

Repositioning Africa in global knowledge production

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Introduction

Sub-Saharan Africa accounts for 13·5% of the global population but less than 1% of global research output. In 2008, Africa produced 27000 published papers—the same number as The Netherlands. Informed by a nuanced understanding of the causes of the current scenario, we propose action that should be taken by African universities, governments, and development partners to foster the development of research-active universities on the continent.

Background

The history of modern universities in sub-Saharan Africa dates to the early 19th century with the establishment of Fourah Bay College, Sierra Leone, in 1827. By the end of the 1950s, however, sub-Saharan Africa had few universities.¹ At independence, many African countries established universities, albeit with few trained Africans to run them. The political elite in newly-independent African countries valued higher education—seeing it as “a strategic weapon in the fight against poverty, ignorance, and disease”.^{2,3} As captured by Mamdani, “At independence, every country needed to show its flag, national anthem, national currency, and national university as proof that the country had indeed become independent”.⁴

The new governments defined higher education policy within their strategies for national development⁵—driven by a desire to decolonise the continent and achieve socioeconomic progress.⁶ Universities were expected to train the professionals needed in the expanding public service, to extend the frontiers of knowledge, and to serve the national economy.⁷ This link between higher education and national development incentivised governments to fund universities. Consequently, during the 1960s, 10–25% of government expenditure in Africa went to education. Of that, 10–35% went to higher education.⁸ Political commitment was strong with the first regional meeting of African Heads of State and Government on higher education held in Addis Ababa in May, 1961, and subsequently the conference of African university leaders in Madagascar, in 1962.⁹ Ironically, the 1962 meeting discussed the same intractable issues animating contemporary discussions about the place of universities in national development: staffing, financing, and content of curricula.^{6,10} The 1960s and 1970s were something of a golden era for higher education in Africa.

The 1980s witnessed reversals in the fortunes of African universities. Many spiralled into decline as national economies suffered because of the oil crisis and International Monetary Fund-sponsored structural adjustment programmes;¹¹ university campuses quickly became centres of political opposition and civil unrest.^{12,13}

Among other outcomes, major cuts in funding for public sector institutions occurred. Poignantly, this coincided with rapid growth in university enrolment and the establishment of more universities in response to growing numbers of young people seeking access to higher education. Enrolment rose steadily from 181000 in 1975, to 600000 by 1980, and 1750000 by 1995.¹⁴ Reductions in funding, amidst growing numbers of students, created tensions between the political elite and academia, which precluded working together in search of solutions. This has had lasting consequences for universities. The growth in demand for higher education continues; between 2000 and 2010, annual enrolment more than doubled from 2·3 million to 5·2 million.¹⁵

Over and above structural adjustment demands to reduce overall public spending, education funding was preferentially diverted to primary and secondary education on the belief propagated by the World Bank, subsequently contested,¹⁶ that the rate of return from primary and secondary education was greater than that from higher education.^{17,18} Top faculty at African universities emigrated as working conditions deteriorated. Africans graduating abroad with post-graduate degrees chose to remain outside Africa to be productive.¹⁹ These factors disproportionately affected research and innovation, research training, and policy engagement.

Road to renewal

Since the 1990s, African universities have sought to regain their role as agents of transformation. Under pressure from mounting evidence on the destructive effect of structural adjustment in Africa, the World Bank changed its policy in favour of supporting higher education, thereby affirming universities' significance in political and socioeconomic transformation.²⁰ A 2014 World Bank study²¹ showed that sub-Saharan Africa has increased the quantity and quality of its research output substantially in the past 20 years: it more than doubled its annual research output from 2003 to 2012; its overall share of global research increased from 0·44% to 0·72% during the same period. Africa's global citations have also grown from 0·06–0·16% to 0·12–0·28%.²² This growth is strongly linked to advances in health sciences research, most of which is externally funded rather than the result of deliberate decisions by African governments. Health sciences research accounts for 45% of all sub-Saharan African research.²¹ Research output for science, technology, engineering, and mathematics (STEM) lag behind other disciplines and has been declining annually at 0·2% since 2002. On a per capita basis, African universities remain severely underfunded in view of increasing enrolment, the establishment of

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new universities, and the declining purchasing power of African currencies.¹⁴

The odds

What underlies this poor record? Part of the explanation is that Africa contributes less than 1% of the global expenditure on research and development. By comparison, Latin America and the Caribbean account for 3%; Europe for 27%; Asia for 31%, and North America for 37%. Even those African Governments that do contribute to research do not spend a significant percentage of their gross domestic product (GDP) on research. Among the top five countries, Kenya spends 0.8%; South Africa spends 0.76%, Morocco spends 0.7%, Tunisia spends 0.65%, and Mali spends 0.55%.²³ Other countries for which data are available are Uganda (0.04% in 2007), DR Congo (0.05% in 2005), Burkina Faso (0.1% in 2007), Senegal (0.1% in 2007), Sudan (0.3% in 2007), and Ethiopia (0.2% in 2007).

Sub-Saharan Africa depends greatly on international collaboration and visiting academics for its research output. In 2012, southern Africa, east Africa, and west and central Africa produced 79%, 70%, and 45% of all their research output, respectively, through international collaborations. Many researchers whose publications are associated with sub-Saharan Africa are described as non-local and transitory; they spend less than 2 years at sub-Saharan African institutions.²¹ Meanwhile, intra-Africa collaboration remains severely restricted. World Bank data show that collaboration among local researchers in sub-Saharan Africa range from 0.9% in west and central Africa to 2.9% in southern Africa.²⁵

Further compromising the quality of training and research at African universities are inadequate teaching and research infrastructure, materials and equipment, and heavy teaching loads for early career researchers, which substantially reduce the amount of time academics spend conducting research. This is aggravated by so-called “moonlighting,” which helps academics to make ends meet in view of poor academic salaries and is often justified by the shortage of faculty with advanced degrees.

At the root of these challenges is limited funding of universities by African Governments and this is where one of the solutions must be found. Until this changes, African Higher Education will continue to underperform.

Looking ahead

African Education ministers have met several times recently to address challenges in higher education: through the African Union in 2006,²⁴ as the Partnership for Applied Science, Engineering, and Technology in 2014, and at the 1st African Higher Education Summit in 2015.²⁵ Important as these meetings might be, and while pressure must continue to be brought to bear on African Governments, waiting for consequent implementation will place existing African universities in jeopardy. We propose that fresh, even radical, thinking and action is required now and this should be led by African

universities themselves. We propose three interlinked actions to revitalise higher education in Africa: differentiation of the higher education system across the continent; new funding mechanisms for research-intensive universities; and, new accountability systems for research-intensive universities.

Research-intensive universities across sub-Saharan Africa need to be identified, recognised, strengthened, and invested in. These research-intensive universities should focus their resources on graduate training and research. The Consortium for Advanced Research Training in Africa (CARTA) provides evidence that revitalisation of the African academy in Africa by Africans is not only possible but is a model that should be emulated and reproduced.²⁶ The Association of Research Universities in Africa (ARUA) provides a forum to develop collaborative intra-African university research partnerships.

Creating and maintaining research-intensive universities will require consistent investment in human capital, research equipment, and relevant administrative support, at far higher levels than is available under current conditions.

Another compelling reason to differentiate research-intensive universities is the projected doubling of sub-Saharan Africa’s population by 2050, which will create continued demand for higher education for the foreseeable future. This necessitates appropriate training of faculty with advanced degrees to staff the new universities and maintain high standards across the higher education system. These faculty are best trained at research-intensive universities.

To ensure that designated research-intensive universities do not become complacent and to allow for the entry of upcoming high-achieving universities, we propose ongoing peer review every 3–5 years. The review function could be entrusted to a supranational body with wide representation. Universities previously designated as research-intensive could lose their designation depending on their research track record, especially in instances of consistent underperformance between reviews. Undesignated universities can also apply during the review period.

New funding mechanisms need to be created to support research-intensive African universities. At a minimum, research-intensive universities should commit their own resources to research. African Governments must increase their support for research in general and provide targeted funding for research-intensive universities—in addition to the usual operational funds and tuition income currently available to these institutions. Governments can foster research collaboration through joint basket funding for research to support regional multicountry collaborative research. However, this investment needs to be complemented by investments from regional and continental bodies, bilateral and multilateral development partners, and philanthropic foundations. These funders should designate a portion of their investments in Africa to support research-intensive African universities.

Citizens, private corporations, and alumni should create Endowed Chairs at research-intensive universities and partnerships with non-university research entities, of which there are many on the continent, should be encouraged and promoted. A number of non-university research institutions exist, beyond those that are CARTA members, that can play such a role including the African Research Coalition for Health, currently funded by the Alliance for Accelerating Excellence in Science in Africa AESA.

These funding mechanisms will enable research-intensive African universities to attract leading researchers, create infrastructure, and support systems for research, and bring African citizens in the diaspora back to replicate their research programmes in Africa. The research-intensive universities will also provide a base for training younger researchers. This, we postulate, will create a virtuous cycle raising output via research publications, attracting internationally competitive researchers, generating grants, and supervising quality PhDs and post-doctoral students—all critical to ensuring long-term sustainability.

Lastly, this will only succeed and be sustained if there is accountability, transparency, and efficiency in the use of funds at research-intensive universities. Good research management capacity at these universities is essential and accountability is crucial. This is already recognised and many African higher education institutions continue to invest in and champion transparency and accountability. Universities that aspire to become research-intensive must establish a set of accountability enhancing criteria that can be measured, and which should be met by all of them. Those that fail to measure up should be sanctioned, including losing their status and funding. Those universities ready to step up to research-intensive status should have a record of good governance. This can only be viable within a framework supported and overseen by both the relevant governments and by transparent self-regulation through a coalition of research-intensive universities across the continent.

Accountability must also extend to efficient use of resources, including creating asset registers and a system to share research equipment, breaking down silos and achieving economies of scale; establishing transparent procurement systems; and developing effective research management teams to support grant management. Best practise must also guide PhD-level training, including that only eligible academics, irrespective of age, sex, or traditional hierarchy, should supervise doctoral students.

This definition of accountability criteria, if engaged in as a collective exercise among universities aspiring to become research-intensive, would establish so-called universal practices to guide university practise across the continent with African institutions pressurising each other to reach and maintain, if not exceed them.

Universities designated as research-intensive and those aspiring to the status must consider and address thorny issues that frustrate research at African universities,

including freeing up existing posts currently filled by non-research-active staff; availing opportunities for post-retirement contracts only to departing staff that promote institutional research goals and linking such contracts to performance; creating a system of mentorship and role-modelling, the objective being to stimulate new graduates to carry on traditions of research excellence upheld by their mentors and role models.

Conclusion

While universities in sub-Saharan Africa have been marginal to global knowledge production they have started to turn the corner. Challenges remain, particularly for universities aspiring to become research-intensive. Working with African universities to effectively make this transition could transform the higher education landscape in sub-Saharan Africa by providing an appropriate base to develop Africa's knowledge economy and the effective training and preparation of Africa's future research leaders and academic faculty. Convening a meeting to discuss this in detail will be the first step and can be hosted by a Head of State, the African Development Bank or the African Union in partnership with Vice-Chancellors of select African universities that can lead such an initiative. These efforts will lay a strong foundation for a new African academy that is fit for purpose in the 21st century global knowledge system.

Contributors

SF and AE conceptualised the Viewpoint and convened and facilitated the meeting of CARTA Vice Chancellors and Heads of Partner Institutions at the University of Nairobi. SF, AE, and FG-M wrote the first draft. All authors reviewed and made material contributions to the various iterations of the Viewpoint.

Declaration of interests

All authors declare no competing interests.

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See Online for appendix

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