

The South African biorefinery innovation system: Role of leverage professionals as catalysts for change

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Introduction

Why biorefineries in the broader pulp and paper sector?

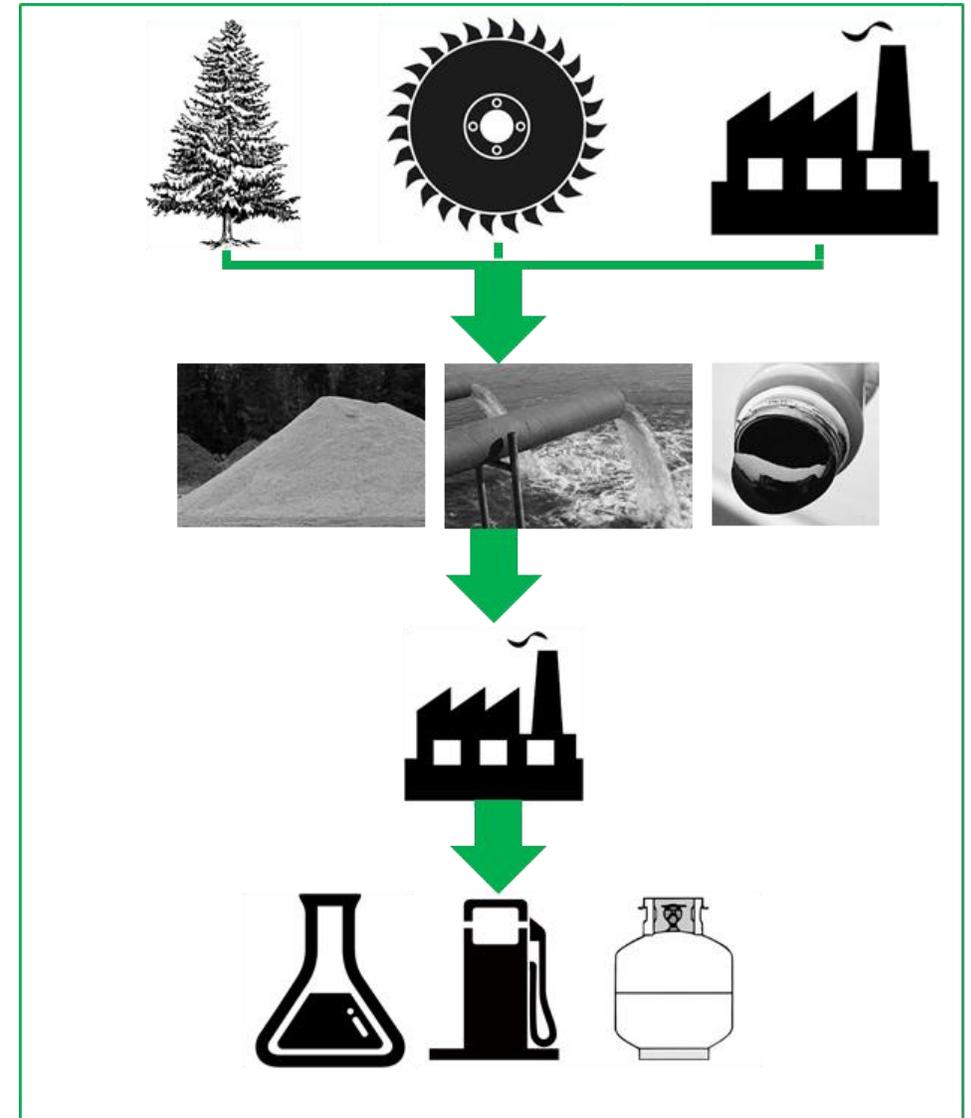
- Contributes c.R28 billion (4.2%) to South African GDP.
- Approximately 50% of the tree is not used.
- Transition from a fossil fuel-based economy to a circular/bio-economy.
- Opportunity for alien vegetation.

Why leverage professionals?

Lundvall's (2007) proposition that:

“To bring innovations, including science-based innovations, to the market, organisational learning, industrial networks as well as employee participation and competence building are more important than ever.”

Systems of innovation theory often focuses at the actor level, with little focus on social capital. I wish to contribute towards filling this gap. Without people, biorefinery [aka innovation] uptake will not happen.



Research questions



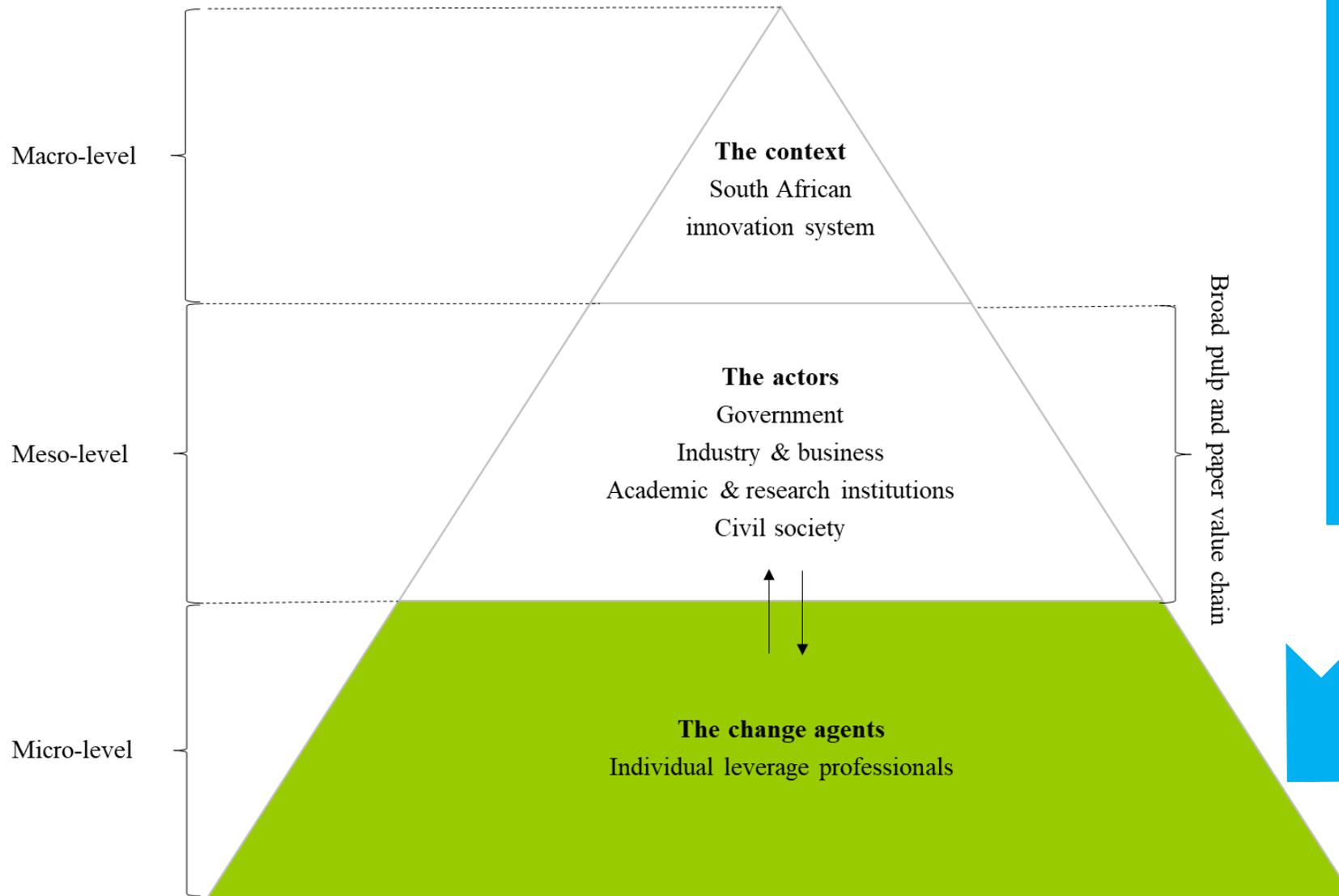
How can the South African pulp and paper sector collaborate more effectively to foster transformative change and catalyse the uptake of biorefinery technologies and products?

To understand the role of leverage professionals in the system:

1. Who are they?
2. What role do they play in catalysing change within or managing the innovation system? How do they collaborate?
3. What specific behavioural preferences, traits, knowledge, skills and capabilities do they exhibit, or should exhibit?
4. What challenges hinder their ability to function?

This presentation represents part of the broader PhD which also investigates:
the **pulp and paper/forestry-products biorefinery innovation system**; and
the **knowledge network** (generation, diffusion, use and types)

Leverage professional context



What is a leverage professional?

‘Professionals’ who do and can enable and embed change through innovation, and should have the desired experience, knowledge, skills and capabilities to do so.

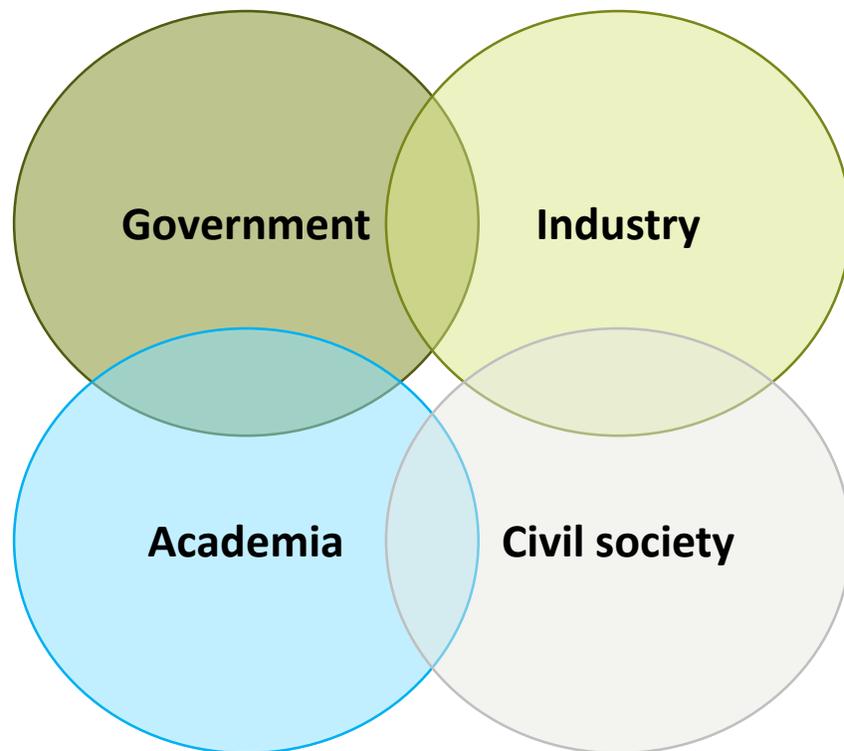
They change the dominant logics, rules, and conditions of engagement (Avelino et al. (2017))

Analytical approach



- Technical Innovation System (TIS) and Multi-level Perspective (MLP)(see Bergek et al., 2008; Hekkert et al., Markard, 2018)
- Interviews with individuals representing Quadruple-helix group of actors (See Carayannis et al., 2015; Cavallini et al., 2016)
- Behavioural preferences and traits: Belbin’s Team Role Taxonomy (2019) and organisational individual role classifications

Quadruple-helix actor group



Government	Industry
Dept. Agriculture, Forestry & Fisheries	AfriBio
Dept. Environmental Affairs	Citius Energy
Dept. Science & Technology (x2)	Evergreen Timbers
Dept. Trade & Industry	Hans Merensky
Government delivery bodies	Independent
CSIR (x3)	Kimberley-Clark
GreenCape/Wesgro	Lignotech
Industrial Development Corporation of SA	Mondi
National Cleaner Production Centre of SA	Sappi (x2)
State-owned entity	York Timbers
Safcol (x2)	Industry associations
	Forestry SA (x2)
	Paper Manufacturers Association of SA
	Sawmilling SA
Total: 11	Total: 15
Academia	Civil society
Durban University of Technology	Fetola
Institute for Commercial Forestry Research	RSB
University of Stellenbosch	South Durban Community Env. Alliance
University of Kwa-Zulu Natal	Trade & Industrial Policy Strategies (TIPS)
	WWF-SA (x2)
Total: 10	Total: 6

Who are they?



- 44 individuals interviewed (indicative of the system)
- Average age of 46 years
- Majority are white (71%), with 20% black and 10% Asian, and 80% male
- Most women work in government and NGOs
- Predominantly hold leadership, management, co-ordination and senior research positions
- High-level of post-graduate qualification, with Masters or PhDs, specialising in fields such as forestry, environmental science and biorefinery technologies.
- Engineering background-centric, which aligns with R&D and techno-economic solution focus in the country; and indicative of an emergent and formative technical innovation system (TIS)

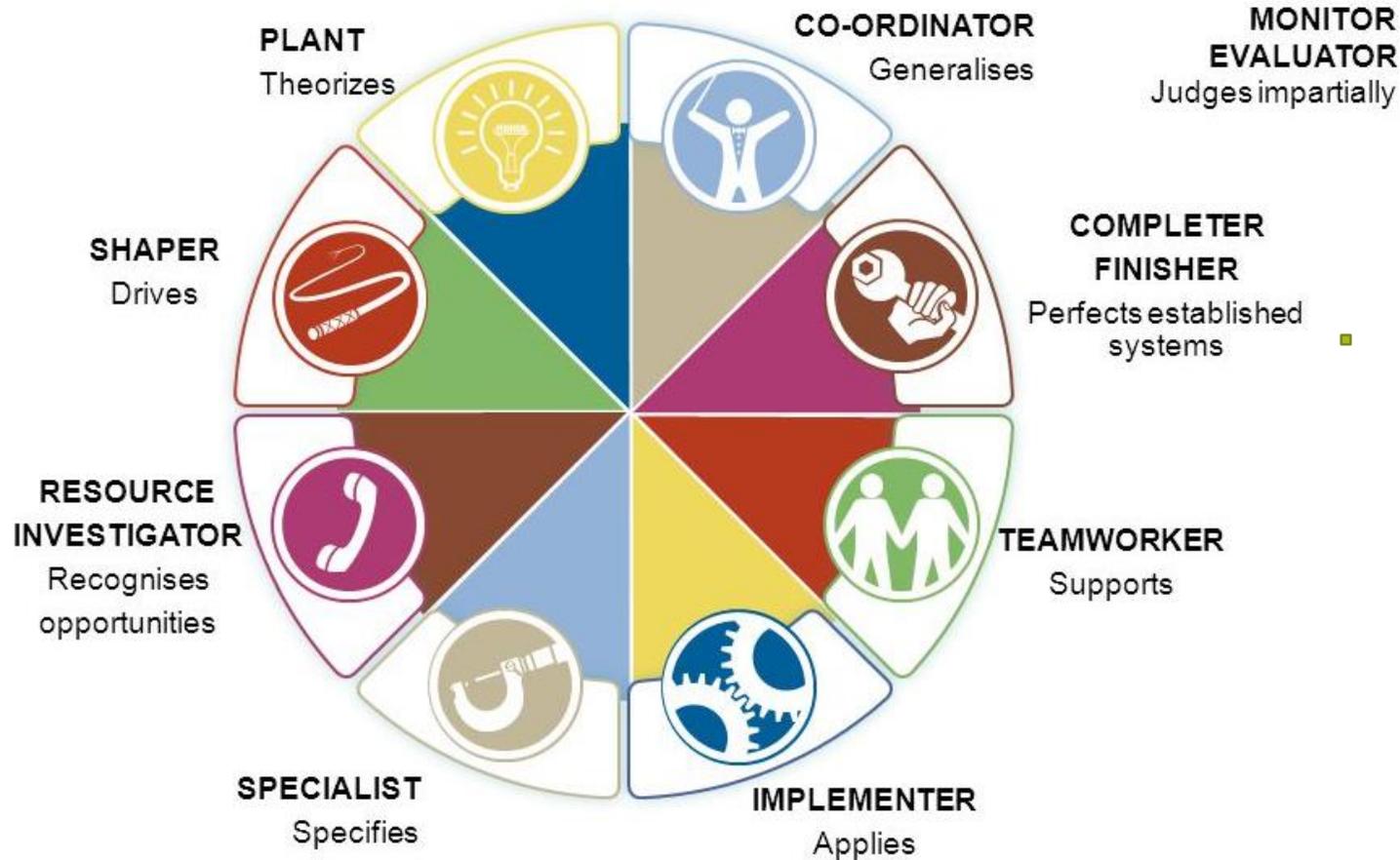


Their role as change agents



- Only a few key individuals are actively involved in biorefinery research, discourse, policy and initiatives; but many indirectly or interested
 - Co-ordination, facilitation and management,
 - Entrepreneurial and operational activities,
 - Advocacy and activism, and
 - Knowledge production and dissemination.
- Internal or external operating (often determined by organisational constraints e.g. IP)
- Exist within mainstream dynamics or are marginal agents (supported by Swilling (2016))
- Remainers or joiners
- Most are focused on R&D, however those in industry e.g. Sappi and Lignotech and via civil society e.g. WWF/Fetola are enabling implementation/uptake
- Those in civil society organisations tend to challenge ‘business as usual’ or take business to task
- Production and diffusion of knowledge, predominantly through research (e.g. providing an evidence-base to inform policy and strategy), proof of concept trials or as advisors.

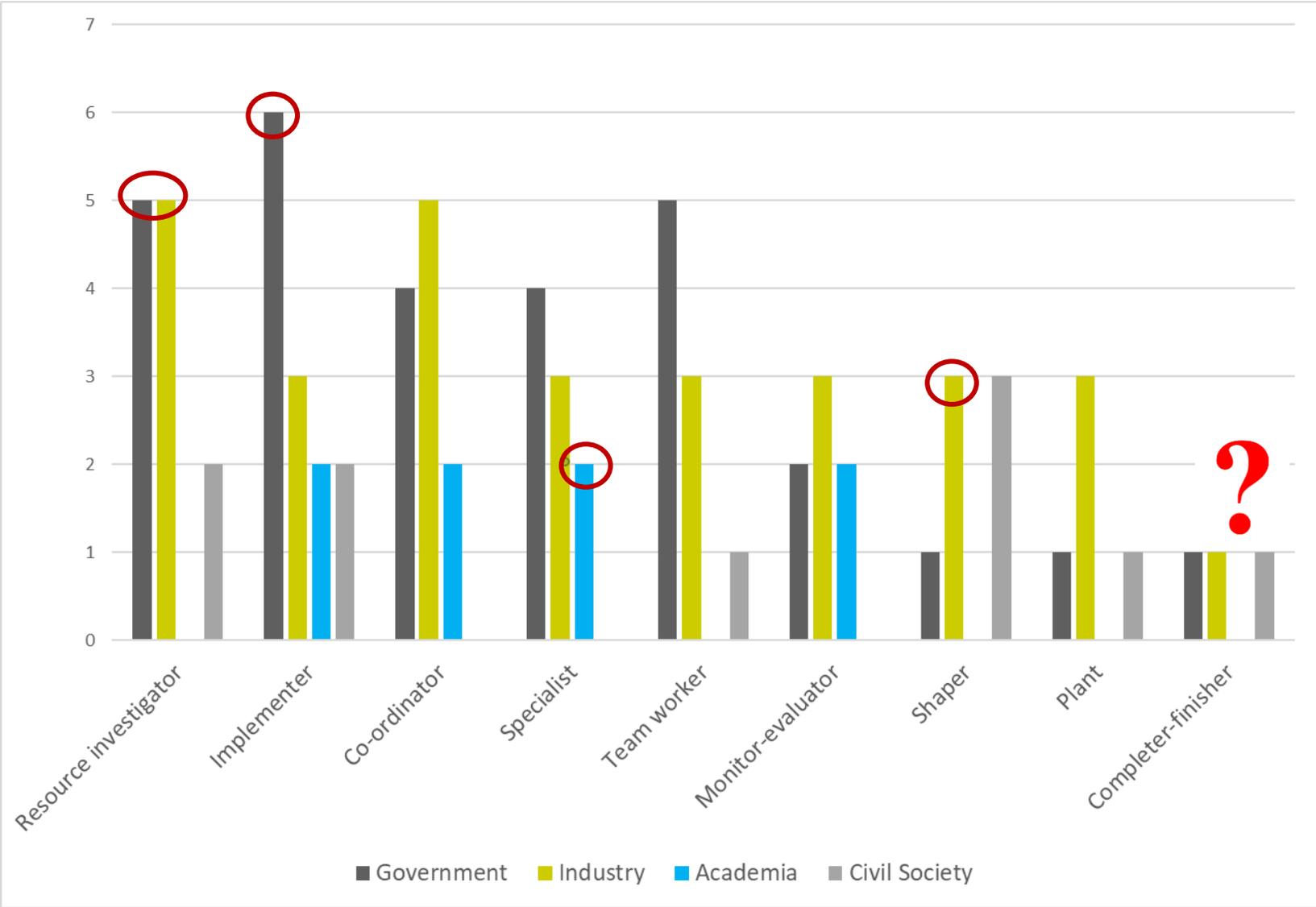
Behavioural preferences (Belbin & others)



Overlaid and aligned with other organisational individual role categorisations:

- **Boundary spanners** (Alexander et al., 2016 and (Safford et al., 2017)
- **Brokers** (Burt, 2001 & 2005)
- **Intermediaries** (see Chen et al., 2015)
- **Change makers / game changers** (Grandia, 2015; Kraft, 2017; Van Poeck et al. 2017)
- **Tempered radicals** (Sparks, 2005)
- **Positive deviants** (e.g. Appelbaum et al., 2007; Pascale et al., 2011; Seidman & McCauley, 2008)

Behavioural preferences



Challenges faced

There are some significant challenges prohibiting transformative change ...

- Restrictive (external and internal) processes and protocols
- Misguided and changing organisation focus
- Lack of colleague support and experience
- Poor government financial support at the implementation and policy-levels
- Industry reluctance to contribute financially (except Sappi)
- **Lack of unified co-ordination and focus at country-level**



What does this mean for delivering scaled innovative uptake within the SA biorefinery innovation system?

- Consider more than design, engineer, entrepreneur and management occupations and skills; include market researchers, investors, policy developers, HR and sales
- It is more than the people who make the loudest noise or networkers (plants and resource-investigators), also need completer-finishers, challengers, evaluators and idea generators
- Alignment of well-informed, evidence-based Government policy
- A unified platform or forum focusing on biorefinery/circular economy activities in the country
- To recognise the need for succession and skills planning
- How best to attract a demographically diverse youth into the sector, that may wander, but return (agriculture and forestry is 'sexy')

This will help to secure a more collaborative and commercially viable future for biorefineries.

It will also aid in the realisation of the significant benefits biorefineries can bring to unlocking jobs, contributing to the country's National Development Plan and transformation towards a green economy.



Thank you

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