

**INTERNATIONAL TECHNOLOGY TRANSFER:
HIGH-LEVEL PERSPECTIVE FROM DEVELOPING
COUNTRIES**
- Keynote 2 -

McLean Sibanda

**WIPO Expert Forum on International Technology
Transfer**

Organised by the World Intellectual Property Organisation (WIPO)

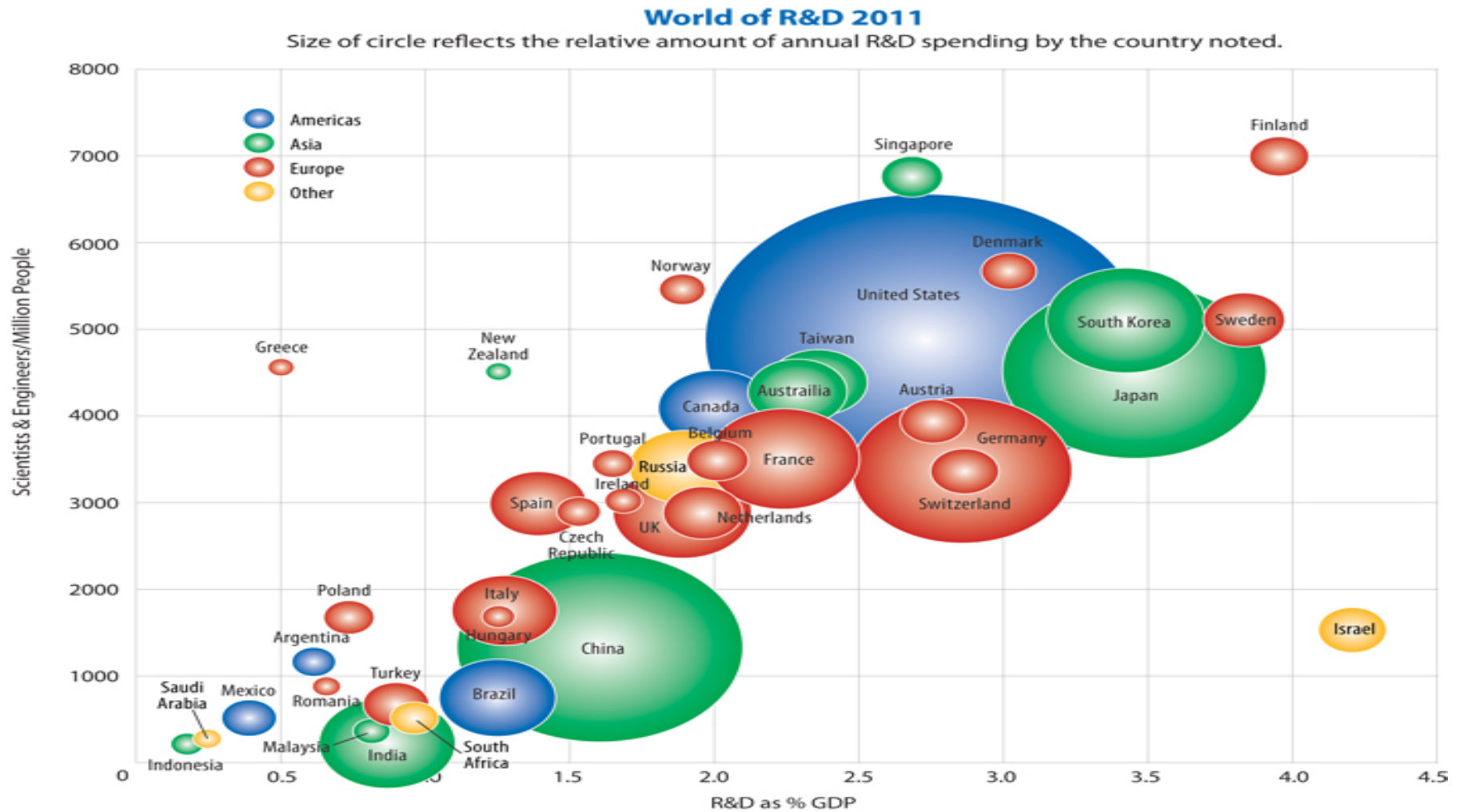
Geneva, February 16 to 18, 2015

Presentation Outline

- ❑ Introduction
- ❑ Developing Countries in Context
- ❑ Transitioning to Knowledge Based Economy – the case of Africa
- ❑ Specific Comments on Technology Transfer
- ❑ Examples of Technology Transfer
- ❑ Concluding remarks

Developing Countries in Context

R&D – not primary source of innovation in Africa



Source: Battelle, R&D Magazine, International Monetary Fund, World Bank, CIA World Factbook, OECD

Developing Countries in Context

Global R&D and Research capacity Landscape (2011)

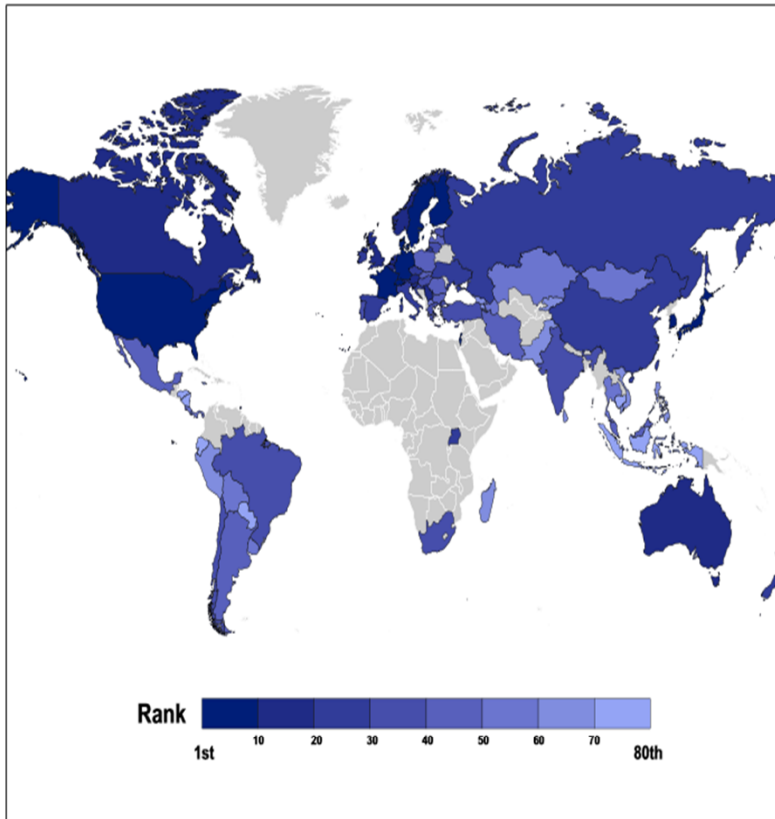


Figure 2: Global R&D Investment Map

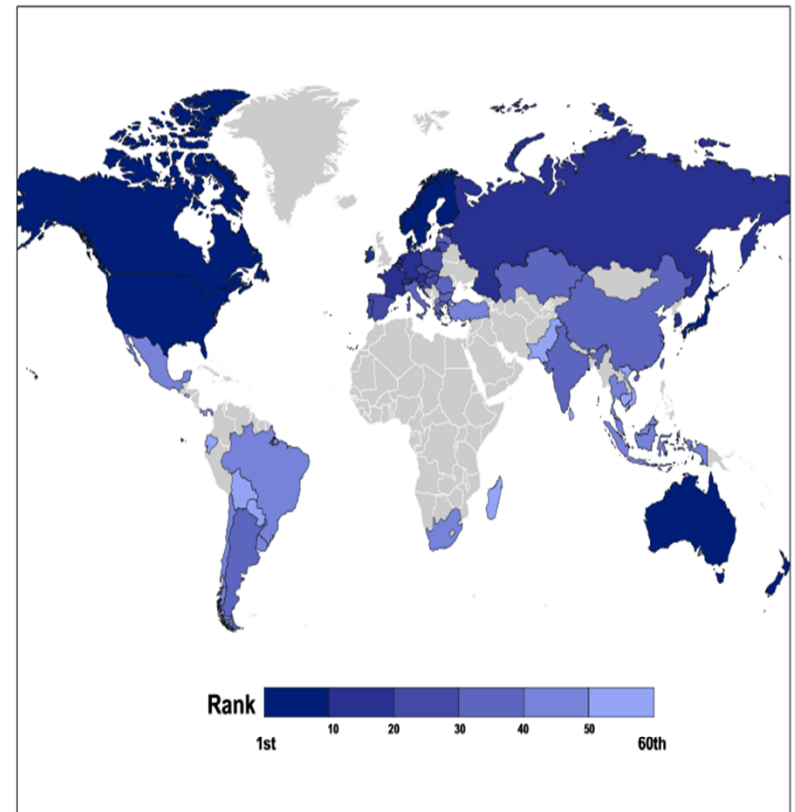


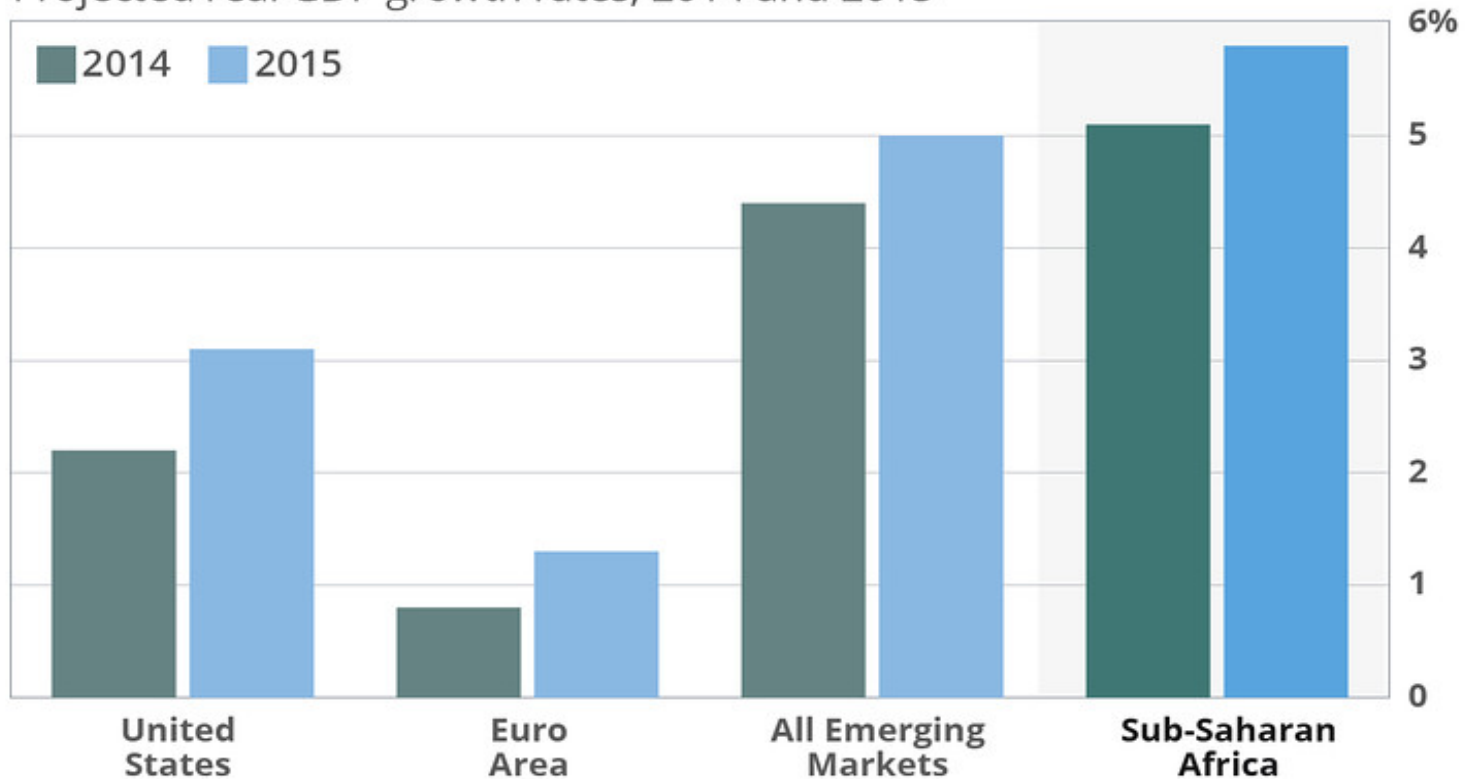
Figure 3: Global Researchers Map

Transitioning to Knowledge Economy: The case of Africa

Global R&D and Research capacity Landscape (2011)

The fast-growing continent

Projected real GDP growth rates, 2014 and 2015



Source: International Monetary Fund

Transitioning to Knowledge Economy: The case of Africa

Africa's Attractiveness as an Investment Destination

Africa's relative attractiveness is on the rise

Relative to the following markets, is Africa more or less attractive as an investment destination?



Source: EY's 2014 Africa attractiveness survey (total respondents: 503).

Source: FDI Intelligence.

Transitioning to Knowledge Economy: The case of Africa

Investors per sector in FDI Projects in Africa

FDI hotspots: top three investors and sectors by FDI projects (2007-13)

Country	Investors	Sectors
Ghana	UK, South Africa, US	Financial services, TMT, RCP
Kenya	US, UK, India	TMT, financial services, RCP
Mozambique	UK, South Africa, Portugal	RCP, coal, oil and natural gas, RHC
Zambia	South Africa, China, India	Financial services, metals and mining, RCP
Tanzania	UK, Kenya, India	Financial services, TMT, RCP
Uganda	Kenya, UK, India	Financial services, RCP, TMT
Nigeria	US, South Africa, UK	TMT, RCP, financial services
Rwanda	Kenya, Uganda, US	Financial services, TMT, RHC

Source: fDi Intelligence.

Transitioning to Knowledge Economy: The case of Africa

Knowledge Generation: Patent Applications Per region

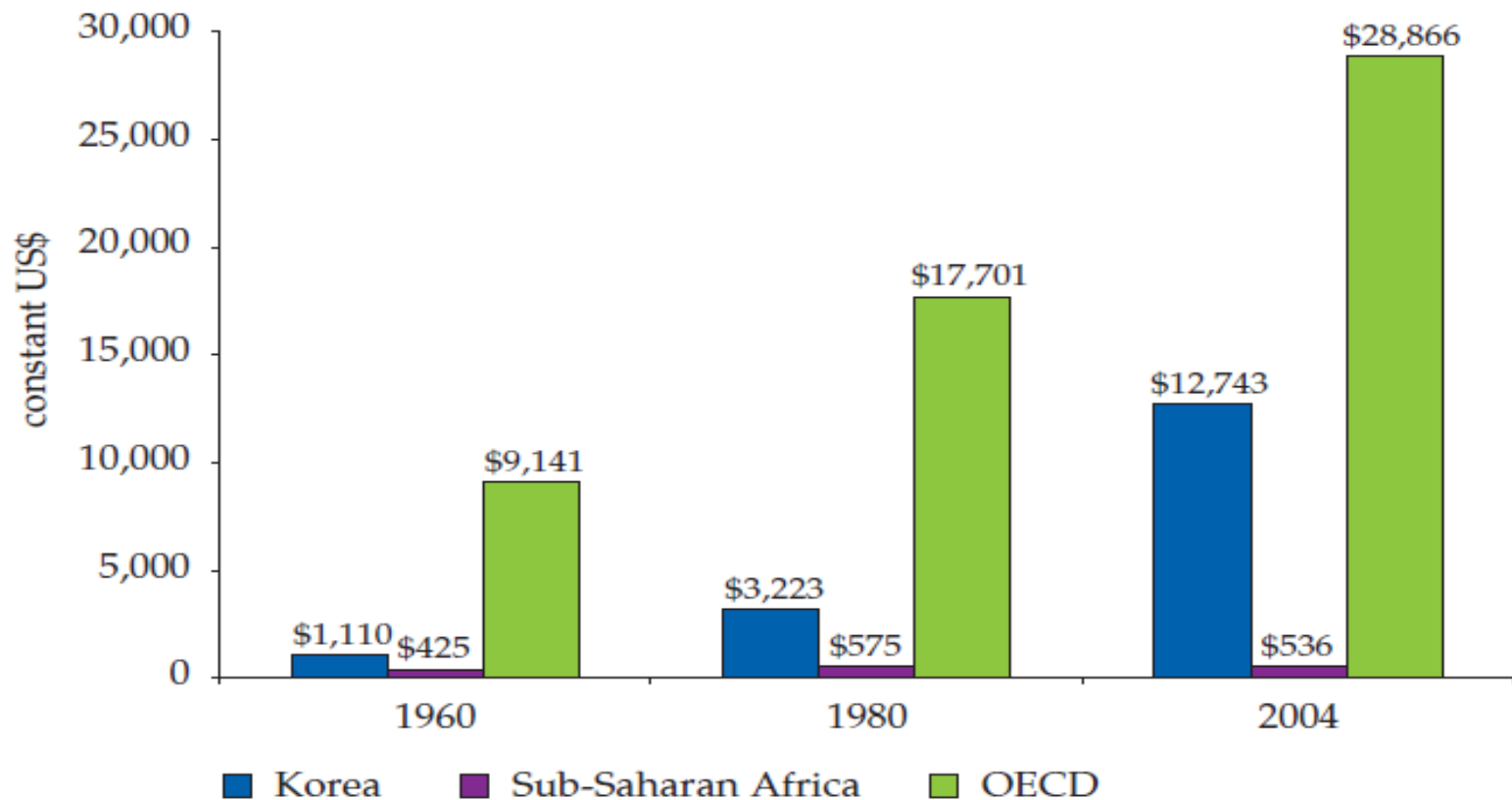
	Number of applications		Resident share (%)		Share of world total (%)		Average growth (%)
	2003	2013	2003	2013	2003	2013	2003–13
World	1,490,300	2,567,900	62.5	66.5	100.0	100.0	5.6
Africa	9,200	14,900	18.5	15.4	0.6	0.6	4.9
Asia	705,600	1,500,400	74.3	78.8	47.3	58.4	7.8
Europe	324,500	346,400	62.2	63.3	21.8	13.5	0.7
Latin America & the Caribbean	42,800	63,300	13.8	12.2	2.9	2.5	4.0
North America	379,700	606,300	50.8	48.2	25.6	23.6	4.8
Oceania	28,500	36,600	15.1	12.8	1.9	1.4	2.5

Note: WIPO estimates cover 139 offices and include the following number of offices: Africa (24), Asia (41), Europe (44), Latin America & the Caribbean (23), North America (2) and Oceania (5).

Source: WIPO statistics database, October 2014.

Transitioning to Knowledge Economy: The case of Africa

Lessons from South Korea



Source: World Bank SIMA database.

Transitioning to Knowledge Economy: The case of Africa

Lessons from 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 10

Transitioning to Knowledge Economy: The case of Africa

African Union

- ❑ **>1billion people, 50% under the age of 25**
- ❑ **Critical mass of STI human resources and skills**
- ❑ **AU Agenda 2063**
 - *“access to technology, opportunities and capital and concerted strategies to combat youth unemployment and underemployment”* as being critical propelling the continent’s political, social, cultural and economic transformation Ibid., paragraph 67(h)
- ❑ **African Union Science, Technology and Innovation Strategy for Africa (STISA-2024)**
 - Building and/or upgrading research infrastructure;
 - Enhancing professional and technical competencies;
 - Promoting entrepreneurship and innovation; and
 - Providing an enabling environment for STI development in the African continent

Specific Comments on Technology Transfer

Focus Areas and Informal Channels

- **Specific focus on development of local technological base and capabilities through technology transfer:**
 - Building relevant STI human capital
 - Expanding Innovation System
 - Developing a balanced IP System

- **Importance of informal channels for technology transfer**
 - Conferences and workshops
 - Research collaborations and networks
 - Networks - people do business with people

Specific Comments on Technology Transfer

Addressing the human capital deficit

- ❑ Prerequisite for successful technology transfer
- ❑ Poor education infrastructure / R&D investment
- ❑ Strengthening human capital
 - Increase R&D investment
 - Focus on both research and innovation enabling skills
 - Joint research programmes
 - Exchange programmes (post-doctoral fellows, secondment of expert personnel, joint appointments, scholarship programmes)
 - Joint supervision of post-graduate students

Addressing the human capital deficit

□ **Examples:**

- European Union - Framework 7 / Horizon 2020
- Emory-South Africa Drug Discovery Programme (2008)
- International Science Promoting Innovation and Entrepreneurship (INSPIRE) – comprehensive scholarship programme – innovation and entrepreneurship
- Hydrogen South Africa (HySA) Centres of Excellence Programme
- Graduate development programmes outside home country (Botswana)
- Gauteng Accelerator Programme in Biosciences - Emory and Pfizer collaboration

Addressing the human capital deficit



Educating entrepreneurs in South Africa: Emory partners to offer Gauteng Accelerator Programme

Woodruff Health Sciences Center | March 16, 2012

Contact

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Emory University and The Innovation Hub, Africa's first internationally accredited science park located in Gauteng Province in South Africa, this week launched the Gauteng Accelerator Programme (GAP) in Biosciences with a two-day bioscience business workshop for South African scientists and entrepreneurs.



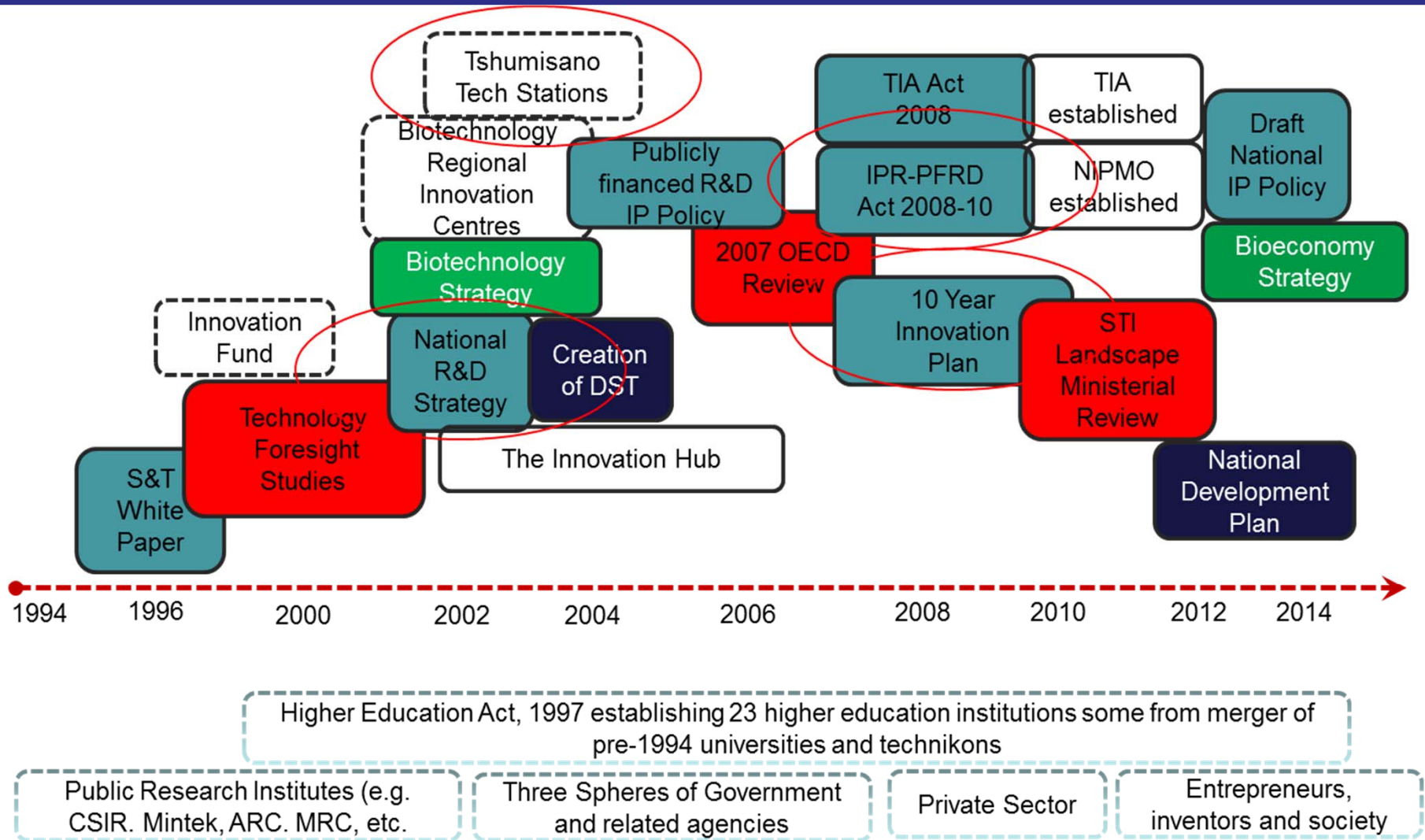
Emory's involvement in GAP Biosciences is part of a larger effort by Emory to assist in building bioscience capabilities in South Africa.

Specific Comments on Technology Transfer

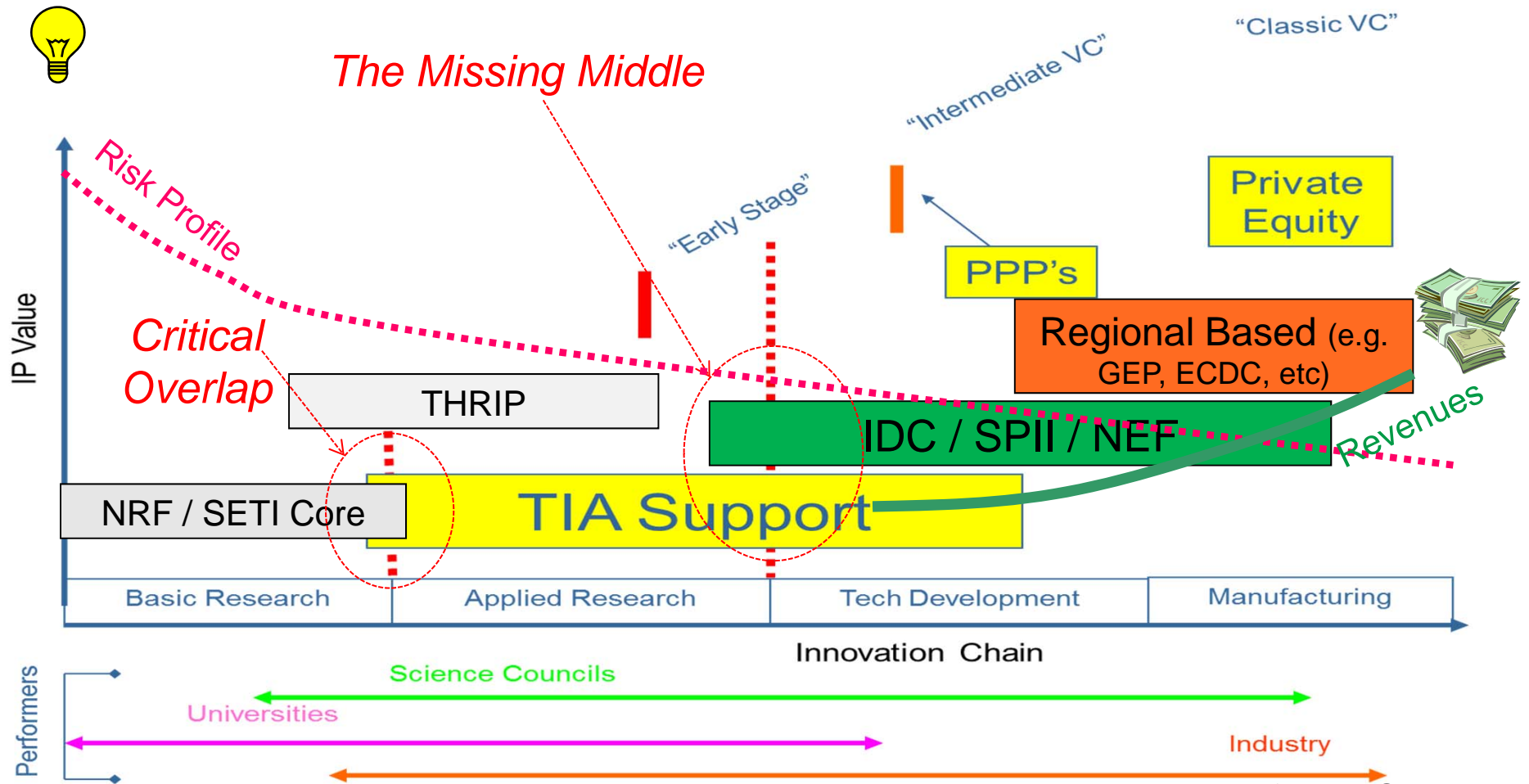
Expanding the National Systems of Innovation

- ❑ Critical mass of STI human capital a prerequisite
- ❑ Building a bridge between R&D and the market (increased focus on commercialisation)
- ❑ Right mix of institutional arrangements
- ❑ Appropriate funding instruments and incentives
- ❑ Expand on the local private sector – focus on entrepreneurship

Expanding the National Systems of Innovation: South Africa



Expanding the National Systems of Innovation: South Africa – the Funding Challenge



Adapted from DST, 2012

Expanding the National Systems of Innovation

Example: South Africa Technology Stations Programme



- ❑ Tshumisano Trust, Department of Science and Technology
- ❑ Strengthen and accelerate interaction between Universities of Technology and Small Medium Enterprises (SMEs)
- ❑ Technology Stations Services:
 - Technical support to SMEs – technology solutions, services and training
 - Adaptations and prototypes

Specific Comments on Technology Transfer

Developing Balanced IP Systems

- ❑ TRIPS Agreement an important framework for appropriate IP Systems aligned to stage of development
- ❑ Effective use of TRIPS flexibilities to support development of a technological base
 - Research exemption
 - Bolar provisions
 - Best mode
 - Utility models / petty patents
- ❑ Policy development
- ❑ Trade Agreements
- ❑ Right balance
 - Attract FDI
 - Incentivise use, adaptation, and endogenous innovation

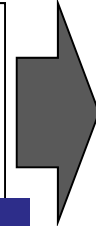
Specific Examples of Technology Transfer

Emory University (USA) – iThemba Pharmaceuticals (South Africa)

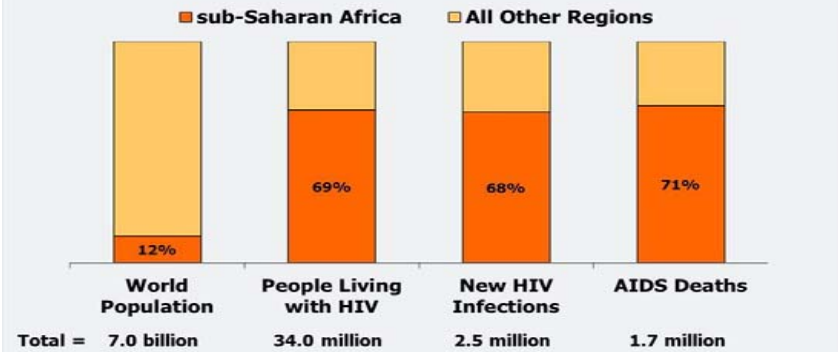
Licensed Patents / know-how:

- Synthesis method for Abacavir
- Novel compounds for treatment of latent TB infections

Emory University (USA)



Sub-Saharan Africa as Share of Global HIV Prevalence, Incidence, and Deaths Compared to Share of World Population, 2011



SOURCE: Kaiser Family Foundation, based on UNAIDS, *Report on the Global AIDS Epidemic*, 2012; Population Reference Bureau, 2011 World Population Data Sheet.



Scientific Advisory Board
(top class researchers in USA, UK and SA institutions)



TIA
(SA Government Fund)

Specific Examples of Technology Transfer

Cuban Heber Biotec – BioVac Institute (South Africa)

BUSINESSDAY

12 OCTOBER 2007

South Africa: Cuban Firm to Help Biovac Make Vaccines

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• [South Africa](#) • [Southern Africa](#)



By Tamar Kahn

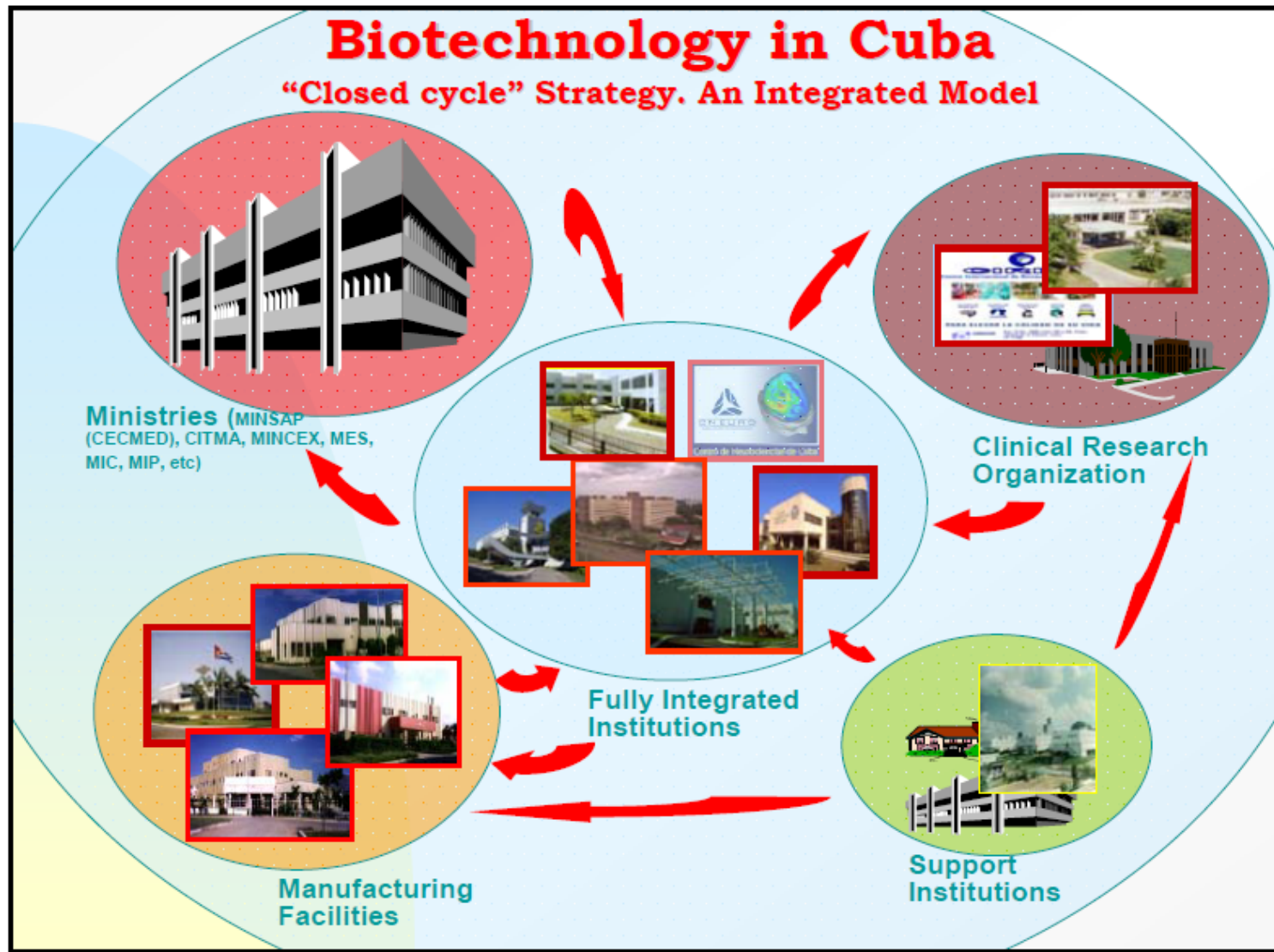
Cape Town — SA is set to start making its first human vaccines in almost a decade, the Biovac Institute said yesterday.

Thanks to a technology transfer agreement with Cuban firm Heber Biotec, Biovac hoped to start manufacturing hepatitis B vaccines next year, the company said.

Technology transfer partnerships with Sanofi Pasteur and Biofarma in the area of vaccines

Specific Examples of Technology Transfer

Cuban Heber Biotec – Biovac Institute (South Africa)



Specific Examples of Technology Transfer

African Agricultural Technology Foundation: Agriculture (2003)



AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION
FONDATION AFRICAINE POUR LES TECHNOLOGIES AGRICOLES

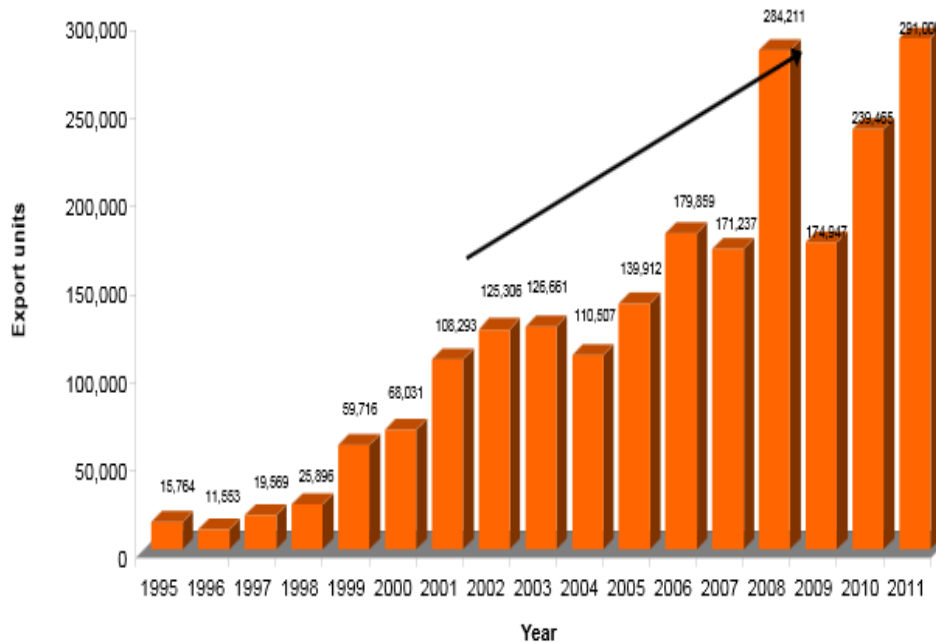
- PPP – transfer, development, production and distribution of technology to smallholder farmers in Sub-Saharan Africa – Nairobi (Kenya)
- Addressing food security and climate change
- > 30 technologies accessed (US\$180m)
- Majority accessed have since been developed and adapted in Africa
- Manages > 20 technology licenses

Specific Examples of Technology Transfer

South African Motor Industry development Programme (MIDP) - 1995



Motor Vehicle Export since 1995
(units)



- Pre-1994 auto-sector
- Improve industry's international competitiveness
- Encourage growth in vehicles and components manufacture
- Exports and stabilise employment
- Incentive for auto sector to offset import tariffs with export credits
- Transfer of skills to locals
- Expansion of supplier base

Specific Examples of Technology Transfer

Pharmaceutical Sector: Aspen Pharma (South Africa)

Multinational patent holders
(incl. GSK, Boehringer Ingelheim)

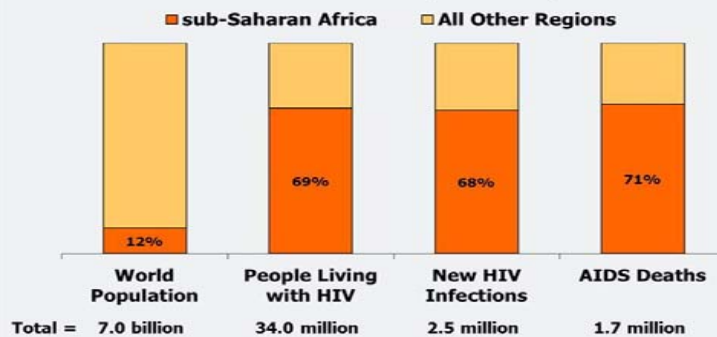
- Voluntary licences
- Technology transfer
 - Low cost producer



- US\$28.5m pharmaceutical manufacture facility
- Strategic Investment Programme (SIP)
- Access to market

the dti
(SA Government)

Sub-Saharan Africa as Share of Global HIV Prevalence, Incidence, and Deaths Compared to Share of World Population, 2011



SOURCE: Kaiser Family Foundation, based on UNAIDS, Report on the Global AIDS Epidemic, 2012; Population Reference Bureau, 2011 World Population Data Sheet.



Specific Examples of Technology Transfer

Gautrain – Mass rapid Transit Railway System (South Africa):
Government Procurement Driving Technology Transfer



- Bombardier Transportation's Electrostar
- Fifteen cars were manufactured and were assembled by Bombardier in Derby, UK
- Remaining cars assembled in South Africa by UCW Partnership (Union Carriage & Wagon Co. (Pty) Ltd) using structural components made in Britain
- Future manufacture in South Africa. 27

Specific Examples of Technology Transfer

Creating and Leveraging Intellectual Property in developing Countries (CLIPDC)



Creating and Leveraging Intellectual Property
in Developing Countries

Southern Sun Elangeni Hotel, Durban,
November 17-20, 2013



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Specific Examples of Technology Transfer

Chinese Shoemaker Huajian Manufactures in Ethiopia (Jan 2012)

- Ethiopian climatic conditions and cheaper labour
- Opened factory in January 2012 (Addis Ababa) and now employ >600 people
- By 2022 will have created > 100,000 jobs
- Local employment and skills transfer / upgrade

Chinese firm steps up investment in Ethiopia with 'shoe city'

Shoemaker Huajian says new \$2bn manufacturing zone will transfer skills to locals so they can become the future managers



Concluding Remarks

- ❑ Barriers to transfer of technology:
 - Poor understanding and value of IP system
 - Low supply of high-end skills beyond commodity orientation
 - Low R&D investment
 - Absence of active local private sector (dominance of MNCs)

- ❑ Efforts must be placed in:
 - addressing STI human capital deficit
 - Increased R&D investment
 - Balanced IP systems aligned to development priorities
 - Relevant institutions and institutional frameworks (enabling systems of innovation)

- ❑ Government incentives, including procurement as a lever for transfer of technology and capacity building

Thank You