Fostering Knowledge and Technology Spillovers in Extractive Industries

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Despite recent economic crisis FDI flows to Africa still on the rise reaching $60.4 billion in 2014. (See AfDB, 2014)

African inward FDI mainly directed at resource-rich countries.

Countries increasingly aim at benefitting from technology and knowledge spillovers. Spillovers may occur through different channels

- Demonstration-imitation channel
- Labor mobility channel
- Backward linkage channel
- Export channel
Demonstration-imitation Channel

Local Firms may imitate Foreign Firm

• Management Practices
• Technology
Imitation – Case Studies

Management Practices
Mobil-Statoil
Statfjord Field (1970s)

- Statoil hired Americans for Leadership Positions
- Created a structure that was closely modeled on Mobil’s organization
- (1970s) Early Production System (EPS) approach applied in the North Sea

Technology
Petrobras

- Acquired FPSO vessel (1998) from service company (USA)
- Modified the drill pipe riser with FMC Technologies
Reducing the Technology Gap to Imitate

Norway
Joint research
International Oil Companies and local educational institutes

Statoil took over operatorship of the Statfjord field in 1986

Brazil
Research by Petrobras through its research center (CENPES)

Petrobras leader in deep-water exploration and production
Labor Mobility Channel

Transfer of physical technology (equipment) to subsidiaries

Need for transfer of knowledge on how to effectively use it

Local workers trained by foreign firms
- Hired by local firms: increasing local firm productivity
- Start their own businesses
## Labor Mobility – Case Studies

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage of Managerial Employees</th>
<th>Percentage of Technical Employees</th>
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<tbody>
<tr>
<td>Ghana</td>
<td>15%</td>
<td>13%</td>
</tr>
<tr>
<td>Mozambique</td>
<td>13.1%</td>
<td>5.6%</td>
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Senior personnel at South Africa’s mining equipment and service suppliers developed knowledge and skills as technicians on mine sites or worked for research centers. Previously employed by foreign mining companies (Farole and Winkler, 2014).
Technology Transfer Cost & Hiring Local Workers

Technology transfer cost
“Cost of transmitting and absorbing all of the relevant unembodied knowledge. “
(Teece, 1977)

In many Sub-Saharan African countries
• Lack of basic (technical) skills

High cost of job specific training.
Dependence on expatriates.

Less room for knowledge spillovers through labor mobility

Need for more technical training facilities
Backward Linkage Channel

Foreign firm knowledge transfer to local suppliers

May reduce input costs for foreign firm in the long run
Importance of the Backward Linkage Channel

Economic value distribution in minerals extraction

- Suppliers: 50%
- Employees: 16%
- Company taxes: 12%
- Reinvested in the Group (capex): 12%
- Dividends: 8%
- Provision of capital (interest): 2%

Source: Anglo American 2012 Sustainable Development Report
Collaboration with Local Suppliers – Case Study

BHP Billiton in Chile
Snapping of shovel cables

Collaboration with local suppliers to develop a solution with mine site as testing ground

Local supplier Prodinsa increased shelf life of cables by approximately 40%

Source: BHP Billiton Copper 2013 Presentation: World-class suppliers to the global mining industry
Risks of Ill-designed Local Content Legislation

“Window dressing” local supply by requiring local ownership
- Substitution of foreign company import by local firm import

Local manufacturing and service delivery by requiring local value addition
- Local or foreign owned supplier

- Higher cost, foreign companies
- No local value added

Lose-lose situation

- Company: closer to supply, lower risk
- Local value addition

Win-win situation
Export Channel

Exporting involves fixed costs:
Market information; Advertising;
Distribution network

Foreign companies can become a channel for entering foreign markets
Export by Local Suppliers – Case Studies

Becoming an exporter after supplying foreign companies (Farole and Winkler, 2014)

- Ghana
  A third of all surveyed local suppliers

- Chile
  42 percent of surveyed suppliers

Prodinsa

has exported the solution to BHP Billiton’s operations in Peru
Lessons and Recommendations

- **Imitation channel**: Research by local and/or foreign firm in collaboration with local knowledge institutions is needed to reduce the technology gap and to make imitation possible.

- **Labor mobility channel**: Legislation on hiring local workers may be ineffective without an accompanying policy to increase local technical skills, which are needed in the resource sector.

- **Backward linkage channel**: Imposing legislation on buying from locally owned firms may not address increasing local production. It is local value addition in the supply chain that is beneficial.

- **Export channel**: Attract foreign firms with operations in different countries and stimulate them to do research in collaboration with local suppliers.
BHP Billiton (2013). Case study: Building human and enterprise capacity: making a positive contribution to society.


