



RESEARCH & INNOVATION IN THE BRICS

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Outline

- Comparing the BRICS
- Policy Frameworks
- The role of Government in R&I
- The Higher Education Sector
- Business Sector and Partnerships
- Challenges
- Innovation & Technology
- Global Innovation Index



Comparing the BRICS

<u>Country</u>	<u>Population (m)</u> 2012	<u>HDI ranking</u> (out of 187)	<u>GDP per capita</u> (PPP \$)
Brazil	198	85	10 152
Russia	143	55	14 461
India	1260	136	3 285
China	1350	101	7 945
South Africa	51	121	9 594



R & I Policy Frameworks

- Enormously complex and diverse systems; also very large especially in the case of China and India
- Complicated also by the (relatively) recent transition to market economies (e.g. China and Russia) and out of apartheid (S Africa)
- Policy frameworks for R&I are dynamic and evolving with changing circumstances
- Example 1: Brazil – innovations to promote linkages between S&T and industrial policy
- Example 2: India – New Knowledge Commission and 20 new ‘innovation universities’



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- Example 3: Technoparks to enhance collaboration between govt., universities, business – Brazil, Russia, China, India
- Example 4: Close link between govt-sponsored Science Councils and Universities – South Africa
- Increasingly effective role being played by Ministries of Science and Technology/Higher Education



Role of Government

- Policy Framework
- Funding
- Active participant in research – China, India, SA, Russia
- Promotes collaboration with universities and/or business sector – Brazil, China, India, Russia



The Higher Education Sector

- **Knowledge Production**
- **India** – relatively weak; most universities still focused almost exclusively on teaching
- Research focused in a number of specialist research centres separate from universities
- **South Africa** – “medium knowledge” producing country but differentiated with D a “historical accident”
- 70% of researchers in in HE sector and 5/23 universities account for 70% of research



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- Brazil – public universities 90% of articles, with 10 producing 60%
- China – currently KP dominated by Academy of Sciences but university production increasing rapidly
- Russia – dominated by AoS with Moscow State University leading HE institution
- Fares relatively poorly in comparison with other BRICS – only 2 institutions in top 20 (RAS), China 7; Brazil: 5; India 4; SA 2



Business Sector & Partnerships

- Business sector active participant in all countries with the exception of India
- Often not enough government incentives – e.g. SA and India
- Innovative relationships are being built between govt, universities, business esp. in Brazil, and China and to a lesser extent Russia



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- Good examples of university-industry partnerships are the Technoparks and business incubators in Brazil, China, India and Russia



Challenges

- Poor quality of schooling – India, SA
- Inadequate public and private investment – India, SA, Brazil
- Inadequate human resources
- Inappropriate policies and/or lack of proper coordination between policy and implementation
- Lack of understanding of the importance of a knowledge-based economy for developing countries



Innovation & Technology – R&D

<u>Country</u>	<u>Exp. as % of GDP</u>	<u>Researchers /m people</u>
Brazil	1.1	696
Russia	1.3	3091
India	0.8	136
China	1.5	1199
South Africa	0.9	396

Source: UNDP Human Development Report, 2013



...contd. - Innovation

Country	Patents/m people	Royalty and licence fees, \$, p.c.
Brazil	17	3.0
Russia	212	6.1
China	101	0.6
India	5	0.1
S.A.	106	1.3



...contd. – Technology Adoption

Country	Personal computers (per 100 people)	Internet users (per 100 people)
Brazil	6.8	26.5
Russia	13.3	43.4
China	5.7	34.4
India	3.2	7.5
S.A.	8.4	12.3



Global Innovation Index (GII)

Country	GII	Innovation Outputs	Innovation Inputs
Brazil	64	68	67
Russia	62	72	52
China	35	25	46
India	66	42	87
S.A.	58	71	51