RFP No. 794/18/10/2017

Research Design and Implementation Requirements:
Centres of Competence Research Project

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List of Acronyms and Abbreviations

BTRI	:	Biomedical Translational Research Initiative
CC	:	Competence Centre
CoC	:	Centre of Competence
CoE	:	Centres of Excellence
CRC	:	Cooperative Research Centre
CSIR	:	Council for Scientific and Industrial Research
DST	:	Department of Science and Technology
HySA	:	Hydrogen Strategy South Africa
ICT	:	Information and Communication Technology
IP	:	Intellectual Property
IU	:	Implementation Unit
NICS	:	Nano Innovation Centres
NSI	:	National System of Innovation
R&D	:	Research and Development
SAR	:	Synthetic Aperture Radar
SIF	:	Sector Innovation Fund
TIA	:	Technology Innovation Agency

1. BACKGROUND AND CONTEXT

The Innovation Priorities and Instruments (IPI) Chief Directorate, within the Department of Science and Technology (DST), has conceptualised, and would now like to implement, a Centre of Competence (CoC) research and evaluation programme comprising two elements, or parts, as follows:

i) Deriving key lessons learnt on the operationalisation and sustainability of CoCs, (or similar triple helix partnership), funding and partnership initiatives. This will include an evaluation of the two pilot CoCs, (i.e. the Biomedical Translational Research Initiative (BTRI) and Synthetic Aperture Radar (SAR) initiative), that have been established by the DST in 2015; as well as,

ii) An assessment of the DST CoC Framework assumptions with a view to deriving policy relevant research that would inform and support future decisions to establish CoCs in key or priority areas.

The Council for Scientific and Industrial Research (CSIR) through its Implementation Unit (CSIR IU) has been contracted to provide technical advisory, as well as, project management support relating to the establishment and incubation of the two pilot CoCs and related policy research requirements pertaining to the evaluation of the project.

This document serves to outline the requirements for the design and implementation of the CoC, (as a one form of a triple-helix partnership), research and evaluation project that is to be initiated utilising the project management services of the CSIR IU.

Section 2 below briefly reflects on the background and origins of DST funded CoCs, and section 3 deals with the scope, methodology and outputs of the CoC evaluation project.

2. BACKGROUND TO THE DST CoC CONCEPT

A 2007 Review of South Africa's innovation policy landscape revealed that there were major challenges in securing sufficient rates of innovation and knowledge flows between academic institutions, public research organisations and industrial and economic activities in the country. These challenges remain relevant today.

As part of its response to the Review, the DST developed the CoC Framework document (2010). This was aimed at conceptually positioning CoCs as a mechanism within the National System of Innovation (NSI) to close gaps along the innovation and technology development value chain; provide support for technology development and systems integration; develop technology-enhanced production capabilities; develop productive human capacity; a well as, to facilitate technology commercialisation.

The Framework document was initiated in late 2007 and was developed throughout 2008 and early 2009 as part of an iterative consultative process. The Framework was approved by the DST Executive Committee in May 2010, meaning it was cleared for implementation, where applicable / desirable, by the various line function programmes within the DST. However, the Framework was not launched as a formal policy document.

CoCs are envisaged as collaborative entities, or instruments, that are preferably led by industry; and, that are resourced by highly qualified researchers who are associated with public research institutions, empowered to undertake market-focused strategic research and technology development for the benefit of industry and the economy at large.

A CoC is, therefore, intended to provide a formal, and as far as possible, contractually secure physical or virtual platform upon which to establish collaborative technology innovation and commercialisation partnerships between government, industry, universities and public research institutions, with the explicit aim of technology commercialisation.

There is no single rigid structure that will be appropriate to all CoCs. Instead, Centres may evolve in a number of different ways depending on specific sectors, participating companies, technological focus, and established relationships. At the time of drafting the Framework, it was envisaged that most CoCs will be established either by the development of an industry cluster that subsequently engages a research provider, or will be stimulated by the need to take advantage of market opportunity or solve social challenges.

It must be noted that the Framework was not launched as a formal policy document of the DST and has not received a dedicated budget allocation in order to give effect to a comprehensive CoC programme for the Department and its partner organisations in the NSI. As a result, the CoC-type projects that have been established to date have been the result of, often isolated, initiatives across individual DST line function programmes and in the absence of clear norms and standards as to which type of initiatives should be classified as a CoC.

This was largely confirmed during 2010 and early 2011 when an internal assessment of the status of CoCs revealed that there were approximately 28 CoC-type projects that had been initiated by DST line function programmes, or that were in conceptual stage, in 8 technology fields / industry areas. The assessment was undertaken by the DST together with the Technology Innovation Agency (TIA). At that time, it was found that very few CoCs had the active support of an industry partner (which is understood as one pre-condition for CoC classification), and that the majority were focused on primary research activities (and therefore considered as research projects, rather than CoCs).

A further study conducted on behalf of the DST in 2015, revealed that the main focus of CoCs should to provide solutions at a system-wide level. A defining and distinguishing characteristic

of a CoC, (at a theoretical level and emerging from international case studies), is to alter the university-industry interaction, such that the universities support the research needs of industry.

Successful CoCs are, therefore, deemed to be industry driven and firm-centric. Most of the South African firms that have the necessary resources to collaborate on R&D, (and are most likely to participate in a CoC), operate business models based on [corporate] centres of excellence where R&D and innovation is undertaken at company research centres at a global level. The 2015 study also recommended that the DST should take its cue from industry in terms of how industry would like to be assisted in collaborative efforts.

As at 2017, some of these issues remain unresolved, particularly with respect to better enabling industry-led collaboration.

3. SCOPE, METHODOLOGY AND OUTPUTS OF THE CoC[1] EVALUATION PROJECT

3.1. WHAT THE RESEARCH QUESTIONS SHOULD PROBE/ANSWER:

The research is envisaged to answer a number of unresolved questions pertaining to the need for, efficacy and sustainability of CoCs and CoC-type structures/partnerships, (i.e. triple-helix partnerships), in converting a greater proportion of research outcomes into tradable products and services in local and international markets.

These could be broadly grouped into a number of issue areas as follows:

3.1.1. How CoCs are understood in the context of South Africa:

i) What are the participants' notions of CoCs?
ii) What should a CoC be responsible for (i.e. the minimum/core functions of a CoC)?
iii) Is CoC the proper name, if not, what is suggested?
iv) Do those who are outside CoCs see a need for CoCs/ any other triple-helix partnership? Especially industry.
v) Why there was a need to establish CoCs from the onset?

3.1.2. Partnership and operational arrangements:

a) Is industry involved, if not, why not?
   i) If industry is not involved, what are, or would be, the plans to get industry involved?
   ii) How do we enable industry led partnerships?
      - What is the desire of industry to lead?
   iii) To what extent are partners or potential partners adequately engaged during the project development process?

[1] The study is considering any types of triple-helix partnerships

iv) Are there challenges faced in forming collaborations? If there are challenges, are they linked to:
- Product advantage and technological synergy;
- Development process factors (e.g. expertise of technological activities, know-how of marketing activities;
- Market environment factors (e.g. market potential);
- Organisational factors (Governance and external relations).

v) To what extend is industry prepared to collaborate on the development and commercialisation of products?
- Are there any areas where they are not willing to collaborate?

b) What are the (typical) role allocations of the participating partners?
   i) Which governance models are available that would best address, or balance the push for academic endeavour/achievements versus market and/or industry needs?
   ii) How conflict/tension is best managed among research and technology development partners that may be competing for funding?

c) Are there governance structures in place and how effective are they?
   i) Does the current administrative model effectively enable the programme to function and achieve the deliverables?
   ii) Are there any challenges in the administrative model that could hinder the achievement of deliverables?
   iii) What are the recommendations on efficient structuring of CoCs?

d) What intellectual property (IP) management arrangements are in place?
   i) What models, or arrangements, are in place to identify value and protect IP?
   ii) Are there any models where industry has full ownership, if not what are the suggestions?
   iii) Which alternative models are in place where ownership is not a concern?

e) In the absence of a dedicated, national CoC programme, how best can ad hoc requests for CoC type-partnership arrangements best be accommodated?

3.1.3. Success measures: What indicators should we be using?

a) New products and/or services?

b) Labour market transition: what has been the impact on the workforce (improving capacity)?
   i) Labour market absorption/transition tools
   ii) Potential for leveraging appropriate skills
   iii) Potential for developing new/niche area skills
   iv) Potential for re-skilling
   - Are there challenges faced in sourcing experts

- Are there challenges faced in sourcing postgraduate students to pursue research topics that form part of projects that will be commercialised by CoCs?

c) IP versus non-IP innovations – is this catered for?

d) What changed when it comes to the past perceptions of stronger relationships between industry and Technikons, do these perceived strong links still exist in the current Universities of Technology? What is different between then and now?

3.1.4. Life cycle, evolution and sustainability issues:

a) How do [successful] CoCs typically emerge and/or morph over time?

b) What is the plausibility of such a programme in South Africa? (International practise should also be taken into account).

c) How do we put in place the right conditions (working models) to build CoCs?

d) Are/should there be limits on the size of the programme?

e) What is the governance structure that is most obviously associated with the successes of CoC-type partnerships?

f) What sustainable revenue generating models can be used by a CoC? (i.e. Alternative funding models).

i) Is there an opportunity to get follow up funding for further development and commercialisation?

ii) Is industry keen to provide pre seed, seed and funding for further development and commercialisation?

- Which alternative funding routes would they recommend?

g) Is a CoC a short, medium of long-term initiative (lifespan)?

i) CoCs should address specific issues/targets.

ii) Once the issues have been addressed, what happens to the CoC? Should they continue operating and under which conditions.

iii) When CoCs are moved/ transferred to other stakeholders, what kind of arrangements can be put into place to ensure smooth handover/transition?

d) Balancing technology push/pull. Are, or how can, CoCs be harnessed for new industry creation? (e.g. case studies Hydrogen Strategy South Africa (HySA); Titanium; and/or the Nano Innovation Centres (NICS).

3.1.5. What other tools/programmes are available?

a) What are the other support initiatives or programmes that the DST, as well as other public and private stakeholders, already have in place to support industry-led collaboration, and are these complementary or competing?

i) Related to a) above, there are Centres of Excellence (CoEs) that already exist, Should, or how, are CoCs differentiated from (CoEs)?

3.1.6. In terms of the two pilot CoCs, or models, currently being tested (models):

i) How do we leverage the findings and the lessons learned?

ii) How do we deal with conflict/tensions, particularly relating to access to funding and IP,among partners?

iii) Governance arrangement lessons?

The probing areas listed above should be addressed in terms of, among others, the following categories:

Need	Efficiency	Sustainability
3.1.1. i) ii) iii) 3.1.2. a) c) d) e) 3.1.3. a) b) c) d) 3.1.4. b) 3.1.5. b)	3.1.1. i) ii) iii) 3.1.2 a) b) c) d) e) 3.1.3 a) b) c) d) 3.1.5. a)	3.1.4. (excluding b) 3.1.6.

3.2. PROPOSED RESEARCH METHODOLOGY

a) Review the need, efficacy and sustainability of CoCs/triple-helix partnerships from a global, African and South African perspective. The review should be focused on the following industries:

i) Digital technologies (ICT)

ii) Bio-economy (human health technologies)

iii) Advanced manufacturing

iv) Public sector services

b) Review of internal DST studies, as well as, where appropriate NSI-wide assessments, conducted by other programmes to assess if there are valuable lessons on industry collaboration that could potentially contribute to the development of CoCs.

c) Review of the existing (external) literature (desktop study).

i) Identify what might already exist

d) Qualitative survey of industries that are operating in the targeted technological industries (business chambers/associations), as identified in paragraph a) above, in order to establish the various ways in which industry can be involved.

e) Interview of higher education institutions or research institutions and industry to get suggestions on how to best deal with IP and whether there is interest among academics/researchers in alternative IP arrangements.

f) Local and international case studies/best practice.

i) Minimum of 3 international case studies of which 1 should be in Africa

ii) How do you develop Public sector CoCs, taking into account the South African landscape and its status as a developing country (countries in Asia should be excluded)

3.3. ENVISAGED RESEARCH OUTPUTS

a) Detailed report that should include:
    i) Findings on the need for CoCs/triple-helix partnerships
    ii) Efficacy of CoCs/ triple-helix partnerships
    iii) Sustainability of CoCs/ triple-helix partnerships
    iv) Challenges that might be encountered
    v) Lessons learnt from the emerging economy and the South African landscape
    vi) How to engage in international CoC relationships
    vii) The existing funding structures and how it effects the governance structure
    viii) Recommendations on way forward (recommendations should be from all stakeholders)
b) Design, develop and populate a database of all the South African triple-helix partnership structures and opportunities.
    i) Capturing of the necessary data whilst the research is underway and as data becomes available. This should be done using Microsoft Excel.

ENDS