



# South African Research Environment and Intellectual Property Rights on Publicly Financed Research and Development Act

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# Overview

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- ❑ The Innovation Hub
- ❑ Research and Innovation
- ❑ Intellectual Property Rights from Publicly Financed Research and Development Act
- ❑ Concluding Remarks



# Introduction: The Innovation Hub



Natl Forensics

Assaf

UP

The Innovation Hub

DST

GCS

SANBI

CHE

NACI

CSIR

NRF



# Introduction: The Innovation Hub



TIH

## Science and Technology Park

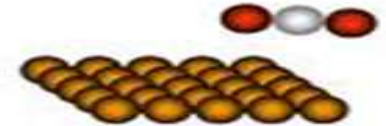
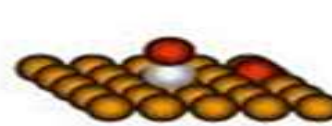
*Catalyst for socio economic development through  
innovation*



*a catalyst breaks bonds.....*



*.....and lets other bonds form*



### Strategic Objectives:

Promote socio-economic development and competitiveness of Gauteng through innovation:

- foster **entrepreneurship** and incubate new innovative companies
- create new **business opportunities** & add value to mature companies in high-tech sectors
- generate knowledge-based companies and jobs
- build **attractive spaces** for emerging knowledge workers
- **enhance synergy** between industry, government, academic



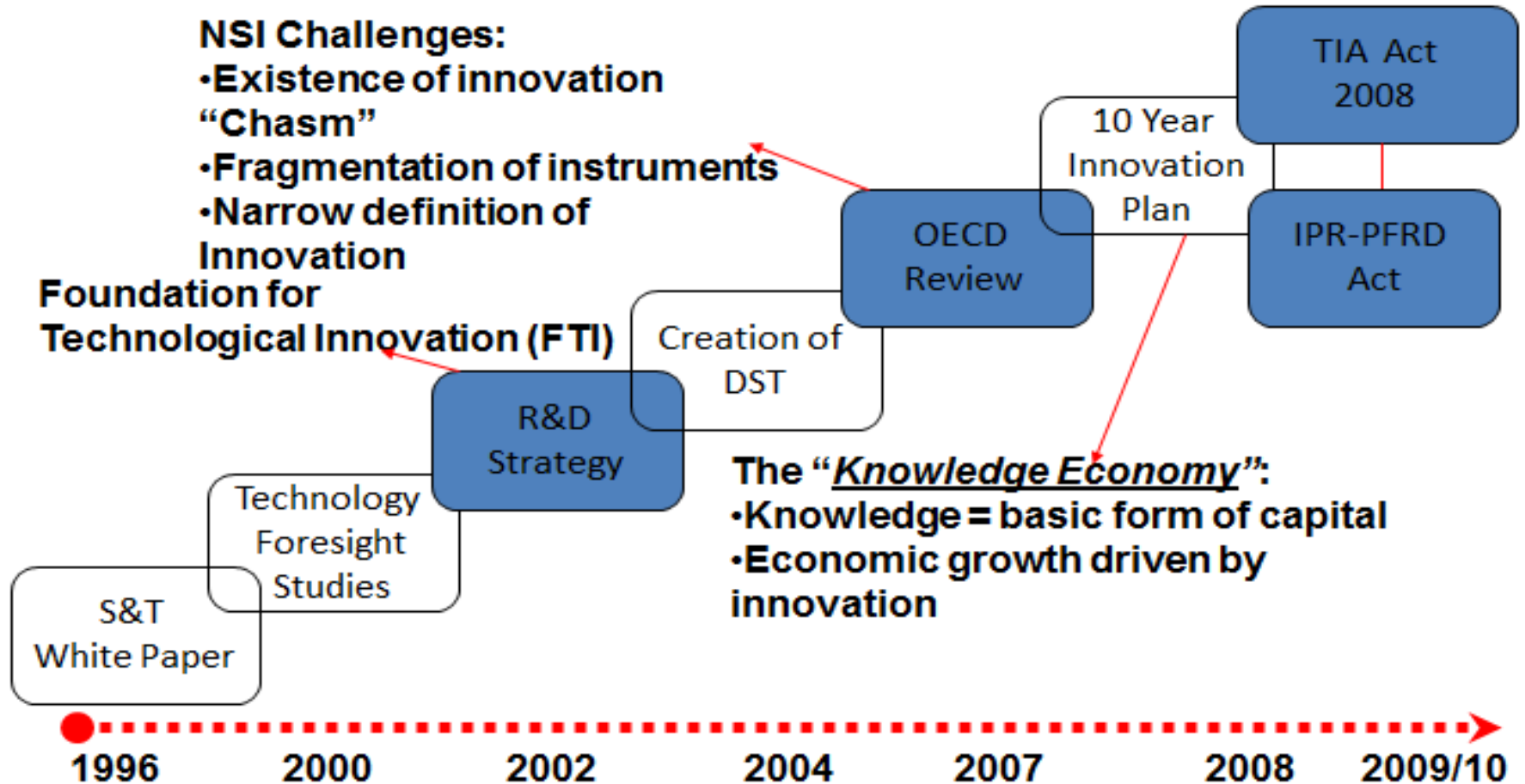
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# RESEARCH AND INNOVATION



# Research and Innovation:

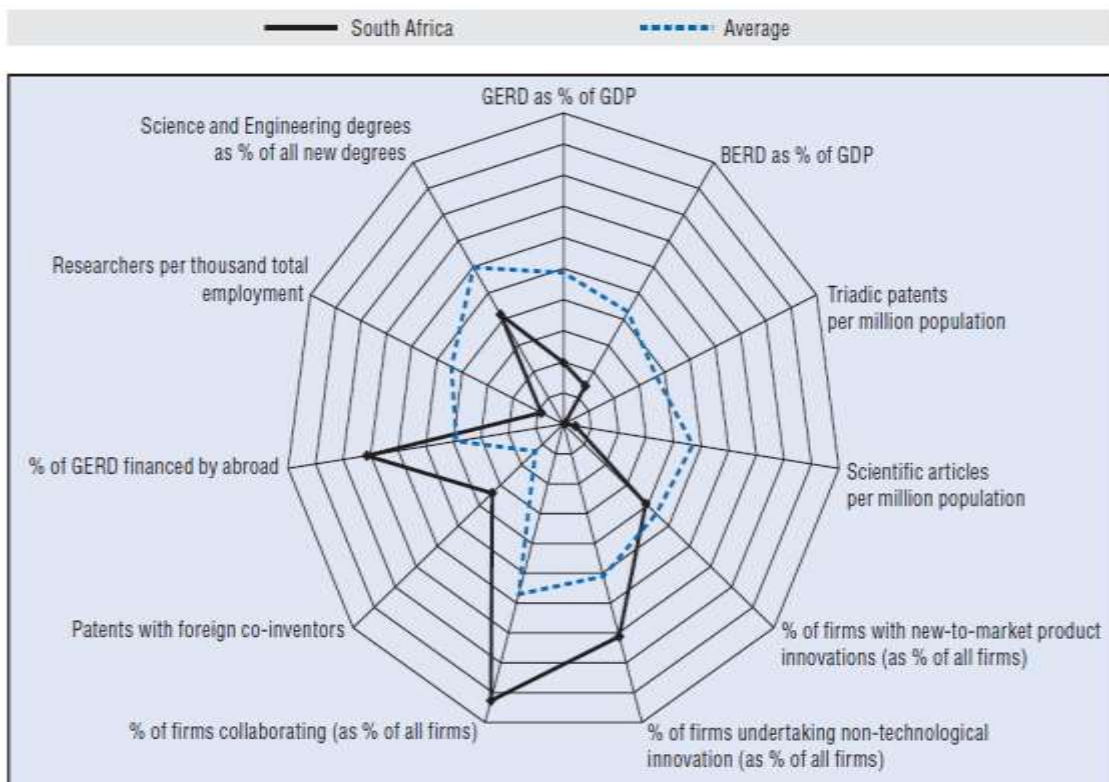
## South Africa's Innovation Policy Milestones



# Research and Innovation: South Africa and Knowledge Based Economies



Science and innovation profile of South Africa



**SA is out of kilter with international norms & this can have severe long-term consequences**

- **Relatively low number of innovation related inputs** (science and engineering graduates, researchers, innovation enabling skills)
- **Relatively low number of outputs and markers** (scientific research, patent production and expenditure on R&D)
- **Higher than average dependence on innovation being funded and driven internationally**
- **Business sector accounts - 44% of gross domestic expenditure on R&D (GERD)**

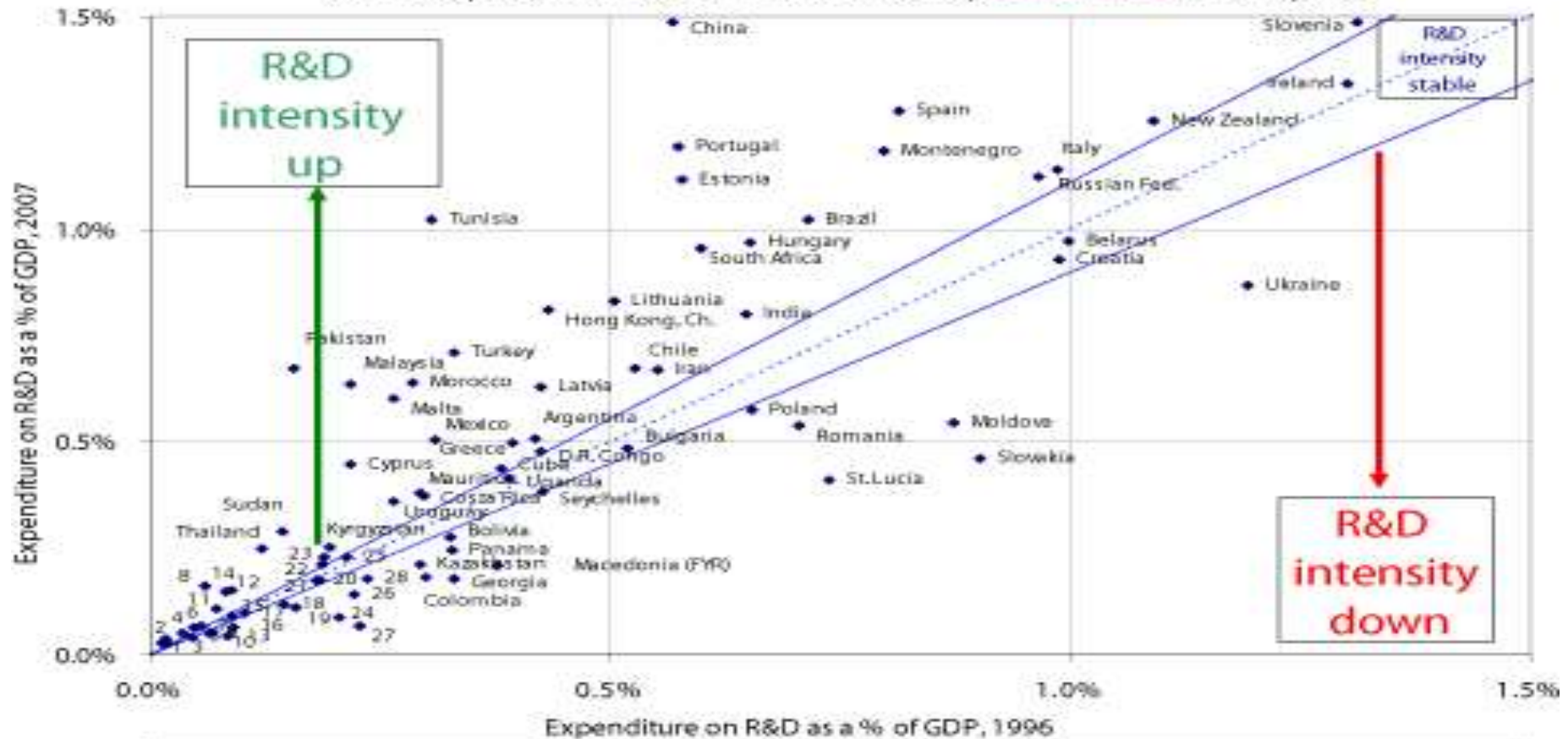


Source: OECD Science, Technology and industry Outlook, 2008

# Research and Innovation: R&D Intensity



The evolution of R&D intensity  
GERD as a percentage of GDP, 1996 (or earliest available year) and 2007 (or latest available year), countries with R&D intensity below 1.5% in both years.



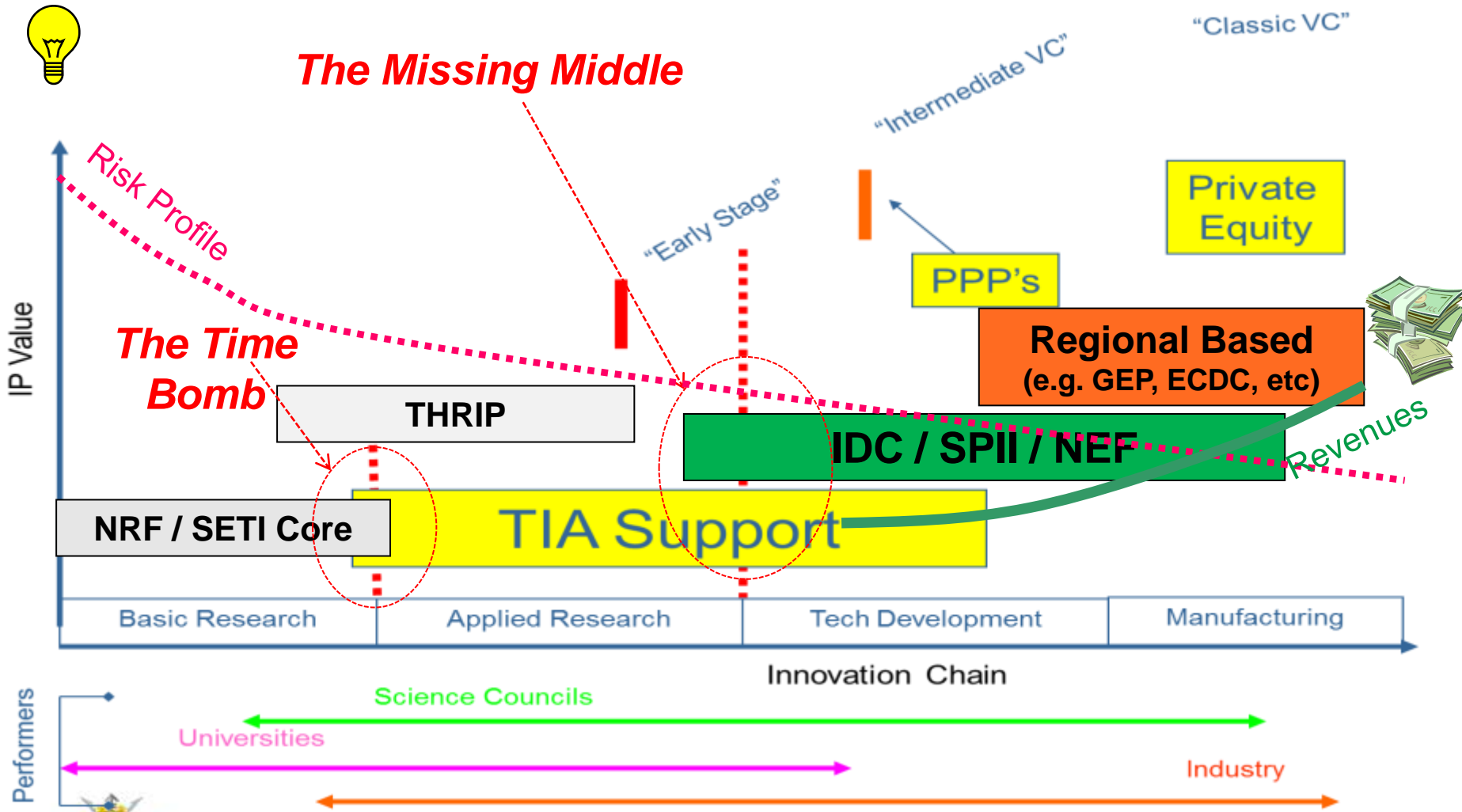
Note: countries in the left-bottom corner of the graph are represented by the following numbers: 1: Zambia; 2: Brunei; 3: Bosnia & Herzegovina; 4: Guatemala; 5: Honduras; 6: Lesotho; 7: Jamaica; 8: Myanmar; 9: Saudi Arabia; 10: Indonesia; 11: Macao, Ch.; 12: Peru; 13: Nicaragua; 14: Ecuador; 15: Paraguay; 16: Tajikistan; 17: Trinidad & Tobago; 18: Philippines; 19: Burkina Faso; 20: Ethiopia; 21: Sri Lanka; 22: Armenia; 23: Mongolia; 24: Kuwait; 25: Egypt; 26: Madagascar; 27: Algeria; 28: Azerbaijan.





# Research and Innovation:

## Funding: *Innovation Landscape*

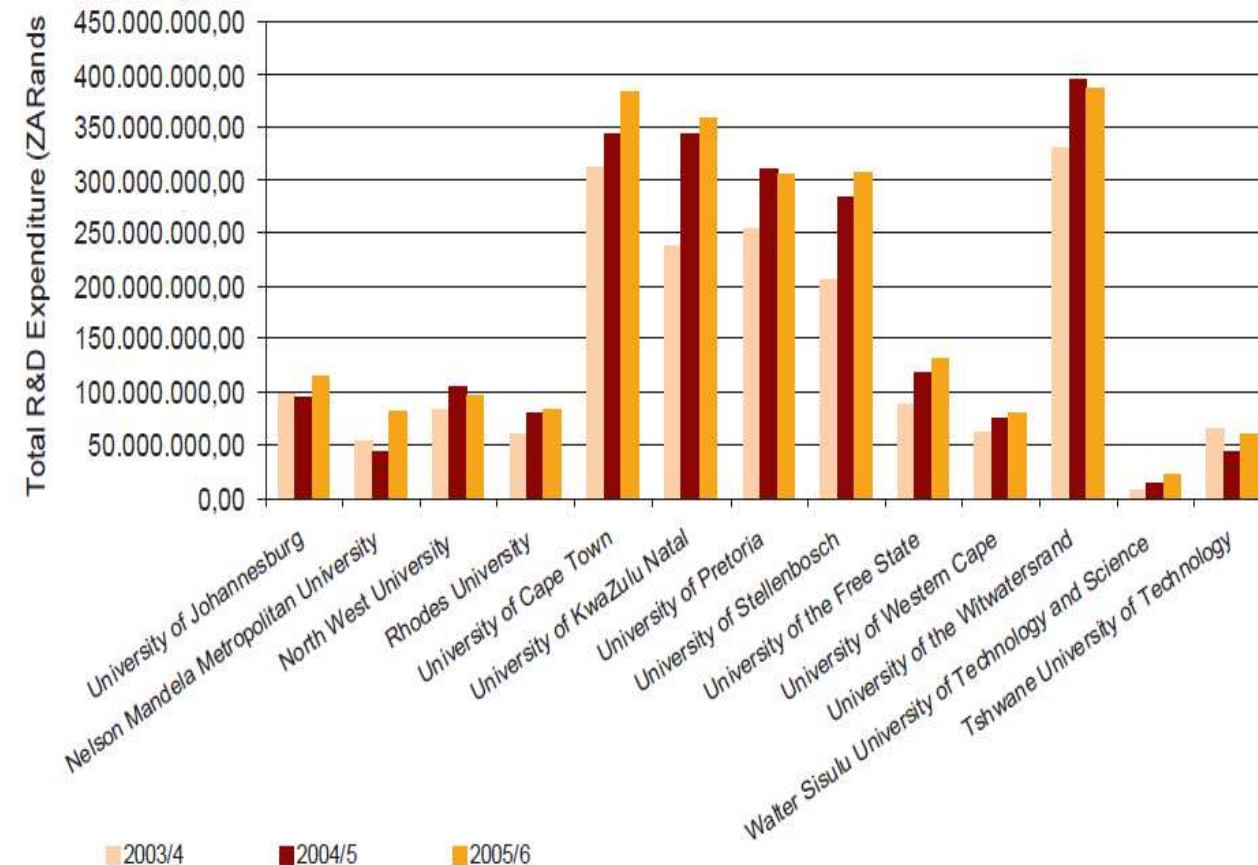


Adapted from DST, 2012

THE INNOVATION HUB®

# Research and Innovation:

## Funding: R&D Expenditure at Higher Education Institutions



- **Research Funding sources:**
  - Government
  - Private sector
  - Donor organisations
- **< 1/3 of higher education institutions**
  - R&D budgets in excess of R300m
- **Business sector:**
  - 44% of gross domestic expenditure on R&D (GERD)

Source: Human Sciences Research Council

Sibanda, M: in *THE ECONOMICS OF INTELLECTUAL PROPERTY IN SOUTH AFRICA*, edited by WIPO, 2009

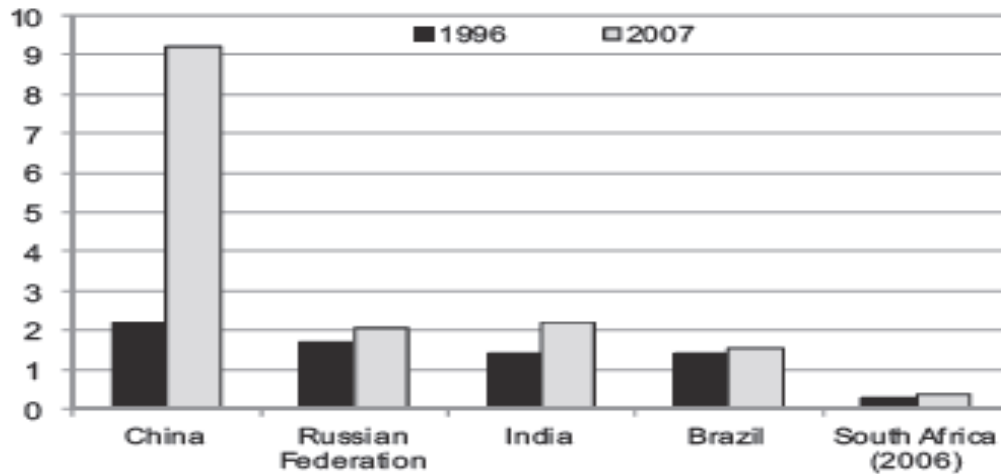


# Research and Innovation:

## Research Outputs: *BRICS Countries Publications*



Change in global share of total R&D  
1996 and 2007 (in %)



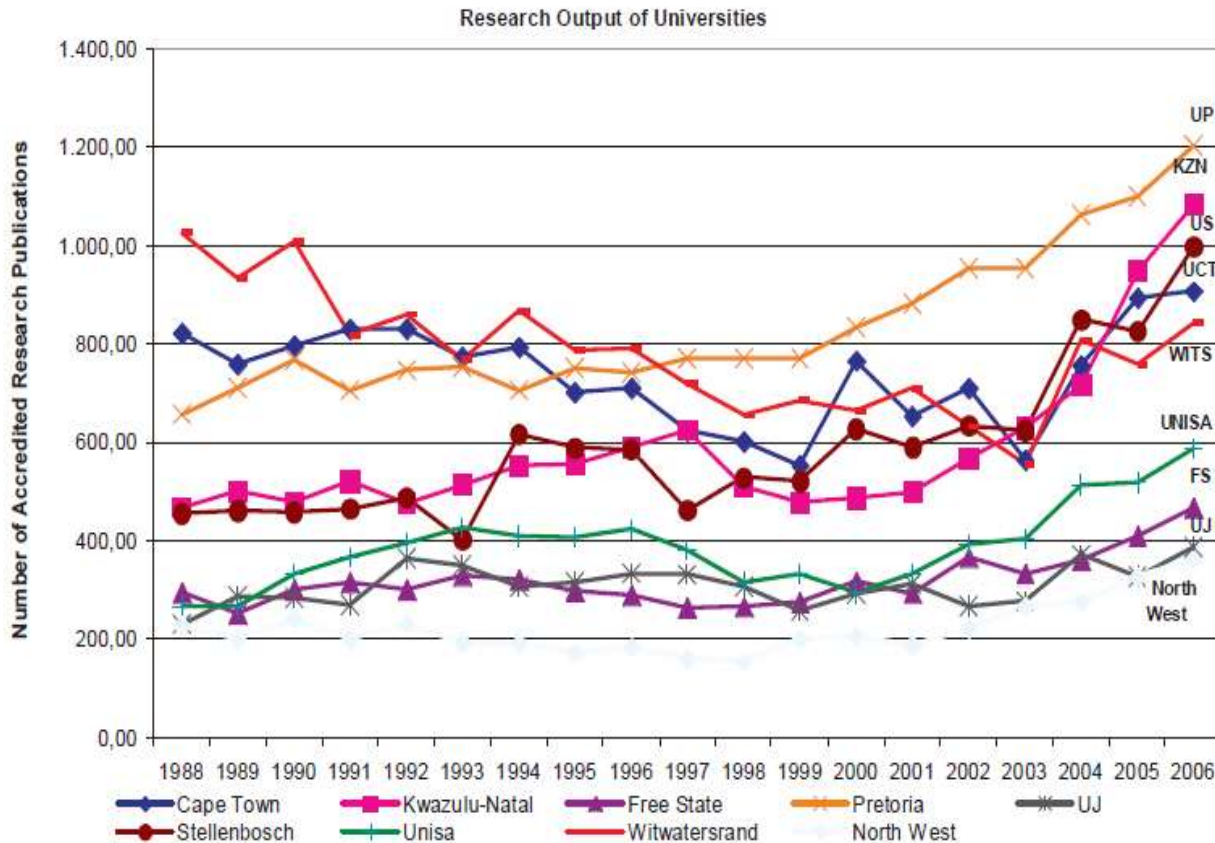
**1996- 2007, scientific articles from the BRICS (Brazil, the Russian Federation, India, Indonesia, China and South Africa) more than tripled...”**

Source: OECD Innovation Strategy: Getting a Head Start on Tomorrow, 2010

- **2002 R&D Strategy:**
  - Need to renew research capacity
- **OECD, 2010:**
  - human resources for science and technology low
- **NRF’s South African PhD Project**
  - number and diversity of South Africans with research doctorate degrees
- **Investment in research PhD capacity should yield increase in research output**



# Research and Innovation: Research Outputs: *University Publications*



- Increase since 2000
- Dominance by 8 higher education institutions
- Mandate of higher education institutions
- Higher publications per higher-education institution than patent filings
- Correlation between R&D expenditure and publication output

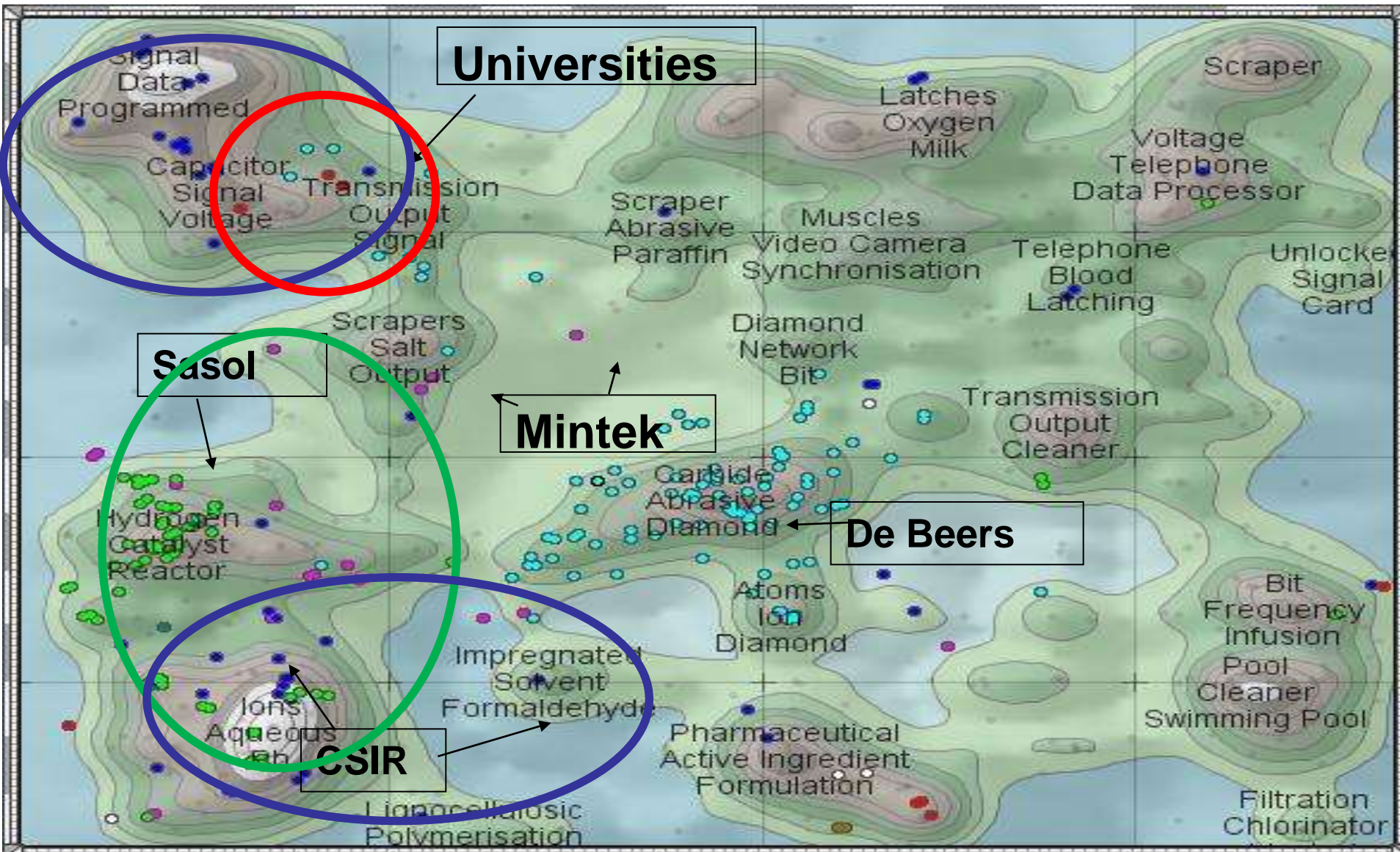
Source: Pouris, 2008

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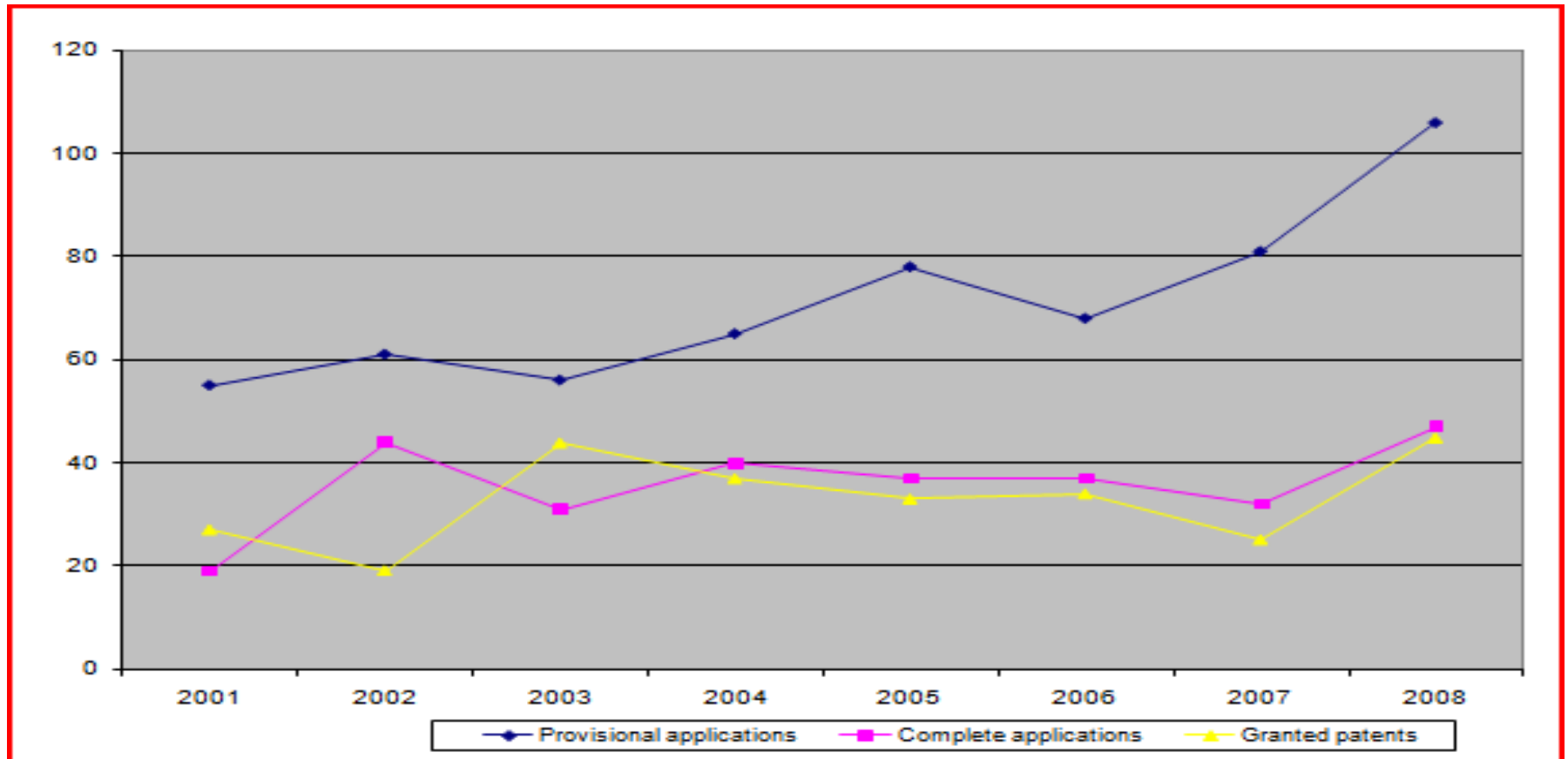
# Research and Innovation:

The State of Patenting 2008 Report – USPTO & EPO  
(1991 – 2005: 2050 patents)-5% from universities



# Research and Innovation:

## Research Outputs: *Domestic Patenting by Institutions*



2002 R&D Strategy

Patent Support Fund

IPR Policy Framework - 2006





# INTELLECTUAL PROPERTY RIGHTS FROM PUBLICLY FINANCED RESEARCH AND DEVELOPMENT ACT



# IPR-PFRD Act:

## *Value Proposition*



The World Economic Forum Global Competitiveness Report indicates a correlation between the protection of intellectual property rights and national competitiveness. In 2004, the 20 countries that were perceived as having the most stringent intellectual property protection were classed among the top 27 in the WEF's growth competitiveness index. Conversely, the 20 countries perceived as having the weakest intellectual property regimes were ranked among the bottom 36 for growth and competitiveness.





# IPR-PFRD Act

## Africa - A Dark Continent?



### The New World Powers in Innovation

Measuring innovation by how many patents a country files for each dollar of research budget reveals the true map of innovation winners around the globe. And The Republic of Korea is leading the way in efficiency.



Japan	patents granted	517,364	Singapore	patents granted	995
United States of America	patents granted	134,760	New Zealand	patents granted	896
Republic of Korea	patents granted	102,833	Denmark	patents granted	874
Germany	patents granted	56,091	Brazil	patents granted	585
China	patents granted	26,292	Hong Kong (SAR), China	patents granted	406
France	patents granted	25,688	Zaich Republic	patents granted	403
Russian Federation	patents granted	19,641	Hungary	patents granted	399
United Kingdom	patents granted	13,103	Luxembourg	patents granted	337
Netherlands	patents granted	9,949	Slovenia	patents granted	277
Switzerland	patents granted	9,857	Finland	patents granted	252
Canada	patents granted	7,533	Portugal	patents granted	196
Sweden	patents granted	7,224	Turkey	patents granted	184
Poland	patents granted	4,341	Thailand	patents granted	158
Australia	patents granted	4,163	Indonesia	patents granted	114
Austria	patents granted	3,537	Belarus	patents granted	98
Spain	patents granted	3,221	Latvia	patents granted	87
Belgium	patents granted	2,773	Croatia	patents granted	83
Israel	patents granted	2,534	Chia	patents granted	78
India (2008)	patents granted	2,267	Lithuania	patents granted	69
Denmark	patents granted	2,170	Denmark	patents granted	63
Poland	patents granted	1,216	Belgium	patents granted	8
Norway	patents granted	1,138	Italy	patents granted	6

### Patent Filings Per Research and Development Expenditure

Figures taken from "World Patent Report: A Statistical Review (2008)"  
Supplied by the World Intellectual Property Organization



The size of the box illustrates relative patent filings per R&D expenditure



**No Data Available for the Following Countries:**  
Albania, Angola, Benin, Chad, Dominica, Gabon, Ghana, Iraq, Libyan Arab, Jamahiriya, Papua New Guinea, Saint Kitts and Nevis, United Republic of Tanzania, Ethiopia, Marshall Islands, Mauritania, Saint Vincent and the Grenadines, T.F.Y.R. of Macedonia, Bahrain, Nigeria, Oman, Cameroon, Bolivia, Vietnam, Saint Lucia

# IPR-PFRD Act:

## Case Study: *South Korea*



**The intellectual property system was an important catalyst for the development of indigenous technology by Korean companies, several of which have become global market leaders. Korea's spectacular transformation from a poor farming economy in the 1960s with a per capita income of less than US \$100 to a highly industrialized country with a per capita income of US \$12,000 today, resulted from a systematic economic and trade development policy that included incentives for technological innovation and the development of domestic intellectual property assets.**

Chulsu Kim, Integrating Intellectual Property into the National Development Policy: the Korean Experience, keynote address at WIPO/ KIPO Ministerial Conference on Intellectual Property for Least Developed Countries



# IPR-PFRD Act:

Case Study: USA – Bayh Dole ...1/2



- ❑ **Prior to Bayh-Dole, government used to own intellectual property developed in university and federal laboratories**
  
- ❑ **Bayh-Dole Legislation**
  - Ownership with universities and federal laboratories – institutional IP Policies
  - Empowered to commercialise their intellectual property and innovations
  - Preference for SME
  - Substantial manufacture in the USA



# IPR-PFRD Act:

Case Study: USA – Bayh Dole ...2/2



**Universities creating 1.25 new products a day**

**Campus patenting 495 issued patents in 1980**

**3,278 issued patents in 2005**

**4,932 academic licenses in 2005**

**28,349 active licenses overall**

**Biotechnology industry rooted in academic research**

**Nanotechnology following similar trend**

From: Joe Allen, USA, Ex-staffer to Senator Bayh,



# IPR-PFRD Act:

Background: 2002 R&D Strategy ...1/2



## Drivers for managing IP (2002 R&D Strategy)

- ❑ Differences in **patent rates** represents one of the greatest “divides” of the knowledge age
- ❑ Intellectual Property:
  - Instrument for wealth creation
  - Must generate social & economic benefits to Republic
  - innovation, diffusion of scientific and technical knowledge
  - Market competitiveness
- ❑ Legislative framework for IP from publicly financed R&D
  - Clear rights & obligations



# IPR-PFRD Act:

Background: 2002 R&D Strategy ... 2/2



- ❑ **Disparate policies on IP ownership and commercialisation**
  - Loss of IP to foreign jurisdictions - little benefit to public
  - Poor commercial practices - IP sitting on shelves
  - IP as instrument for wealth creation / social development
- ❑ **No balance of incentives and regulation**
- ❑ **Unbalanced relationship in negotiation of IP arrangements**
  - Universities, research institutes and business
- ❑ **Low public spending accountability**



# IPR-PFRD Act:

## Background: *Institutional Arrangements*



INSTITUTION	IP POLICY	INSTITUTION	IP POLICY
University of Cape Town	Yes	University of Pretoria	Yes
University of Stellenbosch	Yes	North West University	Yes
Nelson Mandela Metropolitan University	Yes	University of the Witwatersrand	Yes
Rhodes University	Yes	University of Limpopo	No
Walter Sisulu Metropolitan University	Yes	Mangosuthu University of Technology	No
Durban University of Technology	No	University of KwaZulu-Natal	No
University of Fort Hare	No	UNISA	No
Cape Peninsula University of Technology	No	University of Western Cape	No
Vaal University of Technology	No	Vaal University of Technology	No
University of Johannesburg	Yes	Tshwane University of Technology	Yes
Central University of Technology	No	University of Zululand	No
CSIR	Yes	Water Research Commission (WRC)	Yes
Medical Research Council (MRC)	Yes	Agricultural Research Council (ARC)	Yes
Mintek	Yes		

- Different approaches to intellectual property management:
  - Ownership
  - commercialisation
- Most had no intellectual property policy
- Capacity to manage intellectual property
- Not all are research institutions
- Science Councils / HEIs

Sibanda, M: in *THE ECONOMICS OF INTELLECTUAL PROPERTY IN SOUTH AFRICA*, edited by WIPO, 2009



# IPR-PFRD Act:

Background: *Key Issues* ... 1/2



- ❑ **Intellectual property (patents) must be secured on the outputs of publicly financed research**
  - Obligation to disclose potential IP
  - Government can secure IP if institution does not
  
- ❑ **Obligations and benefits are linked**
  - Ownership
  - Obligation to commercialise
  
- ❑ **Individuals and institutions have defined rights**
  - Ownership
  - Benefit sharing





# IPR-PFRD Act:

Background: *Key Issues* ....2/2



- ❑ **Certain patents can be secured to protect public interest and will not be licensed on commercial terms**
- ❑ **Preferences in commercialisation**
  - non-exclusive licensing
  - local licensing
  - SMMEs and BEEs as licensors
- ❑ **Government has walk-in rights on publicly financed IP in the national interest – free licence**
- ❑ **Revenue to institutions will grow but it is not expected to be a major source of finance at the system level**



# IPR-PFRD Act:

## Background: *Guiding Principles*



- ❑ **Consistent approach in protection of IP**
- ❑ **Benchmark against good global practice and contextualise for local efficacy**
- ❑ **Identify key rights, functions & obligations**
- ❑ **Good balance between incentives and control**
- ❑ **Certainty in terms of publicly financed IP**
- ❑ **Must not hinder private-public collaborations**



# IPR-PFRD Act:

Definitions: *Intellectual Property*



**“intellectual property means any creation of the mind that is capable of being protected by law from use by any other person, whether in terms of South African law or foreign intellectual property law, and includes any rights in such creation, but excludes copyrighted works such as a thesis, dissertation, article, handbook or any other publication which, in the ordinary course or business, is associated with conventional academic work”**

- **Broad definition**
  - based on World Intellectual Property Organisation (WIPO) definition
- **Reference to foreign law**
  - Recognition of territoriality of intellectual property rights
- **Exclusion of ‘conventional academic work’**
  - Ensure no interference with academic freedom
  - Assumption that value assessment would have been done by time of publication, thesis, etc.



# IPR-PFRD Act:

## Object



*“The **object** of this Act\* is to make provision that **intellectual property emanating from publicly financed research and development is:***

- **identified;**
- **protected;**
- **utilised and commercialised**

*for the **benefit of the people of the Republic.....”***



# IPR-PFRD Act:

## Key Provisions



### Disclosure and Ownership of Intellectual Property

- \* Recipient has title to IP
- \* Obligation to protect
- \* NIPMO may in national interest where recipient elects not to proceed

### Institutional Arrangements

- \* National Intellectual Property Management Office (NIPMO)
- \* Office of Technology Transfer

### Benefit Sharing Arrangements

- \* > 20% of initial gross revenues
- \* > 30% of nett revenues

### Co-financed R&D

- \* Option to exclusive licence
- \* Joint Ownership possible

### Government Rights

- \* non-exclusive licence for national need
- \* Non-commercialisation
- \* Assignment in case of non-disclosure

### Local IP Transactions

- \* Licences no approval required
- \* Assignment: NIPMO Approval

### Off-shore IP Transactions

- \* Exclusive Licences & Assignments require approval
- \* Capacity in and benefits to Republic

Full Cost R&D



REGULATIONS, 2010

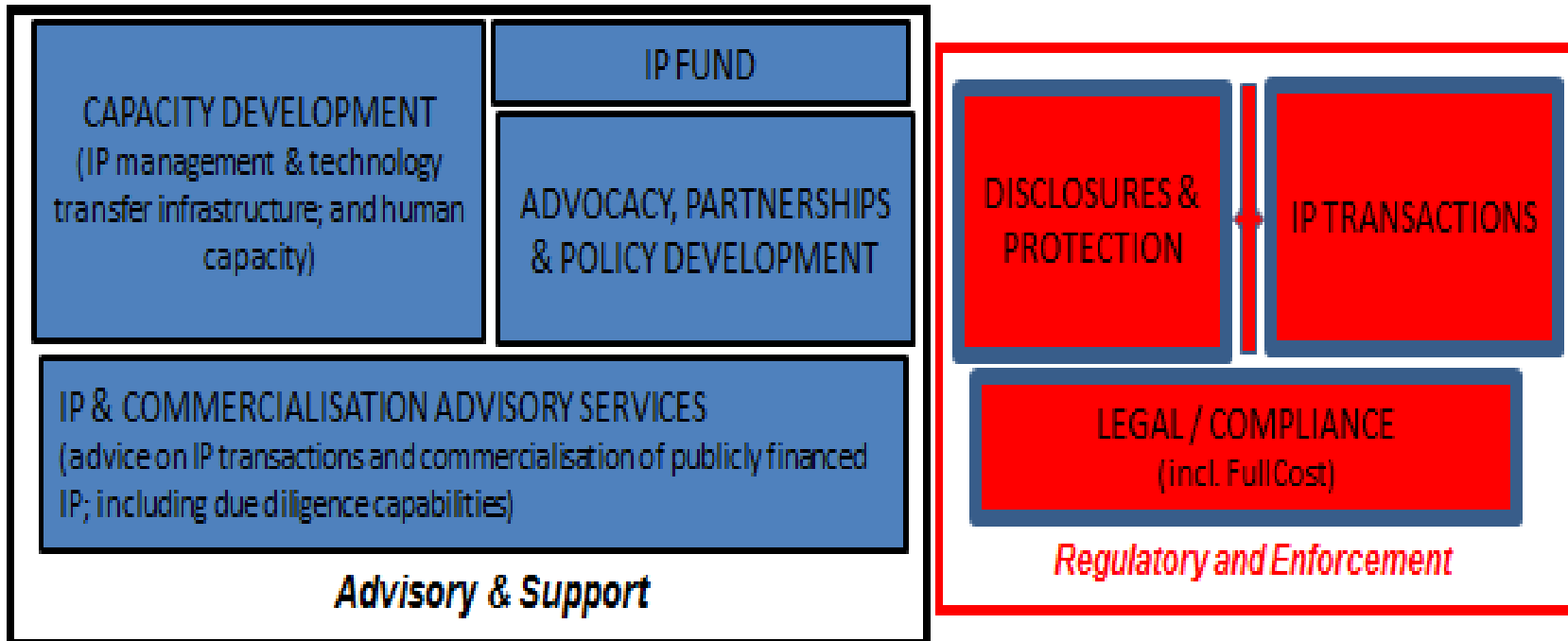


# IPR-PFRD Act:

Key Provisions: *NIPMO*



## NATIONAL INTELLECTUAL PROPERTY MANAGEMENT OFFICE



# Concluding Remarks ... 1/2



## ❑ Funding Mechanisms

- Inadequate funding of basic and applied research being undertaken to feed the innovation pipeline

## ❑ Impact of IPR-PFRD Act:

- Research Cooperation
- Industry Participation at institutions
- Level of foreign funding
- Publications / Patents / Copyright

## ❑ Coexistence of Patents and Publication

- Delays in publication necessitated by novelty requirements
- Two forms of disseminating research results
- Researchers incentives based on publication – awareness important



# Concluding Remarks ... 2/2



- ❑ South Africa must adequately **renew its human resources for science and technology**, *“by younger groupings more representative of our demographics”*
- ❑ SKA Project
  - Significant opportunities for development of critical human resources to support South Africa’s research and innovation system in the future
- ❑ South Africa poised to be a significant player in global arena in terms of research and innovation
  - R&D expenditure
  - Publications and intellectual property
  - Innovation and global competitiveness





# THANK YOU



*The Innovation Hub  
- Innovation catalyst for a smart province: Gauteng -*

