NACI ANNUAL REPORT 2017/18

science & technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

NACI
NATIONAL ADVISORY COUNCIL ON INNOVATION

NACI ANNUAL REPORT 2017/18

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THE NACI COUNCIL (2014 – 2018)

The fourth NACI Council took office in September 2014 and is constituted of membership drawn from diverse backgrounds including academia, science councils and private sector.

Chairperson

Prof. C de la Rey

Acting CEO

Dr M Cele

Ms C Busetti

Prof. R Diab

Dr T Dlamini

Prof. G Gray

Dr A Jammine

Dr S Moephuli

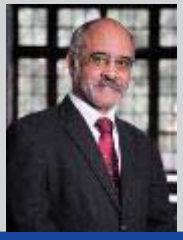
Ms Z Monnakgotla

Mr D Naidoo

Mr K Nassiep

Mr S O'Carroll

Dr M Qhobela



Prof. C Soudien

Mr P Steenkamp

Prof. J Thomson

Ms I Karg

ABBREVIATIONS & ACRONYMS

APP	Annual performance plan
DST	Department of Science and Technology
CEO	Chief Executive Officer
CeSTII	Centre for Science, Technology and Innovation Indicators
CoPs	Communities of Practice
CSIR	Council for Scientific and Industrial Research
GCI	Global Competitiveness Index
GII	Global Innovation Index
GDP	Gross domestic product
GloPID-R	Global Research Collaboration for Infectious Disease Preparedness
GSF	Global Science Forum
HSRC	Human Sciences Research Council
IPAP	Industrial Policy Action Plan
NACI	National Advisory Council on Innovation
NDP	National Development Plan
NRF	National Research Foundation
NSI	National System of Innovation
NSTIIP	National Science, Technology and Innovation Information Portal
OECD	Organisation for Economic Co-operation and Development
PCT	Patent Cooperation Treaty
R&D	Research and development
SADC	Southern African Development Community
SAGE	Scientific Advisory Group for Emergencies
SDGs	Sustainable Development Goals
SMMEs	Small, medium and micro enterprises
STI	Science, technology and innovation
TEA	Total Early-stage Entrepreneurial Activity
TIMMS	Trends in International Mathematics and Science Study
TIP	Innovation and Technology Policy
UCT	University of Cape Town
UK	United Kingdom

PART A: GENERAL INFORMATION

1. Chairperson's overview

On behalf of the National Advisory Council on Innovation (NACI), I am delighted to present the 2017/18 Annual Report, which marks the end of the term of the current Council.

In generating advice for the Minister of Science and Technology, the Council responded to requests for relevant, responsive and evidence-informed advice offering explicit and actionable policy recommendations, while dealing with limited resources. In this regard I am pleased to report that the Council succeeded in its mandate to provide advice, which included a review of the 1996 White Paper on Science and Technology, an analysis of the performance of the National System of Innovation, the development of the National Science, Technology and Innovation (STI) Information Portal, the review of the draft new White Paper on STI, and the development of a measurement framework for the Bioeconomy Strategy. These outputs will undoubtedly have positive effects on the efficacy of STI policy in addressing socio-economic challenges.

NACI also proactively generated advice on key issues it identified, including the energy-water-food nexus, venture capital, skills, and gender issues, and initiated work on technology diffusion, energy storage, and the uptake of locally produced technologies, which will be completed in the 2018/19 financial year.

The annual NACI STI Indicators Booklet was published and presented at stakeholder events. The Council was gratified with the engagement and debate generated by this publication. There are ongoing efforts to enhance the content and communication of the annual STI Indicators Booklet. It is hoped that the booklet will eventually become the central source of information on STI for policymakers, analysts, researchers, civil society and leaders of enterprise.

The draft new White Paper on STI espouses an expanded role for NACI, with explicit reference to foresight, monitoring and evaluation (M&E). Both the STI Indicators Booklet and the current the STI Foresight Exercise lay a foundation for this.

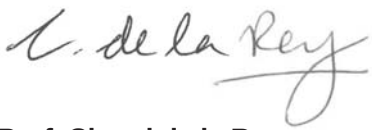
International and local networking and partnerships have been vital to the work of the Council, and NACI participated in several international forums, as well as successfully hosting the 2017 Third Global Forum of National Advisory Councils.

The increasing participation of local stakeholders in various NACI activities was encouraging. Some of NACI's local partners contributed research and policy analysis expertise, while others participated in various round-table discussions and reference groups and thereby enriched the impact of NACI's work.

We hope that all stakeholders in the National System of Innovation (NSI), including the general public, will find this Annual Report informative.

As the term of the current NACI Council comes to an end, I would like to express my sincere gratitude to all the Council members and to the many others who contributed to our work. A special note of appreciation is extended to the Acting CEO, Dr Mlungisi Cele, and the Secretariat team.

My special appreciation goes to the former Minister of Science and Technology, Mrs Naledi Pandor, and the current Minister of Science and Technology, Ms Mmamoloko Kubayi-Ngubane, both of whom have expressed high regard for NACI's contribution and have provided consistent support.



Prof. Cheryl de la Rey

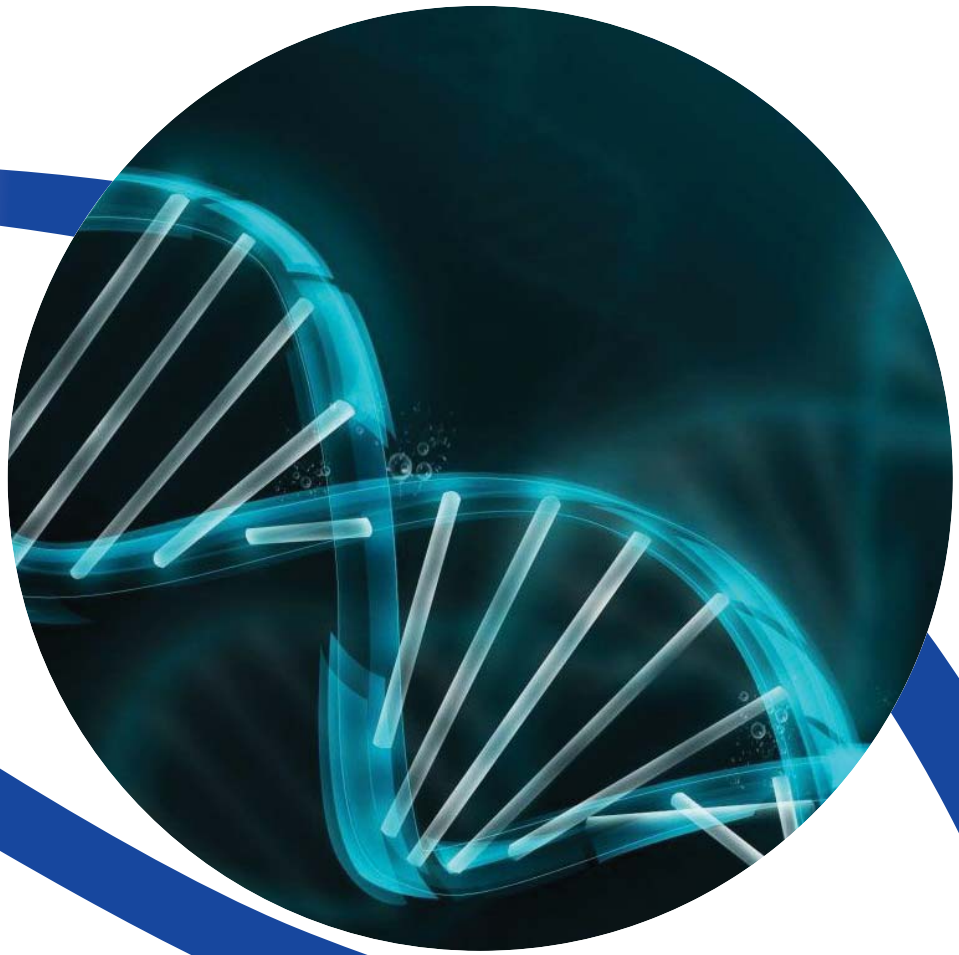
2. Official sign-off

It is hereby certified that this is the Council's Annual Report.

Prof. Cheryl de la Rey
NACI Chairperson Signature

Ms Pretty Makukule
Chief Financial Officer (DST) Signature

Dr Mlungisi Cele
Acting CEO (NACI) Signature



3. Corporate overview

3.1 Mandate

NACI is mandated to advise the Minister of 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 sphere.

3.2 Vision

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

3.3 Mission

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

3.4 Values

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

PART B: PERFORMANCE INFORMATION

4. Activities, performance and outputs – 2017/18 financial year

The Council achieved most of its predetermined objectives for the 2017/18 financial year. Some achievements related to Ministerial requests, while others were initiated by the Council. The Council hosted important events and built critical networks and partnerships.

Council's Responses to Ministerial Requests

4.1 National Science, Technology and Innovation Information Portal

A fully developed and functional national STI data and information portal will play a critical role in enhancing the monitoring, evaluation and learning capability of the NSI. The development of the National Science, Technology and Innovation Information Portal (NSTIIP) is divided into two phases, as illustrated in Figure 1. The portal was launched in Pretoria, Durban and Cape Town in 2017, and is accessible through www.naci.org.za/nstiip. Collaboration between NACI and NSI actors, including the National Research Foundation (NRF), Council for Scientific and Industrial Research (CSIR) and Human Sciences Research Council (HSRC), has played a critical role in the development of the NSTIIP.

The user requirements and experience of the portal continue to be documented. A Technical Forum was established and has already assisted with addressing speed and stability issues.

Once the user requirements and experience have been thoroughly documented, the upscaling phase of NSTIIP development will follow. This will entail a broadening of the data and information, and the introduction of additional features, such as the Communities of Practice (CoPs) and Directory of Experts.

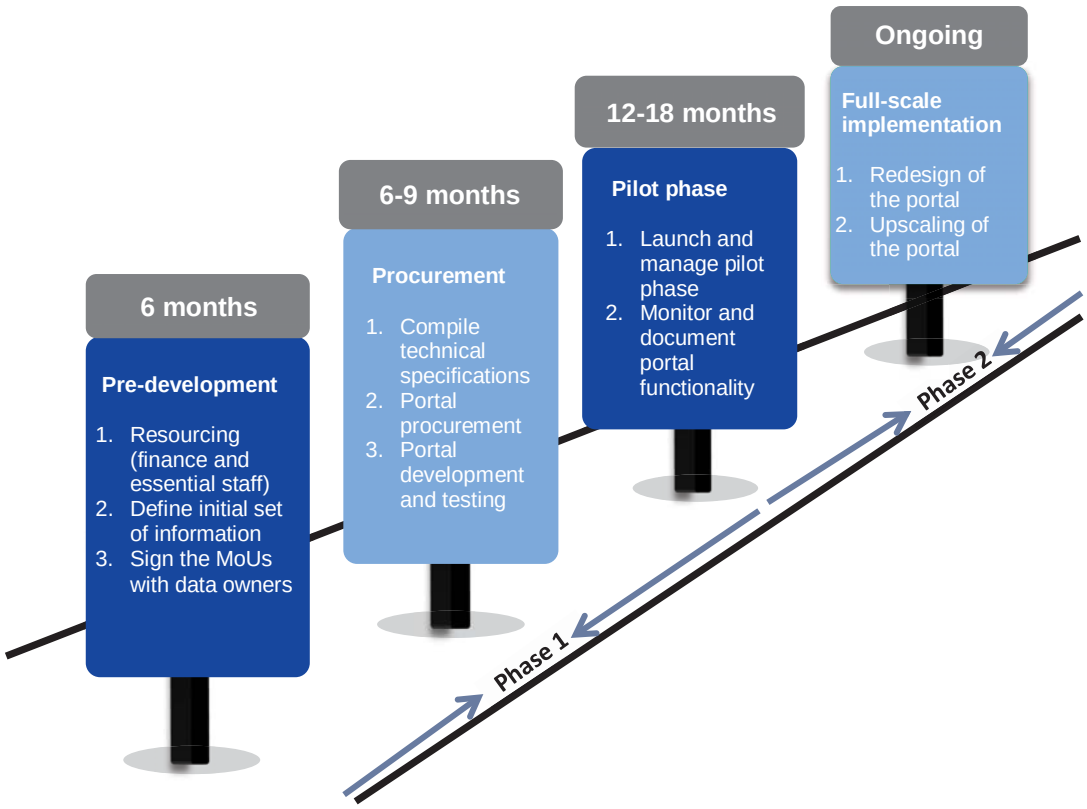


Figure 1: The roadmap for the establishment of the National Science, Technology and Innovation Information Portal

4.2 Bioeconomy measurement framework

The South African Bioeconomy Strategy was launched by the then Minister of Science and Technology, Ms Naledi Pandor, in January 2014. At the outset the strategy did not clearly outline a measurement framework for monitoring and evaluating its implementation over time.

In support of government priorities of economic development outlined in the National Development Plan (NDP), Industrial Policy Action Plan (IPAP) and New Growth Path – and since the Bio-economy Strategy aims to make a significant contribution to South Africa's gross domestic product (GDP) by 2050 – NACI undertook a study to design indicators for measuring, evaluating and monitoring the South African bioeconomy at both sectoral and economy-wide levels.

Suitable data sources for measuring, evaluating and monitoring the South African bioeconomy, as well as its impact on economic development (including GDP/employment growth), have been identified.

The performance indicators were selected to measure the impact of the strategy on the following components of the economy:

- Output (science, technology and economy)
- Employment
- Exports
- Investment
- Innovation

The data (and data producers) that could possibly be utilised to develop each of these performance indicators have been identified.

4.3 Design and implementation evaluation of the Sector Innovation Fund Programme

This evaluation Sis expected to identify the Sector Innovation Fund Programme's theory of change (logic model) or to derive one if it does not exist; to determine the relevance and overlap of the programme with other government innovation grants for the private sector; to benchmark the programme against similar local and international programmes in terms of its administrative efficiency; to measure earlier evidence of the programme's impact; and to recommend improvements in terms of the design, implementation and impact of the programme.

The evaluation used multiple data collection methods (documentation, quantitative survey and qualitative interviews). An online quantitative survey involved a census-type sampling from a population of 202 potential respondents (82 steering committee members and 120 principal researchers). A total of 91 responses were collected (with 61 valid responses), representing an overall response rate of 45% (48.8% for the steering committee members and 42.5% for the principal researchers). Thirteen qualitative interviews were held with government and industry association representatives as a follow-up to the survey and to fill in gaps in answers to the survey questions.

The Secretariat is currently writing up the evaluation and will finalise the report during the 2018/19 financial year.

Council's Self-initiated Activities

4.4 2017 South African Science, Technology and Innovation Indicators Report

The annual South African Science, Technology and Innovation (STI) Indicators Report was generated. This publication is part of NACI's contribution to building the monitoring, evaluation and learning capability necessary for assessing the health of the NSI. The 2017 STI Indicators Report provides valuable input into the current policy development process.

The South African Innovation Scorecard informs the 2017 STI Indicators Report. The scorecard was originally published for the period 2010-2014. In the 2017 STI Indicators Report, the scorecard has been updated to reflect the performance of the country's system of innovation for the period 2010-2015. All individual indicators have been amended, and the base year has been appropriately re-adjusted, taking into account the fact that a number of variables, such as GDP, change over time.

Figure 2 shows the values of the composite indicators for the periods 2010 – 2014 and 2010 – 2015. The overall indicator rose from 0.105 in 2010 to 0.136 in 2010, indicating an overall improvement of almost 30% during the period.

Enablers and outputs also improved, but firm activities continue to decline. Arresting further decline of firm activities poses a challenge to all NSI actors including NACI.

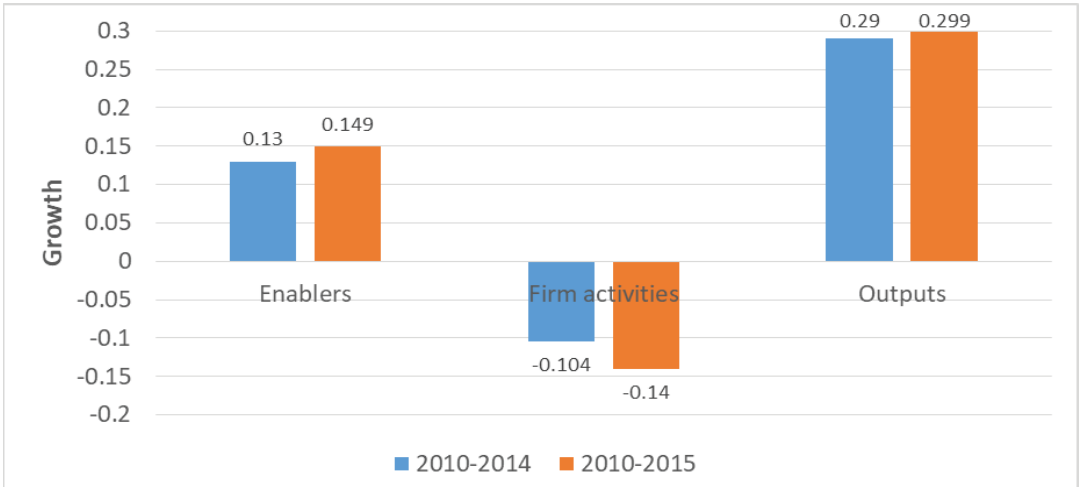


Figure 2: Performance of innovation dimensions (2010-2014 and 2010-2015)

Table 1 shows the growth or decline of individual indicators for the periods 2010 – 2014 and 2010 – 2015. Among the enablers, venture capital as a percentage of GDP reversed its decline. Among the firm activities, only public-private co-publications exhibited growth. Patent Cooperation Treaty (PCT) patent applications showed higher declines than in the previous period. Similarly, business finance to higher education institutions continued to decline. Among the outputs, the contribution of exports in commercial services to total exports also continued to decline.

Table 1: Performance score per indicator for 2010-2014 and 2010-2015

Indicators	Growth or decline (2010-2014)	Growth or decline (2010-2015)
Enablers		
New doctorates per 1 000 of the population aged 25 to 34	0.43	0.25
Percentage of the population aged 25 to 64 having completed tertiary education	0.15	0.24
International scientific co-publications per million of the population	0.52	0.52
Scientific publications among the top 10% most cited publications worldwide as a percentage of the total scientific publications in the country	0.16	0.16
R&D expenditure in the public sector (as a percentage of GDP)	0.027	0.16
Venture capital (as a percentage of GDP)	-0.49	0.168
Firm activities		
R&D expenditure in the business sector (as a percentage of GDP)	-0.108	-0.08
Public-private co-publications per million of the population	**0.27**	**0.42**

Indicators	Growth or decline (2010-2014)	Growth or decline (2010-2015)
Business finance to higher education institutions	-0.25	-0.27
PCT patent applications per billion of GDP	**-0.16**	**-0.3**
PCT patent applications in societal challenges per billion of GDP	-0.06	-0.53
Trademarks per billion of GDP	**-0.33**	**-0.14**
ICT investments as a percentage of GDP	-0.09	-0.09
Outputs		
License and patent revenues from abroad as a percentage of GDP	0.51	0.38
Contribution of high-technology product exports to total exports	0.32	0.176
Contribution of medium high-technology product exports to total exports	0.009	0.009
Contribution of exports in commercial services to total exports	-0.038	-0.05
Life expectancy at birth	0.0073	0.29
Internet users as a percentage of the population	1.10	1.16
GDP per energy use	0.14	0.13

Source: South African STI Indicators Booklet 2017 (NACI)

The STI Indicators Report further identifies areas where progress has been achieved or not achieved. South Africa's ranking in the Global Innovation Index (GII) dropped from 54th in 2016 to 57th in 2017 (out of 127 countries ranked), while its ranking in the Global Competitiveness Index (GCI) dropped from 47th in 2016 to 61st in 2017 (out of 137 countries ranked). South African innovation and competitiveness are still ranked highest among African countries, most notably above those of Nigeria and Egypt (See Table 2).

Table 2: Benchmarking of SA's innovation and competitiveness ranking, 2017

	South Africa	Brazil	China	India	Russia	Egypt	Nigeria
GII ranking	57	69	22	60	45	105	119
GCI ranking	61	80	27	40	38	100	125

Research and development investment, as a percentage of GDP, increased to 0.8% in 2015/16, slightly up from the 0.77% recorded in 2014/15. However, this is still far from the target of 1.5% by 2019.

The venture capital industry plays a significant role in catalysing and growing technological entrepreneurship, especially in new high-growth start-ups. According to the 2017 survey of the Southern African Venture Capital and Private Equity Association, captive government funds, at 39%, were proportionally the largest source of funding for all the active deals invested, followed by independent funds at 35%.

The NSI human resource development pipeline remains constrained. NACI continually monitors and frequently comments on the percentage of Grade 12 learners who obtain 50% or more in mathematics. This percentage has been fluctuating for over a decade, from 18.1% in 2008 to 11.8% in 2015. At tertiary level, most of the science, engineering and technology doctoral degrees awarded in 2015 were in life sciences (24%), followed by health and related clinical studies (20%), physical sciences (20%) and engineering (16%). There is a serious shortage of women with high-end skills in disciplines, such as engineering, mathematics and statistics, and computer and information sciences. There is also a shortage of African graduates with doctoral degrees in life sciences and engineering. The transformation challenge remains, and all NSI actors need to consider what they can do to address it.

South Africa has a high rate of entrepreneurs who innovate with technology of less than five years. In 2016, the percentage of new entrepreneurs innovating with technology of less than five years was 55.1%, while for established entrepreneurs the percentage was 53.2%.

Table 3: Benchmarking of SA entrepreneurial activity phases, 2016

	SA	Brazil	China	India	Russia
Total Early-stage Entrepreneurial Activity (TEA) rate	6.9	19.6	10.3	10.6	6.3
TEA rate with basic education	4.6	19.5	6.6	8.1	6.4
TEA rate with complete secondary education	7.4	20.5	11.2	11.3	2.8
TEA rate with post-secondary education	**11.9**	**14.4**	**12.1**	**14.1**	**7.1**
Percentage of new entrepreneurs innovating with technology of less than five years	55.1	4.0	35.4	55.7	23.6
Established business ownership rate	2.5	16.9	2.5	7.5	5.3
Percentage of established entrepreneurs innovating with technology of less than five years	53.2	4.0	38.5	40.4	24.0

Source: 2016/17 Brazil Report (Global Entrepreneurship Monitor)

4.5 Biomass Assignment Model within a Bio-based Economy

Over the past few years, the concept of the bioeconomy has been rising steadily in the global political agenda. South Africa is one of more than 40 countries that have either a dedicated bioeconomy strategy or policies consistent with a bioeconomy. These countries have announced that they will, through the bioeconomy, boost production of renewable resources from renewable biological materials and convert them into products, such as food, chemicals, animal feed and bioenergy.

The purpose of this work stream was to provide a baseline for the development of a biomass usage policy, aimed at bringing together a wide range of potential applications of biomass within the context of a bio-based economy. NACI has in the past stated that, in South Africa, biomass must be assigned to uses that result in higher impacts in solving economic, social and ecological challenges. The work stream made recommendations that address the need for equity, i.e. fair distribution of costs and benefits in the biomass value chain, and reducing ecological impacts.

Conventional thinking about climate change has prioritised the application of biomass for energy production, due to substantial greenhouse gas emissions associated with fossil fuel utilisation. However, in the pyramid of biomass application priorities, energy represents a low-value, high-volume product. Considering the limited biomass resources available in South Africa, the pyramid indicates that more economic value can be extracted from biomass through conversion to higher value products.

NACI used econometric assessments to make recommendations on how to ensure biomass sustainability and competitive allocation to sectors of the bio-based economy that result in more value-added applications (i.e. sectors that make the most optimal use of biomass resources). Priority should be given to applications that are more likely to solve South Africa's triple challenge of poverty, inequality and unemployment. It is also important to recognise that the bio-based economy will require policy support to overcome the economic barriers to its implementation, mostly due to lack of cost-competitiveness compared to fossil fuel-based products. Mechanisms will ultimately be required to convert the environmental and social benefits of bio-based products and processes into economic advantages that will provide the industry with cost-competitiveness compared to fossil fuel-based products.

Taking into consideration that South Africa has limited biomass resources with multiple, competing possible applications, the country needs to prioritise biomass usage with incentives. Priority areas should be those that address the economic, social and environmental needs of all South Africans.

4.6 The Analysis of Government Support Programmes for Business Research and Innovation

The national surveys of research and experimental development (R&D) indicate that business expenditure on R&D as a percentage of GDP contracted from 58.6% in 2008/09 to 45.4% in 2014/15. While it is not a perfect metric, the

drop in business R&D expenditure suggests a growing innovation gap between South Africa and many of its peers. According to the World Bank's South Africa Economic Update 2017, the country is falling behind the global leaders in technology from a productivity standpoint.

Other challenges facing the NSI, the World Bank reported, include a business environment insufficiently conducive to the emergence of innovative start-ups, a low skills base, slow and expensive broadband, and high trading costs. Added to this is the shrinking of firm activities identified in the 2017 South African STI Indicators Report.

At the same time, the World Bank cited the high levels of academic excellence, entrepreneurial networks in large metros, and array of operational public programmes to support research and development as strengths of the country's NSI. Most significantly, the World Bank concluded that South Africa has "large untapped potential for innovation". Innovation has the potential not only to raise South Africa's competitiveness, enabling it to break into new markets and create new jobs, but also to significantly improve the lives of millions of poor South Africans, and boost their chances of economic participation, through the provision of better and cheaper goods and services, particularly in health, transport and e-government. Fundamentally, innovation can help South Africa to diversify from its traditional commodity-based economic model, which for decades has failed to reduce inequality in the country.

In 2016, NACI convened a Business Symposium aimed at establishing the views of business on the continued low levels of business investment in R&D.

NACI conducted a desktop study of government support programmes, such as the Support Programme for Industrial Innovation, the Technology and Human Resources for Industry Programme, and the R&D tax incentive, Sector Innovation Fund and Seed Fund programmes. The purpose was to establish whether these programmes had achieved their intended outputs or outcomes (in the form of technology development, human capital development, government, academia and industry partnerships and leveraged funding). The study did not assess their impact, which is going to be the subject of a National Treasury project. There were two limitations to the study, namely that it was constrained by time and relied on publicly accessible reports and evaluations.

4.7 The state of imported technology: Cost, benefits and impact of imported technologies in South Africa

During the 2017/18 financial year, NACI initiated a project to look into the state of imported technologies. South Africa, despite being a net importer of technologies, has not been paying much attention to their costs, benefits and impact – a situation which threatens to hold back growth and increase social and economic inequalities. In this context, costs refer to royalties and licenses, intermediate goods and capital equipment, while benefits could include revenue growth, productivity enhancement, employment growth (skilled *versus* unskilled), higher exports, and increased contribution to the fiscus and socio-economic development.

In order to determine the costs, benefits and impact of importing technologies, NACI planned to utilise various qualitative and quantitative approaches, including –

- a literature review to ascertain local and international perspectives;
- a review of local instruments that might influence importation of technologies;
- an econometric analysis study based on existing administrative records data;
- a survey of enterprises or firms of different sizes;
- in-depth interviews with key experts;
- case studies; and
- stakeholder workshops.

After the Council approved the inception report in March 2018, NACI embarked on some of these activities, including the literature review and review of instruments, the design of the Internet-based survey, the questionnaire design, the planning of the econometric analysis study, and the analysis of existing data on technology balance of payments. However, most of the project work will be carried out during the 2018/19 financial year.

The findings of this study will enable NACI to establish a link between the importation of technologies and the benefits thereof, and will inform policy advice to be submitted to the Minister of Science and Technology.

4.8 Utilisation of technologies emanating from publicly funded research in South Africa

It is widely accepted that countries that spend more of their budgets on research experience better economic performances. In the case of South Africa, while considerable amounts are spent on research, scientists and statutory funding bodies argue that still more investment is needed in order to accelerate economic growth.

In order to demonstrate to policymakers how publicly funded research can stimulate economic growth and help to reduce the country's technology balance of payments, NACI undertook a study to measure –

(a) the level of business uptake and use (commercialisation) of technologies emanating from publicly funded research in South Africa; and

(b) the extent to which this has increased South Africa's global competitiveness, promoted the establishment of small high-technology firms and created new jobs.

The study assesses the effectiveness of policy instruments that support the uptake of technologies emanating from publicly funded research, and reflects on lessons that the country can learn from other initiatives around the world. The outcomes of the study will deepen our understanding of how technologies that emanate from publicly funded research are used by business, and give insights into whether publicly funded research is aligned to business needs. NACI will use these findings to generate recommendations for fine-tuning the various national instruments aimed at promoting public funding of research, as one way of reducing the country's technology balance of payments. The work will also inform other planned NACI projects, such as the framework design for a new decadal plan for STI.

4.9 Summary of NACI's performance against strategic goals and objectives

Table 4: Performance against the NACI 2017/18 Annual Performance Plan

Output	Performance indicator(s)	Original annual target	Actual performance	Overall progress indicator	Reason for variance	Actions taken
STI advice	Number of STI policy advice documents submitted to the Minister of Science and Technology	3 STI policy advice documents submitted to the Minister of Science and Technology by 31 March 2018	3 STI policy advice documents were submitted to the Minister and Director-General focusing on the following areas: • Draft White Paper on Science, Technology and Innovation • Analysis of Government Support Programmes for Business Research and Innovation • South African STI Indicators Report In addition, draft advice on a Biomass Assignment Model within a Bio-based Economy was finalised.	Achieved	Not applicable	Not applicable
State of STI reports	Number of state of STI reports produced	State of STI Report finalised by 31 March 2018	The State of STI Report was produced before end March 2018.	Achieved	Not applicable	Not applicable

Output	Performance indicator(s)	Original annual target	Actual performance	Overall progress indicator	Reason for variance	Actions taken
NSI M&E reports	Number of NSI M&E reports produced	2 NSI M&E reports finalised by 31 March 2018	• 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. • A draft Bio-economy Strategy Measurement Framework was produced. • An inception report on an analysis of the cost, benefits and impact (as well as absorption and diffusion) of imported technologies was produced.	Partially achieved	The review of the Sector Innovation Fund Programme was largely done internally by the Secretariat. This demanded more learning and efforts than earlier envisaged. The Minister requested the development of a Bio-economy Strategy Measurement Framework.	A team of experts was appointed to support the Secretariat in crafting the Bio-economy Strategy Measurement Framework. An expert was appointed to support the Secretariat in evaluating the Sector Innovation Fund Programme.
National STI Information Portal	National STI Information Portal (NSTIIP) developed	Documented user experience and business case developed for upscaling the NSTIIP by 31 March 2018	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.	Partially achieved	The business case could not be developed. The portal (at the time) needed to be stable, user-friendly and functional. A solution had to be found to address speed and stability challenges related to the software used.	The Secretariat collaborated with the DST IT unit, HSRC and NRF to address the identified challenges. A solution was found.

Output	Performance indicator(s)	Original annual target	Actual performance	Overall progress indicator	Reason for variance	Actions taken
High-level framework for a new STI decadal plan	Ministerial approval secured for a high-level framework for a new STI decadal plan	A high-level framework for a new STI decadal plan submitted to the Minister of Science and Technology by 31 August 2017 Foresight exercise conducted and recommendations generated by 31 July 2017	Not applicable	Not Achieved	The development of a high-level framework for a new STI decadal plan was dependent on the completion of the new White Paper on STI, which was delayed. The foresight exercise could not commence due to delays in the appointment of local and international service providers.	The Director-General's intervention was sought to fast track the appointment of experts.
Communication Plan	Communication Plan implemented	Communication Plan implemented by 31 March 2018	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.	Achieved	Not applicable	Not applicable
Internal corporate governance	Corporate governance system (e.g. annual report, annual performance plan (APP)) implemented.	Corporate governance system (e.g. annual report, APP) implemented by 31 March 2018	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.	Achieved	Not applicable	Not applicable
Knowledge management system	Knowledge management system developed and implemented	Knowledge management system developed and implemented by 31 March 2018	Knowledge management was implemented through the Alfresco system by 31 March 2018.	Achieved	Not applicable	Not applicable

5. Events and stakeholder engagements

5.1 Third Global Forum of National Advisory Councils

The Council successfully hosted the Third Global Forum of National Advisory Councils at the CSIR International Convention Centre in Pretoria on 5 and 6 December 2017. This is a meeting of top officials of councils or equivalent institutions that provide strategic STI policy advice at the highest public and private level in their countries of origin. It provided an invaluable opportunity for discussion, fostering mutual collaboration, exchanging experiences and learning from different national contexts.

Figure 3: Participants at the Global Forum of National Advisory Councils

Advisory councils on STI have important roles to play in informing policy decisions that address national objectives. In Africa and many other developing countries, there is a lack of such advisory councils relative to the rising number of science academies that focus on science for policy. As such, the forum served as a platform to inspire African countries to initiate their own national advisory councils on STI.

Six panel discussions took place at the forum, focusing on –

(a) innovation for inclusive and sustainable socio-economic development;
(b) building a vibrant innovation ecosystem;
(c) measurement and evaluation of the NSI;
(d) conversation with policymakers: sharing experiences and models of advice;
(e) the contribution of STI to small, medium and micro enterprises (SMMEs); and
(f) the Fourth Industrial Revolution and its implications for STI policy.

5.2 The launch of the 2016 South African STI Indicators Report

The Council launched the 2016 South African STI Indicators Report and National STI Information Portal (NSTIIP) in Pretoria, Durban and Cape Town. The KwaZulu-Natal and Western Cape launch events were co-hosted by the HSRC.

The 2016 South African STI Indicators Report was launched at the 2017 NACI Symposium on STI Indicators for Inclusive Socio-Economic Development in Pretoria on 28 September 2017. About 150 delegates attended the launch and panel discussion, which was broadcast live by CNBC Africa. The panel discussion was facilitated by CNBC Africa anchor, Ms Gugulethu Cele, and focused on the findings and implications of the STI Indicators Report.

Figure 4: Panel Members at the 2017 NACI Symposium on STI Indicators for Inclusive Socio-Economic Development

The panellists were Mr Imraan Patel (DST Deputy-Director General: Socio-economic Innovation Partnerships), Mr Gabriel Goddard (Lead Economist for Trade and Competitiveness at the World Bank), Mr Sizwe Nxasana (Founder of Future Nation Schools and Chairman of the National Student Financial Aid Scheme and the National Education Collaboration Trust), and Dr Azar Jammine (NACI Council member).

Among the issues discussed by the panel were the status of STI in South Africa, the role of STI in the development of the country, business performance and key industrial sectors, national innovation systems, knowledge for economic development and competitiveness, and human capital development. Participants raised several issues, such asthe following:

- Drawing from the 2016 STI Indicators Report, what lessons can be learnt to translate STI investment into innovative production, growth and job creation to address the high unemployment level? What kind of interventions should be drawn from the 2016 STI Indicators Report to bring about the needed changes in five to 10 years from now? In particular, what curriculum changes were needed in order to improve maths and science performance?

- The 4Fourth Industrial Revolution would need innovators and developers. There were students who were innovators. However, the system tended to lose such students due to social challenges they were facing. The students were not always able to patent their innovations. It was therefore critical to address challenges facing young innovators and entrepreneurs as part of promoting small business and innovation.

- The STI Indicators Report would need to consider the Sustainable Development Goals (SDGs) indicators in order to measure its implementation. It also needed to strengthen focus on the link between innovation and entrepreneurship. The higher education research community required greater exposure to the idea of exploiting knowledge, defining needs and then linking innovation and entrepreneurship. Was it hoped that the success of Singapore in economic growth be replicated?

- It was key to broaden the scope of how innovation was being viewed and measured. New measurement methods should be explored, especially impact evaluation.

- The process of transitioning undergraduates into postgraduate work was a challenge. Most existing postgraduate funding is for full-time study, but most potential postgraduate students need to earn an income. Many graduates were the first in their families to achieve tertiary education. They were under pressure to earn money and support their extended family. As a consequence, these students would be unable to fund postgraduate studies, thus limiting their potential contribution to the science and technology and innovation to socio-economic development.

- The incentivisation of the private sector remained a challenge. The investment in private sector R&D was important. Most importantly, there was a need to focus on the returns on investment.
- What tangible outcomes should be measured in order to grow the South African economy? There was a disappointing number of registered patents. How best could the efficacy of SMMEs or innovation technology in South Africa measured, particularly in tangible and positive outcomes?

2017 KwaZulu-Natal STI Indicators Report Roadshow

The KwaZulu-Natal workshop was co-hosted by the HSRC and took place in Durban on 6 October 2017. Dr Azar Jammine, NACI Council member and project leader of the STI Indicators working group, presented the findings of the report, while the Office of the Premier made a presentation on the status of the KwaZulu-Natal Growth and Development Strategy.

Dr Vijay Reddy of the HSRC used the results of the latest Trends in International Mathematics and Science Study (TIMMS) as the basis for a discussion of learners' performance in mathematics, a critical subject for careers in science, engineering and technology. The presentation also drew on the latest Skills Supply and Demand in South Africa Report, which found, among other things, that almost one-third of engineers in the country are employed in the financial sector.

Figure 5: Delegates at the 2017 KwaZulu-Natal STI Indicators Report Roadshow

The workshop welcomed the STI Indicators Report as a critical contribution to STI policy, and alluded to the need for partnerships and the inclusion of more local data. It also acknowledged that, while the Fourth Industrial Revolution opened up new opportunities, it also threatened to exacerbate inequality through jobs losses as a result of increasing automation and mechanisation.

Figure 6: Dr Pieter van Heyningen

2017 Western Cape STI Indicators Report Roadshow

The Western Cape workshop was hosted in partnership with the Centre for Science, Technology and Innovation Indicators (CeSTII) and took place in Cape Town on 16 October 2017.

The workshop provided a much-needed platform for dialogue around the STI indicators, future data needs and the value of the NSTIIP. Dr Pieter van Heyningen, Founder and Partner of SustNet, facilitated a panel discussion on local innovation systems. The panellists were Naim Rassool (Director: South African Renewable Energy Technology Centre), Michelle Matthews (Head of Innovation: Cape)

nnovation and Technology Initiative), Jamie Martin (Founder and CEO of Injini: Africa's EdTech Incubator), and Dr William Cloete (Technology Transfer Manager: Innovus).

A number of local entrepreneurs shared their experiences at the workshop, highlighting the fact that government's view of innovation was often different to that of entrepreneurs. Whereas government focused on the supply side (human capital development, publications, research infrastructure, etc.), entrepreneurs were more concerned with creativity and value addition. There was consensus, however, that both government and entrepreneurs had a crucial role to play in innovation.

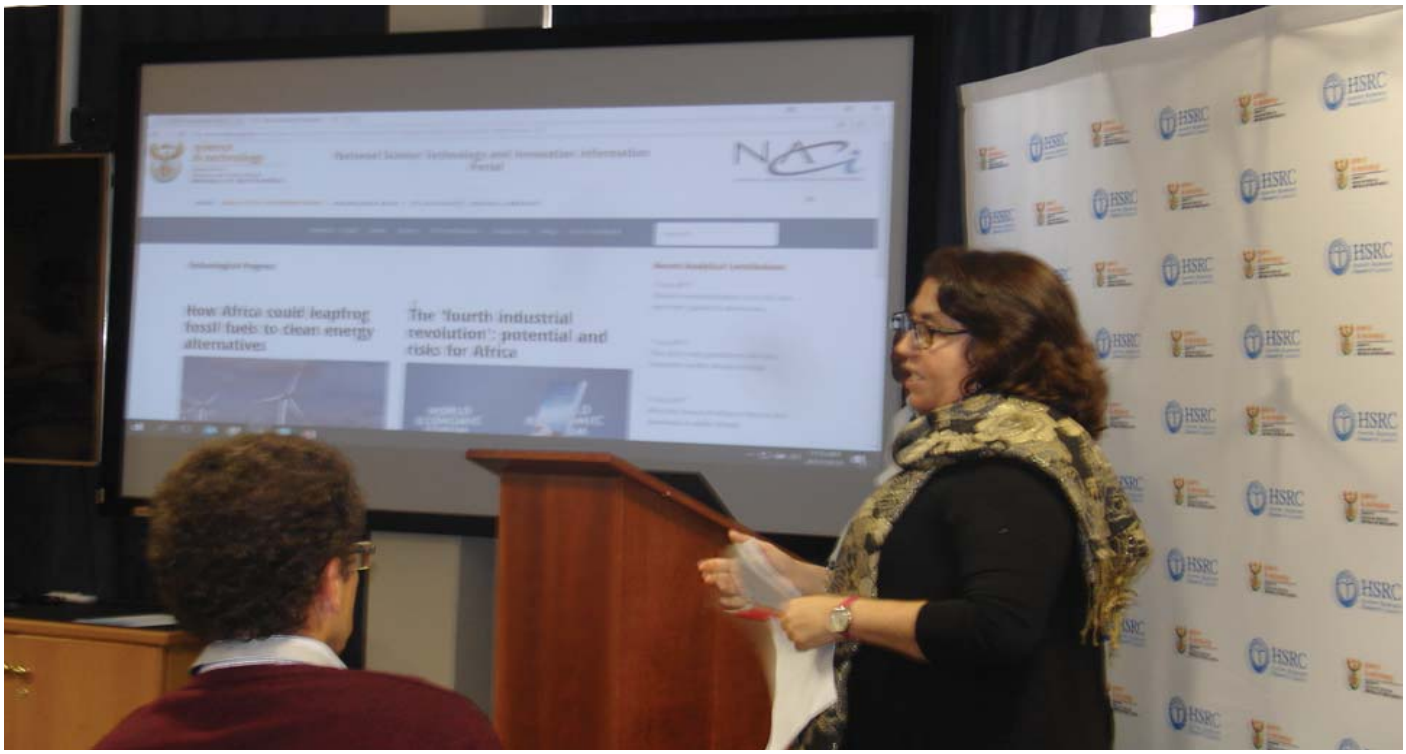


Figure 7: Dr Glenda Kruss 2017 Western Cape STI Indicators Report Roadshow

5.3 Science Forum South Africa 2017

NACI participated in Science Forum South Africa 2017, which was hosted by the DST at the CSIR International Convention Centre in Pretoria on 7 and 8 December 2017. NACI hosted a panel discussion during one of the forum's breakaway sessions under the theme, Rapid Science Response Mechanisms.

The session was chaired by Dr Khotso Mokhele, former Special Adviser to the Minister of Science and Technology, and focused on the importance of science advice and how to coordinate various scientific data providers in order to respond rapidly to disasters. The panellists were Prof. Robin Grimes (United Kingdom (UK) Foreign & Commonwealth Office Chief Scientific Adviser), Prof. Howard Alper (former Chair of Canada's Science, Technology and Innovation Council), Dr Jeffrey Mphahlele (Vice-President for Research at the South African Medical Research Council), and Prof. Sarah Anyang Agbor (African Union Commissioner for Human Resources, Science and Technology).

Figure 8 : Panel Members at the 2017 Science Forum South Africa

Prof. Grimes shared his experience of working with the Scientific Advisory Group for Emergencies (SAGE), which is responsible for ensuring that timely and coordinated scientific advice is made available to decision-makers to support UK cross-government decisions, while Prof. Mphahlele shared his experience of responding to diseases through the Global Research Collaboration for Infectious Disease Preparedness (GloPID-R).

Figure 9: Panel Chair, Dr Khotso Mokhele at the 2017 Science Forum South Africa

Table 5: NACI's participation in local events and strategic engagements

EVENT	LOCATION	ATTENDEE	DATE
Minister's meeting with the Chairperson of NACI	Minister's Boardroom, DST, Pretoria	??	5 April 2017
Briefing to Parliament's Portfolio Committee on Science and Technology on NACI's 2018/19 Annual Performance Plan	Parliament, Cape Town	Council members and Secretariat	18 April 2017
Meeting with Tiina Vihma-Purovaara – Third Global Forum of National Advisory Councils	Sheraton Hotel, Pretoria	Dr M Cele	29 May 2017
Dinner meeting with Prof. Howard Alper, former Chair of Canada's Science, Technology and Innovation Council	Café Beyritz, Lynnwood Bridge, Pretoria	Dr M Cele, Dr P Mjwara	8 June 2017
Special meeting with the Minister and NACI Council	The Innovation Hub, Pretoria	Council	25 July 2017
Innovation Evening at which University of Cape Town (UCT) inventors and innovators were acknowledged for their achievements	Frances Ames Room, Barnard Fuller Building, Faculty of Health Sciences, UCT	Dr M Cele	19 Sept. 2017
Presentation of NACI's 2016/17 Annual Report to the Minister	Gondwanaland Boardroom, DST, Pretoria	Council members and Secretariat	21 Sept. 2017

EVENT	LOCATION	ATTENDEE	DATE
NACI Symposium on STI Indicators for Sustainable and Inclusive Socioeconomic Development	Sheraton Hotel, Pretoria	Council members and Secretariat	28 Sept. 2017
Presentation of NACI's 2016/17 Annual Report to Parliament's Portfolio Committee on Science and Technology	Committee Room V454, 4th floor, Old Assembly Building, Parliament, Cape Town	Council members and Secretariat	4 October 2017
NACI Symposium on STI Indicators for Sustainable and Inclusive Socioeconomic Development	Garden Court South Beach, Durban	Council members and Secretariat	6 October 2017
NACI Western Cape Provincial Roadshow Workshop on STI Indicators for Sustainable and Inclusive Socioeconomic Development	HSRC, 116-118 Buitengracht Street, Cape Town	Council members and Secretariat	16 October 2017
Aide Memoire: The 6th CSIR Conference 2017	CSIR Conference Centre	Ms N Maome	5-6 October 2017
Exploring areas of collaboration (Department of Economic Development and Tourism, Western Cape Government)	11th Floor Boardroom, NBS Waldorf Building, 80 St George's Mall, Cape Town	Dr P Letaba and Ms R Maila	14 Nov. 2017
Briefing to Parliament's Portfolio Committee on Science and Technology on the 2016 South African STI Indicators Report	Committee Room 2, Parliament, Cape Town	Council members and Secretariat	15 Nov. 2017
Meeting with the Office of the Premier, KwaZulu-Natal, to explore areas of common interest related to eM&E and the local innovation system	Durban International Convention Centre	Dr M Cele	28 Nov. 2017
Accreditation and Certification: stakeholder engagement workshop	Westville campus, University of KwaZulu-Natal	Dr M Cele	29 Nov. 2017
Third Global Forum of National Advisory Councils	CSIR International Convention Centre, Pretoria	Council members and Secretariat	5-6 Dec. 2017

EVENT	LOCATION	ATTENDEE	DATE
Science Forum South Africa 2017	CSIR International Convention Centre, Pretoria	Council members and Secretariat	7 - 8 Dec. 2017
Gauteng Provincial Government Technology Innovation Conference	Gallagher Estate, Midrand	Dr M Cele	1 February 2018
Mandela Initiative National Workshop	Graduate School of Business, University of Cape Town	Dr M Cele	12-14 Feb. 2018
Inaugural Southern African Development Community (SADC) Science, Technology and Innovation Indicators Reference Group and Education Management Information and System Meeting	Southern Sun OR Tambo International Airport, Kempton Park, Ekurhuleni	Dr M Cele, Dr P Letaba	12-14 March 2018
Foresight training provided by the Institute for Statistical Studies and Economics of Knowledge	Burgers Park Hotel, Pretoria	NSI actors including NACI Secretariat	27-28 March 2018

Table 6: NACI's participation in international events

EVENT	LOCATION	ATTENDEE	DATE
CAAST-Net Plus Workshop with Entrepreneurs and Portal Managers in the European Union (EU)-Africa Food Security Research Partnership	Cairo, Egypt	Mr P Letaba	22 April 2017
Organisation for Economic Co-operation and Development (OECD) Global Science Forum (GSF) Expert Group meeting on "Science Advice: International Cooperation and Exchange of Data and Information in Crisis Situations"	Paris, France	Mr P Letaba	5 May 2017
36th Meeting of the OECD	Paris, France	Dr M Cele	20-24 March 2017
OECD CSTP Workshop and 111th Session of the CSTP	Paris, France	Dr M Cele	23-25 Oct. 2017
OECD Working Group on Innovation and Technology Policy (TIP) 50th Meeting	Paris, France	Dr M Cele	11-14 Dec. 2017
19th International Academic Conference on Economic and Social Development	Moscow, Russia	Dr M Cele	10-13 April 2018

PART C: GOVERNANCE INFORMATION

6. Governance report

The Science and Technology Laws Amendment Act, 2011 (Act No. 16 of 2011) requires the NACI Council to meet at least once per quarter to ensure proper oversight over the Council's advisory work programme. In addition, the Guidelines to NACI and its Operations require the NACI Executive Committee to meet as often as is necessary to direct the work programme of the Council and to deal with urgent matters.

6.1 Meetings

Table 7: NACI Council meeting attendance 2017/18

Council member		Meetings attended			
Date of meeting	**02/05/2017**	**22/06/2017 Workshop**	**20/11/2017**	**19/03/2018**	**16/05/2018**
Prof. C de la Rey (Chairperson)	×	√	√	√	√
Dr M Cele (Acting CEO)	√	√	√	√	√
Ms C Busetti	√	×	×	√	√
Prof. R Diab	×	×	√	×	√
Dr T Dlamini	×	×	×	√	√
Prof. G Gray	×	×	√	×	×
Mr G Strachan	x	replaced by Mr Gwynne-Evans as an ex-offio member of the Council			
Mr N Gwynne-Evans		√	replaced by Ms Karg as an ex-officio member of the Council		
Dr A Jammine	√	×	√	√	√
Dr S Moephuli	√	x	×	√	×
Mr M Mkwanazi	√	√	Resigned		
Ms Z Monnakgotla	√	√	√	√	×
Mr D Naidoo	√	√	×	√	
Mr K Nassiep	×	×	√	√	×
Mr A Ngcaba	×	×	Resigned		
Mr S O'Carroll	√	√	√		×
Dr M Qhobela	√	×	×		×
Prof. C Soudien	√	√		√	√
Mr P Steenkamp	√	√	√	√	√
Ms Ilse Karg	n/a		√	√	√
Prof. J Thomson	√	√	√	√	√

Table 8: Exco meeting attendance 2017/18

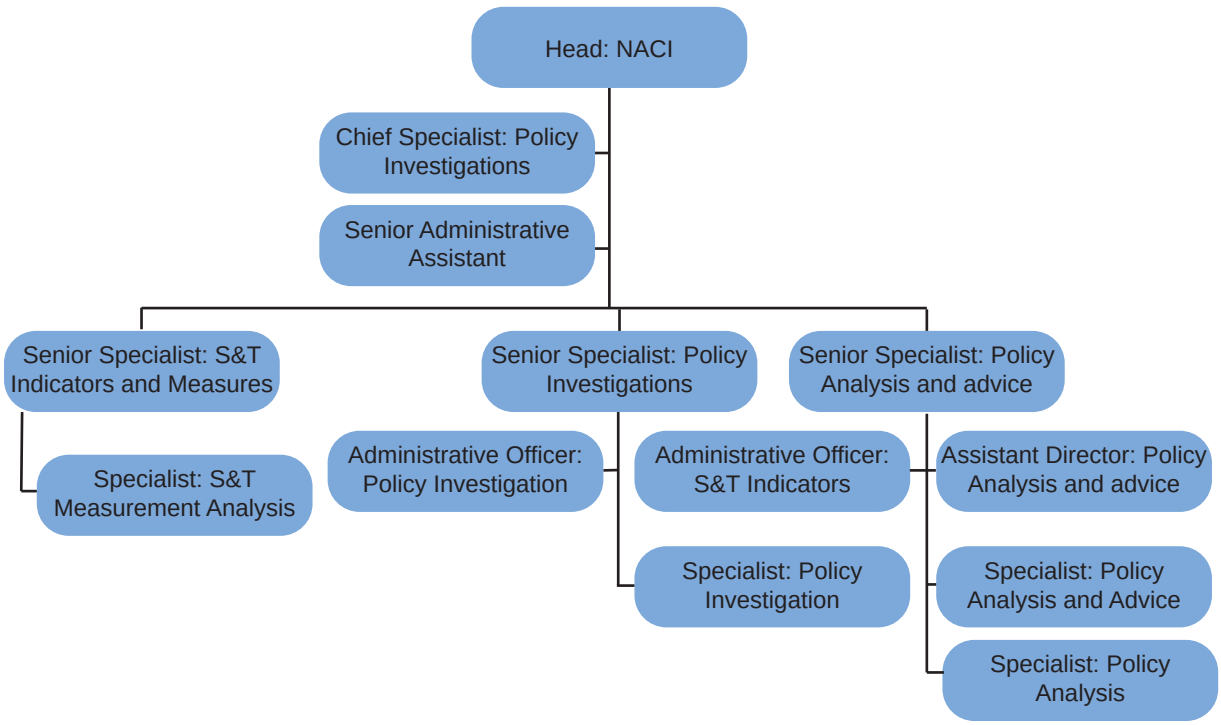
Exco member		Meetings attended			
Date of meeting	**10/03/2017**	**08/08/2017**	**13/11/2017**	**08/02/2018**	**8/05/2018**
Prof. C de la Rey	√	√	√	√	√
Dr M Cele	√	√	√	√	√
Mr D Naidoo	√	√		×	×
Mr G Strachan	×	n/a	n/a	n/a	n/a
Mr N Gwynne-Evans		×	n/a	n/a	n/a
Ms Ilse Karg	n/a		√	√	√
Prof. J Thomson	×	√	√	√	√

PART D: HUMAN RESOURCE MANAGEMENT

7. Human resources

To implement its advisory work programme, the NACI Council is supported by the NACI Secretariat. The Secretariat comprises a small team of 11 people including the Acting CEO. Three people were also employed on fixed-term contracts in the current reporting period, to assist the team with their workload.

Figure 7: Operational structure of the NACI Secretariat



PART E: FINANCIAL INFORMATION

6. Financial resources

NACI's allocated budget for 2017/18 was R18, 858 million. Of this amount, R10, 857 million was allocated for compensation of employees, and R7, 922 million for expenditure on goods and services. NACI spent R7, 919 million on goods and service and R8, 334 compensation of employees. Overall, NACI reported a saving of R2, 532 million for the 2017/18 financial year.

Table 9: NACI budget 2017/18

Description	Expenses	Allocated budget	Available funds
	(R'000)	(R'000)	(R'000)
Compensation of employees	8 334	10 857	2 523
Goods and Services	7 919	7 922	3
Payment of capital assets	34	40	6
Transfers and subsidies	39	39	-
Total	16 326	18 858	2 532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