



***Launch Meeting of the ISTIC for South South Co-operation
under the auspices of UNESCO***

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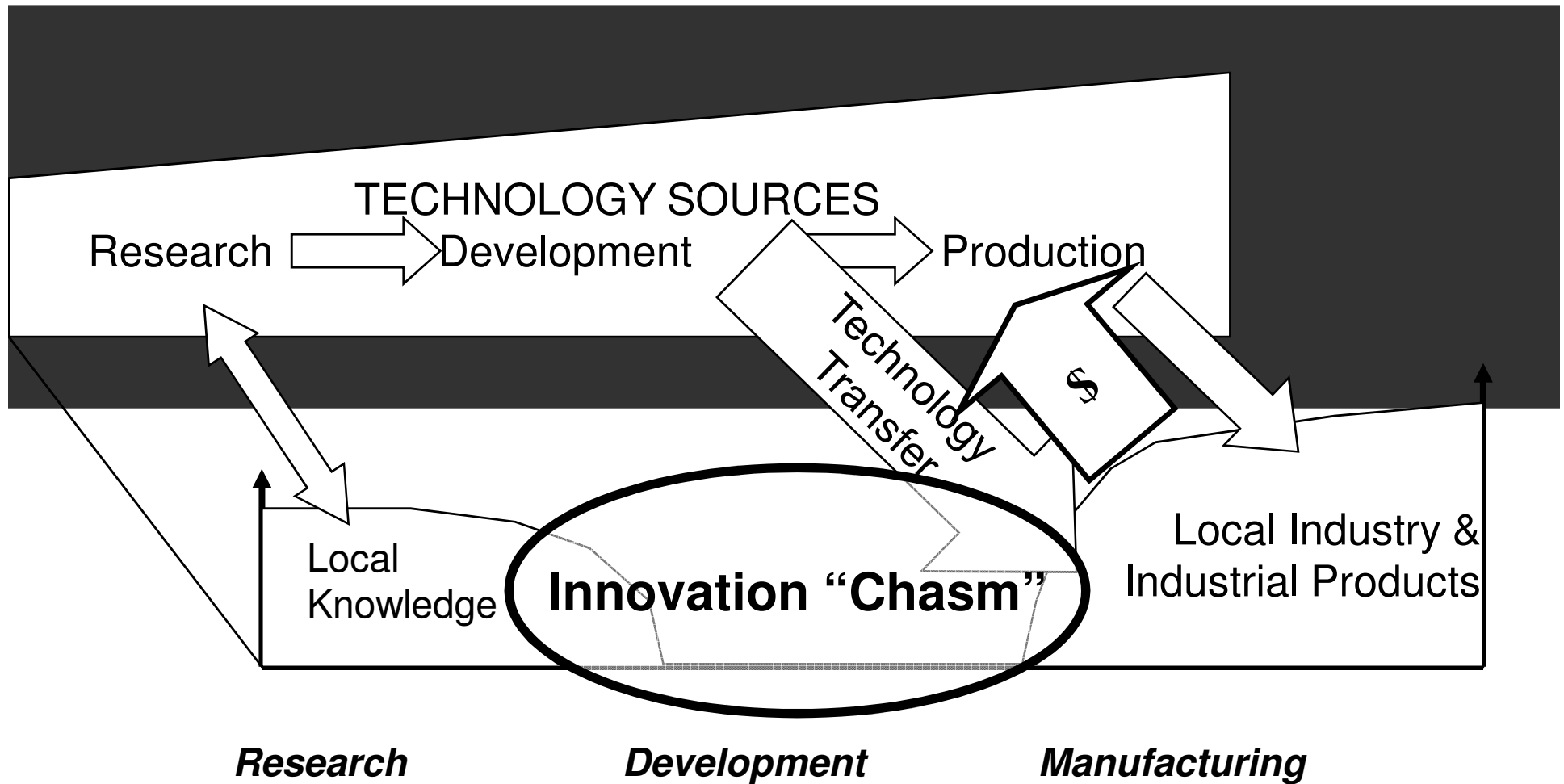
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22 to 24 May 2008 in Kuala Lumpur, Malaysia.

South African Higher Education System

- South Africa's Higher Education System 3 types of universities:
 - Comprehensive 3
 - Technology (UoT) 5
 - Traditional 10
 - Cape Peninsula University of Technology
 - 28 500 students
 - 5 Campuses
 - 50% in SET Programmes
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The Innovation "Chasm"



Towards a knowledge economy in SA

The knowledge-based economy rests on four ,
interdependent pillars:

- Innovation
 - Economic and institutional infrastructure
 - Information infrastructure
 - Education
- ▶ South Africa's economy which was historically a resource-based economy, has some distance to travel to become a true knowledge-based economy.
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Towards a knowledge economy in SA (continued)

- South Africa must seize the opportunities available in areas such as
 - biotechnology,
 - nanotechnology and
 - the “hydrogen economy”
- Establish capabilities that will provide long-term, sustainable solutions in national priority areas such as health and energy, while boosting economic growth.

The Ten-Year Innovation Plan: A vision for 2018

The key objective of this plan is to articulate a national path of innovation in support of the transformation to a knowledge-based economy.

- It describes a future in which SA innovations in science & technology are:
 - ▶ combating the negative effects of climate change in Africa;
 - ▶ fighting crime;
 - ▶ producing drugs to combat disease;
 - ▶ developing sustainable energy solutions;
 - ▶ introducing drought-tolerant, disease-resistant crops;
 - ▶ devising “intelligent” materials and manufacturing processes;
 - ▶ revolutionising communications; and
 - ▶ changing the work we do and the way we do it.
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The SA Ten-Year Innovation Plan

In contrast to many short- and medium-term plans, which amount to an aggregation of current activities, this Ten- Year Innovation Plan has a different starting point -

it begins with where South Africa needs to be a decade from now – an agreement on what we will have accomplished by 2018.

These strategic outcomes are identified as the “grand challenges”.

A concise set of indicators anticipated to be achieved by 2018 is presented with each of the grand challenges.

The vision for South Africa in 2018 includes:

- Being one of the top ten economies in the global pharmaceutical, nutraceutical, flavour, fragrance, and bio-pesticides industries
 - Deploying satellites that provide a range of scientific, security and specialised services for the government, the public and the private sector
 - Achieving a 25-percent share of the global fuel cell catalysts market with novel platinum group metal (PGM) catalysts
 - Development of a fuel cell programme for transport and domestic use
 - Initial capability in the production of hydrogen by water splitting
 - Being a world leader in climate science & the response to climate change
 - Having met the 2014 Millennium Development Goals to halve poverty
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In Summary - we envisage.....

- A society that uses its knowledge systems (technologies) and human capital to solve problems in our country and on our continent, while exploiting economic opportunity in a sustainable way.
 - With increased R&D investment by the private and public sectors, an opportunity exists for bold interventions that will secure a greater share of global markets.
 - South Africa can exploit its natural resource base and intensify knowledge-generation activities to produce competitive technologies in fields that are still at the development phase
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Key principles of the plan

- This long-term plan presents a range of strategic objectives that cannot be simply extrapolated from existing projects and technologies. It is based on a set of broad principles that informs the government's investment decisions
 - This does not mean picking individual winners and losers – but it does mean being selective, alert and flexible.
 - Today, South Africa may need to invest in areas on which we all agree; tomorrow, we may need to disengage from some sectors as their importance declines, while keeping our options open elsewhere. Ultimately, we must focus on building a knowledge-based economy.
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Key principles of the ten-year plan (continued)

1. Strategic decision:
South Africa is failing to convert ideas into economic growth.
While the government must invest throughout the entire innovation chain, strategic choices must be made.
 2. Competitive advantage:
the government should invest in areas of the highest socioeconomic return, i.e. Grand Challenges.
 3. Critical mass:
investment in key research must be made at a critical mass.
 4. Sustainable capacity:
the R&D scale-up must be consistent for the system to have the appropriate absorptive capacity, with each element (e.g. skills, capital spend) relying on others for the system to work.
 5. Life-cycle planning:
R&D infrastructure must be considered over the long term, including depreciation, skills needs and running costs.
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Transformation to a knowledge-based economy

- The knowledge-based economy has four pillars:
innovation,
education,
the economic and institutional regime, and
information infrastructure.
 - The DST, in collaboration with other government departments, aims to boost innovation through a series of interventions in strategic areas.
 - Transformation towards a knowledge-based economy will necessarily shift the proportion and growth of national income derived from knowledge-based industries, the percentage of the workforce employed in knowledge-based jobs and the ratio of firms using technology to innovate.
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Transformation to a knowledge-based economy

- According to the World Bank's 2006 Knowledge-based Economy Index, South Africa ranked 58 out of 132 countries, down from 52nd in 1995.
 - Progress towards a knowledge-based economy will be driven by four elements:
 - Human capital development
 - Knowledge generation and exploitation (R&D)
 - Knowledge infrastructure
 - Enablers to address the “innovation chasm” between research results and socioeconomic outcomes
 - Increased investment in these four areas will certainly have an impact. International experience suggests that an incremental approach will not work.
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Link between citation and wealth intensities

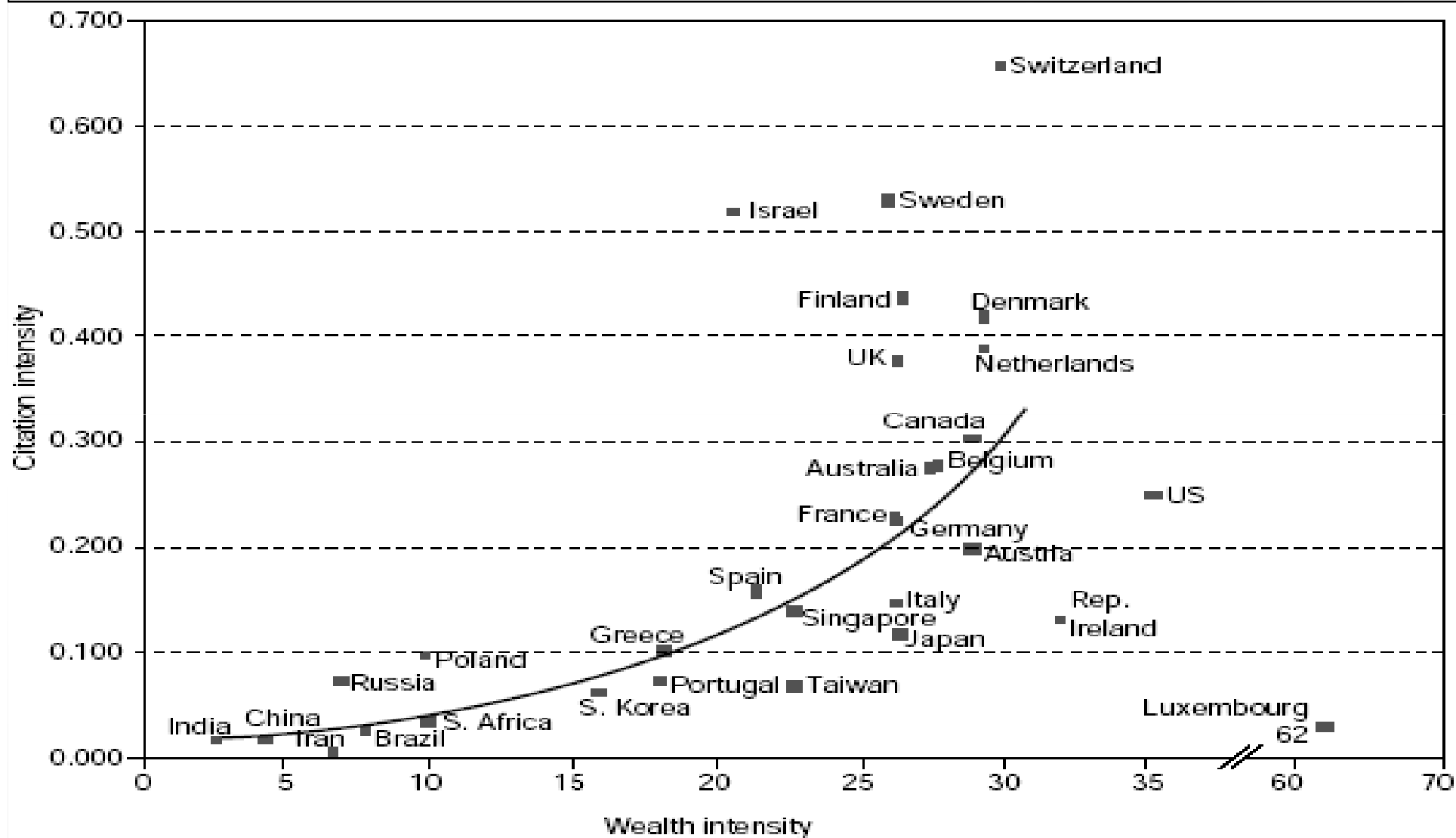


Figure 2: Link between citation and wealth intensities (Sources: Thomson ISI, OECD & the World Bank)

What is the implication for SA ?

- The implication is clear: South Africa needs to increase its knowledge output substantially.
 - This will require an increase in R&D expenditure.
For example, while average R&D spend by the OECD countries in 2004 was 2.3 percent of GDP, and China's was 1.35 percent that year, South Africa invests a mere 0.91 percent of GDP on R&D.
 - By targeting development and new global industries, the country can reduce its dependence on imported technology, and become more self-sufficient in such basic commodities as energy and food.
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Innovation to a knowledge-based economy (2018)

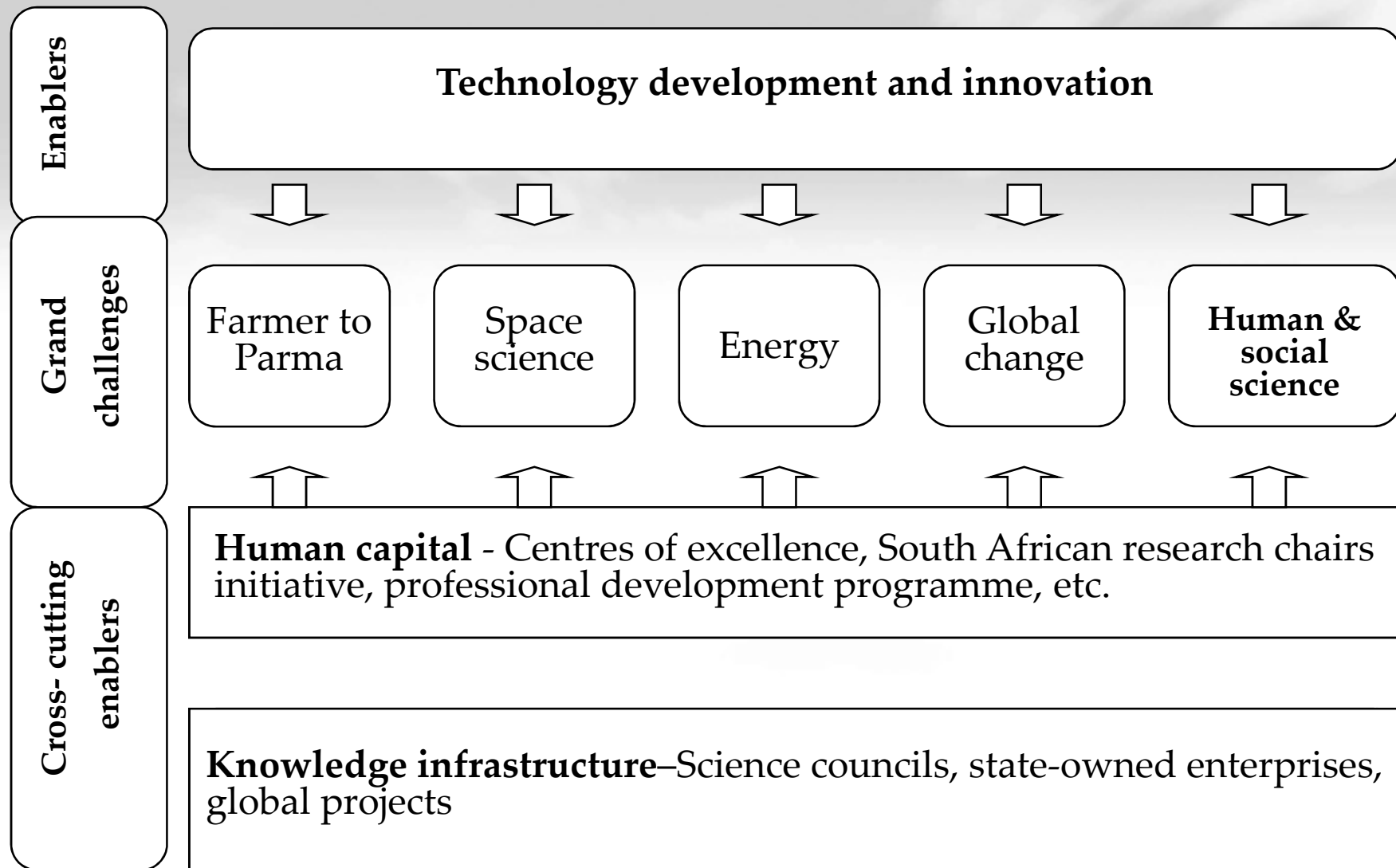
Key Indicators of SA attaining Knowledge based Economy

- Economic growth attributable to technical progress (10% in 2002) 30%
 - National income derived from knowledge-based industries >50%
 - Proportion of workforce employed in knowledge-based jobs >50%
 - Proportion of firms using technology to innovate >50%
 - Global share of research outputs (0.5% in 2002) 1%
 - GERD/GDP (0.92 in 2005; short-term 2008 target was 1%) 2%
 - High- and medium-tech exports/services as a percentage of all exports/services (30% in 2002) 55%
 - Number of South African-originated US patents (100 in 2002) 250
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The grand challenge areas are:

- The Farmer to Pharma value chain to strengthen the bio-economy
 - Space science and technology
 - Energy security
 - Global-change science with a focus on climate change
 - Human and social dynamics
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Figure 3: Grand challenges and enablers of the ten-year plan



GC1: From Farmer to Pharma: life sciences & health

- South Africa has the world's third largest biodiversity resource base, a solid foundation of human capital and a large store of indigenous knowledge, along with a strong industrial base.
 - For South Africa's biotechnology industry to grow, a number of critical factors need to be satisfied, including:
 - ▶ Greater networking and collaboration (domestic and international) across all sectors (academia, science councils, industry and gov'tment)
 - ▶ The development of business skills to help identify viable projects
 - ▶ A clearer strategic focus on selected platforms and markets
 - ▶ Improved funding mechanisms to close the gap between basic research and commercialisation;
 - ▶ Investment in platforms (including infrastructure) to bridge the gap between research and commercial implementation
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GC2: Expanding the limits of space science & technology

- Space applications are essential to addressing these challenges in coming decades.
 - The government has proposed a National Space Agency for South Africa to address three strategic objectives:
 - ▶ Environment and resource management
 - ▶ Safety and security
 - ▶ Innovation and economic growth
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GC3: In search of energy security

The three principal global energy challenges are:

- The need for energy security and sustainability
 - Protecting the environment, particularly given high levels of fossil-fuel emissions
 - Access by the developing world to affordable, safe, clean and reliable energy
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GC3: Major energy related research thrusts

- Clean coal technologies
 - Nuclear energy revisited
 - Embracing all feasible renewable energy technologies
 - The promise of hydrogen
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GC4: Science and technology in response to global change

- South Africa is positioned to serve as a unique laboratory given its proximity to the Antarctic, the Southern Ocean, and the Agulhas and Benguela currents – and to make a major contribution to understanding climate change.
 - South Africa is well positioned to lead research on the continent in terms of understanding and projecting changes to the physical system; the impact of these changes; and mitigation to limit their long-term effects.
 - Mitigating climate change also provides an economic opportunity for South Africa; therefore, SA needs to develop a strategy to take advantage of the so-called “Green Economy”.
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GC5: Human and social dynamics

- Human and social dynamics are at the core of nearly every major challenge facing South Africa and developing nations – from climate change to creating a competitive and innovative workforce.
 - The fifth grand challenge is to increase our ability to anticipate the complex consequences of change; to better understand the dynamics of human and social behaviour at all levels; and to help people and organisations better manage rapid change.
 - In keeping with these goals, the DST will develop a long-term programme to increase basic understanding of human behaviour.
 - Eradication of persistent and chronic poverty.
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From Innovation to Commercialization... the challenges

- The major obstacle to commercialization of technological innovations is financing, due to the high risk and complexity of R&D investments.
 - To address the fragmentation of funding instruments, this Ten-Year Innovation Plan introduces the establishment of a Technology Innovation Agency (TIA).
 - New creative funding mechanisms that could help address this problem are emerging in some public-private partnerships.
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National Initiatives Supporting Innovation and Commercialisation of Research

- Draft Bill on “IP Rights from Publicity Funded Research”
 - Technology Innovation Agency Bill (TIA) (June 2008)
 - DST Ten Year Plan (2008 to 2018)
“Innovation towards a knowledge-based Economy”
 - Funding from DST, DTI, and NRF Programmes
 - Entrepreneurial Funders like Tabeisa and Ashoka
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Some Additional thoughts to consider.....

- Some “New” technologies for South –South collaboration are presented
 - This listing of “new” technologies is by no means absolute!
Rather demonstrative
 - What are further implications for ISTIC?
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