**6. Report of the Select Committee on Education and Technology, Sport, Arts and Culture on Budget Vote 35: Science and Innovation (2020/21), Dated 03 June 2020**

The Select Committee on Education, Technology, Sports, Arts and Culture(hereinafter referred to as the Committee), having considered Budget Vote 35: Science and Innovation, the 2020-2025 Strategic Plan and the 2020/21 Annual Performance Plan (APP) of the Department of Science and Innovation (hereinafter referred to as the Department), reports as follows:

**1. Introduction**

**1.1. Purpose of the Budget Vote 35 Report**

The purpose of this report is to account for work done by the Committee in considering the 2020 - 2025 Strategic Plan and 2020/21 Annual Performance Plan (APP) and budget of the Department in accordance with Section 27(1) of the Public Finance Management Act, 1999 (Act. No 29 of 1999), and as referred by the Chairperson of the National Council of Provinces (NCOP) to the Committee in terms of Rule 338 for consideration and reporting.

**1.2. Method**

The 2020 - 25 Strategic Plans and 2020/21 APPs and budgets of the Department was considered against the background of key government policy documents, including, amongst others, the National Development Plan (NDP), the 2019 – 2024 Medium Term Strategic Framework (MTSF), and the 2020 State of the Nation Address (SONA). The Committee had joint briefing sessions with the Portfolio Committee on Higher Education, Science and Technology to consider the Strategic Plans and the APPs of the Department on 15 and 19 2020.

**1.3. Mandate of Committee and the Department**

The mandate of Parliament is based on the provisions of the Constitution of the Republic of South Africa, 1996, establishing Parliament and setting out the functions it performs. Parliament’s role and outcomes are to represent the people and ensure government by the people under the Constitution, as well as to represent the provinces and local government in the national sphere of government. The main functions of Parliament as outlined in the Constitution are:

* To pass legislation,
* To oversee executive action,
* Facilitation of public involvement, co-operative government and,
* International engagement.

The Department derives its mandate from the following:

**Policy mandate: White Paper on Science, Technology and Innovation**

Succeeding the 1996 White Paper on Science and Technology, the 2019 White Paper on Science, Technology and Innovation, which seeks to specifically enhance the role of innovation, now sets the current long-term policy direction for the National System of Innovation (NSI) and seeks to ensure an increasing role for science, technology and innovation (STI) to accelerate inclusive economic growth, increase the competitiveness of the economy, and improve the livelihoods of South Africa’s citizens.

The 2019 White Paper hinges on three high-level goals; namely to, take advantage of opportunities presented by megatrends and technological change; expand policy approaches that have worked and propose new approaches, where necessary; and promote a more inclusive economy at all levels. These goals are underpinned by the following objectives:

* Adopt a whole-of-government/society approach to innovation;
* Instil a culture of valuing STI, and integrate STI into government planning and budgeting at the highest levels;
* Create an enabling and inclusive governance environment;
* Create a more innovation-enabling environment;
* Increase and transform NSI human capabilities;
* Expand and transform the research system;
* Expand and transform the institutional landscape; and
* Increase funding and funding efficiencies.

A new Decadal Plan for STI will serve as the implementation plan for the 2019 White Paper. This Decadal Plan will take into consideration not only the policy intents of the 2019 White Paper, but also the reviews of the Ten-Year Innovation Plan (2008–2018) and 2002 National Research and Development Strategy, the 2019 National Advisory Council on Innovation’s (NACI) South Africa Foresight Exercise for Science, Technology and Innovation 2030 report, and the priority outcomes of government. It is envisaged that this Plan will be finalised within the 2020/21 financial year.

**Policy context: National Develop Plan and the Medium Term Strategic Framework**

The National Development Plan (NDP) characterises STI as crucial for development since countries that have effectively alleviated poverty by growing their economies, have done so by investing in and developing strong STI environments and capabilities. Hence, the NDP states that South Africa’s NSI needs to be expanded as well as be more effective and, therefore, be aligned with the sectors that will realise the country’s growth objectives. This requires that:

* South Africa invests more in research and development (R&D). The target was 1.5% of GDP invested in R&D by 2019;
* 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 2014-2019 Medium Term Strategic Framework (MTSF) served as the first phase of implementation of the NDP and committed Government to 14 key outcomes. The Department contributed to Outcome 2: A long and healthy life for all South Africans; Outcome 3: All South Africans are safe and feel safe; Outcome 4: Decent employment through inclusive economic growth; Outcome 5: A skilled and capable workforce to support an inclusive growth path; Outcome 6: An efficient, competitive and responsive economic infrastructure network; Outcome 7: Vibrant, equitable and sustainable rural communities and food security for all; and Outcome 10: Protect and enhance South Africa’s environmental assets and natural resources.

Achievement against these Outcomes is mixed and true transformation of the economy, the environment and society continues to elude South Africa, who still faces the challenges of poverty, inequality and unemployment. The 2019-2024 MTSF, representing the second five-year phase of implementation for the NDP, aims to address these challenges through three pillars; namely, achieving a more capable state; driving a strong and inclusive economy; and building and strengthening the capabilities of South Africans. These three pillars underpin the seven priorities of the 2019-2024 MTSF, which are translated through 81 outcomes, 337 interventions and 561 performance indicators.

**2. 2020-2025 Strategic Plan for the Department of Science and Innovation**

During 2015-2020, to position STI within the framework of the NDP, the Department directed its efforts and resources toward five strategic outcome-orientated goals. These goals overlapped with some of the initiatives for which the Department was responsible or contributed to in the 2014-2019 MTSF and directly supported the aims of the Nine-Point Plan, adopted in 2015 to accelerate the growth of the economy and create much-needed jobs through the diversification and enhancement of economic competitiveness. The Department’s five strategic outcome-oriented goals for 2015-2020 were:

**Goal 1:** Responsive, co-ordinated and efficient NSI – build on previous gains to create a responsive, coordinated and efficient NSI.

**Goal 2:** Increased knowledge generation – maintain and increase the relative contribution of South African researchers to global scientific output.

**Goal 3:** Human capital development – increase the number of high-level graduates and improve their representivity.

**Goal 4:** Using knowledge for economic development – derive a greater share of economic growth from R&D-based opportunities and partnerships.

**Goal 5:** Knowledge utilisation for inclusive development – accelerate inclusive development through scientific knowledge, evidence and appropriate technology.

For the period 2014/15 to 2018/19, the Department achieved an average performance of 86% against the targets set for these strategic goals, spent 99% of its budget, and obtained clean audits in the 2014/15, 2017/18 and 2018/19 financial years.

Moving on to the current period; the 2019 White Paper and the Department’s name change in 2019 from science and technology to science and innovation, signifies an expanded mandate and leadership role for the Department in advancing overall government policy on innovation. Furthermore, the merger of the Science and Technology and Higher Education and Training Ministries, while the two departments remain separate, provides these two departments with the opportunity to assess how they can enhance and best implement matching functions.

The Department, building on the successes of the previous period and to ensure that the NSI expands its positive impact on reducing poverty, inequality and unemployment as envisioned by the 2019 White Paper, has identified the following six outcomes for the period 2020-2025:

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

Outcome 1 seeks to improve the contribution of the NSI to achieving the goals of the NDP. The key driver of these contributions will be the Decadal Plan, which will define the critical missions that South Africa will pursue during the period 2020-2030. The four outcome indicators against which performance will be measured are:

i) Percentage increase in the number of formalised partnerships between different category actors of the NSI that advance Decadal Plan priorities;

ii) Number of STI missions introduced and adopted by Cabinet that crowd in resources and capabilities across the NSI;

iii) Percentage increase in the investment support by government that advances gross expenditure on R&D (GERD) towards 1.1% of GDP (revised down from former target of 1,5%); and

iv) Number of approved strategies that give effect to the agreed dimensions of transformation to be effected in the NSI.

A key action to be finalised in 2020 that will guide the establishment, geospatial location, institutional form and dispersion of new NSI institutions is the Higher Education, Science, Technology and Innovation Institutional Landscape (HESTIIL) review. These institutions are expected to advance the implementation of critical science missions and research areas such as astronomy. Additional actions to ensure the success of this outcome include developing R&D-led industries based on new sources of growth such as the Fourth Industrial Revolution and the Circular Economy; directing more effort to formalising partnerships with non-traditional NSI stakeholders such as non-governmental organisations and youth and civil society organisations; and providing targeted developmental support and funding to those aspects of the NSI that are performing sub-optimally or are underrepresented and underserved so that they can improve their contribution to the research and knowledge enterprise. The Department will also ensure a far greater role for South Africa in international innovation partnerships using the Sustainable Development Goals (SDGs) as a guiding multilateral policy framework; continue to implement the African Union’s (AU) Science, Technology and Innovation Strategy for Africa (STISA); and pursue initiatives supporting Agenda 2063 and the Southern African Development Community’s (SADC) Regional Indicative Strategic Development Plan. Bilateral co-operation with African partners will also be prioritised.

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

Outcome 2 seeks to further address the lack of transformation within the NSI. Hence, the Department will continue as well as expand the transformation agenda in all its science focus areas. The Department’s agenda targets four levels of transformation; namely, spatial, institutional, demographic and transdisciplinary transformation. The five outcome indicators against which performance will be measured are:

i) Number of Department-funded PhDs graduating annually as a contribution to the NDP target of 100 PhDs per million population by 2030;

ii) Number of artisans and technicians absorbed into the economy in sectors where DSI has active programmes;

iii) Percentage increase of women and black researchers in South Africa’s Research workforce;

iv) Percentage increase of PhD-qualified teaching and research staff; and

v) Improved knowledge about science among the general public.

In addition to existing actions, the Department will extend its collaboration with the Department of Basic Education to ensure that initiatives that encourage learners to participate in science, technology, engineering, mathematics and innovation (STEMI) subjects are implemented in all nine provinces (currently in seven provinces). Postgraduate funding will continue to be a priority and this funding policy will be structured around the full cost of support for financially needy students. However, should the postgraduate funding budget not grow, this would mean that less postgraduate students will be supported. Funding for engineering postgraduate studies will also be a specific focus, as well as support for the development of technical and artisan skills to support the deployment of newly developed innovations. In addition, to assess how South African’s relate to STI, a dedicated survey will be conducted by the Human Sciences Research Council (HSRC) by 2023/24 and the report published by 2025/26.

**Outcome 3: Increase knowledge generation and innovation output**

Outcome 3 seeks to increase South Africa’s research productivity, currently 0.88% of global share, to 1% of global output. The three outcome indicators against which performance will be measured are:

i) Increase South Africa’s share of global publication outputs;

ii) Percentage increase in prototypes, technology demonstrators, pilot plants that advance industrialisation through innovation; and

iii) Percentage increase in patent and design applications filed from publicly financed R&D.

Key actions to increase research productivity will be to fast-track interventions aimed at PhD qualification attainment and implementing mandate-aligned programmes for historically disadvantaged institutions (HDIs) and universities of technology. The Department and the DHET will review the Research Outputs Policy to determine whether science councils can also benefit from this incentive programme, and through the HDI Development Grant, will develop programmes aimed at ensuring that there is a critical mass of publishing academics at HDIs. The Department will also focus on investments that support the translation of publicly financed IP into social and economic value. In terms of infrastructure, all 13 research infrastructures in phase one of the South African Research Infrastructure Roadmap (SARIR) will be implemented, and it is estimated that the planned increase of the South African National Research Network’s (SANReN) total available broadband capacity to 7 100 Gbps by 2024/25 will provide broadband connectivity access to more than a million users. The establishment of a system for the recognition of prior learning in indigenous knowledge (IK) disciplines, as prescribed by the Protection, Promotion, Development and Management of IK Act, also represents a non-traditional way of developing human capabilities. Furthermore, the Department intends to develop a policy framework for the development of an IK-based pharmaceutical industry and bioinnovation institute.

**Outcome 4: Knowledge utilisation for economic development in (a) revitalising existing industries and (b) stimulating R&D-led industrial development**

Outcome 4 seeks to drive economic development through various initiatives associated with the sectoral masterplans and revitalised industrial strategy. The four outcome indicators against which performance will be measured are:

i) Rand value of research, development and innovation (RDI) investment attracted to support RDI needs identified through the sectoral masterplans process;

ii) Percentage increase in Small, Medium and Micros Enterprises (SMMEs) or Co-operatives whose performance has improved or who have secured new opportunities through support provided by the Department and its entities;

iii) Percentage increase in the commercialisation of granted IP rights from publicly-funded R&D; and

iv) Number of new R&D-led industrial development opportunities initiated by the Department.

Key actions for the Department include participating in the development of sectoral masterplans and implementing flagship programmes in support of priority sectors identified in the national revitalised industrial strategy. Examples of the latter include the continued deployment of hydrogen fuel cells in government buildings, critical infrastructure, as well as in rural formal and urban informal settlements to assess whether this alternative technology can ensure energy security and speed up the rate of electrification. Other examples include the Carbon Capture, Storage and Use Flagship Programme, the Energy Storage RDI Programme, the Indigenous Knowledge-based Technology Innovation initiatives, and the Medical Cannabis RDI Programme. Furthermore, increased attention will be given to building and supporting a pipeline for the development and commercialisation of outputs from publicly-funded R&D, as well as to an enforcement fund to enable publicly-funded institutions to prevent third-party infringement of their IP rights. The Department also aims to expand its network of Technology Stations and Platforms to support SMMEs and Co-operatives.

**Outcome 5: Knowledge utilisation for inclusive development**

Outcome 5 seeks to advance the vision of an inclusive and responsive NSI that provides equitable access to the country’s knowledge infrastructure, and supports the broader concept of innovation. The two outcome indicators against which performance will be measured are:

i) Grassroots innovations whose commercialisation has been facilitated by the support / access of the multi-tiered support package provided by the Department and its entities; and

ii) Publicly-funded IP made available (accessible) in support of grassroots innovators.

The key features of the multi-tiered support package for the commercialisation of grassroots innovations will include technology development, compliance with industry standards, protection of IP and mentorship. The Department, to enhance the use of publicly-funded IP and ensure the deployment of locally developed technology solutions, will facilitate access to this IP that specifically relates to solutions that enable access to basic services, strengthens the state’s capacity to provide services and promotes the inclusion of women, youth and people living with disabilities.

**Outcome 6: Innovation in support of a capable and development state**

Deploying national STI interventions is a challenge because the Department does not have a concurrent function within provincial and local government. However, the Department contributes to the development of an innovation ecosystem and a capable and developmental state via its Regional Innovation Support programmes. Outcome 6 seeks to increase the spatial footprint of innovation support so that innovation will enable localised socio-economic development. The four outcome indicators against which performance will be measured are:

i) Increase in the number of use cases of decision support systems;

ii) Number of demonstrators that have successfully introduced a new way of delivering a service;

iii) Number of districts / metros supported with technology-based applications as part of the District Development Model for Service Delivery Improvement; and

iv) Evidence informed integration of innovation in service delivery.

Key actions will be to ensure the piloting of appropriate technologies that facilitate service delivery, for example, technologies for waste management, water and wastewater management, housing, sanitation, and energy provision, as well as technologies for the circular economy to ensure a just transition to a low carbon economy in line with climate change and sustainable development obligations. The Department states that to build a coherent system to address both climate change and sustainable development, a digital economy is required. Therefore, the Department will focus on programmes that enable innovation and build capacity in the PSET system in ICT domains such as data science, artificial intelligence (AI), the Internet of Things (IoT) and cybersecurity. Furthermore, the capacity to optimally use 5G and other wireless technologies must also be developed so that the state and citizens can take advantage of the opportunities within a digital economy.

These outcomes are similar to the previous five strategic outcome-oriented goals, except that innovation in support of a developmental state has now been included as a separate outcome (outcome 6) where before it was all contained within Goal 5. In addition, in line with the Department’s name change and expanded mandate, the outcomes and performance measures endeavour to ensure the centrality of innovation to the transformation and growth of South Africa’s economy and the lives of its citizens, and new performance indicators speak directly to this. Furthermore, skills development targets will seek to build on the transformation gains made to date, but will also focus more closely on the needs of industry. Hence, Outcomes 1, 3 and 4 align to Pillar 1 of the 2019-2024 MTSF; namely, driving a strong and inclusive economy. Outcome 2 aligns to Pillar 2; building and strengthening the capabilities of South Africans; and Outcomes 5 and 6 align to Pillar 3; achieving a more capable state. The Department has also adjusted its Mission to now explicitly indicate that the leadership, enabling environment and resources it provides for STI should not merely support South Africa’s “development”, but that this development must be “inclusive and sustainable” if the country is to transform its socio-economic trajectory.

**3. Vote 35: Science and Innovation (2020/21)**

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 importance of STI in realising these objectives has been 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 STI is crucial to achieving the objectives set for these initiatives include:

* Energy security – enabling the development of additional generation capacity from renewable energy, natural gas, hydro power, battery storage and coal.
* Climate change – enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change and identifying new industrial opportunities in the green economy.
* Investing in skills and infrastructure – establishment of a new University of Science and Innovation in Ekurhuleni that will be focussed on high-impact and cutting-edge technological innovation for current and future industries. 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.
* Harnessing Data Science – development of the Health Patient Registration System (with the CSIR) to ensure effective implementation of the National Health Insurance.

The 2020 Budget, tabled amid a weakened economic outlook, increasing unemployment and the threat of COVID-19, is framed, among others, around a R63.3 billion downward revision of tax revenue; rising debt; and total expenditure reductions of R261 billion over three years of which R160 billion pertains to reductions in the public service wage bill. The consolidated 2020/21 government expenditure amounts to R1.95 trillion, with most of the spending focussed on learning and culture (R396.4 billion), social development (R309.5 billion) and health (R229.7 billion). Funding for new and urgent priorities will be provided for by reprioritising existing baselines.

The 2020/21 consolidated government expenditure for innovation, science and technology is R16.4 billion (R15.7 billion in 2019/20, revised estimate), which represents 1% of the total MTEF and 7.8% of the consolidated economic development expenditure of R211.5 billion. Within the 2020/21 consolidated expenditure for innovation, science and technology, R1.4 billion has been specifically set aside to support the commercialisation of technological innovation and upgrade infrastructure to strengthen the research and innovation capabilities of the CSIR and SANSA. Furthermore, within the existing pipeline of major infrastructure projects that are under development but have not yet been approved for funding, is the construction of the NRF’s South African Isotope Facility, projected to cost R1.4 billion.

The Department states in its 2020-2025 Strategic Plan that, “the current budget allocation to various Programmes is based on a historic and incremental budgeting method. However, with priorities having changed due to the policy shift (new political administration and the new White Paper), this allocation method will change.” Hence, “the Department will undertake a budget restructuring exercise within the MTEF allocated funds (and extrapolate to the two outer years) to ensure realignment with new priorities during the planning cycle. Guided by the Decadal Plan approach of sectoral planning, a sectoral-based budgeting approach will be adopted. The Department will be required to review and assess the efficiency, effectiveness and relevance of its investments. After the current planning cycle, funds will be reallocated to higher priority areas in the next MTEF. Existing initiatives or programmes that have a minimum impact and/or are no longer relevant will have to be scaled down or discontinued.”

Over the medium-term, the Department is allocated R27.9 billion, where overall expenditure is expected to increase at an average annual rate of 5.8%, from R8.1 billion in 2019/20 to approximately R9.7 billion in 2022/23. This allocation will primarily be directed toward human capital development, generating and exploiting knowledge and innovation, and building and maintaining infrastructure for research and innovation. However, over the medium-term, Cabinet has approved reductions of R460.9 million to the Department’s baseline allocation to be effected mainly on discretionary transfers and non‐core goods and services. Since the work of fostering, promoting and supporting innovation in scientific research and technology is conducted largely by the Department’s entities, universities and non‐profit organisations, Transfers and subsidies account for an estimated 93% (R25.9 billion) of the Department’s total budget over the MTEF period. Compensation of employees is the second‐largest spending item in the Department, accounting for an estimated 4.8% (R1.3 billion) of the total expenditure over the medium-term, increasing at an average annual rate of 6.4% mainly due to the expected filling of critical posts. As at 31 January 2020, the Department had an overall vacancy rate of 23%, with 20% of Senior Management level posts being vacant.

Over the medium-term, an additional R1.2 billion is allocated to set up the Sovereign Innovation Fund to ensure more effective technology commercialisation; R185 million is allocated to the CSIR to invest in infrastructure aimed at improving the efficiency and competitiveness of scientific research; and R100 million is allocated to SANSA to invest in its space science programme.

The Department’s 2020/21 budget allocation increases from R8.1 billion in the 2019/20 financial year to ***R8.8* billion** (Table 1). This represents, when adjusted for inflation, a real increase of 3.1%; and is 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 remains the same as in previous years and comprises 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%).

**Table 1: Budget summary of the Department of Science and Innovation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Programme** | **2019/20**  **Adjusted appropriation**  **(R’ million)** | **2020/21**  **Expenditure estimate**  **(R’ million)** | **Percentage of total budget** | **Nominal percentage change in 2020/21** | **Real percentage change in 2020/21 (inflation-adjusted)** |
| 1. Administration | 391.3 | 360.3 | 4.1 | -7.93 | -11.81 |
| 2. Technology Innovation | 1 224.3 | 1 504.5 | 17.1 | 22.88 | 17.71 |
| 3. International Cooperation and Resources | 149.0 | 156.4 | 1.8 | 4.99 | 0.56 |
| 4. Research, Development and Support | 4 572.9 | 4 882.5 | 55.5 | 6.77 | 2.27 |
| 5. Socio-Economic Innovation Partnerships | 1 834.7 | 1 893.7 | 21.5 | 3.21 | -1.14 |
| **Total** | **8 172.3** | **8 797.4** | **100** | **7.65** | **3.11** |
| **Economic Classification** |  | | | | |
| Current payments | 645.7 | 632.5 | 7.19 | -2.04 | -6.17 |
| Transfers and subsidies | 7 523.9 | 8 162.2 | 92.78 | 8.48 | 3.91 |
| Payments for capital assets | 2.8 | 2.8 | 0.03 | 0 | -4.21 |
| **Total** | **8 172.3** | **8 797.4** | **100** | **7.65** | **3.11** |

The Department’s budget funds five major programmes, namely:

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

These programmes fulfil the Department’s mandate of realising the full potential of science, technology and innovation in social and economic development. The percentage budget allocation to the Programmes and in terms of economic classification remains essentially the same as in previous financial years. The budget allocation is aligned to the priorities of strengthening and expanding STI human capital development and ensuring that innovation and knowledge underpin the government’s growth strategy. Hence, Programmes 2, 4 and 5, that are responsible for the transfers to the following Departmental entities; namely, ASSAf, CSIR, HSRC, NRF, TIA and SANSA, receive 94% of the Department’s total budget allocation.

For 2020/21, the Department has captured its performance reporting into 51 performance outputs that have been translated into 52 performance indicators.

Programmes 2 to 5, since 2019/20, include a sub-programme for the Offices of the Deputy Director-Generals (DDGs), where Programme 2 is allocated R5.3 million, Programme 3 is allocated R5.7 million, Programme 4 is allocated R4.5 million and Programme 5 is allocated R3.5 million. The total allocation to the DDGs Offices is R19 million (R16.7 million in 2019/20). This sub-programme provides management and administrative support to the Programmes and the Offices of the DDGs.

**3.1. Programme 1: Administration**

Programme 1 provides strategic leadership, management and support services to the Department and is responsible for six of the Department’s 2020/21 performance targets. Its sub-programmes are Ministry, Institutional Planning and Support (IPS), Corporate Services (CS) and Office Accommodation. Programme 1’s R360.3 million, which has been subjected to a real decrease of 11.8%, will mainly be spent on salaries (R200.4 million) and on Goods and services (R141.6 million). The sub-programmes, IPS and CS, being responsible for strategic and operational planning, management, monitoring and evaluation, receives the bulk of Programme’s 1 allocation. Notable changes include the significantly reduced allocation to the Office Accommodation sub-programme, which decreases from R53 million to R5.6 million and that expenditure on property payments decreases from R60.3 million in 2019/20 to R13.3 million in 2020/21, the latter amount being similar to those in the three financial years before 2019/20. The substantial increase to the Office Accommodation allocation in 2019/20 was for a feasibility study on the design and construction of a new building and for the refurbishment of the existing headquarters of the Department.

A risk identified in the Department’s 2020/21 APP is that the Department may, at present, not be enabled to effectively coordinate and steer the implementation of the 2019 White Paper. The Department states that this risk will be mitigated through the establishment of a ministerial-level committee for STI and a Presidency-level STI Plenary; the development of the Decadal Plan; and improved stakeholder mapping and targeted engagements to support the implementation of the 2019 White Paper. The Department will also be undertaking an organisational structure review, which will change the current post establishment, as well as a budget restructuring process to ensure alignment with its expanded mandate and new priorities. Priority will then be given to filling those vacancies that are crucial in terms of the Decadal Plan. A key performance objective for Programme 1 is to ensure that the Decadal Plan will be finalised and approved by Cabinet by 31 March 2021.

Programme 1 also administers and funds the operations of NACI, which is estimated to be R16.7 million for 2020/21. Programme 1 transfers R15.6 million to non-profit institutions for *Institutional and programme support research*.

**3.2. Programme 2: Technology Innovation**

Programme 2 enables R&D in space science and technology, energy security, the bioeconomy, and in the areas of nanotechnology, robotics, photonics and indigenous knowledge systems (IKS), and promotes the realisation of commercial products, processes and services from these R&D initiatives. In addition, through the implementation of enabling policies and interventions along the entire innovation value chain, promotes the protection and utilisation of IP, technology transfer and technology commercialisation. It is responsible for 14 of the Department’s 2020/21 performance targets. Programme 2 has five sub-programmes and one specialised service delivery unit (SSDU). These are Space Science, Hydrogen and Energy, Bio-innovation, Innovation Priorities and Instruments (IPI), the Office of the DDG, and the National Intellectual Property Management Office (NIPMO).

Programme 2 receives R1.5 billion (17%) of the Department’s total allocation, which is a real increase of 17.7% when adjusted for inflation. The IPI sub-programme that supports and strengthens the policy initiatives that aim to create and sustain an enabling environment for innovation, technology development and the commercialisation of products from publicly funded R&D, continues to receive the largest share of Programme 2’s budget, as well as the largest increase to its allocation, growing in real terms by 35.3%. The allocation is estimated to increase further over the medium-term to R1.15 billion in 2021/22 and R1.18 billion in 2022/23. The lowest allocation, as in previous financial years, goes to NIPMO. The remaining funds are relatively equally distributed between the Space Science, Hydrogen and Energy and Bio-innovation sub-programmes, with only Space Science receiving an above-inflation increase.

Approximately 93% (R1.4 billion) of Programme 2’s budget is allocated to Transfers and subsidies, with the entities, TIA and SANSA receiving R455.9 million (R440.9 million in 2019/20) and R182.1 million (R143.5 million in 2019/20), respectively. Space science research is also allocated R31.4 million from the Economic Competitiveness and Support Package, which is the next tranche of funding for the further development of South Africa’s earth observation satellite, EO-Sat1. Furthermore, the stated emphasis on innovation reflects in a transfer to various institutions for *Innovation projects research* amounting to R1.3 billion over the medium-term, with the 2020/21 allocation being R241.4 million, a significant increase from the R19.5 million transferred in 2019/20. Thereafter, the transfers for 2021/22 and 2022/23 are estimated to be R544.9 million and R546.5 million, respectively. The significantly increased transfers (i.e. from 2019/20) to various institutions (public corporations) for *Emerging research areas* is sustained and amounts to R364 million over the medium-term, with R116.5 million transferred in 2020/21. The latter supports research in fields related to the Fourth Industrial Revolution.

Strategic policy initiatives that will receive specific attention over the medium-term include continuing the work to establish the Sovereign Innovation Fund, which is allocated R1.2 billion over the medium-term and accounts for the significant increase to the IPI sub-programme’s allocation. The Department will undertake the 2nd Five-year Review of Hydrogen South Africa (HySA); as well as reviews of the TIA, SANSA, the Intellectual Property Rights from Publicly Financed Research and Development Act, and NIPMO.

**3.3. Programme 3: International Cooperation and Resources**

Programme 3 supports South Africa’s foreign policy through science diplomacy. Hence, it develops, promotes and manages international relationships, opportunities and science and technology agreements that both strengthen the NSI and enable an exchange of knowledge, capacity and resources between South Africa and its international partners, with a focus on supporting STI capacity building in Africa. It is responsible for nine of the Department’s 2020/21 performance targets. Programme 3 has four sub-programmes; namely, Multilateral Cooperation and Africa, International Resources, Overseas Bilateral Cooperation and the Office of the DDG.

Programme 3 receives approximately 2% (R156.4 million) of the Department’s 2020/21 budget allocation, which is the smallest portion and increases just slightly above inflation. The distribution of the allocation between sub-programmes remains the same as in previous financial years, with International Resources being allocated the largest share at 44.7%. In terms of economic classification, R81.8 million is allocated to Current payments and R74.6 million to Transfers and subsidies. With regard to the latter, R16.7 million is transferred to the NRF, who manages Bilateral cooperation for global science development agreements on behalf of the Department; and non-profit institutions receive R47.6 million for Global science: International multilateral agreements and R10.4 million for Global science: African multilateral agreements.

Over the medium-term, Programme 3 aims to secure international funding of R900 million; the participation of 2 090 South African researchers in international postgraduate training programmes; provide technical and financial support for 67 SADC and AU approved STI initiatives; and secure 12 new leadership positions in international STI governance structures for South Africa. The Department’s 2020-2025 Strategic Plan states that, “The traditional focus of South Africa’s international STI partnerships has been on research cooperation, chiefly involving public organisations, especially higher education institutions. A stronger emphasis will be placed on innovation and commercialisation initiatives”. Hence, the Department will pursue dedicated interventions to increase the STI-focussed foreign investment secured by South Africa. Furthermore, specific policy initiatives will focus on the implementation of a dedicated strategy for Africa and enhanced partnerships with the European Union.

**3.4. Programme 4: Research, Development and Support**

Programme 4 seeks to provide an enabling environment for research and knowledge production that promotes the strategic development of basic sciences and priority science areas through science promotion, human capital development and the provision of research infrastructure and relevant research support, in pursuit of South Africa’s transition to a knowledge economy. It is responsible for 13 of the Department’s 2020/21 performance targets. Programme 4 has five sub-programmes; namely, Human Capital and Science Promotions, Science Missions, Basic Science and Infrastructure, Astronomy and the Office of the DDG.

Programme 4 is allocated R4.88 billion (55.5%) of the Department’s total allocation. The increase in Programme 4’s budget, once adjusted for inflation, represents a real increase of 2.3% (real decreases of 4% in 2019/20 and 5% in 2018/19). Only the allocation to the Human Capital and Science Promotions sub-programme, which receives 55.5% of the Programme 4’s allocation, does not increase in line with inflation. The Basic Science and Infrastructure sub-programme receives its first real increase in two years after being subjected to decreases in allocation of approximately R102 million in 2019/20 and R49 million in 2018/19. The distribution of the allocation between sub-programmes remains the same as in previous financial years.

Approximately 98.7% (R4.82 billion) of Programme 4’s budget is allocated to Transfers and subsidies, with the entities, ASSAf, NRF and CSIR receiving R27.9 million, R3.4 billion and R260.2 million, respectively. Other notable transfers include R793.8 million for Infrastructure projects for R&D and R230.8 million for Strategic science platforms for R&D. The increase in the Astronomy sub-programme’s allocation is largely driven by the R780.8 million capital contribution for research on the Square Kilometre Array. Over the medium-term, this sub-programme is allocated R2.6 billion.

Over the medium-term, Programme 4 is allocated R15.3 billion for the development of human capital through the provision of postgraduate bursaries, internships, support for emerging and established researchers, and strategic instruments such as the South African Research Chairs Initiative (SARChI). Included in this, is R6.3 billion to the NRF for the awarding of 20 600 postgraduate and 7 400 doctoral STEMI bursaries.

Strategic initiatives that will receive specific attention include developing a framework for and draft of the South African Open Science Policy; developing a Postgraduate Funding Policy; developing a reporting framework on postgraduate bursaries; developing a framework for an efficient, holistic financial aid ecosystem for both undergraduate and postgraduate funding; developing a policy on the training of postgraduate engineering students; implementing the digital platform for tracking NRF-funded students; finalising the South African Council for Natural Scientific Professions (SACNaSP) Amendment Bill; and conducting a feasibility study for an astronomy institute.

**3.5. Programme 5: Socio-Economic Innovation Partnerships**

Programme 5 seeks to enhance the growth and development priorities of government through targeted STI interventions and the development of strategic partnerships with all levels of government, industry, research institutions and communities. It is responsible for 10 of the Department’s 2020/21 performance targets. Programme 5 has five sub-programmes; namely, Sector Innovation and Green Economy, Innovation for Inclusive Development, Science and Technology Investment, Technology Localisation, Beneficiation and Advanced Manufacturing, and the Office of the DDG.

Programme 5 receives R1.89 billion (21.5%) of the Department’s total budget allocation. The increase in Programme 5’s budget, once adjusted for inflation, represents a real decrease of 1.1%, with only the Science and Technology Investment sub-programme receiving an above-inflation increase of 1.4%. The distribution of the allocation between sub-programmes remains the same as in previous financial years, with Sector Innovation and Green Economy being allocated the largest share at 57% to establish high impact scientific research that would support the growth of environmental technologies and services in South Africa. Over the medium-term, R5.8 billion will be invested in the development of industry, particularly in high‐potential fields such as aerospace, advanced manufacturing, chemicals, advanced metals, mining and ICT; the creation of instruments to increase the competitiveness of SMMEs; and youth, by fully funding and co‐funding 1 454 masters and doctoral students, and 590 interns. An estimated R3.4 billion of the R5.8 billion is earmarked for advancing technology‐based interventions intended to enhance South Africa’s economic competitiveness and increase exports, and R123.6 million of the R3.4 billion is to be invested in a range of ICT initiatives such as artificial intelligence, nanotechnology, quantum computing and biotechnology. Furthermore, activities related to advancing the development of a joint industry‐government Mining R&D Hub will be funded through an allocation of R1.2 billion over the medium-term in the Innovation for Inclusive Development sub-programme.

Approximately 96.7% (R1.83 billion) of Programme 5’s budget is allocated to Transfers and subsidies, with the entities, NRF, HSRC and CSIR receiving R8.9 million, R337.6 million and R1.06 billion, respectively. Other notable transfers include R148.8 million from the Economic Competitiveness and Support Package for research and technical support to local manufacturing capacity and local innovations for the cold chain technology project.

Over the medium-term, Programme 5 will focus on how science and technology can be used to achieve inclusive development; identify, grow and sustain niche, high‐potential STI capabilities for sustainable development, the greening of society and the economy, and improve the competitiveness of existing industries; strengthen provincial and rural innovation and production systems; enhance understanding and analysis that support improvements in the functioning and performance of the NSI; and introduce and manage interventions and incentive programmes that increase the level of private sector investment in scientific or technological R&D. Policy initiatives that will be focused on over the medium-term include increasing the spatial footprint of the Living Labs in community learning centres; examining how the Preferential Procurement Policy Framework Act can transform service delivery; and reviving and developing a position paper on the STI Budget Coordination Mechanism and the arrangements finalised with National Treasury and STI-intensive national government departments.

**3.6. Budgetary allocations in support of COVID-19 interventions**

The Department reported that it has, to date, reallocated R324.2 million to support a range of COVID-19 interventions. The specific amounts taken from each Programme and its intended purpose is outlined in Table 2.

**Table 2: Budgetary allocations in support of COVID-19 interventions**

|  |  |  |  |
| --- | --- | --- | --- |
| **Programme** | **Amount**  **R’000** | **Intervention** | **Impact on Programme** |
| Administration | 1 659 | Employees' Health and safety. Provision of digital communication strategy services. | None. Funded from savings under goods and services. |
| Technology Innovation | 102 516 | Development of COVID-19 Indigenous knowledge-based remedies.  Development and manufacturing of testing kits and reagents, including rapid test.  Study for repurposing of drugs.  Acquisition of high resolution satellite imagery for settlement layer and mapping of Spaza shops and hotspots. | Projects and programmes to be deferred. No impact in the long term on the contracted projects, partly because the implementation is delayed due to the COVID-19 outbreak. |
| International Cooperation and Resources | 35 000 | R15 million: Co-funding for a special African rapid response to COVID-19 research fund to be administrated by the NRF for cooperation with 15 other African countries – Canada, Germany and the UK have made available R75 million to the fund – meaning the South African investment leveraged foreign investment at a ratio of 1:5.  R20 million: Co-funding of South African participation in various COVID-19 research and innovation programmes funded by the European Union such as the European Developing Countries Clinical Trials Partnership and the EUREKA Life without a Vaccine programme. | Delay funding other projects. |
| Socio-economic Innovation Partnerships | 185 000 | Several interventions are at various stages of implementation. This includes the establishment of the COVID-19 data system at the CSIR, ongoing work to build a robust evidence base on human behaviours and perceptions, deployment of 3D printing technologies for various COVID-19 requirements, support for ventilator development, and targeted support to technology stations to assist SMMEs with technology support to either respond to or adapt to changing requirements as a result of COVID-19. | No impact for a portion of the funding since implementation of projects will be delayed as a result of COVID-19 (for example, the Mandela Mining Precinct) and through savings within projects of line items such as equipment and reduced travel.  Some impact on the recapitalization of technology stations and implementation of Innovation for Inclusive Development initiatives. These may be mitigated through partnerships with other government departments and social sector. |
| **Total** | **324 175** | | |

For the 2020-2025 period, the Department states that it will strive to foster and enable the entrenchment of an innovation culture across government, and will do so by introducing measures to endorse or assess STI components in all departmental strategies, and/or provide advice, expertise, facilitation and mediation on STI issues. The Department further states that this role must be clearly defined since there has not been a clear leader and owner of innovation policy development in government before.

**4. Committees Deliberations**

In concluding their deliberations on Budget Vote 35: Science and Innovation, the Committees commended the Department for the work they do and for formulating coherent strategies and performance plans. Furthermore, the Committees noted the following:

**4.1.** Transformation of the STI sector in terms of human capacity, organisational composition, and the R&D focus areas; requires deliberate, well considered, and adequately resourced interventions. Hence, the Committee is keen to receive briefings by the Department on these important policy interventions (for example, the new postgraduate funding policy), which aim to chart a new trajectory for the future development and enhancement of South African STI.

**4.2.** To ensure that the country participates meaningfully in the Fourth Industrial Revolution, the Committee recognised the important role the Department may have to play in the design and establishment of the proposed science and innovation university.

**4.3.** Crucial to the transformation of the human capacity in the STI sector, is the creation and continued growth of a pipeline of students pursuing careers in science, mathematics and engineering. Discussion around curricula involving the Departments of Basic Education, Higher Education and Training as well as Science and Innovation, is necessary to assess and input on how this contributes to what is required for the science, technology and innovation system, as well as the skills needed for the economy.

**4.4.** Intergovernmental coordination and partnerships are instrumental in ensuring that the work done by the Department and the entities is used and implemented. These relationships are crucial to ensuring that crosscutting activities are better co-ordinated, resources are optimally utilised and solutions that improve the quality of life of the people are implemented. Hence, the Committee welcomes the on-going internal consultations, particularly around funding responsibilities and awaits the finalisation of the Decadal Plan and the establishment of the inter-Ministerial STI Committee to see how the proposed innovation compacts will be realised.

**4.5.** Enhanced coordination is also necessary at Parliamentary level among the various Portfolio and Select Committees in instances where science and innovation issues are transversal. Increased joint activities will; therefore, be pursued.

**4.6**. The Department has a mandate to deliver on Government’s national priorities. In this regard, the Committees raised its concern about the evident financial sustainability challenges and further proposed budget cuts, especially now when science and innovation has been crucial to the national effort to curb COVID-19 and is also expected to ensure that the country recovers from the impact of COVID-19 on the economy.

**4.7.** The Committees expressed concern that the impact of the budget cuts would be absorbed by reprioritising posts. This is problematic for a Department that already has a 23% vacancy rate.

**4.8.** The Committees noted the National Treasury directive that entity budgets be cut by 20%. However, the Committees are concerned by the seemingly uneven application of this directive to the budgets of the Department’s entities.

**4.9.** The current total investment in R&D is inadequate to drive the economic transformation agenda of South Africa and would need to be increased to effectively meet the goals of NDP Vision 2030. Of particular concern to the Committees is the decreasing expenditure on R&D by the business sector.

**4.10.** Science, technology and innovation drive most of our daily activities. Hence, the Committees expressed concern that the work undertaken by the Department and its entities is not well communicated and in many instances completely unknown. Furthermore, efforts to increase the levels of public science awareness and engagement are inadequate and need to be enhanced.

**4.11.** Impressed by the level and scope of work of the Department, the Committees would like to see the Department and its entities assume a more prominent and leading role in ensuring that science and innovation transforms and drives economic growth and is implemented widely to serve the needs of South Africans.

**The Select Committee on Education and Technology, Sport, Arts and Culture, having considered Budget Vote 35: Science and Innovation, together with the 2020/21 – 2024/25 Strategic Plan and 2020/21 Annual Performance Plans of the Department of Science and Innovation, reports that the Committee has concluded its deliberations thereon.**

**Report to be considered.**