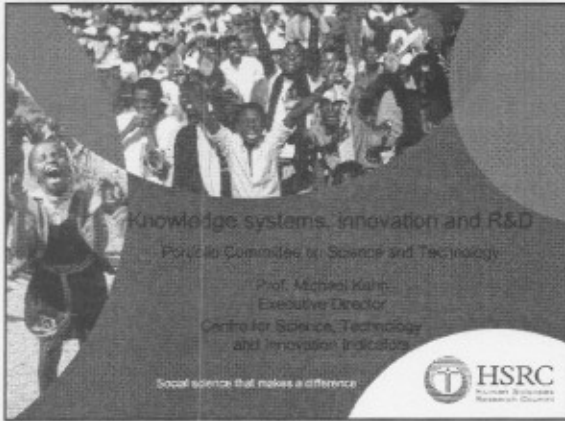


070911
PC Sci



There's only one way to start today's talk

- On 6 September 1970 hijackers commandeered 4 airliners and **forced the pilots** to fly them to Jordan
- On 11 September 2001 hijackers commandeered 4 airliners and **programmed the aircraft** to fly into targets in the United States

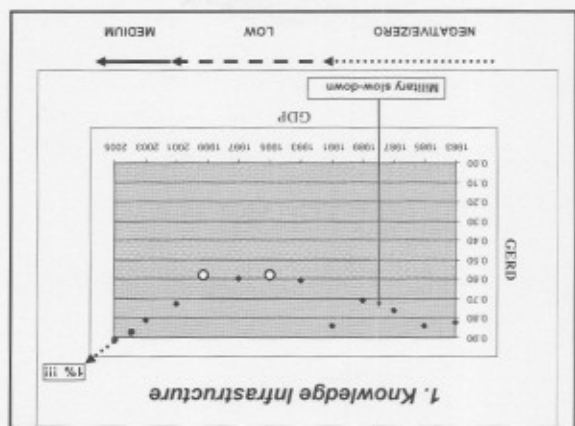
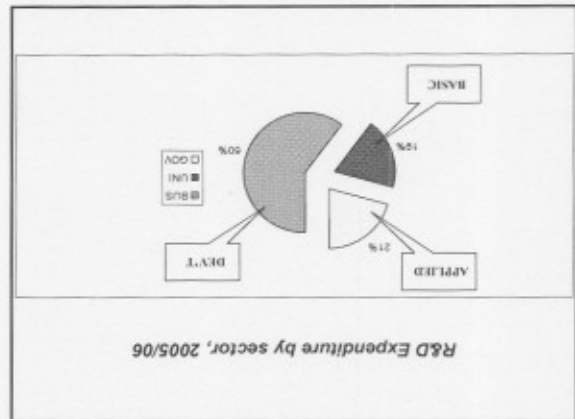
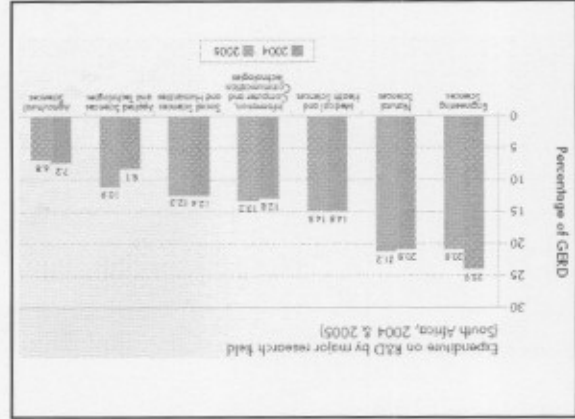
***The Information and Telecommunications
Evolution enabled 9/11***

***The same ICT revolution takes us toward the
knowledge economy in which
the ability to innovate is critical.***

Five key elements

1. Knowledge infrastructure
2. Knowledge workers
3. Innovation and technological outputs
4. Knowledge transfer
5. Framework conditions

CeSTII and its partners measure these



Publications

1991		2001	
Discipline	SRCA	Discipline	SRCA
Geol/Petrol/Mining Engrn	8 976	Geol/Petrol/Mining Engrn	8 732
Multidisciplinary	4 211	Animal Sciences	4 338
Animal Sciences	3 897	Entomology/Pest Control	4 014
General & Internal Medicine	3 637	Philosophy	3 174
Aquatic Sciences	3 225	Veterinary Med/Animal Health	2 919
Entomology/Pest Control	3 193	Environ Studies, Geog & Dev	2 787
Archaeology	3 034	Multidisciplinary	2 755
Veterinary Med/Animal Health	2 719	Environm&Ecology	2 654
Plant Sciences	2 622	Plant Sciences	2 643
Inorganic & Nut Chemistry	2 429	Political Sci & Public Admin	2 603
Classical Studies	2 362	General & Internal Medicine	2 286
Environm&Ecology	2 306	Aquatic Sciences	2 251
History	2 077	Biology	2 139
Philosophy	2 036	Education	2 088

Source: Mphahlele, S. (2005) 'Institutional systems of innovation: laboratory sector (and a comparison between South Africa, India, Mexico and Brazil)' (CSIR/RSF/A/03/016)

Falling world share, but key strengths

Concentrations of excellence

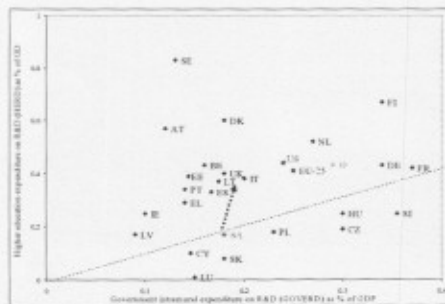
Table 6: Quartile of international ranking of South African institutions

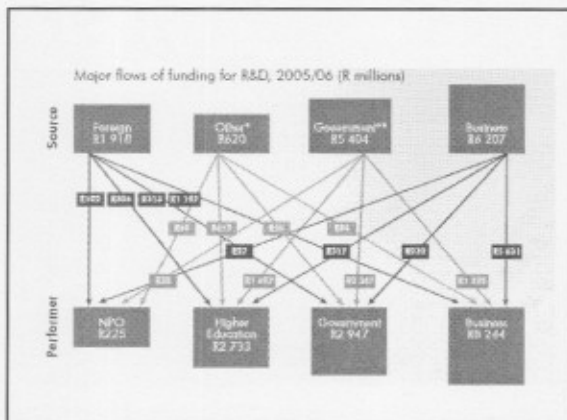
Scientific discipline	UCT	Pretoria	Orange Free State	Witwatersrand	Natal	Stellenbosch
Biology & biochemistry	4			4		
Chemistry				4		
Clinical medicine	1	2	4	1	2	2
Engineering		3		4		
Environment/ecology	2	3			4	
Geosciences	3			2		
Materials science				4		
Plant & animal	2	2	3	4	2	3
Social science gen.	2			2		4

Source: Priddy, A. (2001) 'The international performance of the South African academic institutions: a critical assessment' Higher Education Development

Does not capture small groups

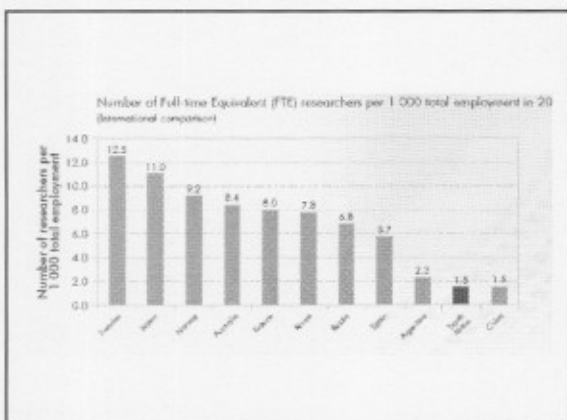
To increase knowledge-intensive production, HERD must grow with BERD (OECD Review)



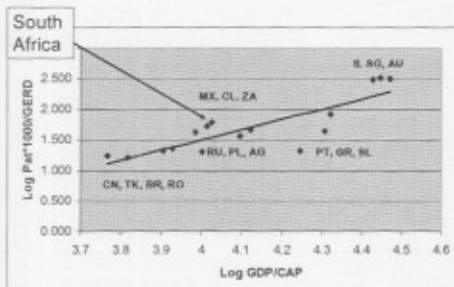


2. Knowledge Workers

- ✓ 39 300 Headcount
- ✓ 28 800 Personnel full time equivalent
- ✓ 17 000 Researchers FTE
- ✓ Male: Female 61: 39
- ✓ Black: White 33: 67 (21:79 in 2001)
- ✓ 22% Researchers w. PhD
- ✓ Massive expansion in HE
- ✓ 1082 PhD graduates in 2004



US Patents filed vs. Wealth



Source: OECD 2003, 2004; RCTT, 2004

Commensurate with wealth

USPTO Ranking

Class	Ranking
518 Chemistry: Fischer-Tropsch Processes	4
075 Specialised Metallurgical Processes	12
210 Liquid Purification or Separation compositions	17
198 Conveyors: Power Driven	18
423 Chemistry of Inorganic Compounds	20
532 Organic Compounds	25
424 Drug, Bio-Affecting and Body Treating Compositions	28

Source: PwC, 2009

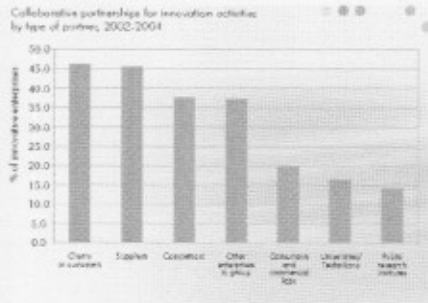
Plant Breeders Rights

Country	World Share (%)
United States	14,1
Canada	10,7
Poland	8,1
Japan	6,9
South Africa	3,8

Source: WIPO, 2001

Agric R&D: Agric GDP = 2%

4. Knowledge transfer



Industry + universities + science councils



5. Framework conditions

It's all about risk

- Of 1,100 Canadian inventions
- 75 reached the market
- Six gave returns greater than 14 times
- 45 lost money

Governments support R&D because they cannot afford not to. The following matter:

- Macro-economic environment
- Labour and immigration policy
- Availability of finance
- Intellectual property rights
- Mechanisms for commercialization
- Direct incentives (SPII, THRIP, Innovation Fund, BRICs etc)
- Indirect incentives (R&D tax allowance)

