

**ADDRESS BY THE MINISTER OF SCIENCE, TECHNOLOGY AND INNOVATION,  
PROF BLADE NZIMANDE, ON THE OCCASION OF THE LAUNCH OF THE 2024  
SCIENCE, TECHNOLOGY AND INNOVATION INDICATORS REPORT AT THE  
INNOVATION HUB, 27 AUGUST 2024**

Programme Director, Ms Funeka Khumalo;

Acting Director General of the Department of Science and Innovation, Mr Daan Du Toit;

Chairperson: National Advisory Council on Innovation, Mr Tilson Manyoni;

CEO: National Advisory Council on Innovation, Dr Mlungisi Cele;

DDGs and other Senior officials from my Department;

Representatives of our Entities and Science Councils;

Representatives of academia and business;

Distinguished guests;

Ladies and gentlemen:

I am honoured to be addressing you on this important occasion- the launch of the 2024 Science, Technology, and Innovation Indicators. The theme for this year's launch is **"Measuring science, technology and innovation to guide their contribution to socio-economic development."**

This theme emphasises the critical importance of accurate and comprehensive measurement for understanding the true impact of science, technology, and innovation on South Africa's development path.

There is no doubt that robust indicators and data-driven insights are essential for identifying areas of strength and weakness, informing evidence-based policy decisions, and ultimately for optimising the returns on investment in science, technology and innovation.

This is why the context for the Science, Technology and Indicators Report derives from our 2019 White Paper on Science, Technology, and Innovation, which mandates the National Advisory Council on Innovation (NACI), to monitor and evaluate the performance of our National System of Innovation (NSI).

It is worth mentioning that NACI has aligned its approach to the 2024 STI indicators report with the 2020 NSI Monitoring and Evaluation Framework, which covers enablers, flows and linkages, outputs, and impacts. Information on sectoral and provincial systems of innovation has been added.

The report gives an overview of our system and is intended to stimulate further research on topics of national interest to inform the development of effective, evidence-based policies and strategies.

Over and above this, I also expect NACI to propose practical actions to transform our STI landscape, including along the lines of gender and race, further ensuring that young people from working class and poor backgrounds are assisted to become scientists or science practitioners.

[In fact, I wish to formally propose that NACI considers convening an urgent summit on transformation within our National System of Innovation.]

### **Progress made**

I now wish to reflect on some of the key aspects of the 2024 STI Indicators report. As it relates to **human resource development for STI**, the report informs us that, South Africa has made significant progress in developing human resources in the research and innovation sector.

Enrolments in public universities increased 12% between 2012 and 2021, from 950 000 to 1,01 million. Over the same period, the number of graduates grew 41% from 165 986 to 233 257, and the throughput rate improved from 17,4% to 21,8%.

By 2020, half of the population aged 20 and above had completed secondary education, which is a significant milestone.

Looking at the National Senior Certificate, 83% of learners passed the National Senior Certificate examination in 2023, with 40% achieving a bachelor pass. In the technical and vocational education and training sector, enrolments for National (Vocational) Certificates remained stable at approximately 150 000 a year.

There was an increase in enrolments for artisanal training, with numbers rising from 21 849 in 2012 to 30 000 in 2018, indicating growth in vocational education and training opportunities.

The representation of female academic staff members in South Africa's higher education institutions increased from 46% in 2010 to 52% in 2021, showing progress in gender equity. Over the same period, the share of Black African academic staff increased from 27% to 43% indicating significant racial transformation in the academic sector.

As it relates to **research output**, the report informs us that, South Africa's research output has significantly increased, with the number of scientific publications rising from 3 693 in 2000 to 27 208 in 2022, representing a global share that reached 1% in 2018.

The number of publications from universities has been increasing steadily, with a compound annual growth rate of 7,4% between 2005 and 2022. The number of articles in accredited journals has also grown, at a rate of 6,7%.

There has been an increase in diversity among authors, with the percentage of women authors rising from 32% in 2005 to 45% in 2022. Over the same period, contributions from black academics increased from under 15% to more than 52%.

The production of scientific journal articles per permanent academic staff member has more than doubled, from 0,47 articles per person in 2005 to 1,19 in 2022. South Africa's scientific publications have shown a positive trend in citation impact, with a mean normalised citation score consistently above the world average over the last decade.

A significant percentage of papers have featured in the top 1% of frequently cited papers, ranging from 2,4% in agricultural sciences to 14,1% in natural sciences.

Over the past five years, domestic collaboration in publications within South Africa has remained steady, fluctuating between 31% and 35%. In contrast, collaboration with other African countries has shown a gradual uptick.

While partnerships with countries outside the continent have surged significantly, reaching a remarkable 53% in 2022. This trend indicates a pronounced shift towards global scientific collaboration.

As it relates to **research and digital infrastructure**, the report informs us that South Africa invested R2,4 billion in national research infrastructure between 2015/16 and 2019/20. Additional investments R1,2 billion were made in the National Equipment Programme between 2014/15 and 2022/23.

An investment of R670 million was made into our Technology Stations Programme between 2017/18 and 2021/22, and R814 million was invested into the Small Enterprise Development Agency Technology Programme between 2018/19 and 2022/23.

As it relates **digital progress**, the report informs us that South Africa has made good progress in leveraging information and communication technologies to enhance public services, promote digital inclusion, and drive sustainable development.

The country's E-Government Development Index rose from 0,49 in 2012 to 0,74 in 2022, and its global ranking jumped from 101st to 65th out of 193 countries.

South Africa went from 63rd on the Inclusive Internet Index in 2018 to 54th in 2022, indicating progress in making the internet more accessible to and affordable for citizens. South Africa's global ranking in ICT infrastructure improved from 86th in 2014 to 70th in 2023.

As it relates to **innovation in the manufacturing sector**, the report informs us that manufacturing exports increased by 11.7% from R462.1 billion to R499.9 billion in 2021, and by 11.2% from R499.9 billion to R555.8 billion in 2022. In 2022, manufacturing exports of R555.8 billion were 9.1% higher than the R509.4 billion in 2013.

Similarly, Medium and High Technology (MHT) exports of R263.2 billion in 2022 were 12.2% higher than the R234.6 billion in 2013, and MHT excluding motor vehicles of R194.8 billion in 2022 were 11.4% higher than the R174.8 billion in 2013.

Building on this momentum, the manufacturing sector is demonstrating a growing commitment to innovation and research, as evidenced by a significant increase in patent filings and publications in emerging technologies.

With a 19% compound annual growth rate in digitalisation patenting between 2011 and 2022, and a substantial increase in publications - from 171 to 1,518 articles on digitalisation and from 279 to 2,222 on nanotechnology - the sector is poised for future growth, with the potential to drive technological advancements, improve productivity, and increase competitiveness.

The focus on digitalisation, nanotechnology, and biotechnology, which accounted for 67.86% of patent applications in manufacturing-related emerging technologies in 2022, indicates a strategic emphasis on developing cutting-edge technologies that can support the sector's expansion and economic contribution.

As it relates to **public science and technology engagement**, according to the Department of Science and Innovation's 2022 survey on the South African public's relationship with science, two-thirds of South Africans are interested in science and technology, and they take pride in the country's achievements in these fields.

While about 60% of respondents were aware of science achievements, some individuals expressed concerns about the pace of change and potential job losses. However, despite these concerns, trust in scientists, universities and research organisations remains high.

### **Challenges facing our system**

Much as the progress outlined above is to be welcomed, there is a lot more that needs to be done to further change the demographics of our researchers and scientists, including at the highest level of practice. Surely it cannot be that 30 years into our democracy some of the key awards does not reflect our demographics.

Another related challenge is that of strongly supporting research and development capacity and strengthening Science, Technology, and Innovation in our historically disadvantaged universities (HDIs). Working together with our Deputy Minister, Ms Nomalungelo Gina, I intend to pay more attention on these matters, and let NACI and all of our entities assist us in this regard.

The report also draws our attention to a number of other **challenges**. The report observes that, South Africa's research, and development (R&D) intensity, measured by gross expenditure on R&D as a percentage of GDP, stood at 0.61% in 2019, which is below the global average.

A significant factor contributing to this is the decline in business R&D expenditure, which dropped from -3.5% in 2012 to -10.8% in 2021. However, a notable turnaround occurred in 2021/22, with a 26,4% increase in business R&D expenditure. This surge was driven by investments in key research fields, including information and communication technologies, medical and health sciences, and materials science.

Investment in manufacturing, financial intermediation, real estate, and business services also contributed to the overall growth. While this trend indicates a positive shift in R&D investments across various sectors, the sustainability of these investments remains to be seen. To fully unlock South Africa's innovation potential, investment in R&D must continue to increase.

As it relates to **patent activity**, the report makes the point that, international patent applications from South Africa declined by 40% between 2013 and 2022, potentially hindering the country's economic growth, competitiveness, and ability to attract foreign investment. Implementing policies that incentivise research and streamline patent processes can help drive innovation and increase patenting activity in South Africa.

As it relates to **venture capital investment**, the reports make the point that South Africa's venture capital investments are concentrated in the Western Cape and Gauteng, with growth slowing in 2020 and declining by 10,2% between 2021 and 2022.

The country's share of African venture capital deals decreased to 14% in 2022, surpassed by Nigeria's 22%.

This worrisome trend suggests a need for decisive interventions to boost the venture capitalist investment ecosystem, including vigorous marketing of South Africa's most promising commercial-ready technologies in fields such as hydrogen energy, clean coal technologies, vaccine and therapeutic development, food technologies, mining and minerals beneficiation, and effectively harnessing of innovation across all provinces and regions.

As it relates to **poverty, unemployment and inequality**, the report makes the point that, South Africa's socio-economic crisis is both a cause and a result of the low investment in research, development, and innovation activities.

With less money available for investment, the potential of STI to make a socio-economic contribution to the country is constrained. South Africa has a 62,6% poverty rate, a 61,5% youth unemployment rate, and a Gini coefficient of 66.92. Addressing these challenges requires collaborative efforts and sustainable solutions.

This data tells us a number of things. It tells us that South Africa has made significant progress in developing its human resources, expanding research outputs, and fostering global research partnerships. The country has also improved its research and digital infrastructure and increased university enrolments.

There has been growth in the manufacturing sector, emerging technologies, and public engagement with science and technology. However, a number of challenges remain, and these include low research and development intensity, declining international patenting activity, and reduced venture capital investment.

There is also the persistence of poverty, unemployment, and inequality. We need to build on the successes that have been identified by the 2024 STI indicators and of course, respond to some of the weaknesses in our system that have been identified by this report.

To be able to do this, in line with our White Paper for STI and Decadal Plan, over the next decade, we will have to make targeted and sustainable policy, institutional and resource interventions in the areas identified by the report.

Further more, this report provides us with rich data for critical agenda-setting of the national coordinating structures through which I want to drive STI priorities to the very core of South Africa's national development, including the Inter-Ministerial Committee and Presidential Plenary. Preparations are already underway for convening both these structures.

In addition to this, we also need to deepen the appreciation across all spheres of government for the need for evidence-based policy making and, in this respect, the report we are launching here today should serve as vital planning resource for all spheres of government. I therefore wish to commend NACI and all other institutions that contributed to the compilation of this report.

In conclusion, following our Budget Vote Debate the Portfolio Committee on Science, Technology, and Innovation, submitted a report to the National Assembly, through the Speaker, which report was adopted on 25 July 2024.

In this letter, the Portfolio Committee makes the following recommendations to me as the Minister. That the Minister should:

- “(a) continue his efforts with National Treasury, the private sector, and international partners to secure additional funding for the science and innovation portfolio;
- (b) enhance collaboration with other government departments on matters of common interest;
- (c) prioritise transformation, which will address the Committee's concerns around having a transformed, representative and inclusive science system;
- (d) provide a detailed account on the impact of the budget cuts on its planned performance, as well as that of its entities; and
- (e) together with the Committee and the Department, consider facilitating a National Dialogue on the importance of STI.”

As the Minister, I fully agree with and support these recommendations by the Portfolio Committee. These recommendations are not a resolution of the National Assembly, and I will be engaging the National Assembly further on this.



We must therefore ensure that these STI indicators do not just become an instrument for planning and resource allocation, but also that they enable us to transform our National System of Innovation to be a true reflection of our country's profile in terms of race, class, and gender.

Thank you.