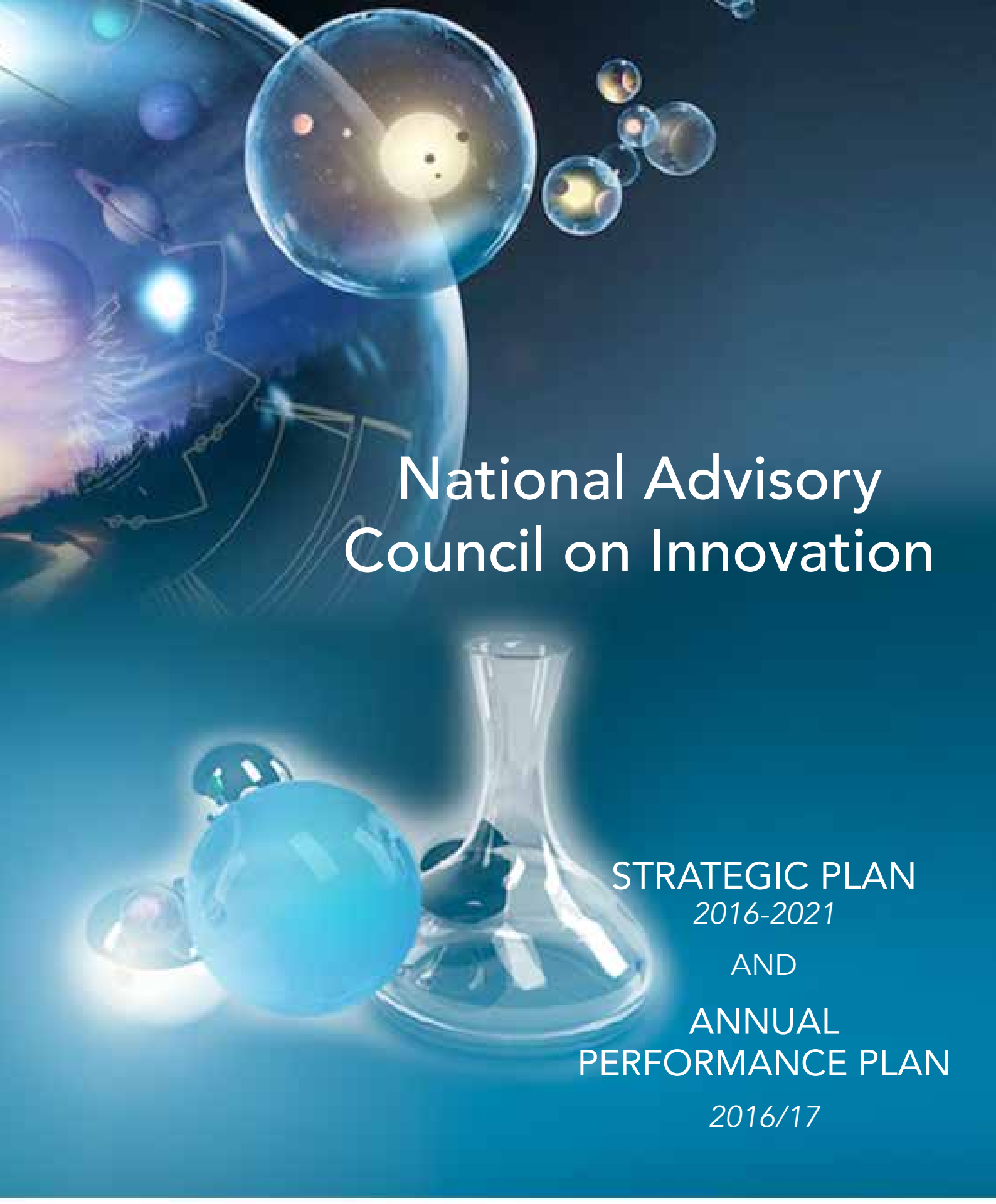

National Advisory Council on Innovation

STRATEGIC PLAN
2016-2021

AND

ANNUAL PERFORMANCE PLAN
2016/17

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

NACI
NATIONAL ADVISORY COUNCIL ON INNOVATION

STRATEGIC PLAN 2016-2021

AND

ANNUAL PERFORMANCE PLAN 2016/17

10 March 2016

INNOVATION

FOR A BETTER FUTURE

Contents

Foreword

Science, technology and innovation (STI) can play a critical role in addressing economic and social challenges (including education, food security, health). This is recognised by the National Development Plan (NDP), which notes that developments in STI fundamentally alter the way people live, communicate and transact, with profound effects on economic growth and development. The NDP further indicates that countries that are able to tackle poverty effectively by growing their economies are characterised by strong STI.

Our 2016-2021 Strategic Plan articulates a vision and identifies strategic-outcome oriented goals that seek to contribute to the realisation of the NDP vision and the mandate of NACI. NACI intends to strengthen its capacity to store and analyse data and improve the quality, relevance and efficacy of its advice, which must be evidence based. It also seeks to strengthen its ability to conduct system's planning, monitoring and evaluation in order to bolster policy performance. Recognising that the National System of Innovation (NSI) remains a work in progress, NACI intends to contribute to the development of an NSI that is coherent, coordinated and responsive to national priorities. Local and international networks and partnerships will play an important role in ensuring successful implementation of our Strategic Plan.

I commend our Strategic Plan to NSI role players and to South African citizens.

Professor Cheryl de la Rey
Chairperson of NACI

Official Sign-off

It is hereby certified that this Annual Performance Plan (APP) was developed by the management of the National Advisory Council on Innovation (NACI) under the guidance of the Acting Chief Executive Officer of NACI; prepared in line with NACI's 2016-2021 Strategic Plan; and accurately reflects the performance targets which NACI will endeavour to achieve, given the resources made available in the budget for 2016/17.

Prof. Cheryl de la Rey
NACI Chairperson

Mr Robert Shaku
Acting Chief Financial Officer (DST)

Dr Mlungisi Cele
Acting CEO (NACI)

Approved by:

Minister Naledi Pandor
Executive Authority

Strategic Plan

1. VISION

A leading advisory body to government on science, technology and innovation, in a well-coordinated, responsive and functioning national system of innovation.

2. MISSION

To provide evidence-based advice to the Minister of Science and Technology and, through the Minister, Cabinet on science, technology and innovation matters, through the research expertise and engagement with stakeholders.

3. VALUES

- Professionalism.
- Integrity.
- Innovation and knowledge sharing.
- Transparency and accountability.

4. LEGISLATIVE AND OTHER MANDATES

4.1 Legislative mandate

The National Council on Innovation Act, 1997 (Act No. 55 of 1997), provides the mandate for NACI (2015). The Act mandates NACI to advise the Minister for Science and Technology and, through the Minister, Cabinet, on the role and contribution of science, mathematics, innovation and technology, including indigenous technologies, in promoting and achieving national objectives, namely, to improve and sustain the quality of life of all South Africans, develop human resources for science and technology, build the economy, and strengthen the country's competitiveness in the international arena.

4.2 Constitutional mandate

There are no specific constitutional provisions for NACI (2015).

4.3 Relevant court rulings

None.

5. POLICY CONTEXT AND MANDATE

The 2011 National Development Plan (NDP) highlights the centrality of science, technology and innovation (STI) in national development. The NDP notes that developments in STI fundamentally alter the way people live, communicate and transact, with profound effects on economic growth and development. The NDP further indicates that countries that are able to tackle poverty effectively by growing their economies are characterised by strong STI. This implies that the STI is fundamental to equitable economic growth, which underpins economic advances and improvements in health systems, education and infrastructure.

Furthermore, the NDP acknowledges that the STI system or the national system of innovation (NSI) has a role to play in improving South Africa's global competitiveness. In particular, the NSI is the principle tool for creating new knowledge, applying knowledge in production processes, and disseminating knowledge through teaching and research collaboration. The NDP further acknowledges that advances in technological innovation and the production of new knowledge are critical to growth and development. Therefore, achieving a competitive and sustainable economy will require a strong and effective NSI, which must contribute to transformation. For these benefits to be realised, the NDP emphasises that the NSI should function in a coherent and coordinated manner with broad common objectives aligned to national priorities.

NACI has begun to identify ways in which its work could contribute to the realisation of some aspects of the NDP. As part of a programme of action, NACI identified the water-energy-food security nexus as a focus that responds to the NDP both directly and indirectly. Projects (involving NSI actors) have already started and produced results, some of which have been provided to the Minister in the form of special advice letters. NACI intends to continue focusing on the water-energy-food security nexus. NACI has adopted a new vision and goals that are intended to help contribute to the development of an NSI that is coherent, coordinated and responsive to national priorities, another expectation of the NDP.

6. STI POLICY MANDATE

The 1996 White Paper on Science and Technology provides NACI with a broad policy mandate, introducing the concept of the NSI. An NSI can be understood as a set of functioning institutions, organisations and policies that interact constructively and optimally in the pursuit of a common set of social and economic goals and objectives, seeking to promote change through the introduction of innovations.

The White Paper highlighted that such a system, in its broadest conception, is the means through which a country seeks to create, acquire, diffuse and put into practice new knowledge that will help that country and its people achieve their individual and collective goals. A well-functioning, coordinated and efficient NSI that helps in the achievement of national development priorities remains an ideal for which South Africa continues to strive.

The White Paper was followed by the National Research and Development Strategy (NRDS) in 2002. The NRDS seeks to contribute towards socio-economic development by focusing on a set of "technology platforms" and "science missions". The technology platforms were for biotechnology, information technology, technology for advanced manufacturing, technology for and from natural resource sectors, and technology for poverty reduction. The missions were in areas in which South Africa had an obvious geographic advantage, such as astronomy, human palaeontology, plant and animal biodiversity, as well as in areas in which South Africa had a clear knowledge advantage, such as indigenous knowledge and deep mining.

These missions and platforms were expanded under the Ten-Year Innovation Plan (2008-2018) under five "grand challenges", in the bioeconomy, space science and technology, energy security, human and social dynamics, and global change (with a focus on climate change).

The Ten-Year Innovation Plan articulated a path to innovation in support of South Africa's transformation to a knowledge-based economy, in which the production and dissemination of knowledge leads to economic benefits and enriches all fields of human endeavour. The Ten-Year Innovation Plan identified the ability of STI to play a driving role in enhancing productivity, sustainable economic growth and inclusive socio-economic development as a measure of the plan's success. Long-term goals based on the grand challenges were set. These included South Africa becoming one of the top three emerging economies in the global pharmaceutical industry, based on the 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.

The Ten-Year Innovation Plan emphasised the importance of human capital development and knowledge generation and exploitation as important elements of a knowledge-based economy. It identified international partnerships as important given that knowledge-based economies are connected through a growing international research and cooperation network.

The Ten-Year Innovation Plan also sought to bridge the "innovation chasm" (the divide between research and the translation of research results into innovative commercial products and services), through, among other things, the establishment of the Technology Innovation Agency (TIA).

7. PERFORMANCE ENVIRONMENT

The 1996 White Paper and the 2002 National Research and Development Strategy noted that the post-apartheid government had inherited an "ailing" science and technology system, which was fragmented and uncoordinated, and not geared to help the government realise the national imperatives of economic growth and enhanced quality of life for all citizens.

The need for greater coherence and coordination in the NSI has therefore been understood for a long time. A variety of statutory and voluntary mechanisms have been established[1] in an attempt to transform the ailing system. The idea of an NSI, introduced in the 1996 White Paper, was premised on the notion of stakeholders working together for a common purpose. The NSI concept assumes the need for the different actors across the system (in both the public and the private sector) to achieve coherence and complementarities in their functions, so that the resources invested in the various entities can make the greatest impact.

According to the Ministerial Review Committee on the STI Landscape in South Africa (2012), NACI is hamstrung in carrying out its mandate because it reports to the Department of Science and Technology (DST) and thus does not have a structural location that affords it the authority needed for the effective coordination of a national system. In response to this finding, the Minister of Science and Technology has improved the composition of and stakeholder representation on the NACI Council (such as the compulsory inclusion of all science council chief executive officers) and granted the Chairperson direct access to the Minister (previously they worked through the Department). A process will be undertaken to ensure that NACI is positioned, empowered and structured to carry out both its legislative mandate and additional tasks assigned to it by the Minister in 2014.

The 2012 Ministerial Review Report pointed out that progress in improving the functioning of the NSI was still hampered by the absence of an assigned responsibility for ensuring the availability, collation, maintenance and analysis of STI indicators (quantitative and qualitative), needed for monitoring and evaluation, and for planning and the management of the NSI as a whole. It stated that, although evidence is available from a number of sources for some dimensions of discrete activity in the system, there is no comprehensive synopsis available, even in conception, that reflects the system in its totality, and that allows an assessment of how it might fulfil its contribution to national development.

South Africa has several institutions that collect and analyse data, for instance, the Centre for Research on Evaluation, Science and Technology, the Department of Higher Education and Training (the Higher Education Management Information System), the Research Information Management System, the Council on Higher Education, and the Centre for Science, Technology and Innovation Indicators. However, it is the opinion of the Ministerial Review Committee that, while there is an excess of data, there is a dearth of information, and it is evident that no entity in the NSI currently has the required capacity in system mapping, system analysis, system building, system steerage, system evaluation, system learning or system foresight.

1 These include NACI, the Council on Higher Education, and the National Science and Technology Forum. Government attempted to achieve coherence across clusters of departments or across priority outcomes by introducing first a cluster system and then delivery forums. There are also numerous sectoral bodies such as Universities South Africa for higher education institutions, and the Committee of Heads of Organisations of Research and Technology, which is mainly for science councils. The contribution of these mechanisms to strengthening the NSI varies, but there is little doubt that much more could be achieved than is currently the case.

The Minister has assigned NACI the task of developing and hosting an STI data portal for the NSI, a central repository that will be important in the establishment of research and strategic intelligence, and the production of biennial state of innovation report.

8. SITUATIONAL ANALYSIS

This section is not intended to be a comprehensive assessment of the situation, but to identify key trends and challenges confronting all science systems in general, and the South African NSI in particular. Although deeper analysis may be required to provide a better understanding of some trends, the available information has been used to reflect on NACI's current work and possible future work, and to develop this Strategic Plan and Annual Performance Plan.

8.1 Innovation for socio-economic development

Innovation has always been a foundation for economic growth. From the invention of the wheel to the Industrial Revolution, the invention of medicines to air transport and the Internet, innovation leads to change and progress. In today's world, beset by financial, social and environmental challenges, and looking for new, stronger, more inclusive and sustainable ways forward, innovation is more important than ever, and policies to foster it, leading to the creation and diffusion of new products, processes and methods, are vital.

Innovation can be measured in several aspects of a country's growth. First, there is technological progress embodied in tangible, physical capital, such as better machinery, smarter equipment or greener buildings. Second, there is intangible, knowledge-based, capital, such as software, data, research and development (R&D), design, intellectual property, and firm-specific skills.

Third, there is the smarter, more efficient use of labour and capital to generate so-called multifactor productivity growth (also referred to as total factor productivity). Fourth, there is the role that innovation plays in strengthening the dynamics of an economy, with new innovative firms entering the market, replacing other slower, less innovative ones in a process known as creative destruction. Together, these four dimensions account for as much as half of GDP growth.

Innovation is also about what humankind needs. It is critical for addressing profound social and global challenges (such as climate change, health, food security, poverty and access to clean water) in an affordable and timely manner. At the same time, innovation can contribute to inequality, which is why it needs to be accompanied by appropriate labour and social policies (OECD, 2015).

8.2 Inclusive innovation

The term "inclusive innovation" has become widely adopted by a range of governments and organisations including international organisations such as the World Bank and the United Nations Development Programme, the latter now maintaining an International Policy Centre for Inclusive Growth headquartered in Brazil. A number of governments in developing countries, such as India and Thailand, have or are in the process of developing explicit policies focused on inclusive innovation. China's 12th Five Year Plan for National Economic and Social Development (2011-2015) shifts the focus from "pursuing economic growth" to "sharing the benefits of development with all people" and innovation has a key role to play (National People's Congress, 2011 cited in NACI, 2015).

There is no agreed definition of inclusive innovation and a variety of similar terms are employed in different contexts, including pro-poor innovation, below the radar innovation, innovation for inclusive development, bottom of the pyramid innovation, grassroots innovation, and frugal innovation (Heeks et al., 2013). However, all these terms share a common notion of the production and/or delivery of innovative solutions to the problems of the poorest, either with or without the active involvement of the poor in the innovation process itself. A broad definition therefore would be: "Inclusive innovation is the means by which new goods and services are developed for and/or by the poor" (Foster and Heeks, 2013; Johnson and Andersen, 2012, cited in NACI, 2015).

It is possible to conceive of a number of different levels at which inclusivity or involvement of the beneficiaries (the poor) could potentially operate. These include the identification of problems that need addressing, so that the innovation is relevant to their needs; the development and application of innovative solutions to their problems; the adoption, assimilation and diffusion of innovative solutions to their problems; and finally the impact of innovation so that the innovation outputs maximise the consumption and/or incomes of the poor (Foster and Heeks, 2013, cited in NACI, 2015).

8.3 Innovation in the public sector

Although firms are recognised as being at the core of innovation, continuous improvement is also an imperative for the public sector, particularly in the context of increasing fiscal pressures and rising expectations from all citizens in respect of the improved delivery of public services (including education, health, security, transport infrastructure and access to public spaces). Government therefore needs to accelerate its pace of innovation, particularly as regards taking advantage of technological advances to improve its performance (e-government).

In a recent study on the scope for innovation in the public sector, the OECD has recommended four core areas in which to raise levels of innovation (OECD 2015, cited in NACI, 2015). These are empowering employees through a focus on skills, culture and values, leadership and engagement; putting knowledge to use through data, openness and learning; working together through partnerships, structures and collaborations; and rethinking the rules through the realistic amendment of regulations and budgeting and project management processes.

Although this is a relatively new area of public policy, the pursuit of innovative means to deliver public services has been recognised in South Africa for some time. In 2001 the Centre for Public Service Innovation was launched. This government component, which is part of the Minister of Public Service and Administration's portfolio, acts as facilitator for the unearthing, development and practical implementation of innovative solutions within and throughout the public service. This is to ensure an effective, efficient and accountable government. The centre makes annual awards for innovative projects within the public sector and facilitates pilot projects aimed at demonstrating the value of innovative solutions (NACI, 2015).

However, more work is needed in this regard. South Africa performs relatively poorly on the key indicators of the Global Competitiveness Index, the Global Entrepreneurship Monitor and the Global Innovation Index in areas relating to government efficiency, the burden of government regulations on business, and the quality of education. Moving forward in these important areas will require not only a level of compliance with existing standards, but also the use of new processes and technologies to accelerate delivery (NACI, 2015).

8.4 Seize the opportunities of the digital economy

Today's world is increasingly shaped by the rise of the digital economy. With billions of people using the Internet and mobile communications, knowledge diffusion is accelerating. In countries where literacy remains a challenge, image and voice communications are connecting communities to global networks. The proliferation of massive amounts of data is just a hint of what can be expected from the emergence of ubiquitous data generation and computing, dubbed the "Internet of Things". An open and accessible Internet, where creativity, sharing, entrepreneurship and experimentation can flourish, is essential for innovation in the 21st century. Big data and data analytics have become a driving force in science, product innovation, processes, organisational methods, and services, including healthcare. Policies are needed to promote skills in data analytics, and to encourage investments in appropriate infrastructure. However, policy makers will have to be careful to strike the right balance between the free flow of data and the safeguarding of personal privacy and confidence (OECD, "Better innovation for better lives", 2015).

8.5 Big data

The processing and analysis of big data will have important effects on the nature and processes of innovation itself. Big data analysis is proving to be a new addition to the acquisition of knowledge, in addition to experimental science, theoretical analysis and computer simulation. Big data generates new hypotheses and the potential wherewithal to test these hypotheses. Data-intensive analysis is likely to yield new insights and will change the way scientific research is done (NACI, 2015).

In addition, the exploitation of big data will be a key element underpinning the competitiveness of firms in almost all sectors, but with particularly strong impacts in health care, retail and trade, manufacturing and public service (Manyika et al., 2011). As an illustration, sensors embedded in manufactured products create innovative after-sales service offerings such as proactive maintenance. A key issue to confront, therefore, is how South Africa will leverage its capacities in big data, particularly data generated through the Square Kilometre Array project.

8.6 Water-energy-food nexus

Water, energy and food systems are increasingly interdependent, which demands a more holistic view of these issues. Water is an essential input for producing agricultural goods and hydropower, while energy is required to produce and distribute water and food, and to pump water from groundwater or surface water sources, to power tractors and irrigation machinery, and to process and transport agricultural goods.[2] Figure 1 shows this interdependence clearly.

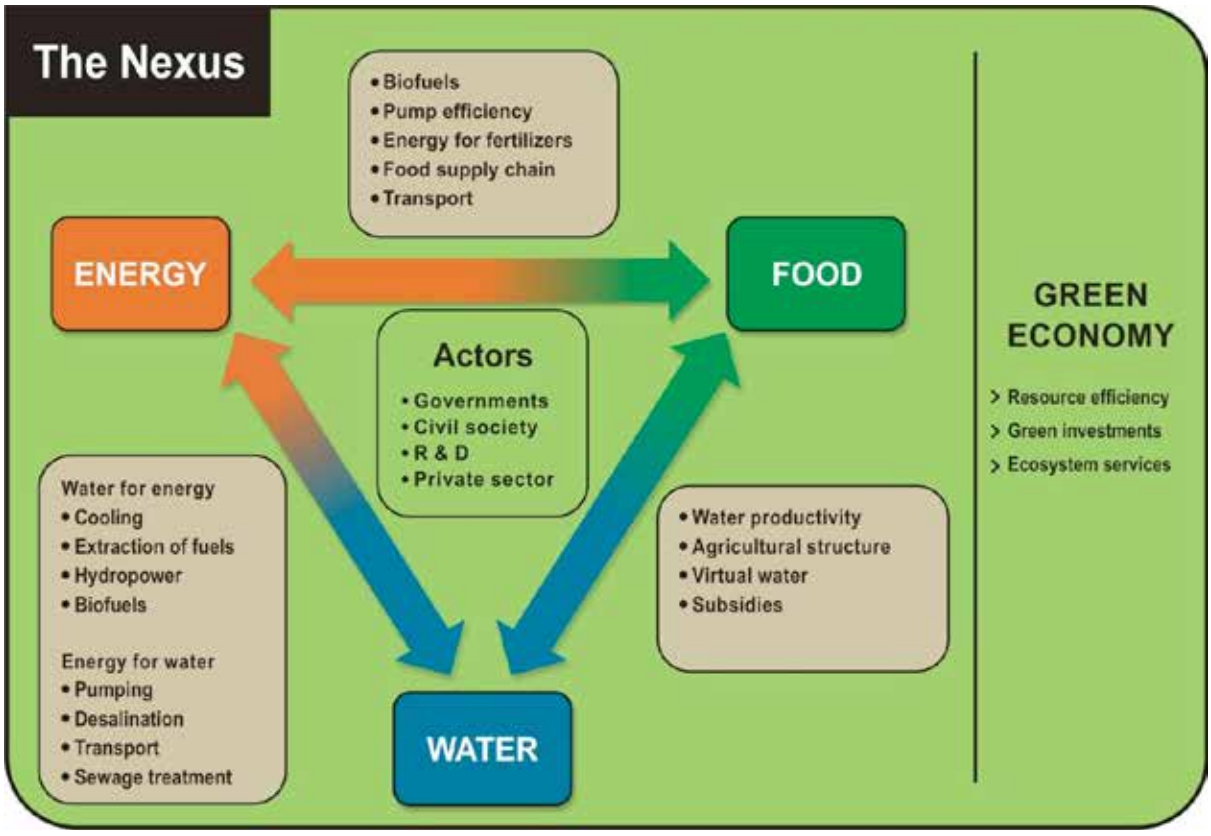

Figure 1: Interdependence between water, energy and food3

Using water to irrigate crops might promote food production, but it can also reduce river flows and hydropower. Growing crops for biofuel under an irrigation system could increase overall water withdrawals at the expense of food security. Converting surface irrigation into high-efficiency pressurised irrigation might save water, but might also result in higher energy use. All these

2 http://www.unwater.org/topics/water-food-and-energy-nexus/en/
3 http://www.water-energy-food.org/fotos/charts/01/nexus_en_450_b.jpg

examples suggest that challenges associated with water, energy and food security should be dealt with through the coordinated and coherent efforts of all the relevant stakeholders to ensure synergies and sustainable benefits. Increased coordination and policymaking in the three areas will therefore be crucial (Nasser, 2013).

8.7 Knowledge generation

Current STI policies (the 1996 White Paper, the 2002 NRDS and the 2008 TYIP) identified knowledge generation, knowledge exploitation and human capital development as critical to the current and future needs of the NSI and society. Consequently, a range of interventions have been introduced, including the South African Research Chairs Initiative, and the centres of excellence, centres of competence, and bursary programmes.

According to the 2015-2019 DST Strategic Plan, South Africa's scientific output, measured by publications in internationally accredited journals, increased at an average rate of 10% per year from 2003-2012, representing an average growth of about 624 publications per year. There has been a steady increase in the country's share of the world's journal publications (from 0,51% in 2005 to 0,64% in 2009, and 0,81% in 2014, as illustrated in Figure 2).

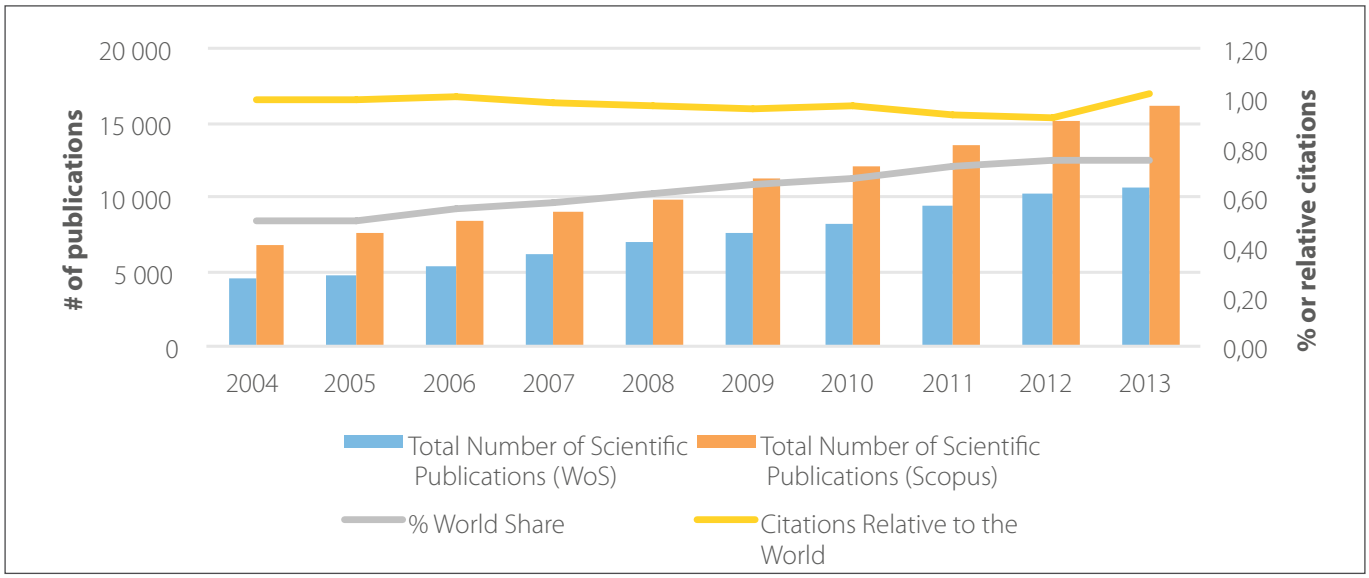

Figure 2: Trend in South African scientific publications (Source: NACI (2015). South African Science and Technology Indicators 2014)

Globalisation and the growing complexity of STI require greater international cooperation. This is evident in Figure 3, which shows international scientific publication collaborations between South Africa and other selected countries. Most of the R&D collaborations are with developed countries (in 2013 approximately 84% of research papers were co-authored with at least one author from countries such as the United States of America, England, Germany, Australia, France, the Netherlands and Canada. Although there have been some recent improvements, more should be done to increase collaboration between South African scientists and scientists from other BRICS countries and the rest of the African continent.

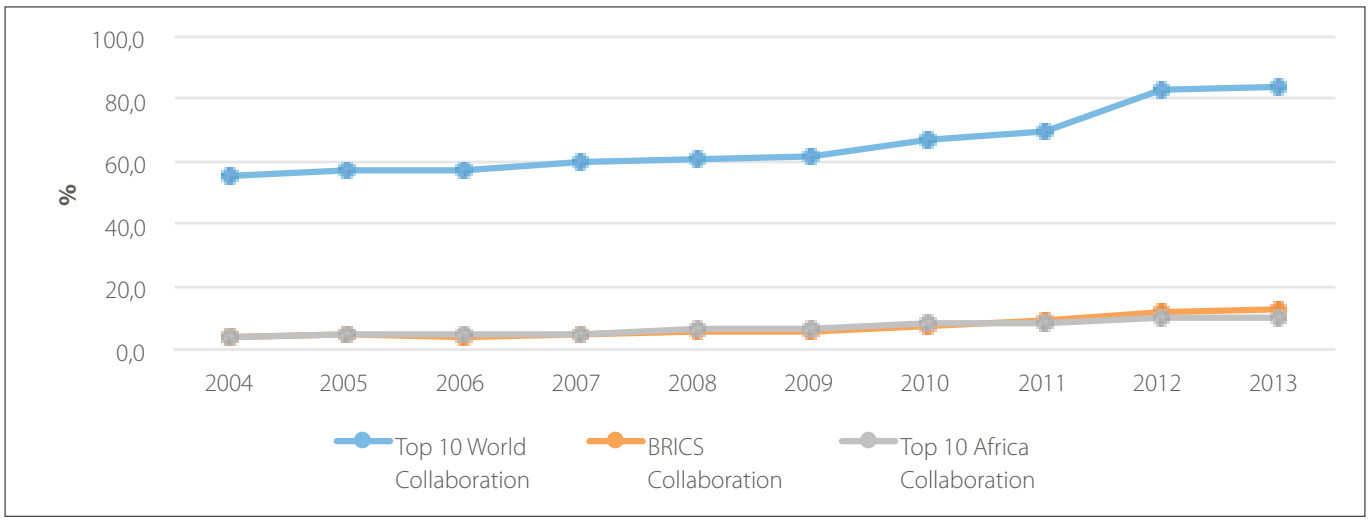

Figure 3: Trends in proportion of SA collaborative scientific publications with selected countries (Source: NACI (2015). South African Science and Technology Indicators 2014)

8.8 Commercialisation of research results

The Intellectual Property Rights from Publicly Funded Research and Development Act, the Technology Innovation Agency (TIA) and National Intellectual Property and Management (NIPMO) were established to accelerate the conversion of research ideas into marketable products and services. According to the 2015-2020 DST Strategic Plan, TIA's achievements over the past few years include

- R1,2 billion disbursed (R424 million for accelerating new technologies, services and products).
- R564 million leveraged through third-party funds.
- A total of 98 products, processes and services developed and 18 investments commercialised.
- More than 500 interns trained in the innovation space.
- Kapa Biosystems offers next-generation polymerase chain reaction reagents. The firm employs more than 50 staff.
- XSIT, a sterile insect technology developed in conjunction with the South African Nuclear Energy Corporation, addresses citrus industry needs. To date, about 8 500 ha have been protected from the False Codling Moth.
- Altus Biologics developed bone-regeneration products and is seeking investments to obtain accreditation for global markets.

NIPMO has awarded more than R42 million to 24 institutions seeking to protect their IP derived from publicly funded R&D.

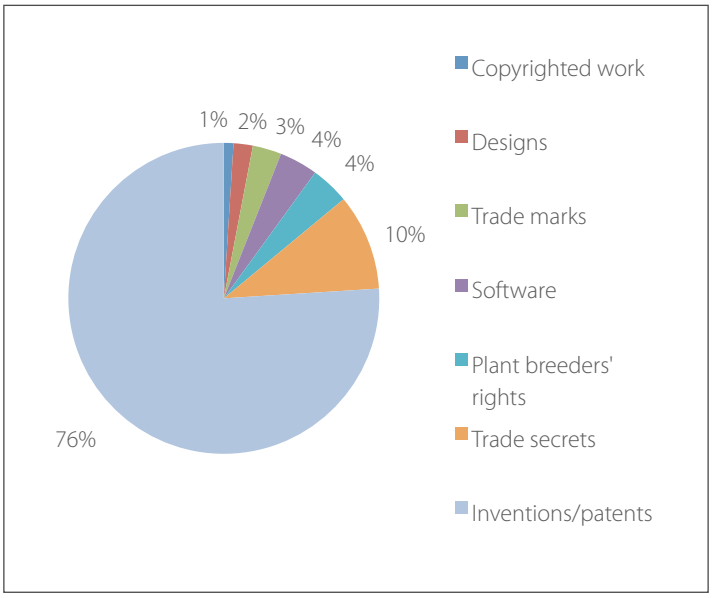

Figure 4: IP types for disclosures received by NIPMO

Early data from NIPMO indicates that invention disclosures have increased. NIPMO has received approximately 682 disclosures for IP generated after 2 August 2010, of which 643 are still active, and 76% are for inventions for which patent protection is being obtained. Of the total number of disclosures received, 5% have an enforceable right, and a further 5% have been licensed (pre-revenue) or commercialised (DST Strategic Plan 2015-2020).

Notwithstanding this progress, there is still the innovation chasm. For instance, South Africa's patent family applications are decreasing sharply (i.e. from 144 in 2008 to 45 in 2012), as shown in Figure 4.

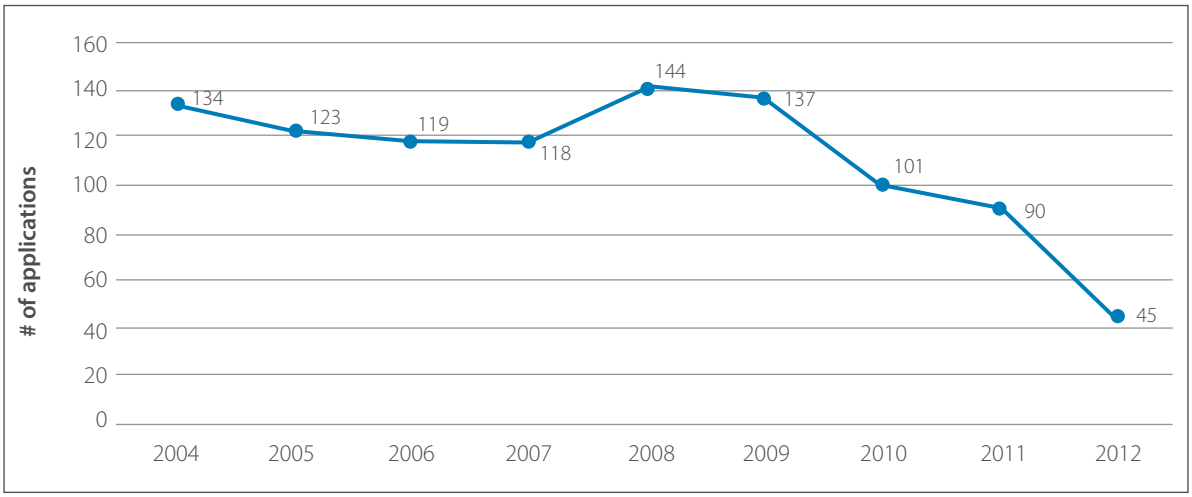

Figure 4: Trends in the number of South African patent family applications (Source: NACI (2015). South African Science and Technology Indicators 2014)

Studies have identified various reasons for the persistent problem of an innovation chasm. These include deficiencies in the existing system support for commercialisation (Kaplan, 2011) and a lack of coordination between DST and Department of Trade and Industry policies and instruments supporting the commercialisation of knowledge (NACI, 2013).

8.9 Financing of the system and incentives

The Ministerial Review Committee report examined how the various dimensions of South Africa's complex NSI should be resourced to facilitate the further evolution of the South African economy into one in which high-level knowledge and skills are added to the system as new drivers. Some of the constraints identified are the unreliable pipeline of trained and knowledgeable people at all levels, the inadequate investment in existing research teams, not keeping up with infrastructure requirements, and failing to incentivise private investment in innovation, both within and from outside the country. Figure 5 shows a drastic decline in the proportion of government funding for business expenditure on research and development, from 22% in 2007/08 to 6% in 2012/13.

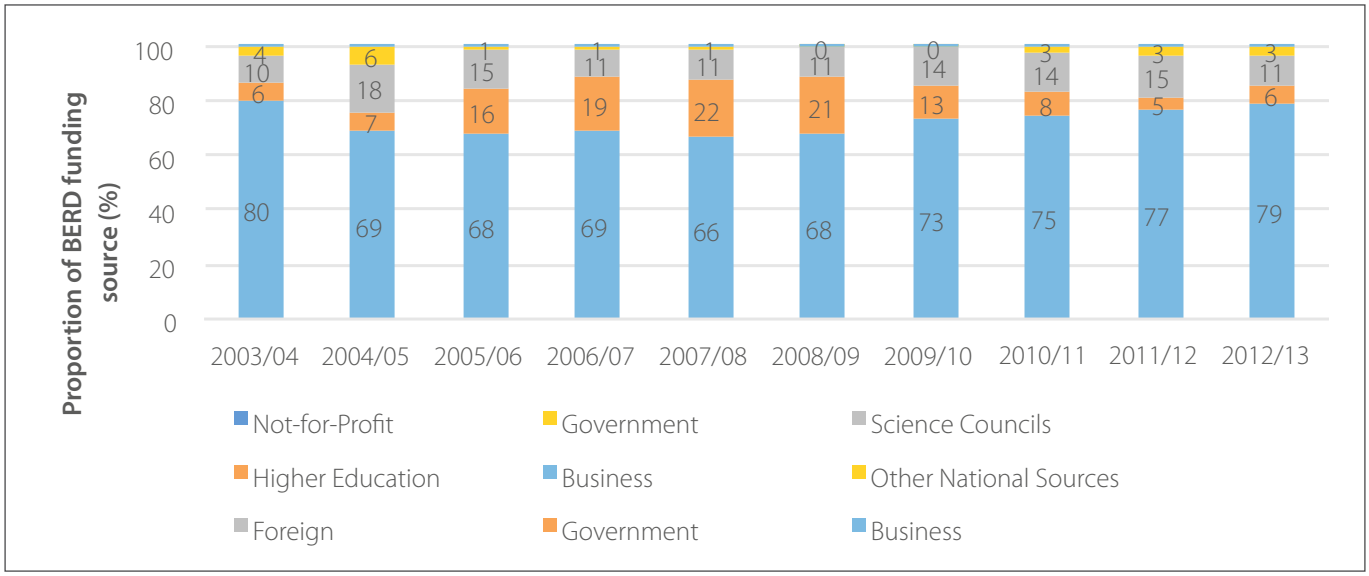

Figure 5: Sources of Funding for Business Expenditure on R&D (Source: DST. South African Survey of Research and Experimental Development 2012/13)

The Ministerial Review Committee report made several recommendations on financing the NSI, providing funding and improved infrastructure for the R&D conducted at public higher education institutions, and offering businesses adequate incentives to their increase R&D expenditure. It also recommended the expansion of incentives offered by the Department of Trade and Industry and the DST (through TIA), in the number and amount of incentives offered and in the range of enterprises serviced. Another recommendation was that South Africa work at being a preferred destination for R&D-related foreign direct investment.

8.10 Human resources for STI

Investment in future R&D capacity is necessary in order to stimulate South Africa's innovation capacity to contribute to knowledge economy. The Human Resource Development Strategy for South Africa 2010-2030 aims to increase the number of learners passing grade 12 Mathematics with at least 60% in order for them to be admitted for professional studies in critical and scarce skills areas. In 2015, only 7% of learners passed grade 12 with 60% or more in Mathematics and 5,4% in Physical Science. In terms of gender, a slightly lower proportion of girls passed grade 12 Mathematics and Physical Science with 60% or more than boys (43,1% in Mathematics, and 43,8% in Physical Science).

During the period 2011-2012, the number of South African researchers per 1 000 employed was 1,5. This was below that for most of the OECD countries (7,7 in 2011) as well as China (1,8 in 2012) and Russia (6,2 in 2012).

In 2012, as shown in Figure 6 below, the percentage of higher education staff with doctoral qualifications was 39,3% at traditional universities, 14,7% at universities of technology and 25% at comprehensive universities. The NDP target is for 75% of academic staff to have doctoral qualifications by 2030 in order to increase research and supervisory capacity.

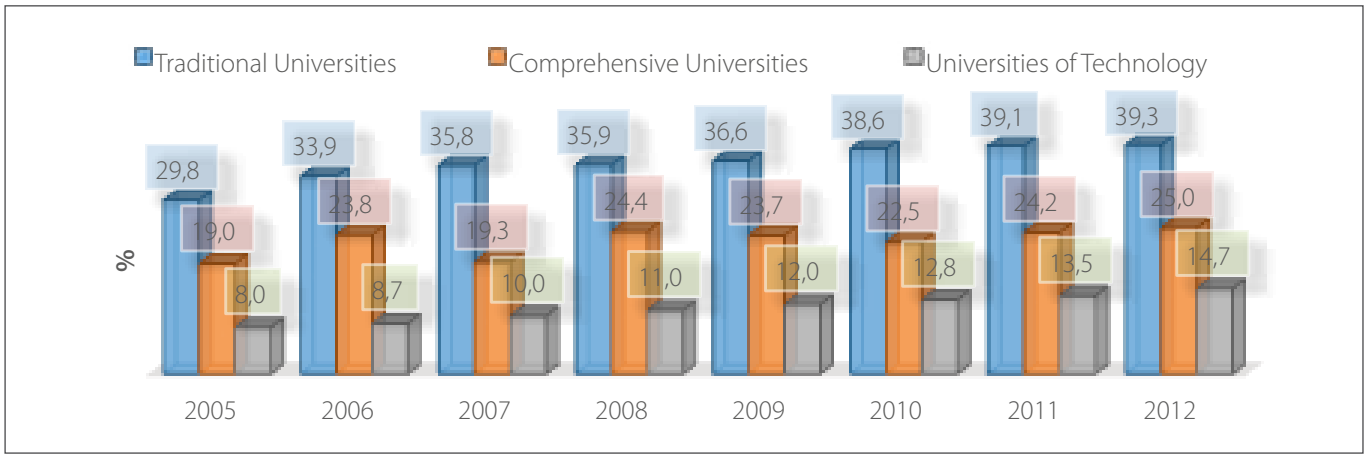

Figure 6: Trend in percentage of academic staff with doctoral qualifications (Source: NACI (2015). South African Science and Technology Indicators 2014)

Table 1 below gives a breakdown of higher education academic staff with doctoral qualifications in terms of gender, race and age. The majority of higher education academic staff with PhDs are white males aged 50 and above. On average, less than 3,5% of academic staff under 30 have PhDs. Generally, male academic staff are more likely to have doctoral qualifications than their female counterparts (36,4% of men in 2012, compared to 25,3% of women).

Table 1: Breakdown of the higher education academic staff with doctoral qualifications

	2005	2006	2007	2008	2009	2010	2011	2012
Number of staff with a PhD	3 782	4 410	4 318	4 722	4 933	5 188	5 699	5 890
% staff with a PhD	22,9	27,1	26,8	28,6	29,1	29,9	30,9	31,3
% female staff with a PhD	16,2	19,4	19,9	22,1	22,2	23,5	24,5	25,3
% male staff with a PhD	28,0	33,0	32,1	33,8	34,7	35,2	36,2	36,4
% African staff with a PhD	13,4	15,0	15,7	17,8	18,7	19,8	21,2	21,6
% coloured staff with a PhD	13,8	18,0	19,0	20,2	22,0	21,5	22,9	25,2
% Indian staff with a PhD	17,5	18,9	19,6	20,3	23,6	24,9	27,0	27,9
% African, coloured and Indian staff with a PhD	14,3	16,2	17,0	18,6	20,1	21,0	22,5	23,2
% African, Coloured and Indian female staff with a PhD	8,9	10,1	11,1	12,8	13,9	14,9	16,1	17,1
% African, coloured and Indian male staff with a PhD	18,0	20,6	21,2	22,6	24,4	25,3	27,1	27,7
% white staff with a PhD	28,6	34,0	32,4	35,1	35,5	36,2	37,2	37,7
% white female staff with a PhD	20,6	25,0	24,7	27,5	27,3	29,0	30,2	31,1
% white male staff with a PhD	35,0	41,2	38,6	41,6	42,9	42,9	43,9	44,1

	2005	2006	2007	2008	2009	2010	2011	2012
% staff aged 20-29 with a PhD	3,1	3,0	3,2	3,4	3,4	3,7	3,7	2,9
% staff aged 30-39 with a PhD	14,1	17,5	18,0	19,9	20,5	22,5	23,9	23,9
% staff aged 40-49 with a PhD	27,1	31,7	30,8	32,4	33,5	33,6	35,1	36,2
% staff aged 50-59 with a PhD	37,8	42,3	39,6	42,2	43,5	42,9	44,1	44,7
% staff aged 60+ with a PhD	41,0	46,2	43,6	45,7	46,7	46,8	47,0	49,8

Source: DST Research Information Management System database

Table 2 shows that science, engineering and technology (SET) graduations increased from 27,9% of total graduations in 2010 to 29,4% in 2013, with a higher proportion at undergraduate level (30,1%) than at postgraduate level (27,7%).

Table 2: Higher education SET graduations

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Number of total SET graduations	33 506	33 542	36 429	39 306	41 511	42 760	46 099	48 848	53 176	55 574
% undergraduate SET graduations	28,9	29,3	29,5	29,9	28,7	27,6	28,6	29,6	30,1	30,6
% postgraduate SET graduations	24,9	26,1	26,4	27,6	29,4	28,7	28,9	29,1	27,7	28,3
% total SET graduations	27,8	28,5	28,8	29,4	28,9	27,9	28,7	29,4	29,4	30,0
% female SET graduations	48,9	48,7	49,2	49,5	49,3	49,1	49,4	49,4	50,0	50,2

Source: Higher Education Information Management System

From a transformation perspective, in 2013, for the first time during the post-apartheid era, South African universities awarded more SET doctoral degrees to Africans than to white students (461 Africans compared to 452 whites). This represents a significant transition point and a key milestone in reducing inequality.

When compared to SET enrolments, SET graduations are still low, although the ratio has been improving (from 17,4% in 2011 to 18,7% in 2013). Between 2004 and 2013 there was an annual growth rate of 9,3% for doctoral degrees in SET, which is higher than the annual growth rate for all doctoral graduations (7,5%). This increase in the number of emerging researchers in SET is the result of several government initiatives aimed at increasing the number of SET doctoral graduates. For instance, the National Research Foundation, through the South African Research Chairs Initiative and the Thuthuka Programme, has doubled the number of postgraduate students they support. International benchmarking shows that the percentage of SET graduations in South Africa (30%) is much lower than that of industrialised countries such as South Korea (46,6%), the United Kingdom (39,0%), Japan (35,9%), Russia (35,1%) and the United States of America (34,4%).

8.11 STI Infrastructure

Although both the National Infrastructure Plan and the NDP identify a need to maintain old infrastructure and to invest in new infrastructure, South Africa faces challenges in the delivery, expansion and roll-out of research and innovation infrastructure. These include the inadequate attention paid to the diversity of existing infrastructure in the NSI (Marcus et al., 2013), inadequate funding, the high domestic cost of broadband internet connectivity, and failure by many public entities to spend their infrastructure budgets or maintain their infrastructure effectively.

Providing research infrastructure across the innovation value chain

MeerKAT/SKA radio astronomy telescope

On 25 May 2012, the SKA Organisation announced that Africa (South Africa and eight African partner countries) and an Australia-New Zealand consortium would share the hosting 1f the SKA. South Africa has also attracted other radio astronomy initiatives from abroad, namely the C-Band All Sky Survey and the Precision Array for Probing the Epoch of Reionization.

National preclinical infrastructure facilities

The newly established national preclinical platform at North-West University consists of a world-class facility capable of conducting preclinical work in accordance with good laboratory and manufacturing practices. These two international quality standards are necessary for drug and vaccine production. A key priority will be to get the facility accredited good laboratory and manufacturing practices, which will automatically give the facility international standing. The American multinational pharmaceutical company

Pfizer has signed an agreement to perform some of the required rodent research once the facility has been fully accredited.

Biotechnology service platforms

Five new technology service platforms will be established in the next five years, including a bioinformatics service platform to service the life science sector, and agro-innovation hubs to provide R&D and connect researchers and rural communities.

High-end infrastructure

According to the DST Strategic Plan, the DST intends to increase the rate of development and the deployment of low-carbon technologies in the South African market. The work done through existing and new RDI initiatives should lead to pilot plants in the fields of lignocellulose, battery cell manufacturing, high-temperature membrane electrode assembly, algae-based biofuels, lithium ion battery precursor materials, metal hydrides, low temperature membrane electrode assembly catalysts and multipurpose centrifuge.

Cyberinfrastructure

Broadband capacity

According to the DST Strategic Plan the roll-out of a gigabit per second (Gbps) capacity broadband network through the South African National Research Network will continue to enable data transmission to all research and academic institutions. The national backbone and its points of presence will be upgraded to increase the average bandwidth per South African National Research Network site per year from 3 500 megabits per second (Mbps) in 2014/15 to 8 000 Mbps in 2018/19. The achievement of this target will also increase the number of network users, contributing to the goal of expanding access to communication technology (SIP 15) to 100% broadband penetration by 2020.

International capacity will also be increased from 10 Gbps to more than 100 Gbps. This is necessary for the successful implementation of national interest projects such as the MeerKAT/SKA project, the Southern African Large Telescope, the African Very Long Baseline Interferometry Network and the Big Data Project, and will allow researchers to participate in competitive research.

Data storage and management

Two petabytes of data storage, shared between the primary Centre for High Performance Computing site in Cape Town and the disaster recovery site at the CSIR in Pretoria, are available through the Data Intensive Research Infrastructure South Africa (DIRISA) initiative. This capacity is used to host a CERN (European Organisation for Nuclear Research) tier 2 data node, an international astronomy data mirror site and data from the Applied Centre for Climate and Earth Systems Science. To store, curate and manage the growing data from these projects and new ones, especially the radio-astronomy data that will soon be generated at MeerKAT, it has become necessary to expand the DIRISA initiative.

Towards the long-term provision of research infrastructure

The South African Research Infrastructure Roadmap

According to the DST Strategic Plan, the South African Research Infrastructure Roadmap is expected to guide the strategic development, acquisition and deployment of research infrastructure as a necessary enabler f1or RDI. It will consist of at least 10 research infrastructures with a focus on six scientific domains: humans and society; health, biological and food security; Earth and the environment; energy; materials and manufacturing; and physical sciences and engineering. Over the next five years a significant portion of infrastructure investment will be used to implement the roadmap. The DST will approach the National Treasury for a dedicated research infrastructure fund to support the implementation.

A national integrated cyberinfrastructure system

In 2013, the DST commissioned a study to develop a framework for a national integrated cyberinfrastructure system, which will help South Africa maximise impact, sustainability and effective management of its cyberinfrastructure. The recommendations will be implemented over the next five years. In addition to the three existing components of the cyberinfrastructure system (the South African National Research Network, the Centre for High Performance Computing and Data Intensive Research Infrastructure South Africa initiative) a fourth pillar for skills and training services will be formally established.

8.12 International partnerships

International partnerships in STI policy and advice represent a growing share of scientific and technical activities worldwide. Often, these offer developing countries opportunities to acquire knowledge and build a science and technology base for local development, as well as to share data and exchange ideas, encouraging greater creativity (Wagner, 2006). The DST is not only entrusted with the overall coordination of the NSI, but is also responsible for facilitating and overseeing South Africa's scientific and technological cooperation with other countries and international organisations.[4] The country has effective science and technology collaborations with, for example, Japan, the European Union, the Organisation for Economic Cooperation and Development, BRICS and the African Union. The DST is also facilitating the creation of an African network of science advice for governments in Africa, which will provide a platform for sharing ideas and experience on the development of sound STI advice. Several of South Africa's science councils, advisory bodies, and publicly funded research and technology organisations have dedicated teams working on international cooperation. The 2013/14 financial year saw the creation of more than 2 000 international cooperation opportunities for the South African NSI (DST, 2014).

The benefits of South Africa's involvement in the Africa Union's science and technology activities, including those related to the New Partnership for Africa's Development, have been less obvious, in spite of some successes, such as the African Science and Technology Indicators Initiative (DST, 2012). Greater effort is needed to ensure that South Africa derives more from partnerships of this nature.

8.13 Summary of challenges

Since the adoption of the White Paper on Science and Technology, the NSI has made progress in a number of areas. However, the following challenges still need to be addressed:

- The creation of a responsive, coordinated and efficient NSI with robust planning, monitoring and evaluation capacity.
- The development and strengthening of regional and provincial innovation systems and capabilities to meet community and industry demands.
- The expansion and transformation of human resources for STI.
- The commercialisation of the results of public research and development.
- The improvement of knowledge generation and diffusion.
- The provision and maintenance of state-of-the-art STI infrastructure.
- Water, energy and food security.
- The financing of the system, especially as regards increasing private-sector investment in RDI.
- The uptake of locally developed technologies by government.

4 http://www.gov.za/about-sa/science-technology

Like other national systems of innovation, South Africa's NSI also has to deal with the following global challenges:

- The effects of a fiscally constrained environment on STI and the need to demonstrate how public investment in STI benefits the economy and society.
- Better impact indicators and impact assessments required.
- How to strengthen the innovation capacity of small and medium enterprises.
- The rapid digitisation of the world through the development of information and communication technologies, open science and big data. Infrastructure, human capital, access and good governance, among other things, will be required.
- The globalisation and growing complexity of STI, which requires greater and interdisciplinary cooperation.
- The balance between basic research and applied research.
- The role of STI in creating sustainable and inclusive growth.
- Growing societal engagement with science and technology, and the need to ensure public trust.
- The improvement of scientific advisory mechanisms.
- The international coordination of scientific advice in times of crisis.

As part of the NSI, NACI therefore needs to reflect on its role and contribution towards addressing some of the above challenges.

9. STRATEGIC OUTCOME-ORIENTED GOALS

In the context of recent trends and challenges, NACI has adopted the following four strategic outcome-oriented goals as the basis for its 2016-2021 Strategic Plan:

- To learn from previous experience to improve efficacy, relevancy and ensure evidence-based, confidential and timely advice to the Minister of Science and Technology and, through the Minister, Cabinet. Achieving this goal will require better data and information analysis, more coordination and improved scientific advisory mechanisms. Building internal capability and exploiting new and established external networks will be critical.
- To contribute to the building of NSI monitoring, evaluation and learning capability in order to assess the health of the NSI and its contribution to sustainable and inclusive development. This goal is intended to partly support government to learn from experience and bolster policy performance over time, and help ensure that government action is meets its objectives efficiently at the lowest possible cost (OECD, 2015). To achieve this goal, NACI will need the capacity to ensure that STI indicators needed for monitoring, evaluation, planning and management (both quantitative and qualitative) are available and analysed (DST, 2012).
- To contribute to the building of a well-coordinated, responsive and effective NSI. NACI will be seeking to explore and propose solutions to the long-standing STI policy questions of coordination, prioritisation, financing, size and shape, human resources, and knowledge production and diffusion, among others.
- Transforming NACI into a smart, efficient and learning organisation. For this, current internal operational inefficiencies will have to be addressed, the quality and turnaround time for the production of advice enhanced, knowledge management and communication improved, and the benefits of digitisation optimally exploited. Skills, knowledge and competency development will be critical.

By pursuing these goals, NACI will be implementing its primary legislative mandate and contributing to meeting NDP expectations related to the NSI (as articulated above). Indicators have been formulated for each of the goals and are captured in Table 3 below.

Table 3: Strategic outcome-oriented goals

Strategic outcome-oriented goal 1	Improved efficiency and effectiveness in generating advice (proactive and reactive)
Goal statement	To learn from previous experience to improve efficacy, relevance and ensure evidence-based, confidential and timely advice to the Minister of Science and Technology and, through the Minister, Cabinet
Proxy indicators	Number of advice letters submitted to the Minister of Science and Technology

Strategic outcome-oriented goal 2	Performance of the NSI assessed
Goal statement	To contribute to the building of NSI monitoring, evaluation and learning capability in order to assess the health of the NSI and its contribution to sustainable and inclusive development
Proxy indicators	▪ Number of NSI monitoring and evaluation reports[1] ▪ Number of state of STI reports produced[2] ▪ Successful implementation of national STI information portal

Strategic outcome-oriented goal 3	Governance and planning of the NSI
Goal statement	To contribute to the building of a well-coordinated, responsive and effective NSI
Proxy indicators	▪ Ministerial approval secured for a high-level framework for a new STI decadal plan ▪ Analytical contributions to support NSI governance, coordination and planning

Strategic outcome-oriented goal 4	To transform NACI into a smart, efficient and learning organisation
Goal statement	Transforming NACI into a smart, efficient and learning organisation
Proxy indicators	▪ Approval of internal corporate governance system ▪ Reduced turnaround times ▪ Communication plan implemented ▪ Improved operational efficiency ▪ Knowledge management system approved and implemented ▪ Improved employee retention and satisfaction ▪ Enhanced knowledge management

ANNUAL PERFORMANCE PLAN

By their nature strategic outcome-oriented goals are broad and focused on the long term. Short to medium-term objectives that can be pursued, implemented and tracked are therefore needed. The NACI objectives are articulated in Table 4, which also provides indicators and baselines.

Table 4: NACI's programme performance indicators and annual targets for the 2016/17 financial year

STRATEGIC GOAL 1: TO LEARN FROM PREVIOUS EXPERIENCE TO IMPROVE EFFICACY AND ENSURE EVIDENCE-BASED, CONFIDENTIAL AND TIMELY POLICY ADVICE TO THE MINISTER OF SCIENCE AND TECHNOLOGY AND, THROUGH THE MINISTER, CABINET									
OUTPUT	**PERFORMANCE INDICATOR**	**STRATEGIC TARGET**	**AUDITED/ACTUAL PERFORMANCE**			**ESTIMATED PERFORMANCE**	**MEDIUM-TERM TARGETS**		
			2012/13	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**
Strategic Objective 1: To provide evidence-based advice on STI matters to the Minister of Science and Technology and, through the Minister, Cabinet, on request or on NACI's own initiative									
STI advice	Number of STI advice documents submitted to the Minister of Science and Technology	9 STI advice documents submitted to the Minister of Science and Technology by 31 Mar. 2019	7 STI advice documents submitted to the Minister of Science and Technology by 31 Mar. 2013	8 STI advice documents submitted to the Minister of Science and Technology by 31 Mar. 2014.		3 rapid advisory briefs on energy, water and food security approved by the Council and submitted to Minister by 30 March 2016	3 STI advice documents submitted to the Minister of Science and Technology by 31 Mar. 2017	3 STI advice documents submitted to the Minister of Science and Technology by 31 Mar. 2018	3 STI advice documents submitted to the Minister of Science and Technology by 31 Mar. 2019

STRATEGIC GOAL 2: TO CONTRIBUTE TO THE BUILDING OF NSI MONITORING, EVALUATION AND LEARNING CAPABILITY IN ORDER TO ASSESS THE HEALTH OF THE NSI AND ITS CONTRIBUTION TO SUSTAINABLE AND INCLUSIVE DEVELOPMENT									
OUTPUT	**PERFORMANCE INDICATOR**	**STRATEGIC TARGET**	**AUDITED/ACTUAL PERFORMANCE**			**ESTIMATED PERFORMANCE**	**MEDIUM-TERM TARGETS**		
			2012/13	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**
Strategic Objective 2: To assess the performance of the NSI									
State of STI reports	Number of state of STI reports produced	2 state of STI reports finalised by 31 Sept. 2019	New target	New target	New target	The Innovation Scorecard Framework	State of STI report finalised by 31 Mar. 2017	No target	State of STI report finalised by 31 Mar. 2019
NSI monitoring and evaluation (M&E) reports[7]	Number of NSI M&E reports produced	8 NSI M&E reports finalised by 28 Mar. 2019		2013 South African Science and Technology Indicators booklet	2014 South African Science, Technology and Innovation Indicators booklet	New target	2 NSI M&E reports finalised by 28 Mar. 2017	3 NSI M&E reports finalised by 28 Mar. 2018	3 NSI M&E reports finalised by 28 Mar. 2019

7 Based on a number of studies to be conducted, such as the review of the impact of public investments in STI; STI human resources development; an analysis of progress towards a knowledge-based economy; an analysis of progress towards transformation within the NSI; an impact assessment of the contribution of STI to sustainable and inclusive socio-economic development, etc.

STRATEGIC OBJECTIVE 3: TO DEVELOP AN STI CENTRAL DATA AND INFORMATION REPOSITORY FOR PUBLICLY FINANCED DATA TO PROVIDE EASY ACCESS TO KNOWLEDGE, LEARNING RESOURCES, INDICATORS AND COMMUNITIES OF PRACTICE ON THE DESIGN, IMPLEMENTATION AND EVALUATION OF INNOVATION POLICIES									
OUTPUT	**PERFORMANCE INDICATOR**	**STRATEGIC TARGET**	**AUDITED/ACTUAL PERFORMANCE**			**ESTIMATED PERFORMANCE**	**MEDIUM-TERM TARGETS**		
			2012/13	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**
National STI information portal	Successful implementation of national STI information portal	Fully functional national STI information portal by 31 Mar. 2019	New target	New target	New target	National STI information portal framework	National STI information portal developed and launched by 30 Nov. 2016	Monitoring and documentation of national STI information portal functionality by 31 Mar. 2018	Full-scale roll-out of national STI information portal innovation portal by 31 Mar. 2019
STI data-sharing agreements between NACI and stakeholders	Number of memoranda of understanding (MoUs) on sharing of data and information	8 MoUs on sharing of data and information between NACI and stakeholders (data) by 31 Mar. 2019	New target	New target	New target	New target	2 MoUs on sharing of data and information between NACI and stakeholders (data) by 31 Mar. 2017	3 MoUs on sharing of data and information between NACI and stakeholders (data) by 31 Mar. 2018	3 MoUs on sharing of data and information between NACI and stakeholders (data) by 31 Mar. 2019

STRATEGIC GOAL 3: TO CONTRIBUTE TO THE BUILDING OF A WELL-COORDINATED, RESPONSIVE AND EFFECTIVE NSI									
OUTPUT	PERFORMANCE INDICATOR	STRATEGIC TARGET	AUDITED/ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
			2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Strategic Objective 4: To contribute towards improving NSI coordination and planning									
A high-level framework for an STI decadal plan	Ministerial approval secured for high-level framework for a new STI decadal plan.	A high-level framework for an STI decadal plan submitted to the Minister of Science and Technology 30 June. 2016	New target	New target	New target	1 feedback report on the White Paper review process submitted to the Minister of Science and Technology by 31 Mar. 2016	A high-level framework for an STI decadal plan submitted to the Minister of Science and Technology by 30 June. 2016	No target	No target
Analytical contributions in support of NSI governance, coordination and planning	Analytical contributions in support of NSI governance, coordination and planning completed	Analytical contributions in support of NSI governance, coordination and planning completed by 31 Mar. 2019		A national innovation framework for a refocused NSI	A foresight framework for STI	New target	Analytical contributions in support of NSI governance, coordination and planning completed by 31 Mar. 2017	Analytical contributions in support of NSI governance, coordination and planning completed by 31 Mar. 2018	Analytical contributions in support of NSI governance, coordination and planning completed by 31 Mar. 2019

STRATEGIC GOAL 4: TRANSFORMING NACI INTO A SMART, EFFICIENT AND LEARNING ORGANISATION									
OUTPUT	PERFORMANCE INDICATOR	STRATEGIC TARGET	AUDITED/ACTUAL PERFORMANCE			ESTIMATED PERFORMANCE	MEDIUM-TERM TARGETS		
			2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Strategic Objective 5: To ensure the efficient and effective provision of administrative, financial, technical and professional corporate services, among others, to support the discharge of the core mandate of NACI									
Communication plan[8]	Communication plan implemented	Communication plan implemented by 31 Mar. 2019	New target	New target	New target	New target	Communication plan implemented by 31 Mar. 2017	Communication plan implemented by 31 Mar. 2018	Communication plan implemented by 31 Mar. 2019
Internal corporate governance system[9] approved and implemented	Approval of internal corporate governance system	Internal corporate governance system approved and implemented by 31 Mar. 2019	New target	New target	New target	New target	Internal corporate governance system (Council charter and self-evaluation tool) developed and approved by 30 Nov. 2016	Internal corporate governance system (Council charter and self-evaluation tool) implemented by 31 Mar. 2017	Internal corporate governance system (Council charter and self-evaluation tool) implemented by 31 Mar. 2017
Knowledge management system	Knowledge management system approved and implemented	Knowledge management system and approved and implemented by 31 Mar. 2019	New target	New target	New target	New target	Knowledge management system approved by 30 Nov. 2016	Knowledge management system implemented by 31 Mar. 2018	Knowledge management system implemented by 31 Mar. 2019

8 Including regular feature articles and a series in the Mail & Guardian, Sunday Independent and relevant specialist publications like Engineering News; one-one-one interviews in the print media, on radio (commercial and public) and on television (e.g. Morning Live on SABC 2, Sunrise on e.tv, and Business Day Television); use of community media (print, radio and television) to reach a broader South African audience; a media round-table held to coincide with a council meeting so that NACI's work can be discussed with the media; use of communication channels (NACI and DST website, Government Communication and Information System (GCIS) noticeboard; use of social media (Twitter, Facebook, LinkedIn, YouTube, etc.);public lectures and round tables on rapid advice.

9 Refers to NACI Council charter and self-evaluation tool.

10. QUARTERLY TARGETS FOR 2016/17

Table 5 presents programme performance indicators and specific quarterly targets for 2016/17 budget, which are based on strategic goals and objectives.

Table 5: NACI programme's quarterly targets for 2016/17 budget

STRATEGIC GOAL 1: TO LEARN FROM PREVIOUS EXPERIENCE TO IMPROVE EFFICACY AND ENSURE EVIDENCE-BASED, CONFIDENTIAL AND TIMELY POLICY ADVICE TO THE MINISTER OF SCIENCE AND TECHNOLOGY AND THROUGH, THE MINISTER, CABINET						
PERFORMANCE INDICATOR	**REPORTING PERIOD**	**ANNUAL TARGET**	**QUARTERLY TARGETS**			
			1ST	**2ND**	**3RD**	**4TH**
Strategic Objective 1: To provide evidence-based advice on STI matters to the Minister of Science and Technology and, through the Minister, Cabinet, on request or on NACI's own initiative						
Number of STI advice submitted to the Minister of Science and Technology	Quarterly	3 STI advice submitted to Minister of Science and Technology by 31 Mar. 2017	Planning and data analysis by 30 June 2016		1 STI advice by 20 December 2016	2 STI advice by 31 Mar. 2017

STRATEGIC GOAL 2: TO CONTRIBUTE TO THE BUILDING OF NSI MONITORING, EVALUATION AND LEARNING CAPABILITY IN ORDER TO ASSESS THE HEALTH OF THE NSI AND ITS CONTRIBUTION TO SUSTAINABLE AND INCLUSIVE DEVELOPMENT						
PERFORMANCE INDICATOR	**REPORTING PERIOD**	**ANNUAL TARGET**	**QUARTERLY TARGETS**			
			1ST	**2ND**	**3RD**	**4TH**
Strategic Objective 2: The performance of the NSI assessed						
Number of state of STI reports produced	Half-yearly	1 state of STI report finalised by 31 Mar. 2017	No target	Data collection and analysis by 30 Sept. 2016	Drafting of state of STI report by 30 Sept. 2016	State of STI report finalised by 31 Mar. 2017
Number of NSI M&E reports	Quarterly	2 NSI M&E report finalised by 28 March 2017	Planning and consultation with relevant stakeholders by 30 June 2016	Data collection and analysis by 30 Sept. 2016	Drafting of the NSI M&E reports	2 NSI M&E reports finalised by 31 Mar. 2017
Strategic Objective 3: To develop an STI central data and information repository for publicly financed data to provide easy access to knowledge, learning resources, indicators and communities of practice on the design, implementation and evaluation of innovation policies						
Successful implementation of national STI information portal	Half-yearly	National STI information portal developed and launched by 30 Nov. 2016	No target	Coding and testing, and sign-off of the national STI information portal by 30 Sept. 2016	Successful launch of national STI information portal by 30 Sept. 2016	Functional National STI information portal by 31 Mar. 2016
Number of memoranda of understanding on sharing of data and information reached between NACI and stakeholders (data)	Quarterly	2 memorandum of understanding on sharing of data and information reached between NACI and stakeholders (data)	No target	1 MoU on sharing of data and information between NACI and stakeholders (data) by 30 Sept. 2016	2 MoUs on sharing of data and information between NACI and stakeholders (data) by 31 Dec. 2016	No target

STRATEGIC GOAL 3: TO CONTRIBUTE TO THE BUILDING OF A WELL-COORDINATED, RESPONSIVE AND EFFECTIVE NSI						
PERFORMANCE INDICATOR	**REPORTING PERIOD**	**ANNUAL TARGET**	**QUARTERLY TARGETS**			
			1ST	**2ND**	**3RD**	**4TH**
Strategic Objective 4: To contribute towards improving NSI coordination and planning						
Ministerial approval secured for high-level framework for a new STI decadal plan.	Quarterly	A high-level framework for an STI decadal plan submitted to the Minister of Science and Technology 30 Nov. 2016	First phase of the development of high-level framework for STI decadal plan completed by 30 June 2016	Second phase of the development of high-level framework for STI decadal plan completed by 30 Sept. 2016	High-level framework for STI decadal plan submitted to the Minster of Science and Technology by 30 Nov. 2016	No target
Analytical contribution in support of NSI governance, coordination and planning completed	Quarterly	Analytical contribution in support of NSI governance, coordination and planning completed	No target	Data collection, analysis and consultation by 31 July 2016	Draft analytical contribution in support of NSI governance, coordination and planning by 30 Nov. 2016	Analytical contribution in support of NSI governance, coordination and planning completed by 28 Feb. 2017

STRATEGIC GOAL 4: TRANSFORMING NACI INTO A SMART, EFFICIENT AND LEARNING ORGANISATION						
PERFORMANCE INDICATOR	**REPORTING PERIOD**	**ANNUAL TARGET**	**QUARTERLY TARGETS**			
			1ST	**2ND**	**3RD**	**4TH**
Strategic Objective 5: To ensure efficient and effective provision of corporate services such as administrative, financial, technical and professional, to support the discharge of the core mandate of NACI						
Communication plan implemented	Quarterly	Communication plan implemented by 31 Mar. 2017	Communication plan refined and implemented by 30 June 2016	Communication plan implemented by 30 Sept. 2016	Communication plan implemented by 31 Dec. 2016	Communication plan implemented by 31 Mar. 2017
Approval of internal corporate governance system	Quarterly	Internal corporate governance system (Council charter and self-evaluation tool) developed and approved by 30 Nov. 2016	Planning and data analysis by 30 June 2016	Drafting of the internal corporate governance system (Council charter and self-evaluation tool) developed and approved by 31 Aug. 2016	Internal corporate governance system (Council charter and self-evaluation tool) finalised by 30 Nov. 2016	No target
Knowledge management system developed and implemented	Half-yearly	Knowledge management system developed and implemented by 30 Nov. 2016	No target	No target	Knowledge management system developed and implemented by 30 Sept. 2016	No target

11. RESOURCE CONSIDERATIONS

11.1 Human resource requirements

A process will be undertaken to assess NACI's fitness for purpose on the basis of the new vision and goals set out in this Strategic Plan. This process is expected to produce a new organisational structure and articulate NACI's knowledge and skills requirements.

11.2 Expenditure estimates

Table 3 below presents a summary of 2016/17 expenditure estimates for the total budget of R18 967 000, comprising compensation of employees (R10 432 000) and goods and services (R8 535 000).

Table 1: NACI expenditure estimates

PROGRAMME	AUDITED OUTCOMES			ADJUSTED/ APPROPRIATION	MEDIUM TERM EXPENDITURE ESTIMATE		
R'000	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Compensation of Employees	7 565	6 849	10 034	10 308	10 432	11 025	11 610
Goods and Services	7 979	5 643	8 223	8 434	8 535	9 021	9 499
TOTAL	**15 544**	**12 503**[6]	**18 257**	**18 742**	**18 967**	**20 046**	**21 109**

10 At the beginning of the financial year 2013/2014 the allocated budget was R15 503 000, as reflected in the Annual Performance Plan for 2013/2014, but at the end of the financial year funds were shifted and NACI was left with R12 503 000 as reported in the 2013/2014 Annual Report.

LINKS TO OTHER PLANS

Listed below are some key public policies and strategies relevant to the National Advisory Council on Innovation's work over the next five years.

- White Paper on Science and Technology.
- National Development Plan (Vision 2030).
- Nine-Point Plan.
- New Growth Path.
- Industrial Policy Action Plan.
- Ten-Year Innovation Plan.
- National Infrastructure Plan.
- Medium Term Strategic Framework (MTSF).

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Notes

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