



2 2
0 0
2 2
3 4

ANNUAL PERFORMANCE PLAN



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



Annual Performance Plan 2023/24

Innovation for a better future

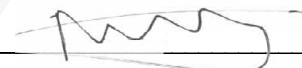
OFFICIAL SIGN-OFF

It is hereby certified that this Annual Performance Plan –


Was developed by the management of the National Advisory Council on Innovation (NACI) under the guidance of the Acting CEO of NACI;

Considers all relevant policies, legislation and other mandates for which NACI is responsible; and


Accurately reflects the impact and outcomes that NACI will endeavour to achieve, given the resources made available in the budget for 2023/24.

Signature: 

Mr Tilson Mphathi Manyoni: Chairperson: NACI

Signature: 

Mr Robert Shaku: Acting Chief Financial Officer: DSI

Signature: 

Dr Mlungisi Cele: Acting Chief Executive Officer: NACI

Signature: 

Dr Phil Mjwara: Accounting Officer

Approved by:

Signature: 

Dr Blade Nzimande: Executive Authority

CONTENTS

| | |
|---------------------------------------------------------------------|-----------|
| ACCOUNTING AUTHORITY STATEMENT | 6 |
| PART A: MANDATE | 7 |
| 1. Constitutional mandate | 8 |
| 2. Legislative mandate | 8 |
| 3. Policy mandates | 8 |
| 3.1 The relationship between the NDP and the NSI | 8 |
| 3.2 Medium-Term Strategic Framework, 2020–2025 | 9 |
| 3.3 Science, technology and innovation policy mix | 9 |
| 4. Policies and strategies governing the five-year planning period. | 11 |
| 5. Organisational mandate | 12 |
| 5.1 Strategic outcomes | 12 |
| 6. Relevant court rulings | 12 |
| PART B: STRATEGIC FOCUS | 13 |
| 1. Vision | 14 |
| 2. Mission | 14 |
| 3. Values | 14 |
| 4. Updated situational analysis. | 14 |
| 4.1 External environment analysis | 14 |
| 4.2 Selected STI trends | 16 |
| 4.3 Internal environment analysis | 21 |
| PART C: MEASURING PERFORMANCE | 23 |
| 1. Outcomes, indicators and targets for the 2023/24 financial year | 24 |
| 2. Quarterly targets for 2023/24 | 27 |
| 3. Planned performance over the medium-term period | 28 |
| 4. Resource considerations | 28 |
| 4.1 Human resource requirements | 29 |
| 4.2 Expenditure estimates | 29 |
| 5. Key risks and mitigations | 30 |
| PART D: TECHNICAL INDICATOR DESCRIPTIONS | 31 |
| REFERENCES | 36 |

LIST OF TABLES

| | |
|---------------------------------------------------------------------------------------------|----|
| Table 1: Benchmarking on world competitiveness ranking | 16 |
| Table 2: NACI's performance outcomes, indicators and targets for the 2023/24 financial year | 24 |
| Table 3: NACI's quarterly targets for the 2023/24 financial year | 27 |
| Table 4: NACI expenditure estimates | 29 |
| Table 5: NACI technical indicator descriptions | 32 |

LIST OF FIGURES

| | |
|-----------------------------------------|----|
| Figure 1: Sustainable Development Goals | 15 |
|-----------------------------------------|----|

LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|----------|--------------------------------------------------------------------------------------|
| 4IR | Fourth Industrial Revolution |
| APP | Annual Performance Plan |
| ASSAf | Academy of Science of South Africa |
| BRICS | Brazil, Russia, India, China, South Africa |
| CREST | Centre for Research on Evaluation, Science and Technology |
| DHET | Department of Higher Education and Training |
| DPME | Department of Planning, Monitoring and Evaluation |
| DSI | Department of Science and Innovation |
| ERRP | Economic Reconstruction and Recovery Plan |
| GDP | Gross Domestic Product |
| GERD | Gross Expenditure on Research and Development |
| GII | Global Innovation Index |
| HDI | Human Development Index |
| HSRC | Human Sciences Research Council |
| ICT | Information and Communication Technology |
| IMC | Inter-Ministerial Committee |
| M&E | Monitoring and Evaluation |
| MTSF | Medium-Term Strategic Framework |
| NACI | National Advisory Council on Innovation |
| NDP | National Development Plan |
| NRDS | National Research and Development Strategy |
| NRF | National Research Foundation |
| NSI | National System of Innovation |
| NSTIIP | National STI Information Portal |
| R&D | Research and Development |
| Stats SA | Statistics South Africa |
| S&T | Science and Technology |
| SADC | Southern African Development Community |
| SciSTIP | Centre of Excellence in Scientometrics and Science, Technology and Innovation Policy |
| SPI | Social Progress Index |
| STI | Science, Technology and Innovation |
| TVET | Technical, Vocational Education and Training |
| TYIP | Ten-Year Innovation Plan |
| UCT | University of Cape Town |
| WHO | World Health Organization |

ACCOUNTING AUTHORITY STATEMENT

On behalf of the National Advisory Council on Innovation (NACI) and in the context of policy reflection and renewal in South Africa, I am honoured to present NACI's 2023/24 Annual Performance Plan.

NACI's five-year Strategic Plan (2020/21 – 2024/25) identifies strategic outcomes to contribute to the realisation of the National Development Plan (NDP) and the 2019 White Paper on Science, Technology and Innovation (STI). Some of the recent outputs from NACI include –

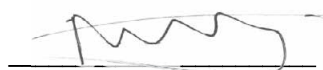
- The South Africa Foresight Exercise for STI 2030;
- Report on the review of the National Research and Development Strategy (NRDS) and Ten-Year Innovation Plan (TYIP);
- The Monitoring and Evaluation (M&E) Framework for the National System of Innovation (NSI);
- Guidelines and Toolkit for the Design and Implementation of the Sovereign Innovation Fund;
- 2021 Status of Innovation in Technical, Vocational Education and Training (TVET) report;
- 2022 Science, Technology and Innovation (STI) Indicators Report;

NACI will continue to improve the quality, relevance and efficacy of its advice to the Minister of Higher Education, Science and Innovation and – through the Minister – to the Cabinet. NACI generates advice proactively or at the behest of the Minister.

NACI recognises the importance of focusing on both the foundations of STI (disciplines or knowledge domains, infrastructure and human resources) and the role of STI in addressing the challenges of education, health, food security and global change in a sluggish economy. To achieve its objectives, NACI recognises access to good quality data, analytical capability, strong partnerships and healthy relationships with recipients of advice as critical. Some of NACI's strengths include the ability to mobilise NSI stakeholders and to access local and international experts to complement its limited resources. Accordingly, partnerships are critical to enable NACI to achieve its objectives of evidence-based science advice.


NACI will continue to build on its previous efforts to strengthen the planning, monitoring and evaluation capability in the NSI. Working with partners, the Council will continue to improve Phase 1 and develop Phase 2 of the National STI Information Portal (NSTIIP).

The Council values the importance of good corporate governance, communication and international engagement, and we are confident that NSI role players and South African citizens will benefit from the work that NACI has planned for the 2023/24 financial year.



Mr Tilson Mphathi Manyoni

Chairperson: NACI



PART A

MANDATE

PART A: MANDATE

1. Constitutional mandate

There are no specific constitutional provisions for NACI.

2. Legislative mandate

The National Council on Innovation Act, No. 55 of 1997 provides the mandate for NACI (2015). The Act empowers NACI to advise the Minister for Higher Education, Science and Innovation and – through the Minister – the Cabinet, on the role and contribution of science, mathematics, innovation and technology, including indigenous technologies, in promoting and achieving national objectives. These objectives are: 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.

3. Policy mandates

3.1. The relationship between the NDP and the NSI

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

The NDP acknowledges that economic development is a long-term project and that innovation should grow in importance over time. In the first phase (2012–2017), the focus was on “intensifying research and development spending, emphasising opportunities linked to existing industries”. In the second phase (2018–2023), the “country should lay the foundations for more intensive improvements in productivity” and “innovation across the state, business and social sectors should start to become pervasive”. As the country approaches 2030, “the emphasis should be on consolidating the gains of the second phase, with greater emphasis on innovation, improved productivity, the more intensive pursuit of a knowledge economy and better utilisation of comparative and competitive advantages in an integrated continent”.

The NDP is clear that achieving a competitive and sustainable economy will require a strong and effective NSI, which must contribute to transformation. It views the NSI as the principal tool for creating new knowledge; applying knowledge in production processes and disseminating knowledge through teaching and research collaboration. The NDP further acknowledges that advances in technological innovation and the production of new knowledge are critical to growth and development.

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

3.2. Medium-Term Strategic Framework, 2020–2025

Research, science and innovation have become even more fundamental in advancing the nation's preparedness for emergent threats and to be relentless and comprehensive in leading the recovering of the economy. The aim goes beyond the health and safety of South Africans; it addresses the long-standing legacy of exclusion and dispossession that still impoverish society today.

It is paramount to make progress in addressing poverty, inequality and unemployment; to avoid a single person in South Africa going hungry; to pursue a faster rate of economic growth than population growth; to increase the employment rate of young people; to improve educational outcomes at schools and to significantly reduce violent crime.

In pursuit of these goals, the following seven priorities have been identified to guide the government over the Medium-Term Strategic Framework (MTSF) period:

- Priority 1: Capable, Ethical and Developmental State.
- Priority 2: Economic Transformation and Job Creation.
- Priority 3: Education, Skills and Health.
- Priority 4: Consolidating the Social Wage through Reliable and Basic Services.
- Priority 5: Spatial Development, Human Settlements and Local Government;
- Priority 6: Social Cohesion and Safe Communities.
- Priority 7: A Better Africa and World.

The achievement of these priorities requires improved coordination – both vertical and horizontal – and alignment between various policies (including STI policies), leadership, human and financial resources, infrastructure, etc. The key challenge will be to align the implementation of the MTSF with other policies, including the NDP, the Re-imagined Industrial Strategy, the 2019 White Paper on STI and the Post-School Education and Training Policy.

In executing its mandate, NACI indirectly contributes to the implementation of the MTSF, through its NSI-related initiatives. These include ongoing M&E of systemic initiatives (including those of the Department of Science and Innovation) and production of advice proactively and at the behest of the Minister of Higher Education, Science Technology and Innovation, which is aligned to the intent of objectives of priorities 1 and 7. The project on industrialisation and science and innovation policy can be linked to MTSF Priority 2. The assessment of mathematics and physical science interventions, the monitoring of the state of innovation in TVET, the performance of the NSI and the role of NSI in implementing the National Health Insurance scheme can be linked to MTSF Priority 3.

3.3. Science, technology and innovation policy mix

The period between 2014 and 2019 was characterised by a critical reflection on STI policy and policy implementation towards an improved understanding of the NSI and its role in shaping the future of South Africa. Government and other NSI actors, including NACI, conducted or commissioned initiatives, such as reviews of the 1996 White Paper on Science and Technology, the 2002 NRDS, the TYIP 2008–2018, an analysis of the performance of the NSI, the first phase in the STI institutional landscape review, and a national STI foresight exercise looking towards 2030. A new White Paper on STI was developed and approved by Cabinet in March 2019. The White Paper, which is to be implemented through decadal plans, provides a framework for the development of the first Decadal Plan.

(a) 2019 White Paper on STI

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 for 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 R&D and encouraging increased expenditure by the private sector.

The requirement was to build on previous successes and adopt new approaches, so the White Paper sets out a long-term policy approach for the government to ensure a growing role for STI in a more prosperous and inclusive society. Apart from identifying inclusivity, transformation and partnerships as core themes, the White Paper 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 marginalised groups and enabling good governance and service delivery. It also has to identify clear actions to support small, medium and micro enterprises and stimulate innovation in all regions of the country.

The commitment in the 2019 White Paper to a broader set of participants in STI priority-setting should be reinforced and policymakers should use the bodies of knowledge residing in different social constituencies – including government, academia, civil society and business – to address South Africa's most pressing socio-economic challenges.

As part of implementing the above, NACI, in partnership with the Centre of Excellence in Scientometrics and Science, Technology and Innovation Policy (SciSTIP) produced the M&E framework for the NSI in 2019. As a sequel to this, NACI will develop an M&E framework specifically for the new decadal plan for STI.

In executing the activities of the 2023/24 financial year and M&E functions, NACI supports the Department of Science and Innovation (DSI) strategic plan outcomes 1, 2,3 and 4, which were developed in response to the 2019 White Paper on STI imperatives, and also assists the DSI to reflect better on its contributions to and its support of national priorities.

The six DSI outcomes formulated to measure its impact over the strategic plan term are:

Outcome 1: A transformed, inclusive, responsive and coherent NSI.

Outcome 2: Human capabilities and skills for the economy and for development.

Outcome 3: Increased knowledge generation and innovation outputs.

Outcome 4: Knowledge utilisation for economic development.

Outcome 5: Knowledge utilisation for inclusive development.

Outcome 6: Innovation in support of a capable and developmental state.

NACI seeks to contribute across all the above outcomes. In partnership with the DSI, NACI is developing the NSI transformation programme, which will consist of different aspects. For instance, the programme will derive a measurement framework that will be used to monitor and evaluate transformation progress in the NSI. NACI will be participating in the STI Inter-Ministerial Committee (IMC) and Presidential Plenary. It will also undertake an international human resources development initiative.

(b) Decadal Plan

Cabinet approved the Decadal Plan for STI in 2022. The Decadal Plan seeks to give effect to the policy ambitions expressed in the 2019 White Paper by identifying societal grand challenges where research, development and innovation can support the development of solutions in the areas of climate change and education for the future. The Decadal Plan also focuses on the innovation to address health and energy, as well as exploit new sources of growth, such as the digital economy (DSI, 2022).

4. Policies and strategies governing the five-year planning period.

The 2019 White Paper on STI has several implications for the NSI and its actors. Regarding NACI, the White Paper proposes the following actions:

- 4.1. NACI will be reconfigured to act as the national STI monitoring and evaluation 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.
- 4.2. Government recognises that, to support the proposed Ministerial STI Structure in carrying out its mandate, ongoing stakeholder engagement is required, in addition to an STI plenary. NACI will be strengthened to facilitate such engagements, e.g., by following up on matters discussed at the STI plenary. Policy reports from relevant NSI institutions and think-tanks, e.g., the Academy of Science of South Africa (ASSAf), the Human Sciences Research Council (HSRC) and the DSI-NRF Centres of Excellence, will also be used.
- 4.3. The Ministerial STI Structure will require expert studies and up-to-date performance and environmental information to support its decisions. To advise the structure, a strengthened NACI will undertake such studies.
- 4.4. Knowledge-management systems need to be implemented to enhance the analysis of NSI performance and support evaluation work that informs strategies. In this respect, 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.
- 4.5. The DSI, working with NACI, has developed 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 is 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 the level of Director-General, including national and provincial governments with significant STI mandates. NACI will work with the DSI, the Department of Planning, Monitoring and Evaluation (DPME) and National Treasury to ensure that the framework information is actionable and comparable in informing the management and funding of 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 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.

To give effect to these proposals, a process will be initiated to amend the NACI legislation.

5. Organisational mandate

NACI derives its mandate from an Act of Parliament promulgated in 1997 and amended in 2011. The legislation requires NACI to offer advice to the 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 several specific areas in which NACI is expected to provide advice, including:

- Coordination and stimulation of the NSI.
- Strategies for the promotion of technology innovation, development, acquisition, transfer and implementation in all sectors.
- Coordination of science and technology policy and strategies with policies and strategies in other environments.
- Identification of R&D priorities and their incorporation in the process of government funding of R&D.
- Promotion of mathematics, the natural sciences and technology in the education sector.
- Establishment and maintenance of information systems that support the M&E of the management and functioning of the NSI.
- International liaison and cooperation in STI.
- Developments in STI that may require new legislation.

5.1. Strategic outcomes

The Strategic Plan 2020–2025 identifies the following strategic outcomes, which were designed to support the NACI mandate, vision and mission:

- To learn from previous experiences to improve efficacy and deliver 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, 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.
- To transform NACI into a smart, efficient and learning organisation. This goal is intended to address current internal operational inefficiencies; enhance quality, turnaround times, knowledge management and communication; and exploit the benefits of digitisation. Skills, knowledge and competency development will be critical.

6. Relevant court rulings

None.



PART B

STRATEGIC FOCUS

PART B: STRATEGIC FOCUS

1. Vision

A leading advisory body for the government on STI within a well-coordinated, responsive and functioning national system of innovation.

2. Mission

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

3. Values

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

4. Updated situational analysis.

This Annual Performance Plan (APP) and its implementation are evolving within a context that continues to be characterised by the longstanding COVID-19 pandemic. The imperatives are shaped by an even more acute social, environmental and economic crisis than others we have had to endure. Given its role in the course of implementing the APP, NACI will, among other things, assess the role played by the NSI in addressing the impact of the pandemic and seek to contribute towards shaping a post-COVID-19 STI system in South Africa.

4.1. External environment analysis

(a) Economic challenges

According to Statistics South Africa (Stats SA), the country's gross domestic product (GDP) expanded by 1,9% in the first quarter of 2022, representing a second consecutive quarter of upward growth. The size of the economy is now at pre-COVID-19 pandemic levels. The real GDP was slightly higher than before the pandemic. However, unemployment was at 34,5% during the first quarter of 2022. Black women and the youth bore most of the brunt.

(b) COVID-19 pandemic

The COVID-19 pandemic has had a disastrous impact on public health systems and economic progress across the globe. Millions of people have died and economies have declined sharply while unemployment has increased significantly which has seen a rise in poverty and a deepening of inequality. The gains related to the Sustainable Development Goals are at risk, and vulnerabilities and inequalities within and between nations have been exposed.

The NSI responded to the COVID-19 pandemic by demonstrating the goodwill and competence of South Africa's NSI actors, who collaborated in collecting funding from various sources, constructing hospitals at speed and producing medical devices and protective gear at competitive prices.

The World Health Organization (WHO) permitted South Africa to establish a world-class consortium to create the first technology transfer hub for COVID-19 vaccines in Africa. The hub will play a leading role in the preclinical research phase of Africa's first messenger RNA technology. It will also be responsible for the inbound technology transfer and production of the first vaccines against COVID-19 and other diseases.



Figure 1: Sustainable Development Goals

The government's Economic Reconstruction and Recovery Plan (ERRP) points out that, while the COVID-19 global pandemic is a crisis of unprecedented scale, it is also a "rupture with the past, and an opportunity to drive fundamental and lasting change. Just as the past war era enabled the restructuring of economies, societies and the global order, COVID-19 will herald a transformation of social and economic relations in South Africa" (2020). Further, the ERRP states South Africa's growth story will "rely on a massive investment in infrastructure, including in energy, telecommunications, ports and rail. It will be propelled by swift reforms to unleash latent potential and is supported by an efficient state that is committed to clean governance. It will be inclusive, digital, green and sustainable, and it will invest in our human capital to lay the foundations for the future" (2020).

4.2. Selected STI trends

(a) Global trends in STI

Both the global indices monitored in NACI's South African STI Indicators Report – the Global Innovation Index (GII) and the Global Competitiveness Index (GCI) – show positive and negative trends in the performance of South Africa's NSI against other countries.

The GI provides an important indicator of the efficiency of the NSI by measuring innovation inputs and outputs for 126 countries. South Africa's GI ranking rose from 63rd in 2019 to 60th in 2020, with the innovation inputs pillar remaining as the country's strong area. South Africa's ranking on innovation inputs is above that of Brazil (59th) and India (57th), although it is the lowest on innovation outputs within the Brazil, Russia, India, China, South Africa (BRICS) group of countries. South Africa performing better in terms of inputs than outputs indicates that, compared to other countries, the NSI is not converting inputs into outputs effectively.

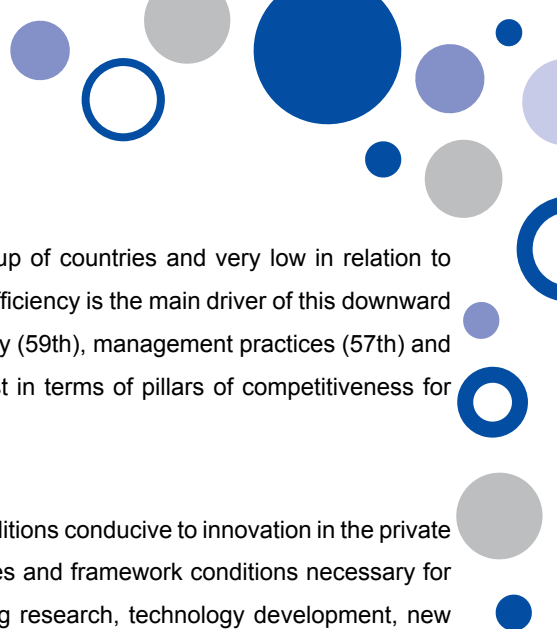
Market sophistication is also an area of strength for South Africa (15th). This component includes areas such as ability to secure credit, investment opportunities, as well as trade, competition and market scale. South Africa, on the human capital and research component, ranks 70th, which is equal to the average of upper middle-income countries, but is very low in comparison to the average of BRICS member countries (43rd).

South Africa's ranking on the Institute for Management Development's World Competitiveness Ranking continues to deteriorate, falling from 56th in 2019 to 59th in 2020.

Table 1: Benchmarking on world competitiveness ranking

| | Overall performance | | Economic performance | | Government efficiency | | Business efficiency | | Infrastructure | |
|----------------|-----------------------------|------|----------------------|------|-----------------------|------|---------------------|------|----------------|------|
| | 2019 | 2020 | 2019 | 2020 | 2019 | 2020 | 2019 | 2020 | 2019 | 2020 |
| | Ranking out of 63 countries | | | | | | | | | |
| South Africa | 56 | 59 | 59 | 61 | 50 | 54 | 44 | 56 | 60 | 61 |
| Brazil | 59 | 56 | 57 | 56 | 62 | 61 | 57 | 47 | 54 | 53 |
| China | 14 | 20 | 2 | 7 | 35 | 37 | 15 | 18 | 16 | 22 |
| India | 43 | 43 | 24 | 37 | 46 | 50 | 30 | 32 | 55 | 49 |
| Malaysia | 22 | 27 | 11 | 9 | 24 | 30 | 18 | 29 | 28 | 31 |
| Philippines | 46 | 45 | 38 | 44 | 41 | 42 | 32 | 33 | 59 | 59 |
| Russia | 45 | 50 | 31 | 47 | 47 | 48 | 53 | 58 | 37 | 42 |
| Singapore | 1 | 1 | 5 | 3 | 3 | 5 | 5 | 6 | 6 | 7 |
| South Korea | 28 | 23 | 27 | 27 | 31 | 28 | 34 | 28 | 20 | 16 |
| United Kingdom | 23 | 19 | 22 | 24 | 19 | 18 | 31 | 20 | 14 | 12 |
| United States | 3 | 10 | 1 | 2 | 23 | 26 | 11 | 14 | 1 | 5 |

Source: Institute for Management Development World Competitiveness Ranking 2020



According to this ranking, South Africa is placed as the worst among the BRICS group of countries and very low in relation to comparable economies such as Malaysia and the Philippines. Deteriorating business efficiency is the main driver of this downward trend. The lowest-ranked indicators on business efficiency are productivity and efficiency (59th), management practices (57th) and attitudes and values (57th). Infrastructure and economic performance rank the lowest in terms of pillars of competitiveness for South Africa (both 61st in 2020).

The public sector has a dual role to play, that of innovation performer and provider of conditions conducive to innovation in the private sector. This involves creating, implementing enabling STI policy, appropriate strategies and framework conditions necessary for establishing and maintaining strategic STI institutions to generate knowledge including research, technology development, new product and process development, and commercialisation. Framework conditions must address the provision and retention of STI human capital, a well-functioning research system and a positive environment for innovation.

(b) STI investment

The 2021 UNESCO Science Report raised a concern that four out of the five BRICS countries devoted less than 1% of their GDP to R&D. Among the BRICS countries, South Africa and India are struggling to exceed the 1% benchmark. In 2019/20, South Africa's R&D intensity was 0,62%.

COVID-19 constrained the already tight NSI fiscal environment further with the DSI and its entities experiencing budget cuts.

All NSI actors need to work together and contribute toward the realisation of Gross Expenditure on Research and Development (GERD) equal to 1,5% of GDP. GERD has more than doubled in the past decade, increasing from R9 billion in 2010/11 to R19 billion in 2019/20. A minor dip in 2018/19 was followed by a large increase in 2019/20 (11,1%).

In 2019/20, Business Expenditure on Research and Development (BERD) decreased 29% from the previous year. This decrease was far larger than the decline in aggregate private sector investment, which was 16%. The business sector has been the main reason for the stagnation in R&D intensity over the last decade. BERD as a percentage of GERD declined from 53,2% in 2009/10 to 39,3% in 2018/19.

(c) Human resource capabilities

In the ten-year overview of graduations in master's and doctoral degrees, including the broad science, engineering and technology (SET) field, two features stand out. First is a decline in the proportion of master's graduates in SET fields compared with a small rise in doctoral graduates. The second is that doctoral enrolments have risen nearly three-fold to 1 841, however, this is still short of the target of 3 000 in the TYIP.

The number of master's graduates (research) increased from 11 627 in 2014 to 13 519 in 2019. The number of doctoral graduates increased from 2 258 in 2014 to 3 445 in 2019. This means that there is progress towards the NDP target of 5 000 PhD graduates by 2030. In 2019, 35% of 1 841 doctoral degrees were awarded to international students, who are subject to work permit regulations. This means that the number of SET doctoral graduates immediately available to the research market is in the order of 1 200, well below the target of 3 000.

South Africa had 19 523 professional engineers registered with the Engineering Council of South Africa in 2019/20. This translates to 33 professional engineers per 100 000 members of the population. More than 94% of registered professional engineers are male. A similar gender imbalance is observed with regard to engineering technologists, professional certified engineers and professional engineering technicians. About 15 966 (82%) of registered engineers are white, followed by African (2 176 or 11%), Indian (1 149 or 6%) and coloured (232 or 1%).

Unemployment is lower among people with higher levels of education. Among those with master's and doctoral degrees, unemployment increased from 2,4% in 2018 to 2,8% in 2019.

(d) Human resources for science and technology Retaining local talent

South Africa is performing well on public expenditure on education as a percentage of GDP (first in 2020) and the female labour force as a percentage of total labour force (35th) relating to investment and development of the local talent pool. In the area of talent readiness, South Africa is pulled down by indicators such as: ability of primary and secondary education to meet the needs of a competitive economy (60th); percentage of graduates in information and communication technology (ICT), engineering, maths and natural sciences (55th); skilled labour (55th) and international experience of senior managers (55th).

A 2015 report by the Centre for Research on Evaluation, Science and Technology (CREST) provided detailed evidence on the retention and progression rates of postgraduate students in South Africa. The report highlighted the following challenges:

- Financial challenges, which constitutes the single biggest obstacle to producing more postgraduate students in South Africa. Financial challenges are also more prevalent for black students at all levels in the system.
- Low progression and retention rates are mainly due to the part-time nature of studies, which, in turn, relates to the lack of funding for full-time studies.
- Students in the natural sciences (where larger proportions study full-time) have significantly higher progression and completion rates.
- Various factors influence student choices about continuation and discontinuation of studies, but the main reason is the availability of funding.
- Choice of university and degree programme at all levels is mostly informed by academic reputation and quality considerations, as well as employability factors.

Recent initiatives by the Department of Higher Education and Training (DHET) and the National Research Foundation (NRF) to address the challenges in the academic pipeline need to be supported and strengthened if we want to be more successful in retaining our best talent for the science system and the labour market.

(e) Human resources for S&T: Attracting foreign talent

Over the past five years, South Africa has been slipping down the Institute for Management Development's World Talent Ranking. It ranked 43rd in 2016 and, in 2020, it ranked 52nd out of 63 countries. An area of strength is the country's appeal to the international talent pool (40th in 2020). An example is an increasing proportion of PhD students that came mainly from other African countries. The indicators in which South Africa is performing well on this component of the World Talent Ranking are the cost-of-living index (second in 2020) and effective personal income tax rate (third).

There is only one reference in the NRDS to attracting foreign talent (with specific mention of increased numbers of postdoctoral fellows), and it is found in the context of a discussion on internationalisation. There is also no reference to an international strategy or programme in either the NRDS or TYIP. However, considerable resources have been expended on a wide range of bilateral and multilateral S&T agreements in support of increased international (particularly African) cooperation and collaboration.

To ensure a coherent and sustainable solution to some of these challenges, the South African government has established an IMC on the Employment of Foreign Nationals. The committee is tasked to ensure that our approach to the employment of foreign nationals provides the scarce and critical skills that we need to grow the South African economy.

As indicated in the CREST report on the state of the South African research enterprise, South Africa has indeed managed to attract foreign talent in recent years, specifically at doctoral and master's levels. The statistics attest to the fact that South Africa has once again become a destination for migrant students from Africa, on a far larger scale than before apartheid. This increase is partly driven by the Southern African Development Community (SADC) Protocol on Education and Training, which removes barriers to the free movement of researchers and students of higher education across the region. The protocol requires member states to allocate up to 5% of their university places for SADC students and to charge them domestic fees. The trend has also been stimulated by the increasing number of students from Africa not being able to afford the high student fees in Europe and North America.

Between 2000 and 2017, a total of 28 686 doctoral students graduated from South African universities. Approximately two-thirds of these graduates were South African nationals and slightly more than one quarter (26%) were from the rest of Africa. However, the real growth in doctoral graduation output is driven by students from the rest of Africa. The rate of increase of rest-of-Africa students (17%) has been nearly three times higher than the rate of increase of South African students. Hence, by 2017, doctoral graduates from the rest of Africa already constituted 37% of all graduates, compared to South African nationals, who constituted 57% of all graduates. It is mainly because of the inbound mobility of doctoral students from the rest of Africa that has contributed the steep increase in the number of graduates over the past 10 years, which is also why it now seems realistic to expect that we will reach the national target of producing 5 000 PhDs by 2030. According to this forecast, if current rates of growth continue, the number of doctoral students from the rest of Africa will surpass the number of graduates born in South Africa in 2020/21. A far more alarming result is that the number of South African doctoral graduates has already started to plateau and is growing at a slower rate.

The challenge is to exploit complementarity in a way that contributes to meeting national objectives and the country's international commitments, particularly to the rest of Africa.

NACI will contribute to the development of an international programme to enhance human resource capabilities, especially in areas that are said to be critical in the transition to the future, in respect of the so-called Fourth Industrial Revolution (4IR), digitisation and other gaps exposed by COVID-19. This envisaged intervention has played a vital role in the development of countries such as China, South Korea and India. Its conception and implementation will require resources and partnerships and cooperation between various NSI actors.

(f) Attractive research systems

South Africa's publications per million population increased from 248 in 2011 to 505 in 2020. Overall, South Africa's scientific publications per million population are above the average of the upper-middle-income countries (452 in 2020).

As a result of the pandemic, there was a rapid upsurge in COVID-19-related research. In South Africa, COVID-19-related scientific publications increased from 400 in 2020 to almost 700 in 2021.

(g) Innovation activities

During the period 2016-2019, the University of Cape Town (UCT) had the most copublications with industry (5,2% of its co-publications), followed by the University of the Witwatersrand (5,1%) and the University of Pretoria (4,9%). Universities experienced a decline in their share of scientific co-publications with industry.

In 2020, South Africa had 25 patent applications per million population. This is lower than the average for other upper-middle-income countries (641 in 2020).

The United Nations Conference on Trade and Development's technology readiness index, which forms part of its Technology and Innovation Report (2021), measures the level at which countries adopt and diffuse frontier technologies. The index looks at five aspects: ICT deployment, skills, R&D activity, industry activity and access to finance. South Africa's main weaknesses are in skills (where it is 84th of 158 countries), industry (71st) and ICT (69th). Its area of strength is the availability of finance (13th). South Africa has the lowest technology readiness index of the BRICS countries.

(h) Social effects of innovation

The socio-economic indicators presented in the report show a significant rise in deprivation, which reflects the impacts of the COVID-19 pandemic. The number of households living in poverty increased in terms of all poverty indicators (the food, lower-bound and upper-bound poverty lines). Over the past decade, other forms of deprivation (such as a lack of access to clean water and sanitation) have remained unchanged.

The Social Progress Index (SPI) and the Human Development Index (HDI) indicate a decline in South Africa's standards of living since 2015. The country's relatively low ranking on the HDI is mainly a consequence of low life expectancy at birth (64,1 years in 2019).

The proportion of people living in extreme poverty was about 24% in 2020. About 33% lived below the lower-bound poverty line, and 45% lived below the upper-bound poverty line.

A global deterioration in social progress seems to have affected mainly the SPI indicators under "basic human needs" and "foundations of well-being". The provision of shelter is generally deteriorating in upper-middle-income countries, while South Africa's ranking improved in this regard, from 104th in 2019 to 96th in 2021.

Since the start of the COVID-19 pandemic, there have been various efforts by the government and civil society to provide shelter and take care of homeless people. South Africa's rankings in health and wellness (109th to 102nd), environmental quality (85th to 78th) and personal rights (51st to 46th) all improved.

(i) Economic effects of innovation

South Africa's medium and high-technology manufacturing output decreased by almost 20% in 2020. Its high-technology manufacturing exports as a percentage of total exports was 5,6%. This is very low in comparison with other middle-income countries such as Brazil (11,4%) and Malaysia (53,8%).

South Africa's digital competitiveness ranking improved, from 51st in 2016 to 44th in 2019, before falling steeply to 60th in 2020. About 71% of firms in manufacturing and services use email for conducting business and only 36% of firms have websites. Inadequate digital skills are one of the causes.

The country's total early-stage entrepreneurship activity (TEA) rose steadily from 7% in 2014 to 11% in 2017, and then declined slightly to 10,8% in 2019. This decline is an indication that the motivation for entrepreneurs to start new businesses is low. The TEA measures the percentage of individuals between 18 and 64 years who are in the process of starting a business and those who have been running businesses for less than three and a half years.

South Africa scored marginally higher than other BRICS member countries in respect of shifting to more progressive taxation in terms of rethinking how corporations, wealth and labour are taxed, nationally and in an international cooperative framework. The country scored lowest among BRICS countries with regard to incentivising and expanding investment in research, innovation and inventions that could create the "markets of tomorrow". South Africa experiences challenges in creating "markets of tomorrow", owing not only to weaknesses in its research and technological systems, but also weak public-private partnerships.

In summary, the NSI has laid a solid foundation for the future. However, it remains fragmented across government and between business, academia and civil society. It continues to be significantly underfunded, and the participation of black people and women at senior level (e.g., professors) remains too low.

The COVID-19 pandemic has stretched the NSI to its limits, revealing areas that need strengthening to improve the country's resilience and preparedness for future crises.

South Africa's innovation performance is falling behind other middle-income countries with regard to outputs such as patents and high technology exports. South Africa performs better in innovation inputs than innovation outputs. Considering its level of innovation investment, the country produces few innovation outputs.

4.3. Internal environment analysis

Challenges, opportunities and partnerships

The 1996 White Paper on Science and Technology and the 2002 NRDS note that the post-apartheid government inherited an "ailing" science and technology system that was fragmented, uncoordinated and not geared to help the government realise the imperatives of economic growth and enhanced quality of life for all citizens.

The need for greater coherence and coordination in the NSI has, therefore, been understood for a long time. A variety of statutory and voluntary mechanisms have been established¹ in an attempt to transform the system. The idea of an NSI, introduced in the 1996 White Paper, was premised on the notion of stakeholders working together for a common purpose. The NSI concept assumes the need for different actors across the system (in both the public and the private sector) to achieve coherence and complementarity in their functions so that the resources invested in the various entities can have the greatest impact.

In 2014, the Minister at the time requested that the CEOs of the then Department of Science and Technology's public entities become *ex officio* members of the NACI Council. He also asked NACI to develop and host the NSTIIP, which was launched in 2017. The NACI Chairperson has been granted direct access to the Minister to improve coordination and the collaboration of diverse stakeholders (e.g., the DSI-NRF SciSTIP, the DHET, the Higher Education Management Information System, the Research Information Management System, and the Centre for Science, Technology and Innovation Indicators).

Following the recent NACI Institutional and Higher Education Science, Technology and Innovation Institutional Landscape Reviews and the adoption of the 2019 White Paper on STI, NACI has initiated a draft discussion document focusing on its renewal and repositioning. The renewal and strengthening of NACI are among several White Paper interventions intended to address persistent problems besetting the NSI, such as coordination, financing, planning, and M&E. The process also provides an opportunity to address the continuing problems in NACI, such as structural location, secretariat capacity and efficacy, as identified by various reviews, and to reposition NACI so that it can play a catalytic system-wide role in providing STI advice for sustainable socio-economic development in South Africa.

NACI will therefore need to be reconfigured to carry out the functions, as set out in the 2019 White Paper. To implement these, the government will need to initiate a process to amend the NACI legislation. NACI will also conduct an international benchmarking with NACI-type bodies, the outcome of which will feed into the reconfiguration of the system's institutional landscape and amendments to the NACI legislation.

NACI has established partnerships with different organisations domestically and internationally. These include,

- 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 – experience and knowledge sharing and learning, improving the role and contribution of advisory councils, developing relevant advice, the interaction between advisors and policymakers, capacity building and joint projects.
- The NRF, HSRC, ASSAf, South African Council for Natural Scientific Professions, Technology Innovation Agency, Accenture, the New Partnership for Africa's Development, the National Science and Technology Forum, 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 NSTIIP, and developing the next generation of STI policy analysts.
- The Institute for Statistical Studies and Economics of Knowledge (Moscow) – planning, such as foresight exercises.
- African Union-European Union High-Level Policy Dialogue on STI.
- BRICS institutions.
- Embassy of the Republic of Cuba in South Africa – learning and sharing about the challenges and opportunities facing both countries' STI systems.

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



PART C

MEASURING PERFORMANCE

PART C: MEASURING PERFORMANCE

1. Outcomes, indicators and targets for the 2023/24 financial year

Table 2: NACI's performance outcomes, indicators and targets for the 2023/24 financial year

| Outcome | Outputs | Output Indicators | AUDITED/ACTUAL PERFORMANCE | | | Estimated performance | MEDIUM-TERM TARGETS | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| | | | 2020/21 | 2021/22 | 2022/23 | | 2024/25 | 2025/26 | 2026/27 |
| 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. | STI advice | Number of STI policy 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 2021. | Two STI advice documents submitted to the Minister of Higher Education, Science and Innovation by 31 March 2022. | Three STI advice documents submitted to the Minister of Higher Education, Science and Innovation by 31 March 2023. | Three STI advice documents submitted to the Minister of Higher Education, Science and Innovation by 31 March 2024. | Three STI advice documents submitted to the Minister of Higher Education, Science and Innovation by 31 March 2025. | Three STI advice documents submitted to the Minister of Higher Education, Science and Innovation by 31 March 2026. | Three STI advice documents submitted to the Minister of Higher Education, Science and Innovation by 31 March 2027. |

| Outcome | Outputs | Output Indicators | AUDITED/ACTUAL PERFORMANCE | | | | Estimated performance | MEDIUM-TERM TARGETS | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| | | | 2020/21 | 2021/22 | 2022/23 | 2023/24 | | 2024/25 | 2025/26 | 2026/27 |
| To contribute to the building of NSI monitoring, evaluation and learning capability to assess the health of the NSI and its contribution to sustainable and inclusive development | The "State of STI" Reports ² . | Number of "State of STI" reports produced | STI Indicators Report produced by 31 March 2021 | STI Indicators Report produced by 31 March 2022 | STI Indicators Report produced by 31 March 2023 | STI Indicators Report produced by 31 March 2024 | STI Indicators Report produced by 31 March 2025 | STI Indicators Report produced by 31 March 2026 | STI Indicators Report produced by 31 March 2027 | STI Indicators Report produced by 31 March 2027 |
| | NSI M&E reports. | Number of "NSI M&E" reports produced | Two NSI M&E reports produced by 31 March 2021 ³ | Two NSI M&E reports produced by 31 March 2022 | Two NSI M&E reports finalised by 31 March 2023 | Two NSI M&E reports finalised by 31 March 2024 | Two NSI M&E reports finalised by 31 March 2025 | Two NSI M&E reports finalised by 31 March 2026 | Two NSI M&E reports finalised by 31 March 2027 | Two NSI M&E reports finalised by 31 March 2027 |
| | National STI Information Portal (NSTIIP) | Successful implementation of NSTIIP | Ongoing maintenance and implementation of the NSTIIP by 31 March 2021 | Directory of Experts and Communities of Practice of platforms/modules developed by March 2022 | Ongoing maintenance and implementation of the NSTIIP by 31 March 2023 | Ongoing maintenance and implementation of the NSTIIP by 31 March 2024 | Ongoing maintenance and implementation of the NSTIIP by 31 March 2025 | Ongoing maintenance and implementation of the NSTIIP by 31 March 2026 | Ongoing maintenance and implementation of the NSTIIP by 31 March 2027 | Ongoing maintenance and implementation of the NSTIIP by 31 March 2027 |
| To contribute towards building a well-coordinated, effective and responsive NSI | Institutional foresight exercise capability | Number of analytical reports produced, and round-table discussions held | Institutional foresight exercise conceptualised, partnerships established and skills development done by 31 March 2021 | One sectoral/provincial/regional foresight exercise conducted in partnership with relevant stakeholders by 31 December 2022 | Review report on the design evaluation of the South Africa Foresight Exercise for STI 2030 by 15 March 2023 | Environmental Scanning for the NSI by 15 March 2024 | One sectoral/provincial/regional round-table discussions conducted in partnership with relevant stakeholders by 31 March 2025 | One sectoral/provincial/regional round-table discussions conducted in partnership with relevant stakeholders by 31 March 2026 | One sectoral/provincial/regional foresight round-table discussions in partnership with relevant stakeholders by 31 March 2027 | One sectoral/provincial/regional foresight round-table discussions in partnership with relevant stakeholders by 31 March 2027 |

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

3. M&E reports will emerge from studies, including the state of innovation in the TVET sector, the impact of imported technologies, technology diffusion, transformation and absorption of STI human resources, and evaluation of maths and physics education performance.

| Outcome | Outputs | Output Indicators | AUDITED/ACTUAL PERFORMANCE | | | | Estimated performance | MEDIUM-TERM TARGETS | | |
|---------------------------------------------------------------------|--------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | 2020/21 | 2021/22 | 2022/23 | 2023/24 | | 2024/25 | 2025/26 | 2026/27 |
| | | | Communication plan updated and implemented by 31 March 2021 | Communication plan updated and implemented by 31 March 2022 | Communication plan updated and implemented by 31 March 2023 | Communication plan updated and implemented by 31 March 2024 | | Communication plan updated and implemented by 31 March 2025 | Communication plan updated and implemented by 31 March 2026 | Communication plan updated and implemented by 31 March 2027 |
| To transform NACI into a smart, efficient and learning organisation | Communication plan. | Communication plan updated and implemented | Corporate governance system implemented (2020/21 APP, 2019/20 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2021 | Corporate governance system implemented (2021/22 APP, 2020/21 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2022 | Corporate governance system implemented (2022/23 APP, 2021/22 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2023 | Corporate governance system implemented (2023/24 APP, 2022/23 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2024 | Corporate governance system implemented (2024/25 APP, 2023/24 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2025 | Corporate governance system implemented (2025/26 APP, 2024/25 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2026 | Corporate governance system implemented (2026/27 APP, 2025/26 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2027 | Corporate governance system implemented (2026/27 APP, 2025/26 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2027 |
| | Internal corporate governance system | Internal corporate governance system implemented | Knowledge management system implemented by 31 March 2021 | Knowledge management system implemented by 31 March 2022 | Knowledge management system implemented by 31 March 2023 | Knowledge management system implemented by 31 March 2024 | Knowledge management system implemented by 31 March 2025 | Knowledge management system implemented by 31 March 2026 | Knowledge management system implemented by 31 March 2027 | Knowledge management system implemented by 31 March 2027 |
| | Knowledge management system | Knowledge management system implemented | Knowledge management system implemented by 31 March 2021 | Knowledge management system implemented by 31 March 2022 | Knowledge management system implemented by 31 March 2023 | Knowledge management system implemented by 31 March 2024 | Knowledge management system implemented by 31 March 2025 | Knowledge management system implemented by 31 March 2026 | Knowledge management system implemented by 31 March 2027 | Knowledge management system implemented by 31 March 2027 |

2. Quarterly targets for 2023/24

Table 3: NACI's quarterly targets for the 2023/24 financial year

| Output indicator | Annual target | QUARTERLY TARGETS | | | |
|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| | | 1st | 2nd | 3rd | 4th |
| Number of STI policy advice documents submitted to the Minister of Higher Education, Science and Innovation | Three STI policy advice documents submitted to the Minister of Higher Education, Science and Innovation by 31 March 2024 | Planning and data analysis by June 2023 | Data analysis, consultation and reporting: 30 September 2023 | One STI advice document by 20 December 2023 | Two STI policy advice documents generated by 31 March 2024 |
| Number of "State of STI" reports produced | STI Indicators Report finalised by 31 March 2024 | Concept and work plan produced by June 2023 | Data collection completed by September 2023 | Data analysis and review by December 2023 | Final STI Indicators Report finalised by 31 March 2024 |
| Number of NSI M&E reports | Two NSI M&E reports finalised by 31 March 2023 | Finalise concept and data collection by June 2022 | Data analysis by September 2023 | Drafting M&E reports by 15 December 2023 | Two NSI M&E reports finalised by 31 March 2024 |
| Successful implementation of the National STI Information Portal NSTIIP | Ongoing maintenance and implementation of the NSTIIP by 31 March 2023 | Directories of Experts and Communities of Practice data extended by June 2022 | STI statistics section expanded by September 2023 | Community of Practice session for extending functionality conducted by Dec 2023 | Indexing system for ongoing maintenance and implementation of NSTIIP concluded by March 2024 |
| Number of analytical reports produced, and round-table discussions held | Review report on the design evaluation of the South Africa Foresight Exercise for STI 2030 by 15 March 2023 | No target | Appointment of experts to conduct field work by September 2023 | Data analysis and review by December 2023 | Review Report on the design evaluation of the South Africa Foresight Exercise for STI 2030 by 15 March 2024 |
| Communication plan | Communication plan implemented by 31 March 2023 | Communication plan refined and implemented by 30 June 2022 | Communication plan implemented by 30 September 2023 | Communication plan implemented by 31 December 2023 | Communication plan implemented by 31 March 2024 |
| Internal corporate governance system implemented | Corporate governance system implemented (2022/23 APP, 2021/22 Annual Report) developed and approved by Minister and submitted to Parliament by 31 March 2023 | Annual Report highlights submitted to the DSI by 30 May 2022 | 1st draft of the 2021/22 Annual Report submitted to the DSI by 30 July 2023. 2nd draft of the 2021/22 Annual Report submitted to the DSI by 30 August 2022. 2021/22 Annual Report ready for tabling in Parliament by 30 September 2023 | 1st draft of the 2023/24 Annual Performance Plansubmitted to the DSI by 15 October 2023 | The final draft of the 2023/24 Annual Performance Plan submitted to the DSI by 30 January 2024 |
| Knowledge management system | All NACI meetings recorded and transcripts for 2022/23 financial year stored safely in Knowledge Management System by 31 March 2023 | Knowledge management system evaluation of progress conducted by 31 March 2022 | Skills transfer workshop conducted by 30 September 2023 | Technical matters on knowledge management system monitored and report established by 30 December 2023 | All NACI meetings recorded and transcripts for 2022/23 financial year stored safely in Knowledge Management System by 31 March 2024 |

3. Planned performance over the medium-term period

3.1 *To learn from previous experience to improve efficacy and ensure evidence-based, confidential and timely policy advice to the Minister of Higher Education, Science and Innovation and – through the Minister – Cabinet.*

Achieving this outcome will require better data and information analysis, more coordination and improved scientific advisory mechanisms. Building internal capability and exploiting new and established external networks will be critical.

3.2 *To contribute to the building of NSI monitoring, evaluation and learning capability to assess the health of the NSI and its contribution to sustainable and inclusive development.*

This outcome is intended partly to support the government to learn from experience and bolster policy performance over time, as well as to help ensure that government action meets its objectives efficiently at the lowest possible cost. To achieve this outcome, NACI will need the capacity to ensure that the STI quantitative and qualitative indicators needed for monitoring, evaluation, planning and management are available and analysed.

3.3 *To contribute to the building of a well-coordinated, responsive and effective NSI.*

NACI will seek to explore and propose solutions to the long-standing STI policy questions of coordination, prioritisation, financing, size and shape, human resources, and knowledge production and diffusion, among other things.

3.4 *Building a capable, smart and effective organisation.*

For this outcome to be realised, current internal operational inefficiencies will have to be addressed; the quality and turnaround time for the production of advice enhanced, knowledge management and communication improved; and the benefits of digitisation optimally exploited. Skills, knowledge and competency development will be critical.

4. Resource considerations

4.1. Human resource requirements

To implement its advisory work programme, the NACI Council is supported by the NACI Secretariat. The Secretariat comprises a team of 15 members, including the Acting CEO. Two people are employed on fixed-term contracts..

4.2. Expenditure estimates

Table 3 presents a summary of 2023/24 expenditure estimates for the total budget of R17 million, comprising compensation of employees (R11,3 million) and goods and services (R5,7 million).

Table 4: NACI expenditure estimates

| Programme | Audited outcomes | | | | Adjusted/ appropriation | Medium-term expenditure estimate | | |
|------------------------------|------------------|---------------|---------------|---------------|----------------------------|-------------------------------------|---------------|---------------|
| R'000 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 |
| Compensation of employees | 9,891 | 7,976 | 8,322 | 10,816 | 11,302 | 11,808 | 12,339 | 12,894 |
| Goods and services | 9,587 | 8,816 | 7,598 | 5,474 | 5,720 | 5,976 | 6,245 | 6,526 |
| Transfers and subsidies | 26 | - | - | - | - | - | - | - |
| Payment for financial assets | - | - | - | - | - | - | - | - |
| TOTAL | 19,504 | 16,792 | 15,920 | 16,290 | 17,022 | 17,784 | 18,584 | 19,420 |

5. Key risks and mitigations

| Outcomes | Key risks | Risk mitigations |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. | Low uptake of advice. Appointment of highly capable and competent staff. | Secretariat to undergo training to develop skills relating to drafting and delivering high-quality advice timeously. Council to secure ministerial advice/direction/ approval of identified areas before the production of advice. Council to robustly engage with the draft advice before submission to the Minister. |
| To contribute to the building of NSI monitoring, evaluation and learning capability to assess the health of the NSI and its contribution to sustainable and inclusive development | Copyright infringements relating to STI data and information stored on the STI data and information portal. Non-appointment of individuals with critical skills. | Continue negotiations with the service provider to determine the terms of utilising STI data and information. |
| Building a capable, smart and effective organisation | Inaccurate, unreliable and incomplete reporting of actual achievements against predetermined objectives as indicated in the APP (Qualified Audit Opinion on non-financial performance). Lack of funding to fill critical and scarce skills. | <ul style="list-style-type: none"> Conduct awareness sessions with all employees on Technical Indicator Descriptive Matrix (step-by-step training to the user on how to capture the indicator as indicated in the APP using the Technical Indicator Descriptive standard template prescribed by National Treasury). Implement and monitor quarterly the approved Roles and Responsibilities on Performance Information Reporting Guidelines. Finalise the draft Department of Science and Technology Performance Information Reporting Guidelines. |



PART D

TECHNICAL INDICATOR DESCRIPTIONS

PART D:

TECHNICAL INDICATOR DESCRIPTIONS

Strategic outcomes are broad and focused on the long term. Short to medium-term objectives that can be pursued, implemented and tracked are, therefore, needed. The NACI objectives are articulated in Table 4, which also provides indicators and a baseline.

Table 5: NACI technical indicator descriptions

| | |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator title | PPI 1: Number of STI advice submitted to the Minister of Higher Education, Science and Innovation. |
| Short definition | Evidence-based, confidential and timely advice (proactive and reactive) will be generated. |
| Source/collection of data | Primary data, secondary data (survey and literature review) and existing data (literature review). |
| Method of calculation/ assessment | Quantitative and qualitative. |
| Data limitations/ assumptions | <ol style="list-style-type: none"> 1. NACI will have access to readily available data that is relevant, up-to-date and of high quality. 2. The capacity is readily available within NACI and its committees to tackle all pertinent content issues. |
| Disaggregation of beneficiaries | Different advice areas may target different beneficiaries through various recommendations. |
| Spatial transformation | N/A |
| Calculation type | Non-cumulative |
| Reporting cycle | Quarterly |
| Desired performance | To learn from previous experience to improve efficacy and ensure evidence-based, confidential and timely production of advice to the Minister of Higher Education, Science and Innovation and – through the Minister – to Cabinet. |
| Indicator responsibility | Chief Senior Specialist and Senior Specialists |

| | |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator title | PPI 2: Number of “State of STI” reports produced. |
| Source/collection of data | Secondary data |
| Method of calculation/ assessment | Qualitative and quantitative |
| Data limitations/ assumptions | NACI partners will be able to provide accurate, relevant and quality data since NACI conducts secondary data analysis. However, the required data may not always be available in a form or quality that NACI prefers or would like it to be. |
| Disaggregation of beneficiaries | Yes. All reports will be required to provide disaggregated data where possible. |
| Spatial transformation | N/A |
| Calculation type | Non-cumulative |
| Reporting cycle | Quarterly |
| Desired performance | STI Indicators Report Different M&E reports |
| Indicator responsibility | Chief Senior Specialist, Senior Specialists and Acting Senior Specialist: S&T Indicators and Measures. |

| | |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator title | PPI 3: Number of NSI M&E reports produced |
| Short definition | Generate research findings to inform policy recommendations. |
| Source/collection of data | Primary data, secondary data (survey and literature review) and existing data (literature review). |
| Method of calculation/ assessment | Qualitative and quantitative |
| Data limitations/ assumptions | NACI partners will be able to provide accurate, relevant and quality data since NACI conducts secondary data analysis. However, the required data may not always be available in a form or quality that NACI prefers or would like it to be. |
| Disaggregation of beneficiaries | Generally, NACI's reports are intended to benefit all beneficiaries without necessarily specifying them. In certain instances, M&E reports will be specific to certain social groups. |
| Spatial transformation | N/A |
| Calculation type | Non-cumulative and cumulative (long-term). |
| Reporting cycle | Quarterly |
| Desired performance | Advice letters with policy recommendations based on research findings. |
| Indicator responsibility | Chief Senior Specialist and Senior Specialists |

| | |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator title | PPI 4: Successful implementation of the NSTIIP. |
| Short definition | The central repository of all key STI data and information. |
| Source/collection of data | Primary data (surveys etc. from data collectors), secondary (linkages with other similar portals) and improvement of existing data (issues or challenges faced) |
| Method of calculation/ assessment | Qualitative and quantitative |
| Data limitations/ assumptions | NACI partners will always be willing to cooperate and avail primary data as and when required. However, NACI lacks the necessary authoritative power to compel data sources to share their data. |
| Disaggregation of beneficiaries | Yes. All reports will be required to provide disaggregated data where possible. |
| Spatial transformation | N/A |
| Calculation type | Non-cumulative |
| Reporting cycle | Quarterly |
| Desired performance | Optimal functioning of the NSTIIP |
| Indicator responsibility | Acting Senior Specialist: S&T Indicators and Measures |

| | |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator title | PPI 5: Foresight exercise capability institutionalised |
| Short definition | Design evaluation of the SA Foresight Exercise for STI |
| Source/collection of data | Primary data, secondary data (survey and literature review) and existing data (literature review). |
| Method of calculation/ assessment | Qualitative and quantitative |
| Data limitations/ assumptions | NACI partners will be able to provide accurate, relevant and quality data since NACI conducts secondary data analysis. However, the required data may not always be available in a form or quality that NACI prefers or would like it to be. |
| Disaggregation of beneficiaries | Generally, NACI's reports are intended to benefit all beneficiaries without necessarily specifying them. In certain instances, M&E reports will be specific to certain social groups. |
| Spatial transformation | N/A |
| Calculation type | Non-cumulative and cumulative (long-term). |
| Reporting cycle | Quarterly |
| Desired performance | Advice letters with policy recommendations based on research findings. |
| Indicator responsibility | Chief Senior Specialist and Senior Specialists |

| | |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator title | PPI 6: Communication plan implemented |
| Short definition | Through the use of media engagement, electronic communications, branding, events management, internal and intergovernmental communications and outreaches, ensure that stakeholders and citizens are aware of and can access the initiatives and programmes undertaken by NACI. |
| Source/collection of data | <ul style="list-style-type: none"> • On-site surveys at events • Attendance registers • Distribution of reports • Media analysis reports • Ministry and presidential speeches • Departmental advice |
| Method of calculation/ assessment | <ul style="list-style-type: none"> • Attendance registers • Public reports produced. • Number of media/press clippings/inserts/interviews |
| Data limitations/ assumptions | 1. NACI will generate enough with useful material being communicated to the public and key stakeholders locally and internationally. The challenge is to translate scientific data into easy to understand messages. |
| Disaggregation of beneficiaries | Yes All reports will be required to provide disaggregated data where possible. |
| Spatial transformation | N/A |
| Calculation type | Non-cumulative |
| Reporting cycle | Quarterly |
| Desired performance | Awareness of and access to NACI programmes and initiatives by NSI stakeholders and the South African public. |
| Indicator responsibility | DD: Administration and Coordination/Chief Director: Communications |

| | |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator title | PPI 7: Internal corporate governance system approved and implemented |
| Short definition | To develop and implement M&E reports to inform planning and decision making. |
| Source/collection of data | <ul style="list-style-type: none"> • Strategic and APPs • National Treasury Framework for strategic planning and annual performance plans • DPME National Evaluation Policy Framework |
| Method of calculation/ assessment | Quantitative |
| Data limitations/ assumptions | Council projects not completed timeously. |
| Disaggregation of beneficiaries | Yes. All reports will be required to provide disaggregated data where possible. |
| Spatial transformation | N/A |
| Calculation type | Cumulative |
| Reporting cycle | Quarterly |
| Desired performance | Reports (four quarterly reports and one annual report) leading to informed decision-making that will ensure the achievement of the MTSF objectives. |
| Indicator responsibility | DD: Administration and Coordination/Chief Director: Governance |

| | |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator title | PPI 8: Knowledge management system implemented |
| Short definition | To extract and harness historical organisational data to inform continued operations. |
| Source/collection of data | Primary data (surveys, interviews etc. from data collectors), secondary (stored information in the registry) |
| Method of calculation/ assessment | Quantitative and qualitative |
| Data limitations/ assumptions | NACI partners will always be willing to cooperate and avail primary data as and when required. However, NACI lacks the necessary authoritative power to force data sources to share their data. |
| Disaggregation of beneficiaries | Yes. All reports will be required to provide disaggregated data where possible. |
| Spatial transformation | N/A |
| Calculation type | Non-cumulative |
| Reporting cycle | Quarterly |
| Desired performance | Knowledge system |
| Indicator responsibility | DD: Administration and Coordination/ Chief Director: Governance |

REFERENCES

2019 EC/OECD Science, Technology and Innovation Policy Survey, 29 May 2019, accessed on

[http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/STP\(2019\)17&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/STP(2019)17&docLanguage=En)

2019 White Paper on STI, accessed on

https://www.dst.gov.za/images/2019/White_paper_web_copyv1.pdf

Centre for Research on Evaluation, Science and Technology (CREST) Report: a study on the retention, completion and progress rates of South African postgraduate students, April 2015, accessed on

<https://www.dhet.gov.za/UCD%20Reports/Ministerial%20Task%20Team%20Report%20and%20Supporting%20Annexures/Annexure%20I%20DST%20Postgraduate%20Progression%20Report.pdf>

National Development Plan, March 2011, accessed on

https://www.gov.za/sites/default/files/gcis_document/201409/devplan2.pdf

National Advisory Council on Innovation Act [No. 55 of 1997], accessed on

https://www.gov.za/sites/default/files/gcis_document/201409/a55-970.pdf

Presidential Commission on the 4th Industrial Revolution Report, published in *Government Gazette*, No. 42388 on 9 April 2019, accessed on

https://www.gov.za/sites/default/files/gcis_document/202010/43834gen591.pdf

South African Economic Reconstruction and Recovery Plan, October 2020, accessed on

https://www.gov.za/sites/default/files/gcis_document/202010/south-african-economic-reconstruction-and-recovery-plan.pdf

South African Science Technology and Innovation Indicators Report 2021, August 2020, accessed on

<http://www.naci.org.za/wp-content/uploads/2021/09/South-African-Science-Technology-and-Innovation-Indicators-Report-2021.pdf>



DEPARMENT OF SCIENCE AND INNOVATION

NATIONAL ADVISORY COUNCIL ON INNOVATION

Suite L2, Enterprise Building
Mark Shuttleworth Street
The Innovation Hub
Pretoria
0087

Tel: 012 844 0925

E-mail: naci@dst.gov.za