The role of public research institutes in innovation for inclusive development in South Africa

How can research and innovation managers at the Council for GeoScience promote innovation and interaction to wider social and economic benefit?

Glenda Kruss, Genevieve Haupt and Azinga Tele

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PRESENTATION OUTLINE

1. Research approach
2. Organisational conditions that facilitate and constrain interaction at CGS in 2013
3. Mapping patterns of interaction of individual scientists at CGS in 2013
4. Implications for CGS strategy going forward?

A shifting emphasis

1. Public research institutes roles in economic growth and development - innovation and interaction with firms to enhance global competitiveness
2. Role in improving quality of life through engagement – innovation and interaction with local communities, participation, equitable development
3. Scientific excellence / global knowledge base

⇒ Innovation for inclusive development: opportunity to align and balance multiple roles of post-1994 mandate

⇒ Nature and beneficiaries of interaction: PRIs as knowledge producers and external partners as 'users'?

Mapping patterns of interaction

- Extending scientific knowledge to the benefit of ALL external partners, through research, development and technology transfer, in line with unit and organisational missions
- What are the dominant and significant niche patterns of interaction of scientists in practice?
  - Main **partners** – firms, farmers, government, knowledge, communities
  - Main **types** of relationship and channels of interaction
  - Main types of outcomes and **benefits**

Institutional conditions that facilitate and constrain interaction?

- Strategic mandate, historical trajectory and policy orientation: reputational and scientific concerns primary
- Conceptions of interaction and partnership
- External and internal interface structures:
  - Research office, contracts office, innovation office, strategic initiatives
  - Technology transfer office, incubator, research translation
- Interactive mechanisms:
  - Incentives (promotion, reward, awards)
  - Open days, websites, industry / community forum, publications, radio platform
- Role of individual scientific leaders and ‘’entrepreneurs’’
- Functional integration and internal alignment
- INTERACTIVE CAPABILITIES?

METHODOLOGY

- Site visit, documents and interviews with range of internal stakeholders: executive, senior managers, heads of units
- Survey of scientists:
  - in 2013, a total of **157** scientists
  - **117** participated in the telephonic survey

=> a response rate of **75%**

What are the organisational conditions at CGS that facilitated and constrained interaction?

- Distinctive features:
  - involvement in precompetitive research space
  - national facility ⇔ science council
- SETI Review 2003 Dual imperative:
  - Statutory role of geological mapping / economic relevance
  - Contract research for funding : Key *customer* groups

  ⇒ impact on scientific quality and reputation
- SETI Review 2009 expanding mandate:
  - Earth science solutions of social relevance / quality of life – more multi-sectoral

  => partnerships and interaction
- 2010 Economic recession, reduced government funding

  => contracts and consultancies

A laissez faire approach to interaction

- Current activities and interaction shaped largely in response to managing financial challenges, implementing an extended organisational mandate, and maintaining quality of geoscience / national facility
- Driven to pursue ‘commercial’ work for clients internationally, to the detriment, at times, of scientific contribution and to SA NSI - developmental imperatives remain aspirational ?
- Management: Ability to respond dynamically and strategically to a changing policy and funding environment?
- Laissez faire organisational culture – units and individuals as drivers of interaction, ad hoc

Internal interface structures

- Strategic Planning Unit, a single person directly reporting to the CEO: coordination of information for reporting
- Business units have a great deal of autonomy
- Multi-disciplinary nature of research facilitates internal collaboration between units on projects: unstructured, driven by project leaders' expertise and interests, and based on individual relationships
- Aim for more strategic, structured matrix approach
- Contracts office – no IP office

=> facilitate commercial consultancy relationships and scientific collaborations

External interface structures largely tacit

- Large-scale scientific networks operate as external interface mechanisms, to support interaction with other knowledge partners and governments: driven by nature and focus of specific disciplines
- Business development unit functions to "look for jobs'' and arrange meetings with potential government clients: marketing CGS and brokering contracts for 'commercial' work
- Regional offices function de facto as external interface mechanisms: provide basis for closer integration with provincial priorities
- The museum and the library serve as interface mechanisms: includes a repository that offers services to external clients
- The sale of maps: dissemination of CGS products and expertise to the broad public and geological consultancies

Incentives

- A balanced score card system monitors individual performance: potential to be undermined by the separation and imbalance between statutory and commercial work
- Other incentives suspended due to funding constraints
- *“When you become a scientist you don’t do it for the money, you do it for the love, so an incentive should be more something that would excite them and get them more creative and innovative. I think that’s probably the reason why that incentive policy never really kicked off because is not actually the driver that the scientist needs”*

Potential for interaction?

- A mission-centred science council grappling to respond proactively in a shifting policy environment, and to build reputation in South Africa as strongly as it has on the African continent

⇒ We may expect two main types of partners:

1. other knowledge institutions with which collaborate on statutory mandate
2. clients of commercial services:
   - local and African governments
   - foreign funding agencies and donors
   - junior mining houses
   - general public use of mapping and analytical services

Mapping patterns of interaction at CGS

- The analysis allows identification of dominant and emergent trends as well as niche areas
- It provides insight into the ways in which science councils balance the three fold mandate and roles in the national system of innovation
- It provides a basis for innovation and research managers to align activity more strategically across the organisation

Scientists who do not engage

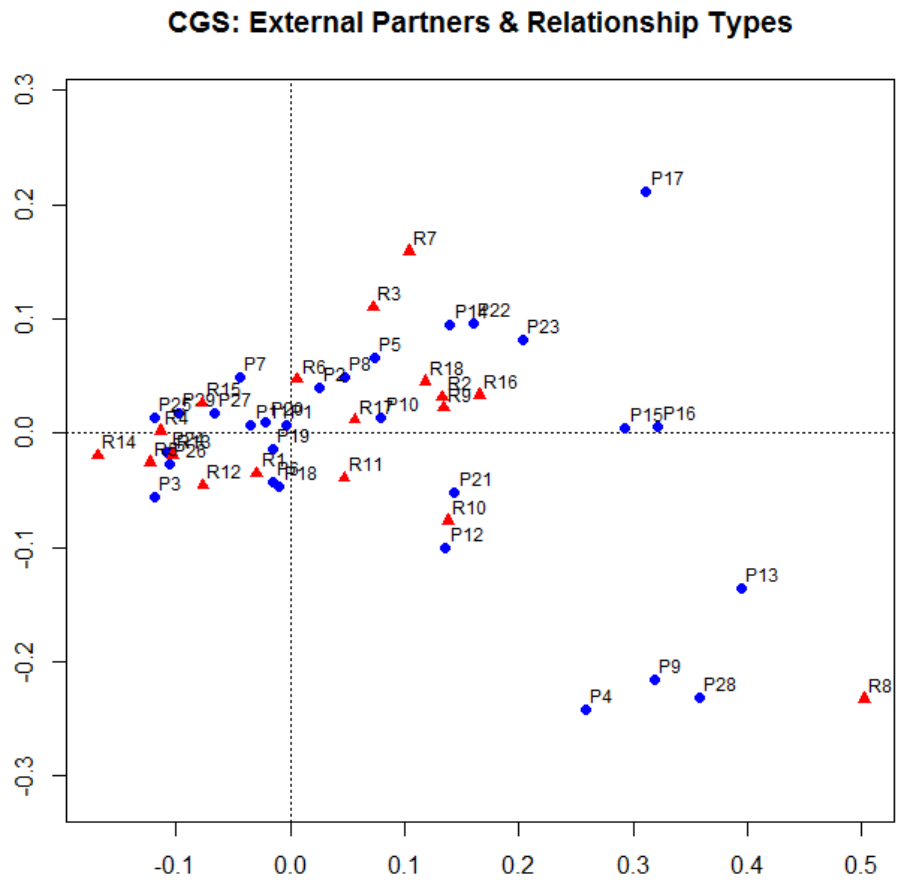
- Only a small group, 11%, indicated they do not engage
- No distinguishing demographic or positional attributes characterize this group, except that they tended to have lower level qualifications
- Main reasons proffered:
  - My unit or centre does not promote engagement
  - Not appropriate given the nature of my scientific field
  - Lack of clear institutional policy on engagement
  - Lack of partners' knowledge about research activities and priorities in science councils
  - Not central to my scientific role

Most frequent partners?

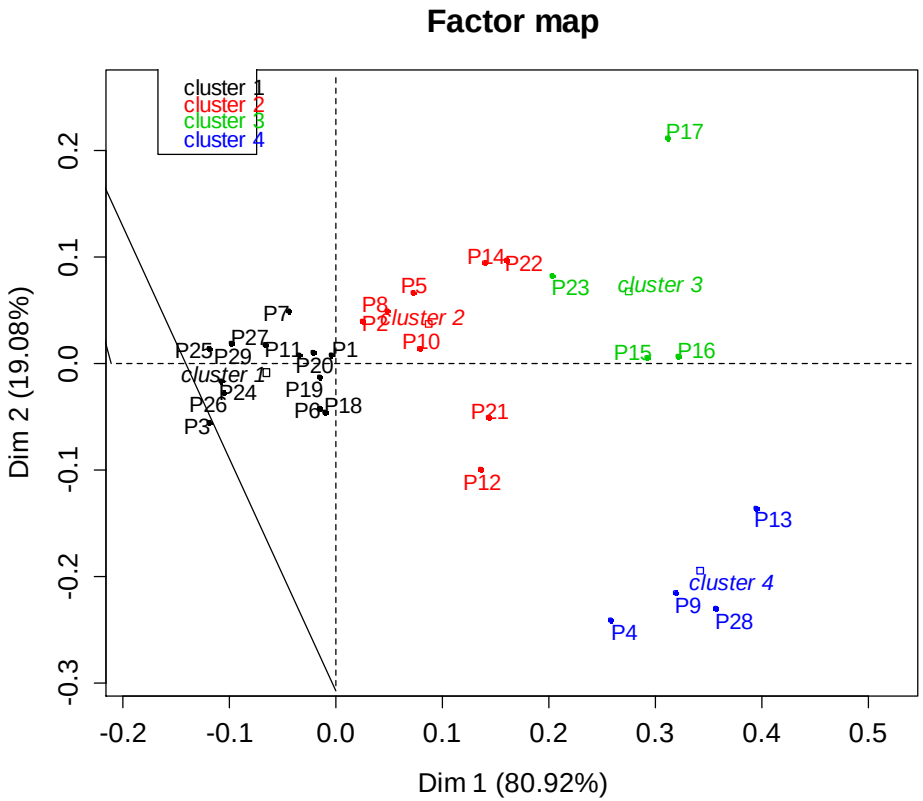
Social partners		Engaged						
		Frequencies					WTotal	WAI
		<>	1	2	3	4		
24	South African universities		7	7	44	42	321	3.21
26	South African science councils		10	21	44	25	284	2.84
3	National government departments		25	26	22	27	251	2.51
7	Individuals and households		25	27	30	18	241	2.41
1	Local government agencies		22	38	25	15	233	2.33
25	International universities		30	28	24	18	230	2.30

Are these the traditional academic collaborations in the precompetitive space, and how do they reflect the expanded mandate?

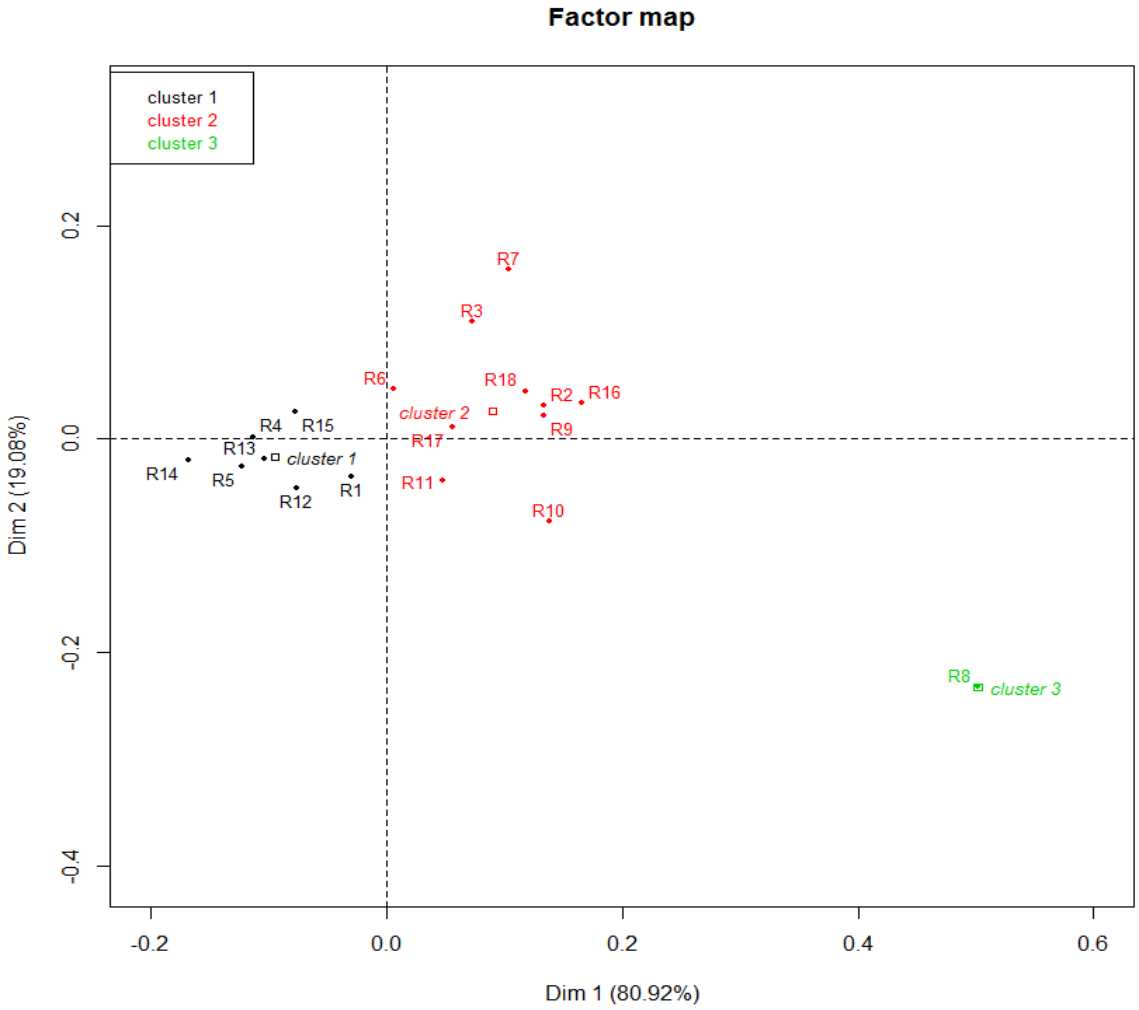
Correspondence analysis



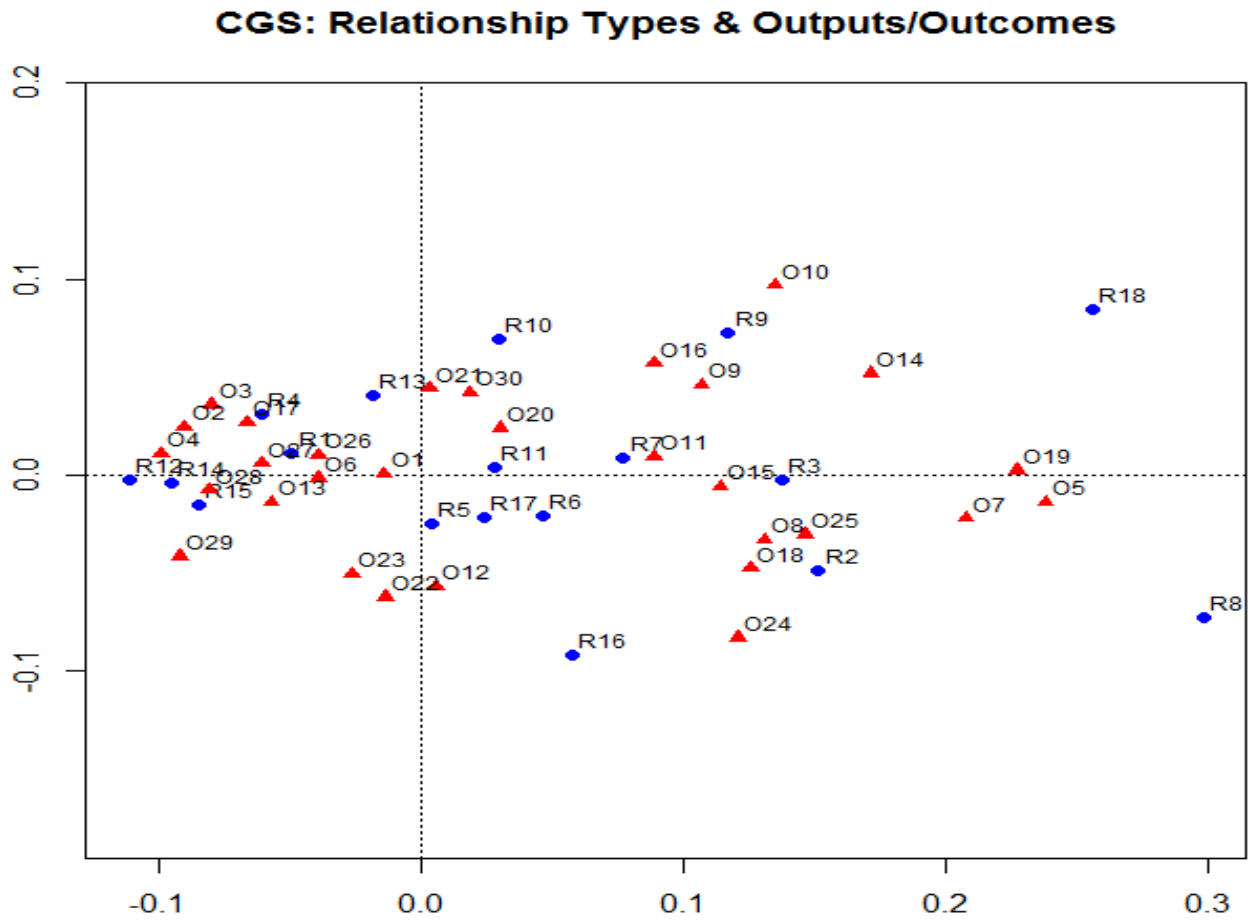
Cluster types of partners: 4 clusters



Clusters of types of relationship



Outputs and outcomes



Key trends: common CGS Patterns

Cluster 1: Core mandate Statutory and clients	Relationship types	Outputs and outcomes
International science councils SA science councils International universities SA universities national government departments Local government agencies Large SA firms Individuals and households	Continuing education and professional development Customized training and short courses Technology transfer Collaborative R&D projects Contract research Education of post graduate students so they can be socially responsive	Scientific and institutional reputation Academic publications Relevant research focus and new research projects popular publications Reports, policy documents, Scientific collaborations
Cluster 2 community and social development	**Relationship types**	**Outputs and outcomes**
Schools Community organizations NGOs Specific local communities Provincial governments Commercial farmers Small scale farmers	Voluntary outreach programmes Design and testing of new interventions and protocols Community based research projects Participatory research networks Policy research, analysis and advice	Incorporation of indigenous knowledge Community employment generation

Atypical relationships

- Interactions that some of the scientists might be involved in of their own free will, as citizens, and not directly related to their scientific knowledge roles
  - Cluster 3: religious, sectoral and political organisations and social movements
  - Cluster 4: Civic associations, Welfare agencies, hospitals, clinics and health centers

How can the CGS use the analysis to inform the achievement of their strategic mandate ?

- Strategic goals – how well aligned are ***existing*** patterns of interaction?
  - More (international) collaboration to achieve scientific goals / reputation?
  - Or/ and to address national geohazard priorities?
    - Through innovation for competitiveness – more clients? Firm partners? Contracts or networks?
    - Through innovation for quality of life – government, firms? Communities as partners or beneficiaries?

=> How promote such an ideal pattern of partners and type of relationship ?

Organisational policies and structures

- Strategy on innovation, engagement, research impact on beneficiaries?
- Alignment of commercial client driven work with strategic goals / scientific excellence / quality of life work?
- Stronger coordination and internal alignment vs individual drivers and coordination that works in a small organisation?
- Build on current structures and mechanisms in a more coherent and coordinated manner : BDU, regional offices, museums?

Thank you

Glenda Kruss
gkruss@hsrc.ac.za
Genevieve Haupt
ghaupt@hsrc.ac.za
Azinga Tele
atele@hsrc.ac.za