

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

***How can research and innovation managers at the Mintek promote innovation and interaction to wider social and economic benefit?***

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**December 2014**

# PRESENTATION OUTLINE

1. Research approach
2. Organisational conditions that facilitate and constrain interaction at Mintek in 2013
3. Mapping patterns of interaction of individual scientists at Mintek in 2013
4. Implications for Mintek 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 **214** scientists; **179** participated in the telephonic survey
- => a response rate of 83%

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

- Claim to offer a “one-stop shop” - degree of internal alignment and collaboration, structured by the need for expertise along the minerals value chain, is a distinctive feature
- Roles in mining value chain fosters interaction with different stakeholders (local and international) in distinct segments - reflected in clearly articulated strategic mandate
- Well structured and coordinated with incentives to promote and support interaction with external “stakeholders”
- Internal collaboration and interaction formalized legally, facilitated and monitored : SAP facilitates any internal contracts and service level agreements between **units and external partners**

# Internal interface structures

- Cluster system: horizontal multi-unit interaction enabling collaborative research work on common commodities - aligned to strategic goals
  - Coordinators to deepen communication at operational level in clusters
  - Line managers rotated to familiarise with all aspects of the business – facilitates collaborative institutional culture
  - Management committee at strategic level
  - Funding allocation to units: based on how well work together to achieve their individual as well as R&D cluster and organisational goals
  - Centralised project collaboration register (SAP)
- => organizational structure allows for a degree of internal alignment between knowledge and technology fields



# External interface structures

- Matrix internal structure, based on cooperation and formal contractual relationships, provides foundation for interaction with external partners – all units can direct the requests of partners to the full spectrum of expertise required
- Business Development Unit - and business development support
  - Identifies new funding and business opportunities
  - Coordination for external interaction – tech transfer
  - Mining Economics and Strategic Unit
  - Marketing strategies to external clients : exhibitions, advertisements of products, coordination of technical papers, conferences by individual scientists and engineers, plant visits, sales of Mintek services and products, website
- Small-scale mining and beneficiation unit-supports SMME sector through R&D of appropriate technologies and by providing support

# Mapping patterns of interaction at Mintek

- 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 interact with “stakeholders”

- About 23% of the scientists indicated they do not engage
- Few marked differences in age, gender or qualifications between engaged/not engaged
- Main reasons proffered:
  - Engagement is not appropriate given the nature of my scientific field or discipline
  - Engagement is not central to my scientific role
  - Lack of partners’ knowledge about research activities and priorities in science councils
  - My unit or centre does not promote engagement

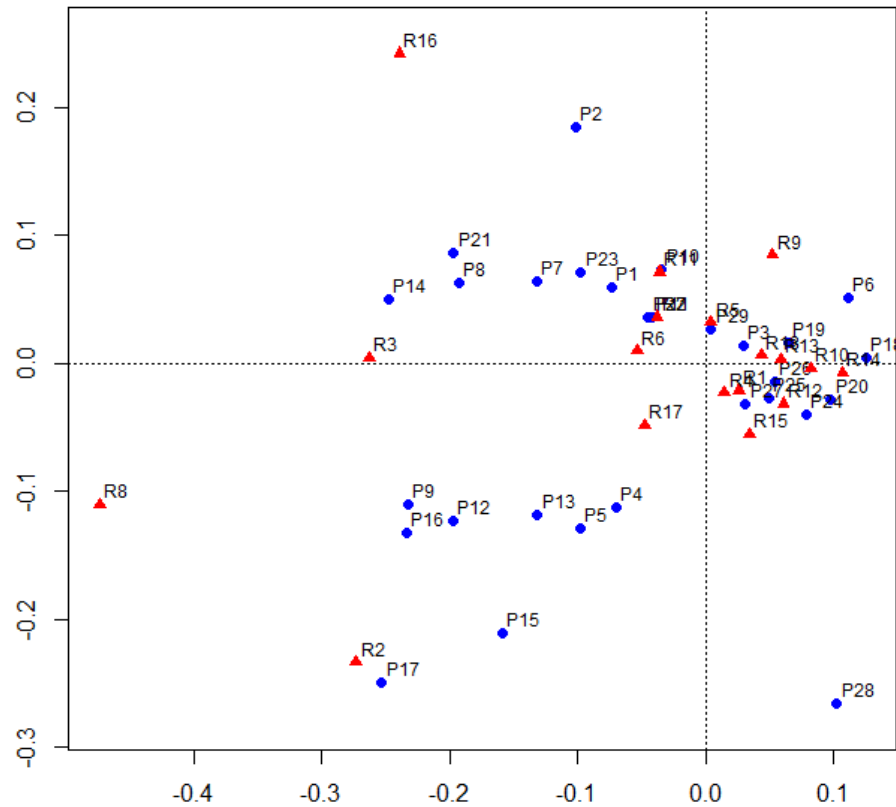
# Most frequent partners of those who do engage?

		engaged						
		Frequency						
Social partners		<>	1	2	3	4	Wtotal	W AI
24	South African universities	131	13	29	40	49	387	3.0
26	South African science councils	131	16	31	44	40	370	2.8
20	Multi-national companies	131	22	30	32	47	366	2.8
18	Large South African firms	131	27	21	43	40	358	2.7
19	Small, medium and micro enterprises	131	27	32	47	25	332	2.5

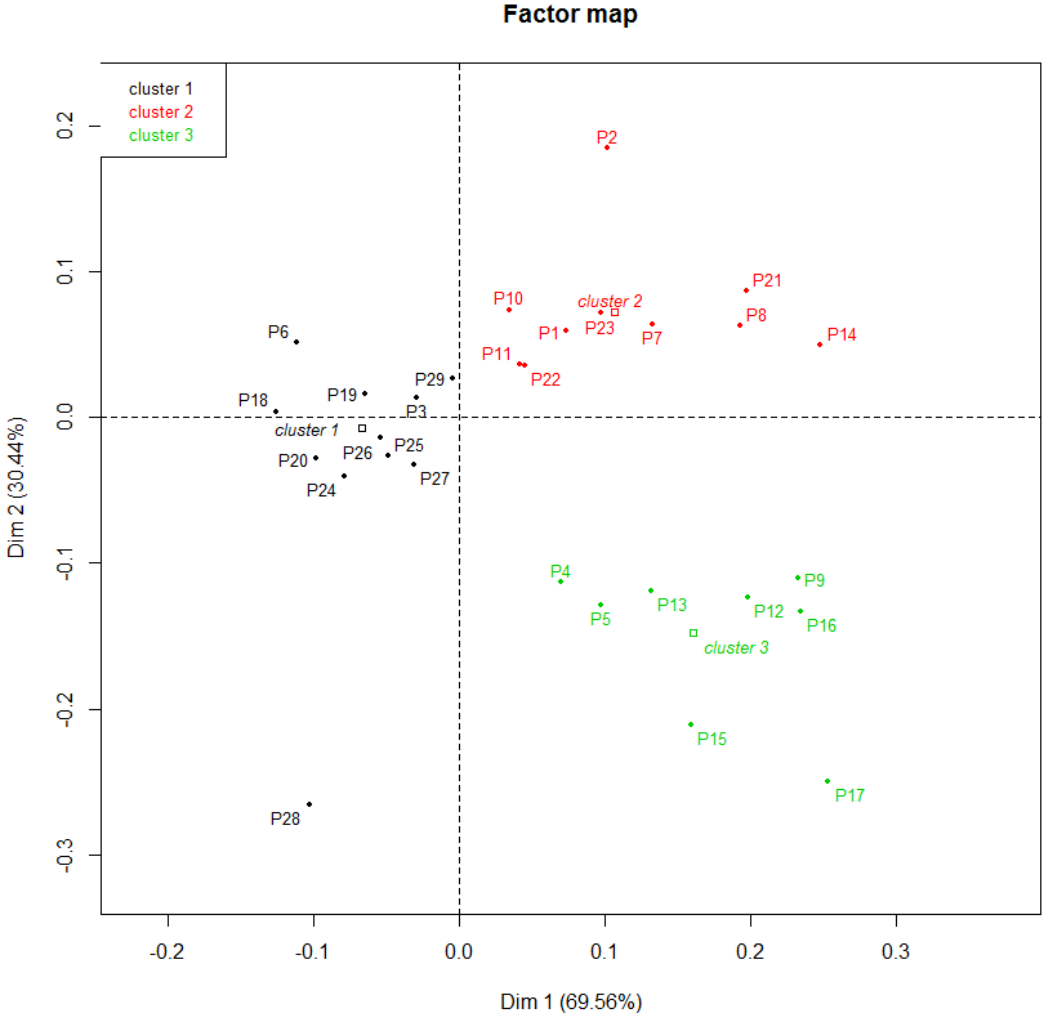


# Correspondence analysis

Mintek: External Partners & Relationship Types



# 3 clusters with similar relationships

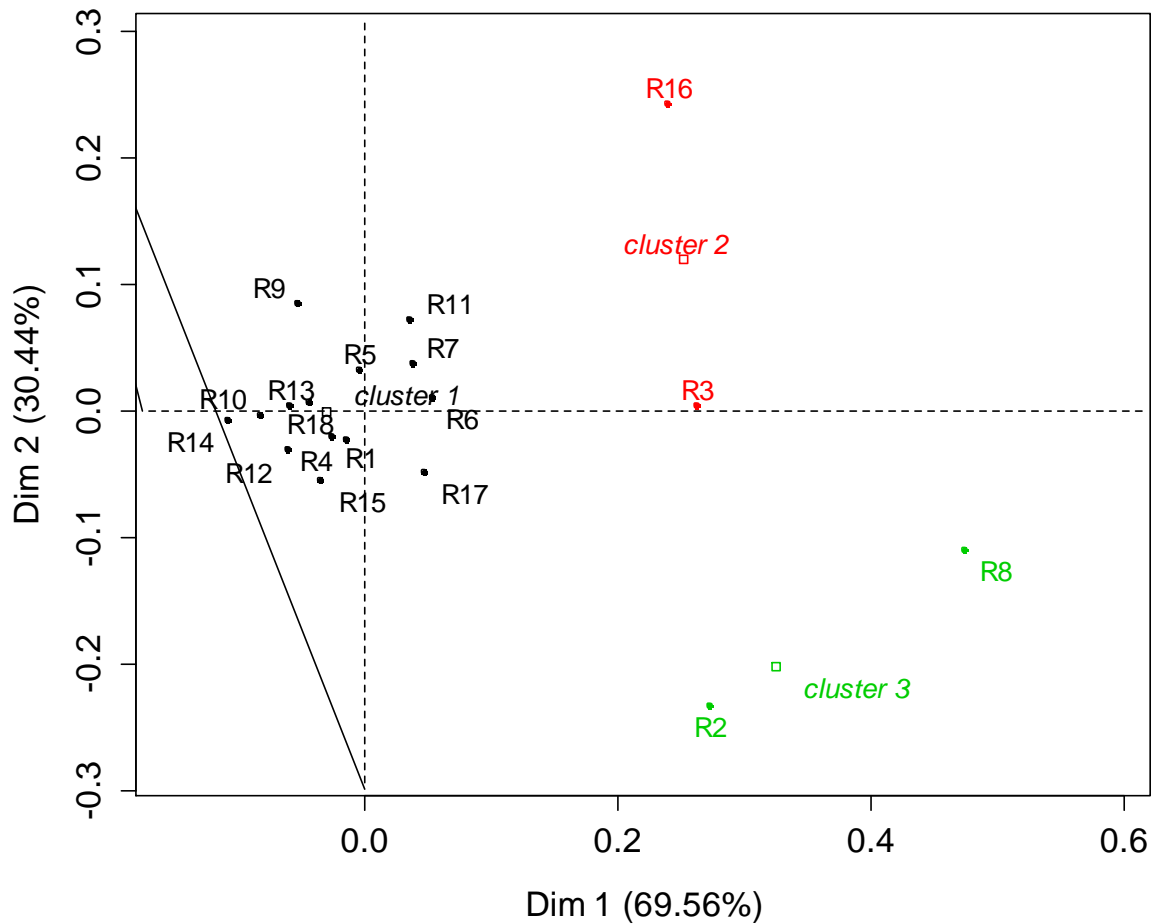


# 3 clusters

<b>Cluster 1: Technical programmes</b>	<b>Cluster 2: Social programmes</b>	<b>Cluster 3: Corporate outreach</b>
<p>National regulatory &amp; advisory agencies Large SA firms SMMEs Funding agencies National government departments International universities International science councils South African universities South African science councils Multi national companies</p>	<p>Provincial government departments and agencies NGOs Development agencies Commercial farmers Local government agencies Sectoral organisations Individuals and households Small scale farmers Community organisations Specific local community</p>	<p>Clinics and health centres Schools Civic associations Trade unions Welfare agencies Political organisations Social movements Religious organisations</p>

# Clusters of relationships

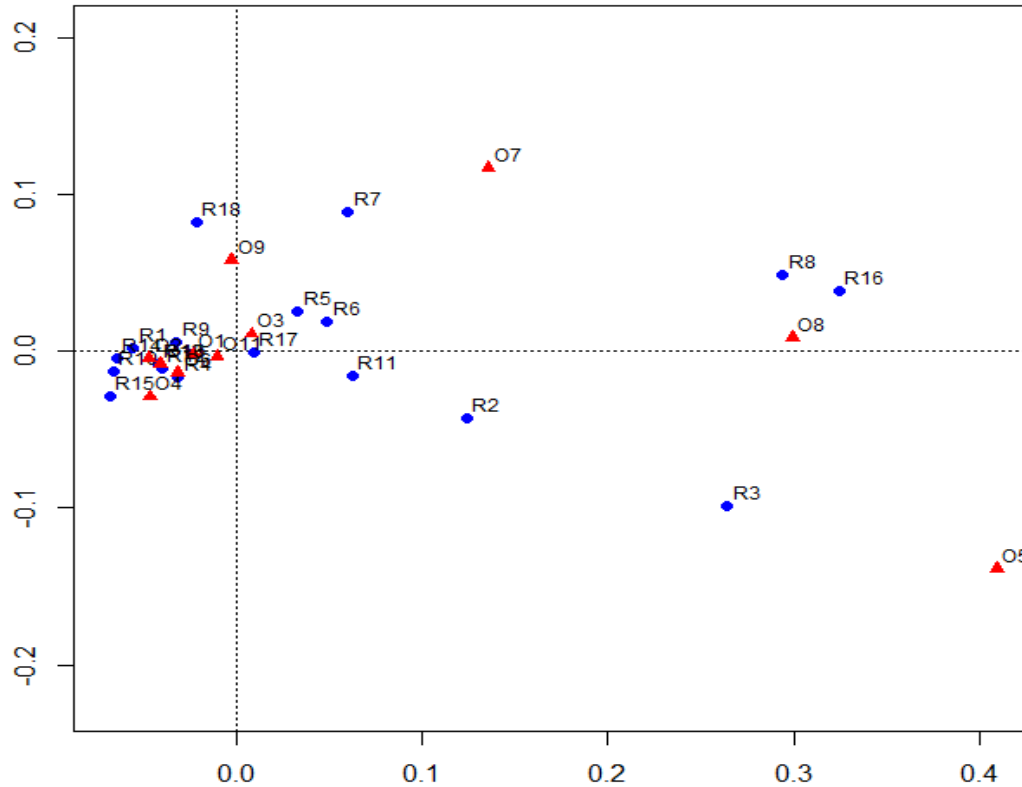
Factor map





# Relationship types and outputs

Mintek: Relationship Types & Outputs



# Mintek patterns of interaction

- Predominantly with firms, taking the forms of contracts, consultancy, needs assessments and technology transfer, for new or improved processes and products, but seen to enhance scientific reputations
- A significant scale of interaction with other knowledge users that tends to take more collaborative forms and leads to traditional academic outputs and reputations
- A niche of downstream, beneficiation-oriented R&D related to health applications of minerals
- An emergent niche addresses imperatives to support small scale miners and communities to promote livelihoods and economic development
- Evidence of a form of corporate social responsibility activities with communities - related largely to a role in education and skills development

# How can the Mintek use the analysis

- Expanded mandate – how well aligned are *existing* patterns of interaction?
    - More (international) collaboration to achieve scientific goals / reputation?
    - Or/ and to address national mining priorities?
      - Through innovation for competitiveness – more commercialisation? Firm partners? Contracts or networks?
      - Through innovation for emerging miners/ beneficiation for local development? Communities as partners or beneficiaries?
- => How institutionalise ideal pattern?

# Deepening effectiveness of structures and mechanisms?

- Deepen / improve functioning of current matrix structures and mechanisms?
- Adaptation of interactive mechanisms to support small scale miners and communities to promote livelihoods and economic development?
- Financial imperatives as driver of interaction – 70% of income from contracts? How fund development-oriented R&D?