	487.6	527.5	573.9	652.1
Total of sub-programmes	1,273.8	1,454.7	1 591.4	1 764.0	1 950.4	2 045.5	2 406.3
Compensation of employees	11.9	15.0	18.1	23.4	19.7	20.6	23.5
Goods and services	8.0	6.499	7.6	13.4	5.5	6.8	7.0
Total transfer and subsidies	1 253.9	1 433,0	1 565.4	1 726.9	1 924.1	2 018.1	2 375.7
Total payments for capital assets	0.0	0.2	0.2	0.2	0.1	0.1	0.1
Total	1 273.8	1 454.7	1 591.4	1 764.0		2 045.5	2 406.3

Performance and expenditure trends

Expenditure trends

The spending focus over the medium term will continue to be on increasing South Africa's human capital in research, development and innovation, as well as supporting research infrastructure and scientific equipment that sponsor high quality research and supervision of postgraduate students.

Expenditure increased from R1, 3 billion to R1, 8 billion between 2007/08 and 2010/11, at an average annual rate of 11,5 per cent. The main area of expenditure was in human capital development, mainly to support researchers conducting research and producing research outputs, and students pursuing postgraduate studies at honours, masters, doctoral and postdoctoral level. These activities are managed by the National Research Foundation, which explains the transfer payments over this period. In addition, spending on research and development infrastructure and cyber infrastructure, which include the Centre for High Performance Computing and the South African Research Network, also increased spending.

Over the medium term, expenditure is expected to increase to R2, 4 billion in 2013/14, at an average rate of 10.9 per cent. The increase is due to the additional allocations for: increasing South Africa's human capital in research, development and innovation; and supporting research infrastructure and scientific equipment that support high quality research and supervision of postgraduate students. The National Research Foundation's baseline allocation also increases by R299, 9 million in 2011/12; R298, 3 million in 2012/13 and R316,2 million in 2013/14, as a result of a policy decision to incorporate funding for a number of department initiated programmes such as South African Research Chairs Initiative into Foundation's baseline.



Programme 5



Table 14 : Strategic objectives and performance indicators and annual targets for 2011

Strategic objective	To demonstrate strategic technology-based interventions for poverty reduction in order to support the creation of sustainable job and wealth opportunities, and contribute to sustainable human settlements and enhanced service delivery in areas of deprivation								
	Performance indicator	Strategic target	Audited/actual performance		Estimated performance	Medium-term targets			
Output			2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Households benefiting from technology-based interventions	Number of households benefiting from technology-based interventions	10 000 households benefiting from technology-based interventions by 31 March 2014	-	-	-	1 020	3 000 households benefiting from technology-based interventions by 31 March 2012	3 500 households benefiting from technology-based interventions by 31 March 2013	3 500 households benefiting from technology-based interventions by 31 March 2014
Job opportunities created and sustained	Number of new job opportunities created	1 200 job opportunities created by 31 March 2014	-	-	-	600	400 additional job opportunities created by 31 March 2012	400 additional job opportunities created by 31 March 2013	400 additional job opportunities created by 31 March 2014
Strategic objective	To grow and strengthen a portfolio of niche high-potential but neglected science and technology capabilities as well as actively facilitate the exploitation of both existing and new capabilities to support sustainable development priorities and the non-energy green economy ambitions of South Africa								
Output	Performance indicator	Strategic target	Audited/actual performance		Estimated performance	Medium-term targets			
			2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
High-level human capital developed Knowledge and innovation products	Number of Master's and PhD students funded or co-funded in designated niche areas annually	200 students funded annually for research degrees (master's and PhDs) by 31 March 2014	-	-	-	84	200 students funded for research degrees by 31 March 2012	200 students funded for research degrees by 31 March 2013	200 students funded for research degrees by 31 March 2014

To grow and strengthen a portfolio of niche high-potential but neglected science and technology capabilities as well as actively facilitate the exploitation of both existing and new capabilities to support sustainable development priorities and the non-energy green economy ambitions of South Africa										
Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance	Estimated performance	Medium-term targets				
				2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Knowledge and innovation products	Number of patents, prototypes, and technology demonstrators added to the intellectual property portfolio annually from funded or co-funded research programmes	5 additions to the IP portfolio (patents, patent applications, licences and trademarks) by March 2014	3				1 addition to the IP portfolio (patents, patent applications, licences and trademarks) by March 2012	2 additions to the IP portfolio (patents, patent applications, licences and trademarks) by March 2013	2 additions to the IP portfolio (patents, patent applications, licences and trademarks) by March 2014	
							23	45 published scientific and technical papers by 31 March 2012	50 published scientific and technical papers by 31 March 2013	55 published scientific and technical papers by 31 March 2014
Strategic objective	Contribute to improving government decision making on S&T as productive investments and to promote the private sector R&D activities in order to increase government expenditure on research and development as a percentage of GDP									
Output	Performance indicator	Strategic target	Audited/actual performance	Estimated performance	Medium-term targets					
			2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	
Decision-support interventions	Number of statistical and analytical reports published for the Minister, Cabinet and public information	Annual report on performance of R&D tax incentive presented to Parliament			First report to Parliament on the performance of R&D tax incentives (2006-2008)	2009/10 report on performance of R&D tax incentives	2010/11 report on performance of R&D tax incentives published by 30 October 2011	2011/12 report on performance of R&D tax incentives published by 30 October 2012	2012/13 report on performance of R&D tax incentives published by 30 October 2013	

Contribute to improving government decision making on S&T as productive investments and to promote the private sector R&D activities in order to increase government expenditure on research and development as a percentage of GDP

Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets			
				2007/08	2008/09	2009/10		2010/11	2011/12	2012/13	2013/14
			Report on public funding for science, research and innovation, including the Government Science and Technology Budget Tables			2008/9 baseline datasets on publicly funded scientific and technological activities (STAs)	2009/10 report on publicly funded STAs	2010/11 report on public funding for science, research and innovation, by 31 March 2012	2011/12 report on public funding for science, research and innovation, by 31 March 2013	2012/13 report on public funding for science, research and innovation, by 31 March 2014	2013/14 report on public funding for science, research and innovation, by 31 March 2014
			Review report on Type 3 S&T infrastructure: South African Weather Services; Agricultural National Public Assets				1 report on the review of Type 3	1 report on the review of Type 3 S&T infrastructure published by 31 March 2012	1 report on the review of Type 3 S&T infrastructure e. by 31 March 2013	1 report on the review of Type 3 S&T infrastructure by 31 March 2014	
			Draft framework for production of TBP data and other indicators for the knowledge economy			Framework for TBP production finalised	2009/10 TBP report	Data on TBP published providing new tabulations and policy implications;	Updated data on TBP published, including policy implications by 31 March 2013	Updated data on TBP published, including policy implications	Updated report on knowledge-based economy indicators by 31 March 2014
								Baseline report on new indicators for knowledge-based economy by 31 March 2012			

Contribute to improving government decision making on S&T as productive investments and to promote the private sector R&D activities in order to increase government expenditure on research and development as a percentage of GDP									
Strategic objective	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
			2007/08	2008/09	2009/10		2011/12	2012/13	2013/14
Output		National research and experimental development survey(R&D survey) reports published	2005/06 R&D survey report	2006/07 R&D survey report	2007/08 R&D survey report	2008/09 R&D survey report	2009/10 R&D survey report published by 31 March 2012	2010/11 R&D survey report published by 31 March 2013	2011/12 R&D survey report published by 31 March 2014
		Innovation survey report published				2008 South Africa innovation survey report		2010/11 South Africa innovation survey report published by 31 March	2010/11 South Africa innovation survey report
Strategic objective	Grow and strengthen a portfolio of niche high-potential R&D capabilities that support the development of new industries in advanced manufacturing, chemicals, advanced metals, and ICT.								
Output	Performance indicator	Strategic target	Audited/actual performance			Estimated performance	Medium-term targets		
			2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Human capital for competitiveness in advanced manufacturing, chemicals, advanced metals and ICT	Number of high-level research graduates funded or co-funded (masters and PhD students) supported in niche areas annually	140 of Master's and PhD students supported in designated niche areas by 31 March 2014	4	6	7	78	136 (cumulative) Master's and PhD students supported in designated niche areas by 31 March 2012	138 (cumulative) Master's and PhD students supported in designated niche areas by 31 March 2013	140 (cumulative) Master's and PhD students supported in designated niche areas by 31 March 2014
IP	Number of patents, prototypes, or technology demonstrators added annually to the IP portfolio through funded or co-funded research initiatives	40 patents, prototypes or technology demonstrators added to the IP portfolio by 31 March 2014	2	2	7	12	13 patents, prototypes or technology demonstrators added to the IP portfolio by 31 March 2012	13 of patents, prototypes or technology demonstrators added to the IP portfolio by 31 March 2013	14 patents, prototypes or technology demonstrators added to the IP portfolio by 31 March 2014

Grow and strengthen a portfolio of niche high-potential R&D capabilities that support the development of new industries in advanced manufacturing, chemicals, advanced metals, and ICT.

Strategic objective	Output	Performance indicator	Strategic target	Audited/actual performance				Estimated performance	Medium-term targets		
				2007/08	2008/09	2009/10	2010/11		2011/12	2012/13	2013/14
Growth in advanced industries through support to companies	Number of companies provided with TAPs	82 companies provided with TAPs by 31 March 2014	24			24	24	24 companies provided with TAPs by 31 March 2012	28 companies provided with TAPs by 31 March 2013	30 companies provided with TAPs by 31 March 2014	
Small and medium-enterprises receiving technology supported through the Technology Stations Programme	Number of small and medium-enterprises receiving technology support through the Technology Stations Programme	5801 small and medium-enterprises receiving technology support through the Technology Stations Programme by 31 March 2014				1594	1594	1753 small and medium-enterprises receiving technology support through the Technology Stations Programme by 31 March 2012	1928 small and medium-enterprises receiving technology support through the Technology Stations Programme by 31 March 2013	2120 small and medium-enterprises receiving technology support through the Technology Stations Programme by 31 March 2015	

14.4.2 Reconciling performance targets with the Budget and MTEF

Table 10.3: Expenditure estimates

PROGRAMME NAME: Socio-Economic Partnerships detailed by subprogramme							
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Rand thousand	Outcome			Adjusted Appropriation	Medium Term estimates		
					MTEF Baseline		
Science and Technology for Economic Impact	845.0	847.2	899.2	921.7	950.8	984.3	1 035.8
Science and Technology for Social Impact	254.1	247.6	264.9	261.0	298.0	373.4	392.1
Science and Technology Investment	4.8	23.7	10.4	32.8	21.5	23.9	25.3
Total of sub-programmes	1 103.9	1 118.4	1 174.6	1 215.5	1 270.3	1 381.6	1 453.2
Compensation of Employees	14.1	22.0	21.7	32.1	32.3	34.0	35.7
Goods and Services	8.5	5.8	11.2	15.2	12.4	14.0	14.3
Total transfer and subsidies	1 080.9	1 090.4	1 141.3	1 167.8	1 225.1	1 333.2	1 402.7
Total payments for capital assets	0.3	0.2	0.4	0.4	0.4	0.5	0.5
Total	1 103.9	1 118.4	1 174.6	1 215.5	1 270.3	1 381.6	1 453.2

Expenditure trends

The spending focus over the medium term will be on providing technological support to local manufacturing firms to allow them to become potential suppliers to large scale public procurement processes. The programme will also continue to support the implementation of the 10-year innovation plan's objectives for human and social development dynamics and science and technology for global change.

Expenditure increased from R1, 1 billion in 2007/08 to R1, 2 billion in 2010/11, at an average annual rate of 3,3 per cent. The marginal increase is ascribed to expansion of activities in policy and indicator development, tax incentives, sustainable human settlement research, sustainable livelihoods and social development analysis.

Over the medium term, expenditure is expected to increase at an average annual rate of 6.1 per cent, to reach R1, 5 billion in 2013/14, to provide for inflationary adjustments.

ABBREVIATIONS

AISA	Africa Institute of South Africa
ANPA	Agricultural National Public Assets
ASSAf	Academy of Science of South Africa
AU	African Union
CHPC	Centre for High Performance Computing
CoC	centre of competence
CoE	centre of excellence
CSIR	Council for Scientific and Industrial Research
DST	Department of Science and Technology
EU	European Union
HSDD	Human and Social Dynamics in Development
HSRC	Human Sciences Research Council
ICT	information and communication technologies
IKS	indigenous knowledge systems
IPR Act	Intellectual Property Rights from Publicly Financed Research and Development Act/Bill
KAT	Karoo Array Telescope
MTEF	Medium Term Expenditure Framework
MTSF	Medium Term Strategic Framework
NEP	National Equipment Programme
NEPAD	New Partnership for Africa's Development
NIKSO	National Indigenous Knowledge Systems Office
NIPMO	National Intellectual Property Management Office
NNEP	Nanotechnology Equipment Programme
NRDS	National Research and Development Strategy
NRF	National Research Foundation
NRS	National Recordal System
NSI	National System of Innovation
OECD	Organisation for Economic Cooperation and Development
OTT	Office of Technology and Transfer
R&D	research and development
RDI	research, development and innovation
RISP	Research Infrastructure Support Programme
S&T	science and technology
SADC	Southern African Development Community
SALT	Southern African Large Telescope
SANReN	South African National Research Network
SARChI	South African Research Chairs Initiative
SAWS	South African Weather Services
SKA	Square Kilometre Array
SET	science, engineering and technology
SMMes	small, medium and micro-enterprises
STEMI	science, technology, engineering, mathematics and innovation
STI	science, technology and innovation
TBP	technology balance of payments
TIA	Technology Innovation Agency
USAASA	Universal Service and Access Agency of South Africa
YISS	Youth into Science Strategy





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