



Current challenges to Research and Innovation systems in South Africa

An NSTF/Science Councils Discussion Forum

13-14 August 2024

Background:

As a developing nation, South Africa (SA) encounters numerous obstacles when competing with developed countries in the marketplace. Governance issues, resources allocation challenges, and inadequate infrastructure represent significant hurdles for the country. These constraints have implications for the national system of innovation (NSI) in general and cause challenges for the development of particular innovation systems and the advancement of research. Research plays a vital role in our lives and the development of the country. Research is critical for new ideas, for bridging the gaps in society, and for developing new technologies and innovations. Enhancements in education, health, social policy, employment, and credibility hinge on investments in research. SA has historically been characterised by relatively low research investments (less than 1% of GDP) and limited research capacity. Nevertheless, SA's research output has increased over the years. Between 2000 and 2016, the country doubled its research output and expanded its academic and scientific workforce, and made notable progress in doctoral students' production since 2015. SA has a growing community of researchers. The percentage of Gross Domestic Product (GDP) devoted to research and development (GERD) increased to 0.62% in 2021/22 from 0.60% in the year prior, however it had decreased substantially over the preceding years. SA still falls short in achieving the international standard for doctoral graduates per one million inhabitants. Consequently, there is a pressing need to encourage research and inspire young individuals to pursue careers in various fields of research.

There are many challenges to that, including:

- **Lack of mentorship, research and training skills:** There is need for mentorship programmes and placement opportunities where young African researchers can be given opportunity to showcase their skills. And young scientists need training in proposal and thesis writing. But mentorship programmes are rare because experienced researchers are extremely time-constrained or relocating to other countries.

- **Lack of funds:** Securing adequate funding for research is a challenge. Mainly because of government budget constraints, shifting priorities, limited resources and unforeseen disasters.
- **Policymakers need to be onboard:** Key decision makers and policy makers must have a good understanding of the link between research, sustainable economic development and innovation. Policy makers need to be aware of the importance of research and provide support to young scientists.
- **Heavy workload on senior researchers and postgraduates:** Research requires time. Senior researchers at academic institutions have a heavy teaching load and administrative duties that interfere with their time to conduct research. Due to financial constraints, many postgraduate students find themselves needing to take on additional roles such as tutoring and assisting with lectures. These responsibilities, while providing essential income and experience, often come with significant time commitments that can detract from their primary research and academic pursuits. This added workload can lead to increased stress and reduced focus on their studies, ultimately impacting the quality and progress of their research projects.
- **Rapid technological change:** The pace of technological change is accelerating, presenting opportunities and challenges for researchers and innovators. Keeping up with the latest advancements, acquiring new skills, and adapting to rapidly evolving technological landscapes require ongoing effort and investment.
- **Infrastructure deficiencies:** The laboratories, which serve as the breeding grounds for discovery, frequently show signs of neglect. Insufficient infrastructure and obsolete equipment hinder the pursuit of breakthroughs, prompting us to rethink and rejuvenate the environments where innovation flourishes.
- **Commercialisation barriers:** Bringing innovations to market remains challenging due to barriers in navigating commercialisation processes, accessing funding for startups, and navigating regulatory frameworks.

All these challenges hinder the output of research, including innovation. Innovation is a vital measure of growth and progress. Being innovative ensures competitiveness in business and industry and overall, for South Africa in the global market. Innovation increases productivity and creative development; it impacts positively on economic growth; it creates employment; improves accessibility to communication and education; and it contributes to sustainable development goals (See information [here](#)). It is therefore very important to focus and improve on research to ensure innovative outputs. Many of SA's science councils focus on research and ways to improve and develop advanced innovations. These include:

- **Human Scientific Research Council (HSRC):** The HSRC has the leading centre for the measurement of research, development, and innovation (RDI). This is a project of the Department of Science and Innovation (DSI). The Centre for Science, Technology, and Innovation Indicators (CeSTII) was established in 2001 and it focuses on statistical and policy research. The centre undertakes annual surveys, to indicate the progress of RDI measurements.
- **Technology Innovation Agency (TIA):** TIA is known for encouraging innovation projects among innovators by providing funding. The organisation publishes a call for proposals for the Grassroots Innovation Programme in collaboration with the DSI. The programme aims to give new innovators support, funding, and technical assistance to enable them to develop new products that can solve local challenges using local resources and capabilities.
- **South Africa National Energy Development Institute (SANEDI):** SANEDI is working on a smart grid programme. The Smart Grid Programme addresses the government's Medium Term Strategic Framework (MTSF) objectives of energy transformation and service delivery. There will be technology

innovation which will enable Smart Grid Technologies that will improve effectiveness and efficiency of energy delivery within municipalities.

The organisations listed above and many more are working on innovative ways to promote socio-economic development. The [National Science and Technology Forum \(NSTF\)](#) held a discussion forum in October 2023, where all the science councils and statutory bodies discussed how they contribute to sustainable socio-economic development through their work. The discussions touched on the contributions (see the [NSTF Discussion Forum: How do publicly funded institutions contribute to sustainable socio-economic development?](#)) and to a lesser extent on the challenges they experience in the research and innovation field. It is vital to discuss further what issues/challenges are experienced. What recommendations are there to overcome these challenges? How do we get the policy makers and the public involved? How do we create a sustainable innovative environment?

Purpose:

The NSTF in SA brings together various stakeholders in science, engineering, and technology (SET) and innovation. Every year NSTF representatives of the Science Councils and Statutory Bodies Sector plan a [discussion forum](#) on important and relevant matters for which SA's researchers at these organisations among others, find solutions.

Due to the recent pandemic, the government has not increased funding for research. The budget constraints, among other challenges in the research and innovation system, are delaying the progress of change and innovation. This discussion forum will provide a platform for all organisations in research and innovation, to come together and share insights and knowledge with recommended solutions and a way forward.

Themes:

- Challenges with research funding
- Lack of support from policymakers and poor governance
- Poor infrastructure for research
- Lack of training and skills in research
- Research for sustainable innovations
- Young minds and career paths in research
- Brain drain in research fields
- Collaboration and networking
- Commercialisation challenges

Objectives:

- Learn about the challenges faced by researchers.
- Address the impacts of these challenges on the economy and social wellbeing.
- Raise awareness and get important stakeholders involved.
- Advocate for policy reforms, investments, and initiatives that support the growth, sustainability, and inclusivity of research and innovation systems in SA

- Promote dialogue, collaboration, and knowledge sharing among stakeholders involved in research, innovation, academia, government, industry, and civil society

Outputs:

As is usual for [NSTF Discussion Forums](#), a media release will be issued that summarises the most important issues and conclusions. The following outputs will also be made available on the event page and through social media platforms ([Facebook](#), [Instagram](#), [X](#), [YouTube](#) and [LinkedIn](#)):

- Video recordings of speakers' presentations (subject to the speakers' agreement)
- Presentation slides (if available and subject to the speakers' agreement)
- Speakers' biographies
- Useful links (Feel free to let us know should you have any related information that you would like us to consider posting here.)
- NSTF will engage the media on possible interviews and/or articles, and post on social media before, during and after the event.

References and further reading:

- <https://www.linkedin.com/pulse/importance-research-advancing-knowledge-progress-society/>
- **South Africa 'punches above its weight' in research**, says study, by [Sharon Dell](#), 02 October 2019: [https://www.universityworldnews.com/post.php?story=20191001143824647#:~:text=South%20Africa's%20research%20production%20compares,rank%20\(28%20in%202015\)%2C](https://www.universityworldnews.com/post.php?story=20191001143824647#:~:text=South%20Africa's%20research%20production%20compares,rank%20(28%20in%202015)%2C)
- Kumwenda S, Niang EHA, Orondo PW, William P, Oyinlola L, Bongo GN, Chiwona B. Challenges facing young African scientists in their research careers: A qualitative exploratory study. *Malawi Med J.* 2017 Mar;29(1):1-4. doi: 10.4314/mmj.v29i1.1. PMID: 28567188; PMCID: PMC5442483.
- [Career paths for researchers – where to in a changing world? \(2-3 December 2019\) – NSTF](#)
- [RD_StatisticalReport2021-22_WEB.pdf \(hsrc.ac.za\)](#)

National Science and Technology Forum (NSTF)

SET for socio-economic growth

- Independent non-profit stakeholder body and network
- Voice for the science, engineering, technology (SET) and innovation community
- Includes private and public sectors
- Promoting SET and innovation in South Africa since 1995