SCIENCE GRANTING COUNCILS INITIATIVE SGCI IOSRS INITIATIVE DES ORGANISMES SUBVENTIONNAIRES DE LA RECHERCHE SCIENTIFIQUE

Perspectives on research excellence in the Global South

Assessment, monitoring and evaluation in developing-country contexts

Robert Tijssen & Erika Kraemer-Mbula

Summary

'Research excellence' seems to have become a catchword in the world of science. Globally there is a widespread aspiration for researchers and organisations to be excellent. Deriving its original meaning from 'to excel', being superior, the term is at risk of becoming inflated. In countries where research funding is scarce, such as in low-income countries, the quest for excellence is becoming even more acute. Has the term lost its relevance for the assessment of research quality in the 'Global South'?

This Policy Brief introduces an instrumental perspective to address this question. In doing so, it takes a critical view of mainstream methodologies to assess and evaluate the quality of science in the 'Global South' and proposes practical suggestions for analytical models and diagnostic kits, geared towards the needs of science funders and review panels operating in resource-constrained environments. We advocate an evidence-based analytical framework - with localised quality criteria and customised indicators of research performance - for assessments of grant proposals and evaluations of scientific achievements.

Adopting a practical stance, we develop a list of 10 recommendations to make sense of research excellence. Our proposed good practices present a roadmap to guide evidence-based decisions on science funding and research excellence.

"To excel": to be superior to; surpass in accomplishment or achievement

(Mirriam-Webster online dictionary, 2017)

Challenges of science in the Global South

Scientific research is subject to increasing external accountability. Research funders, particularly in the public and charitable sectors, face mounting scrutiny from stakeholders to demonstrate relevant outcomes and impact. This has led to a greater need for a reliable and transparent evidence base to assess and compare research grant applications and to identify high-quality scientific achievements. Inevitably, there will be differences in performance levels and quality. Those that are clearly seen as superior to others are likely to be tagged as 'excellent'.

The term 'excellence' has gained momentum over the last decade as a distinctive feature of the African science landscape, exacerbated by the continent's reliance on external sources to fund research activities.[1] For example, the World Bank's 'Africa Centres of Excellence' project aimed to strengthen higher education organisations across the continent.[2] There are several other initiatives in Africa, each operating under an 'excellence' banner, each reflecting worthy aspirations and challenging levels of ambition. More generally, funders of scientific research in developing countries seem increasingly drawn to 'excellent

[1] For instance Mozambique, Burkina Faso and Uganda receive 78%, 59% and 57% respectively for their R&D from foreign sources (African Innovation Outlook 2014, NEPAD Planning and Coordinating Agency, Pretoria).

[2] This initiative was established in 2013 and began with a first phase in West and Central Africa where 19 centres were selected. For more details, see:http://projects.worldbank.org/P126974/strengthening-tertiary-education-africa-through-africa-centers-excellence?lang=en (accessed in September 2017)

research' partly due to their pressure to spend their resources wisely, but also because of the belief that lower-income countries can benefit from developing high-quality science capacities domestically.

Strangely, in the light of economic and political interests at stake, the fundamental concept of 'research excellence' is still underdeveloped and insufficiently contextualised to local[3] circumstances. Underlying notions and practices of science policy remain strongly driven by traditional, mainstream views on how scientific research takes place in high-income nations. However, in the socioeconomic environments and policy frameworks of the lower-income countries, concepts such as 'science' and 'quality' may take on a wide range of meanings, where excellence could for example reflect successful applied research that tackles problems and challenges specific for low- and middle-income countries (LMICs).

As the term 'research excellence' gains ground, there is a need to inform how it is interpreted in the Global South, where resources are scant

Incentive schemes and funding regimes play a major role in shaping and steering the varied research systems of the Global South where governments and science granting councils in the South are weighing the costs and benefits of allocating larger budgets to scientific research. Some incentives may promote application-oriented research addressing national socioeconomic priorities, while others aim for cutting-edge scientific discoveries with global benefits. Irrespective of the objectives, or the drivers and enablers in the system, a large share of the current incentive systems is designed to promote effectiveness of the research process and the quality of outcomes. Aiming for improvements in performance and promoting top quality puts 'excellence' high on the agenda.

How should the wide range of research funders in the Global South – from national governments to private foundations abroad – deal with these issues? National science granting councils in LMICs are often insufficiently equipped to assess research performance in full detail; for example, to reconcile the many views and perspectives of 'quality' in research proposals, or to demonstrate that the research they fund is as good as that which is done elsewhere in the world.

[3] Our use of the term 'local', as opposed to 'global', refers to local geographical zones (city, urban agglomeration, region) or characteristics at the national level.

Making sense of excellence

A large body of academic research and scholarship shows that the notions of 'research quality' and 'research excellence' are problematic in many ways – not only are they associated with flawed assessment and evaluation methodologies[4], but also with contested quality criteria and performance indicators. The exact meaning of 'excellence' is left undefined in funding programmes and vision statements of excellence-promoting initiatives. It is not difficult to see why: the underlying generic concept of 'research quality' is not so easily pinned down: it is complex, multidimensional notion with many context-specific and time-dependent attributes.

Grasping 'research excellence' in any convincing way is clearly a challenging exercise. In addition, as one moves more deeply into the arena of research assessment, monitoring and evaluation, its meaning may become even more blurred. Value judgments are a matter of perspective and opinion; underpinning information is incomplete and inaccurate, especially with regards to gauging quality in terms of the value of scientific research for the wider society.

Tackling the conceptual and analytical intricacies of research excellence starts with definitions. Here one can bypass the large body of philosophical and sociological literature on the topic, and move directly to the online wisdom of Wikipedia, where the slippery notion of excellence is neatly defined as: "a talent or quality which is unusually good, and so surpasses ordinary standards".

If one is willing to perceive and adopt 'ordinary standards' as benchmarks against which actual performance is compared, identifying research excellence then boils down to applying the appropriate standards that relate directly to relevant attributes of research quality. Excellence is then defined as being superior to others, according to specific attributes of research quality and its benchmark value. In technical terms: excellence is to be found in the upper regions of a performance distribution.

Stating that something or someone is 'excellent' within this analytical-empirical framework has two major practical implications in terms of data gathering and analysis:

[4] We use the term 'assessment' for ex ante value judgements of research excellence (notably with regards to research grant proposals or research progress) and apply the term 'evaluation' for ex post judgements of research outputs or impacts.

- availability and access to information that enables evidence-informed value judgements on research quality;

- an analytical framework with performance indicators and criteria that are sufficiently explicit and meaningful (with convincing definitions and widely-acceptable operationalisation) to determine the "unusually good" within a larger population and its performance distribution.

Distinguishing the 'best' from the 'rest' means taking into account local context and the global research landscape

Quality and excellence can manifest themselves across a wide range of research-related attributes. The breath and diversity of that spectrum extends from 'inputs' (such as the ability to attract competitive funding, having access to advanced facilities and research equipment, or the ability to create innovative and creative ideas) to 'impacts and benefits' (such as scientific influence on follow-up research worldwide to socioeconomic benefits in terms of creating employment in new, science-based business enterprises). Many of these attributes are interconnected. Some are difficult or impossible to objectify or quantify.

Any convincing research performance indicator must take into account the dynamics and relational fabric of modern-day science. Scientific research is usually embedded in a networked structure of interconnected scholars and scientists, who are members of the same (inter)national communities where ideas and research projects are often built on prior work done elsewhere. Mainstream contemporary science has effectively become a complex, adaptive system covering the entire globe. Research funders are actors within that same system, as are the scientists who sit on peer review panels to assess the research proposals and work of others. Clearly, when analyzing such a globally integrated and self-organizing system, it is difficult to make a clear-cut distinction between the Global North and Global South.

At the same time, it can be argued that some fields of science are particularly amenable to benefit from stronger links to traditional knowledge systems, which are context-specific and held by local communities outside science systems. This is for instance the case of scientific fields such a health, agriculture and those addressing environmental sustainability and climate change adaptation, where refined traditional knowledge related to meteorology, geology, ecology, botany, etc. These fields can be pivotal in scientific contributions from the South.

Rather than adopting a North/South divide, it is more effective, from an analytical point of view, to distinguish 'local' from 'global'

It is therefore difficult to fully separate 'science in the South' from its surrounding environment, both the local and the global. However, systems analysis and science mapping may help identify relevant components of scientific landscapes and research practices in the Global South. To properly assess the research quality of any single entity (could be an idea, individual, project, program, or something otherwise) one will need to take the local surroundings into account. Our small-scale case study of African researchers offers some illustrative insights.

Research performance indicators: An African researcher's perspective

How do researchers in Africa perceive 'research excellence' within the context of their national scientific environment? To answer this question, our recent survey collected responses from 106 researchers across Africa. The findings presented us with a long list of challenges they face to achieve excellence (Tijssen and Kraemer-Mbula, 2017)[5]. A third of the respondents mentioned 'insufficient funding'. Other frequently mentioned obstacles are: 'poor research infrastructure and equipment', 'heavy teaching loads/ lack of incentives to research/ insufficient time', 'lack of human resources/ low research capabilities' and 'poor access to top rated journals'. Some challenges, like 'poor research infrastructure & equipment', are more typical for science systems in LMICs. Some of the other challenges reflect structural problems of global science, such as shortage of resources (in increasingly competitive research environments).

[5] Tijssen, R. and E. Kraemer-Mbula (2017), Research excellence in Africa: policies, perceptions and performance, Science and Public Policy (in press, 2017).

Hypothetical case study of
research excellence in Africa

(part 1 of 3)

An English-language research publication was published in a peer-reviewed African journal. It presents the final results of collaborative basic research, part of a larger medical research program and consortia that involved no less than 10 African nations and was funded by an international donor organisation.

The research concerns a disease that is rampant in Sub Saharan Africa. The article shows a list of authors with many African names and affiliations. The lead author on the list – the principal investigator – is a high-profile researcher affiliated with a top university in South Africa.

Hypothetical case study of
research excellence in Africa

(part 2 of 3)

As a result of the above-mentioned research collaboration, a working paper, describing preliminary results of one of the program's research projects (on preventive measures), was posted on a university' online repository.

The paper, in English and Portuguese, summarises the findings of applied research in one of the local communities. It is hardly cited but has been downloaded from the site many times, and copies have been distributed among members of that community.

It is unclear if and how the findings are implemented by the villagers. Which indicator should be used to assess "quality"?

The survey findings also highlight a wide diversity of opinions and preferences with regards to Africa-relevant dimensions of research excellence. When asked "***what criteria would you use to describe an 'excellent' researcher?***" the respondents placed the highest weight on 'training and supporting future generations of researchers' – a reflection of the severe shortage of research skills in Africa. 'Creating new knowledge in the field', 'producing work with great social impact' and 'being well published', follow down the list of criteria. No less than 18 criteria are considered 'relevant' or 'very relevant'.

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If research excellence is indeed such a fuzzy and highly multidimensional concept, how should research funders deal with this complexity when allocating monies? What should the key criteria be? One of the questions in the survey enquires "which performance indicator(s) should the science council in your country apply to assess a research proposal?" Respondents singled out 10 dimensions as either 'relevant' or 'very relevant'. Among the 'very relevant' ones, 'methodology and scientific rigor' of the proposal is seen as the most important criterion, followed by 'potential for social impact and policy influence'. Of lower perceived relevance, but still highly valued, are 'bibliometric' performance indicators of (i.e. publication output and citation impact counts), but also 'peer-review scores' and 'credentials of the researchers' organisations'.

The top preference for 'methodology and scientific rigor' is echoed by some science analysts in the Global North, who are highly critical of the notion 'excellence', and argue for framing research quality in terms of input or throughput attributes such 'soundness' of proposals and capacity building objectives of research activities.[6]

[6] Moore, S., Neylon, C., Eve, M., O'Donnell, D. and Pattinson D. (2017), Excellence R Us: university research and the fetishisation of excellence, Palgrave Communications, 3, article no. 16105 (doi:10.1057/palcomms.2016.105)

Research funders generally want to support research likely to leave a significant positive impact; therefore, excellence is also sought in ex-post evaluations of research outcomes. Respondents answered the question "***what performance indicator(s) should the science council in your country apply to assess the 'quality' of research outputs or impacts?***" The three most frequently mentioned indicators are: 'creating awareness of societal issues', 'direct benefits to disadvantaged communities' and 'new technological developments'. Rather than emphasizing scientific output and impact, the social and economic impacts appear to take preference. As for scientific visibility and significance, 'publications in top international journals' is also acknowledged as a relevant indicator.

These survey findings reveal major differences in opinions and preferences. There was no majority among the respondents for any specific performance indicator. Trying to develop or agree upon an ultimate 'key performance indicator' therefore seems pointless. An alternative analytical approach would be designing a pallet of carefully selected indicators. Such an 'indicator scoreboard' approach[7] captures a wider range of performance dimensions, reduces the risk of overreliance on a single source of data, and helps prevent strategic behavior by those who may attempt to 'play the system' in their favor.

Some of the indicators in the scoreboard would remain firmly within the domain of (evidence-informed) personal opinion; others would be amenable to independent, systematic measurement - either way, the question remains: how to define and set benchmarks for excellence for each indicator?

New insights from researchers and stakeholders in Africa highlight the importance of 'rigour' and the consideration of broader contextual factors, to define research excellence

Standards and benchmarks of excellence

Performance benchmarks of research quality need to be 'appropriate'. This applies to both ***ex ante*** assessments of research grant proposals and ***ex post*** evaluations of research outputs and impacts. Benchmarks can be subjective, objective, or something 'objectifiable' in-between. Their sources of information can range from an informed opinion of a single reviewer, all the way up to consolidated and verified statistical data derived from 'big data' empirical studies.

Skewed perspectives, unreliable opinions or biased information make for bad benchmarks. So, rather than chasing a dominant 'gold standard' of research quality, a 'silver platter' menu of multiple benchmarks, each tapping into a different performance dimension, offers a much better chance of gaining sufficiently wide acceptance within the scientific community and its funders. The value proposition of any selected indicator, and associated performance benchmark, should be their ability to discriminate between 'unusually good' and the rest. Ensuring comparability across selected units of analysis (research proposals, etc.) is therefore a key technical requirement. Sufficient transparency is a must. Ideally, the information is based on sound measurements derived from verifiable, empirical evidence produced by independent sources.[8]

[7] See for example: Tijssen, R.J.W., Scoreboards of research excellence, Research Evaluation, 12, 91-104, 2003.

[8] The 'do nothing' alternative is to abandon the whole idea of applying any explicit standard, and applying the label of 'excellence' as a general descriptor devoid of any explicit definitions or empirical specifications.

Hypothetical case study of
research excellence in Africa

(part 3 of 3)

One of the African research teams in the above-mentioned consortium has decided to submit a proposal at their national science funding agency for follow-up research in that same community. They claim that the one English-language research publication they co-produced is ample evidence of 'international excellence' and certainly warrants generous funding for further basic research. They mention benefits for the local community and other possible societal impacts, but there is no explicit objectives or targets stated in their grant application.

Which benchmark(s) should be applied to assess the degree of excellence?

Any judgement value should be, ideally, informed by in-depth understanding of the research process within the general context of relevant science funding strategies, objectives and policies. Such a 'frame of evidence' relies on various sources of information: views and preferences of stakeholders, analyzing past practices with performance assessment frameworks, but also benchmarking with good practices elsewhere. Delineating the relevant local circumstances helps to grasp characteristics that are essential to develop local quality benchmarks. Here one needs to address the key question: which features of the scientific landscape are essential for developing those local benchmarks? And how do those features translate into a selection criteria and benchmarks to identify excellence?

Some of those benchmarks will be 'explicit' (pre-determined, formalised and codified) and pre-defined by research funders or assessment panels. For example, professional credentials or demonstrable capabilities of the applicant – preferably supported by concrete evidence of conducted prior research. The number of research publications is one of the most popular ways of quantification, where publication output equate to scientific production and large outputs may reflect excellence. The same applies to the quantity of references to those publications from 'citations' by other researchers. The more citations, the larger the scientific impact and relevance. High-level impact is increasingly regarded as a true sign of excellence.

Other benchmarks may rely on intuition and ad hoc strategic judgment. In this case, the degree of quantification is limited, and usually does not extend beyond grades administered by one or more expert reviewers. For example, any research proposal with an average score of 4 or more, on a 5-point scale, would qualify as 'excellent'.

There is a need for a range of inclusive, context-specific benchmarks that can support expert judgment in LMICs

For stakeholders, 'appropriate' benchmarks tend to be motivational devices and aspirational targets; a beneficial, meaningful and integral part of their local and/or global incentives and reward systems. To become effective the formulation and implementation of appropriate benchmarks of research quality requires an understanding of how different perspectives of 'quality' and 'excellence' may impact on assessment practices and funding processes. Which means that the views of the researchers, the main beneficiary and one of the prime stakeholders, should be incorporated in developing and testing those benchmarks.

Scientific research can be a harsh environment in LMICs, where severely under-resourced and aspiring scientists may struggle to conduct their activities and reach their set objectives. International collaboration with researchers from high-income countries may bring major benefits to resolve such challenges, either through complementary financial and human resources, or pooling expertise and facilities. The contribution of international support or cooperation can be quite significant and should be reflected in excellence benchmarks.

Towards good practices

This Policy Brief offers a roadmap towards firmer empirical ground. It builds on our recent paper on the topic of research excellence in Africa[9] in which we advocate an evidence-informed approach with a greater standardisation and precision in research assessment and evaluation processes. From this we distill 10 practical recommendations:

1. science funders should be more explicit in their descriptions or definitions of 'research quality' and 'research excellence';

[9] See footnote 5.

2. determining 'excellence' is contingent on appropriate performance standards and benchmarks;

3. the appropriateness of a performance indicator depends on its degree of 'usability' and 'user acceptability' in terms of information value, operational value, analytical value, assessment value and stakeholder value;

4. proper understanding and operationalising requires multiple perspectives (both local and global); it is important to make a clear distinction between common global benchmarks and 'local' customised ones.

5. experiences within LMICs in adapting concepts of 'research excellence' and 'research quality' to their local contexts constitutes valuable sources of information to establish good practices in assessment and evaluation practices worldwide;

6. expert opinions from peers should be a prime source of information for value judgements on research quality and excellence;

7. personal views, usually embedded in implicit scientific norms regarding quality standards or driven by selected showcases of successful research, should be complemented by external empirical information to create 'informed peer-review' assessment and evaluation;

8. the multidimensional nature of research excellence requires an 'indicator scoreboard' approach, where performance indicators may span the entire spectrum from research resources to socio-economic impacts;

9. the choice of performance indicators and/or excellence benchmarks will always be context-dependent and goal-dependent; there is a clear need to incorporate local contextual factors in customised indicators;

10. frameworks designed to assess research excellence ought to be flexible enough to incorporate changes in the local context and priorities, as well as dynamics of the global science system.

New considerations and practices can significantly improve how research excellence is addressed in the Global South

Further research in this area should take a critical and constructive approach to the existing trends in understanding research excellence as relevant concept in research assessments and science policy. This includes two main questions:

- what does research excellence mean at various levels (i.e. in terms of research activities by individual researchers or research teams, programs, organisations, scientific disciplines), and whether and how the concept can be pursued as an overall objective for research funding in the Global South?

- which analytical models, tools and assessment frameworks would be appropriate to either implement, adapt or find alternatives for this concept, with the specific intent of strengthening locally relevant scientific research?

Evidence-based decisions on science funding require robust science policy tools and analytical frameworks. Future contributions could consider different avenues and perspectives that can help science granting councils around the world, but especially in the Global South[10], address a perceived need to fund research excellence without sacrificing broader objectives related to research impact, inclusivity, social responsibility, transparency and accountability.

[10] This includes the work of science granting councils in Africa, international donor organisations, as well as other capacity-building initiatives in lower-income nations of Latin America and South East Asia.

Contact information

Robert Tijssen

DST-NRF Centre of Excellence in Science, Technology and Innovation Policy (SciSTIP), Stellenbosch University, South Africa

tijssen@sun.ac.za

Erika Kraemer-Mbula

DST-NRF Centre of Excellence in Science, Technology and Innovation Policy (SciSTIP), Stellenbosch University, South Africa; University of Johannesburg, South Africa

erikakm@uj.ac.za

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About the Science Granting Councils Initiative in Sub-Saharan Africa

The SGCI strengthens capacities of the Science Granting Councils to:

a) manage research

b) use Science Technology and Innovation Indicators (STI) to design and monitor research

c) support knowledge transfer to the private sector and

d) establish partnerships with each other and other science system actors

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