

Innovation for a BETTER Future

ANNUAL REPORT 2019/20

science & technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

NACI
NATIONAL ADVISORY COUNCIL ON INNOVATION

NATIONAL ADVISORY COUNCIL ON INNOVATION
INNOVATION FOR A BETTER FUTURE
ANNUAL REPORT 2019/20



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PART A
GENERAL INFORMATION

1. PUBLIC ENTITY'S GENERAL INFORMATION

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ABBREVIATIONS AND ACRONYMS

4IR	Fourth Industrial Revolution
AGSA	Auditor General of South Africa
ASSAf	Academy of Science of South Africa
BNCT	Biotechnology, Nanotechnology and Converging Technologies
BRICS	Brazil Russia India China and South Africa
BBBEE	Broad Based Black Economic Empowerment
CSTP	Committee for Scientific and Technological Policy
CEO	Chief Executive Officer
CFO	Chief Financial Officer
DPME	Department of Planning, Monitoring and Evaluation
DSI	Department of Science and Innovation
GERD	General expenditure on research and development
GII	Global Innovation Index
PFMA	Public Finance Management Act
TR	Treasury Regulations
MEC	Member of Executive Council
MTEF	Medium Term Expenditure Framework
NACI	National Advisory Council on Innovation
NDP	National Development Plan
NRDS	National Research and Development Strategy
NSI	National System of Innovation
NSTIIP	National STI Data and Information Portal
NSTF	National Science and Technology Forum
OECD	Organisation for Economic Cooperation and Development
R&D	Research and Development
STI	Science, Technology and Innovation
SMME	Small Medium and Micro Enterprises
SCM	Supply Chain Management
SciSTIP	National Research Foundation Centre of Excellence in Scientometrics and STI Policy
SDG	Sustainable Development Goals
SMME	Small, medium and micro-enterprises
SIF	Sector Innovation Fund
TYIP	Ten-Year Innovation Plan
USPTO	United States Patent and Trademark Office
WTO	World Trade Organisation



3. FOREWORD BY THE CHAIRPERSON

DR SHADRACK MOEPHULI - ACTING CHAIRPERSON

On behalf of the National Advisory Council on Innovation (NACI), I am delighted to present the 2019/20 Annual Report, the first in the term of the current Council, which began in the third quarter of 2018/19.

In the year under review, the NACI Council and Secretariat have responded to a number of issues at the request of the Minister of Higher Education, Science and Innovation. NACI continued to build on its previous efforts to strengthen planning, monitoring and evaluation capability in the national system of innovation (NSI). The Council contributed to the new White Paper on Science, Technology and Innovation (STI), produced a framework for development of the new decadal plan for STI, completed the South Africa Foresight Exercise for Science, Technology and Innovation 2030, and developed the National STI Information Portal and the Monitoring and Evaluation Framework for the NSI.

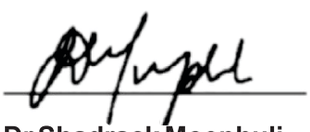
NACI continues to advance the quality, relevance and efficacy of its advice to the Minister and, through the Minister, the Cabinet. The Council worked to ensure that NACI influenced industry-wide consideration of the foundation of STI (disciplines or knowledge domains, infrastructure and human resources) and the role of STI in addressing the socio-economic challenges of education, health, food security and global change. This has been achieved by mobilising NSI stakeholders and accessing both local and international experts to complement its limited resources.

NACI carried out extensive work towards facilitating international and local networking and partnerships to ensure knowledge sharing and skills transfer, deepening the understanding of the latest trends in STI policy globally. There are a number of international experts who participate in reference groups and oversee projects, NACI also participated in a number of international forums.

Acknowledging the significance of all stakeholders in the NSI, NACI continued to serve the nation. The Annual Report will provide information on how the NSI and ordinary citizens benefited from the work undertaken by NACI in the 2019/20 financial year.

I would like to extend a special note of appreciation to the Acting CEO, Dr Mlungisi Cele, and the Secretariat team for their dedication and hard work in ensuring that NACI's mandate continued to be carried out in the year under review.

The Council acknowledges the unwavering support afforded to NACI by the Minister of Higher Education, Science and Innovation, Dr Blade Nzimande.



Dr Shadrack Moephuli
Acting Chairperson
National Advisory Council on Innovation (NACI)
Date: 28 July 2020

4. Statement of responsibility and confirmation of accuracy for the annual report

To the best of my knowledge and belief, I confirm the following:

All information and amounts disclosed in the annual report is consistent with the annual financial performance.

The annual report is complete, accurate and is free from any omissions.

The annual report has been prepared in accordance with the guidelines on the annual report as issued by National Treasury.

The accounting authority is responsible for the preparation of the annual financial performance and for the judgements made in this information.

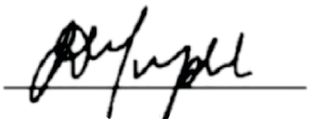
The accounting authority is responsible for establishing, and implementing a system of internal control has been designed to provide reasonable assurance as to the integrity and reliability of the performance information, the human resources information and the annual financial performance.

In our opinion, the annual report fairly reflects the operations, the performance information, the human resources information and the financial affairs of the National Advisory Council on Innovation (NACI) for the financial year ended 31 March 2020.

Yours faithfully



Chief Executive Officer
Dr Mlungisi Cele
28 July 2020



Chairperson of the Board
Dr Shadrack Moephuli
28 July 2020

5. STRATEGIC OVERVIEW

5.1 Vision

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

5.2 Mission

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

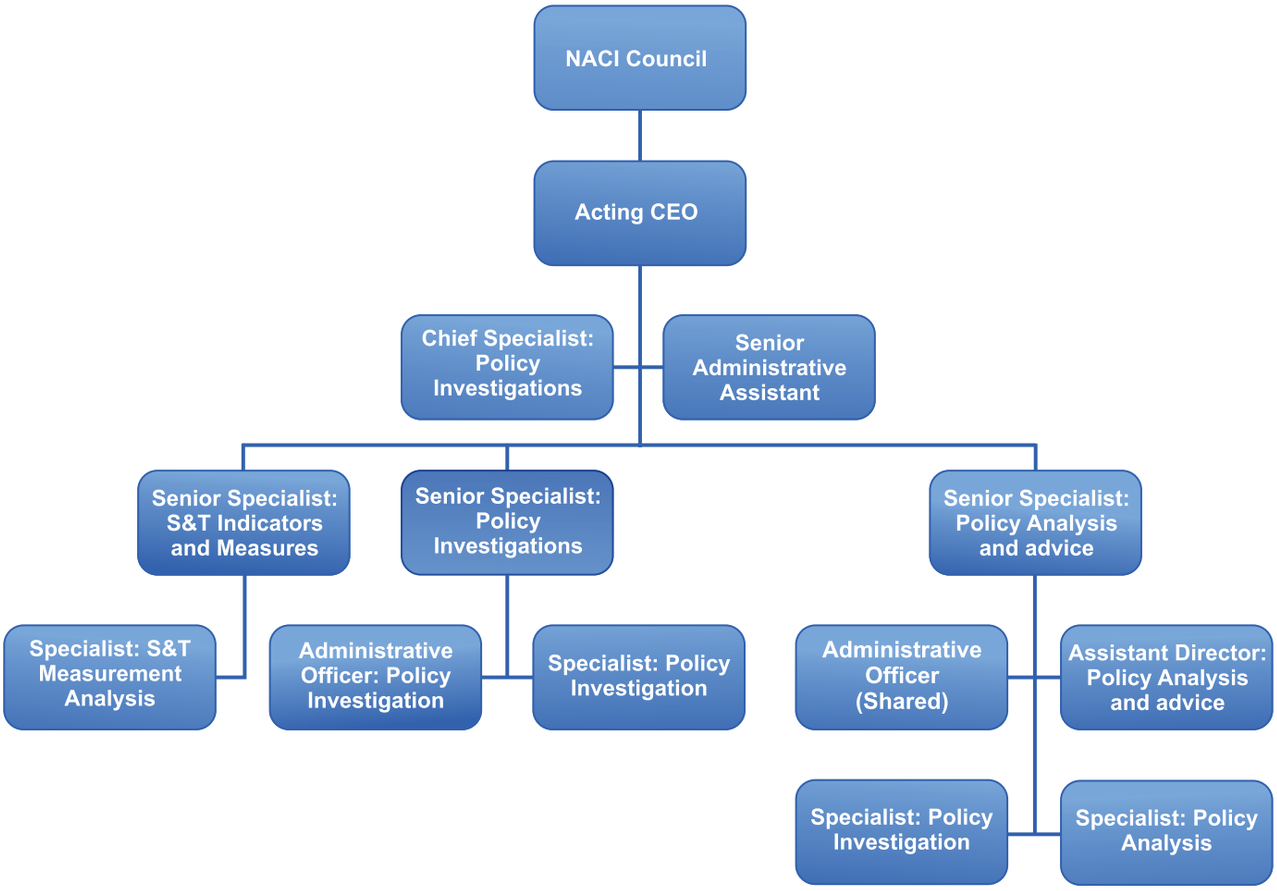
5.3 Values

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

6. LEGISLATIVE AND OTHER MANDATES

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.

7. ORGANISATIONAL STRUCTURE





PART B
PERFORMANCE INFORMATION

1. SITUATIONAL ANALYSIS

1.1 Service Delivery Environment

The government's 25-year Review Report (1994-2019) and the 2018 World Inequality Database report confirm that South Africa remains one of the most inequitable societies in the world. Essentially, the country continues to reflect the contradiction of uneven and unequal development on the one hand, and an increasing demand for improved quality of life and well-being on the other. This is despite notable successes in specific areas, including the development of progressive and transformative STI policy mix, which is intended to serve the needs of all South Africans rather than a privileged minority, as it did before 1994. Much work is still required to make STI truly inclusive.

The NACI evolved in a particular context, characterised by negotiated political transition (the Government of National Unity and a fledgling democracy), increasing globalisation, and a global economy increasingly driven by knowledge, innovation and information. Since 1994, the South African economy has faced the dual challenge of integrating into the competitive arena of international production and finance; and 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.

The dual challenge and emerging 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.

STI, economy and society

Nationally, the 2011 National Development Plan (NDP) recognises that developments in STI are fundamentally altering the way people live, connect, communicate and transact, with profound effects on economic growth and development. STI are key to equitable economic growth because technological and scientific revolutions underpin economic advances, improvements in health systems, education and infrastructure. The NDP argues that STI are the differentiators between countries that are able to tackle poverty effectively by growing and developing their economies, and those that are not. The extent to which developing countries emerge as economic powerhouses depends on their ability to grasp and apply insights from STI and use them creatively.

More recently, discussions towards a reimagined industrialisation strategy have brought greater focus to bear on the relationship between the economy, industrialisation and STI. The principal concern is that the South African economy is not growing, not creating employment, and not becoming more competitive. In its analysis of international and domestic forces impacting on our economy, government identified four growth drivers between 2008 and 2018, namely, the 2008 global financial crisis ended the commodity super-cycle; the global economy is now on a completely different growth trajectory; economic "nationalism" and

protectionism under the guise of "national security" are emerging; and the World Trade Organisation is under serious threat.

At the same time, government identified structural faults in the South African economy that contribute towards growth remaining low and the country's current inability to reach the 5% growth levels experienced in the late 90s and early 2000s. The structure of the South African economy remains insufficiently diversified; inefficient public monopolies increase the costs of infrastructure such as electricity and transport; exports are concentrated in minerals and metals products; industrial structures are concentrated, with limited competition and high barriers to entry; there is weak and volatile growth in labour-intensive sectors such as construction, manufacturing and agriculture; and South Africa's skills development is not sufficiently linked to the economy's needs.

Globally, STI have been identified as part of the toolkit required to achieve sustainable growth in the long run, including (a) building a capable (and developmental) state as well as a functional relationship between the state and the private sector; (b) macro-economic policy in support of growth and employment creation; (c) building economic confidence with policy predictability and rule of law; (d) improving educational outcomes throughout individuals' working life; (e) harnessing the opportunities brought by 4IR and adaptation to climate change; (f) expanding effective, affordable and integrated public transport systems, and prioritising targeted housing and urban development interventions to overcome spatial legacies and support densification; and (g) progressive policies which contribute to equity, social stability and cohesion.

Innovation in the digital economy, developing and diffusing new technologies, has been identified as an engine of growth. Others include industrialisation (masterplans and social compacts for national priority sectors); (b) investment and infrastructure (leveraging private sector investment and expanding infrastructure; (c) integration (complete Africa Free Trade Agreement to grow investment and exports); and (d) inclusion (revitalising townships, boosting SMMEs, creating jobs, youth and BBBEE). The figure below illustrates a number of multiple policy levers for priority sectors.

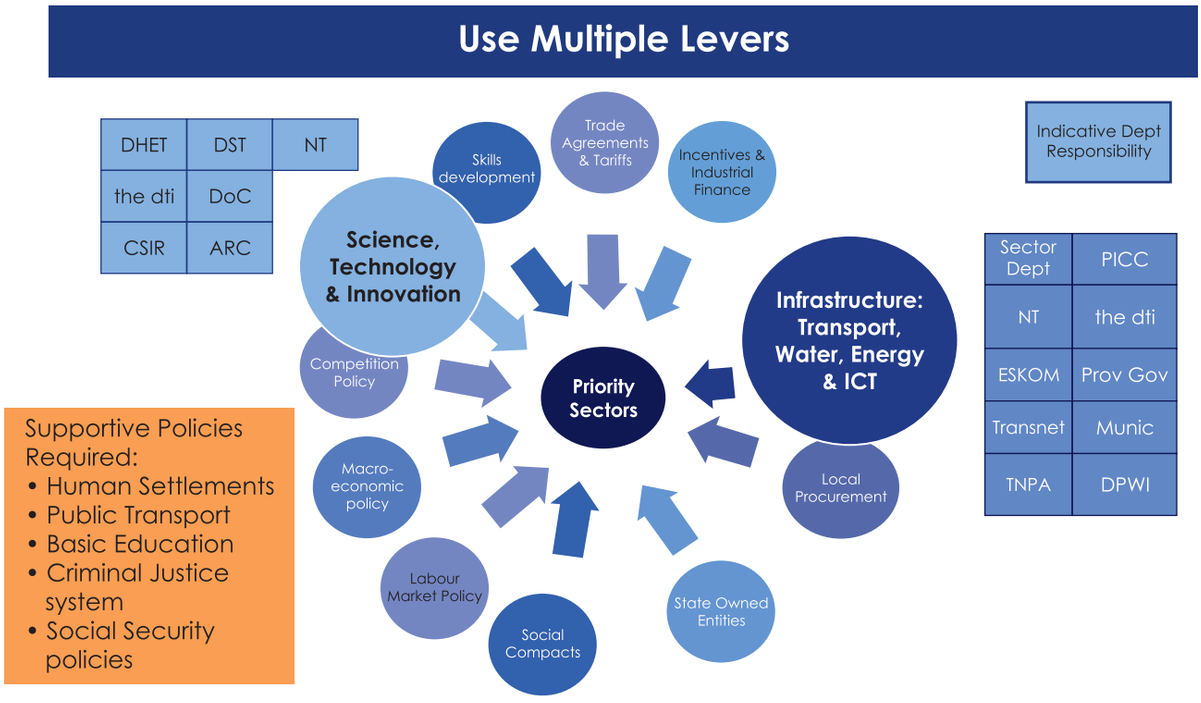


Figure 1: shows number of multiple policy levers for priority sectors

The important role and contribution of STI in addressing both present and future economic challenges is clear from the above. Building on existing and identifying new ways of enhancing the impact of the STI policy on industrial and economic and other policies should be a key focus going forward. Innovative partnerships between government and business will be vital to address a range of constraints. The clearest indicators of the state of innovation in the business sector are derived from the export market. Increasing innovation results in an increase in the number of exporting firms, new export products and new export markets.

In South Africa, very few firms are significant exporters, and entry rates are below those of comparator countries. According to the World Bank's 2014 South Africa Economic Update – Focus on Export Competitiveness, "South Africa has one of the lowest new firm entry rates into exporting among its peers". The same report shows that by far the largest share of South Africa's export growth is accounted for by existing firms selling into existing markets.

Furthermore, South Africa's top exporting firms, which are responsible for the overwhelming share of South African exports, are developing and selling fewer products in global markets. It is innovative and competitive firms that enable economic growth, diversify the economy and exports, raise productivity and enhance employment. Economic growth and employment creation are the highest priorities of government, but South African firms are becoming less rather than more innovative.

In comparison with other countries, South Africa's NSI is not operating efficiently. In fact, there is evidence that the efficiency of the NSI has been declining. The best indicator of inefficiencies at the system level is provided by the Global Innovation Index (GII). The GII measures innovation inputs and outputs for 126 countries. The overall score is the simple average of the two. The table below summarises South Africa's 2018 GII ranking.

Category	Rank	Score
Innovation inputs	48	45.36
Innovation outputs	65	24.87
Overall	58	35.13

There is a considerable difference between the input and output scores. The GII calculates the efficiency ratio by measuring the degree to which innovation inputs are transformed into innovation outputs, and in terms of this South Africa comes in at 83 out of 126, with a score of 0.55. Of the 57 countries that have a higher overall GII score than South Africa, only one, the United Arab Emirates, has a lower efficiency ratio.

According to a 2018 study performed by Cornell University, INSEAD and the World Intellectual Property Organisation, South Africa is a significant negative outlier in terms of its overall innovation performance relative to its stage of development – with only four countries faring worse (the United Arab Emirates, Qatar, Kuwait and Brunei).

In terms of technology, several indicators suggest that the system is not working well. South Africa's share of patents at the United States Patent and Trademark Office (USPTO) has declined significantly against the global total. The country's share of total foreign patents at the USPTO declined by more than 50% between 1996 and 2015, which does not compare well with Brazil, the best comparator country for South Africa (the countries have comparable GDP per capita, economic growth rates and rates of growth of manufacturing). Likewise, South Africa's share of high technology exports does not compare well with Brazil's. The World Bank's development indicators show that South Africa's share stagnated while Brazil's grew significantly, and by 2016, high technology exports as a share of total manufactured exports was almost three times more for Brazil than South Africa.

South Africa's receipts from the sale of intellectual property show an overall trend of decline. In the first half of the 1990s, South Africa's receipts were higher than those of Brazil, but by 2015, Brazil's were more than six times higher than South Africa's. The decline in receipts from the sale of intellectual property between 2013 and 2016 is of particular concern.

In terms of innovation, there is also evidence that the system is not working as required. Measured in terms of the introduction of new products for export and/or new export markets, established firms are becoming less innovative, and there are fewer new firms entering the export market. These two indicators show clearly that innovation outputs are in decline.

Despite new policies and additional resources, technology and innovation outputs have stagnated or risen only very slowly. There is an urgent need to ensure that policies and resources are used more effectively.

In South Africa, perhaps the most critical constraint is the lack of skills and their deployment. South Africa's lowest GII scores are in education (83) and tertiary education (87), and a 2018 World Bank report identifies the skills constraints in South Africa as a major deterrent to innovation in general, and to the vitality of the manufacturing sector in particular. There should be continuous investment in education and skills development encompassing a range of areas, including mathematics, science, engineering, data coding and analytics, and robotics, which are critical to technological age necessary to put the economy on a growth trajectory.

While many studies are being done and a lot of information is being generated to improve our understanding of the COVID-19 pandemic, and assist with planning to address effects and find an integrated, multidisciplinary and comprehensive strategy to deal with the effects of the pandemic, the world has changed radically and permanently. Beyond the coronavirus's disastrous impact on health systems across the globe and the deaths of hundreds of thousands of people, there are strong signs that the global economy will slip into depression, bringing increased unemployment. Hundreds of millions of school-going children are out of the education system. Questions are arising about the responsiveness of STI to the crisis (looking back to look forward), the readiness of STI systems to help address the crisis and the resilience of the STI system against the crisis (bounce back).

STI Policy mix

The period between 2014 and 2019 has been characterised by critical reflection on STI policy and policy implementation, towards a better understanding of the NSI and its role in shaping the future of South Africa. Government, with other NSI actors, including NACI, carried out or commissioned initiatives such as reviews of the 1996 White Paper on Science and Technology, the 2002 National Research and Development Strategy and the Ten-Year Innovation Plan (2008-2018), an analysis of the NSI's performance, the first phase an STI institutional landscape review, and a national STI foresight exercise looking towards 2030. A new White Paper on STI was developed, and was approved by the Cabinet in March 2019. The White Paper is to be implemented through decadal plans, and this document provides a framework for the development of the first decadal plan.

The 2019 White Paper on STI was informed and shaped by the NDP, which identifies STI as critical for the creation of a competitive and sustainable economy and for addressing societal challenges such as education and health. It advocates a strong, coordinated, coherent and effective STI system that promotes networks and partnerships between different actors in the public and private sectors, that contributes to transformation, and that recognises a multiplicity of knowledge production sites beyond higher education. It promotes the idea that knowledge should be shared as widely as possible across society and calls for the expansion of STI outputs by increasing government expenditure on research and development (R&D) and encouraging increased expenditure by the private sector.

Building on previous successes and adopting new approaches where required, the White Paper sets out a long-term policy approach for the South African government to ensure a growing role for STI in a more prosperous and inclusive society. It identifies inclusivity, transformation and partnerships as core themes, and proposes a range of actions to address policy coherence, the development of human capacity, knowledge expansion, innovation performance and increased investment. The implementation of the White Paper should ensure that the twin concepts of inclusivity and transformation are given concrete expression by ensuring dignity and integrity to the marginalised, and enables good governance and service delivery. It must also identify clear actions to support SMMEs and stimulate innovation in all regions of the country.

The inclusion of non-traditional R&D actors (such as civil society and the informal sector) in all STI processes, not merely as beneficiaries, is vital, as is the promotion of social and grassroots innovations. The White Paper's wider concept of innovation must be given concrete expression in practice.

Harnessing STI to tackle societal challenges, as the White Paper proposes, is a challenging task, and ongoing discussions around genetic modification or artificial intelligence need to be held with the public to ensure trust and the responsible development of advanced and emerging technologies.

South Africa has embraced the 4IR by establishing the Presidential Commission on 4IR and ensuring that it features prominently in the White Paper on STI. 4IR is seen as radical and disruptive technological change that will impact on production and quality of life across the world. Human beings have always identified and developed tools to augment their constraints or limitations. In this regard, 4IR represent such tools. 4IR will have both positives and negatives. It will create new jobs and, at the same time, destroy existing jobs. Technological change demands better management of transition to ensure that old institutions are not ruined while new institutions are established.

Countries have diverse views on the future challenges and opportunities presented by 4IR, depending on their own present situation and objectives, and their STI interests. Some developed countries (such as Germany, Italy, Japan and the USA) have articulated and determined how they seek to exploit 4IR to meet local needs. It is hoped that the new decadal plan will set out how South Africa intends to exploit and leverage 4IR to meet national imperatives. For instance, it may be important to establish centres or institutes of AI as part of building the capacity of the NSI to exploit 4IR and digitisation so that it may address societal challenges.

A strategic compact between government and the private sector will be critical for the success of the decadal plan. There is need to improve the rate of systemic efficiency and quality to stimulate growth. Conditions must be created to enable effective allocation for appropriate impact. A shortage of human resources for STI is a key constraint to the performance of the NSI and the economy. The internationalisation and transformation of human resources for STI should not be seen as conflicting goals but as complementary imperatives.

1.2 Organisational environment

As indicated above, NACI derives its mandate from an Act of Parliament, promulgated in 1997 and amended in 2011. The legislation requires NACI to offer advice to government on the role and contribution of STI in meeting national imperatives such as the creation of sustainable quality of life, sustainable development and economic growth, and developing human capital for STI. The Act sets out a number of specific areas in which NACI is expected to provide advice. These include (a) the coordination and stimulation of the NSI; (b) strategies for the promotion of technology innovation, development, acquisition, transfer and implementation in all sectors; (c) the coordination of science and technology policy and strategies with policies and strategies in other environments; (d) the identification of R&D priorities, and their incorporation in the process of government funding of R&D; (e) the promotion of mathematics, the natural sciences and technology in the education sector; (f) the establishment and maintenance of information systems that support the monitoring and evaluation of the management and functioning of the NSI; (g) international liaison and cooperation in STI; and (h) developments in STI that might require new legislation.

The issue of mandate is one of the factors that affect the influence and effectiveness of advisory councils. The areas indicated above span the policy concerns of Cabinet as a whole, as well as the work and jurisdictions of various government departments. This is one of the reasons for repeated questions about whether NACI is able to fulfil its mandate in its current form and location. Although the Minister responsible for science and technology or DSI officials occasionally refer NACI's advice to other government departments to which the advice might be relevant, the 2018 Institutional Review found that NACI's advice was primarily associated with the priorities and jurisdictions of DSI and did not appear to have a Cabinet reach.

NACI's ability to fulfil its mandate and perform some of its functions has been hampered for several reasons. The Ministerial Review Committee on the STI Landscape in South Africa, the 2007 OECD Review of the South African NSI, and institutional reviews of NACI carried out in 2008 and 2018, among other documents, argue that NACI is "hamstrung by the fact that it report[s] to the DSI and thus ha[s] no structural location that … afford[s] it the authority needed for effective coordination of a national system" (2012). There has been a general call for NACI to be established as an independent entity responsible for its own resources, both

human and financial. The idea is for the Secretariat to be removed from government and be appointed under terms to be determined by the NACI Council. This has not yet been achieved, although NACI's founding legislation was amended to allow NACI to have its own Chief Executive Officer, where previously the Director-General of Science and Technology was the CEO.

In 2014, the Minister at the time requested that the CEOs of the DSI 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 DSI-National Research Foundation Centre of Excellence in Scientometrics and STI Policy; 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).

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 2019 White Paper.

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 (such as the review of the 1996 White Paper on Science and Technology) and the latest institutional review of NACI. Some of them acted as critical readers for the draft new White Paper on STI and are now involved with some local institutions.

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

- The Organisation for Economic Cooperation and Development – STI policy analysis, evaluation, country reviews, impact assessment, bibliometrics, and data and repository management.
- 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.
- 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.
- 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 in STI activities in partnerships under BRICS (Brazil, Russia, India, China and South Africa grouping), the African Union and the Southern African Development Community.

The 2019 White Paper on Science, Technology and Innovation proposes an expanded mandate and role for NACI, which is to perform advisory, monitoring and evaluation, planning and coordination functions. To carry out this mandate effectively, NACI will have to align its work to broad government priorities, ensure that the Council is representative, and be given enhanced organisational capacity.

1.3 Key policy developments and legislative changes

The 2019 White Paper on STI has number of implications for the system and its actors. It proposes a number of actions in relation to NACI. Namely,

- NACI will be reconfigured to act as the national STI M&E institution, charged with analysing STI information and undertaking work to inform government planning on STI. NACI will convene a high-level forum to develop a framework of indicators to monitor South Africa's NSI performance.
- To support the ministerial STI structure in carrying out its mandate, government recognises that, in addition to the STI Plenary discussed above, there is a need for ongoing stakeholder engagement. NACI will be strengthened to facilitate such engagement, for example, by following up on matters discussed at the STI Plenary. Policy advice from relevant NSI institutions and think-tanks, for instance the Academy of Science of South Africa, the Human Sciences Research Council and the centres of excellence, will also be used.
- Furthermore, the ministerial STI structure will require expert studies and up-to-date performance and environmental information to support its decisions. To advise the ministerial STI structure, a strengthened NACI will undertake such studies.
- Implement knowledge management systems to enhance the analysis of NSI performance and support evaluation work that informs strategies. In this, NACI will draw on the work of existing specialist centres that collect STI-related information. Existing institutional arrangements for data collection (e.g. innovation and R&D surveys) will be maintained and strengthened and, where necessary, expanded.
- The DSI, working with NACI, will develop a public STI investment framework to support the commitment of public resources for STI by the ministerial STI structure. NACI's role will be to undertake foresight studies and provide an independent STI M&E function (including regular analysis of public STI spending). The framework will be based on an analysis of STI funding requirements in line with strategic and sovereign priorities, as well as consultation across government through an interdepartmental STI budget committee at director-general level, including national and provincial governments with significant STI mandates. NACI will need to work with DSI, the Department of Planning, Monitoring and Evaluation (DPME) and the National Treasury to ensure that the framework delivers actionable and comparable information that can inform the management and funding of the NSI initiatives.

Appropriate links will also be established between NACI and the DPME to help integrate STI into transversal government planning by the DPME, and to support funding prioritisation by the DPME and National Treasury (e.g. via the annual Budget Mandate Paper). For instance, based on its new M&E function and on regular environmental scanning, NACI will prepare reports on the implications of geopolitical and demographic shifts, technological changes, environmental sustainability imperatives and other megatrends for government STI planning.

In order to give effect to the above proposals, government will need to initiate processes to amend existing NACI legislation.

1.4 Strategic Outcome Oriented Goals

The strategic outcome-oriented goals were 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 Higher Education, Science and Innovation 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.

2. PERFORMANCE INFORMATION

2.1 Programme 1: (NACI)

2.1.1 Activities, Performance and Outputs 2019/20 Financial Year

NACI achieved most of its objectives for the 2019/20 financial year. It produced a high-level framework for developing a new science, technology and innovation (STI) decadal plan, a review of the sector innovation fund, the South African Foresight Exercise for STI 2030, a review of the National Research and Development Strategy and Ten-Year Innovation Plan, and a monitoring and evaluation (M&E) framework for the national system of innovation (NSI). It also developed a new Strategic Plan, Annual Performance Plan and Communication Plan. The Council successful launched the 2019 STI Indicators Report nationally and in four provinces (the Free State, KwaZulu-Natal, the Eastern Cape and the Western Cape).

2.1.2 Advice

High-Level Framework for the developing new Decadal Plan

In developing the framework, the Council accepted as its point of departure the vision and goals of the 2019 White Paper on STI. In particular, the White Paper seeks to find STI-based solutions to societal challenges (including inequality, poverty, water shortages, health, education, energy, HIV/Aids and climate change), the sluggish economy and perennial STI systemic challenges (including financing, coordination and coherence). The White Paper also recognises the need for South Africa to prepare for the technological changes of the Fourth Industrial Revolution (4IR).

NACI also remained mindful of the principal contradiction facing the post-apartheid and democratic state, namely, inadequate and inequitable development, and people's need for a better quality of life. Viewing the tensions in the White Paper on STI not as constraints, but as opportunities to move forward, the Council reflected on what should inform the decadal plan from a conceptual standpoint. The Council considered issues related to the alignment of STI policy with other government policies, and the role of innovation in stimulating economic growth and societal development. It made proposals in respect of enablers, especially investment in STI, human resource capabilities, regulatory reform, innovation and international cooperation.

Review of Sector Innovation Fund (SIF)

The main aim of this study was to evaluate the design and implementation of the Sector Innovation Fund programme and present findings, lessons learnt and key recommendations. The evaluation addressed issues related to the programme's theory of change, relevance and evidence of early impact. An international benchmark analysis of the programme with similar programmes was also conducted. This evaluation was conducted through a combination of document analysis, an online quantitative survey and qualitative interviews. The revaluation resulted in key findings and recommendations on the programme`s design, relevance and implementation and were used to inform future implementation of the programme. Overall, the evaluation highlighted that the SIF programme remains relevant within the national system of innovation, especially in the context of addressing the low levels of business expenditure on research and development.

South African Foresight Exercise for STI 2030

A synthesis report was written as part of the South African Foresight Exercise for Science, Technology and Innovation 2030 (SAForSTI), led by NACI as part of its contribution to the development of a decadal plan for implementing the 2019 White Paper on STI. The exercise sought to investigate the future of STI in South Africa, and the potential of STI to address ongoing societal challenges (including unemployment, poverty, inequality, health and education) and support the creation of inclusive and sustainable socio-economic development. Societal challenges are systemic in nature and require long-term planning and a broad, holistic approach. At an international level, these challenges have been articulated as the SDGs in the United Nations 2030 Agenda for Sustainable Development. The SDGs need to be addressed and achieved in an integrated fashion, and the emphasis should therefore be on interlinkages, collective actions, coordination and collaboration between different nations, institutions and policies.

Throughout the foresight exercise, it was emphasised that, before a sustainable and just economy could even be discussed, there should be a broader understanding of both inequality (and its economic, gender, spatial and class dimensions, among others) and sustainability. Knowledge is important for the required transformation to an equitable society and a sustainable economy. Among other things, knowledge is needed to inform policy, bringing together different areas of STI and all their economic, environmental and social dimensions, as well as their potential to create sustainable new growth for South Africa.

While the foresight exercise was obviously not aimed at developing concrete implementation plans, the adoption (even in a modified form) of the STI domains and thrusts it proposes as priorities for the next decade will require the system to continue to focus on capacity building (human and infrastructure), develop more effective ways to combine resources (both public and private), develop cooperative solutions, and deploy the many STI resources at its disposal. There may also be implications for knowledge production, policy governance (for instance, ensuring two-way alignment between innovation policy and other policies), policy design and funding.

The SAForSTI process entailed the use of various methodologies informed by global experience and local context. The analysis process entailed the use of big data analytics. Broad stakeholder participation was a strong feature of the exercise. The synthesis report profited from discussions and input from NACI Council members and a range of NSI actors who participated in workshops, web-based surveys, interviews and expert-led groups. In addition, inputs were received from senior government officials and some Technology Top 100 companies. Several experts assisted with the review of inputs generated through workshops and web-based surveys, and the refinement of the draft domains and thrusts identified in the foresight exercise.

New technologies serve the needs of society, and society is changed by new technologies. STI and society must evolve together. Comparing South Africa's scientific output with the domains and thrusts identified in the foresight study, it emerged that South Africa's research position in ICT is relatively low, despite the fact that most STI domains are closely linked to the development of ICTs. The country has strengths and potential in the agricultural, astronomical, biological, microbiological, veterinary, environmental, immunological, water, and earth and space sciences, as well as in business management and accounting, the health professions, the decision sciences, and the social sciences and humanities. Areas that show potential or recent improvement include renewable energy. Areas that require urgent attention in terms of knowledge generation and human capital development include engineering, mathematics and computer sciences, transport and neuroscience.

The analysis demonstrated the feasibility of the White Paper's goals, but the decadal plan needs to ensure that research capacity, skills and infrastructure are developed in a balanced manner.

To maximise the value of the outputs of SAForSTI for the new decadal plan, emphasis was placed on uncovering the potential of STI in achieving the vision of the National Development Plan 2030. While existing capabilities and capacities can produce new impact, new thinking is typically required, and there was emphasis on the possibility of new impact being delivered by STI areas that are new to South Africa.

The following were borne in mind when the areas of STI on which to focus the foresight process were identified and analysed:

- Areas of STI that are currently robust and working effectively, and in which significant change is not anticipated.
- Areas of STI that appear to have a high potential for growth.
- Areas of STI that are relatively new in the context of the South African national system of innovation.

The last two categories were favoured because they would have the greatest potential for significant new impact in the next 10 to 15 years. In the end, SAForSTI identified the following nine STI domains (with their associated priorities or thrusts):

- The Circular Economy.
- Education for the Future.
- Sustainable Energy.
- The Future of Society.
- Health Innovation.
- High-tech Industrialisation.
- ICTs and Smart Systems.
- Nutrition Security.
- Water Security.

The above domains are to be understood within the context of South Africa's current challenges related to inequality, poverty, unemployment, food security, health, education, water, climate and so forth. These societal challenges are systemic in nature; they require longer-term planning and policy actions across technological, economic and social structures and boundaries, and across national borders.

At the same time, South Africa is living in an age of unprecedented advances in the techno-sciences, whose effects are beginning to permeate virtually every sphere of human and planetary life. This includes major advances in information and communications technology (ICT), biotechnology, nanotechnology, the Internet of Things, robotics, artificial intelligence, machine learning, blockchain technology, and additive manufacturing, among many others. All of these are elements of the new production revolution or 4IR that is transforming production processes, products, markets, services and trading systems, entire industries and entire economies.

Countries have diverse views on the challenges and opportunities presented by the 4IR, depending on their current situation, level of development, objectives and STI interests. South Africa, like other developing countries, must determine ways to use the opportunities offered by the 4IR, while at the same time preparing to deal with unintended and negative consequences. A younger population can be a catalyst and a great advantage in the context of rapidly accelerating technological innovation and the socio-technological transformations associated with the 4IR.

2.1.3 Monitoring and Evaluation

The National STI Data and Information Portal

The National STI Data and Information Portal (NSTIIP) is intended to be a central repository of all key STI data and information. During the 2019/20 financial year, the main achievements in this regard are as follows:

- The NSTIIP was developed in a phased approach using agile methodology. In the first phase, a proof of concept/demo version was developed in-house in partnership with the Department of Science and Innovation (DSI). As part of the second phase, NACI has initiated the process of sourcing a service provider that will assist in scaling up the portal by solving challenges experienced in the first version and developing additional capabilities.
- An online rebranding survey was carried out to gather user inputs for the improvement of the NSTIIP. The survey provided valuable insights into users' experience and expectations of the improved NSTIIP. The inputs received informed the framing of a hackathon.
- A two-day hackathon was hosted, bringing together diverse multidisciplinary teams of coders, data scientists, programmers, innovation policy makers, researchers and students. The teams collaborated by drawing on one another's expertise to solve pre-determined challenges experienced with the NSTIIP. The hackathon produced solutions that will contribute to scaling up the NSTIIP by improving the statistics section and implementing planned new modules.
- Engagements with the NSTIIP technical forum and other NSI stakeholders were held during the financial year to facilitate dialogue and gather consensus on the process of scaling up the NSTIIP. The technical forum meetings input was used in the development of the business case for scaling up the NSTIIP.

2019 South African Science, Technology and Innovation Indicators report

The 2019 White Paper on STI advocates the use of STI to address societal challenges and contribute towards creation of an inclusive and sustainable economy. It also clearly states the need to strengthen the monitoring and evaluation capability of the NSI. The STI Indicators Report is part of NACI's contribution to building the monitoring, evaluation and learning capability necessary for assessing the state of the NSI.

The 2019 STI indicators report highlights progress or lack thereof and provides a comparative analysis of selected indicators. While the target of general expenditure on research and development (GERD) equal to 1,5% of gross domestic product has not been realised (it was 0,82% in 2016/17), in the period covered by the indicators report, government funding of research and development (R&D) exceeded its R&D budget for the first time, and South Africa had the highest world share of scientific publications in artificial intelligence (1,01%) and the Internet of Things (0,68%), examples of research areas related to 4IR. South Africa experienced an increase of 7% in the number of scientific publications per million inhabitants between 2008 and 2017.

Some of the key concerns raised in the report include South Africa's loss of competitive advantage in medium-technology exports when compared to the average of other upper-middle income countries. Between 2007 and 2017 the country dropped from 44th to 67th position in the Global Competitiveness Index and from 38th to 58th in the Global Innovation Index. South Africa ranks low in several indicators of social progress and human development, for instance, life expectancy (161 out of 189 countries), personal safety (135), health and wellness (102), and nutrition and basic medical care (100).

The following key observations from the report should be noted by all NSI stakeholders:

- NSI actors have made a recognisable positive contribution to key national issues, such as the Oceans Economy Phakisa, nutrition, mining, biodiversity, regional innovation and the circular economy. However, most of these efforts are niche and largely uncoordinated. The country's coordination, prioritisation and funding mechanisms will need to be improved in order to realise high economic and social impact from the STI activities.

- To meet national objectives, it will be necessary to double the current ratio of GERD to GDP and treble the number of researchers in the country. The low investment in research and development (R&D) in South Africa, including by provincial government and the private sector, affects growth in 4IR-related areas (e.g. robotics, quantum computing and nanotechnology), among others. In respect of STI human capital, while there are increasing numbers of doctoral graduates, a significant proportion of these graduates are not South African. Strategies are needed to keep graduates in the country and to support local talent.

- The socio-economic development of the country requires STI. Key economic sectors such as manufacturing and mining continue to shed value, and the technology intensiveness of the country's experts is on the decline. This calls for stronger integration of the country's STI and industrial policies. Social problems such as unemployment, inequality and crime could also use STI and innovative approaches to improve people's well-being and quality of life.

It is hoped that the above observations will stimulate deeper discussions on ways to enhance the NSI's performance and contribution to socio-economic development in South Africa.

Review of the National Research and Development Strategy and Ten-Year Innovation Plan

The review was intended as a retrospective assessment of the 2002 National Research and Development Strategy and Ten-Year Innovation Plan (2008-2018), which were the instruments used to implement the 1996 White Paper on Science and Technology's broad vision and framework of STI activities. This was the first major review of the two policy instruments since their inception, and was intended to identify, map and reflect on all related activities or policy initiatives (in and outside the DSI) in order to develop a better understanding of the progress or lack of progress in implementing the two policy instruments. To ensure that review results could find immediate application in the development of the new decadal plan for STI, the emphasis was advising on what had worked and what had not, recommending actions to address current policy gaps, and informing the development of future strategies or plans. The review started in January 2019 and extensive interactive engagement by the international reference group and the NACI Council enhanced the draft report.

Development of M&E framework for the NSI

In March 2019, Cabinet approved a new White Paper on STI, which advocates strengthening M&E capability in the NSI to bolster policy performance, assigning NACI the task of developing the M&E framework in order to address, among other things, inadequate mechanisms for policy learning.

Once concern addressed by the M&E framework is the need for enhanced learning processes. A workable and effective framework requires a sound theoretical and understandable foundation, a transparent and applicable analytical model, appropriate information sources and contextualised performance indicators. The NSI M&E rationale underpinning the framework should incorporate the views and interests of all major stakeholders and actors in the STI system, where public sector and private sector perspectives are taken into account.

The NSI M&E framework deals with the overarching systems level (not sector, programme or any other lower level). Developing a systems-level M&E framework is challenging. The proposed multi-perspective framework built on decades of M&E traditions and best practices in South Africa and elsewhere, has five core components, namely, (a) an adaption of the national system of innovation, (b) theory-based evaluation derived from Theory of Change and an associated logic model, (c) an integrated set of domain-specific evaluation questions and system-level evaluation questions, (d) applying a wide range of quantitative performance indicators, and (e) introducing M&E information platforms, such as an STI scoreboard with an STI index, to track and measure the general performance of the entire system and how it moves forward.

The M&E framework makes a clear distinction between monitoring objectives and evaluation goals. In respect of monitoring, the framework presents the criteria for systems-level performance indicators and a variety of possible candidates, ranging from background or context indicators to high-priority key performance indicators. NACI took cues from the European Innovation Scoreboard as a particularly interesting indicator-based model for designing such an analytical tool for South Africa. Such a tool should distinguish between two important complementary functional approaches to assessing the general health of the South African STI system, namely, international and domestic benchmarking. An analysis of the currently available indicators, and how they map onto the structure of the STI model, offers many options for applications in M&E settings, but also reveals important information gaps and missing indicators that need to be developed.

In respect of evaluation, the framework applies the theory-based evaluation approach and focuses on systems-level evaluation questions related to previous or ongoing STI policies and (proposed) interventions. The STI policy intents and ambitions in the White Paper on STI were used as input, as were relevant systems-level issues in South African STI domains, and international and global trends in STI. The framework's tailor-made approach puts strong emphasis on connections between actors and processes in the system, both national and international.

Table 2: Strategic objectives, performance indicators planned targets and actual achievements

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 Higher Education, Science and Innovation and, through the Minister, to Cabinet						
Strategic objectives	Performance Indicator	Actual Achievement 2018/2019	Planned Target 2019/2020	Actual Achievement 2019/2020	Deviation from planned target to Actual Achievement for 2019/2020	Comments on deviations
To provide evidence-based advice on science, technology and innovation matters to the Minister of Higher Education, Science and Innovation and, through the Minister, to Cabinet, on request or on NACI's initiative	Number of STI advice documents submitted to the Minister of Higher Education, Science and Innovation	Three STI advice documents submitted to the Minister of Higher Education, Science and Innovation by 31 March 2019	Three STI advice documents submitted to the Minister of Higher Education, Science and Innovation by 31 March 2020	3 STI advice documents were submitted to the Minister of Higher Education, Science and Innovation by 31 March 2020: • A high-level framework for the development of new decadal plan for STI • A synthesis report on the South African Foresight Exercise for STI 2030 • Sector Innovation Fund Review	N/A	N/A
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						
Strategic objectives	Performance Indicator	Actual Achievement 2018/2019	Planned Target 2019/2020	Actual Achievement 2019/2020	Deviation from planned target to Actual Achievement for 2019/2020	Comments on deviations
To assess the performance of the NSI	Number of state of STI reports produced	STI Indicators Report was produced by 31 March 2019	STI Indicators report finalised by 31 March 2020	The draft STI Indicators Report was produced and engaged on by an independent reference group • *M&E framework for the NSI* A final M&E framework for the NSI was produced in November 2019	The SMS staff member responsible for the project resigned The nature of the project requires highly specialised, scarce (bibliometric) skills The production of the final report was therefore delayed	An independent expert was appointed to work with the Secretariat to finalise the report

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						
Strategic objectives	Performance Indicator	Actual Achievement 2018/2019	Planned Target 2019/2020	Actual Achievement 2019/2020	Deviation from planned target to Actual Achievement for 2019/2020	Comments on deviations
	Number of NSI M&E Reports	Two NSI M&E reports finalised by 31 March 2019	Two NSI M&E reports finalised by 31 March 2020	2 NSI M&E reports were finalised by 31 March 2020 • *Review of the National Research and Development Strategy and Ten-Year Innovation Plan Report* • *Technologies emanating from publicly funded research in South Africa*	N/A	N/A
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	Successful operation of NSTIIP	Phase 1 (upscaling of NSTIIP) by 31 March 2019	Phase 2 (full scale roll-out of the NSTIIP) by 31 March 2020	The NSTIIP is intended to be a central repository of all key STI data and information NACI initiated a process to source a service provider to assist in scaling up the portal by solving challenges experienced with the first version and by developing additional capabilities	There were delays in procurement due to national lockdown restrictions	Supply Chain Management was engaged on virtual tender processes, including a virtual Bid Specification Committee meeting

Strategic outcome-oriented goal 3: To contribute towards building a well-coordinated, effective and responsive NSI						
Strategic objectives	Performance Indicator	Actual Achievement 2018/2019	Planned Target 2019/2020	Actual Achievement 2019/2020	Deviation from planned target to Actual Achievement for 2019/2020	Comments on deviations
To contribute towards improving NSI coordination and planning	A high-level framework for new STI decadal plan submitted to the Minister of Higher Education, Science and Innovation	Final Report on foresight exercise produced was depending on the completion of the new White Paper that was delayed The Foresight Exercise could not commence due to delays in the appointment of local and international service providers by 31 March 2019	High-level framework for STI decadal plan submitted to the Minister of Higher Education, Science and Innovation by 31 July 2019	The STI decadal plan framework was submitted to the Minister of Higher Education, Science and Innovation by 31 July 2019	N/A	N/A
Strategic outcome-oriented goal 4: Transforming NACI into a smart, efficient and learning organisation						
Strategic objectives	Performance Indicator	Actual Achievement 2018/2019	Planned Target 2019/2020	Actual Achievement 2019/2020	Deviation from planned target to Actual Achievement for 2019/2020	Comments on deviations
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 implemented	Communication plan updated through engagements with the Department of Science and Innovation, Communications Unit on ways to enhance NACI's profile	Communication plan implemented by 31 March 2020	The Secretariat worked with the DSI Chief Directorate: Science Communication to produce a communication plan that was approved by Council	N/A	N/A

Strategic outcome-oriented goal 4: Transforming NACI into a smart, efficient and learning organisation						
Strategic objectives	Performance Indicator	Actual Achievement 2018/2019	Planned Target 2019/2020	Actual Achievement 2019/2020	Deviation from planned target to Actual Achievement for 2019/2020	Comments on deviations
	Internal corporate governance system implemented	The 2019/2020 Final Annual Performance Plan was submitted to the Department of Science and Technology	Corporate governance system implemented (2019/20 APP, 2018/19 Annual Report), developed and approved by the Minister of Higher Education, Science and Innovation and submitted to parliament by 31 March 2020	The new Strategic Plan and Annual Performance Plan were approved by the Minister of Higher Education, Science and Innovation and tabled in Parliament by 31 March 2020	N/A	N/A
	Knowledge management system implemented	Knowledge Management System implemented by 31 March 2019	Knowledge Management System continued to be implemented by 31 March 2020	All NACI meetings were recorded and transcripts were filed on Alfresco Staff members received training on knowledge management in March 2020 to ensure best practice	N/A	N/A

2.1.4 Events and Stakeholder Engagements

Launch of the South African STI Indicators Report findings

In an effort to ensure wider dissemination of the findings of the report, the STI Indicators Report was launched in Pretoria on 26 July 2019. The launch was well attended by various stakeholders and participants and covered by the media.

Following the national launch, the Council partnered with various organisations and institutions on round-table discussions and provincial roadshows to discuss the report, as well as key issues concerning regional and provincial innovation systems, in the Free State, KwaZulu-Natal, the Eastern Cape and the Western Cape. These engagements were attended by, among other stakeholders, heads of departments, deputy vice-chancellors, business leaders, municipalities, educators and learners doing coding and programming, and government agencies.



***Free State** – The Free State roadshow was held on 23 August 2019 in partnership with the Departments of Economics, Small Business Development, Tourism and Environmental Affairs in the Free State.*



***KwaZulu-Natal** – The KwaZulu-Natal roadshow was held on 27 September 2019 at the Durban Botanic Gardens in KwaZulu-Natal*



Eastern Cape – *The Port Elizabeth roadshow was held on 13 September 2019 at Mthawelanga conference centre in Coega Industrial Development Zone (IDZ) in partnership with the Eastern Cape Socio-Economic Consultative Council.*



Eastern Cape – *The East London roadshow was held on Thursday 12 September 2019, at the East London Industrial Development Zone Conference Centre, in partnership with the Eastern Cape Socio-Economic Consultative Council. At the end of the workshop, delegates were given an opportunity to tour the East London IDZ science park.*



Western Cape – *The Western Cape roadshow was held on 10 September 2019 at InvestSA one stop shop in Cape Town. The roadshow was hosted in partnership with the Human Sciences Research Council's Centre for Science, Technology and Innovation Indicators and the Western Cape Government.*

The national and the provincial engagements brought to light some broader societal and policy challenges. It will be necessary to reflect on the extent to which the regulatory environment (in particular the Public Finance Management Act) negatively affects service delivery, the relationship between government departments and implementing agencies, coordination between government departments across all levels, and investment and promotion of STI.

The National STI Information Portal Hackathon



The Council organised and hosted a two-day hackathon in Pretoria on 24 and 25 July 2019. The purpose of the hackathon was to bring together diverse, multidisciplinary teams of coders, programmers, innovation policy makers, researchers and the like, to draw on each other's expertise and come up with solutions to assist in scaling up the NSTIIP and making it a fully functional system.



The hackathon was also used as an opportunity to inspire the young generation to take up coding. Learners from the Chartwell Entrepreneurship and Leadership School participated as observers on both days.

Draft M&E Framework for the NSI



The draft M&E Framework was presented at a round-table discussion in Pretoria on 10 September 2019. Participants came from various institutions and provinces.

South African bio-economy



On 5 April 2019, NACI held a round table on the South African bioeconomy and progress in implementing the Bioeconomy Strategy.

South Africa Foresight Exercise for Science Technology and Innovation 2030



The Council launched the foresight exercise results on the 4 December 2019 during Science Forum South Africa 2019. The Director-General of Science and Technology, Dr Mjwara, gave a keynote address at the launch, which was well attended by various stakeholders and participants.

Table 3: NACI's participation in International events

EVENT	LOCATION	ATTENDEE	DATE
114th Session of the Organisation for Economic Cooperation and Development (OECD) Committee for Scientific and Technological Policy (CSTP)	Paris, France	Dr Mlungisi Cele	3-5 April 2019
9th Meeting of the OECD Working Party on Biotechnology, Nanotechnology and Converging Technologies	Paris, France	Dr Ntsane Moleleki	15-17 May 2019
Portland International Conference on Management of Engineering and	USA, Portland	Dr P Letaba	25-29 August 2019
OECD CSTP High-Level Round Table	Paris, France	Dr Mlungisi Cele	15-18 October 2019
The IX Annual International Academic Conference on Foresight and STI Policy	Moscow, Russia	Dr Mlungisi Cele	20 – 22 November 2019
10th meeting of the OECD Working Party on Biotechnology, Nanotechnology and Converging Technologies	Paris, France	Dr Ntsane Moleleki	2-4 December 2019



PART C
GOVERNANCE

THE NACI COUNCIL

The Science and Technology Laws Amendment Act, 2011, made it a requirement for the NACI Council to meet at least once per quarter to ensure proper oversight over NACI's advisory work programme. To align with governance, the guidelines for NACI and its operations require the NACI Executive Committee to meet as often as is necessary to direct the programme of work and to deal with important and urgent matters.

The members of NACI, other than the CEO and an officer from the Department of Trade, Industry and Competition (DTIC), are appointed in their personal capacity due to their outstanding achievement in any field of science and technology, or in the context of innovation, special knowledge, experience and insight into the role and contribution of innovation in promoting and achieving national and provincial objectives.

Table 4: Composition of the Council

Name	Designation (in terms of Council structure)	Date appointed	Date resigned	Qualifications	Area of Expertise	Board Directorships	Other Committees or Task Teams	No. of Meetings attended
Prof D Swartz	Chairperson	Sep 2018	June 2019	- BA (UWC) - MA (Essex) - Ph.D (Essex) - 9Doctorate in Human Rights Law (honoris causa)	Higher Education Science & Technology	- Nelson Mandela University investment Company; - Nelson Mandela University Trust; - Missionvale Care Centre; - Amadlelo Empowerment Trust	Universities' SA Changing World of Work Strategy Group	5
Dr S Moephuli	Interim Chairperson from July 2019	Sep 2018	-	PhD in Animal Genetics/ Animal Science	-	Nokukhanya and Albert Luthuli Peace and Development Institute – Board member Agricultural Research Council	African Union-European (AU-EU) High Level Policy Dialogue for Food Nutrition Security & Sustainable Agriculture – Working Group member	8
Dr. M Cele	Acting CEO	Sep 2018	-	PhD in Education Studies	-	-	-	8

Name	Designation (in terms of Council structure)	Date appointed	Date resigned	Qualifications	Area of Expertise	Board Directorships	Other Committees or Task Teams	No. of Meetings attended
Ms C Busetti	Council Member	Sep 2018	-	B Sc in Chemistry MBA	-	- Member of Special Economics Zone Advisory Board - Member of the National Research Foundation - Member of SiMODiSA Advisory Board - Member of Spartan SME Finance (Pty) Ltd Board - Member of Debswana Pension Fund Board - Member of Senior Experts Panel of IDC	Advisor to Ariya Bridge Trust Fund in Namibia	3
Dr T Dlamini	Council Member	Sep 2018	-	- B.Sc. Chemistry - University of Witwatersrand - B.Sc. (Hons) Chemistry - University of Witwatersrand - PhD Chemistry, Catalysis - University of Witwatersrand - Master in Business Leadership - University of South Africa	Materials Science Technology and Innovation Managemen t Strategic thinking	- CSIR Board - Board Member - Vumelana Trade 120 Director - Kusile Invest 125 Director - Mavela Consulting Services - Director	Presidential Commission on the Fourth Industrial Revolution	5
Mr I Engelbrecht	Council Member	Sep 2018	-	MBA	Innovation, Technology and Business Leadership	NACI (EXCO)	- Municipal Innovation Maturity Index (MIMI) - Assessing the viability of utility scale energy storage for the industrial, commercial transport and residential sectors in South Africa. - State of Innovation in TVET College - Mainstreaming of innovation in Public sector (member)	5

NATIONAL ADVISORY COUNCIL ON INNOVATION

Name	Designation (in terms of Council structure)	Date appointed	Date resigned	Qualifications	Area of Expertise	Board Directorships	Other Committees or Task Teams	No. of Meetings attended
Dr R Gavhi-Molefe	Council Member	Sep 2018	April 2020	PhD in Mathematics, MPhil in Science and Technology Studies - focus on Public Science Engagement	Mathematics and Science Communication/Science-Society Engagement	None	Chairperson of NACI Working Committee - Transformation in the National Systems of Innovation Programme (NSI)	4
Ms I Karg	Officer of the DTI	Sep 2018	-	- Bcom Economic - School of Government: Presidential Strategic Leadership Development Portfolio: Executive Development Programme	- 4IR & related issues of Skills, Technologies, Advanced manufacturing, Strategies, etc. - Government plans – NDP, MTSF, MTBPS and IPAP - Strategic planning and thinking - Governance and ethic Financing of programmes Budget, Expenditure & Cash Flow - National Budget preparation - Feasibility studies-funding models - Editing & Publishing of financial and Economic data - Legal: Compliance & Regulation - Public Finance Management Act & Treasury regulations - Policy formulation and development - Performance management	Board member and Co-chair for Intsimbi Future Production Technologies Initiative (PPP)	**LOCAL** - Task Team member: Ministerial Task Team(MTT) DHET: Post School Education & Training system on 4IR; - Council member: National Advisory Council on Innovation (NACI) and NACI EXCO member - MTT DTPS: Presidential Commission on the 4IR Steering Committee member: Industrial Development Think Tank with Centre for Competition Regulation & Economic Development (UJ) - Implementation/ working Committee member: Human Resource Development Strategy (HRDS) review and Co-chair for 4IR Skills & Training - Task team member for the Digital Skills Strategy of South Africa - Judge: Factory of the Year Competition	6

Name	Designation (in terms of Council structure)	Date appointed	Date resigned	Qualifications	Area of Expertise	Board Directorships	Other Committees or Task Teams	No. of Meetings attended
							INTERNATIONAL - Chairperson (2018/19) rotating chair as presiding BRICS country; - Member of Advisory Committee: BRICS PartNIR (Founding person on international 4IR Workgroup); - Steering Committee Member: SA-EU Dialogue facility - BRICS Business Council Member of Manufacturing Workstream - World Economic Forum (WEF) member: Shaping the Future of Advanced Manufacturing & Production, Global Community Group - WEF Africa participant - AU: 4IR participant - Commonwealth Digital Connectivity Working Group member	
Dr T Lephoto	Council Member	Sep 2018	-	Bsc, BScHons, MSc, PhD, MBA candidate	Microbiology, Biotechnology, Bioinformatics, Genomics and Science Innovation	- Nematech Bioscience - GoMaths Foundation	- NACI Bio Economy Audit Project member and Chairperson - National Research Foundation Committee Member for Thuthuka grant applications for 2020 - National Research Foundation Committee Member for the Review of applications	4

Name	Designation (in terms of Council structure)	Date appointed	Date resigned	Qualifications	Area of Expertise	Board Directorships	Other Committees or Task Teams	No. of Meetings attended
							submitted in the 2018 Free Standing Innovation and - Scarce Skills Postdoctoral (FISS) Call for 2019, 2018 - National Research Foundation Committee Member for the Review of applications submitted in the 2018 Free Standing Innovation and Scarce Skills Postdoctoral (FISS) Call for 2018, 2017 National Research Foundation Review Committee member for the DAAD-NRF Joint In-Country Masters and Doctoral Scholarships in 2018, 2017	
Ms M Matikinca-Ngwenya	Council Member	Sep 2018	-	- Bachelor of Commerce - Honours Degree (Econome-trics) and; - Candidate for a Master of Management Finance and Investment	Economist and She plays a critical role in providing macro-economic insight to FNB and its clients while actively participating in media commentary	-	Member of the Presidential Economic Advisory Council	4
Ms T Mthethwa	Council Member	Sep 2018	Honors in Computer Science and information systems	Computer Science and Information systems	-	Mentor Innovation Hub	Honors in Computer Science and information systems	2
Mr D Naidoo	Council Member	Sep 2018	-	MSc	Water and Sanitation, Policy, Strategy, Innovation	- HumanRight 2Water - Water Policy Group	-	4

Name	Designation (in terms of Council structure)	Date appointed	Date resigned	Qualifications	Area of Expertise	Board Directorships	Other Committees or Task Teams	No. of Meetings attended
Dr B Phakathi	Council Member	Sep 2018	-	- MBCHB (UKZN) FCS (SA) MMED (UP) - PhD candidate	Education and Research	-	- Chair-NACI Transformation committee - Foresight task team	8
Dr M Qhobela	Council Member	Sep 2018	-	PhD	Plant Pathology	- SALT FOUNDATION PTY LTD - TENET – Board Chairperson - MPATLOANE	- SALT FOUNDATION PTY LTD - TENET - MPATLOANE INVESTMENTS - CHE	5
Prof H Soodyall	Council Member	Sep 2018	-	- B.Sc. (Hons) (UDW); - M.Sc. (Biotech-nology)(Wits); PhD (Human Genetic) (Wits)	Human Genetics, Ethics, Human Origins and Evolution	YAZI (Centre for Science and Society in Africa)	- COHORT - Open Science, Advisory Board Africa Open Science Platform,	7
Prof C Soudien	Council Member	Sep 2018	-	PhD	Sociology, education, history	IEB, Project Literacy, Clanwilliam Trust	-	7
Mr P Steenkamp	Council Member	Sep 2018	-	- Executive MBA (Henley Business School); - Honours in Organisa-tional Psychology (Rhodes University)	Innovation Integration Expert	- I Am Jack Frost Holdings (PTY) Ltd; - Creative Leadership Collective (PTY) Ltd	Mainstreaming of Innovation across Government and Private Sector + Technologies Emanating Out of Publicly Funded Research in South Africa + Sovereign Innovation Fund	6

EXECUTIVE COMMITTEE

The duties of the Executive Committee (ExCo) are to dispose of matters determined by the Council. The ExCo's terms of reference and decision-making power for each matter referred, are decided by NACI.

Table 5: Current Exco Meeting attendance (2019 - 2020 Council Members)

EXCO MEMBER	MEETINGS ATTENDED			
	11/03/2019	11/11/2019	04/03/2020	No. of Meetings attended
Prof D Swartz ⬇ Dr S Moephuli (Interim Chairperson from	√	√	√	1 2
Dr M Cele – Acting CEO	√	√	√	3
Mr I Engelbrecht	√	√	√	3
Ms I Karg	√	√	√	3
Ms Matikinca - Ngwenya	√	X (Maternity Leave)	X	1



PART D
HUMAN RESOURCE MANAGEMENT

1. INTRODUCTION

To implement its advisory work programme, the NACI Council is supported by the NACI Secretariat. As at the 31 March 2020, the post establishment of the Secretariat was at 13, with 09 positions filled and 04 vacant which constitute a 30 % vacancy rate. There are four members of Senior Management Service and three technical employees at the level of Deputy Director. There were two people employed on fixed term contracts in the current reporting period, to assist the team with the workload. There are three vacant positions (Chief Executive Officer, Deputy Director and Assistant Director).

For the reporting period, only a single employee terminated services through resignation at the end of the financial year which reflect a low turnover rate and the position will be prioritised in the next financial year. The Secretariat complied with the Performance Management and Development System and all employees submitted their performance agreements and assessment and only 8 employees qualified for performance rewards by 31 December 2019.

The Employment Equity profile of the Secretariat is 50/50 representation and 0 % compliance for employees living with disability. The target is to increase female representation to 75 % over the next financial years.

2. HUMAN RESOURCE OVERSIGHT STATISTICS

Table 6: Personnel Cost by programme/ activity/ objective

Programme/ activity/ objective	Total Expenditure for the entity (R'000)	Personnel Expenditure (R'000)	Personnel exp. as a % of total exp. (R'000)	No. of employees	Average personnel cost per employee (R'000)
Secretariat	16 407	7 243	44.15%	10	724

Table 7: Personnel cost by salary band

Level	Personnel Expenditure (R'000)	% of personnel exp. to total personnel cost (R'000)	No. of employees	Average personnel cost per employee (R'000)
Top Management	-	-	-	-
Senior Management	4 102	56.63%	4	1 026
Professional qualified	2 136	29.49%	3	712
Skilled	1 005	13.88%	3	335
Semi-skilled	-	-	-	-
Unskilled	-	-	-	-
TOTAL	7 243	100%	10	724

Table 8: Performance Rewards

Programme/ activity/ objective	Performance rewards				Personnel Expenditure (R'000)		% of performance rewards to total personnel cost (R'000)	
	Notch progression		Bonus		Notch progression	Bonus	Notch progression	Bonus
	No. of employees	Beneficiaries	No. of employees	Beneficiaries				
Top Management (L15-16)	0	0	0	0	0	0	0	0
Senior Management (L13-14)	4	3	4	0	305 760	0	0.0008	0
Professional qualified (L9-12)	3	3	3	0	41 496	0	0.0001	0
Skilled (L6-8)	3	2	3	1	8 574	24 031.87	0.00002	0.00006
Semi-skilled (L3-5)	0	0	0	0	0	0	0	0
Unskilled (L1-2)	0	0	0	0	0	0	0	0
TOTAL	**10**	**8**	**10**	**1**	**355 830**	**24 031.87**	**0.0001**	**0.00006**

Table 9: Training Costs

Programme/ activity/ objective	Personnel Expenditure (R'000)	Training Expenditure (R'000)	Training Expenditure as a % of Personnel Cost.	No. of employees trained	Average training cost per employee
NACI Training & Dev	7 243 000	R49 083.01	0.7%	6	R8 180.50

Table 10: Employment and vacancies

Programme/ activity/ objective	2019/2020 No. of Employees	2019/2020 Approved Posts	2019/2020 No. of Employees	2019/2020 Vacancies	% of vacancies
NACI Training & Dev	9	13	9	4	23%
TOTAL	**9**	**13**	**9**	**4**	**30%**

Table 11: Employment changes

Salary Band	Employment at beginning of period	Appointments	Terminations	Employment at end of the period
Top Management	0	0	0	0
Senior Management	4	0	1	3
Professional qualified	3	0	0	3
Skilled	3	0	0	3
Semi-skilled	0	0	0	0
Unskilled	0	0	0	0
TOTAL	**10**	**0**	**1**	**9**

Table 12: Reasons for staff leaving

Reason	Number	% of total no. of staff leaving
Death	0	0
Resignation	1	10
Dismissal	0	0
Retirement	0	0
Ill health	0	0
Expiry of contract	0	0
Other	0	0
TOTAL	**1**	**10**

Table 13: Labour Relations: Misconduct and disciplinary action

Nature of disciplinary Action	Number
Verbal Warning	0
Written Warning	0
Final Written warning	0
Dismissal	0

Table 14: Equity Target and Employment Equity Status

Levels	MALE							
	African		Coloured		Indian		White	
	Current	Target	Current	Target	Current	Target	Current	Target
Top Management	0	0	0	0	0	0	0	0
Senior Management	3	0	0	0	0	0	0	0
Professional qualified	1	0	0	0	0	0	0	0
Skilled	1	0	0	0	0	0	0	0
Semi-skilled	0	0	0	0	0	0	0	0
Unskilled	0	0	0	0	0	0	0	0
TOTAL	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Levels	FEMALE							
	African		Coloured		Indian		White	
	Current	Target	Current	Target	Current	Target	Current	Target
Top Management	0	1	0	0	0	0	0	0
Senior Management	1	2	0	0	0	0	0	0
Professional qualified	2	0	0	0	0	0	0	0
Skilled	2	0	0	0	0	0	0	0
Semi-skilled	0	0	0	0	0	0	0	0
Unskilled	0	0	0	0	0	0	0	0
TOTAL	**5**	**3**	**0**	**0**	**0**	**0**	**0**	**0**

Levels	Employees living with disability			
	Male		Female	
	Current	Target	Current	Target
Top Management	0	0	0	0
Senior Management	0	0	0	0
Professional qualified	0	0	0	0
Skilled	0	0	0	0
Semi-skilled	0	0	0	0
Unskilled	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**



PART E
FINANCIAL INFORMATION

1. REPORT OF EXTERNAL AUDITOR

NACI is not subject for external auditing.

2. ANNUAL FINANCIAL PERFORMANCE

The NACI allocated budget for 2019/20 was R19,506 million, including compensation of employees. The expenditure on goods and services from the annual budget was R9,137 million. The available funds in respect to the compensation of employees occurred as a result of three people who were employed on fixed term contracts in the current reporting period.

Table 15: Financial Performance in 2019/20 Financial Year

Description	Expenses	Commitments	Allocated Budget	Available funds
	(R'000)	(R'000)	(R'000)	(R'000)
Compensation of employees	7 243	0	9 891	2 648
Goods and Services	9 137	302	9 587	148
Payment of Capital Assets	25	0	26	1
Transfers and Subsidies	1	0	2	1
Total	16 406	302	19 506	2 798

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