

The Budgetary Review and Recommendation Report of the Portfolio Committee on Higher Education, Science and Technology on the Performance of the Department of Science and Innovation for the 2020/21 Financial Year, Dated 26 November 2021

The Portfolio Committee on Higher Education, Science and Technology, having considered the performance of the Department of Science and Innovation, Council for Scientific and Industrial Research, Human Sciences Research Council, National Research Foundation and South African National Space Agency for the 2020/21 financial year, reports as follows:

1. INTRODUCTION

1.1. Mandate of the Portfolio Committee on Higher Education, Science and Technology

The Portfolio Committee on Higher Education, Science and Technology (hereafter, the Committee) is mandated by the Constitution and the Rules of Parliament to oversee the activities and performance of the Department of Science and Innovation (hereafter, the Department or DSI) and the entities that report to it. Furthermore, the Committee must consider, amend and/or initiate legislation; consider international agreements and provide a platform for the public to present views on issues and/or legislation specific to the science, technology and innovation (STI) system.

To enhance Parliament's oversight role, the Money Bills Amendment Procedure and Related Matters Act (9 of 2009) was promulgated to provide Parliament with a procedure to make recommendations to the Minister of Finance to amend the budget of a national department. A key provision of this Act is that Portfolio Committees must annually compile Budgetary Review and Recommendation (BRR) Reports. These BRR Reports provide an assessment of service delivery performance given available resources; evaluates the effective and efficient use of resources; and may make recommendations on the forward use of resources. The BRR Reports are also source documents for the Committees on Appropriations when they make recommendations to the Houses of Parliament on the Medium-Term Budget Policy Statement (MTBPS).

1.2. Purpose of and method to develop the 2021 Budgetary Review and Recommendation Report of the Portfolio Committee on Higher Education, Science and Technology

The purpose of the BRR Report is to account, in accordance with National Assembly Rules 339 and 340, for work done by the Committee in considering the 2020/21 performance and expenditure trends of the Department and its entities. Accordingly, the Committee considered the Department and entities' 2020/21 Annual Performance Plans, budget allocations, quarterly performance and expenditure trends, and conducted oversight by having briefings on specific initiatives and programmes. Furthermore, on 12 November 2021, the Committee considered the 2020/21 Annual Reports of the Department and its entities the Council for Scientific and Industrial Research (CSIR), National Research Foundation (NRF) and South African National Space Agency (SANSa), and invited the Auditor-General of South Africa (AGSA) to explain the 2020/21 audit outcomes of the science and innovation portfolio. The Committee considered the 2020/21 Annual Report of the Human Sciences Research Council (HSRC) on 19 November 2021.

2. POLICY CONTEXT

2.1. National Development Plan and Medium-Term Strategic Framework

Science, technology and innovation are considered crucial for the creation of wealth and improving the quality of life in modern society. The National Development Plan (NDP) 2030 identifies the need to increase the size, coherence and effectiveness of the National System of Innovation (NSI) because STI is crucial for national development. Hence, the country must enhance its investment in infrastructure, improve the skills base and ensure that it better exploits the knowledge generated from its investments in research, development and innovation (RDI). This requires that, among others:

- South Africa invests more in research and development (R&D). The target is 1.1% of GDP invested in R&D by 2024;
- The STI institutional arrangement improves the link between innovation and the productive needs of industry;

- Government should collaborate with the private sector to raise the level of R&D in companies; and
- Public investments in research infrastructure should be focussed on and fulfil the needs of a modern economy.

The NDP outlines three phases of science and innovation actions to support the creation of a knowledge-driven, inclusive and dynamic economy. These phases are:

- **Phase 1 (2012-2017):** Focus on intensifying R&D spending, emphasising opportunities linked to existing industries.
- **Phase 2 (2018-2023):** Lay the foundations for more intensive improvements in productivity where innovation across state, business and social sectors should start to become pervasive.
- **Phase 3 (2023-2030):** Consolidate the gains of Phase 2 with greater emphasis on innovation, improved productivity, more intensive pursuit of a knowledge economy and better exploitation of comparative and competitive advantages in an integrated continent.

The 2019-2024 Medium-Term Strategic Framework (MTSF), representing the NDP's second five-year phase of implementation, is framed around seven apex priorities. The apex priorities are all interrelated and the Department and its entities contribute to a number of interventions. However, the Department's focus and commitments centre on Priorities 2 (Economic transformation and job creation) and 3 (Education, skills and health).

2.2. 2019 White Paper on Science, Technology and Innovation

In March 2019, Cabinet approved a new White Paper on Science, Technology and Innovation, which seeks to ensure an increasing role for STI to accelerate inclusive economic growth, increase the competitiveness of the economy and improve the livelihoods of South Africa's citizens. The 2021-2031 Draft STI Decadal Plan, approved by Cabinet in March 2021, serves as the implementation plan for the 2019 STI White Paper. The STI Decadal Plan is informed by the NDP's intent for STI, the new Economic Reconstruction and Recovery Plan and the Sustainable Development Goals (SDGs). It also derives input from the National Advisory Council on Innovation's (NACI) 2019 STI Foresight Study and the Review Reports of the 2008 Ten-Year Innovation Plan, 2002 National Research and Development Strategy and 2021 Higher Education, Science, Technology and Innovation Institutional Landscape (HESTIIL).

The STI Decadal Plan is premised on a whole-of-government/society approach to science and innovation and will rely on the pooling of resources and commitment to actions across the three spheres of government to realise its systemic goals. These are:

- An inclusive and coherent NSI;
- Increased and future-proof human capabilities;
- An expanded and transformed research system;
- An enabling innovation environment; and
- Significantly increased funding and funding efficiencies.

2.3. 2020 State of the Nation Address

The key focus of the 2020 State of the Nation Address (SONA) was inclusive growth, which relies on implementing the critical actions needed to build a capable state, and place the economy on a path to recovery. The role of STI in realising this objective is illustrated in the NDP, the 2019-2024 MTSF and the Department's 2020-2025 Strategic Plan. Examples of specific actions outlined by President Ramaphosa in the 2020 SONA where RDI is crucial to achieving the objectives set for these initiatives included:

- Energy security – enabling the development of additional generation capacity from renewable energy, natural gas, hydropower, battery storage and coal;
- Climate change – enhancing adaptive capacity, strengthening resilience, reducing vulnerability to climate change and identifying new industrial opportunities in the green economy;

- Investing in skills and infrastructure – establishing a new University of Science and Innovation in Ekurhuleni that will focus on high-impact and cutting-edge technological innovation for current and future industries, as well as the development of a smart city in Lanseria;
- Digital economy – within the era of rapid technological advancement, the digital economy will increasingly drive growth and employment;
- Growing key industries – for example, agriculture, where R&D has ensured that the sector can adapt to and mitigate the effects of environmental degradation and climate change; and
- Harnessing Data Science – for example, a national COVID-19 Data and Decision Support Centre, hosted and supported by technology developed by the CSIR, was established. This led to the establishment of a National Policy Data Observatory.

2.4. Strategic Outcome-Oriented Goals of the Department of Science and Innovation

The Department is responsible for developing, co-ordinating and managing the NSI by providing policy leadership and creating an enabling environment for STI. To realise this mandate and ensure that the NSI expands its positive impact on reducing poverty, inequality and unemployment as envisioned by the 2019 White Paper, the Department directs its efforts and resources toward the following six strategic outcome-orientated goals:

- **Goal 1: A transformed, inclusive, responsive and coherent NSI**
Transform the NSI and enhance its coherence, responsiveness and inclusivity.
- **Goal 2: Human capabilities and skills for the economy and for development**
Improve the representivity of those with high-end skills and increase the development of technical and vocational skills for the economy.
- **Goal 3: Increased knowledge generation and innovation output**
Maintain/increase the relative contribution of South African researchers to global scientific and innovation output.
- **Goal 4: Knowledge utilisation for economic development in (a) revitalising existing industries and (b) stimulating R&D-led industrial development**
Improve the sustainability and competitiveness of traditional sectors of the economy and initiate/continue research and development in emerging technology areas that could enable the creation of non-traditional South African economic sectors.
- **Goal 5 Knowledge utilisation for inclusive development**
Expand the use of scientific knowledge (as evidence) in support of innovation for societal benefit and public good.
- **Goal 6: Innovation in support of a capable and developmental state**
Increase the use of innovation as an enabler in the delivery of efficient services and access to government programmes.

3. RESPONSE TO PREVIOUS FINANCIAL RECOMMENDATIONS OF THE PORTFOLIO COMMITTEE ON HIGHER EDUCATION, SCIENCE AND TECHNOLOGY

The Minister of Finance responded, in National Treasury's 2021 Budget Review, to the recommendation of the Committee's 2020 Budgetary Review and Recommendation Report as follows:

Committee Recommendation:

The Minister of Higher Education, Science and Innovation further advises against the proposed funding reductions by the National Treasury, based on the key motive that economic transformation and growth are strategically linked to our investment in science, technology and innovation.

Response from Minister of Finance:

Fiscal constraints are serious and reprioritisation is the main policy tool for making funding available. The National Treasury recognises the importance of science, technology and innovation and will continue to work with the Department of Science and Innovation and its entities to strengthen public-led research and development spending.

4. 2020/21 FINANCIAL PERFORMANCE OF THE DEPARTMENT OF SCIENCE AND INNOVATION

The 2020/21 financial year was dominated by the COVID-19 pandemic, which disrupted livelihoods and economies globally, and elicited an unprecedented deployment of the global science and innovation community. The pandemic, more so than other recent crises, emphasised the importance of science and innovation to both prepare for and react to future crises, and highlighted the need to ensure that STI policies direct RDI efforts toward achieving socio-economic and environmental sustainability, inclusivity and resilience.

The Department, its entities and the broader NSI, relying heavily on the capabilities and skills developed through past investments in STI, made and continues to make significant contributions to combatting and mitigating the impacts of the COVID-19 pandemic. Noteworthy examples included the genomic surveillance project that led to South Africa discovering the first variant of COVID-19, which sensitized the global scientific community to how this virus mutates. South Africa is recognised as a world-leader in this regard and continues to participate in regional and international networks to track and monitor the evolution of new variants, as well as evaluate the effects of new variants on neutralization and vaccines. The Department funded social science and humanities research in support of the National Coronavirus Command Council and Cabinet to inform better the response to the pandemic. Furthermore, a national COVID-19 Data and Decision Support Centre, hosted and supported by technology developed by the CSIR, was established. This led to the establishment of a National Policy Data Observatory. The systems engineering and integration expertise, gained during South Africa's bid to build the Square Kilometre Array (SKA) radio telescope, was harnessed to assist the National Ventilator Project (NVP), which delivered 20 000 locally manufactured ventilators by November 2020.

4.1. Vote 35: Science and Innovation 2020/21 Budget Allocation and Expenditure

The Department's 2020/21 budget allocation increased from R8.1 billion in the 2019/20 financial year to R8.8 billion. This represented, when adjusted for inflation, a real increase of 3.1%; and was the first real increase in the Department's budget allocation since the 2015/16 financial year. In terms of economic classification, the apportionment of the Department's 2020/21 budget allocation of R8.8 billion remained the same as in previous years and comprised Current payments of R632.5 million (7.2%), Transfers and subsidies of R8.2 billion (92.8%) and Payments for capital assets of R2.8 million (0.03%). The Department's budget funds five major programmes:

- Programme 1 – Administration;
- Programme 2 – Technology Innovation;
- Programme 3 – International Cooperation and Resources;
- Programme 4 – Research, Development and Support; and
- Programme 5 – Socio-economic Innovation Partnerships.

The June 2020 Special Adjustments Budget, government's initial economic and fiscal response to COVID-19, revised the Department's budget allocation down to R7.36 billion. The total funds suspended for COVID-19 purposes amounted to R1.76 billion, where R324 million had been reprioritised for the Department's COVID-19 interventions. Hence, the total net downward revision of the Department's budget allocation was R1.44 billion and comprised R40 million from Compensation of employees, R53.4 million from Goods and services and R1.34 billion from Transfers and subsidies. Through virements, R28 million of these funds were reallocated to other Departmental Transfers and R6.66 million was reallocated to Goods and services. The budget cut to Transfers and subsidies comprised R295 million from the Parliamentary grant transferred to entities and R1.05 billion from transfers to specific projects and programmes. The latter amount constituted 72.9% of the total cut to the Department's budget. Within the Programmes, the largest net adjustment of R1.07 billion was effected on Programme 4 because it was allocated the largest share (52%) of the Department's total budget.

In October 2020, the Adjusted Estimates of National Expenditure (AENE) tabled with the MTBPS, and needed for the requirements of the State, further revised the Department's budget down by R83.6 million to R7.28 billion. An amount of R87.1 million was cut from Programme 4's transfer to Infrastructure projects for R&D and transferred to the Department of Public Enterprises for the implementation of the South African Airways business rescue plan. Only Programme 2 received an additional R3.4 million.

The Department effected virements of R133.9 million after the AENE process, which represented 1.8% of the adjusted budget. An amount of R20.6 million was moved between major items and R19.2 million was moved between Programmes. In addition, R111.3 million was shifted within Transfers and subsidies. The funds were used for the following, among other things: Industrial Biocatalysis Hub, market intelligence for sugar diversification, Synthetic Aperture Radar payload, Space Propulsion Programme, International Atomic Energy Agency, DSI-NRF centres of excellence, extension support for doctoral and masters students, the Southern Ocean Carbon-Climate Observatory, the National Recordal System, the SKA and the Industry Innovation Partnerships Programme.

The Department spent 98.4% (98.5% in 2019/20), i.e. R7.17 billion of R7.28 billion (underspending of R113 million), of its 2020/21 budget (Table 1). The material variances in expenditure occurring in Programme 1 were due to delays in filling prioritised positions, reduced expenditure on water and electricity due to officials working remotely and reduced expenditure on a finance lease due to the Department not receiving all cell phones from Vodacom before the end of the financial year. In Programmes 2 and 3, the variance in expenditure was due to delays in the filling of prioritised positions. The variance on Transfers and subsidies was due to delays in finalising the process to identify savings to cover the shortfall in Programme 5 for the Presidential Youth Employment Initiative (PYEI). High spending line items under Transfers and subsidies amounted to R2.4 billion and comprised:

- Human Resource Development R831.1 million
- R&D Infrastructure R587.7 million
- SKA R477.7 million
- South African Research Chairs R544.5 million.

The Department also received R69.6 million in Donor Funds and spent R69.1 million of these funds.

Table 1: Department of Science and Innovation's 2020/21 Expenditure by Programme and Economic Classification

Programme	Final appropriation	Actual expenditure	Variance	Expenditure as % of final appropriation
	R'000			
1. Administration	294 416	262 240	32 176	89.1%
2. Technology Innovation	1 397 065	1 379 841	17 224	98.8%
3. International Cooperation and Resources	119 302	114 229	5 073	95.7%
4. Research, Development and Support	3 735 718	3 730 976	4 742	99.9%
5. Socio-economic Innovation Partnerships	1 731 786	1 677 979	53 807	96.9%
TOTAL	7 278 287	7 165 265	113 022	98.4%
Economic Classification				
Current payments	481 362	428 954	52 408	89.1%
Transfers and subsidies	6 789 431	6 729 702	59 729	99.1%
Payments for capital assets	6 994	6 062	932	86.7%
Payments for financial assets	500	547	(47)	109.4%
TOTAL	7 278 287	7 165 265	113 022	98.4%

Source: 2020/21 Annual Report of the Department of Science and Innovation

The Department spent R47.6 million on the procurement of goods and services, where 39.8% was spent on small, medium and micro enterprises (SMMEs), 67% on black-owned companies, 31.6% on women-owned companies and 14.2% on youth-owned companies. The Department spent R1.9 million on the procurement of COVID-19 goods and services, where 93.4% was spent on SMMEs, 73% on black-owned companies, 16.3% on women-owned companies and 60% on youth-owned companies. The Department paid 98.9% of its invoices within the 30-day specified period.

As at 31 March 2021, only 81% (85% in March 2020) of the approved Departmental organisational structure was funded. The process of reviewing the organisational structure remained suspended. The

Departmental post establishment stood at 495, with 386 positions filled and 109 vacant, translating to a 22% vacancy rate. This was owing to the impact of the National Treasury decision to reduce the baseline of the allocation for compensation of employees, which resulted in all vacant positions being declared unfunded and only a few prioritised for filling. Due to the moratorium placed on filling vacancies, the Department's expenditure on *Agency outsourced services* for temporary employment placements increased from R9 million in 2019/20 to R10.2 million in 2020/21

The 2020/21 underspending of R113 million affected the operations of the Department as follows:

- No financial impact due to underspending on Compensation of employees. However, the delays in the filling of positions will affect the existing personnel due to them having added responsibilities;
- The Department requested a rollover from National Treasury for the Presidential Employment Stimulus package, but it was declined. The Department then reprioritised funding from slow spending programmes for this project; and
- For projects that were not finalised in Goods and services and Capital assets – these will be financed through the shifting of funds in the 2021/22 financial year.

4.2. Auditor-General's Report on the Financial Statements of the Department of Science and Innovation

The AGSA awarded the Department an unqualified audit opinion with no findings; hence, a clean audit for the fourth consecutive year. The AGSA further stated that no material findings on compliance with key legislation and no significant deficiencies in internal control were identified. The Department did not incur any irregular expenditure or fruitless and wasteful expenditure in 2020/21.

However, the Department's Audit Committee and the AGSA raised that the following areas of concern require management attention. These are:

- Information technology system controls related to user access management and the use of unsupported or outdated versions of key software; and
- The adequate review of achieved performance targets with appropriate supporting evidence.

5. 2020/21 PERFORMANCE OF THE DEPARTMENT OF SCIENCE AND INNOVATION

For the 2020/21 financial year, the Department captured its performance reporting into 51 performance outputs that were translated into 52 performance targets. These were further broken-down into quarterly targets that were reported on when the Committee considered the Department's quarterly financial and non-financial performance reports. The 2020 Special Adjustments Budget resulted in the downward revision of some of the Department's performance targets in Programmes 1, 2, 4 and 5, the removal of one target in Programme 4 and the addition of one new target in Programme 5 (Table 2). The new target was the Presidential Youth Employment Initiative (PYEI). The performance targets for Programme 3 remained unchanged.

Table 2: Revised 2020/21 Performance Targets of the Department of Science and Innovation

Programme	Performance indicator	Original annual target	Revised annual target
1. Administration	Percentage of approved funded positions filled annually	90% of all approved funded positions filled by 31 March 2021	Revised down to 75%
	Branding initiatives developed and implemented	Roll-out of branding and marketing initiatives across provinces and Metropolitan Municipalities by 31 March 2021	Two national thematic campaign reports on the branding roll-out initiatives by 31 March 2021
2. Technology Innovation	Number of technology demonstrations, prototypes, products and services developed	17 technology demonstrations, prototypes, products and services developed in designated energy, space, Innovation Priorities and Instruments, and bioeconomy areas by 31 March 2021	Revised down to 10
	Number of commercial outputs in designated areas	7 commercial outputs in designated areas by 31 March 2021	Revised down to 4
4. Research, Development and Support	Number of PhD students awarded bursaries annually as reflected in the reports from the NRF and other relevant entities	No fewer than 3 100 PhD students awarded bursaries annually as reflected in the reports from the NRF and other relevant entities by 31 March 2021	Revised down to 2 400
	Number of pipeline postgraduate students awarded bursaries annually as reflected in the reports from the NRF and other relevant entities	No fewer than 9 300 pipeline postgraduate students awarded bursaries annually as reflected in the reports from the NRF and other relevant entities by 31 March 2021	Revised down to 8 000
	Number of research Infrastructure grants awarded	25 research infrastructure grants awarded by 31 March 2021	Revised down to 20
	Total available broadband capacity provided by SANReN per annum	5 800 Gbps total available broadband capacity provided by SANReN by 31 March 2021	Revised down to 5 000 Gbps
	Number of researchers awarded research grants through NRF-managed programmes as reflected in the NRF project reports	No fewer than 3 950 researchers awarded research grants through NRF-managed programmes as reflected by the NRF project reports by 31 March 2021	Revised down to 3 000
	Number of research articles published by NRF-funded researchers and cited in the Web of Science Citation Database as reflected in the NRF project reports	7 000 Internationally accredited research articles from researchers awarded research grants by 31 March 2021	Revised down to 6 000
	Number of initiatives conducted to promote public awareness of and	No fewer than 9 initiatives	Removed for all 3 years

Programme	Performance indicator	Original annual target	Revised annual target
	engagement with science		
5. Socio-economic Innovation Partnerships	Number of high-level research students (honours, master's and doctoral students) fully funded or co-funded in designated niche areas (advanced manufacturing, aerospace, chemicals, mining, advanced metals, ICTs, the Industry Innovation Programme (incl. SIFs) and the green economy	At least 392 honours, master's and doctoral students fully funded or co-funded in designated niche areas by 31 March 2021	Revised down to 313
	Number of knowledge and innovation products added to the industrial development and green economy IP portfolios through fully funded or co-funded research initiatives	An annual total of at least 70 industrially relevant knowledge and innovation products (patents, prototypes, technology demonstrators or technology transfer packages) added to the industrial development and green economy IP portfolio by 31 March 2021	Revised down to 42
	Number of Presidential Youth Employment Initiative (PYEI) beneficiaries	New Target	1 700 PYEI beneficiaries by 31 March 2021

Source: 2020/21 Revised Annual Performance Plan of the Department of Science and Innovation

The Department's 2020/21 quarterly performance was affected by the pandemic and the resultant lockdowns. The key issues affecting performance during this time included:

- The closure of and/or restricted access to offices, entities and institutions that delayed financial reporting and/or the finalisation of contracts and plans;
- The postponement of events, meetings, conferences and consultative sessions, all originally formulated as in-person events;
- Budget reductions requiring the revision of plans, projects and initiatives;
- The re-engineering of existing capability and redirecting these, as well as existing funding, to the COVID-19 national response; and
- The need to adapt to remote working.

The Department identified performance areas that needed closer monitoring and effort to ensure that these would be achieved by year-end. For 2020/21, as reported in the Annual Report, the Department achieved an overall performance of 83% (87% in 2019/20), achieving 43 of its 52 performance targets (Table 3).

Table 3: 2020/21 Quarterly and Annual Programme Performance of the Department of Science and Innovation

Programme	Quarter 1		Quarter 2		Quarter 3		Quarter 4		2020/21 Annual Performance)	
	✓	✗	✓	✗	✓	✗	✓	✗	✓	✗
1. Administration	0	3	2	2	1	2	4	1	6	0
2. Technology Innovation	1	2	2	1	5	2	10	3	12	2
3. International Cooperation and	2	5	4	4	5	4	5	4	8	1

Resources										
4. Research, Development and Support	1	6	8	3	5	2	9	3	8	4
5. Socio-economic Innovation Partnerships	5	3	4	3	4	4	9	2	9	2
Total achieved and not achieved	9 (32%)	19	20 (61%)	13	20 (59%)	14	37 (74%)	13	43 (83%)	9
Total performance targets	28	33	34	50	52					

- ✓ Achieved
- ✘ Not achieved

The nine performance targets that were not achieved are shown Table 4 and the Department classified the reasons for not achieving these targets as follows:

- Process delays – Due to factors that are not within the control of the Department;
- Ineffectiveness of implementers – Due to deficiencies during the implementation phase; and
- Target formulation deficiencies – Due to variables not foreseen when the target was formulated.

Table 4: 2020/21 Performance Targets that were Not Achieved

Programme	Planned performance target	Actual achievement	Reasons for variance
2. Technology Innovation	Flight model for the maritime domain awareness (MDA) missions, completed in support of the Oceans Economy Phakisa, delivered and ready for launching by 31 Dec 2020	The Flight model was delivered but not launched	Process delay. The launch was delayed owing to the effects of COVID-19 on the global space value chain.
	200 black emerging farmers (subsistence, small-scale, and potential commercial farmers) benefitting from technology/innovation support programmes by 31 Mar 2021	71 black emerging farmers benefitted from technology/innovation support programmes	Target formulation deficiencies. The necessary documentation to verify that the planned total number of farmers was supported could not be sourced in time. Only the support to 71 farmers could be verified.
3. International Cooperation and Resources	32 capacity-building initiatives for international cooperation specifically targeting historically disadvantaged institutions and individuals by 31 Mar 2021	17 capacity-building initiatives	Process delays. Due to COVID-19 restrictions and the lack of connectivity in rural areas, there were limited engagements with historically disadvantaged institutions.
4. Research, Development and Support	No fewer than 2 400 PhD students awarded bursaries annually as reflected in the reports from the NRF and other relevant entities by	303 PhD students were awarded bursaries	Ineffectiveness of implementers. The verification documents of the NRF were still being sorted out.

Programme	Planned performance target	Actual achievement	Reasons for variance
	31 Mar 2021		
	No fewer than 8 000 pipeline postgraduate students awarded bursaries annually as reflected in the reports from the NRF and other relevant entities by 31 Mar 2021	326 pipeline postgraduate students were awarded bursaries	Ineffectiveness of implementers. The verification documents of the NRF were still being sorted out.
	Regulations for the IK Act approved by the Minister by 31 Mar 2021	The Minister could not approve the IK Act Regulations	Ineffectiveness of implementers. The planned target could not be met owing to internal delays in finalising the Regulations.
	12 strategic and technical engagements with the NRF, ASSAf and SACNASP to ensure alignment to national priorities by 31 Mar 2021	9 strategic and technical engagements	Process delays. Some institutions could not hold meetings in the first and second quarters of the financial year.
5. Socio-economic Innovation Partnerships	Pre-approval decisions provided within 90 days from the date of receipt for 80% of the applications for the R&D Tax Incentive received between 1 Jan and 31 Dec 2020	20.2% (23 of 114) of applications were provided with pre-approval decisions	Process delays. The lack of capacity and online systems, delays caused by requests for additional information from applicants and adherence to the Promotion of Administrative Justice Act affected the processing of applications.
	1 700 PYEI beneficiaries by 31 Mar 2021	641 PYEI beneficiaries	Process delays. The funding allocation for the PYEI was only finalised in Sep 2020 and this funding was insufficient. The Department also had to generate savings to cover the shortfall and this became available in Dec 2020.

Source: 2020/21 Annual Report of the Department of Science and Innovation

When the Department briefed the Committee on its 2020/21 Annual Report, it was reported that the targeted support to PhD and pipeline postgraduate students was achieved and this was verified once the NRF and the Department had sorted out all the necessary evidence reports. Hence, the Department achieved 45 (86.5%) of the 52 performance targets.

Despite the challenges experienced during the 2020/21 financial year, the Department continued to make significant strides in the achievement of its strategic goals. Selected achievements comprised:

- The approval by Cabinet of the draft 2021-2031 STI Decadal Plan and its recognition as a masterplan of government;
- The in-principle agreement by National Treasury to the integration of a Public STI Budget Coordination Mechanism in the annual Medium-Term Expenditure Committee process to improve the allocation of funding to STI across government;

- The extensive support provided to the national COVID-19 pandemic response by the Department, its entities and the broader NSI;
- The Department's efforts to ensure a coherent and appropriate package of support to the District Development Model and the Economic Recovery and Reconstruction Plan;
- The launch of the OR Tambo Africa Research Chairs Initiative, which aims to contribute to the improvement of African global research competitiveness while responding to the continent's socio-economic needs;
- The Department supported 18 projects related to the African Union's Agenda 2063 and 17 initiatives in response to the Southern African Development Community (SADC) Regional Indicative Strategic Development Plan;
- The Minister of Higher Education, Science and Innovation approved the National Big Data Strategy for Research, Development and Innovation for implementation and endorsed the approval for the restructuring and reconfiguration of the National Institute for Theoretical Physics (NITheP) to form the National Institute for Theoretical and Computational Sciences (NITheCS). The reconfiguration will offer a broader sectoral impact, while enhancing the benefits of the investment already made;
- The continued implementation of a range of initiatives to improve the output and competitiveness of selected industries; and
- The development and provision of a range of decision support tools and information management systems to support evidence-based decision-making.

5.1. Auditor-General's Test of the Performance Information of the Department of Science and Innovation

The AGSA does not express an opinion or conclusion on the reported performance information. Neither does the AGSA evaluate the completeness and appropriateness of the performance indicators. However, the AGSA does test the usefulness and reliability of the reported performance information for selected Programmes. In this case, Programme 2 was selected. During the audit process, the AGSA identified material misstatements in the annual performance report of Programme 2: Technology Innovation. However, since the Department's management corrected these misstatements, the AGSA did not raise any material findings on the usefulness and reliability of the reported information for this Programme.

6. ENTITIES OF THE DEPARTMENT OF SCIENCE AND INNOVATION

The Department's entities are funded through an annual baseline allocation also known as the Parliamentary grant (Table 5), specific project and/or contract funds; or from income that is generated from research and commissioned projects, or from income that is generated from royalty, publishing, membership, registration and/or facility fees.

Table 5: 2020/21 Parliamentary grant and performance overview of the entities of the Department of Science and Innovation

Entity	Parliamentary grant R'000	Performance	Audit outcome
Academy of Science of South Africa	24 840	Achieved 18 of 21 (90%)	Unqualified with no findings
Council for Scientific and Industrial Research	893 581	Achieved 25 of 31 (80.6%)	Unqualified with no findings
Human Sciences Research Council	289 325	Achieved 19 of 21 (90%)	Unqualified with findings
National Research Foundation	859 469	Achieved 7 of 9 (78%)	Unqualified with no findings
South African National Space Agency	161 196	Achieved 14 of 17 (82%)	Unqualified with findings
Technology Innovation Agency	408 825	Achieved 9 of 10 (90%)	Unqualified with no findings
Total	2 637 236	Average (85%)	4 of the 6 obtained clean audits

For the current reporting period, the Committee considered the 2020/21 Annual Reports of the CSIR, HSRC, NRF and SANSA.

6.1. COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH

October 2020 marked the 75th anniversary of the CSIR's existence.

The CSIR's mandate is to foster industrial and scientific development in the national interest through multidisciplinary research and technological innovation. The CSIR's current strategy (first implemented in 2019/20), Project Synapse, seeks to strengthen the CSIR's industrial research activities and create closer ties with industry. Project Synapse seeks to ensure a balance between scientific and industrial research so that the CSIR's support for, and development of, South African industry is enhanced. To execute the strategy, the CSIR began a radical restructuring programme and regrouped its research, development and innovation (RDI) activities into nine Technology Sector Clusters. These prioritised industry clusters and their key focus areas are:

1. Future Production: Chemicals - Apply disruptive and innovative (bio)-chemical conversion technology to create a dynamic African chemical industry with access to forward-looking and modern digitised production processes.
2. Future Production: Manufacturing – Strengthen the middle tiers of the value chain (fabrication and assembly), and develop strategic capabilities to address high-value industries, facilitating supply chain integration technological advances, through Industry 4.0 technologies.
3. Future Production: Mining – Modernise mines via mechanisation and automation and, ultimately, fully autonomous operations, is the envisaged path that will bring change to processes, technologies, skillsets, and social and environmental impacts associated with current and future mining practices.
4. Advanced Agriculture and Food – Harness the opportunities afforded by transformative technologies to develop the agricultural industry and associated processing activities and, in turn, use these opportunities as a catalyst for rural development and inclusive growth.
5. NextGen Health – Continuous personalised health care and timely, personalised interventions through connected intelligent medical devices, AI algorithms to predict risk factors and the creation of new preventive clinical paths (synthetic biology interventions, telemedicine).
6. Smart Mobility – Connected and robotised logistics and infrastructure to maximise the efficiency and productivity associated with transport and logistics; this is especially important for a resource-extraction country that is spatially divided.
7. Defence and Security – Enable integrated national defence and security solutions in South Africa by being pre-emptive and adaptive through hardened intelligence defence and security offerings, linking into global supply chain markets.
8. NextGen Enterprises and Institutions – Enable the digital transition of South Africa's enterprises and institutions that support effective service delivery, improve transparency and accountability, and cultivate a connected platform that supports industrial and societal advancement; ultimately, improving the ease and effectiveness of doing business.
9. Smart Places – Smarter resources, infrastructure and service developments directed towards enabling competitive manufacturing environments and sustainable economic growth, through integrated and holistic planning and trade-off modelling.

6.1.1. 2020/21 Budget Allocation and Adjustments

Initially, the CSIR projected that its total operating income for 2020/21 would be R3 billion. It also projected a break-even position once its expenses were accounted for. However, with the Special Adjustments Budget, its income was projected to be R2.7 billion and once expenses were accounted for, the CSIR projected a possible loss of R83 million for the 2020/21 financial year. Some of the impacts of the 10% cut (Special Adjustments Budget) to the CSIR's R997.7 million Parliamentary grant included:

- R15 million cut from strategic research infrastructure;
- R37.5 million cut from a range of strategic research capability development initiatives, with initiatives for the development of capability in precision health, mining and agro-processing suspended due to being underfunded by R10.5 million;

- R8 million cut from technology development and commercialisation initiatives; and
- R2.2 million cut from the CSIR's Project Synapse.

In addition, R20.4 million was cut from the CSIR's Mining R&D allocation and R200 million was taken from the CSIR's Cyber-Infrastructure R&D programme.

During the Second Adjustments Budget, transfers to the CSIR were further reduced by R4.3 million, which resulted in a R893.6 million Parliamentary grant for the 2020/21 financial year. In accordance with the provision for unforeseeable and unavoidable expenditure in terms of section 6(1)(a) of the Appropriation Act (2020), the CSIR was allocated R4.3 million to train 350 graduates as environmental champions and R4.4 million to provide experiential training to 150 graduates.

6.1.2. 2020/21 Performance

Annually, the CSIR enters into a Shareholder's Compact with the Department, which lists the specific Key Performance Indicators (KPIs) against which its performance will be measured. The CSIR's KPIs are structured around five strategic objectives (SO). As with the Department and other entities, the CSIR had to revise its KPIs for the 2020/21 financial year.

Overall, the CSIR met 25 (80.6%) of its 31 KPIs, which is an improvement on the 61% performance achieved in 2019/20. However, of concern are the KPIs that were not met, as these pertain to human resources and industrial development support.

- **SO1: Conduct RDI, localise transformative technologies and accelerate their diffusion**
The CSIR exceeded four of the five indicators in this category, i.e. 80% (33.3% in 2019/20). It did not achieve the target for the number (3 instead of 17) of technology licence agreements signed due to subdued private sector activity and an uncondusive economic environment for the uptake of early-stage technologies.
- **SO2: Improve the competitiveness of high-impact industries to support South Africa's re-industrialisation**
The CSIR exceeded two of the three indicators in this category, i.e. 66.7% (50% in 2019/20). It did not meet the target for the number (5 instead of 10) of localised technologies due to the COVID-19 pandemic and the resultant lockdowns hampering efforts to meet with potential clients. The CSIR planned to localise CO2 fermentation technologies from the United Kingdom (UK) and insulin technology from the International Centre for Genetic Engineering and Biotechnology in Italy.
- **SO3: Drive socio-economic transformation through RDI that supports the development of a capable state**
The CSIR exceeded all three indicators that contribute to the support of a capable state.
- **SO4: Build and transform human capital and infrastructure**
The CSIR met 10 of the 12 indicators in this category, i.e. 83.3% (33.3% in 2019/20). It did not meet the target set for the percentage of principle researchers who are black (31% instead of 37%) due to intense competition for SET skills in the labour market. It also did not meet the target set for the number of exchange programmes with industry (8 instead of 11) due to the COVID-19 pandemic and resultant lockdowns.
- **SO5: Diversify income, maintain financial sustainability and good governance**
The CSIR met six of the eight indicators in this category, i.e. 75% (62.5% in 2019/20). It did not meet the target set for total income (R2.57 billion instead of R2.7 billion) due to the effect of the COVID-19 pandemic on the capacity to earn revenue, travel restrictions, facilities not being operational and the cancellation of events. It also did not meet the target set for international contract income as a percentage of total income (5% instead of 5.9%) due mainly to international travel restrictions.

For 2020/21, the CSIR's total income amounted to R2.57 billion (R2.76 billion in 2019/20). The net profit of R96 million (R55 million in 2019/20) exceeded the budget by R179.4 million and the prior year's actuals by R41 million. Contract income amounted to R1.9 billion and was R98.3 million or

4.9% below the projected amount. The gap was mainly attributed to the inability to secure and finalise a number of planned contracts. Total expenditure amounted to R2.5 billion and this was 11% below budget. Also evident is that the projected deficit was not realised.

The largest portion of the CSIR's income, at 56%, was contract R&D from the public sector and this was followed by the Parliamentary grant at 27%. Private sector and international income comprised 13% and 5% respectively. The CSIR improved its B-BBEE rating level, and moved from level 4 to level 2.

In 2020/21, the CSIR allocated a Property, Plant and Equipment (PPE) budget of R55.4 million and formally approved a Capital Investment Plan that prioritised infrastructure and equipment procurement projects in the areas of RDI (R66.4 million) and Information and Communication Technologies (R20.6 million). On average, 43% of the allocated infrastructure funds were spent. From the allocated infrastructure funds, Information and Communication Technologies spent 73% of the funds, RDI spent 58% of the externally funded projects and facilities management spent only 26% of the allocated funds. The budget versus expenditure showed that better planning is required to use the funds requested by each area.

Despite the challenges experienced during the 2020/21 financial year, the CSIR continued to make significant strides in the achievement of its strategic goals. Selected achievements comprised:

- The provision of COVID-19 testing laboratories to support the National Health Laboratory Service;
- The CSIR was a key partner in the National Ventilator Project;
- The co-development of composite material for Africa's largest steel pipe manufacturer;
- The development and piloting of a digital geospatial information system called Precision Agriculture Information System that translates remote sensing imagery into maps and statistics of soil and crop growth parameters on a near real time basis; and
- The implementation of wireless network infrastructure for affordable broadband internet connectivity in the neediest communities through SMMEs owned by women, youth and the disabled.

6.1.3. 2020/21 Audit Outcome

The AGSA awarded the CSIR an unqualified audit opinion with no findings; hence, a clean audit for the thirteenth consecutive year. The AGSA further stated that no material findings on compliance with key legislation and no significant deficiencies in internal control were identified.

The CSIR incurred irregular expenditure of R372 000 (R1.36 million in 2019/20) due to four incidences of non-compliance with supply chain management regulations that occurred in prior years. Disciplinary action was taken against officials who committed two of the four offences, while no action could be taken in the remaining two instances because the employees had left the employ of the CSIR. The CSIR received the full value of services in relation to these transactions. The CSIR did not incur any fruitless and wasteful expenditure in 2020/21.

The AGSA does not express an opinion or conclusion on the reported performance information. Neither does the AGSA evaluate the completeness and appropriateness of the performance indicators. However, the AGSA does test the usefulness and reliability of the reported performance information for selected strategic outcomes. SO1 was selected and the AGSA did not identify any material findings on the usefulness and reliability of its reported performance information.

6.2. HUMAN SCIENCES RESEARCH COUNCIL

The HSRC is mandated to perform in terms of the Human Sciences Research Council Act (No. 17 of 2008), which requires it to:

- a) Initiate, undertake and foster strategic basic and applied research in human sciences. Address developmental challenges in the Republic, elsewhere in Africa and in the rest of the world.
- b) Inform the effective formulation and monitoring of policy, as well as evaluate the implementation thereof.

- c) Stimulate public debate through the effective dissemination of fact-based research results.
- d) Help build research capacity and infrastructure for the human sciences.
- e) Foster research collaboration, networks and institutional linkages.
- f) Respond to the needs of vulnerable and marginalised groups in society through research and analysis of developmental issues.
- g) Develop and make available data sets underpinning research, policy development and public discussion of developmental issues.
- h) Develop new and improved methodologies for use in the development of such data sets.

For the period 2020-2025, as its key strategic goal, the HSRC will continue to focus on the social determinants and outcomes of poverty and inequality. However, as recommended by the HSRC Institutional Review that was completed in the 2019/20 financial year, the approach to this should be through a much more focused and consolidated programme of work. In addition, a priority focus will be to establish suitable strategies to enable the HSRC to evolve from research generation only, to research use and research impact assessment. The HSRC will also develop a set of impact metrics to be used across the science and innovation landscape.

6.2.1. 2020/21 Programme Performance

The HSRC pursues its research agenda within five strategic outcomes, summarised in the acronym LeaPPTS. This stands for **L**eadership in knowledge production, **P**olicy influence, **P**artnerships, **T**ransformed research capabilities and **S**ustainability.

The HSRC's five strategic outcomes are implemented across two programmes; namely, Programme 1: Administration and Programme 2: Research, Development and Innovation.

Programme 1 achieved nine of its 11 (82%) performance indicators. The targets that were not achieved:

- The proportion of senior researchers who are female was 32.5% as opposed to the target of 35%; and
- The percentage of total income that is extra to the Parliamentary grant was 39% as opposed to the target of 48%. Although the HSRC secured sufficient external funding, it was not able to draw down these funds due to the COVID-19 lockdown that prevented fieldwork in communities.

Programme 2 achieved all 10 of its (100%) performance indicators.

Overall, the HSRC achieved 19 of its 21 (90%) performance indicators (70% performance in 2019/20), which is the highest recorded performance to date.

Selected achievements comprised:

- The HSRC conducted a number of surveys to understand attitudes, perceptions and behaviours in relation to COVID-19, the results of which informed government planning and messaging for a co-ordinated and effective COVID-19 response;
- Further surveys examined the effect of COVID-19 on schooling, post schooling and R&D and innovation in business;
- The HSRC hosted several seminars and websites on a range of issues and topics to ensure continued science engagement and communication; and
- The HSRC continued its significant research output, producing and curating 404 research outputs in 2020/21.

A key challenge for the HSRC is that it has a limited number of senior researchers, who are required to not only raise funds, but also implement a range of contract research projects and reach scholarship targets. As was highlighted in all previous institutional reviews, the HSRC needs to employ more senior researchers in permanent positions to:

- Ease the burden of fund raising; and
- Provide reliable mentoring to its research trainees.

However, the HSRC has historically struggled to achieve its transformation targets at senior researcher level. Resignation data show that black researchers are in demand and are offered very high salaries in the university and private sectors. The HSRC loses its transformation capital when it loses these researchers.

During 2020, an Impact Centre was established to focus on research use and impact, providing support and mechanisms for collaboration, and convening and communicating the HSRC's work so that it is able to position itself as the flagship for human and social sciences research in the country. Important new activities included the HSRC's participation in the PYEI and the transfer of the Department's Internship Programme from the NRF to the HSRC.

6.2.2. 2020/21 Financial Performance

The current financial model of the HSRC depends significantly on external funding to support research and the broader mandate of the HSRC. The recently audited ratio of parliamentary funding to external income is 52:48 (54:46 in 2019/20). This means that there is pressure on the HSRC to increase external income at a faster pace than the growth in its Parliamentary grant, to ensure that all necessary budget commitments in terms of staff, administration, infrastructure and research can be met.

As with other entities, the HSRC had to contend with a 10% (R32.5 million) cut to its Parliamentary grant during the Special Adjustments Budget and a further R2.8 million cut during the Second Adjustments Budget. The HSRC, however, was allocated R28.4 million as part of the PYEI to recruit 1 000 graduates to be health promotion agents.

In 2020/21, the HSRC received revenue from Parliament (R251.6 million), research revenue (R117.2 million) and other operating revenue (R43.2 million) totalling R411.9 million (R448.2 million 2019/20). The total expenditure was R389.5 million, which included R243.9 million (62.6% of total expenditure) for staff costs and R69.7 million for direct research costs. The HSRC recorded a surplus of R22.5 million, which was primarily due to a significant decrease in the staff costs of the organisation resulting from the moratorium placed on appointments. Furthermore, decreases in expenditure occurred due to the restrictions and protocols to curb the COVID-19 pandemic, which consequently reduced project expenses and the demand for operational resources, as employees continued to work from home. The reported accumulated (current and prior financial years) surplus was submitted for retention and amounted to R63.7 million in 2021. National Treasury approved the retention of R45.5 million on 15 November 2020.

6.2.3. 2020/21 Audit Outcome

The AGSA awarded the HSRC with an unqualified audit opinion but with findings, which is a regression from last year's clean audit. These findings related to non-compliance with supply chain management legislation where a number of deviations were not pre-approved by National Treasury. Therefore, the AGSA found that the HSRC's "Management did not adequately monitor controls to ensure compliance with laws and regulations. Review and monitoring processes were not sufficient to ensure that the appropriate authority approved deviations from normal competitive bidding resulting in irregular expenditure."

The HSRC incurred irregular expenditure of R15.9 million due to non-compliance with supply chain management legislation. The incidents of non-compliance were:

- R6 123 due to non-compliance with National Treasury Instruction Note 3 of 2016/17 relating to deviations that exceeds 15% of the original contract not being referred to National Treasury for approval.
- Five donor-funded sub-contractor appointments to the amount of R3.1 million were awarded without the prior written approval of National Treasury in terms of deviating from normal bidding processes under paragraph 8.5 of SCM Instruction Note 3 of 2016/17.
- Twelve donor-funded sub-contractor appointments to the amount of R12.8 million were awarded in 2019/20, without the prior written approval of National Treasury in terms of deviating from normal bidding processes under paragraph 8.5 of SCM Instruction Note 3 of 2016/17.

Both the current and prior period irregular expenditure identified, were due to non-compliance under paragraph 8.5 of SCM Instruction Note 3 of 2016/17 and originated from the incorrect interpretation of “sole supplier” versus “single source supplier”. Sole supplier deviations are approved in terms of the entity’s delegation of authority, but all single source suppliers must be pre-approved by National Treasury. All incidents of irregular expenditure have been investigated. The HSRC also incurred fruitless and wasteful expenditure of R27 000 due to missed flights and traffic fines.

The HSRC’s Audit and Risk Committee Report stated, “Based on the current year Internal Audit rating of the Supply Chain Management Review, Information Technology (Cyber security review) and Occupational Health and Safety review were rated as requiring major improvement. All other areas were considered to require some improvement.” The Audit Committee also determined that risk and compliance management processes for the year under review were inadequate.

The AGSA also reviewed the performance information for Programme 2 and did not identify any material findings on the usefulness and reliability of the reported performance information.

6.3. NATIONAL RESEARCH FOUNDATION

The objective of the NRF is to contribute to national development by:

- a) Supporting, promoting and advancing research and human capacity development, through funding and the provision of the necessary research infrastructure, to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including the humanities, social sciences and indigenous knowledge;
- b) Developing, supporting and maintaining national research facilities;
- c) Supporting and promoting public awareness of, and engagement with, science; and
- d) Promoting the development and maintenance of the national science system and support of Government priorities.

6.3.1. 2020/21 Budget Allocation and Adjustments

The NRF projected its total income for 2020/21 to be R4.4 billion, with the income streams accounting for this comprising the Parliamentary grant (22%); DSI contract funding (68%); contract funds from other government departments and entities (6.5%), and income generated internally through sales and interest accrued (3.5%).

With the Special Adjustments Budget, the NRF’s budget allocation was revised down by R753 million from R3.8 billion to R3.04 billion. The R753 million cut comprised R96.6 million cut from the Parliamentary grant and R656.6 million cut from contracts implemented on behalf of the Department. The largest reductions to contracts included R324 million from the SKA and R253.7 million from Human Resource Development. With regard to Human Resource Development, the NRF decided that it would not implement budget reductions on active graduate internships, postgraduate student bursaries, postdoctoral fellowships and early career and emerging researchers. However, reductions were applied to active grant awards to established researchers, such as the Centres of Excellence (CoE) and South African Research Chairs.

With the Second Adjustments Budget, transfers to the NRF were revised down further by R10 million taken from the operations budget.

6.3.2. 2020/21 Programme Performance

The NRF is organised into four Programmes:

- **Programme 1: Corporate** – provides enabling systems and structures that support effective and efficient governance, strategy and planning capacity, and shared services.
- **Programme 2: Science Engagement** - leads and coordinates the discourse on science with and for society and supports the national imperative of developing a scientifically literate society.

- **Programme 3: Research and Innovation Support and Advancement (RISA)** - supports and promotes research through the development of human capacity, the generation of knowledge, and the provision of, and access to, cutting-edge research infrastructure.
- **Programme 4: National Research Infrastructure Platforms (NRIP)** - provides leading-edge research infrastructure platforms in support of knowledge generation, innovation and human capacity development.

These Programmes contribute to the NRF's four strategic outcomes against which performance is measured. Overall the NRF achieved seven (78%) of its nine KPIs. The two targets that were not achieved:

- **Strategic outcome: Enhanced impact of the research enterprise**
The NRF aimed that the proportion of peer-reviewed publications produced by NRF supported researchers relative to the number of peer-reviewed publications produced by all researchers in the NSI would be 35%. The target reached was 31%. The variance was attributed to the number of researchers funded by the NRF having reduced over the last two years resulting in fewer publications emanating from NRF supported researchers.
- **Strategic outcome: A transformed organisation that lives its culture and values**
The NRF aimed that the proportion of employees from designated groups, specifically women, at levels 1 to 7, comprised 28%. The target reached was 27%. This was attributed to the effect of COVID-19 and the moratorium on filling vacancies on recruitment activity.

Selected achievements comprised:

- The South African Radio Astronomy Observatory (SARAO) led the National Ventilator Project;
- The NRF played a key role in the refurbishment and launch of the Cofimvaba Science Centre in partnership with the Department and provincial government;
- The successful 1st year of implementation of the new DSI-NRF Postgraduate Funding Policy, awarding bursaries to 11 093 postgraduate students of whom 79% were black and 58% were women;
- The development of a project brief for a system-wide Science Engagement Information Management System, which will be developed by the CSIR; and
- Two infrastructures under the South African Research Infrastructure Roadmap, the Expanded Freshwater and Terrestrial Environmental Observation Network and Shallow Marine and Coastal Research Infrastructure are currently being implemented. A third, the South African Polar Research Infrastructure, will be implemented from 2021 onwards. The eventual integration of these into a single platform will create a holistic environmental research infrastructure of unparalleled size and scope.

6.3.3. 2020/21 Financial Performance

The NRF's total income decreased by 9% from R3.9 billion in 2019/20 to R3.6 billion in 2020/21. The Parliamentary grant decreased from R943 million to R859 million with the Special Adjustments Budget and again by R10 million with the Second Adjustments Budget. The DSI contract funding decreased from R2.5 billion in 2019/20 to R2.3 billion in 2020/21 and the 23% budget cut due to the COVID-19 pandemic was largely absorbed by carried forward funding of R662 million from 2019/20 on projects that were in progress. Other contract income decreased from R296 million in 2019/20 to R293 million in 2020/21. Other income decreased by 18% mainly due to decreased isotope export sales to the international market at iThemba LABS. This was because of limitations on demand and distribution restrictions on international flights brought upon by COVID-19.

The NRF's expenditure largely mirrored its level of income. The decrease of 8.3% in total expenditure from R3.9 billion in 2019/20 to R3.6 billion in 2020/21 was mainly attributed to significantly lower grant and bursary expenditure as well as operating expenditure, all directly related to the impact of COVID-19 on the operations of the NRF.

6.3.4. 2020/21 Audit Outcome

The AGSA awarded the NRF an unqualified audit opinion with no findings; hence, a clean audit as in 2019/20. The AGSA further stated that no material findings on compliance with key legislation and no significant deficiencies in internal control were identified.

The NRF incurred irregular expenditure of R12.9 million due to non-compliance with supply chain management legislation where contracts were varied more than the prescribed threshold of 15% of the original contract amounts without prior approval from National Treasury. Full value for money and services were delivered on all related contracts. The NRF did not incur any fruitless and wasteful expenditure.

6.4. SOUTH AFRICAN NATIONAL SPACE AGENCY

The legislative mandate of SANSA is premised on two primary Acts; namely, the Space Affairs Act (No. 84 of 1993) and the South African National Space Agency Act (No. 36 of 2008). The former, an instrument of the Department of Trade, Industry and Competition, caters for the regulatory/policy context for the South African space programme; whereas the latter, an instrument of the Department, enables the establishment of SANSA as an implementing agency for the South African space programme. The National Space Strategy and the South African Earth Observation Systems (SAEOS) Strategy provide directives that directly inform the operationalisation of the South African space programme, inclusive of the role that SANSA should play. The South African National Space Agency marked the 10th anniversary of its existence in 2020.

SANSA's five strategic goals that collectively contribute to the achievement of the vision for the local space sector and the mission of SANSA are:

- **Goal 1:** The development of a suite of space application products and services that directly respond to user needs.
- **Goal 2:** The building of core space infrastructure, both ground and space based, that will enable the delivery of essential space services.
- **Goal 3:** The generation of space relevant knowledge that supports the developmental agenda. SANSA will set the national R&D agenda, its priorities, targets and outcomes in line with its 2020-2025 Strategic Plan.
- **Goal 4:** The development of requisite human capacity that is needed for the implementation of key space initiatives. Skills development with a solution driven mind-set will be promoted, and space will be utilised as a driver to prepare the youth for the fourth industrial revolution.
- **Goal 5:** The positioning of SANSA as a key enabler of government's policy imperatives.

6.4.1. 2020/21 Budget Allocation and Adjustments

Initially, SANSA's 2020/21 budget was projected to be R325.8 million. With the Special Adjustments Budget, SANSA's Parliamentary grant was revised down by R18.2 million. The Second Adjustments Budget further revised down SANSA's Parliamentary grant by R2.7 million, but allocated an additional R20 million (funds moved from transfers to Innovation projects research) for Space science research under the Economic Competitiveness and Support Package (ECSP), bringing the total ECSP allocation for 2020/21 to R51.4 million.

6.4.2. 2020/21 Programme Performance

SANSA has five strategic programmes; namely, Administration, Earth Observation, Space Operations, Space Science and Space Engineering. These Programmes contribute to the following six outcomes against which performance is measured:

- **Outcome 1:** Increased –space relevant knowledge that supports the developmental agenda.
- **Outcome 2:** Growth of the space sector through SANSA space related industry expenditure.
- **Outcome 3:** Increased human capacity for the implementation of key space initiatives.
- **Outcome 4:** SANSA re-positioned as a key enabler of government's space-related policies.
- **Outcome 5:** Appropriate infrastructure developed to support the local space sector.
- **Outcome 6:** Increased share of the global space operations market.

For 2020/21, SANSA achieved 14 of the 17 (82%) performance targets. The targets that were not achieved:

- Engaging 2 937 youth directly, as opposed to the planned 4 000, due to effect of COVID-19 on the school terms and reductions in available learner contact.
- Development of Digital Earth South Africa - The ingestion of the SPOT archive was not achieved due to delays related to data license and software contracts and Analysis Ready Data (ARD) processing.
- No progress could be made with the upgrading of the Houwteq Assembly, Integration and Testing (AIT) Facility due to the pending ownership resolution. These delays affected both project milestones and related capital expenditure.

During 2020/21, several key infrastructure projects estimated at R4.47 billion were identified by SANSA and these relate to the development of the Space Infrastructure Hub (SIH). Another key project undertaken by SANSA is the establishment of a Regional 24-hour Space Weather Centre which was at 42.8% completion at the end of the financial year. Construction of the Space Weather Centre building is envisaged to be completed by the end of 2022. Selected performance highlights included:

- SANSA was afforded an opportunity to host a virtual edition of the 16th International Space Operations conference (SpaceOps 2020);
- SANSA researchers produced 44 peer-reviewed publications in high impact journals;
- SANSA finalised the appointment of Dr Martin Snow, the Research Chair in Space Weather; and
- SANSA supported 45 postgraduate students in key space science disciplines (76% Africans and 47% females).

6.4.3. 2020/21 Financial Performance

SANSA's total income for 2020/21 was R282.5 million (R394 million in 2019/20), with Transfers and subsidies accounting for R200.7 million. Expenditure amounted to R263 million, with employee costs, due to the high-end skills required by SANSA, accounting for approximately R130.5 million (49.6%) of all expenditure. Operating costs amounted to R117.5 million. During the Second Adjustments Budget, an additional R123.8 million was brought forward from surplus commitments. However, capital expenditure was negatively affected by restrictions and backlogs related to the COVID 19 pandemic. SANSA ended 2020/21 with a surplus of R19 million.

6.4.4. 2020/21 Audit Outcome

SANSA's auditor, Nexia SAB&T, once again awarded SANSA an unqualified audit opinion with material findings on compliance with legislation resulting from material misstatements identified in the financial statements that were also submitted late for audit. Hence, the audit draws attention to the finding that SANSA management did not adequately implement proper record keeping and did not adequately review the financial statements before submitting these for audit. The auditor did not raise any material findings on the reliability and usefulness of the reported performance information for Strategic Goal 2.

SANSA incurred irregular expenditure amounting to R290 000 where in one instance it sourced services without prior approval and incorrectly appointed a service provider in a recruitment panel in two instances. SANSA did not suffer any loss for the latter two instances as the services were appropriately rendered. SANSA did not incur any fruitless and wasteful expenditure.

7. SUMMARY OF THE FINANCIAL AND NON-FINANCIAL PERFORMANCE

The 2020/21 financial year was the first year of implementation of the Department's and entities' 2020-2025 Strategic Plans and the 2019-2024 MTSF and for the first time since 2015/16, the Department's allocation of R8.8 billion increased in real terms by 3.1%. However, the COVID-19 pandemic and the need to divert resources to respond to its effect on the economy and livelihoods, ushered in extensive budget reductions that were implemented across government. These budget reductions precipitated

the revision of performance and operational plans to accommodate what was widely referred to as the “new normal”.

When the Committee considered the adjusted budget of the Department and its entities, and the implication of these adjustments, it expressed concern as to the long-term effects of these budget reductions on the mandate of the Department and its entities. Moreover, considering the significant contribution of the Department, its entities and the broader NSI to the national COVID-19 response, the central role of STI to South Africa’s efforts to reconstruct its economy, and that STI is already sub-optimally funded, the Committee was of the view that the science and innovation budget should not have been subjected to such extensive budget reductions. Of particular concern is:

- That in the absence of new funds, the continued reprioritisation of funds within the science and innovation portfolio is not sustainable and jeopardises the gains made to date as well as future prospects and sustainability. It also limits the scope and pace of implementation of new projects since these now rely on whatever funding can be made available and are, therefore, rarely fully funded. Moreover, it delays progress for the initiative from which funds were taken.
- The enduring challenge to reach the proportion of gross expenditure on R&D (GERD) to GDP, which is a measure of R&D intensity, of 1.1% by 2024. The original target was 1% by 2008, then 1.5% by 2015, and then 1.5% by 2019. The latest measure is that in 2018 GERD was 0.75%, declining from 0.83% in 2017.¹
- R&D expenditure and funding in the business sector (BERD) declined further in 2018/19 and was lower than at any other point in the preceding decade. Business sector R&D expenditure as a percentage of GERD was 39.3% in 2018/19. It was 53.2% in 2009/10.²
- The STI Budget Coordination Mechanism, which was first approved by Cabinet for implementation in 2018/19 and never was, is now again being considered for implementation as one of the interventions under the STI Decadal Plan to ensure increased funds for STI.
- The NRF’s total income has been declining over the last five years, negatively affecting the size of awards to and the numbers of postgraduate students and researchers that can be supported. Student and researcher support are two key areas of work that seeks to transform the STI workforce.
- The sub-optimal level of funding for all entities has compromised the full implementation of mandates; limited the scope and pace, hence, the reach and impact, of key initiatives; created capacity challenges as high-level skills seek better/more secure employment elsewhere; and compelled these entities to secure external contract funding to ensure their sustainability.

In terms of financial and non-financial performance, the Department and its entities have made significant contributions to the achievement of their strategic objectives. Furthermore, and despite the grave challenges presented by the COVID-19 pandemic, they have admirably used and demonstrated the expertise and capabilities inherent in the NSI to ensure the national COVID-19 response was supported by the best available scientific and technological advice and instruments.

In 2020/21, the Department and its entities spent in excess of 90% of their allocated funds and achieved, on average, around 85% of their performance targets. Underexpenditure and non-achievement of performance targets were mainly attributed to delays in operations due to the effect of the lockdown measures instituted to contain the spread of COVID-19 and the moratorium placed on staff appointments, which exacerbated lack of capacity issues.

Notwithstanding their achievements, the Department and its entities have been subjected to successive years of below-inflation increases to the Vote allocation, and as is the case in 2020/21, two rounds of budget reductions. The sub-optimal funding of the Department and entities has restrained many of the initiatives aimed at increasing the size, coherence and effectiveness of the NSI, as required by the NDP, since the implementation of these initiatives is defined by the available budget and not by the need it seeks to address. Hence, the Department and its entities are increasingly compelled to find additional forms of funding. However, due to the weak state of the economy, the external funding the entities rely on to execute their functions has also declined. In the case of the HSRC, the needed contract income was secured but could not be accessed due to the limitations on community fieldwork imposed by the COVID-19 lockdown. In addition, public procurement regulations

¹ National Advisory Council on Innovation - South African Science, Technology and Innovation Indicators, 2021

² Ibid

require public entities to tender and compete with the private sector for government contracts, usually for work that the entities are mandated to do and for which they receive money from the national fiscus. In this regard, the CSIR reported that it could not realize potential contract income from the public sector amounting to R450 million in the 2020/21 financial year.

The AGSA indicated that the Department, CSIR and NRF all maintained their clean audits for the 2020/21 financial year. Whereas, the HSRC had regressed from a clean audit to an unqualified audit with findings and SANSA retained its unqualified audit with findings. The findings relate to non-compliance with supply chain management legislation, the late submission of financial statements and material misstatements in the financial statements. Where instances of irregular expenditure and fruitless and wasteful expenditure were detected, the AGSA was satisfied that the science and innovation portfolio has effective consequence management processes in place. Furthermore, the AGSA indicated that the Department, CSIR and NRF have a strong leadership culture, effective financial and performance management, and effective governance. They also have effective governance structures and stable leadership that ensures that actions are taken to address audit findings. These should be maintained. The HSRC was advised to take swift action to address its supply chain management compliance findings and monitor its controls to ensure compliance with laws and regulations. Across the portfolio, the AGSA advised that supply chain management training be implemented to ensure the correct understanding and application of legislation and any updates to legislation requirements.

Overall, the Department with its entities have shown that they can, to a significant degree, spend their allocated budget and achieve their performance targets. Existing data show that when faced with an economic crisis, countries that invested more in STI to respond to the crisis recovered faster and were in an economically stronger position after the crisis than those countries that either maintained or reduced their existing level of STI investment.

8. COMMITTEE OBSERVATIONS

The Committee commended the Department and the entities for their efforts in delivering on some of the key areas for social and economic development in line with the goals of the NDP and within acute financial constraints.

The Committee's observations highlight some of the key areas emanating from the interactions with the Department, entities and relevant stakeholders, which require further attention and discussion. Hence, the Committee:

- 8.1.** Noted the impact of the COVID-19 pandemic on the 2020/21 financial year and how it hampered the optimal functioning of the Department and its entities. It meant that already constrained budgets had to be further reduced, resulting in amendments to performance targets and plans.
- 8.2.** Acknowledged the important contributions of the Department and its entities in combatting and mitigating the impact of the COVID-19 pandemic and the importance of ongoing and adequate funding for such efforts beyond the current to prepare for and react to future crises.
- 8.3.** Noted the finalisation and Cabinet approved Decadal Plan for STI, which seeks to drive a whole-of-government/society approach to innovation to enhance the impact of the National System of Innovation on socio-economic development.
- 8.4.** Welcomed the finalisation of the Higher Education, Science, Technology and Innovation Institutional Landscape (HESTIIL) Review report, which focuses on the future direction, development and infrastructure requirements of the country's post-school education and STI landscape.
- 8.5.** Acknowledged the development and on-going discussions with its entities around the DSI's Transformation Framework. Although gains around transformation are being made, the Committee expressed concern as to the slow pace at which these were proceeding. The need to ensure the development of an inclusive, transformed research sector across all career levels and the future sustainability of the research cohort was one of the key areas highlighted by the Committee.
- 8.6.** Noted the response with regard to finalising the Indigenous Knowledge (IK) Act Regulations, its readiness to be gazetted for public comment and the on-going work in preparing for implementation.

- 8.7. With regard to Indigenous Knowledge Systems (IKS), noted the information emanating from the National Survey of Intellectual Property and Technology Transfer at publicly funded research institutions.
- 8.8. Noted the Department's efforts with regard to data quality checks and synchronisation in assisting the IKS Documentation Centres. These Centres are important tools for the collection, documentation, storage and dissemination of IK information for community access and future economic benefit.
- 8.9. Noted that, within the science and innovation portfolio, some of the highly skilled employees could not be retained due to funding constraints.
- 8.10. Welcomed the Department's report that some of the senior management and critical skills vacancies would be filled during the current financial year and that the vacant post of the Chief Financial Officer had been advertised.
- 8.11. Requested the Department to ensure that it spends its total budget allocation, especially since they were already under funded.
- 8.12. Expressed concern about the on-going challenges regarding the administration of the R&D Tax Incentive. They noted that the 90-day turnaround time target, which has never been met, would improve with the introduction of the new online system.
- 8.13. Anticipates the tabling of the new Annual Report on the R&D Tax Incentive and the outcome as to whether the Incentive, which is currently being reviewed since it ends in October 2022, will be continued. National Treasury will decide whether to retain the incentive or not.
- 8.14. In engaging with the National Research Foundation, South African National Space Agency, Council for Scientific and Industrial Research and the Human Sciences Research Council, noted the constraints brought about by a lack of adequate investment.
- 8.15. Noted the limitations with regard to the Parliamentary grant that necessitates entities to source external contract funding, which may then deflect the focus of the work done away from national interest to that of the contractor. Furthermore, the primary function of researchers is compromised, as they are now required to undertake administrative tasks such as sourcing contracts and preparing tender documents for research funding.
- 8.16. Noted the negative impact of procurement regulations on the ability of entities to earn contract income from the public sector. Entities are required to compete with private organisations that are larger and/or better resourced; hence, their bids may be lower even if they do not have the same level of expertise as the entities, for these tenders.
- 8.17. Noted that the current total investment in R&D is inadequate to drive the economic transformation agenda of South Africa and would need to be increased.

9. RECOMMENDATIONS

The Portfolio Committee on Higher Education, Science and Technology recommends the following:

- 9.1. The Minister continues his efforts with the National Treasury to secure additional funding, and advises against the future reduction of funds, for the science and innovation portfolio.
- 9.2. The Committee facilitates a discussion with the Minister, Department, affected entities and the National Treasury around the limitations of the procurement regulations, to develop an informed view and to propose a change to these provisions to enhance the sustainability of the entities and ensure that public entities serve the needs of government.
- 9.3. The Committee establishes the specific detail around additional funding for the Department. The Committee will schedule a meeting with the Department in the first term of 2022 to discuss this matter.
- 9.4. The Committee formalise the request for additional funding for the science portfolio through engaging the Standing Committee on Appropriations.
- 9.5. The Department reviews and improves on the current format of its Annual Report Presentation so that its work and performance against targets is presented in a much more user-friendly manner.
- 9.6. The Committee, aware of the complexity of measuring and reporting on the impact of investment in science, recommends that the Department explore mechanisms to better report on the impact of science and innovation investment.
- 9.7. The discrepancy, regarding evidence for performance indicators that were agreed upon and then changed at the time of audit, should be resolved between the AGSA, Department and the affected entities to prevent its reoccurrence.

- 9.8. The Department and NRF should ensure that targets specifically relating to the funding of postgraduate students are achieved.
- 9.9. The Department presents an update on the STI Decadal Plan as the process of consultation progresses. This briefing will be scheduled for the first term of 2022.
- 9.10. The Department briefs the Committee on progress to finalise the IK Act Regulations as well as the outcomes of the public consultation process. This briefing will be scheduled for the first term of 2022.
- 9.11. The Department briefs the Committee on the Annual Report of the R&D Tax Incentive as soon as it is tabled in Parliament.

Report to be considered.