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# **Key issues for African countries in Science, Technology and Innovation**

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## **Technology and innovation are essential for overall development in three important ways:**

- Technology has a public goods dimension:
  - Technology, innovation to address sustainable development goals
  - Science education, access to knowledge and implications for tertiary education
  - STI and key challenges
    - agriculture and food security
    - health and access to medicines
    - Access to energy

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## **Technology and innovation are essential for overall development in three important ways (contd):**

- Technology and innovation are essential for private enterprise development:
  - Building capabilities within countries at the enterprise level
  - Promoting technological change in small and large enterprises
  - Harnessing interactive learning
  - ICTs and private sector-led development

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## **Technology and innovation are essential for overall development in three important ways (contd):**

- Technology and innovation capacity have a critical developmental dimension:
  - Technological development is an essential component of building productive capacity.
  - Large technology and innovation gaps exist, and developing countries particularly in Africa are often far from technology frontiers.
  - Economic catch-up requires narrowing these gaps through the accumulation of knowledge and innovation capacity, moving closer to the technology frontiers.

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## A well-functioning innovation ecosystem:

- Focuses on technological change and capabilities building wherein
  - Institutional frameworks that enable the creation of dynamic capabilities are critical for learning (national, sectoral).
  - Coordination of policies and incentives is critical – education, R&D, science and technology policy, technology transfer, IPRs, - that are coordinated to promote interactive learning.
  - Technological learning is not only dependent on access to technologies but also opportunities in trade and investment.
- The narrowing policy space in this context has implications for harnessing the developmental dimension of technological change.



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## **Three sets of issues are critical while addressing how innovation can enable development in Africa:**

### **1. Bridging the technological divide through access to technologies:**

- Promoting productive and absorptive capacities
  - » Arresting the growing technological divide
  - » Sharing experiences and successes: what works, what does not.
- Harnessing intellectual property rights for developmental goals
  - » IPRs and the knowledge economy
  - » Article 66 (2) and the flexibilities debate
- Promoting inclusive innovation within countries
  - Enacting national policies for innovation capacity and that make it possible to:
    - » access, learn, adapt and diffuse existing technologies and create new knowledge
    - » Reduce inequality through labour and employment opportunities for all
    - » Promote private sector development – small, medium and large firms



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## **Three sets of issues are critical while addressing how innovation can enable development in Africa:**

### **2. Reducing structural vulnerabilities of African countries through financing of innovation**

- In a large number of developing countries, shallow financial markets often thwart their responses to developmental needs.
- Structural vulnerabilities can be reduced inter alia through promoting technological change, which supports structural diversification and reduces the dependence of countries and economies on commodity boom/bust cycles.
- Technological change is integral to this process, supporting the diversification of economic activities
- Financing of innovation to achieve this goal remains an imperative.
- The challenge of mobilizing such financial resources for technological development form a significant part of the post 2015 agenda through.
  - » Reconfiguring the current knowledge paradigms
  - » Financing innovation within the current global governance architecture



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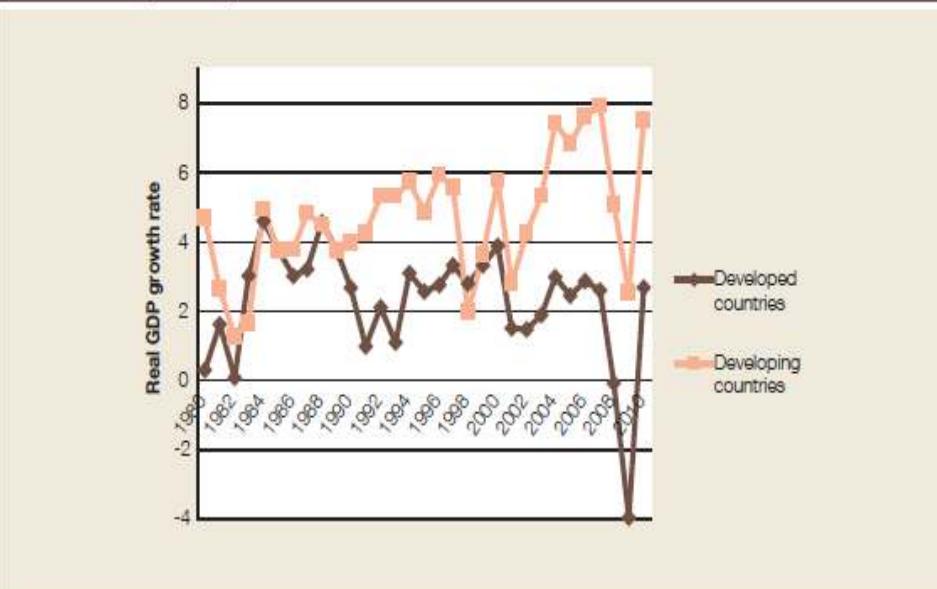
## **Three sets of issues are critical while addressing how innovation can enable development in Africa:**

- 3. Promoting collaborations and alliances in sectors of public importance**
  - » Through existing means such as STI partnerships
  - » New means, particularly South-South collaborations
- UNCTAD's Technology and Innovation Report 2012 has dealt with how and to what extent the rise of the South and growing South-South collaboration can provide an impetus to technological learning and innovation capacity across the developing world.

# The Phenomena of the Rise of the South

- There has been a surge in growth in an increasing number of developing countries.
  - In 2010, the real GDP growth rate in developing countries was of 7.48%, as opposed to 4.68% in 1980.
  - Made possible by interrelated factors: growing capabilities in manufacturing and services, technological investments and efficient utilization of opportunities arising from globalization.
  - The NIEs, followed by BRICS, represent an ongoing but punctuated process of catch-up growth and development.

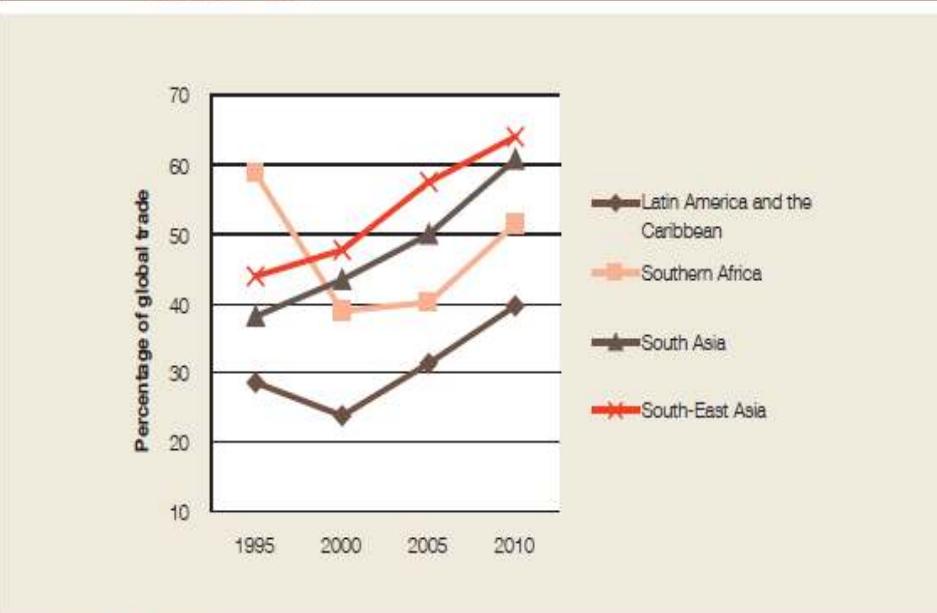
Figure 1.1: Real GDP growth rates of developed and developing countries, 1980–2010  
(Per cent)



Source: UNCTADstat.

## South-South trade is increasing...

Figure 1.2: Evolution of trade of different regions with the South as a share of their total trade, 1995–2010 \*



Source: UNCTADstat

- In 1995 42% of the trade of developing countries was with other developing countries, and by 2010 it reached 56%.
- South-East Asia have the highest proportion of intra-South trade, amounting to approximately 64% of their trade in 2010.
- South-South trade was more important than South-North trade, except for the Latin America and Caribbean region.

## The import of capital goods are on the rise ...

- A significant contributor to technological learning and capacity-building is the import of capital goods.

Table 2.1: Regional share of imports of capital goods (as part of total imports) from developing and developed countries, 1995 and 2010 (Per cent)

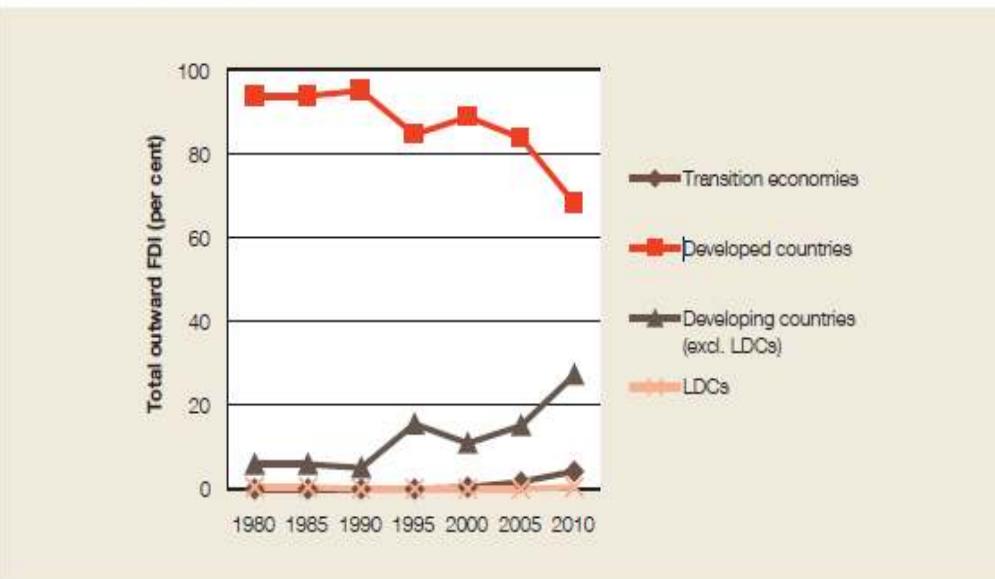
Partner		Importing region					
		Developing countries	Developed countries	Others	Developing countries	Developed countries	Others
		1995			2010		
	Developing countries	35.36	62.21	2.43	53.99	43.78	2.23
	Latin America and the Caribbean	30.42	68.80	0.79	39.27	60.02	0.71
	Southern Africa	..	..	..	57.90	41.46	0.64
	South Asia	32.45	65.00	2.56	56.06	42.36	1.57
	South-East Asia	44.13	55.43	0.44	62.57	36.67	0.76
	East Asia	45.52	53.73	0.75	50.21	47.03	2.76

Source: UNCTADstat.

- South-South trade in capital goods increased from 35% in 1995 to 54% in 2010.
- This is similar to trade trends where South-North trade declined from 57% of total global trade in 1995 to 42% in 2010, and South-South trade rose from 42% to 56% over the same period.
- These trends imply a growing capacity in the South to produce such goods, at least in some countries.

## ...as well South-South FDI outflows

**Figure 1.4: Share of FDI outflows from developing countries in total global FDI, 1980–2010 • (Per cent)**



Source: UNCTADstat.

- Developing countries have increased their share in total global FDI outflows from 6% in 1980 to 28% in 2010.
- Specially from Asia region, which accounted for 68% share of FDI outflows among developing countries in 2010.
- However, there was a declining trend in FDI from Africa from 37% in 1970 to 1.8% in 2010, and from Latin America from 61% to 30% in the same period.

### I.3. How these can lead to building technology and innovation capacity in Africa...

- Is a critical pre-requisite to ensure that countries can benefit from South-South exchange.
- Because using imports of capital goods or FDI are highly relevant for overall industrial development *if* they can promote technological learning in developing countries.
- But since institutions in many developing countries, particularly least development countries (LDCs), tend to be weak, these countries are challenged in their quest to use South-South trade and investment to build their technological capabilities.

## Against this background, the TIR 2012...

- argues that the similarity of development experiences of the countries of the South (particularly in promoting innovation capacity) makes them essential complements to existing North-South interactions.
- Its central message is that:
  - developing countries are important partners to promote technological capabilities in the South.
  - therefore it is a priority to analyze how South-South collaboration for technology and innovation can be promoted in a systematic way to promote inclusive sustainable development across all developing countries.
- The TIR 2012 argues that the South can only complement, *but not replace*, efforts of developed countries to help address technology and innovation issues in a comprehensive way.

## However, harnessing the true potential of South-South collaboration in technology and innovation...

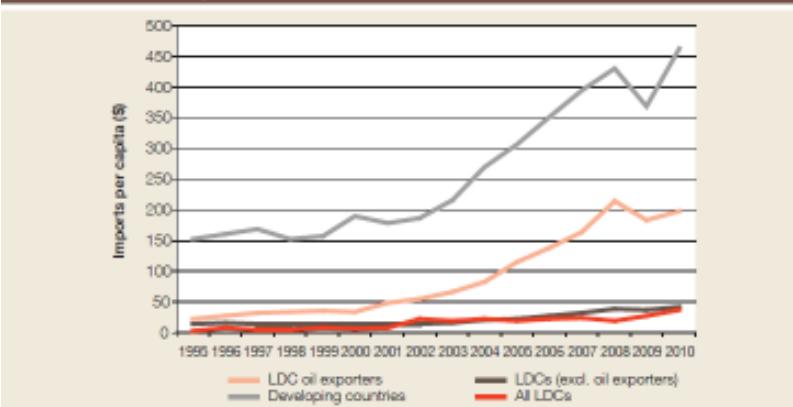
- Calls for a better understanding of the merits of South-South collaboration in this area, namely:
  - Southern countries have followed similar pathways in building their growing manufacturing capabilities, and these experiences carry important lessons for policy learning and policy sharing.
  - Technology developed in the South may be more appropriate to other developing countries and their firms.
- Also calls for the recognition that South-South collaboration in this area, may not be spontaneous, and need to be enhanced.

## Results of the Report in this context point out that...

- Currently, developing countries with a minimal level of technological capabilities are increasingly engaging in ongoing technological exchange.
- A large share of the capital goods exported and imported, is for instance, concentrated in a sub-set of developing countries.
- Trends in FDI further confirm this, where there are significant regional variations.
- The review of the case studies also shows that inter-firm technological collaborations are mainly motivated by economic considerations, or proactive governmental initiatives or both.
- While some technological collaboration is evident amongst the South as a whole, most countries are limited by their low levels of technology absorption capacity to benefit from the opportunities of South-South exchange.
- There is also a need to better coordinate scientific and technical assistance from emerging countries with technological collaboration for the firms.

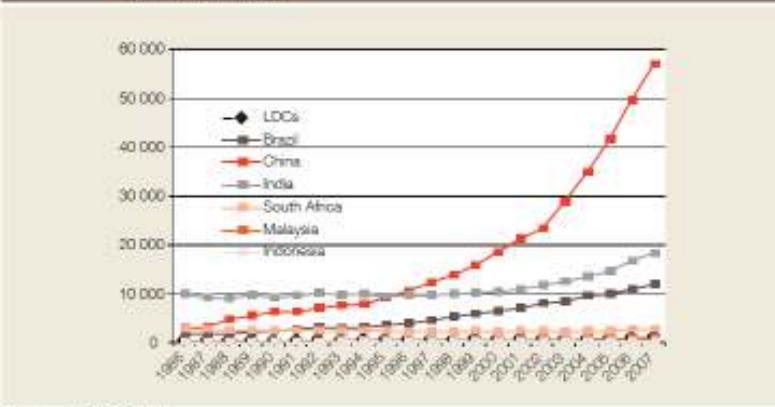
## Some indicators of this technological divergence is shown in the graphs below...

Figure 2.8: Imports per capita of machinery and transport equipment by developing countries and LDCs, 1995–2010



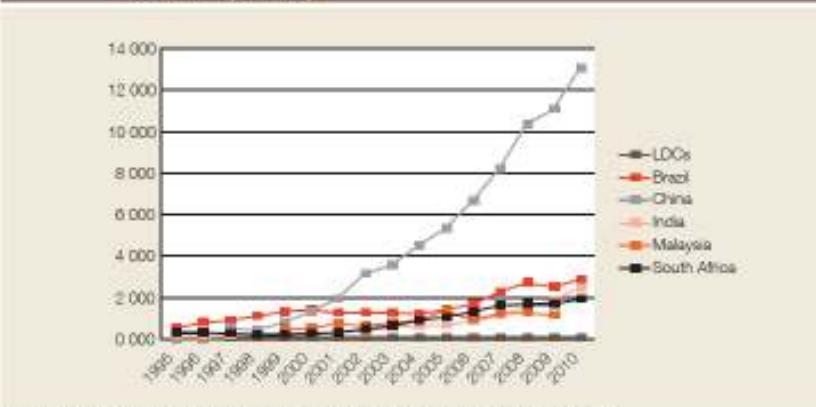
Source: UNCTADstat.

Figure 2.13: Number of scientific and technical journal articles in LDCs and selected countries, 1986–2007



Source: UNCTADstat.

Figure 2.14: Royalty and licensing payments in LDCs and selected countries, 1996–2010 (\$ million)



Source: UNCTAD calculations, based on World Development Indicators (2011).

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**To address this, the Report proposes among others that:**

**Developing countries should pool technological resources to address common challenges. The creation of a *South-South Innovation and Technology Pact*, that can help to create:**

- Promote technological learning at the firm level;
- Promote enterprise development and financing of innovation activities that are of particular importance to developing countries as a whole; and
- Act as a platform for sharing innovation experiences and promoting policy learning.

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