

# Overcoming hurdles facing researchers in Africa

Tebello Nyokong, Bokolombe Ngoy and Edith Amuhaya share their experiences in conducting research in Africa.

Several countries on the African continent recognize that a transition to a knowledge-based economic model would stimulate growth and enable scientific independence<sup>1,2</sup>. Investing in new knowledge would drive the formation of highly qualified professionals and the use of advanced technologies, triggering in return positive economic trends. Importantly, a knowledge-based economy that values the impact of science on society would help reversing the migration of skilled workers and lead to brain gain.

With this in mind, we discuss here what doing research in an African country means. Most of the research is conducted in universities, both private and public. Funding towards the overall running of public universities comes from the government, and is mainly allocated based on the number of students, faculty and staff. In South Africa, research productivity — in terms of articles published in accredited journals — is also considered, helping stimulating research. In the majority of countries, however, government funds are mainly used to pay salaries and to ensure basic maintenance, with little money left to support research. Hence, academic researchers bear the responsibility of attracting additional research funds.

Specific research and development grants are managed by funding agencies and assigned through competitive processes. The National Research Foundation (NRF; <https://www.nrf.ac.za/>), one of the main agencies operating in South Africa, also provides grants for research students and funding for up to 15 years to the recipients of the Research Chairs Initiative (<https://www.nrf.ac.za/division/rcce/instruments/research-chairs>). The NRF Kenya (<https://researchfund.go.ke/>) funds researchers and graduate student research projects in Kenya, and establishes regional and international research collaborations. In contrast, in the Democratic Republic of Congo funds are mostly used for sending people abroad to get some experience by taking small courses related to applied science and technology, while researchers have to look for external sources for their research.

For many African countries, therefore, establishing collaborations within the African continent and with the rest of the world is vital to expand research and innovation capacities, as well as to retain

researchers within African institutions that do not have sufficient resources for research support. This is the case for one of us, B.N., who relies on research funds from collaborations with the Czech Republic and South Africa, and also carries out part of his research in these countries due to the lack of equipment and funding in his own university. In addition, positive collaborations may also ease the feeling of academic loneliness in research<sup>3</sup>, a particularly acute problem for African researchers. Living in an usually isolated research environment, and experiencing gender and racial bias in some scientific interactions, means that African researchers often have no peers to talk to. In many cases, such loneliness is not even considered as a problem, and researchers learn to live with it. Raising awareness, and creating a network of healthy scientific exchanges, would instead help to better integrate African researchers with the international community.

Although several African countries are making efforts to allocate economic resources to research, unfortunately these are far from being sufficient to allow scientists to reach their full research potential and hence scientific independence. Almost all African countries spend less than 1% of their GDP on research and development (<http://go.nature.com/2Ol7Kj9>), at least 2–3 times less than some developed countries. This problem is further compounded by systemic failures in the distribution of funds to the grantees: there are instances where the funds are assigned after long delays, or only partially, or not assigned at all to the researchers. Researchers have devised ways of stretching the little resources they have, by recycling materials, solvents and consumables, or even using personal funds to purchase reagents or pay for analyses. Some of these interventions, however, can only go so far before one runs out of options.

The final roadblock towards a knowledge economy is the difficulty in converting research outputs into products and services, also referred to as the innovation chasm. In many African countries, bridging this gap has limited success, possibly because of a lack of minimal cooperation between industries and academic researchers. Fortunately, several initiatives are being put in place to assist in the development of innovations and foster collaborations that are market

driven. South Africa, for example, set up the Technology Innovation Agency and the National Intellectual Property Management Office, while Kenya has launched a dedicated Kenya National Innovation Agency. This shows that there is political will, but more needs to be done to achieve our full potential.

In this complex picture, it is not surprising that a career in science is not particularly sought-after by students, who mainly aim at becoming high-school teachers or starting businesses. Moreover, the lack of sufficient scholarship opportunities to retain students in local universities leads those most motivated to apply for graduate studies abroad. In our experience, African students have very good theoretical knowledge of their subjects and they have a hunger for knowledge. To avoid wasting this precious human capital, there is an urgent need for countries to make available more scholarship opportunities or increase funding towards student loans for graduate studies.

While there are initiatives by African countries that have been put in place to encourage research in academic institutions, there is significant margin for improvement. The assets of the African continent can be used to solve the problems affecting our societies and come up with innovative products. While there are infrastructural challenges in many African institutions, researchers should tap into the available resources and opportunities to grow their research potential. □

Tebello Nyokong<sup>1</sup>✉, Bokolombe P. Ngoy<sup>2</sup> and Edith K. Amuhaya<sup>3</sup>

<sup>1</sup>Institute for Nanotechnology Innovation, Rhodes University, Makhanda, South Africa. <sup>2</sup>Département de Chimie, Université de Kinshasa, Kinshasa, Democratic Republic of the Congo. <sup>3</sup>School of Pharmacy and Health Sciences, United States International University - Africa, Nairobi, Kenya. ✉e-mail: [t.nyokong@ru.ac.za](mailto:t.nyokong@ru.ac.za)

Published online: 15 March 2021  
<https://doi.org/10.1038/s41563-021-00961-0>

## References

1. Vadra, R. J. *Knowl. Econ.* **8**, 1229–1240 (2017).
2. Blankley, W. O. & Booyens, I. S. *Afr. J. Sci.* <https://doi.org/10.4102/sajs.v106i11/12.373> (2010).
3. Sibai, O., Figueiredo, B. & Ferreira, M. C. Overworked and isolated: the rising epidemic of loneliness in academia. *The Conversation* (29 January 2019).

## Competing interests

The authors declare no competing interests.