Centre of excellence as a tool for capacity building

Case study: South Africa

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Executive summary

The OECD has carried out a study on Centres of Excellence (CoE) as a part of the Project on Innovation, Higher Education and Research for Development (IHERD), which is financed by the Swedish International Development Cooperation Agency, Sida.

The development of CoEs is a policy measure, applied by governments in many parts of the world in order to promote a robust research and innovation environment. This is achieved by encouraging institutional profiling and generating a critical mass of researchers. CoE initiatives are a flexible instrument and have been applied in several different ways and for different purposes, such as promoting basic research, innovation, social development and education. Because CoEs are often located in higher education institutions, these initiatives increasingly influence the management of institutions and academic careers.

This case study of South Africa’s CoE program, which was implemented in 2004, assesses the programme with reference to its framework conditions. On creation, the centres were envisaged to have two key roles: a) stimulating sustained distinction in research; and b) generating highly qualified human resource capacity to have a meaningful impact on key areas of knowledge both nationally and globally.

The primary framework conditions of the CoEs are:
- taking the lead in cutting edge research
- building research capacity
- building South Africa’s research standing
- positioning South Africa to lead in the knowledge economy
- researching key questions for South Africa.

Currently there are eight CoEs established in South Africa in the following topics:
- invasion biology
- tree health biotechnology
- catalysis
- strong materials
- epidemiological modelling and analysis
- biomedical tuberculosis (TB) research
- birds as keys to biodiversity conservation
- climate and earth systems

A review of the programme conducted in 2009 concluded that CoEs in South Africa have been successful in the first five years of their operation. Some specific findings were:
- The CoE programme was well thought through and implemented through an open call for proposals and a selection process which was perceived as thorough and fair.
- All CoEs have met all the aims of the programme.
- CoEs have performed exceptionally well and are internationally competitive.
- Management of the CoEs has benefited from the appointment of first rate managers.
### Acronyms and abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACCESS</td>
<td>Applied Centre for Climate and Earth Systems</td>
</tr>
<tr>
<td>ARC</td>
<td>Agricultural Research Council</td>
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<tr>
<td>CoE</td>
<td>Centres of Excellence</td>
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<tr>
<td>CoG</td>
<td>Condition of grant</td>
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<tr>
<td>CSIR</td>
<td>Council for Scientific and Industrial Research</td>
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<tr>
<td>DST</td>
<td>Department of Science and Technology</td>
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<tr>
<td>HEI</td>
<td>Higher education institution</td>
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<td>IHERD</td>
<td>Innovation, Higher Education and Research for Development</td>
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<tr>
<td>MoA</td>
<td>Memorandum of agreement</td>
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<td>MRC</td>
<td>Medical Research Council</td>
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<td>NRDS</td>
<td>National Research and Development Strategy</td>
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<td>NRF</td>
<td>National Research Foundation</td>
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<td>SARChI</td>
<td>South African Research Chairs initiative</td>
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<td>TB</td>
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1. Introduction

The objective of this study is to

- carry out a case study of the Centres of Excellence (CoE) programme in South Africa, using the OECD's analytical framework to assess CoEs in teaching, research and innovation
- comment on the possible constraints for data collection
- provide suggestions for further improvement of the analytical framework, if applicable.

This assessment of the CoE programme in South Africa and its performance is based on a review of relevant documents made available by the National Research Foundation (NRF) and gleaned from the NRF and the Department of Science and Technology (DST) websites (http://www.nrf.ac.za/centres, http://www.dst.gov.za). Providing information on the contribution of the CoE programme to innovation, the development of partnerships with industry, and the employability of CoE funded graduates in industry would require key informant interviews with the directors of the CoEs, captains of relevant industry and relevant NRF and Department of Science (DST) officials.
2. Historical background

The conceptual framework of the CoE programme in South Africa derives from the National Research and Development Strategy (NRDS) which was approved by Cabinet in 2002. As the then President, Thabo Mbeki notes in its preface: “Critical in this regard (wealth creation in the context of globalisation) is the matter of human resource development. We have to exert maximum effort to train the necessary numbers of our people in all the fields required for the development, running and management of modern economies...”

The NRDS identifies the creation of “centres and networks of excellence” in science and technology as a key component of the creation of highly skilled human capital and the transformation imperatives of government, i.e. addressing the “frozen demographics in science, engineering and technology workforce both in respect of race and gender”. The CoEs were envisaged as having two key roles: stimulating sustained distinction in research while simultaneously generating highly qualified human resource capacity to create a meaningful impact on key areas of knowledge both nationally and globally.

Following the acceptance by government of the NRDS, the DST and the NRF developed a Programme Framework document in 2004 for the establishment of Centres of Excellence (CoEs), after consultations with various international experts and following examples of CoEs in Australia, Canada and the USA. The operational management of the programme was entrusted to the NRF through a memorandum of agreement (MoA) between the DST and the NRF. The DST/NRF Centres of Excellence Programme was launched in 2004, and initially focused primarily on South Africa. To increase its reach, the NRF actively pursued collaborations through bilateral and multilateral initiatives with similar centres in Africa as well as links with similar capacity-building initiatives through north-south collaborations.

The CoE programme, together with the South African Research Chairs Initiative (SARChI), forms the pinnacle of the NRF’s research funding programme. While SARChI aims to bring new research capacity to higher education institutions (HEIs) in the country, the CoE programme is designed to raise the research ceiling of already existing top-level scientists at HEIs and to further enhance capacity development and the regeneration of the broader science community.

The primary framework conditions for the establishment of CoEs, as enunciated in the Framework were:

a) Taking the lead in cutting edge research
   This is to be achieved by having leading researchers working on cutting-edge research, national and international research collaborations, and offering an exceptional training ground for research students and young researchers.
b) **Building research capacity**  
Training the next generation of researchers while addressing transformation imperatives.

c) **Building South Africa’s research standing**  
CoEs are expected to take the lead in their respective disciplines, and bring South Africa's research output to a par with the best in the world.

d) **Positioning South Africa to lead in the knowledge economy**  
CoEs are training grounds for the next generation of South African researchers, and are expected to equip young researchers with the skills and knowledge that will make South Africa a leader in the knowledge economy.

e) **Researching key questions for South Africa**  
As centres of research excellence, CoEs research key questions of strategic importance to South Africa. They are also required to think ahead and scan the horizon for challenges that will/may confront the country in the future.
3. **Definition and rationale**

**Definition**

In the South African context, the Centres of Excellence (CoEs) are physical or virtual centres of research which concentrate existing research capacity and resources and enable researchers to collaborate across disciplines and institutions on long-term projects that are both locally relevant and internationally competitive.

**Rationale**

The rationale for the establishment of the CoE programme in South Africa is that the programme is envisaged as an appropriate funding and support modality for achieving the highly skilled human capital required for economic development and the transformation imperatives of the country.

To achieve these ends the programme is designed[^3] to ensure the integration of several smaller and related research initiatives (at both the established and historically disadvantaged universities) into large science programmes (generally at the more established universities), and by this to:

- achieve economies of scale through the optimisation of resources and effort by sharing personnel, equipment, data and ideas;
- achieve critical mass of research supervisory capacity and mentorship;
- allow for planned, strategic, long-term research;
- promote collaborative and interdisciplinary research;
- retain, attract, sustain and improve scientific excellence;
- promote knowledge and human capital development in areas of national strategic importance;
- develop and create an internationally competitive research training environment;
- enhance the international competitiveness and visibility of South African science, for example by increasing its global share of research outputs;
- promote better diffusion and exploitation of the knowledge produced by HEIs;
- ensure secure and stable long-term funding for CoE research and dissemination;
- reduce micro-management of CoE resources by the funding agency.
4. Selection and establishment of a CoE

From time to time, the NRF initiates an open and competitive call for the establishment of CoEs based on identified themes of national importance, and invites pre-proposals of not more than ten pages for initial assessment. The assessment of the pre-proposals is made in accordance with set evaluation criteria.

The process then follows one of two routes:

**Development route**

Where a pre-proposal to host a CoE falls short of the selection criteria, but is identified as having potential or is of strategic importance, seed funding is provided for further development of the pre-proposal. The revised pre-proposal is submitted after 12 months.

**Recognition route**

Where the pre-proposal to host a CoE meets the selection criteria, invitations are extended to the research leader/host institution to submit full proposals (maximum 50 pages) which detail the research and capacity development plans of the proposed CoE for the duration of the CoE (which was 10 years, but is now extended to 15 years). At this stage seed funding is also provided for proposal development, where appropriate. The funding is based on the level of maturity of the proposal, nature of centre, extent of multidisciplinarity, additional resources available, needs of applicants, and other relevant factors.

The NRF then sets up discipline-specific Selection Panels which evaluate the full proposals according to set evaluation criteria. The review of full proposals includes postal/electronic reviews by international experts and on-site reviews by local experts.

Finally, recommendations for the establishment of a CoE by the Selection Panel are discussed before a DST/NRF committee where a funding decision is made.

The establishment of the CoE is then formalised by the signing of conditions of grant (CoG) and appropriate contractual arrangements between the NRF and the host institution, as well as between the director of the CoE and the host institution.

Implementation then follows a ‘stage-gate’ model which consists of 5 stages:

1. **Forming Stage**, which sets the scene for the CoE (12 months) and includes the establishment of the CoE Board, recruiting research staff and students, fine-tuning long term strategies and setting short term goals, and establishing the management team;
2. *Storming Stage*, the bedding down stage (6 months) during which there is production of early outputs, firming of long term strategies, and demonstration of good academic and financial management, and synergies and team spirit;

3. *Norming Stage*: this is the growth stage (6 months), characterized by research and capacity development outputs, examples of networking, knowledge transfer and service delivery, and growing team spirit;

4. *Performing Stage*: the production stage (24 months) when the CoE has matured and is characterized by steady flow of research and research related outputs and utilization of the CoE’s outputs and interactions to generate alternative funds. Re-conceptualisation of the CoE and re-engineering of its programme also takes place during this stage;

5. *Exiting Stage* (24 months) during which the impact of the CoE is assessed, funding is secured from other sources, future continuation and/or winding up strategies are developed.
5. Governance and organisation

Institutional commitment

On signing the conditions of grant (CoG) the host institution of a CoE commits itself to:

a) formally endorse the CoE from inception to its full operation
b) sign appropriate contractual arrangements between the funding organisation and the host organisation as well as between the director of the CoE and the host institution
c) be involved in the oversight and effective integration of the CoE into its broader institutional context
d) award the head/director of the Centre of Excellence the position of university Chair
e) ensure that effective management and appropriate staffing of the CoE (as described below) are in place
f) meet all basic infrastructure and some administrative needs of the CoE.

Effective management

Each CoE is expected to have:

a) an outstanding leader who enjoys a high international standing as a scientist
b) a management/advisory board to provide strategic direction
c) a clearly determined research focus
d) intellectual and management capacity to integrate and deliver on identified activities and services
e) mechanisms to ensure staff satisfaction and retention
f) a welcoming and conducive environment for research students.

Appropriate staffing

Each CoE is expected have:

a) scientific staff who have a high local and international academic profile
b) scientific staff with the capacity to generate high-quality work that is widely acknowledged by peers and other users as having a critical impact on the field of study
c) sufficient high-quality staff with a diversity of skills
d) senior researchers with high-level supervisory and mentoring skills
e) staff with multidisciplinary research capacity
f) exchange programmes to enable high-calibre international interactions and short-term visitor staffing
g) staff who are able to participate in local and international consortia.
6. Funding and evaluation mechanisms

Funding of CoEs

The CoE programme is located at the pinnacle of the funding framework that the NRF provides to researchers and research groups at different points of development on the research spectrum, with core funding being provided by the NRF for 5 to 10 or 10 to 15 years.

The NRF transfers the funds to the centres on an annual basis; allocations per funding category are made by the centres, with the host institutions deciding on the values per category.

The funds are to be applied within the following parameters:

a) salary subsidy for the Director of the CoE
b) bursaries and staff support based on principles of equivalence, i.e. post-doctorates at lecturer level; grant holder linked bursaries for research students at the NRF's prestigious scholarships level; other CoE staff at appropriate senior lecturer, associate professor or professor level
c) equipment grants
d) financial reporting using a standard costing mode, i.e. full declaration of costs.

In addition to meeting all basic infrastructure and some of the administrative needs of the CoE, the host institution is expected to contribute 10% of the annual NRF funds awarded to the CoE. The host institution and the Director of the CoE are expected to devise other ways of raising funds to ensure longer-term sustainability of the centre.

Monitoring and evaluation

Each CoE is expected to manage and provide the following activities and services:

Research

High quality research is the main activity of a CoE and should be focused on the creation and development of new knowledge and technology of national importance.

Research capacity development and training

Human resource development is also of high priority and is to be achieved through master's and doctoral programmes, postdoctoral support, internship programmes, support for students to study abroad, and joint ventures in student training, with particular attention being given to racial and gender disparities.
Information brokerage

CoEs are to provide highly developed pools of knowledge and relevant databases, and promote knowledge sharing.

Networking

A CoE is expected to actively collaborate with scientists, technologists and institutions of repute, and develop national, regional, continental and international partnerships.

Service rendering

A CoE is expected to provide information, analysis, policy, and other services, including informed and reliable advice to government, business, and civil society.

Monitoring and evaluation phases

There are three phases in the monitoring and evaluation of the performance of CoEs in respect of their key activities:

a) Annual monitoring:
Annual monitoring of the CoE is conducted by a suitably appointed Advisory Board, which is generally chaired by the Deputy Vice Chancellor of Research of the host institution with a representative of the NRF taking part as a member. Of particular interest are strategic research direction and financial control. Advisory Boards can recommend closure of centres if progress is not satisfactory and aims and targets are not met.

b) International mid-term review
A stringent international panel evaluation of outputs, outcomes and impact of NRF support is conducted on a 5-, 7- and 10-year basis.

c) End phase evaluation
Finally an end phase evaluation will be contractually agreed upon between the NRF and the host institution, and undertaken in the penultimate year or on completion, of a funding cycle to determine an exit strategy.

The first international 5-Year Review of the entire CoE programme took place in June 2009[4]; the second review is scheduled to take place in 2013.
7. **Strategic orientation, capacity building and impact**

The strategic orientation of the CoEs, their contribution to capacity building and their impact on the research landscape may be gauged from the CoEs that have been established and the highlights of their achievements from the first five years of their existence.

The DST and the NRF have established eight CoEs, to take the lead in researching and building research capacity in various areas that are of national interest. These centres are listed below [www.nrf.ac.za].

**Centre of Excellence in Invasion Biology**

Host institution: University of Stellenbosch.
Collaborators: The Council for Scientific and Industrial Research (CSIR), the South African Institute for Aquatic Biodiversity at Rhodes University, Nelson Mandela Metropolitan University, Walter Sisulu University and the Universities of Cape Town, Free State, KwaZulu-Natal, North-West, Pretoria and the Witwatersrand.

Launched in November 2004, the centre addresses the consequences to biodiversity of biological invasions, and provides scientific understanding required to reduce the rate and impacts of biological invasions.

**Centre of Excellence in Tree Health Biotechnology**

Host institution: Forestry and Biotechnology Institute, University of Pretoria.
Collaborators: The CSIR, Medical Research Council and University of Stellenbosch.

South Africa’s rich diversity of native trees and huge forestry industry are continuously and increasingly being threatened by pests and diseases. Launched in January 2005, the centre concentrates on understanding and combating diseases affecting South Africa’s indigenous trees.

**Centre of Excellence in Catalysis**

Host institution: University of Cape Town.
Collaborators: Stellenbosch University, Nelson Mandela Metropolitan University and the Universities of Cape Town, Limpopo, Johannesburg, Free State, KwaZulu Natal, North-West, Western Cape and the Witwatersrand.

Launched September 2004, the Centre provides a virtual platform for a new approach to catalysis research and the integration of catalysis practitioners across disciplines such as chemistry, physics, materials science and biochemistry.
**Centre of Excellence for Strong Materials**

Node: University of the Witwatersrand.
Collaborators: Mintek, the Nuclear Energy Corporation of South Africa, Nelson Mandela Metropolitan University, and the Universities of KwaZulu-Natal, Johannesburg and Limpopo.

Launched April 2005, the centre seeks to understand and improve the properties of advanced strong materials to increase their efficiency and reduce costs. The research is also geared towards more advanced and cheaper materials to increase the competitiveness of South African industries.

**Centre of Excellence for Epidemiological Modelling and Analysis**

Host institution: University of Stellenbosch.
Collaborators: The Agricultural Research Council, the Universities of Cape Town, KwaZulu-Natal and the Witwatersrand, and Zimbabwe’s National University of Science and Technology.

The centre, launched in May 2006, uses mathematics to understand and predict the development of diseases and provide advice on how best to combat them.

**IS BIOMEDICAL TB RESEARCH**

**Centre of Excellence for Biomedical TB Research**

Co-hosts: University of Stellenbosch and University of the Witwatersrand.
Collaborators: National Health Laboratory Service and the Medical Research Council

South Africa has the highest incidence and second highest mortality rate of tuberculosis (TB) in the world. The CoE for Biomedical TB Research researches new tools for the diagnosis, treatment and prevention of TB in both humans and animals. It evaluates new drugs, vaccines and the genetic composition of drug-resistant TB.

**Centre of Excellence in Birds as Keys to Biodiversity Conservation**

Host institution: The Percy FitzPatrick Institute, University of Cape Town.
Collaborators: Northern Flagship Institution, Stellenbosch University, and the Universities of Cape Town, Pretoria and the Witwatersrand.

The centre was launched in October 2004, and focuses on understanding and maintaining biodiversity using birds as indicators. Its many projects include researching the foraging habits of African penguins and Cape gannets.
**Applied Centre for Climate and Earth Systems (ACCESS)**

Host institution: Council for Scientific and Industrial Research (CSIR)
Collaborators: Rhodes University, the Universities of Cape Town, Western Cape, the Universities of Witwatersrand, KwaZulu Natal and Pretoria, and South Africa National Biodiversity Institute, South Africa Earth Observation Network, South Africa Earth Observation Service, Council for GeoScience and the Department Environmental Affairs.

The ACCESS CoE, launched in September 2010, is not discipline specific but is organised around the dynamics and interactions of earth systems: land, ocean and atmosphere. It is implementing a suite of activities with the aim of understanding various space and time scales of change in earth systems.

ACCESS is a key component of the DST strategy for implementation of the Global Change Grand Challenge, which is aimed at increasing the scientific understanding of global change and developing relevant technologies to respond to the change.

**Funding levels of CoEs**

The different CoEs are not uniformly funded; their level of support depends on the nature of their projects and their infrastructure needs. The funding for financial years 2009/10 and 2010/2011 is given in Table 1.

**Table 1. CoE Funds allocated by the NRF for financial years 2011/2/13- 2013/14**

<table>
<thead>
<tr>
<th>CoE</th>
<th>2011/12</th>
<th>2012/13</th>
<th>2013/14</th>
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<td></td>
<td>R000</td>
<td>Eu000</td>
<td>R000</td>
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<tr>
<td>Invasion biology</td>
<td>7 418</td>
<td>741.8</td>
<td>8 096</td>
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<tr>
<td>Catalysis</td>
<td>6 962</td>
<td>696.2</td>
<td>7 598</td>
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<td>Birds as key to biodiversity conservation</td>
<td>2 570</td>
<td>257.0</td>
<td>5 611</td>
</tr>
<tr>
<td>Biomedical TB research</td>
<td>7 339</td>
<td>733.9</td>
<td>9 294</td>
</tr>
<tr>
<td>Tree health biotechnology</td>
<td>2 570</td>
<td>257.0</td>
<td>5 611</td>
</tr>
<tr>
<td>Strong materials</td>
<td>10 257</td>
<td>1 025.7</td>
<td>11 194</td>
</tr>
<tr>
<td>Epidemiological modelling and analysis</td>
<td>6 063</td>
<td>606.3</td>
<td>6 617</td>
</tr>
<tr>
<td>ACCESS</td>
<td>N/A</td>
<td>10 700</td>
<td>1 000.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>43 183</strong></td>
<td><strong>4 317.9</strong></td>
<td><strong>64 721</strong></td>
</tr>
</tbody>
</table>

Source: NRF.
Performance highlights of CoEs 2004-09

Figures 1 to 3 present the performance highlights of the CoEs: numbers of research students, graduating master and doctoral students and publications in peer reviewed journals, based on information/reports supplied by the NRF[5].

Figure 1. Total number of students (master and doctoral), black students and female students supported by CoEs, 2004-09
Figure 2. Number of CoE-supported master’s and doctoral graduates, 2004-09

Figure 3. Number of peer-reviewed publications generated by CoEs, 2004-09
Several achievements are worthy of note:

1. The CoEs are characterised by strong collaborations between host institutions, Science Councils (CSIR, MRC, ARC), established and formerly disadvantaged higher education institutions, and partner institutions in Africa and worldwide.
2. The number of research students has increased from 126 in 2004 to over 400 in 2009.
3. Black students constitute more than 50% of the master and doctoral students.
4. Female students constitute 48% of the master and doctoral students, of whom 48% are black.
5. The number of research publications in peer-reviewed journals shows a marked increase from 76 in 2004 to over 400 in 2009.

It is evident that the CoEs in South Africa have been remarkably successful in the first five years of their operation.
8. The 5-Year Review of the CoE Programme

The South African CoE programme underwent its first 5-Year Review in June 2009\(^4\). Members of the Review Panel were:

- Dr Susan E Cozzens, Associate Dean for Research, Ivan Allen College of Humanities and Social Sciences, Georgia Institute of Technology, Atlanta, Georgia, USA
- Dr David R Woods (Convener), former Vice-Principal of the University of Cape Town and former Principal of Rhodes University.

The Review Panel was requested to assess the conception, implementation and management of the DST/NRF CoE Programme from inception to 30 June 2008 and to make recommendations for the future to enhance the DST/NRF CoE Programme.

The panel met at the NRF from 23-26 June 2009, and with various members of the DST, NRF, ARC and the directors of the CoEs, and considered the extensive reviews of the individual CoEs by international experts.

The main findings of the review were:

a) The CoE programme was well thought through and implemented through an open call for proposals and selection process which was perceived as thorough and fair. The bottom-up process was important and a model that should be followed in the future. Implementation via a "stage gate" model and different service level agreements worked and all CoEs were successfully established.

b) All the CoEs have met all the aims of the programme. Not only has the output of publications in peer-reviewed journals improved but there has been a significant improvement in the impact factors.

c) The CoEs have performed exceptionally well and are internationally competitive

d) The management of the CoEs has benefited from the appointment of first-rate managers, some with PhDs.

e) The Management/Advisory Boards of the CoEs have been important in the management, strategic direction and interaction with the host university of the CoE.

f) The CoEs have been proactive in the recruitment of black students. This has involved mentorship programmes at the undergraduate level, development of school programmes and nodes on predominantly black campuses. Nevertheless the majority of black students have been recruited from other African countries.
The Review Panel also found some of the elements of the DST/NRF CoE programme of particular relevance in South Africa today. Some examples of this are:

a) “Exploiting the competitive advantage vested in outstanding researchers” and “rewarding, retaining, sustaining and improving scientific excellence” are particularly important in a research system in transition from an old to a new state.

b) “Providing secure and stable funds for research and knowledge dissemination” is particularly important at a time when institutions are under stress.

c) “Reducing micro-management of academics and their resources by the funding agency” provides well-deserved autonomy for leading researchers in the system.

d) The multiple, interacting goals of the centres have also made them powerful contributors to capacity development, both by training people and establishing links between institutions, both pressing needs in the South African context.

Recommendations of the Review Panel:

1. The DST/NRF should continue funding each of the CoEs for a further 5 years.

2. The DST/NRF should continue the CoE programme and run another bottom-up competition as soon as possible.

3. The DST/NRF should encourage other government departments and research councils to provide funding for CoEs in specific areas. The process should be managed by the NRF and the specialised CoEs awarded on an open and competitive basis.

4. The DST/NRF should develop strategies to prevent the loss of critical mass and expertise that has been developed, for example, i) by allowing holders of the South African Research Chairs to be members of CoEs, and ii) increasing support for research students.

5. The DST/NRF, Boards and CoEs should immediately start planning for the transition at year 10, which is the second phase of CoE programme.

In response, the NRF has continued the funding of the CoEs for a further 5 years and extended the programme’s lifetime from the initial 10 years to 15 years.
9. Concluding comments

In summary, the Centres of Excellence have provided support for collaboration across institutions and disciplines, achieved critical mass of researchers and research students and diversity of intellectual opportunity, enhanced the scale of research, and extended supervisory and mentoring capacity. All of these are in particular need in South Africa's research and higher education system.

Constraints on data collection

An obvious recommendation is that the analytical framework be extended to include interviews with the heads of CoEs, heads of research at host institutions, and the heads of department in which the CoEs are located, in order to assess:

- the impact of the CoE on the wider research activity of the department and the host institution
- the contribution of CoE researchers to information brokerage service and service to the wider community.
References


