
PEESA III
Personalized Engineering Education in South Africa
Accelerate
CAPE TOWN
Meaningful Partnerships
Impactful Collaboration
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- Regional Innovation System (RIS)
- Business-University Collaboration

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About Accelerate Cape Town (ACT)

- Founded 2006 – independent, private sector business leadership org.
- Represents interests of top, listed corporates in Cape Town city region
- Current membership represents >150 000 employees
- Network also includes: regional government (City & Provincial), academia (4 regional universities), regional partners (SPV, NGOs, etc.)

- Thought Leadership, Collaboration, Advocacy, Networking

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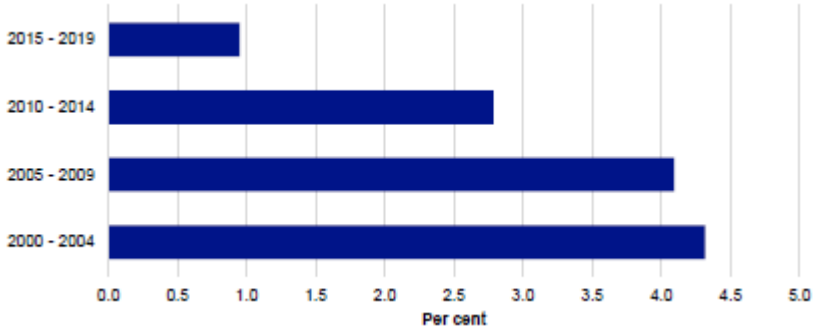
Western Cape Economy

- COVID-19 pandemic has been devastating – SA economy already in decline pre-COVID
- WC economy to contract by **6.9%** in 2020 & optimistically estimated to rebound by **3.8%** in 2021
- Net job losses for 2020: 151 744 (6.4%)

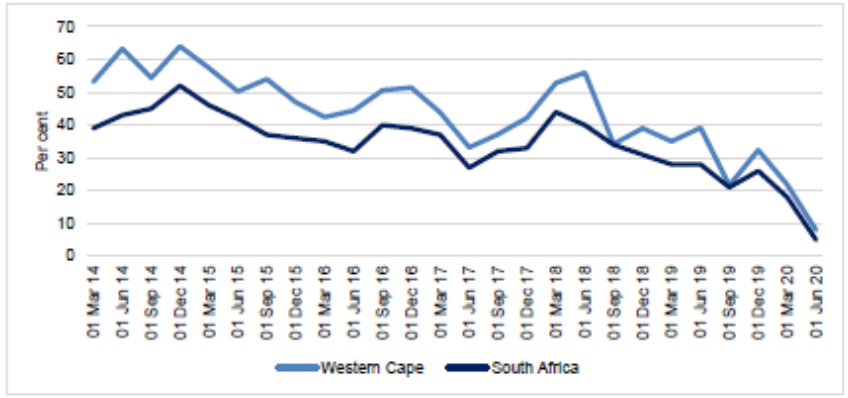
SA Real GDP growth forecast (%)	2020e	2021f	2022f
IMF	-7.5	2.8	1.4
World Bank	-7.8	3.3	1.7
OECD	-7.2	3.0	2.0
South African Reserve Bank	-7.0	3.6	2.4
National Treasury	-7.0	3.3	1.9
Moody's Investor Services	-7.0	4.5	1.1

Sources: IMF, World Bank, OECD, SARB, National Treasury, Moody's

Western Cape economic growth (5-year average), 2000 - 2019



Business confidence, Western Cape compared to South Africa, 2014 - 2020



Source: Quantec Research, 2020

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Western Cape Economy

- Manufacturing & Construction experienced very slow growth
- Tourism & the wine industry severely impacted in the Western Cape. Global travel has collapsed, and tourism flows and wine sales have ground to a halt after travel and alcohol bans were imposed.
- Tourism accounts for **4.5% of total employment** in South Africa

- Primary growth sectors (2019-2021 expected): agriculture, finance, insurance, real estate and business services. [*WC agriculture & agri-processing exports grew by **23.8%** in 2020*]

- Western Cape economy will continue to be driven by a **growing tertiary sector**, and experience accelerated urbanisation & the **need for skilled workers**.

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Western Cape Economy

- We cannot grow out of this crisis organically – we need to INNOVATE out of this
- Need to come back smarter, more innovative, more resilient, greener & more inclusive
- Recalibration in global value chains possible, particularly US dependence on Chinese supply chains? Also applicable to local import-dependent supply chains.
- **New non-traditional markets & sectors present new opportunities:**
  - Agriculture sector & agri-processing sectors
  - AgriTech
  - FinTech
  - HealthTech (BioTec)
  - eCommerce
  - ICT, Tech & BPO sectors
  - Digital economy & innovation
  - Green energy sector
  - Building energy resilience

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4th Industrial Revolution (4IR)

- Convergence of different technologies
- Seamlessly merging **physical**, **digital**, & **biological** spheres thereby impacting on social & economic sectors
- Technologies like: robotics, Ai, genomics, autonomous vehicles, mobile computing, smartphones, VR, AR, Internet of Things (IoT), additive manufacturing (3D printing), quantum computing, cryptocurrencies, bioengineering, big data, etc.
- Convergence of these technologies is resulting in the development of new products and services with increased efficiency & (hopefully) providing better quality of life

The COVID-19 response accelerated 4IR, and those who do not have access to internet and technology are at risk of being left behind.

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Digital Disruption

- All industries are being impacted by the disruptive nature of the 4IR

- Largest accommodation company in the world, doesn't own a single room (AirBnB)
- Largest transport provider doesn't own a single vehicle (Uber)
- Connectors of people have led to mass alienation & depression (FB, Instagram, Twitter)

- Who gains, who loses, what extra value has been created?

Is this a good thing (for SA)!?

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Is South Africa Ready for 4IR?

The 4th Industrial Revolution comes with Advantages and Risks

Connection (P-P, P-T, & T-T)

Efficiency

Better management and utilisation of Assets

Improve Lives

New Opportunities

Inability to Adapt

People not ready & skilled

Unable to capture benefits

New Security Concerns

Inequality will grow

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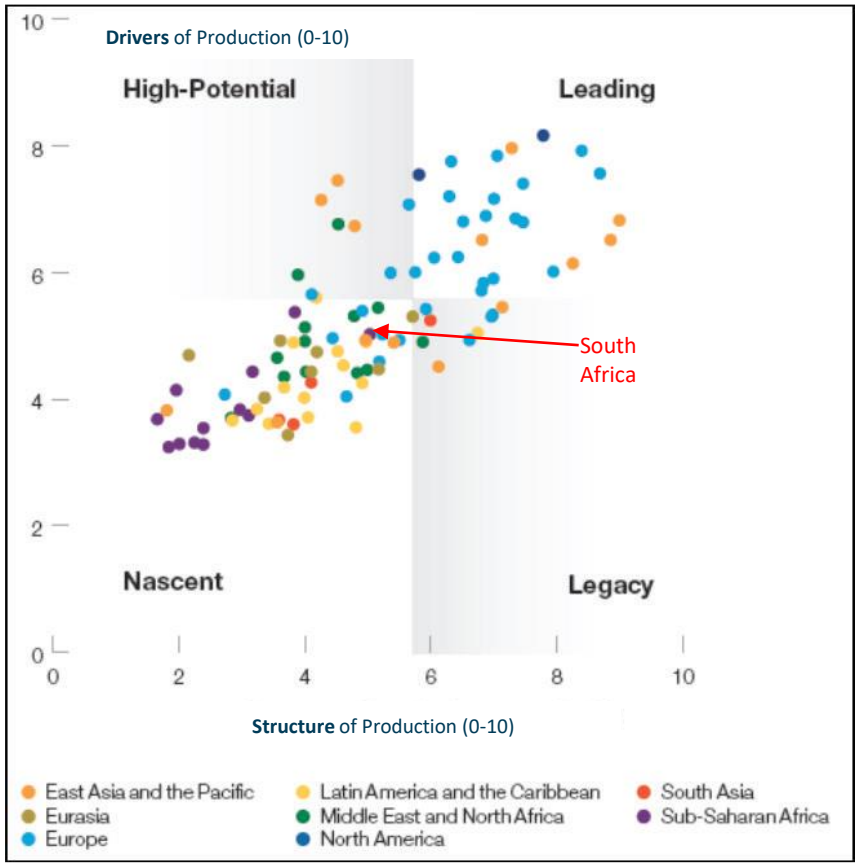
Is South Africa Ready for 4IR?

- **High Potential** – Limited current production base, but positioned well for the future [Australia, UAE, Norway, NZ]
- **Leading** – Strong current base and positioned well for the future [USA, China, Switzerland, Germany, Japan]
- **Legacy** - Strong production base, but at risk for the future [Mexico, India, Turkey]
- **Nascent** – Limited production base and at risk for the future [SA, Brazil, Indonesia]

WEF Readiness for the Future of Production Report 2018



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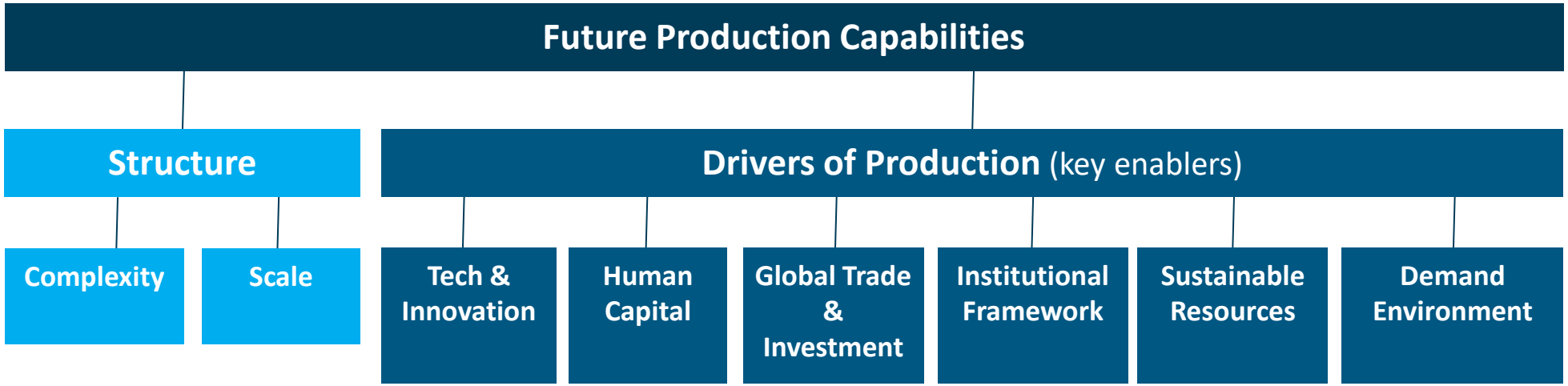
Is South Africa Ready for 4IR?



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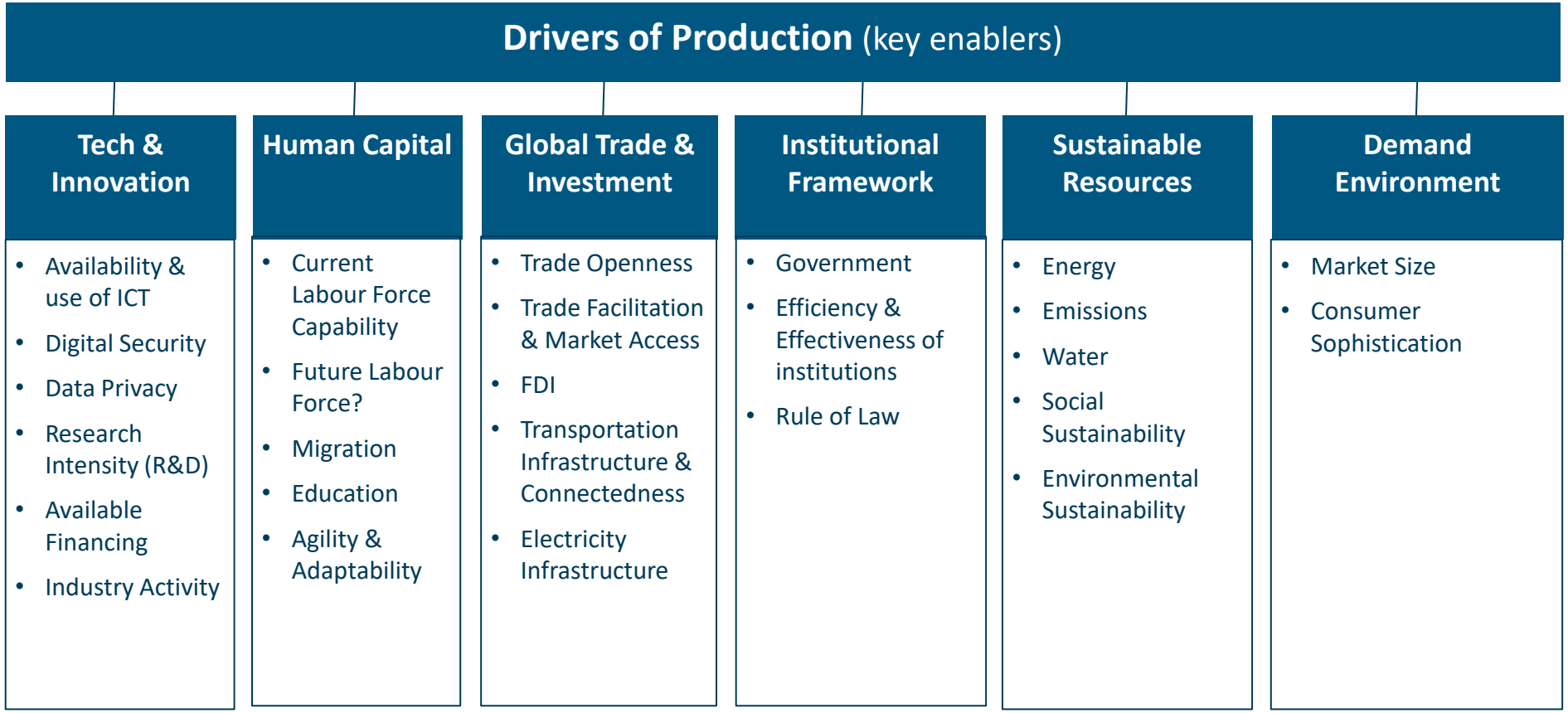
Is South Africa Ready for 4IR?



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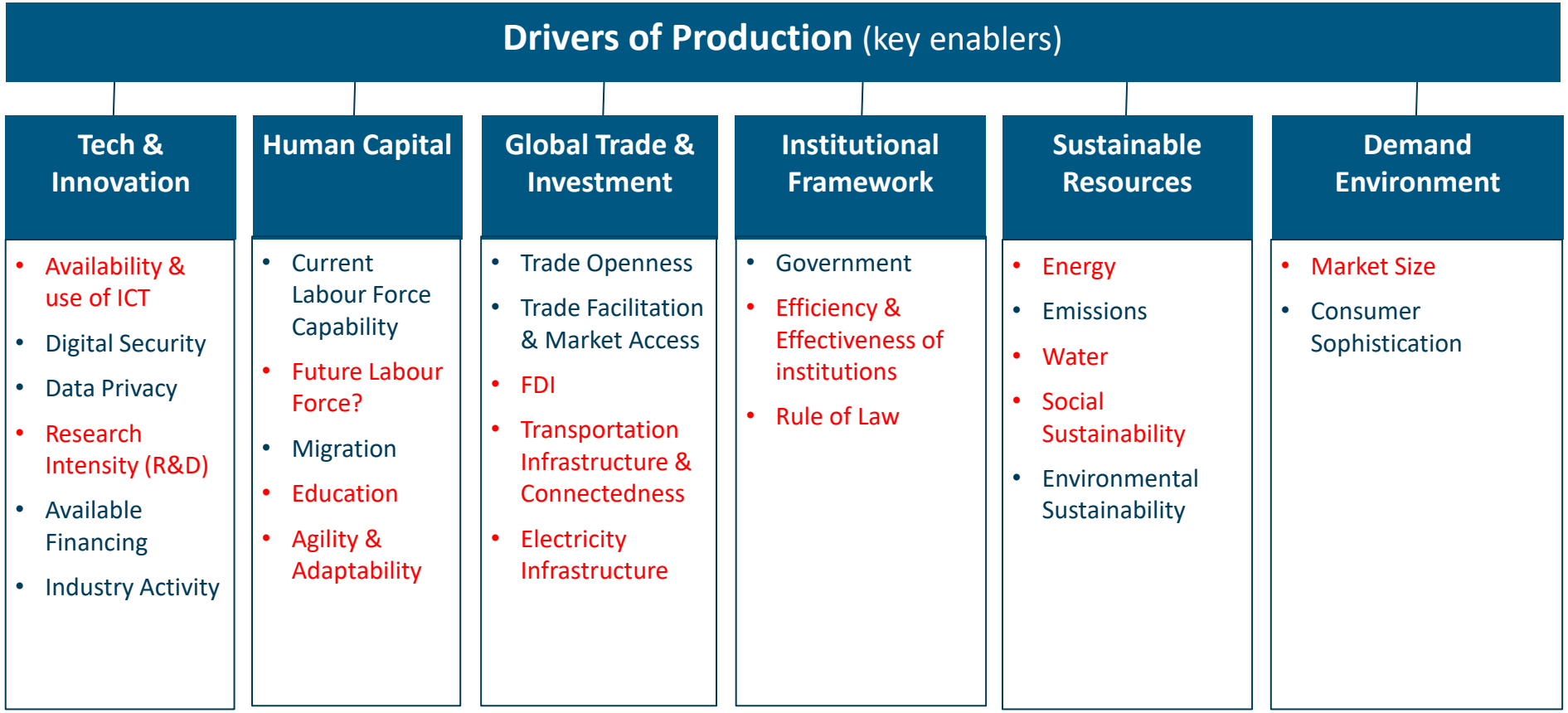
Is South Africa Ready for 4IR?



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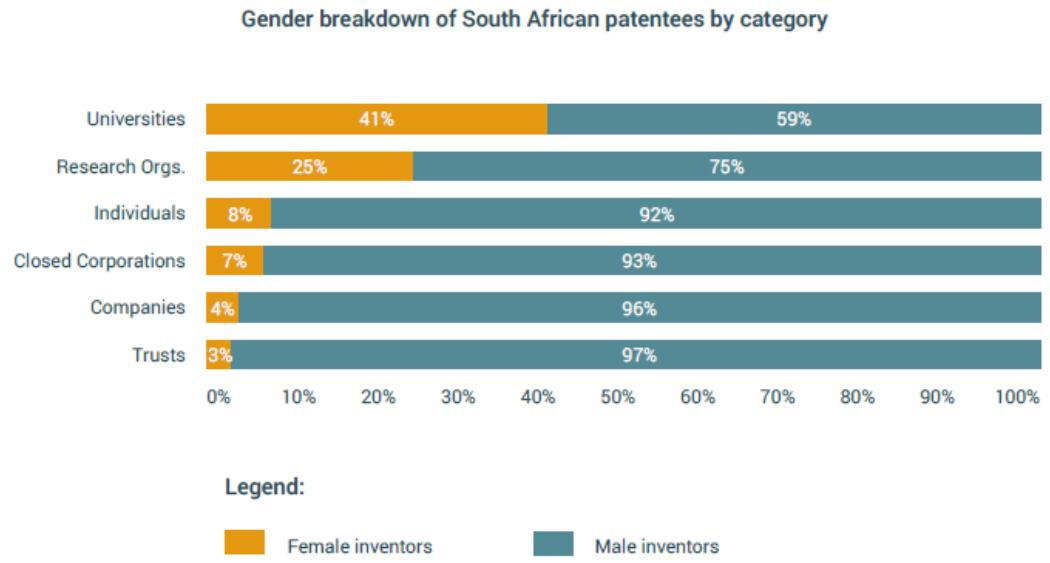
Regional Innovation - Who are South African patentees?

- Patents registered in South Africa between 2005 and 2015
  - **Total**: 40131 [**SA Patents**: 4064 (~10%, 400/yr); vs. **Foreign patents**: 36067]
- Ave. time from application to granting of patent: **13.5 months**
- **44.8%** - individuals; **39.5%** - private & public companies; **6.1%** - SA universities; **1.6%** state-owned research organisations (CSIR & Mintek)
- Gender disparity: only 9% of SA patents had a female inventor!



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Regional Innovation

- Publicly-funded research conducted by SA universities and research organisations (such as the CSIR and Mintek) - that results in the grant of SA patents, is more likely to result in innovations also securing patent protection outside of the country.
- What this strongly suggests is that **a primary driver of quality local innovation is the availability of public funding for research and development**, and not the existence of a permissive IP regime.
- South Africa needs to ensure that there are sufficient incentives for innovation

- One possible solution: **significant investment in public research institutions and universities**, as well as in the individuals they employ

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Regional Innovation System (RIS)

- Triple-Helix model: Innovation reliant on interactions between **Govt-Academia-Industry**
- Which of these components should be the driving force in the framework?
  - The shift towards a knowledge-based society has perhaps given a bigger role to universities - as innovation is increasingly based on scientific knowledge, the role of universities as creators of knowledge is more valued
  - Industry has the (financial) resources and access to markets
  - Government controls the legislative environment
- Strength of interaction is not currently ideal in SA
  - High redundancy between university and corporate R&D activity
  - SA IP legislation is onerous *(who owns the IP?)*
  - 'Push' vs. 'Pull' Innovation
  - Limited data and 'visibility' with respect to regional innovation

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Regional Innovation System (RIS)

- How do we measure levels of regional innovation – what are the indicators?
- A regional innovation systems (RIS) framework currently under development – via WCG & CHEC
- Potential to create a geographic information system (GIS) that charts regional innovation

Business-University Collaboration

Benefits for Business:

- to reduce cost and risk
- for new ideas and horizon scanning
- benchmark quality of a company's in-house R&D
- to develop skills, capability and profile
- to inform and enhance investment decisions
- derive future competitive advantage

Benefits for Universities:

- engagement with business-relevant research challenges
- access to company knowledge and resources
- new ideas for teaching and training
- improving market awareness and reputation
- creating new opportunities for the institution, its staff and students

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RIS Business-University Collaboration

How to measure and deliver value?

- It is difficult, and may also be misleading, to try to *directly* measure commercial outcomes of engagement
- Setting appropriate milestones for research projects is difficult and requires a high level of expertise

Delivering value from business-university engagement depends on many factors, including:

- The quality and extent of the engagement
- The experience and quality of the university staff and students involved
- Speed of response when needed: market changes may mean that quick answers are needed
- Aligned value propositions between the two sides of the partnership
- Stability of ownership and management (on both sides)
- Clarity of the challenge and of exploitation channels
- Appropriate flexible handling of IP and due consideration of commercial and other sensitivities

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Business-University Collaboration – Bridging the Divide

- Significant **cultural and communications divide** tends to impair industry-university partnerships
- The rise of a global knowledge economy has **intensified the need for strategic partnerships** that go beyond the traditional funding of discrete research projects
- NB to transform the role of the research university for the 21st century, anchoring it as a vital centre of competence to help tackle social challenges and drive economic growth
- Develop strategic partnerships that **merge the discovery-driven culture of the university with the innovation-driven environment of the company**
- The most productive collaborations are **strategic and long-term** - built around a shared research vision and establishing deep professional ties, trust and shared benefits

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Business-University Collaboration – Bridging the Divide

- **University leadership is vital** – industry partnerships as strategic priority, with input at the highest levels from both universities and business
- **Design incentives** for faculty & provide resources to put a clear priority on engaging with industry for mutual benefit and for the benefit of society
- **Long-term strategic partnerships** with built-in flexibility work best - focus the university's creativity and talent on enabling future innovations
- Start with a **shared vision** and develop a strategy – business & academic leaders should collaboratively map out the key questions and research challenges that are a high priority for both
- **Put the right people in charge** – those who cross boundaries, multidisciplinary individuals who are mentors and bridge-builders

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Business-University Collaboration – Bridging the Divide

- **Kick-start the dialogue** – create opportunities for academics and company researchers and executives with shared interest to come together and encourage cross-fertilisation of ideas
- **Don't get hung up on IP** - develop a broad overarching framework agreement and work out details on a case-by-case basis
- Encourage **multidisciplinary academic programmes** and promote the engagement of industry in such programmes - innovation depends on the ability of university & industry experts to work together across a number of disciplines, such as technology, design and engineering
- Companies & universities should **avoid trying to measure the value of an industry-university partnership** in artificial metrics such as papers published or patent applications filed - volume does not automatically equate with value
- Redefine the role of the research university - beyond teaching and public service research - to tackling key social challenges and helping drive economic growth

Bold, visionary partnerships between industry and universities can accelerate innovation and help deliver solutions to pressing social challenges

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Thank You!

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