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The state of the South African research enterprise



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Local intellectual labour has a global effect

Johann Mouton and colleagues have compiled a magisterial volume on *The State of the South African Research Enterprise*. It originates in the DST-NRF Centre of Excellence in Scientometrics and Science, Technology and Innovation Policy based at Stellenbosch University. It builds on years of research conducted at CREST (Centre for Research on Evaluation, Science and Technology), which was established as a research centre at Stellenbosch University in 1995 and has since then been the mainstay of research on the state of research in South Africa.

The goal of this study was to conduct a ‘comprehensive assessment of the state of the South African research enterprise’ (p.i). This goal should be understood in the context of national and global scholarship that seeks to examine intellectual work and its outputs. In the national context, such investigations have often asked two kinds of question. The first is: to what purpose is knowledge put? Under apartheid this question often suggested ideological orientation in funding research and producing knowledge. The second relates to South Africa’s national research capacity in relation to Africa and the rest of the world.

This work focuses largely on the latter question, taking a highly detailed bibliometric approach that concentrates on South Africa’s global positioning and ranking. These issues dominate the first three sections of the book. The fourth section focuses on a strategic research assessment of six areas: (1) agriculture and food security, (2) climate and the environment, (3) education, (4) energy, (5) health and (6) water. Here the question is: to what extent is South African research responsive to national (and international) societal priorities and goals?

The book unfolds a clear and precise explanation of our research enterprise. It is conceptualised as consisting of three dimensions: research funding, research capacity and research performance. Funding and capacity refer to the availability of money for research and the skilled people to undertake the investigation and thinking for knowledge production. The impact of the conjunction of these two enablers is addressed in the assessment of the research performance. In this latter regard, both quantity and quality of research outputs matter.

The higher education and research landscape has been revolutionised by bibliometrics and obsession with competition and measurement. This is mirrored in the audit culture that has gripped universities. Understandably there is scepticism about the measurements. There is a reductive element to them in which the fine-grain detail is lost and qualitative analyses are ignored. Bibliometrics are also open to manipulation and outright ‘cheating’ in which citations, for example, can be boosted and publication rates inflated by recourse to predatory publishing.

Yet bibliometrics and measurement are here to stay; university ranking systems proliferate and universities invest a great deal into getting rated and advancing up the league tables.

What is impressive about this book is how it ‘drills’ down to expose trends that broad analysis often misses. This detail is an effect both of a sophisticated methodology and a very clear conceptualisation of what the book needed to do to provide a proper and helpful analysis. It is difficult to argue with the authors’ own assessment that ‘The report arguably constitutes the most comprehensive empirical assessment of the state of the South African research enterprise’ (Preface).

What are the take-home messages of this study? South Africa does very well in an under-resourced environment. This simple statement should be evaluated against the backdrop of a current global interest in knowledge production and the continued, but not uncontested, dominance of the global North. One of the reasons for this dominance is the under-resourcing of research in the global South.

As the authors write:

South Africa invests too little in Research & Development (R&D). Although nominal expenditure has increased, Gross Domestic Expenditure on R&D...has remained unchanged at around 0.8% for most of the past fifteen years. South Africa’s poor performance is best illustrated by the fact that, when compared to eight very similar research systems, our investment is less than half of their mean investment’. (p.1)

Countries within the Organisation for Economic Co-operation and Development in Europe spend an average of 2.4% per annum.

Reasons for underfunding are complex but include the crisis facing the whole country and the decline in corporate/business expenditure on R&D, partly the result of the troubles of several large companies which once invested heavily (Anglo American and Eskom) and the movement of local R&D to other countries (p.2).

‘The research capacity in the country is too small and needs to be expanded as a matter of urgency’ (p.2). Countries similar to South Africa have, on average, twice as many full-time equivalent researchers per thousand of their workforces and three times as many per million of the countries’ inhabitants. Great strides have been made to boost the PhD pipeline but the ratio of doctoral graduates to the population remains well below international benchmarks. Alarming, for the first time in a decade, there has been a decline in full-time equivalent researchers within universities: from 5098 in 2014/2015 to 4702 in 2015/2016.

Despite these problems, the authors conclude that, overall, South Africa’s research performance is ‘excellent’ and describe the country as ‘punching above its weight’ (p.2). In terms of international benchmarking, South Africa has increased its research output and world research share and improved its world rank (28 in 2016). The output of articles (according to the Web of Science) increased from 3668 publications in 2000 to 15 550 in 2016. This annual average growth of 2.9% resulted in a doubling of South Africa’s relative world output (from 0.4% in 2000 to 0.91% in 2016).

This study is a very important one that, it is hoped, will persuade funders (the state, industry and corporates, and organisations) to contribute to South African research. It will encourage our scientists because it demonstrates that local intellectual labour has a global effect. This is reassuring in the face of rising levels of competition and increases in the production of research outputs. It also offers policymakers guidance on what needs to be done to ensure that South Africa continues to contribute to the global store of what we know.

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