

Review of the DST-NRF Centres of Excellence Programme 2013

FINAL REPORT

Review panel

Prof Ahmed Bawa (convenor)	Vice-Chancellor and Principal, Durban University of Technology, South Africa
Prof Howard Alper	University of Ottawa and Govt of Canada's Science, Technology and Innovation Council, Canada
Prof Susan Cozzens	Vice Provost: Graduate Education, Georgia Institute of Technology, USA
Prof Venni Krishna	Professor in Science Policy and Chairperson, Centre for Studies in Science Policy, Jawharlal Nehru University, India
Prof Dave R Woods	Chair: SANTRUST, Cape Town, South Africa

REPORT: NATIONAL RESEARCH FOUNDATION REVIEW OF ITS CENTRE OF EXCELLENCE PROGRAMME

1. INTRODUCTION

1.1 National System of Innovation

The concept of the South African National System of Innovation (NSI) came into being through a Green Paper/White Paper Science and Technology policy discourse and process that gave rise to the Act of 1995. The NSI concept was designed to provide the basis for the development of a framework for cohesion, synergy and purposefulness in the national science-technology-innovation nexus. The framework gave rise to new institutions such as the National Research Foundation (NRF) (which grew out of progenitor institutions: the Foundation for Research Development and the Centre for Science Development), the National Advisory Council on Innovation and the Academy of Science of South Africa (ASSAf). Perhaps most importantly the NSI was meant to provide for the purposeful articulation of the institutions of the science system; including the universities. The NSI, with its paraphernalia, grew out of a clear understanding of the existence of an innovation chasm—a disarticulation between a productive science system, an innovation and technology development system and the production systems.

1.2 NRF Funding

The NRF is the key funding agency for research within the science systems. It has a multifaceted research funding system through which it addresses its key mandates of building national research capacity, building high-level scientific human capacity and the building of knowledge domains and to do this by taking into account the deep race and gender imbalances that permeate the South African science system. The instruments that it uses are constructed

- a. Either in terms of its mandate via the board-directed resources allocated to it by the Department of Science and Technology (DST). In 2013 this amount was about R450 million. This includes its funding of scholarships, funding of researchers through competitive funding schemes and its very successful Thuthuka Programme for developing scientists.
- b. Or in terms of programmes specially funded by DST such as the South African Research Chairs Initiative. The NRF also has arrangements with the Department of Trade and Industry (DTI) for funding the outstanding Technology and Human Resources for Industry Programme (THRIP). This part of the NRF's activities commands the larger chunk of the NRF's budget—R1.2 billion in 2013.

The Centres of Excellence Programme that is the subject of this Review is another programme in this category, though it is small in relation to the other to the programmes at about R45 million.

1.3 South African Development Policy Initiatives

Beginning in the early 1990s, South Africa has produced a number of policy frameworks for its developmental trajectory, beginning with the Reconstruction and Development Programme (RDP) upon which the African National Congress based its campaign during the inaugural elections of post-apartheid South Africa. The tradition has given rise to the National Development Plan (NDP), a 450-page document that lays out a 30-year developmental plan with a significant emphasis on people-centred inclusive growth.

This review process, within certain limits, has to take into account these three layers of policy/instrumentation/implementation and the dynamics between them: the assessment of the Centres of Excellence Programme among the NRF's funding instruments, the place of the Programme within the NSI and how it contributes to the functioning of the NSI and then the broader, more tenuous, more temporary, national developmental strategies captured in various documents but especially in the NDP—all of them imaginations of the future of South Africa.

1.4 The Review of the Centres of Excellence Programme

The NRF assembled a team of five reviewers to study the DST/NRF Centres of Excellence Programme and to make recommendations relating to its future. The terms of reference of the review is attached as Appendix 1. In the first engagement of the Review Panel with leadership of the NRF it was clarified that the terms of reference were somewhat curtailed or contained the review to one of the Programme (as an instrument of NRF/DST funding) rather than of the individual centres and their activities, productivity, successes and failures. This clarification shifted the emphasis of the Review.

Perhaps more importantly, a decision to renew the funding cycle of the existing nine centres of excellence for a further five years—to take it up to a 15-year period—was taken about 9 months before the onset of the review. This had an important effect on the interpretation of the terms of reference by the Review Panel.

The Review Panel was provided with documentation to peruse prior to the assembling of the five participants. A list of this documentation is provided in the Annexure to Appendix 1. The Team was also provided with the opportunity to meet with a significant number of stakeholders, board members, leadership and students of the various Centres and with relevant administrators in the NRF and DST. The programme of meetings is attached as Appendix 2. The work of the Review Panel was strongly supported and facilitated by the Division of Monitoring and Evaluation of the NRF. Anke Rädcl and her team were superb in their support of the work of the panel.

The team consisted of 5 reviewers:

- Howard Alper, a Chemist, who is in his third term as Chair of the Government of Canada's Science, Technology, and Innovation Council (STIC), and is also Distinguished University Professor at the University of Ottawa.

- Ahmed Bawa, a Physicist, and Vice-Chancellor and Principal of Durban University of Technology.
- Susan Cozzens, a Public Policy Specialist with interest in science, technology and innovation policies, is currently Vice Provost of Graduate Education and Faculty Affairs.
- VV Krishna, a Sociologist of Science and Public Policy specialist at Jawaharlal Nehru University and a professor at the Centre for the Studies in Science Policy in the School of Social Sciences.
- David Woods, one of South Africa's foremost biological scientists, and former Vice-Chancellor of Rhodes University.

The brief bios of the five members of the team are provided in Appendix 3. The Review Panel, chaired by Ahmed Bawa, met daily over a six-day period between the 10th and the 15th of March, 2013.

2. THE CENTRES OF EXCELLENCE PROGRAMME

As has been pointed out above the funding of the Centres of Excellence Programme is a ring-fenced allocation from DST to the NRF. The terms of reference of both parties is captured in the agreement between them. It places the custodianship of the programme with the DST and makes the NRF the sole implementer of the 'strategic initiative'. Quoting from this agreement,

'This programme, therefore, is a partnership programme where the Parties have distinct roles to play. The DST is responsible for strategic direction of the programme with guidance from the NRF and the NRF is responsible for the operational management of the programme.'

This provides the Review Panel with a clear understanding of the roles of the two parties.

2.1 The Programme Concept

The definition of these centres is laid out in the NRF's *Guide for the Funding of Centres of Excellence* as

'Centres of Excellence (CoE) are physical or virtual centres of research which concentrate existing capacity and resources to enable researchers to collaborate across disciplines on long-term projects that are locally relevant and internationally competitive in order to enhance the pursuit of research excellence and capacity development.'

It is clear from this that these centres must at the very least have the capacity to engage in the pursuit of excellence in research and in research capacity development, they must act as networks to bring researchers together around a theme of research, must provide the space for and encourage interdisciplinary research and be relevant to local challenges. The abovementioned Guide refers to 2 other objectives. The first is brokerage of information—'Centres of Excellence are to provide access to a highly developed pool of knowledge, maintaining data bases, promoting knowledge sharing and knowledge transfer, etc. The second is service rendering by which is meant 'A CoE is to provide information, analysis, policy, and other services, including informed and reliable advice to government, business,

and civil society.’

The document also lays out how the creation and good performance of these centres will contribute to the various mandates of the NRF. These are listed here only because they will have been communicated to the Centres in the construction of their agreement with the NRF.

‘There are multiple reasons why CoE are an appropriate funding and support modality for the NRF. Particularly, they aim to:

- Ensure the integration of several smaller and related research initiatives into large science programmes;
- Reward, retain, sustain and improve scientific excellence;
- Exploit the competitive advantage vested in outstanding researchers;
- Promote knowledge and human capital in areas of national strategic importance (including indigenous knowledge);
- Promote collaborative research;
- Develop interdisciplinary research;
- Systematically develop a creative research training environment that is internationally competitive;
- Raise quality, international competitiveness, visibility and esteem of South African science e.g. by an increase in global share of research outputs;
- Promote better diffusion and exploitation of the knowledge produced by tertiary institutions;
- Achieve economies of scale through the optimization of resources and effort by, amongst other things, sharing personnel, equipment, data, and ideas;
- Ensure secure and stable funding for research and dissemination;
- Allow for planned, strategic, long-term research;
- Reduce micro-management of resources by the funding agency.’

It is clear that the DST and NRF gave considerable thought as to whether this was a suitable programme of funding and whether it matched some of the overall objectives of the NRF.

2.2 The Centres of Excellence

Nine Centres of Excellence exist. An Advisory Panel of ASSAf has recently reviewed the outputs and impact of these centres and the report has been approved by the Council of the Academy. David Woods, a member of this Review, chaired the ASSAf study team and the report of that review is available from ASSAf. The Review Panel of the CoEs agreed with the recommendations on the ASSAf Advisory Panel. Seven of the centres were reviewed in some detail in terms of their impacts.

3. THE OBSERVATIONS OF THE REVIEW PANEL

3.1 Performance of Centres

The Review Panel is most impressed with the performance of the Centres in terms of their outputs and their achievements in networking researchers.

The production of research and the graduation of masters and doctoral students are at a very substantial level. These were already very productive centres and in our consultations with the directors, staff and students it was clear that these were understood to be centres of high performance. The Centres are also on a good trajectory in terms of their journal outputs and student graduation rates. The development of a cohort model for graduate students provides the basis for excellent supervision.

The Centres are interdisciplinary in nature and provide the right conditions for the growth of interdisciplinary research.

Most of the Centres work as outstanding networks bringing together individuals from different institutions and research groups.

The Centres have been providing advice, information and knowledge to various stakeholders —government and statutory bodies, industries, non-governmental organizations, and so on. This is regarded as an important role.

The unanimous view of the Review Panel is that this has been a successful programme of funding.

For a detailed review of the impacts of the individual Centres readers are referred to the ASSAf report.

3.2 The Purpose of the Programme

While the founding documents indicate what is expected of the Centres, how they will be measured and how they are expected to contribute to the mandate of the NRF, there isn't a clear statement about the *purpose of the Programme*. For instance, should the Programme (and hence the Centres) resonate with the NDP or with the national grand challenges? This is a question about the meta-narrative of the Centres of Excellence Programme.

3.3 The Identity of the Centres

This is related to 3.1.2. The Review Panel queried whether the NRF/DST and the Centres had done enough to distinguish themselves sufficiently from the other centres of research and graduate education established by the universities. Examples of such centres would be the Centre for the AIDS Programme of Research in South Africa and the Astrophysics and Cosmology Research Unit, both at the University of KwaZulu-Natal. The question arises as to how these Centres of Excellence differ in a meaningful manner from numerous other centres in the South African higher education system. The Review Panel does not have an answer to this but discussed the need to articulate the uniqueness of the Centres of Excellence with the challenges of national development.

3.4 Ambivalences in Mandate

The discussions the Team had with the NRF and the DST indicated quite clearly that in the design of the Programme there was an emphasis on building on the strong research assets. The Panel agrees with this aim of the NRF/DST. The Review Panel is however of the view that as these Centres mature—as some of them did—there should also be a progressive evolution in their mandates. In particular, this movement should include the ability of the Centres to address the innovation chasm in their domains of research activity. The innovation chasm was identified as a rather serious impediment to economic growth in policy processes between 1990 and 1995. It continues to be a problem.

The Review Panel in its discussions came to the conclusion that there is certain ambivalence with regard to the research—innovation—product nexus with the propensity to think of these as three separate domains rather than as a single, complex and integrated enterprise. Very little innovation now depends on the notion of a linear spectrum of activities and institutions between research and product. From the perspective of NSI, it is viewed as an interactive process connecting different actors and agencies in the science, technology and innovation system.

Another way of addressing this spectrum is to shift the emphasis in measuring the performance of the Centres of Excellence Programme from assessing their outputs to measuring their impacts on society—on industrial innovation, social innovation, technology development and so on.

3.5 Student Experience

We met with 15 students, drawn from across the centres, including masters and doctoral students and postdoctoral scholars. Two doctoral students were from other countries in Africa, and two postdoctoral scholars were from OECD countries. They were all very complimentary about their experiences in the centres. They reported that the research resources were very rich, in terms of instrumentation and other infrastructure. They appreciated the fact that whatever resources they needed for their work was available. Many reported having two or three supervisors, with larger dissertation committees that met regularly to support their research efforts. We could only wish that every South African graduate student had a similarly supportive environment.

A key resource was the funding for their stipends. They knew that these were more generous than the usual NRF bursary, and that some of their fellow graduate students had to work during the studies. They appreciated being able to devote themselves entirely to their research. The number of years of funding for doctoral students varied from centre to centre, but the students generally agreed that few could finish in three years. Four years of funding would be far more realistic.

One set of students was very concerned about their prospects for employment in academic or research jobs – the kind they were preparing for. They saw others in their fields stuck in multiple postdoctoral positions. They were not getting explicit career advice or preparation, and had virtually no opportunity to gain teaching experience, which they saw as important to their being competitive in the academic job market.

3.6 Balkanization of the Actions of Government Departments

All nine of the Centres are funded by the DST, the NRF and by the Department of Higher Education and Training (DHET). The contribution of the DHET will be in the form of large core funding through the subsidy system, infrastructure grants and research output grants. The Review Panel was concerned that there was no engagement with DHET in terms of its role in helping to shape the future of these centres.

Further, all nine of the Centres have some level of interface and intersection with other government departments either as funders, customers, advisees and so on.

At the moment there are no apparent conversations and linkages between government departments in terms of their relationships, connections, intersections or funding (or co-funding) of the activities of the Centres. There appears to be a lack of coordination and no attempts at synergistic funding.

3.7 Internationalisation of South African Research

The Centres of Excellence have done an exceptional job at building national networks of scholars allowing the construction of strong centres of science. This was one of the objectives of creating the Programme and this has been successful.

The Centres have also been very successful in developing international linkages at the individual level. There is good exchange of students and faculty members.

The Review Panel was concerned however, that there does not appear to be the development of bi-national and multinational research programmes that are strategic in nature and which are internationally co-funded. There are a few examples of this but this does not appear to be a strategic thrust. The Centres of Excellence do not see themselves as research bridges to the global enterprise of research. It would appear that there is an underutilization of the research potential of the Centres in addressing global challenges in areas such as health and environment.

3.8 Capacity Building Networks

While the building of networks has been seen as an important activity by the Centres of Excellence and they have been successful in creating these, the Review Panel was concerned that not enough progress was made in developing strategic network connections with the

historically-disadvantaged institutions as a way to develop the research capacity of these institutions in the relevant research areas.

The Review Panel was also concerned that there does not appear to be a deliberate attempt by the institutions in which the Centres are headquartered to use the Centres as a way to build local research capacity.

3.9 Metrics and Data

The collection of standard data on centres is a challenge that all centres programmes internationally have faced. NRF was able to provide some key output indicators for the COE programme, including numbers of students supported (with demographic and citizenship information) and numbers of publications. Individual centres sometimes provided a richer set of performance measures in their self-assessment reports, but these were not standard across the reports. Particularly useful among these were the numbers on complementary funding from the host universities and other sources and the length of time to degree for various students supported by the centre.

With nine centres already operating, seven more on the way, and hundreds if not thousands of staff members and students, the COE programme needs to take a more systematic approach to collecting data from the centres. While the programme itself should develop the list of key indicators, it should certainly collect some input indicators (including on faculty, staff, and various funding sources), activities (for example, students supported, presentations at professional meetings), outputs (students graduated, publications, patents, policy briefs, etc.), and impacts. The ASSAf exploration of impacts in the study referred to above, illustrated how diverse they are across centres, as well as how little information some centres provided in key areas because of lack of a standard format. The programme should develop an online system for centres to use to enter information so that it can be easily aggregated at programme level, and should certainly require the centres to enter data for the students they support into the NRF tracking system. The ASSAf report strongly recommends developing a system to track student career outcomes after graduation, and we fully concur.

In addition, we encountered claims about the performance of the centres in comparison with other funding instruments that could not be supported with the appropriate comparative data. An example is degree completion rate. We heard the assertion that completion rates were better in the centres, but not only is the data on this result not available for all the centres, but no data were forthcoming on completion rates outside the centres, including in other centres, under SARCHI Chairs, under research grants, or with standard bursaries. Likewise, publication numbers were not normalized by number of staff or students nor compared with national rates or rates associated with other funding instruments.

The Review Panel was also concerned that the current measurement system uses outputs as a way of determining performance levels. In terms of 3.4 above, there is a view that the system should be extended to include measures of impact.

3.10 Issues of Governance

In the engagement of the Review Panel with the NRF, DST and the Centres of Excellence a number of governance issues arose. The Panel notes that the Centres of Excellence should be seen as national assets and should be governed as such. The function of the Board should be to assure that the Centre is performing excellent research, providing excellent education for students, producing knowledge that is relevant to appropriate stakeholder groups, and communicating that knowledge both to users and the broader public. Because the Board has this stewardship function, it needs to be appropriately constituted.

3.10.1 The Chair of the Board of a Centre of Excellence

In terms of the way in which the NRF has established the governance models of the Centres of Excellence, the directors report to the deputy vice-chancellors for research. There are good reasons for this. For instance, if there is need for an impetus towards interdisciplinarity in the activities of the Centres then placing it under the leadership of one of the faculty deans would be a negative influence on this. Another point to support this is that the reporting line to the relevant deputy vice-chancellor would ensure that the Centre would be properly integrated into the institution.

The Review Panel is concerned however, that the Boards cannot (and should not) be chaired by the deputy vice-chancellors of the institutions in which the Centres are located. The latter are operating in a direct conflict of interest mode in addressing technical content issues as well as a wide range of other matters.

3.10.2 The Representation of DST and NRF on the Boards of the Centres

The Review Panel notes that both DST and NRF representatives are full, voting members of the Boards and this is deemed to be unsatisfactory.

Several inputs were received that the participation of the DST representatives was at best sporadic and this raised a number of issues, primary among them that there was often a lack of continuity in their engagement.

More seriously, concerns were also raised about the fact that the focus of DST and NRF representatives on these boards focused primarily on issues of transformation among faculty and students. While the Review Panel sees this issue as extremely important, it would make much more sense to ensure that this participation contributed to matters of science and innovation, good governance and so on.

3.10.3 Lack of Sustainability and Accountability Plans

Only one of the Centres indicated that it had thought about and conceptualised a sustainability plan. None of the centres indicated that they had developed accountability plans. The Review Panel perceives this to be a failure of governance, a responsibility that has to be borne by the Board, by the leadership of the Centres and by the NRF as the granting and managing agency.

The Review Panel is concerned that the governance issues of national research facilities ought to be beyond reproach.

3.11 The Leadership of the Centres of Excellence

During its discussions and deliberations, the Review Panel encountered questions about the relationship between the different funding programmes of the NRF. What is the relationship between the Centres of Excellence Programme and the South African Research Chair Initiative (SARChI), for instance? The Panel tried to understand how these programmes fitted with each other and to come to grips with the nature of the relationship between them. This brought the Panel to the point where it thought it important to focus on what it sees as an important issue: the Leadership of the Centres of Excellence.

While Centre-affiliated faculty may include a number of SARChI chairs, it should not be taken for granted that the directors of the Centres should be chairs. In fact the Panel is concerned that not much thought has been given to the qualities of leadership of these directors. The Panel is of the view that these directors ought to have the qualities of networker and administrator, be people sensitive, have the skills to engage with industry and user communities and to understand the challenges and opportunities of knowledge translation. Needless to say the directors have also to be high quality scientists, individuals who are able to set the research and innovation agendas. The Panel regards the issue of leadership as rather important issue and encourages the NRF to engage with the Boards of the Centres on this matter and consider the development of a set of guidelines.

3.12 NRF's Management of the Programme

The discussions that the Review Panel held with a large number of stakeholders indicated that broadly speaking there are deep concerns about the management of the Programme by the NRF. The main concerns raised by the leadership of the Centres and the leadership of the universities in which the Centres are based are twofold: inordinate delays in important communications and fragmentation of the administrative systems.

The appointment of the new Programme Director by the NRF is strongly applauded and there is great optimism that this will help the situation immediately.

The Panel perceives a lack of scientific engagement and programmatic leadership on the part of the NRF. One example of this is the decision of DST/NRF to extend the funding of the existing Centres for a third 5-year period without external review of the science content,

plus the disjuncture between this decision and the assembling of the Review Panel in March 2013.

The Review Panel is concerned that the NRF's management information system may not provide the data and the analytical support required for the effective management of and future planning for the Programme.

3.13 Awareness of Centre of Excellence Programme

At its meetings the Review Panel became concerned about the fact that there wasn't sufficient knowledge about the Programme except in the narrow constituency in which the Centres operate.

The awareness of the Programme in the public space appears to be very limited. There does not appear to be any communication strategy with the public on the importance of the Centres to the national wellbeing.

The place of the Programme in the NSI is not well known. This is important to ensure that the articulation of the Programme with the other institutions in the NSI is more systematic.

There does not appear to be communication internationally in all the centres, although some have excellent connections.

Perhaps most importantly, there isn't any indication of an ongoing engagement with parliamentarians, policymakers, members of the Cabinet and so on. These are vitally important.

4. RECOMMENDATIONS OF THE REVIEW PANEL

4.1 Funding Extensions

The Review Panel recommends that

- a. New Centres receive funding for a maximum period of 2 terms of five years each
- b. For Existing Centres:
 - Funding should be terminated at the end of the 15-year period.
 - Immediate steps should be taken to develop transition plans.
 - International best practice of trajectories adopted by centres of excellence that have come to the end of their funding should be systematically studied.

4.2 Identity of Centres of Excellence and the Programme

The Review Panel recommends that

- a. The NRF should define the key characteristics of these Centres and especially how they differ from numerous university established centres. What is it that makes them national centres of excellence?
- b. This is related to their
 - Purpose
 - Place in the NSI
 - Orientation with respect to the NDP and national grand challenges

4.3 The Orientation of the Centres of Excellence

The Review Team recommends that

- a. Centres of Excellence be strongly aligned with the NDP and national grand challenges. For example, consideration should be given to the establishment of a Centre of Excellence in Mining, in Food Security, and so on.
- b. There be detailed discussions between the NRF/DST and the National Development Commission, the other science councils, policymakers and other government departments about the themes of any new centres that may come into being.
- c. The Centres should be strongly interdisciplinary with social sciences woven in.
- d. Serious consideration should be given to the establishment of a number of social science Centres of Excellence to address the enormity of the social issues faced by South Africa.
- e. The Centres must remain strongly inter-institutional, and they must build networks that are sustainable. Longstanding and strong networks should be a lasting legacy of their existence. Appropriate research schemes and institutional arrangements should be created to sustain research and excellence capacities already developed in Centres of Excellence.
- f. The Centres must deliberately build networks with historically disadvantaged institutions to the building of capacity and inclusivity in South Africa's research base.

And the Centres must move towards an impacts paradigm rather than an outputs approach.

4.4 Student Experience

Taking into account our engagement with the students the Review Panel recommends the actions be taken to

- a. Increase support for doctoral students from three to four years as a standard.
- b. Build career advice and preparation into the programmes, including both academic and non-academic career pathways.

4.5 The Knowledge Project

The Review Panel recommends that

- a. The knowledge project of the Centres of Excellence must encompass the full spectrum of research and innovation (together with teaching and training). These are not separable entities in the context of a national system of innovation. By innovation we refer to industrial, institutional, organisational and social innovation. This should become a focus of attention as the Centres mature in their research function.
- b. Consideration should be given to the creation of intermediary functions/institutions at Centres to facilitate this at the institutional locus of the Centres. An example of this is the Strategic Health Innovation Partnership (SHIP)—an intermediary established by the MRC.

4.6 Governmental Synergy

The Review Panel is deeply concerned by what appears to be the balkanization of government's interactions with the Centres of Excellence, as with the science system generally. This has important consequences for the way in which the Centres of Excellence are perceived by policymakers and perhaps more importantly, for the long-term sustainability of the Centres.

The Review Panel therefore recommends

- a. The NRF should play a key role in developing regular formal discussions concerning planning and implementation of new programmes, as well as monitoring existing programmes between itself, DST, DHET and other government departments that intersect with the Centres such as the Department of Health, DTI, Department of Water Affairs, Department of Environmental Affairs, etc. Balkanization must be prevented.
- b. This engagement should also focus in on the ways in which government departments pay for services that they receive from the Centres.

4.7 Internationalising South African Research

Notwithstanding evidence of extensive international collaborations and linkages that some of the Centres have provided, in the opinion of the Review Panel the scope and extent of this internationalisation has by no means reached desirable levels. Centres of Excellence in other international contexts have established strategic research programmes with centres in other countries.

The Review Panel therefore recommends that

- a. The Centres must enter and initiate research programmes that are international in scope to enhance South African science, broaden the funding base, increase the mobility of researchers and so on.
- b. The Centres consider using bi-national and multinational agreements as a platform for these.
- c. The Centres deliberately adopt strategies that will extend its international activities beyond collaboration between individuals and to focus their attention on building strategic programmes of research with international partners.

4.8 Networks For Building Capacity

One of the defining characteristics of the 1995 science and technology policy development process was the driving impetus to correct the race and gender imbalances of the science system. This is one of the core mandates of the NRF as well. While progress has been made in addressing these issues, much has still to be done.

The Centres of Excellence are all located within academic institutions and there was a strong view within the Review Panel that these institutions must draw on the Centres to build research capacity, research management, and so on.

The Review Panel recommends that

- a. The Centres must proactively build relationships and connections with HDIs so as to broaden the research and innovation base of South Africa.
- b. Academic institutions must work proactively to change the research culture using the Centres as models. This includes the management of research at those institutions.

4.9 Management Information

The Review Panel makes the following recommendations:

- a. The NRF must establish a management information system that gathers comparative data and allows it to provide strategic programmatic leadership and management. This should involve all of the NRF's funding programmes as well as national baselines
- b. The NRF should develop an online system for centres to use to enter information so that it can be easily aggregated at program level.
- c. The NRF should require the centres to enter data for the students they support into the NRF tracking system.

- d. The NRF should develop a system to track student career outcomes after graduation.

4.10 Governance Issues

The Centres of Excellence are important science institutions in the national system and it is important to ensure that their governance systems are properly constituted and effective. Three points need to be kept in mind. These are publicly funded research centres and so their Boards must bear their fiduciary responsibility including long-term plans for their research agendas. The Boards must also act as a resource to connect the Centres with relevant social, economic and industrial stakeholders.

The Review Panel recommends strongly that the boards (and the NRF) establish a number of assessment facilities to quality assure the Centres are performing excellent research, providing high quality education for students, producing knowledge that is relevant to appropriate stakeholder groups, and communicating that knowledge both to users and the broader public. Because the Board has this stewardship function, it needs to be appropriately constituted.

They should be constituted in such a way that this role can be played.

- a. Transition and accountability plans should be developed as a matter of good governance and good practice.
- b. The DST should designate the NRF as its representative on the CoE Programme.
- c. The NRF representative on the Board should hold observer status.
- d. The Boards should be chaired by an independent external expert and NOT the relevant Research DVC.

4.11 Leadership Of Centres Of Excellence

The leadership of a Centre is critically important to its success. The Centres are complex research and innovation bodies that play a variety of roles including their effective participation in the social and/or economic sector(s) in which they exist.

The Review Panel therefore recommends that in making the appointment of director, care be taken to ensure that in addition to being an outstanding researcher/scientist, the Director has the knowledge, experience and passion to

- a. Undertake the setting of the research and innovation agenda of the Centre.

- b. Play the role of networker.
- c. Be people sensitive.
- d. Engage the NSI in terms of the place of the Centre in it.
- e. Lead Industrial/user engagement to ensure that there are channels of connection between the Centres and their 'markets'. This includes engagement with the NDP and other national grand challenge projects.
- f. Lead the Centres engagement with industry/government/other users about the knowledge translation project—to act positively to address the innovation chasm project.
- g. Be efficient and effective as an administrator.

4.12 Awareness Of Centres Of Excellence

The Review Panel recommends that the NRF and the Centres of Excellence work together to develop a strategy to address an awareness deficit and to consider this on four levels:

- a. Public awareness of the Centres and the science that they do.
- b. Integration of the Centres into NSI so that they are seen by the science councils, universities, government laboratories and others as important elements of a national system.
- c. The development of an ongoing and vibrant/exciting communication strategy with the public, within the scientific community and internationally.
- d. The development of a regular engagement with parliamentarians, public policymakers and cabinet.

APPENDIX 1

TERMS OF REFERENCE

SECOND REVIEW OF THE DST/NRF CENTRE OF EXCELLENCE (CoE) PROGRAMME

1. Assignment title

Second review of the DST/NRF (Department of Science and Technology/National Research Foundation) Centre of Excellence (CoE) Programme.

2. Background

Centres of Excellence (CoEs) are physical or virtual centres of research which concentrate existing capacity and resources to enable researchers to collaborate across disciplines on long-term projects that are locally relevant and internationally competitive in order to enhance the pursuit of research excellence and capacity development. The DST/NRF CoEs Programme and the individual CoEs are sponsored by DST and the operational management of the Programme is managed by the NRF.

The following seven CoEs were the first cohort of Centres established in 2004/2005 and will form part of the second Programme review:

- DST/NRF CoE for **Biomedical TB Research** to research new tools for the diagnosis, treatment and prevention of tuberculosis (established in September 2004 with nodes at Stellenbosch University and the University of the Witwatersrand, and the University of Cape Town added as a third node in 2011).
Director: Prof Paul van Helden, Stellenbosch University.
- DST/NRF CoE in **Birds as Keys to Biodiversity Conservation** to focus on understanding and maintaining biodiversity using birds as indicators (established in September 2004).
Director: Prof Phil Hockey, University of Cape Town.
- DST/NRF CoE for **Invasion Biology** to address the biodiversity consequences of biological invasions (established in August 2004).
Director: Prof Dave Richardson, Stellenbosch University.
- DST/NRF CoE in **Tree Health Biotechnology** to concentrate on understanding and combating diseases affecting South Africa's indigenous trees (established in September 2004).
Director: Prof Mike Wingfield, University of Pretoria.
- DST/NRF CoE in **Catalysis** to drive innovation in catalysis, a key process in the chemical and manufacturing sector (established in September 2004).
Director: Prof Michael Claeys, University of Cape Town.
- DST/NRF CoE in **Strong Materials** to seek to understand and improve the properties of advanced strong materials to increase their efficiency and reduce their cost (established in September 2004).
Director: Prof Lesley Cornish, University of the Witwatersrand.

- DST/NRF CoE in **Epidemiological Modelling and Analysis** to use mathematics to understand, predict and ultimately combat diseases (designated by DST and established in March 2006).
Director: Dr Alex Welte, Stellenbosch University.

In terms of the agreement with the DST, reviews of the performance of the CoE Programme are to be scheduled at regular intervals. The first review took place in 2009, including in-depth reviews of the individual CoEs. The second review to take place in 2013 will focus on the CoE Programme as a whole including a bird's-eye view of the individual CoEs.

3. Assignment Principal and Review Reference Group (RRG)

The Assignment Principal is the NRF represented by the Deputy CEO: Research & Innovation Support & Advancement. The RRG comprises the Deputy CEO of the NRF and five members appointed by the Deputy CEO.

The role of the RRG will be to:

- amend and approve the terms of reference;
- recommend the budget;
- approve the members of the international review panel;
- approve the review plan and time frame for the review process;
- consider and suggest suitable interviewees for the review panel;
- meet under the direction of the Chair of the Review Reference Group, as required;
- accept the draft and final report by the review panel;
- accept the response of the management of the CoE Programme to the report; and
- ensure that the review report addressed the ToR.

4. Service provider

The Monitoring and Evaluation (M&E) Unit of the NRF will act as the service provider to manage the review process. The responsibilities of M&E will be to:

- develop the terms of reference for the review;
- prepare the letters of invitation for the approved members of the review panel for the Assignment Principal's signature and distribution;
- develop a programme for the review, including a budget;
- coordinate and manage the entire review process, including logistics;
- provide support to the review panel;
- source the necessary documents stipulated in the Appendix with the help of the staff of the DST/NRF CoE Programme and make them available to the review panel six weeks prior to the commencement of the review in South Africa;
- receive the draft and final report by the review panel and submit them to the Assignment Principal for further action;
- forward the draft and final report by the review panel to the RRG for acceptance;
- place the final review report on the NRF website within one month of the acceptance of the review report by NRF management.

5. Purpose of the review

The purpose of the review will be twofold, i.e., firstly, to assess the:

- overall performance of the CoE Programme from 30 June 2008 to 31 December 2012;
- management of the DST/NRF CoE Programme from 2008 to 31 December 2012;
- commitment of the relevant university/universities to host the CoEs for the next five years;

and, secondly, to make recommendations to enhance the:

- CoE Programme; and
- funding model to ensure sustainability of the CoE Programme and the individual DST/NRF CoEs.

6. Scope of the review

The focus of the review will be a summative retrospective view of the DST/NRF CoE Programme with a bird's-eye view of the seven DST/NRF CoEs covering the period 30 June 2008 to 31 December 2012.

The prospective view will cover recommendations to enhance the Programme and the prospects of the Programme as well as the individual CoEs to achieve sustainability.

7. Review dimensions

The panel is requested to assess the

7.1 performance of the CoE Programme in terms of its objectives, i.e., to:

- exploit the competitive advantage vested in outstanding researchers;
- reward, retain, sustain and improve scientific excellence;
- integrate smaller and related research initiatives into one programme;
- achieve economies of scale through the optimization of resources and effort by sharing personnel, equipment, data and ideas;
- provide secure and stable funds for research and knowledge dissemination;
- support planned, strategic, long-term research;
- reduce micro-management of academics and their resources by the funding agency;
- develop human capacity; and
- expand the national research base.

7.2 performance of the NRF in

- implementing and managing the DST/NRF CoE Programme to date;
- providing administrative and other logistical support for CoE Programme operations;

7.3 extent to which the recommendations of the 2009 review have been implemented;

7.4 future plans of the CoE Programme;

7.5 overall performance of the seven DST/NRF CoEs in terms of their mandates clustered around the key performance areas (KPA) given below:

7.5.1 Research

The work should be focused on the creation and development of new knowledge and/or technology.

7.5.2 Education and training

Human resource development is to be done through masters and doctoral programmes, post-doctoral support, internship programmes, support for students to study abroad, joint ventures in student training, etc. In creating, broadening and deepening research capacity, a CoE needs to pay particular attention to racial and gender disparities.

7.5.3 Information brokerage

CoEs are to provide access to a highly developed pool of knowledge, maintaining data bases, promoting knowledge sharing and knowledge transfer, etc.

7.5.4 Networking

A CoE is expected to actively collaborate with reputable individuals, groups and institutions. Equally it must negotiate and help realise national, regional, continental and international partnerships, etc.

7.5.5 Service rendering

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

7.5.6 Management of CoEs in terms of:

- leadership;
- staffing;
- commitment of institution/s hosting the CoE;
- location of the CoE;
- funding; and
- strategic positioning of the CoE and future plans.

8. Review structure and process

8.1 A panel consisting of five members (i.e., three from abroad and two from South Africa) with appropriate experience of innovation systems and knowledge of the broad disciplines will be appointed for the review.

8.2 The panel will base its review on the self-evaluation reports of the CoE Programme and individual CoEs as well as interviews with a selection of critical stakeholders.

8.3 The resource documents for the review listed in the Annexure will be made available to the panel well in advance of the commencement of the review.

8.4 The service provider will draw up a programme for the review in consultation with the Assignment Principal and the management of the DST/NRF CoE Programme. The panel will have the opportunity to interrogate the proposed programme and to recommend amendments and additions should the need arise.

8.5 The panel will have the opportunity to interview a selection of relevant stakeholders, staff of the CoE Programme, and Directors of the individual CoEs (including selected CoE Board members and students).

- 8.6 The logistical arrangements for the reviewers will be made by the service provider. All arrangements for the on-site programme, including the logistical arrangements for the interviewees invited to interact with the reviewers, will be made by the service provider in conjunction with the relevant CoE.
- 8.7 The review panel will decide on and pursue its own line of questioning during interviews.

9. Deliverables by:

9.1 CoE Programme

9.1.1 Self-evaluation report by the CoE Programme for transmission to the review panel at least eight weeks prior to the commencement of the review programme in South Africa. The report should address the terms of reference and should cover the period from 30 June 2008 to 31 December 2012 and should not exceed 40 pages with annexures.

9.1.2 Documents listed on the Annexure to the terms of reference for the review which are not in the public domain are to be supplied to the Service Provider for onward transmission to the review panel seven weeks in advance of the commencement of the programme in South Africa.

9.1.3 A written response to the final review report. This will also be placed on the NRF website.

9.2 Directors of CoEs

9.2.1 Self-evaluation reports compiled by the individual CoEs for transmission to the review panel at least eight weeks prior to the commencement of the review programme in South Africa. The reports should address the KPAs (see Item 7.5 above) and should cover the period from 30 June 2008 to 31 December 2012 and should not exceed 40 pages with annexures. Details of the requirements for the reports will be provided by the Service Provider.

9.2.2 List of stakeholders

Appointments/discussions with stakeholders will be arranged for the review panel to facilitate its task. CoEs will therefore be requested to supply the names of suggested stakeholders. It would be helpful, if the names could be clustered under the headings research, education and training, information brokerage, networking, service rendering and management (cf. Item 7.5 of the ToR) and if the critically important stakeholders are highlighted or appear in bold.

9.2.3 Concise information on the funds received by the CoE from national (including all sources in the NRF) and international sources per year for the period under review.

9.2.4 List of documents considered to be essential reading for the review panel and other documentation which should be accessible to reviewers during the review.

9.2.5 Names, affiliations and contact details of possible reviewers for consideration.

9.3 Review panel

9.3.1 Verbal feedback to the Assignment Principal, Directors of CoEs, members of the Review Reference Group as well as representatives of DST and NRF;

9.3.2 Draft report on completion of the stakeholder interviews; and

9.3.3 Final report within two weeks of completion of the stakeholder interviews.

The report should include:

- an executive summary;
- background to the review;
- evaluation questions that were addressed;
- key findings;

- recommendations;
- conclusions; and
- appendices containing, e.g., terms of reference, persons interviewed, etc..

10. Time frame

Preparations for the review will commence in 2012 but the programme involving the reviewers will take place during the first quarter of 2013 depending on the availability of suitable reviewers.

11. Budget

The service provider will submit a budget for the review to the management of the DST/NRF CoE Programme for approval and payment.

DOCUMENTS FOR THE REVIEW PANELS

ESSENTIAL READING

General

- Memorandum of agreement entered into between the Department of Science and Technology and the National Research Foundation, 2004.
- Guide to funding of Centres of Excellence, February 2004.
- Handbook to assist with the operation of a Centre of Excellence, April 2004.
- The NRF Framework for Centres of Excellence in the South African System of Research and Innovation, May 2003.
- Introducing South Africa's Centres of Excellence – Taking the lead in cutting-edge research.
- Seven review reports on individual DST/NRF Centres of Excellence, 2009.
- Seven responses by management of DST/NRF CoEs to review reports.
- Strategic Plan of the NRF – *NRF Vision 2015*.
- Report on the review of the South African Research Chairs Initiative, 2012
- Department of Science and Technology Ministerial Review Committee on the Science, Technology and Innovation Landscape in South Africa, March 2012

Documents specific to individual Centres of Excellence

DST/NRF CoE for Biomedical TB Research

- Self-evaluation report

DST/NRF CoE in Birds as Keys to Biodiversity Conservation

- Self-evaluation report

DST/NRF CoE for Invasion Biology

- Self-evaluation report
- Department of Science & Technology Strategic Plan for the Fiscal Years 2011-2016
- An assessment of South Africa's biodiversity and ecosystems. Synthesis report, South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria by Driver, A, Sink, KJ, Nel, NJ, Holness, S, Van Niekerk, L, Daniels, F, Jonas, Z, Majiedt, PA, Harris L & Maze, K. 2012

DST/NRF CoE in Tree Health Biotechnology

- Self-evaluation report
- Activities Review

DST/NRF CoE in Catalysis

- Self-evaluation report
- A National Advanced Manufacturing Technology Strategy for South Africa

DST/NRF CoE in Strong Materials

- Self-evaluation report
- Letter of commitment
- The National Nanotechnology Strategy

DST/NRF CoE in Epidemiological Modelling and Analysis

- Self-evaluation report

ADDITIONAL READING

General

- National Development Plan 2030
- Report of the Advisory Panel of the Academy of Science of South Africa on the Research and Impact of the Centres of Excellence
- Annual Report of the DST-NRF Centres of Excellence 2011/12
- White Paper on Science and Technology
- South Africa's National Research and Development Strategy
- OECD report on the National System of Innovation in South Africa
- Ten-year Innovation Plan of the Department of Science and Technology
- Human Capital and the South African Knowledgebase

END

APPENDIX 2

PROGRAMME **REVIEW OF THE DST/NRF CENTRES OF EXCELLENCE PROGRAMME**

REVIEW PANEL MEMBERS:

- Prof Howard Alper, University of Ottawa and Govt of Canada's Science, Technology and Innovation Council, Canada
 - Prof Ahmed Bawa (convenor), Vice-Chancellor and Principal, Durban University of Technology, South Africa
 - Prof Susan Cozzens, Vice Provost: Graduate Education, Georgia Institute of Technology, USA
 - Prof Venni Krishna, Professor in Science Policy and Chairperson, Centre for Studies in Science Policy, Jawaharlal Nehru University, India
 - Prof Dave R Woods, Chair: SANTRUST, Cape Town
-

Sunday, 10 March 2013

arrival of reviewers in Pretoria

18:00 – 20:00 Informal get-together of reviewers including Ms Anke Rädcl, Professional Officer: Monitoring and Evaluation (M&E), NRF

Accommodation: The Cornerstone Guest Lodge, Camellia Avenue, Lynnwood Ridge,

tel. +27 12 361-8100, fax +27 12 348-4792 or 086 5116621, mobile +27 82 5712110, mail info@cornerstonelodge.co.za; <http://www.cornerstonelodge.co.za/>

Monday, 11 March 2013

Venue for the day: Nelson Mandela Board Room, NRF, Meiring Naudé Road, Brummeria, Pretoria

09:00 – 10:30 **Welcome and briefing of reviewers by Assignment Principal**

Dr Gansen Pillay, Deputy CEO: Research and Innovation Support and Advancement, NRF

Also present:

Ms Joyce Olivier, Manager: M&E, NRF

Ms Anke Rädcl
Dr Daisy Selematsela, Executive Director: Knowledge
Management and Evaluation, NRF
Ms Makhupu Selepe, Professional Officer: M&E, NRF

- 10:30 – 11:00 tea/coffee
- 11:00 – 11:30 Discussion of programme/arrangements with members of
staff of the NRF M&E unit
- 11:30 – 12:30 session for panel members to prepare their strategy and to
allocate tasks among themselves
- 12:30 – 13:30 lunch
- 13:30 – 14:15 **representatives of Department of Science and
Technology**
Dr Thomas Auf der Heyde, Deputy Director-General: Human
Capital and Knowledge Systems
Dr Phethiwe Matutu, Chief Director: Human Capital and
Science Platforms (also member of Review Reference Group)
- 15:00 – 15:30 tea/coffee
- 15:30 – 16:15 **sample of members of National Planning Commission**
Dr Miriam Altman, Human Sciences Research Council

Accommodation: The Cornerstone Guest Lodge, Pretoria

Tuesday, 12 March 2013

Venue for the day: Nelson Mandela Board Room, NRF

- 08:30 – 09:15 **NRF staff dealing with CoEs**
Dr Andrew Kaniki NRF Executive Director: Knowledge Fields
Development
Dr Bernard Nthambeleni, NRF Executive Director: Grants
Management Systems Administration (GMSA)
Dr Nthabiseng Taole, NRF Programme Director: Centres of
Excellence
Ms Ayanda Zondi, Grant Coordinator, GMSA: South African
Research Chairs Initiative and CoEs
- 09:15 – 10:00 **sample of CoEs Board members in Gauteng**
Dr Tracy Bromfield, SASOL Technologies (Pty) Ltd (CoE
Catalysis)
Dr N Cingo, UP/CSIR (CoE Strong Materials)
Prof M Hale, National Health Laboratory Services (NHLS)
(CoE Biomedical TB Research)
Prof Anton Ströh, UP (CoE Tree Health)

- 10:00 – 10:30 tea/coffee
- 10:30 – 11:15 **sample of representatives of CoE funders other than DST**
 Dr Papo Jones, Mintek (CoE Strong Materials)
 Dr Paul Motalane, CSIR/National Laser Centre (CoE Strong Materials)
 Mr Michael Peter, Forestry South Africa (CoE Tree Health)
- 11:15 – 12:15 **Directors of CoEs (Gauteng)**
 Prof Lesley Cornish (CoE in Strong Materials)
 Prof Bernard Slippers and
 Prof Emma Steenkamp obo Prof Mike Wingfield (CoE in Tree Health Biotechnology)
- 12:15 – 13:00 **Deputy Vice-Chancellors of universities hosting CoEs (Gauteng)**
 Prof Stephanie Burton, UP
 Prof Helen Laburn, University of the Witwatersrand (UW)
- 13:00 – 14:00 lunch
- 14:00 – 15:00 **sample of Representatives of CoEs stakeholders**
 Mr Mark Anderson, BirdLife SA (CoE Birds)
 Mr Andre Botha, Endangered Wildlife Trust (CoE Birds)
 Prof Nazir Ismail, NHLS (CoE TB Research) [also funder]
 Dr Andrew McKechnie, UP (CoE Birds)
 Dr Serdar Ozbayraktar, Element 6 (CoE Strong Materials)
- 14:00 – 15:00 Parallel session: **Sample of postgraduate students of CoEs**
 Venue for this slot: *Max Theiler Room, NRF*
 Miss Emily Aradi, UW (PhD) (CoE Strong Materials)
 Mr Wilson Mogodi, UW (MSc) (CoE Strong Materials)
 Ms Kershney Naidoo, UP (PhD) (CoE Trees)
 Ms Duduzile Ndwandwe, UW (PhD) (CoE Biomedical TB Research)
 Ms Mmatshapho Phasha, UP (PhD) (CoE Trees)
 Ms Maxine Whitfield, UP (MSc) (CoE Birds)
 Dr Tsungai Zengeya, ex UP now CSIR, (PhD) (CoE Invasion Biology)
- 15:00 – 15:30 tea/coffee
- 17:45 – 19:55 flight SA 0359 Johannesburg/Cape Town

Accommodation: Roodenburg House, 74 Campground Road, 7700 Rondebosch, Cape Town, tel. +27 21 685 2933 mobile: +27 82 531 4068, e-mail: info@roodenburghouse.co.za, <http://www.roodenburghouse.co.za/>

Wednesday, 13 March 2013

Venue for the day: Board Room, Dept of Chemical Engineering, UCT

- 09:00 – 10:00 **Directors of CoEs (Cape Town)**
Prof Michael Claeys (CoE in Catalysis)
Dr Rob Little, Manager and
Prof Peter Ryan, Acting Director (CoE in Birds as Keys to Biodiversity Conservation)
- 10:00 – 10:45 **sample of Board members (Western Cape)**
Mr Mike Edwards, Ex Forestry SA (CoE Tree Health)
Mr Ahmed Khan, Dept of Environmental Affairs (CoE Invasion Biology)
Dr Masikana Mdeleleni, PetroSA (Pty) Ltd (CoE Catalysis)
Prof Francis Petersen, UCT (CoE Catalysis)
- 10:45 – 11:00 tea/coffee
- 11:00 – 12:00 **Directors of CoEs (Stellenbosch)**
Prof Dave Richardson (CoE for Invasion Biology)
Prof Paul van Helden (CoE for Biomedical TB Research)
Prof Alex Welte (CoE in Epidemiological Modelling and Analysis)
- 12:00 – 12:45 **Deputy Vice-Chancellors of universities hosting CoEs (Western Cape)**
Prof Eugene Cloete, Vice-Rector (Research and Innovation), Stellenbosch University (SU)
Prof Danie Visser, UCT
- 13:00 – 14:00 lunch with **sample of reviewers of South African Research Chairs Initiative**
Prof Krish Bharuth-Ram
- 14:00 – 15:00 **sample of representatives of CoEs stakeholders**
Prof Barry Green, African Institute of Mathematical Sciences (CoE SACEMA)
Prof SA Karim, Medical Research Council (CoE TB Research) [also funder]
Dr Makhapa Makhafola, General Manager: R&D, Mintek (CoE Strong Materials)
Mr Stephen Roberts, UCT (CoE Catalysis)
Mrs Rene Toerien, UCT (CoE Catalysis)
Dr Wessel Vermeulen, SANPARKS (CoE Tree Health) (by teleconference at 044-3025614)

14:00 – 15:00 Parallel session: **Sample of postgraduate students of CoEs**
Venue for this slot: *Tanzanite Room, Dept of Chemical Engineering, UCT*

Ms Faikah Bruce, SU (masters) (CoE Epidemiological Modelling and Analysis)
Dr Susie Cunningham, UCT (postdoc) (CoE Birds)
Mr Owen Davies, UCT (PhD) (CoE Birds)
Ms Tanya Haupt, SU (doctoral) (CoE Invasion Biology)
Dr Robert Henkel, UCT (postdoc) (CoE Catalysis)
Dr Aticsa Moosa, UCT (postdoc) (CoE Biomedical TB Research)
Ms Caroline Pule, SU (MSc) (CoE Biomedical TB Research)

15:00 – 15:15 tea/coffee

15:15 – 16:00 **sample of representatives of funders other than DST (Western Cape)**
Dr Richard Gordon, Technology Innovation Agency (CoE TB Research) [also stakeholder rep]
Dr Guy Preston, Dept of Environmental Affairs (CoE Invasion Biology)

16:00 reviewers (excl. Prof Woods) to drive with Prof Bawa to Cape Town airport

17:55 – 19:55 flight SA 0362 Cape Town/Johannesburg

Accommodation: City Lodge, Cnr. Lynnwood and Daventry Roads, Lynnwood Ridge, Pretoria, tel. +27 12 471 0300, e-mail cllynnwood.resv@citylodge.co.za

Thursday, 14 March 2013

Venue for the day: Room 114, NRF

09:00 Report-writing

13:00 – 14:00 lunch

Accommodation: City Lodge, Pretoria

Friday, 15 March 2013

Venue for finalisation of report: Nelson Mandela Board Room, NRF

08:30 – 13:00 finalisation of report

13:00 – 14:00 lunch

Venue for feedback: NRF Auditorium

14:00 – 15:00 Verbal feedback by panel members to representatives of DST, NRF, Review Reference Group, Directors of CoEs and other interested parties

Venue for debriefing session: Nelson Mandela Board Room, NRF

15:00 – 16:00 Debriefing session by panel members to Assignment Principal (incl. tea/coffee) Dr Gansen Pillay
Dr Daisy Selematsela

Accommodation: City Lodge, Pretoria (Profs Alper, Cozzens and Krishna)

APPENDIX 3

SHORT BIOS OF THE MEMBERS OF THE REVIEW PANEL

HOWARD ALPER

Howard Alper is currently Chair of the Government of Canada's Science, Technology, and Innovation Council (STIC), and Distinguished University Professor at the University of Ottawa. The basic research Alper has been pursuing spans organic and inorganic chemistry, with potential applications in the pharmaceutical, petrochemical, and commodity chemical industries.

He has discovered new reactions using homogeneous, phase transfer, and heterogeneous catalysis (e.g. clays, dendrimers). He has also used chiral ligands in metal catalyzed cycloaddition and carbonylation reactions, and succeeded in preparing valuable products in pharmacologically active form. He has published 537 papers, has thirty-seven patents, and has edited several books.

Alper has received a number of prestigious Fellowships including the E.W.R. Steacie (Natural Sciences and Engineering Research Council, 1980-82), Guggenheim (1985-86), and Killam (1986-88) Fellowships. Major awards to Alper include the Alcan Award for Inorganic Chemistry (1986), Bader Award for Organic Chemistry (1990), Steacie Award for Chemistry (1993), all of the Canadian Society for Chemistry. The Chemical Institute of Canada has presented Alper with the Catalysis Award (1984), the Montreal Medal (2003), and the CIC Medal (1997), its highest honour. He also received the Urgel-Archambault Prize (ACFAS) in physical sciences and engineering.

In 2000, the Governor General of Canada presented him with the first Gerhard Herzberg Canada Gold Medal in Science and Engineering. The following year, he was given the National Merit Award for contributions to the Life Sciences. In 2002, he received the Le Sueur Memorial Award of the Society of Chemical Industry (U.K.). In 2004, he was made an Honorary Fellow of the Chemical Research Society of India, in 2006, an Honorary Fellow of the Chemical Institute of Canada, and in early 2013, will be recognized as an Honorary Foreign Member of the Chemical Society of Japan. He was also elected as a Honorary Member of the Colombian Academy of Sciences in 2011, and of the Mexican Academy of Sciences in 2009.

He has served on a number of NSERC committees (e.g. Committee on Research Grants), and as Chair of Boards and Committees including, amongst others, the Partnership Group for Science and Engineering (PAGSE), Council of Canadian Academies, Canadian Research Knowledge Network, and the Steacie Institute of Molecular Sciences. He was also Visiting Executive at the International Development Research Centre during 2006-2010.

Alper was appointed in 1996 as a Titular Member of the European Academy of Arts, Sciences, and Humanities, and in 2003 as a member of TWAS-the Academy of Sciences for the Developing World. He was appointed as an Officer of the Order of Canada in 1999, and in 2002 he received the award of Officer, National Order of Merit, by the President of the Republic of France. In 2012, he received the Queen Elizabeth Diamond Jubilee Medal. He was named President of the Royal Society of Canada for a two-year term commencing November 2001, and was its Foreign Secretary from 2004-2010.. In 2004, he was elected to a three-year term as Co-Chair of the InterAmerican Network of Academies of Science (IANAS). In December 2006, he was elected Co-Chair of IAP: The Global Network of Science Academies, for a three-year term, and in January, 2010, was re-elected to a second three year term as Co-Chair. In 2010, he was also appointed for a three year term to the U.S. National Science Foundation Advisory Committee for International Science and Engineering, to the Science Advisory Committee of the World Economic Forum, to the Board of the African Institute of Mathematical Sciences-Next Einstein Initiative, to the Advisory Board of the Young Global Academy, and as Vice-Chair of the RIKEN Advisory Council. In 2011, he was elected as Chair of the International Advisory Board of the Knowledge Economy Network headquartered in Brussels. In 2007, he was appointed Chair of the Government of Canada's Science, Technology and Innovation Council(STIC) which provides advice to Cabinet and the Prime Minister on science, technology and innovation issues, and the Council also issues a State of the Nation reports every two years benchmarking Canada's performance on a global basis. The inaugural report was released in May, 2009, and the second report appeared in June, 2011. In December, 2012, the Government of Canada reappointed him to a third term as Chair of the STIC.

He is passionate about Canada, research and chocolate.

Ahmed Bawa

Ahmed Bawa is a theoretical physicist and currently holds the position of Vice-Chancellor and Principal of Durban University of Technology.

Until August 2010 he was a faculty member at the Department of Physics and Astronomy, Hunter College and a member of the doctoral faculty, The Graduate Center – both in the City University of New York. He has previously, for about nine years, held the position of Deputy Vice-Chancellor at the University of Natal and then at the University of KwaZulu-Natal. He has served as the Program Officer for Higher Education in Africa with the Ford Foundation and during this time led and coordinated the Foundation's African Higher Education Initiative. During this time he worked closely with the Association of African Universities, the Council for the Development of Social Research in Africa and so on.

Ahmed Bawa holds a Ph.D. in Theoretical Physics from the University of Durham, in the UK. He has published in the areas of high energy physics, nuclear physics, science education and to some extent in the area of science and society.

He served on a number of policy development teams in the post-1994 period in the areas of Science and Technology and Higher Education and was an inaugural member of the National Advisory Council on Innovation till 2002. He is Fellow of the Royal Society of South Africa as well as the Academy of Science of South Africa of which he was one of the inaugural vice-presidents and is currently a Council member. He also served as Chair of the Board of the Foundation for Research Development and later served on the Board of the National Research Foundation and was Vice-Chair of the board the Atomic Energy Corporation. He also served on the boards of Telkom and Sanlam. He serves on several international advisory boards.

Since January 2012 he has chaired Higher Education South Africa (HESA).

Susan E Cozzens

Susan E. Cozzens is Vice Provost for Graduate Education and Faculty Affairs at the Georgia Institute of Technology in Atlanta, Georgia, and a professor in the School of Public Policy. She has been active in science and innovation policy for over 25 years. She served the U.S. National Science Foundation as a policy analyst and later Director of the Office of Policy Support and member of the senior leadership team. She has consulted widely within the United States and around the world on science and innovation policy issues. She is past editor of Research Evaluation and Science, Technology, & Human Values, and senior consulting editor for Science and Public Policy. She has published over fifty articles and book chapters and authored or edited five books. Her current research is on innovation for inclusive development, with a focus on science and innovation policies in developing countries.

V V Krishna

Dr. V.V. Krishna is a Professor in Science Policy Centre for Studies in Science Policy, School of Social Sciences, Jawaharlal Nehru University (JNU), New Delhi. He was a Visiting Professor at IRD and MSH, Paris, France, during 1994-95; and one month each in 2000, 2001 and 2004; for one year during (2004–05) at the Centre on Industry and Innovation Studies, University of Western Sydney, Sydney, Australia; and Visiting Professor, Institute of Advanced Study, United Nations University, Yokohama. He is also currently the Editor-in-Chief, *Science, Technology and Society – An International Journal* (Sage Publications).

He has a PhD in Sociology of Science from the University of Wollongong, New South Wales, Australia. Dr Krishna has more than 25 years of research experience in the areas of sociology of science, science and technology policy and innovation studies and social history of science. He has published over 30 research papers and five books which include *Scientific Communities in the Developing Countries, Science and Technology in a Developing World* (Sage Publications, 1997) and *S.S. Bhatnagar on Science Technology and Development, 1938–54* (1994, Wiley Eastern Ltd). His forthcoming books include *Science, Technology and Diffusion of Knowledge: Innovation Systems in Asia-Pacific* (Forthcoming, Edward Elgar, UK). Dr Krishna was a consultant to UNESCO, Paris, for its programmes on electronic publishing in developing countries and the publication of the World Science Report 1998 and UNESCO Science Report 2005, and to the ILO in 2001 for its programme on the informal sector. He was a Council Member of the Society for Social Studies of Science (4S), USA and a member of the International Council for Science Policy Studies, ICSU, UNESCO, Paris. Currently he is also on the Task Force on Clusters, UNIDO, New Delhi.

David Woods

David Woods was born in Pietermaritzburg, Natal on 18 July 1940 was educated at Cordwalles (1948-53) and Michaelhouse (1954-58). He obtained the BSc Hons Degree at Rhodes University in 1962. As a Natal Rhodes Scholar he went to University College, Oxford University in 1963 and obtained the D. Phil Degree in 1966. In 1967, he returned to Rhodes and was appointed Professor and Head of the Department of Microbiology in 1972. In 1980 he moved to the University of Cape Town as Professor and Head of the Department of Microbiology and Director of the Microbial Genetics and Industrial Microbiology Research Unit and became an A-rated scientist in 1984, a Fellow in 1985, Distinguished Teacher in 1987, and Deputy Vice-Chancellor in 1988. He held the R.F. Cherry Chair for Distinguished Teaching at Baylor University, USA, 1992-3. He was appointed in 1996 to the post of Vice-Chancellor of Rhodes University and retired in 2006. In addition to his more than 200 research papers and 40 Ph.D. graduates, Dr Woods edited *The Clostridia and Biotechnology*, holds Gold Medals of the SA Microbiology Society and the SA Society for the Advancement of Science, the John F.W. Herschel Medal for Outstanding Research of the Royal Society of South Africa, and the Claude Harris Leon Foundation Award for Distinguished Research. He was a Research Fellow at the Institute Pasteur, Paris (1973-74) and a Royal Norwegian CSIR Post-Doctoral Fellow, Trondheim (1974-1975). He was Chairman of the Bacteriology and Applied Microbiology Division of the International Union of Microbiological Sciences 1995-99, is a Fellow of the American Academy of Microbiology and a Fellow of both the Royal Society of SA and the SA Academy of Science. He was on the editorial board of the Journal of Bacteriology and Anaerobe Microbiology. He served on the Boards of the Council for Scientific and Industrial Research, Medical Research Council, and National Research Foundation and was a founder member and chair of SAGENE and a member of COGENE. He has acted as a consultant for Goodyear; Akron; USA; DuPont; Wilmington; USA; Sentrachem and Anglo American. In 2004 he became a Trustee of the Claude Harris Leon Foundation. He was Chair of the South African Netherlands Research Programme for Alternatives in Development (SANPAD) from 2005 - 2009 and is Chair of SANTRUST which has fiduciary responsibility for SANPAD and other higher education projects. SANPAD funds a PhD Training Programme and Research Projects in the Humanities and Social Sciences. He was Coordinator of the International Advisory Committee for the South African Malaria Initiative (SAMI) and a Trustee of LifeLab. He is Chair the Board of Directors of Fermentation Technology & Innovation (Pty) Ltd which is a biotechnology start-up company. He was a member of the European Universities Association Advisory Committee for a project on Cooperation on Doctoral Education between Asia, Southern Africa, Latin America and Europe (2011-2012). In 2003, he was awarded the Degree of Doctor of Civil Law,

honoris causa, by Oxford University. In 2007 he was awarded the Degree of Doctor of Laws, *honoris causa*, by Rhodes University.