



TECHNOLOGY IN A BRICS COUNTRY – *CASE OF SOUTH AFRICAN ENTERPRISES*

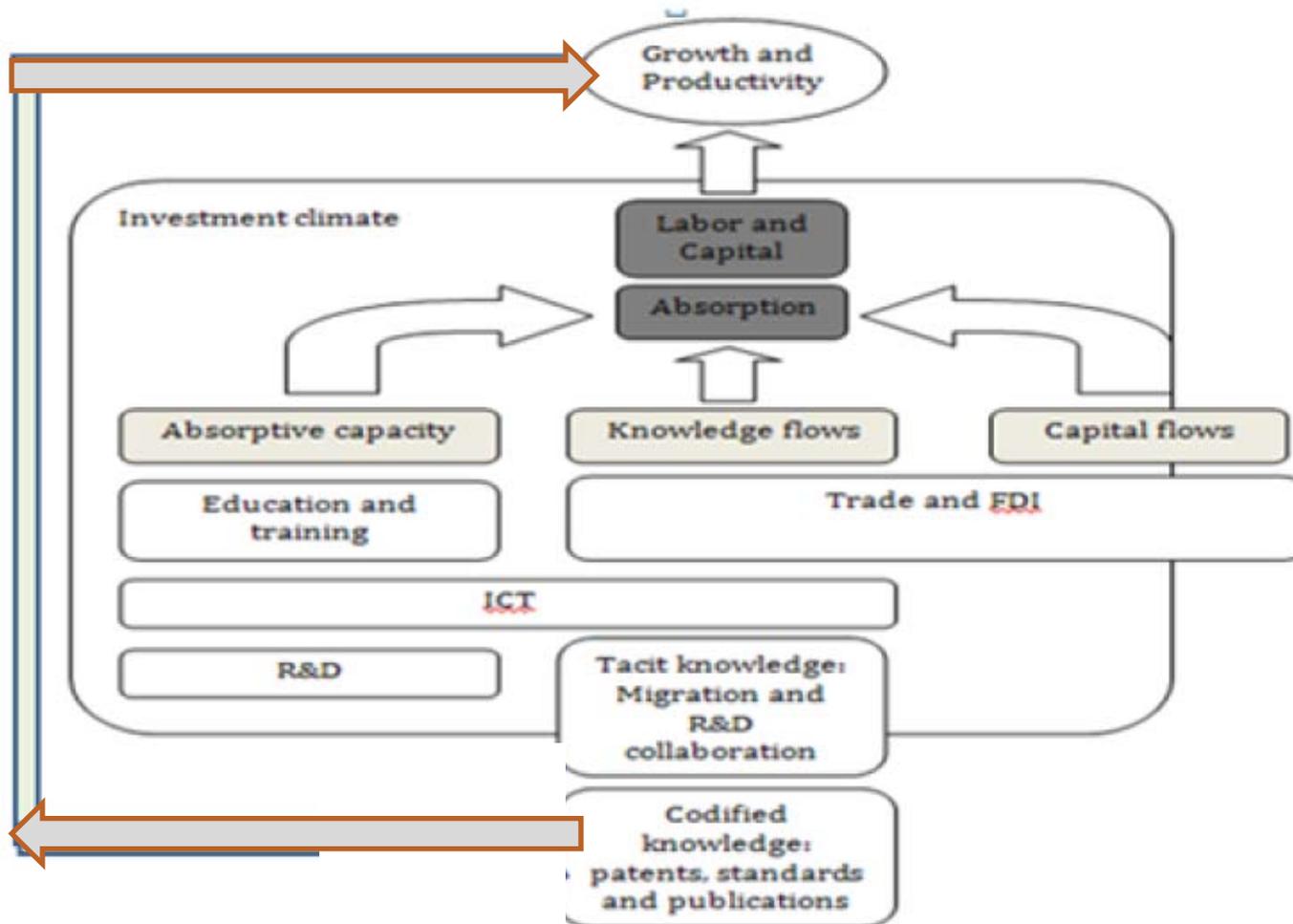
Smita Kuriakose, The World Bank

**Investigating Industrial and Innovation Policies for Growth:
*Contrasting Expert's Views***

European Commission, IPTS

Seville, November 2, 2011

OBJECTIVE: ENHANCE GROWTH AND PRODUCTIVITY



INNOVATION AND TECHNOLOGY ABSORPTION AND GLOBAL COMPETITIVENESS

- Technological progress is critical to maximize total factor productivity gains, which are pivotal to increasing global market share and economic growth.
- Particularly so, because South African manufacturing industries have very limited competitive advantage in terms of labor cost in competing with Asia.

METHODOLOGY

- 2 pronged approach- Case Studies complemented by econometric analyses.
- 4 sector case studies for South Africa: Exporters from 3 medium tech sector (auto comp, capital goods, chemicals) and 1 hi-tech sector (ICT)
- In depth questionnaire followed by a firm site visit.
- Econometric analyses: using the World Bank Enterprise Surveys and the South Africa National Innovation Survey (NIS)

CHANNELS OF AND CONSTRAINT TO TECHNOLOGY ABSORPTION AND INNOVATION

CHANNELS OF TECHNOLOGY ABSORPTION

○ **TRADE**

- **Acquisition of machinery and equipment**

- 80 percent of the firms in South Africa (NIS) cite acquisition of machinery, equipment and software as their primary channel by which they acquire new technology.

- **Learning By Exporting**

- Increased global competition increases firm incentives to invest in technology absorption.
- Firms exporting to advanced economies invested in new machinery and equipment as compared to those exporting to the region.
- Strong correlation between exporting and investing in innovation and technology absorption (not causation).

CHANNELS OF TECHNOLOGY ABSORPTION

○ FDI

- Brings in positive spillovers – e.g. access to foreign technologies and management practices.
- Some evidence to show greater investment in training and technology absorption in South Africa.

○ TRADE IN KNOWLEDGE

- **Licensing of Technology acquired from the trading partners**
 - Technology agreement with MNCs as in the case of South African auto component industry.
 - Acquisition of technology and know-how from their suppliers of materials and equipment, foreign or domestic.

CHANNELS OF TECHNOLOGY ABSORPTION

○ SKILLS TRANSFER

- **Technical consulting services provided by equipment suppliers**
- **Hiring skilled expatriate labor**
 - Firms in the ICT sector alleviate skills shortages by hiring expatriate skilled labor.

○ INDUSTRY RESEARCH LINKAGES

- Limited in most industries however effective collaboration in the mining sector.
- Competencies built on strong linkages for the capital goods sector with mining firms and research institutes (MINTEK).

CONSTRAINTS TO GREATER TECHNOLOGY ABSORPTION

○ **SKILLS SHORTAGES**

- Skills mismatch
- Difficulties in hiring skilled expatriate labor
- Low training levels in the firm
- Outflow of skilled personnel out to more advanced economies

○ **INSUFFICIENT INDUSTRY RESEARCH LINKAGES**

- With the exception of the mining sector, there are virtually no industry- research linkages.

○ **BARRIERS TO FDI**

- Skills shortages
- Crime
- Labor Market rigidities
- Regulatory and Political Uncertainty

○ **OTHER CONSTRAINTS**

- High logistics costs
- Broadband costs (for IT sector in South Africa)
- High labor costs

ICT SECTOR CASE

- SA ICT market largest in the middle east and Africa.
- SA- competitive advantage in developing niche applications for specific vertical industries such as mining, finance.
- High skills levels in the sector: 50% of employees in the sector are professionals with formal tertiary qualifications in ICT.
- Investment in R&D was key, with the large firms accessing the R&D tax credit.
- Client demands increased incentive to invest in innovation.
- Locally available skills proving to be a constraint- high premium on skilled expat labor increasing costs.
- Restrictions on the movement of IP constrains investment in innovation
- High broadband costs

POLICY OPTIONS FOR GREATER INNOVATION AND TECHNOLOGY ABSORPTION

GOVERNMENT SUPPORT FOR INNOVATION AND TECHNOLOGY ABSORPTION

- Basic level: Creating a supportive business environment, in which firms driven by profit motives will seek to update their technology in the best way they can.
- A more coordinated approach to innovation and technology policy and framework.
- Addressing market failure: Beyond those general policies, governments may also need to intervene at the industry and firm levels.
- Four potential areas of public policy intervention based on findings in this study:
 - Skills development;
 - Learning through trade;
 - FDI spillovers;
 - R&D activities.

BUSINESS ENVIRONMENT

- Allocation of entrepreneurial talents between productive and non-productive usages: to be the best in innovation or rent-seeking?
- Competition: why invest in innovation when there is better way to make money?
- Infrastructure: A vast majority of the firms interviewed were also constrained by logistical and infrastructural factors.
- Get the basics right.

DIRECTION AND PRIORITIES OF REFORM FOR SKILLS DEVELOPMENT

- Public-private partnership: the government concentrates on financing and quality assurance, mobilizing both public and private service providers to increase service provision.
- Rapidly scaling up the capacity for Technical and Vocational Educational Training in general and workplace learning in particular.
- Strengthening position in the international competition for talents to address HR constraints.

LEARNING THROUGH TRADE

- Financial assistance to defray a portion of the cost that the firm would have to incur in order to acquire the requisite technological capability to export. E.g. costs of consultancy and certification, product testing or conformity assessment.
- Public provision of basic infrastructure for technology transfer and absorption. E.g. Metrology, Standards, Testing and Quality Certification (MSTQ) infrastructure.
- Brokering relationships – including referral to experts and private consultants.
- Technical assistance and training activity accompanying importation of machinery and equipment.
- Technology diplomacy: governments make use of their bargaining power in trade to promote technology transfer to their domestic economies.

FDI SPILLOVERS

- First-order challenge is to attract FDI, but spillover does not happen automatically. Need proactive action.
- Providing incentives to foreign investors for engaging in deliberate actions of technology transfer.
 - Ensure the extra cost is fully compensated for.
 - Linked to performance and results.
 - Can be offered by government as well as domestic firms.
- Encouraging domestic firms' learning efforts and strengthen their absorptive capacity.

R&D ACTIVITIES

- R&D and research-industry collaboration is of strategic importance to building absorptive capacity.
- Making the R&D tax incentive easier to access, allowing for applied R&D costs and carry forward of the tax deduction. Evidence in the analyses to show that the larger firms conduct R&D.
- Making research more industry relevant-through programs that incentivize collaborative research.
- Supporting intra-country technology diffusion.

FUNDING FOR COMMERCIALIZATION OF INNOVATION

- To increase financial support to early stage innovation by a system of matching grants to product and business development in its broadest sense
 - The Support Program for Industrial Innovation (SPII) program which provides support via matching grants for early stage has many good features, has not been widely accessed- some recommendations include:
 - allowing a broader range of expenditures to qualify in addition to developing a prototype,
 - allowing spin offs from large companies to qualify and;
 - broader information outreach.
- Encourage private VC to support growth stage of the innovation cycle- the government could mitigate private investors' risk by investing as a founding and passive Limited Partner not holding a majority stake with investment decisions being solely at the discretion of general partners.
- Making exit more attractive- to enable access to global Initial Public Offering (IPO) at the exit stage.

THANK YOU