IGF

INTERGOVERNMENTAL FORUM on Mining, Minerals, Metals and Sustainable Development

IGF Guidance For Governments:
Leveraging Local Content Decisions for Sustainable Development

CASE STUDY

SOUTH AFRICA: HORIZONTAL LINKAGES

BUILDING EXPERTISE BY OVERCOMING COUNTRY-SPECIFIC CONSTRAINTS

OVERVIEW

LEVEL OF OPERATION:
Industry

GOVERNMENT ROLE:
Regulator (at a later stage)

LINK TO POLICY ADOPTED:
see Chamber of Mines; South African Capital Equipment Export Council

KEY COMMODITIES:
Gold (world leader), platinum (world leader), diamond, coal, base metals[1]

TOTAL NATURAL RESOURCE RENTS (AS % OF GDP) (2015):
4.2 per cent[2]

NATIONAL EXTRACTIVES COMPANY:
African Exploration Mining and Finance Corporation (AEMFC)

UNDP HUMAN DEVELOPMENT INDEX VALUE (2016):
0.666 (Rank 119)[3]

South Africa's upstream and horizontal linkages are the result of the unique scale and type of its resources. Horizontal linkages developed through the establishment of an upstream supplier sector that built its expertise by overcoming specific constraints of mining in South Africa and applied this expertise to seize opportunities in other sectors and abroad. Government intervention did not play a major role in the development of these linkages: the successes are mostly attributable to market forces and private sector involvement.

MINING AND MINING SUPPLY IN THE SOUTH AFRICAN ECONOMY

South Africa has a long history in mining, and the sector has left an indelible imprint on the economy. Most of the early industrialization

[1] Central Intelligence Agency (CIA). (2017). *The world factbook*. Washington, DC: CIA. Retrieved from https://www.cia.gov/library/publications/the-world-factbook/fields/2111.html

[2] World Bank Group. (2017). *Total natural resource rents (% of GDP)*. Washington, DC. Retrieved from https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS

[3] United Nations Development Programme. (2016). *Human Development Reports: South Africa*. Geneva, Switzerland. Retrieved from http://hdr.undp.org/en/countries/profiles/ZAF

of the country can be attributed to the mining sector, and even as late as the 1970s economic development was, in one form or another, dependent on the mineral-energy complex.

The history and influence of the mining sector in South Africa has been quite different from that of other countries, especially other African ones. The discovery of diamonds and gold—and importantly, the sheer magnitude and type of the mining required—changed the nature of operations from the early 1900s onwards. First, the large scale of the South African mineral deposits brought in substantial and long-lasting investment. Instead of small plots of land and men panning rivers, the large deposits required capital-intensive operations by companies with access to significant finance to build underground shafts and transport infrastructure, purchase the industrial machinery, and hire (or develop) skilled labour.[4]

Mining suppliers have struggled in recent years as global competition has eaten away at their domestic market share.

Second, the type of deposits—which presented unique technological challenges—meant that from an early stage the mining sector required new techniques and equipment. Linkages with other sectors emerged as local solutions were required to mine the deposits. The competencies built up in supplying the mines, which kept on venturing into increasingly complex areas (e.g., as gold reserves became depleted), created the bases for horizontal linkages. In later apartheid years the economic isolation—coupled with the discovery of a wider range of minerals—led to further specialization and spinoffs from mining activities.[5]

Currently, South Africa is a world leader in a host of mining equipment products. These include spirals for washing coal, water pumps, hydropower, tracked mining, underground locomotives, ventilation, shaft sinking, turnkey new mine design and operation, etc. Much of this is based on capabilities acquired through deep-level mining. In other areas where value chains and economies of scale matter more than engineering solutions, South African firms are in competition with large multinational firms and experience less notable success.

Overall, the mining sector has declined in relative terms since South Africa's transition to democracy. As the economy continued to diversify, reintegrate into the global economy, and expand into new areas, the growth of tertiary industries has dwarfed that of the mining and manufacturing sectors. More recently, lower commodity prices and uncertainty surrounding domestic mining policies have made several higher-cost mines unprofitable and led to delayed or cancelled investments. Currently, the mining sector accounts for roughly 7 per cent of GDP, down from 20 per cent in the 1980s, and manufacturing accounts for roughly 12 per cent of GDP, down from 20 per cent in 1994. However, mining and base-metal goods are still critical for exports and a major source of demand for many domestic firms. Mining suppliers have also struggled in recent years as global competition has eaten away at their domestic market share. The mining sector is sourcing an increasing portion of its intermediate input requirements from foreign producers, with this ratio rising from 16 per cent in 2000 to 20 per cent in 2013.[6] It is worth noting that this is still relatively low import leakage.

[4] Feinstein, C.H. (2005.) *An economic history of South Africa: Conquest, discrimination and development*. Cambridge. UK: Cambridge University.

[5] Kaplan, D. (2011). *South African mining equipment and related services: Growth constraints and policy* (MMCP Discussion Paper No 5). Cape Town, South Africa, the University of Cape Town, and Milton Keynes, the Open University. Retrieved from http://commodities.open.ac.uk/80257505004 53F86/(httpAssets)/A9F11B4C2003A8548025787E003A620F/$file/South%20African%20mining%20equipment%20and%20related%20services%20Growth,%20constraints%20and%20policy.pdf

[6] Industrial Development Corporation (IDC). 2014. *Export Opportunities for South Africa's Capital Goods Industry."* Sandton: IDC of South Africa Ltd.

CAPABILITY-LED HORIZONTAL LINKAGES

Five main drivers of capability-led horizontal linkages in South Africa can be identified:

The **scale of mineral resources** enabled the establishment of supporting sectors, such as chemicals (explosives), machinery, electrical equipment and cables, cement and transport equipment. Some of these investments, which have substantial start-up costs (e.g., chemicals), were only possible due to the size of the market created by the mining industry[7] but then served other markets.

The **type of mining required** has led to the development of horizontal linkages from the outset. Difficult mining conditions resulted in several major innovations as mining firms constantly looked for ways to improve efficiency and lower costs. Coal, for example, is abundant in South Africa but mostly of poor quality. It had to be washed to remove impurities, which led to extensive development in spirals for washing, a product and technology that is now applied in several new areas, such as the oil sands in Canada.[8]

Mining firm cooperation, particularly through the Chamber of Mines, led to pooled skills and research that benefited all mining firms. The cooperation between firms was partly possible due to the type of mining and scale of resources discussed above, which contributed to a concentrated industry structure dominated by large firms. Cooperation across these firms and the large amount of funds at their disposal led to major technological improvements. As an example, in the late 1960s, the depth of gold deposits motivated the Chamber of Mines Research Organisation (COMRO)—the industry's cooperative research institute—to undertake research and development into alternative technologies to extract gold-bearing rock. This led to the development of several complementary technologies to produce an integrated all-water-based hydraulic mining extraction technology. Based on this, a range of niche resource and non-resource technologies have emerged.[9]

The **development of strong upstream linkages**, including through geographical clusters around Johannesburg and the Witwatersrand, allowed the development of horizontal linkages. The concentration of mining houses in a relatively small area naturally led to the concentration of suppliers in the same area, allowing for cooperation between companies and spillover effects between mining firms and producers (including through worker migration). The cluster included companies specializing in metallurgy, machinery, electrical equipment and construction activities.[10] The capital equipment industry went on to create a formal organization, the South African Capital Equipment Export Council. While the Council operates nationwide, most of its companies are still based in a relatively small geographical area, promoting greater interaction.

Mining and related activities are the only industries where South Africa has a significant number of patents and where the patents have a high value.[11] Not only is this a clear manifestation of global competitiveness, but it also supports further research and investment that build on these competencies (e.g., skills, capacity, and business and market knowledge).

Supplier companies' willingness and ability to branch out into other markets then played an important role. For example, South Africa developed special expertise in deep gold and platinum mining. When mining activity declined

[7] Large investments in the mining sector were also a key driver of infrastructure development. Today, not only are a significant proportion of railway transport revenues and port charges derived from minerals transportation and export, but the entire shape of the transport network reflects the history of the mining sector's development.

[8] Kaplan (2011), Id. note 5.

[9] Pogue, T.E. (2008). Missed opportunities? A case study from South Africa's mining sector. In J. Lorentzen (Ed.), *Resource intensity, knowledge and development: Insights from Africa and South America*. Cape Town, South Africa: Human Sciences Research Council Press. Retrieved from https://ieri.org.za/sites/default/files/outputs/Resource_Intensity_Chapter_5_mining_sector.pdf

[10] Columbia Center on Sustainable Investment (CCSI). (2016). *Linkages to the resource sector: The role of companies, government and international development cooperation*. Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from http://ccsi.columbia.edu/files/2016/07/Linkages-to-the-resource-sector-GIZ-CCSI-2016.pdf.pdf

[11] Kaplan (2011), Id. note 5.

in the 1990s (as gold became depleted), the country's highly specialized equipment manufacturers diversified by either expanding abroad or by modifying and adapting their generic technologies for use in other industries, such as the construction, agriculture and general manufacturing sectors.[12]

Because the key factors cited above are mainly context-specific or market-related, government policy did not play a strong role in development of horizontal linkages in South Africa.

RECENT POLICY DEVELOPMENTS

The end of apartheid brought a change in policies across many industries, including a focus on downstream beneficiation, international integration (although recent years have seen some pull-back with higher tariffs), and an attempt to redress injustices and imbalances. Given the history of apartheid and the role of mines within this regime, there is additional focus on the mining industry through policies that favour historically disadvantaged people. South Africa thus has one of the world's most detailed and complex local content legislation and frameworks.[13] The local content policies aim to correct the socioeconomic imbalances created by apartheid and to ensure that local mining communities, as well as South Africans more broadly, benefit from mining operations. The policies are contained across several pieces of legislation that have evolved in the past two decades; however, the focus can be described across seven elements:

1) Ownership participation
2) Employment equity
3) Human resource development
4) Preferential procurement (for South African companies and companies owned by historically disadvantaged South Africans)
5) Local community development
6) Beneficiation
7) Housing and living conditions.

As is apparent from the above, these policies do not explicitly target horizontal linkages. The thrust of industrial policy has been to focus on downstream beneficiation of minerals (despite several reports warning against this). Promotion of upstream linkages focuses on firms with ownership and management by previously disadvantaged South Africans. The support plays out in a complex manner since the established firms, which operate at the technological frontier, are often white-owned. This means that support is targeted at the establishment of new firms or at small and medium-sized enterprises (SMEs). There are relatively few policies aimed directly at upstream suppliers (particularly manufacturing firms). While there are generic grant incentives available (e.g., the Manufacturing Competitive Enhancement Programme), as well as generic marketing incentives (e.g., Export Marketing and Investment Assistance), there are few specific incentives or supports to help mining suppliers branch out into new products or markets. Mining-related industries also do not feature specifically in the R&D 10-Year Road Map of the Department of Science and Technology.[14]

While some successes have been achieved, the government has recently grown frustrated at the perceived slow pace of transformation and has attempted to rectify this through stricter regulation (e.g., the proposed new Mining Charter in June 2017, which the Chamber of Mines is challenging in court.)[15] Mining firms have also become frustrated at what they see as policy uncertainty regarding mining rights, ownership and potential export restrictions. Mines have also faced increasing pressure from local communities and employees, including multiple damaging strikes. The uncertainty in the South African mining sector

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[12] Walker, M. (2005). *Unpacking the nature of demand and supply relationships in the mining capital goods and services cluster: The case of PGMs.* Trade and Industrial Policy Strategies (TIPS) Annual Forum 2005: Trade and Uneven Development: Opportunities and Challenges. Retrieved from http://tips.org.za/files/769.pdf

[13] Korinek, J. & Ramdoo, I. (2017). *Local content policies in mineral-exporting countries* (OECD Trade Policy Papers, No. 209). Paris: OECD Publishing. Retrieved from http://dx.doi.org/10.1787/4b9b2617-en

[14] Kaplan (2011), Id. note 5.

[15] Among the disputed points is the increase in the extent of ownership by historically disadvantaged people required, as well as whether mines should continually readjust and update their shareholding to meet the ownership objectives.

and its effect on investor confidence have led to lower or delayed investments, which directly harms suppliers and manufacturers.

It is unclear what effect the transformation of the mining supply industry will ultimately have on production and horizontal linkages, but the latter have already weakened due to a widening knowledge gap between mining companies and the non-mining sectors, and to the risk to first-mover supplier companies of venturing into non-mining sectors. Some have suggested that policies to encourage the sharing of technological competencies be put in place to correct these market failures.[16]

The potential for horizontal linkages is further reduced by the lack of progress by the government in improving the skills level in the economy. Kaplan (2011) argues that there has been a decline in the skills and competencies available for the mining and related sectors.[17] This skills shortage is being exacerbated by aggressive recruiting on the part of competitor firms, especially from Australia, which have been very successful at recruiting skilled South Africans. By contrast, South African firms complain that they have major problems in securing the necessary work permits for expatriate labour.

This affects both locally owned and foreign-owned firms operating in South Africa, but particularly the latter. Bhorat and Rooney (2017)[18] cite overall skills shortages as one of the main reasons for the recent poor performance of the manufacturing sector.

KEY LESSONS

- Capability-led horizontal linkages most often develop from upstream linkages. If upstream linkages do not yet exist or are underdeveloped, then the focus should be on developing these upstream linkages. It may be possible to develop some horizontal linkages in conjunction with developing upstream sectors.
- Local context and the market are main drivers for horizontal linkages. The technologies used, and the potential for spillovers, are influenced by both the type and the specific conditions of the mining operation. The stage of development of the mining sector thus determines the potential for horizontal linkages.
- The availability and level of skills in the economy determine the absorptive capacity. Without an adequate skills base, horizontal linkages are likely to be limited. Skills and knowledge gaps need to be addressed first or in conjunction with horizontal linkages policies.

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[16] Kaplan (2011), Id. note 5.

[17] Ibid.

[18] Bhorat, H., & Rooney, C. (2017). *State of manufacturing in South Africa* (DPRU Working Paper 201702). Retrieved from http://www.dpru.uct.ac.za/sites/default/files/image_tool/images/36/Publications/Working_Papers/DPRU%20WP201702.pdf

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