



ANNUAL PERFORMANCE PLAN 2019/2020

INNOVATION FOR A BETTER FUTURE



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA




NATIONAL ADVISORY COUNCIL ON INNOVATION



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Foreword

On behalf of the National Advisory Council on Innovation (NACI), and in the context of policy reflection and renewal in South Africa, I am honoured to present NACI's 2019/20 Annual Performance Plan (APP). Nationally, government is reviewing what it has achieved and not achieved since 1994, with the aim of guiding the enhancement of policy to address the persistent challenges of unemployment, inequality and poverty.

NACI is carrying out its legislative mandate and functions in terms of its 2016-2021 Strategic Plan. The Strategic Plan identifies strategic outcome-oriented goals to contribute to the realisation of the National Development Plan (Vision 2030) and the science, technology and innovation (STI) policy mix (the 1996 White Paper on Science and Technology, 2002 National Research and Development Strategy and 2008 Ten-Year Innovation Plan). Recently, the Council completed a review of the 1996 White Paper on Science and Technology, including a performance analysis of the national system of innovation (NSI) over a 20-year period, and submitted this as input into the new White Paper on STI.

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NACI will continue to improve the quality, relevance and efficacy of its advice to the Minister of Science and Technology and, through the Minister, to the Cabinet. It generates advice proactively or at the behest of the Minister of Science and Technology. In thinking about advice, the Council recognises that it is important to focus on both the foundations of STI (disciplines or knowledge domains, infrastructure and human resources) and the role of STI in addressing the challenges of education, health, food security and global change in a sluggish economy. The Council sees access to good quality data, analytical capability, strong partnerships and healthy relationships with recipients of advice as critical. Some of NACI's strengths include the ability to mobilise NSI stakeholders and access local and international experts to complement its limited resources.

NACI will build on its previous efforts to strengthen planning, monitoring and evaluation capability in the national system of innovation (NSI). Working with partners, the Council will improve phase 1 and develop phase 2 of the National STI Information Portal, and will develop a monitoring and evaluation framework and system for the NSI. The latter will take into consideration the new White Paper on STI, the new decadal plan, the reviews of the National Research and Development Strategy and Ten-Year Innovation Plan, and the foresight exercise currently under way.

The Council values the importance of good corporate governance, communication and international engagement, and we are confident that NSI role players and South African citizens will benefit from the work NACI has planned for the 2019/20 financial year.



Derrick Swartz
Chairperson: NACI

Statement of responsibility

It is hereby certified that this APP was developed by the NACI Secretariat under the guidance of the NACI Council and Chairperson, and in line with NACI's 2016-2021 Strategic Plan. It accurately reflects NACI's performance targets, based on the resources made available in the 2019/20 budget.

Derrick Swartz
Chairperson (NACI)

Signature 


Ms Pretty Makukule
Chief Financial Officer (DST)

Signature 

Dr Mlungisi Cele
Acting Head (NACI)

Signature 

Approved by:
Minister MT Kubayi-Ngubane
Executive Authority

Signature 



Part A: Strategic Overview

The following sections present a strategic overview of NACI. It captures the vision, mission, values and legislative mandate of the organisation, including information on performance delivery and the institutional environment.

1. VISION

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

2. MISSION

To produce evidence-based advice for the Minister of Science and Technology and, through the Minister, Cabinet, on science, technology and innovation matters through 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 Advisory Council on Innovation Act, 1997 (Act No. 55 of 1997), provides the mandate for NACI. The Act mandates NACI to advise the Minister of Science and Technology and, through the Minister, the 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 sphere.

4.1 Constitutional mandate

There are no specific constitutional provisions for NACI.

4.2 Relevant court rulings

None.

5. UPDATED SITUATIONAL ANALYSIS

NACI performance environment

The National Advisory Council on Innovation evolved in a particular context, characterised by negotiated political transition (the Government of National Unity and a fledgling democracy), increasing globalisation, and the global economy driven by knowledge, innovation and information. Over the past 25 years, the South African economy has been facing dual challenge of (1) integrating itself into the competitive arena of international production and finance; and (2) reconstructing domestic social and economic relations to eradicate and redress the inequitable patterns of ownership, wealth, and social and economic practices shaped by segregation and apartheid.

A number of trends continue to impact on the ability of South Africa to address this dual challenge. These trends (a) the 2030 Sustainable Development Goals (SDGs); (b) the Paris Declaration on climate change; (c) global and local societal or grand challenges – the effects of the global economic crisis, a sluggish economy, unemployment, poverty and inequality; (d) water scarcity, global change, energy, food security, loss of topsoil, and diseases like HIV and Aids; (e) a very different set of scenarios for Africa development; (f) dramatic changes in the world's consumption and production patterns; (g) the growing momentum of digitisation; (h) the fourth industrial revolution; and (i) big data, and open science. In 2017, NACI conducted deeper analysis of select trends and submitted detailed report to the Department of Science and Technology.

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The dual challenge and emergent trends necessitated macroeconomic policy reforms through the Reconstruction and Development Programme, the Growth, Employment and Redistribution Strategy, the Accelerated and Shared Growth Initiative for South Africa, the Industrial Policy Action Plan, the New Growth Path and the National Development Plan (NDP). However, the role and contribution of STI to economy and society has gradually been recognised.

The critical task for NSI actors is to develop a better understanding of these challenges and their implications on STI policy and the system in general.

The relationship between the National Development Plan and the national system of innovation

The 2011 National Development Plan (NDP) highlights the centrality of science, technology and innovation (STI) in creating sustainable socio-economic development and addressing societal challenges such as education, health, food security, water shortages and climate change. The difference between countries that are able to tackle poverty effectively by growing and developing their economies, and those that cannot, is the extent of their ability to grasp and apply insights from STI and use them creatively (NDP, 2011).

The NDP acknowledges that economic development is a longer-term project and that innovation should grow in importance over time. In the first phase (2012-2017), the focus was to be on “intensifying research and development spending, emphasising opportunities linked to existing

industries". In the second phase (2018-2023), the "country should lay the foundations for more intensive improvements in productivity", and "innovation across state, business and social sectors should start to become pervasive". As the country approaches 2030, "the emphasis should be on consolidating the gains of the second phase, with greater emphasis on innovation, improved productivity, more intensive pursuit of a knowledge economy and better utilisation of comparative and competitive advantages in an integrated continent".

The NDP is clear that achieving a competitive and sustainable economy will require a strong and effective national system of innovation (NSI), which must contribute to transformation. It views the NSI as the principal 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.

Having identified the potential contribution of the NSI to socio-economic development, the NDP proposes two actions for the NSI. First, a common overarching framework should be created to address pressing challenges in the NSI (involving the higher and further education systems, state-owned enterprises and private industries). The NSI should function in a coordinated manner with objectives that are aligned to national priorities. Second, the size and effectiveness of the NSI should be increased.

STI Policy Mandate

Brief outline of the STI policy mix

The post-apartheid government inherited a science and technology system designed to serve the interests of the white minority. Some of the system features were aptly summarised in the 2002 National Research and Development Strategy. These included the financial consequences of the termination of apartheid technology missions (such as military dominance on the subcontinent and energy self-sufficiency) by the apartheid government between 1990 and 1994. Second, the Southern Africa Development Community and sub-Saharan Africa faced strategic risks from a human, economic and security perspective. Other challenges included inadequate intellectual property legislation, fragmented governance structures, reduced levels of local private sector investment in R&D, the completely unrepresentative demographics of the science and technology system, inadequate access and employment of the majority of citizens (black people in general and African women in particular), and skewed human resource patterns, research capabilities, and STI infrastructures.

The 1996 White Paper on Science and Technology provided NACI with a broad policy mandate, introducing the concept of the NSI – 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 towards which South Africa continues to strive. Since the publication of the White Paper on Science and Technology (DACST, 1996), the national systems approach has become more accepted in South Africa in line with its wide adoption in many countries and international organisations. According to Lundvall (2007), two of the positive impacts have been firstly a reconsideration of policies for international competitiveness (of domestic economies), where the latter is now more focussed on improving output rather than reducing cost (such as through currency devaluation); and secondly a shift in policy circles from linear to interactive thinking of innovation, also referred to as a transition from science and technology policy to innovation policy (Lundvall and Borrás, 2005 (cited in RebelGroup South Africa, 2018)).

In 2002, the National Research and Development Strategy (NRDS) was published. The NRDS sought to contribute towards socio-economic development by focusing on a set of “technology” and “science missions”. The technology missions 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, and biodiversity, as well as in areas in which South Africa had a clear knowledge advantage, such as indigenous knowledge and deep mining.

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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 (TYIP) 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 TYIP 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; and becoming a world leader in climate science, and responding effectively to the multiple challenges associated with global and climate change.

The TYIP 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 TYIP 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.

Selected highlights

Since 2015, NACI has participated in the review of the NSI policy. It completed the review of 1996 White Paper on Science and Technology and performance analysis of the NSI in 2016 and 2017 respectively. These reviews contributed to the development of the new White Paper for STI. The Council is a process to comprehensively review the NRDS and TYIP whose outcome will contribute towards the crafting of the new decadal plan.

The 2016 and 2017 NACI led reviews noted that progress towards the attainment of the high level goals and requirements (as set out in the 1996 White Paper on Science and Technology), including the important issues of reducing unemployment, providing safety and security, and working towards environmental sustainability, has been limited. Important indicators across a range of components including life expectancy, employment and standard of education remain at low levels (World Bank, 2015).

The 2016 review further noted that although economic growth may have been consistent, it has certainly not been remarkable, with the Gross Domestic Product (GDP) increasing by between 2 to 3% annually over this period. Furthermore, based on the per capita data, economic growth has been minimal and highly exclusive. The labour market has been characterised by a shrinking of low-wage formal employment opportunities and higher earnings/better working conditions for white- and blue-collar workers. This divergence between conditions for unskilled vs skilled labour is an enduring feature of apartheid policies which specifically sought to establish and preserve high wages and protected incomes for the white minority. Furthermore post-1994 policies such as trade liberalisation and the promotion of a high-productivity growth path have favoured capital-intensive over labour intensive firms, resulting in rising real wages for the employed but higher levels of unemployment in 2014 compared to 1994.

One important mitigation factor counteracting this trend has been the increased payments of social grants, which have trebled in real terms since 1994 and now reach an estimated 17 million recipients from about 4 million in 1994. This development is recognised in the 2015 OECD report on the South African economy (OECD, 2015) which notes that:

1 “South Africa has made great progress in reducing absolute poverty by rolling out social grants for pensioners, the disabled and children. Access to education, housing, water, electricity and other services has been greatly broadened. As a result, well-being has increased substantially.”

The 2016 NACI review recognised that path dependence remains a key determinant in the economy with relatively little change in several aspects. The post-apartheid state acquired a system of actors, institutions and policies which had historically paid little attention to the needs of the poor (Mariotti and Fourie, 2014). Although the new state has performed well in several

¹<http://evaluations.dpme.gov.za>

respects including the management of knowledge, the ability to collect taxes, and the operation of a substantial welfare state, it has been deficient in development planning and implementation, and as a result largely ineffective as a developmental state. It has sustained a strong science and technology system, including several world-class universities, but has failed to prevent the erosion of its manufacturing sector or develop new medium- and high-technology industries with the result that the potential of innovation-led growth has been under-realised. Moreover key actors such as the economic elite have retained a powerful influence over policy to the extent that little changes to the distributional patterns of income have been possible.

The latter factor is central to this review and the proposed revision of innovation policy. Despite rising public investment in research and development, and by implication science and technology for innovation, outputs have been disappointing with limited growth in the key indicators such as patents and high technology exports. At a general level, this weak performance can be explained as a manifestation of the conflict between the demands of various constituencies, and in particular the fiscal tension between longer term policies/expenditure and shorter term welfare state programmes. The need to manage this tension was identified in the 2007 OECD review of the NSI which noted the imperative for the NSI to deliver tangible benefits to the poor in order to secure sustained political support for science, technology and innovation (OECD, 2007 cited in 2016 NACI).

Although innovation-led growth as a development strategy remains valid and is indeed a central principle of the National Development Plan, its implementation has been largely hindered by under-resourcing of business innovation, adverse labour market conditions, low levels of entrepreneurship and the slow response of the educational system to deliver human resources for a high-technology economy. All these issues will need to be resolved in the short term if significant progress towards a progressive and full employment economy is to be realised.

In respect of specific initiatives, the NACI reviews noted the following progress:

- a. The implementation of the White Paper has been successful in several areas. Namely, first, the introduction of the national system of innovation (NSI) framework that scoped a host of policy instruments and organisations that would contribute to the goal of harnessing science technology and innovation (STI) to sustainable socio-economic development.
- b. The establishment, building and strengthening of NSI actors and institutions (DST, NRF, TIA, NIPMO, SAASTA, SANSA, the SANReN roll out, the Microscopy Centre at NMMU, university Centres of Excellence and Centres of Competence, a pilot plant to produce foot and mouth disease vaccine, and facilities such as IIDMM at UCT; DDMRI at UKZN, the Wits Reproductive Health and HIV Institute, SALT, KAT-7 and MeerKAT) (NACI, 2017, 2016).
- c. The incorporation of STI policies and goals within other policies, strategies and plans (such as National Development Plan [NDP] and Industrial Policy Action Plan [IPAP]. Fourth, the broadening of participation in all sectors of the NSI (mainly through transformation). Fifth, the re-direction and improvement of research and development (R&D) within the universities/science councils. Sixth small but measurable progress in human resource development (NACI, 2017, 2016). The number of degrees awarded to African students has shown phenomenal increase and significant demographic shifts are occurring, though output is still short of employment equity goals (NACI, 2017, NACI, 2016).

- d. The public funding for STI activities has risen substantially in real terms since 1994, with funding in 2014 almost double the level twenty years previously led by the DST whose funding level has increased 900% since 2005/6. This funding has been heavily instrumental in maintaining the quality (in some cases the excellence) of the country's science and technology (S&T) institutions, including its top universities and science councils.
- e. Knowledge outputs, international collaboration and university participation rates (enrolments) have all increased substantially, suggesting that the knowledge creation aspect of the NSI is intact (NACI, 2017, 2016).
- f. South Africa research system has relatively done well in areas such as palaeontology, astronomy, mathematics, theoretical physics projects and health science (established very strong international links to governmental and multilateral donors and philanthropies). In climate change, South Africa has a voice in the structures of the IPCC, thereby recognising expertise in the fields of ecology, environmental science, water resources and modelling (NACI, 2017).
- g. Public sector innovation has yielded positive results including the development of the new portal for educator support, the system of social grants, and on-line tax collection. These innovations are essentially non-technological in character, with their execution depending upon the supply of skills from the higher education in general (NACI, 2017).
- h. Space science and technology enjoys the successes associated with KAT-7 and the first light event of MeerKAT. These projects demonstrate significant local expertise in signal detection and processing, and speak to the resilience of the telemetry sectoral system of innovation. DST support has been pivotal to this work (NACI, 2017).
- i. Considerable organizational innovation and change has taken place. For example, the Innovation Fund (IF) began life inside Department of Arts Culture Science and Technology (DACST). It then migrated to the NRF where it remained for a decade and grew an expert team, after which it was merged into TIA, there to be joined with the four BRICs. The IF had initially functioned through the mode of competitive thematic calls but became less focussed with time. In its later phase the IF also backed the Joule electric vehicle project into which some R450 million was invested before the project was abandoned. While the IF pioneered the concept of the 'living evaluator,' namely an expert who worked with each funded project during its life cycle, no authoritative post hoc evaluation of the value gained from the close to R 2 billion invested in the IF is in the public domain. Much organizational development occurred but the associated learning is in danger of being lost (NACI, 2017).
- j. Modest funding for pre-commercial stage R&D projects is available from the Department of Trade and Industry through the Technological Human Resources for Industry Programme (THRIP) and the Support Programme for Industrial Innovation (SPII). Both programmes have been subjected to recent external evaluation with SPII receiving strong praise despite some observed inefficiencies in the drawdown of funding. The THRIP has a long track record of bringing industry and the universities closer together and has served an important secondary role of easing the recruitment of promising researchers into the private sector.

The draft new White Paper on STI and its implications for NACI

The new White Paper is premised on the view that the South Africa's national system of innovation is relatively productive considering the challenges (which include its size, funding and governance, its racial, age and gender-skewed human resources, and its bias towards technological innovation).

The new White Paper also recognises that South Africa is part of a world in transition. Some of the features of this transition include growing unemployment, inequality, poverty, climate change, the hollowing of nation states through excessive contracting, a multipolar distribution of power in the world, new wars, megacities, growing migration, the ongoing effects of the 2008 global economic crisis (with another predicted in the near future), the post-truth approach and the rise of chauvinistic nationalism. The Sustainable Development Goals are a global agreement to address these challenges.

In South Africa, particular challenges include the legacy of colonialism and apartheid (including the land question), the burden of disease (such as HIV/Aids), youth unemployment, a sluggish economy, the erosion of agricultural land, water scarcity, the mismatch between education investments and outcomes.

The new White Paper proposes that an innovation culture should be pervasive, and that South Africa should see digitisation and the integration of the cyber and physical worlds (the Fourth Industrial Revolution), and its youthful population, as opportunities for finding solutions to global and national challenges. Therefore, the object of the draft new White Paper can be understood as transforming the national system of innovation into an inclusive, expanded, purposeful, self-learning and coordinated system that is responsive to economic, environmental and societal challenges.

The new White on STI envisages strengthened role and functions of NACI in the NSI. It encourages NACI to undertake systemic monitoring and evaluation (M&E), and to build NACI's internal capacity to carry out foresight exercises. The draft new White Paper on STI also proposes that NACI supports the biennial STI plenary (to be convened by the President) and Interministerial Committee on STI aimed at improving coordination and planning. The proposed changes are intended to enable NACI to fulfil its legislated mandate of providing government-wide advice.

In 2018, NACI completed an institutional review focusing on the period between 2009 and 2018. The review panel considered matters such as the recognition of the importance of NACI as an apex advisory structure for the NSI, and concerns about NACI's structural location and performance. In developing its final report, the review panel worked on the assumption that the new White Paper on STI would contain the changes to NACI proposed in the draft new White Paper. The Minister and NACI Council will engage and agree on the process and approach to implement both the new White Paper on STI proposals and institutional review recommendations. Part of this engagement will necessitate reflection on international experiences and evolution of NACI type STI advisory mechanisms as response to the changing and increasing demands for relevant and responsive policy advice.

Brief reflection on global advisory councils

NACI is part of global advisory councils community. In 2017, it hosted the 3rd Global Forum on National Advisory Councils. The Forum offers members an opportunity to share and learn from each other. The Global Forum of National Advisory Councils affirmed that science technology and innovation (STI) is undoubtedly one of the most influential drivers of sustainable and inclusive socioeconomic development and affects a nation on all levels. Changes are occurring at unprecedented speeds, which sometimes outpace society's ability to adapt and transform. This paradigm compels governments to re-evaluate their policy and redesign national systems to embrace the new era.

For its part, the Global Forum discussed among others, ways of enhancing efficacy of advice to government, the 4th industrial revolution, climate change, water-energy-food nexus, big data, financing and human resources for STI, governance, planning, monitoring and evaluation and creating STI ecosystems, STI and SMMEs, innovation and entrepreneurship. The Forum also dealt with STI policy developments including dealing with emergent concepts such as systems innovation and transformative change.

Internationally, national advisory councils differ from one country to another and evolve continuously. Internationally, national councils for STI are usually established based on three models, namely:

- a. planning and priority setting (for instance in Japan, Korea, China and Finland, but this function seems to be disappearing);
- b. advisory (in Austria, Canada, Denmark, Germany's Commission of Experts for Research and Innovation, Singapore, Switzerland, the United Kingdom and the United States); and
- c. coordination (sometimes in addition to the advisory model, in Finland, Germany's Innovationsdialog and Wissenschaftsrat, Japan, Korea and China).

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National advisory Councils experience numerous and diverse challenges. According to the Organisation for Economic Co-operation and Development (OECD), the planning and coordination models require "significant commitments of ministers' time by government as well as a willingness across political parties to see research and innovation as permanently central aspects of government policy. It is difficult for politicians to give up some of their autonomy and to participate in such arrangements." The study, National Research and Innovation Councils as an Instrument of Innovation Governance: Characteristics and Challenges (2015), identified a number of other challenges.

First, to strike the right balance between independence and credibility on the one hand, and legitimacy or clout on the other hand. Second, stakeholder inclusion and transparency. Third, demand for coordination and the ability to promote experimentation. The ability of a council to drive policy coordination tends to be limited because coordination does not happen simply by creating a council. Coordination is "often hampered by the fact that people are bounded by their contextual, political or other realities or constraints, not because they are not talking to each other or because they are not aware of the need for coordination". Fourth, effectiveness of advice (to balance advice

to maintain credibility and influence), the importance of government's receptiveness to outside advice and the importance of both individuals (in councils, government, ministries, secretariats) and group dynamics. Finally, "no council, regardless of its composition, is immune to the vagaries of political fickleness. A council's effectiveness might be impeded by a new Prime Minister or government that might dislike the mandate or composition of a council, simply because it was appointed by its predecessor."

In addition, National Advisory Councils are confronted with what former South Africa's Statistician General described as "evolving and tenuous relationship between systems of evidence (quantitative and qualitative) and decision systems or politics" (2017).

6. ORGANISATIONAL AND PERFORMANCE ENVIRONMENT

The 1996 White Paper on Science and Technology 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 established² in an attempt to transform the 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 complementarity in their functions, so that the resources invested in the various entities can make the greatest impact.

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In 2014, the Minister at the time requested that the CEOs of the DST public entities become ex officio members of the NACI Council. He also asked NACI to develop and host the National STI Information Portal. The portal was launched 2017. The NACI Chairperson has been granted direct access to the Minister to improve coordination and the collaboration of diverse stakeholders (such as the DST-National Research Foundation Centre of Excellence in Scientometrics and STI Policy (SciSTIP); the Department of Higher Education and Training; the Higher Education Management Information System; the Research Information Management System; and the Centre for Science, Technology and Innovation Indicators).

NACI recognises the importance of building local and international networks. These networks serve different purposes. These include knowledge sharing, capacity building and skills transfer, deepening knowledge of and understanding of latest trends in STI policy and world in general, evaluation, governance, planning and representation of Africa in general and South Africa in particular. A number of senior international experts have been involved as part of reference groups overseeing high-profile projects (Review of the 1996 White Paper on Science and Technology)

²These include NACI, the Council on Higher Education and the National Science and Technology Forum. Government attempted to achieve coherence across departments or across priority outcomes by first introducing 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.

and institutional review of NACI. Some of them (such as SPRU) acted as critical readers for the draft new White Paper on STI are now involved with some local institutions.

Some existing networks include the following local and international organisations (each collaboration has its own specific focus):

- a. The Organisation for Economic Cooperation and Development – STI policy analysis, evaluation, country reviews, impact assessment, bibliometrics, and data and repository management.
- b. The Global Forum on National Advisory Councils on Innovation – experience and knowledge sharing and learning, improving the role and contribution of advisory councils, developing relevant advice, interaction between advisors and policymakers, capacity building and joint projects.
- c. The National Research Foundation, Human Sciences Research Council, Academy of Science of South Africa, South African Council for Natural Scientific Professions, Technology Innovation Agency, Accenture, the New Partnership for Africa's Development, the National Science and Technology Forum (NSTF), the Science Policy Research Unit (University of Sussex), and SciSTIP at Stellenbosch University – strengthening the system's monitoring, evaluation and learning capability, developing and operating the National STI Information Portal, and developing the next generation of STI policy analysts.
- d. The Institute for Statistical Studies and Economics of Knowledge (Moscow) – planning, such as foresight exercises.

In addition, NACI has been and will continue to play an important part in Brazil, Russia, India, China and South Africa STI, African Union and Southern African Development Countries STI Office activities. For instance, NACI participated and presented at the first meeting of BRICS member countries Finance Ministers, Governors of Central Banks and STI policy makers and experts and training of SADC officials on the development of STI indicators.

The Council is cognisant of the challenges confronting the NSI. These challenges are summarised below:

- a. 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.
- b. The creation of a responsive, coordinated and efficient NSI with robust planning, monitoring and evaluation capacity.
- c. The development and strengthening of regional and provincial innovation systems and capabilities to meet community and industry demands.
- d. The expansion and transformation of human resources for STI.
- e. The commercialisation of the results of public research and development.
- f. The improvement of knowledge generation and diffusion.
- g. The provision and maintenance of state-of-the-art STI infrastructure.
- h. Water, energy and food security.

- i. The financing of the system, especially as regards increasing private-sector investment in RDI.
- j. The uptake of locally developed technologies by government.
- k. Like other national systems of innovation, South Africa's NSI also has to deal with the following global challenges:
 - l. The effects of a fiscally constrained environment on STI and the need to demonstrate how public investment in STI benefits the economy and society.
 - m. Better impact indicators and impact assessments required.
 - n. How to strengthen the innovation capacity of small and medium enterprises.
 - o. 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.
 - p. The globalisation and growing complexity of STI, which requires greater and interdisciplinary cooperation.
 - q. The balance between basic research and applied research.
 - r. The role of STI in creating sustainable and inclusive growth.
 - s. Growing societal engagement with science and technology, and the need to ensure public trust.
 - t. The improvement of scientific advisory mechanisms.
 - u. 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. This APP does respond to some of the challenges.

7. STRATEGIC OUTCOME-ORIENTED GOALS

The following approved strategic outcome-oriented goals are designed to support the NACI mandate, vision and mission (they appear in the 2016-2021 Strategic Plan):

- To learn from previous experience to improve efficacy and ensure evidence-based, informed, confidential and timely policy advice to the Minister of Science and Technology and, through the Minister, to Cabinet.
- 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.
- To contribute to the building of a well-coordinated, responsive and effective NSI by exploring and proposing solutions to the long-standing STI policy questions of coordination, prioritisation, financing, size and shape, human resources, knowledge production and diffusion, and so forth.
- To transform NACI into a smart, efficient and learning organisation. (This goal is intended to address current internal operational inefficiencies, enhance quality, turnaround time, knowledge management and communication, and exploit the benefits of digitisation. Skills, knowledge and competency development will be critical.).



Part B: NACI Advisory Programme and Work Plan

This section sets out NACI's performance indicators, annual and quarterly targets, expenditure estimates and the reconciliation of performance targets with the budget and Medium Term Expenditure Framework.

8. NACI PERFORMANCE INDICATORS AND ANNUAL TARGETS FOR 2019/20

Table 1: NACI's performance indicators and targets for the 2019/20 financial year

Strategic Outcome-Oriented Goal 1:		To learn from previous experience to improve efficacy and ensure evidence-based, informed, confidential and timely policy advice to the Minister of Science and Technology and, through the Minister, to Cabinet						
Output	Performance indicator	Strategic target		Audited/actual performance		Estimated performance	Medium-term targets	
		2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Strategic objective 1		To provide evidence-based advice on science, technology and innovation matters to the Minister of Science and Technology and, through the Minister, to Cabinet, on request or on NACI's initiative						
STI advice	Number of STI policy documents submitted to the Minister of Science and Technology	One brief advice document on energy submitted to the Minister	Advice focusing on issues related to venture capital, sustainable use of biomass in South Africa, food security in South Africa, and indicators to monitor the implementation of South Africa's Bio-economy Strategy	Three STI policy advice documents submitted to the Minister and Director-General of Science and Technology focusing on the following areas: Draft White Paper on STI. Analysis of government support programmes for business research and innovation. South African STI Indicators Report. In addition, a draft advice on a biomass assignment model within a bio-based economy.	Three STI advice documents submitted to the Minister of Science and Technology by 31 March 2019	Three STI ³ advice documents submitted to the Minister of Science and Technology by 31 March 2020	Three STI advice documents submitted to the Minister of Science and Technology by 31 March 2021	Three STI advice documents submitted to the Minister of Science and Technology by 31 March 2022

³NACI generates advice proactively or at the behest of the Minister. The need for advice can be identified at any time during the course of the financial year. It is therefore not advisable to commit to the types of advice to be generated in advance

Strategic Outcome-Oriented 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		
			2015/16	2016/17	2017/18		2019/20	2020/21	2021/22
To assess the performance of the NSI									
State of STI reports ⁴	Number of state reports produced	Three STI Indicator reports finalised by 31 March 2022	2015 South African STI Indicators booklet Final innovation scorecard report submitted to the Minister	The NSI performance analysis and the situational reports were finalised	The State of STI report was produced before 31 March 2018	STI indicators report finalised by 31 March 2019	STI Indicators report finalised by 31 March 2020	STI Indicators report finalised by 31 March 2021	STI Indicators report finalised by 31 March 2022
NSI M&E reports	Number of NSI M&E reports produced	Six NSI M&E reports finalised by 31 March 2022	No target	The 2016 STI Indicators report was finalised	A draft progress report on the evaluation of the Sector Innovation Fund Programme was produced. A preliminary draft of an M&E framework for the South African STI system was produced. An inception report on the costs, benefits and impact (as well as absorption and diffusion) of imported technologies was produced.	Two NSI M&E Reports finalised by 31 March 2019	Two NSI M&E Reports finalised by 31 March 2020	Two NSI M&E Reports finalised by 31 March 2021	Two NSI M&E Reports finalised by 31 March 2022

⁴The STI Indicators Report will serve as the "State of STI Report". Discussions are underway with different actors to enhance the framing, content and quality of the STI Indicators Report so that it becomes an authoritative State of STI Report for South Africa. In future, the production of the State of STI Report will be produced biennially.

Strategic objective 3		To develop an STI central data and information portal 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							
National STI Information Portal (NSTIIP)	Successful implementation of NSTIIP	Fully functional and effective model of NSTIIP by 31 March 2022 ⁵	National STI data and information portal framework	NSTIIP was developed	User experience of the NSTIIP was documented. A technical forum was established and is functioning well. Potential areas for upscaling the NSTIIP (e.g. communities of practice and a database of researchers) have been identified.	Phase 1 (upscaling of NSTIIP) by 31 March 2019	Phase 2 (full-scale roll-out of the NSTIIP) by 31 March 2020	Ongoing maintenance and implementation of the NSTIIP by 31 March 2021	Ongoing maintenance and implementation of the NSTIIP by 31 March 2022
Strategic Outcome-Oriented Goal 3:									
Output		Strategic target	Audited/actual performance		Estimated performance	Medium-term targets			
			2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Strategic objective 4:									
A high-level framework for an STI decadal plan	A high-level framework for new STI decadal plan submitted to the Minister of Science and Technology	A high-level framework for STI decadal plan submitted to the Minister of Science and Technology by 31 July 2019	One feedback report on the White Paper review process submitted to the Minister. A council task team and plan for the development of the high-level framework for the decadal plan was finalised.	No target	No target	Finalisation of foresight exercise by 30 September 2018	High-level framework for STI decadal plan submitted to the Minister of Science and Technology by 31 July 2019	No target	No target

⁵The NSTIIP has reached the fourth capability maturity level and contributes significantly to NSI planning, monitoring and evaluation. All aspects of the portal are fully developed, accessible and of value to the users.

Strategic oriented goal 4: Transforming NACI into a smart, efficient and learning organisation.									
Output	Performance indicator	Strategic target	Audited/actual performance	Estimated performance	Medium-term targets				
			2015/16	2016/17	2017/18	2019/20	2020/21	2021/22	
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	Communication plan updated and implemented	Communication plan updated and implemented by 31 March 2022	New target	<p>One stakeholder engagement on the 2016 South African STI Indicators report</p> <p>Five collaboration and partnership meetings with STI stakeholders:</p> <p>(1) NSTF on 2 Feb. 2017;</p> <p>(2) SciSTIP on 9 Feb. 2017;</p> <p>(3) Technology Innovation Agency on 16 Feb. 2017;</p> <p>(4) Technology Top 100 on 17 Feb. 2017; and</p> <p>(5) Embassy of Switzerland on 17 Feb. 2017</p> <p>Two presentations:</p> <p>(1) Minister of Science and Technology on the NACI Annual Performance Plan on 27 February 2017, and</p> <p>(2) Cluster on the STI Indicators booklet on 1 March 2017</p> <p>Two international participation events: (1) Innovation and Technology Absorption by South African Firms on 2 March 2017; and (2) Organisation for Economic Co-operation and Development Committee for Scientific and Technological Policy Global Science Forum meeting from 20 Feb. to 4 March 2017</p>	<p>Media coverage of the launch of the South African STI Indicators Report included live broadcast and television interviews. Articles were also published in newspapers on a range of issues related to the Council's work.</p>	Communication plan implemented by 31 March 2019	Communication plan updated and implemented by 31 March 2020	Communication plan updated and implemented by 31 March 2021	Communication plan updated and implemented by 31 March 2022

Output	Performance indicator	Strategic target	Audited/actual performance		Estimated performance	Medium-term targets			
			2015/16	2016/17		2017/18	2019/20	2020/21	2021/22
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									
Internal corporate governance system	Internal corporate governance system implemented	Internal corporate governance system approved and implemented by 31 March 2022	New target	Corporate governance system developed and approved	The 2016/17 Annual Report and 2018/19 APP were approved by Parliament. The Terms of Reference for the Institutional Review (2009-2018) were finalised. The Institutional Review Panel was established.	Corporate governance system implemented as Annual Report, Annual Performance Plans by 31 March 2019	Corporate governance system implemented (2019/20 APP, 2018/19 Annual Report)	Corporate governance system implemented (2019/20 APP, 2018/19 Annual Report)	Corporate governance system implemented (2019/20 APP, 2018/19 Annual Report)
Knowledge management system	Knowledge management system implemented	Knowledge management system approved and implemented by 31 March 2022	New target	Draft terms of reference have been developed and sent to the DST's Knowledge, Information and Records Management Unit to assist NACI with sourcing technical advice for training and development of the system.	Knowledge management system implemented through Alfresco system by 30 March 2018	Knowledge management system implemented by 31 March 2019	Knowledge management system continued to be implemented by 31 March 2020	Knowledge management system continued to be implemented by 31 March 2021	Knowledge management system continued to be implemented by 31 March 2022

9. QUARTERLY TARGETS FOR 2019/20

Table 2: NACI's quarterly targets for the 2019/20 financial year.

Strategic Outcome-Oriented Goal 1:		To learn from previous experience to improve efficacy and ensure evidence-based, informed, confidential and timely policy advice to the Minister of Science and Technology and, through the Minister, to Cabinet				
Performance indicator	Reporting period	Annual target	Quarterly targets			
			1st	2nd	3rd	4th
Strategic objective: 1						
Number of STI policy advice documents submitted to the Minister of Science and Technology	Annually	Three STI policy advice document submitted to the Minister of Science and Technology by 31 March 2020	No target	No target	No target	Three STI policy advice documents generated by 31 March 2020
Strategic Outcome-Oriented 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						
To assess the performance of the NSI.						
Number of State of STI reports produced	Annual	STI Indicators report finalised by 31 March 2020	No target	No target	No target	Final STI Indicators report finalised by 31 March 2020
Number of NSI M&E reports	Biannually	Two NSI M&E reports finalised by 31 March 2020	No target	No target	Drafting M&E reports 15 Dec. 2019	Two NSI M&E reports finalised by 31 March 2020

Strategic Outcome-Oriented 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 3						
Successful operation of National STI Information Portal (NSTIIP)	Half-yearly	Phase 2 (full-scale roll-out of the NSTIIP) by 31 March 2020	No target	Directory of experts from two universities Two active communities of practice on the NSTIIP	No target	Directory of experts from four universities Eight active communities of practice on the NSTIIP
Strategic Outcome-Oriented Goal 3: To contribute towards building well-coordinated, effective and responsive NSI						
Performance indicator	Reporting period	Annual target	Quarterly targets			
			1st	2nd	3rd	4th
Strategic objective: 4						
A high-level framework for new STI decadal plan submitted to the Minister	Quarterly	High-level framework for STI decadal plan submitted to the Minister of Science and Technology by 31 July 2019	No target	High-level framework for STI decadal plan submitted to the Minister of Science and Technology by 31 July 2019	No target	No target

Strategic Outcome-Oriented 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 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	Half-yearly	Communication plan implemented by 31 March 2020	Communication plan refined and implemented by 30 June 2020	Communication plan implemented by 30 September 2020	Communication plan implemented by 31 December 2020	Communication plan implemented by 31 March 2020
Corporate governance system	Quarterly	Corporate governance system implemented ((2019/20 APP, 2018/19 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2020	Annual Report highlights submitted to the DST by 30 May 2020	1) 1st draft of the 2019/20 Annual Report submitted to the DST by 30 July 2019 2) 1st draft of the 2019/20 Annual Performance Plan submitted to the DST by 1 August 2019 3) 2nd draft of the 2019/20 Annual Report submitted to the DST by 30 August 2019 4) 2019/20 Annual Report ready for tabling in Parliament by 30 September 2019	2nd draft of the 019/20 Annual Performance Plan submitted to the DST by 25 November 2019	Final draft of the 2019/20 Annual Performance Plan submitted to the DST by 15 January 2020

Strategic Outcome-Oriented 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 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				
Knowledge management system implemented	Quarterly	Knowledge management system continued to be implemented by 31 March 2020	Knowledge café to be hosted as a platform to create NACI knowledge management strategy by 30 June 2019	Identification of key interviewees (with NACI knowledge) to be finalised by 30 September 2019	All NACI meetings recorded and transcripts stored safely in Alfresco by 30 November 2019 Interviews with selected knowledge holders recorded and stored by 30 November 2019.	Knowledge management system continued to be implemented by 31 March 2020

10. RISKS AND MITIGATION ACTIONS

Strategic Outcome-Oriented Goal	Risk	Actions
1. Improved efficiency and effectiveness in generating advice (proactive and reactive).	Possible Mandate change of NACI.	Ensure that Secretariat is well-informed, understand and utilise the latest STI developments (including global and local trends, theoretical advances, analytical tools and policy changes)
2. Performance of the NSI assessed.	Due to fragmented data sources, NACI may be unable to ensure optimal use of STI information to respond to monitoring and evaluation questions and issues.	Develop and implement a fully-fledged STI Information portal. Continuous staff development in monitoring and evaluation approaches and methodologies. Development of systemic monitoring and evaluation framework and system.
3. Governance and planning of the NSI.	Limited capability (such as foresight exercise) to identify and advise government on key STI priorities.	Institutionalise foresight exercise capabilities. Ensure that Secretariat is well-informed, understand and utilise the latest STI developments (including global and local trends, theoretical advances, analytical tools and policy changes)
4. To transform NACI into a smart, efficient and learning organisation.	Loss of institutional memory due to staff and Council turnover. Limited capacity within NACI to fulfil its mandate. Organisational structural change	Develop and implement the Knowledge Management Strategy. Implement the resolutions of the 2018 institutional review report and the new White Paper on STI. Resourcing of NACI to respond effectively to its changing environment and mandate

11. RESOURCE CONSIDERATIONS

11.1 Human resource requirements

To implement its advisory work programme, the NACI Council is supported by the NACI Secretariat. The Secretariat comprises a small team of 13 people, including the Acting CEO. There are seven technical employees (four SMS and three deputy directors). Two vacant positions (one deputy director and assistant director) exist. The Institutional Review Panel has expressed an independent view of the type and quality of technical expertise required in order to enable the Council to fulfil its legislative mandate and proposed future role and functions by the new White Paper on STI.

11.2 Expenditure estimates

Table 3 presents a summary of 2019/20 expenditure estimates for the total budget of R21 million, comprising the compensation of employees (R11,7 million) and goods and services (R9,6 million).

Table 3: NACI expenditure estimates

R'000	Audited outcomes			Adjusted appropriation	Medium- Term expenditure estimates		
	2015/16	2016/17	2017/18		2018/19	2019/20 R'000	2020/21 R'000
Compensation of employees	8 149	8 451	8 334	9 138	7 818	7 976	8 228
Goods and services	3 980	5 762	8 730	10 090	8 633	8 816	9 095
Households	-	32	40	-	-	-	-
Payment for capital assets	3	254	34	-	-	-	-
Payment for financial assests	-	4	-	-	-	-	-
Total	12 132	14 494	17 137	19 228	16 451	16 792	17 323



Part C: Links to other plans

The list below includes key public policies and strategies relevant to NACI's work over the next five years:

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



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