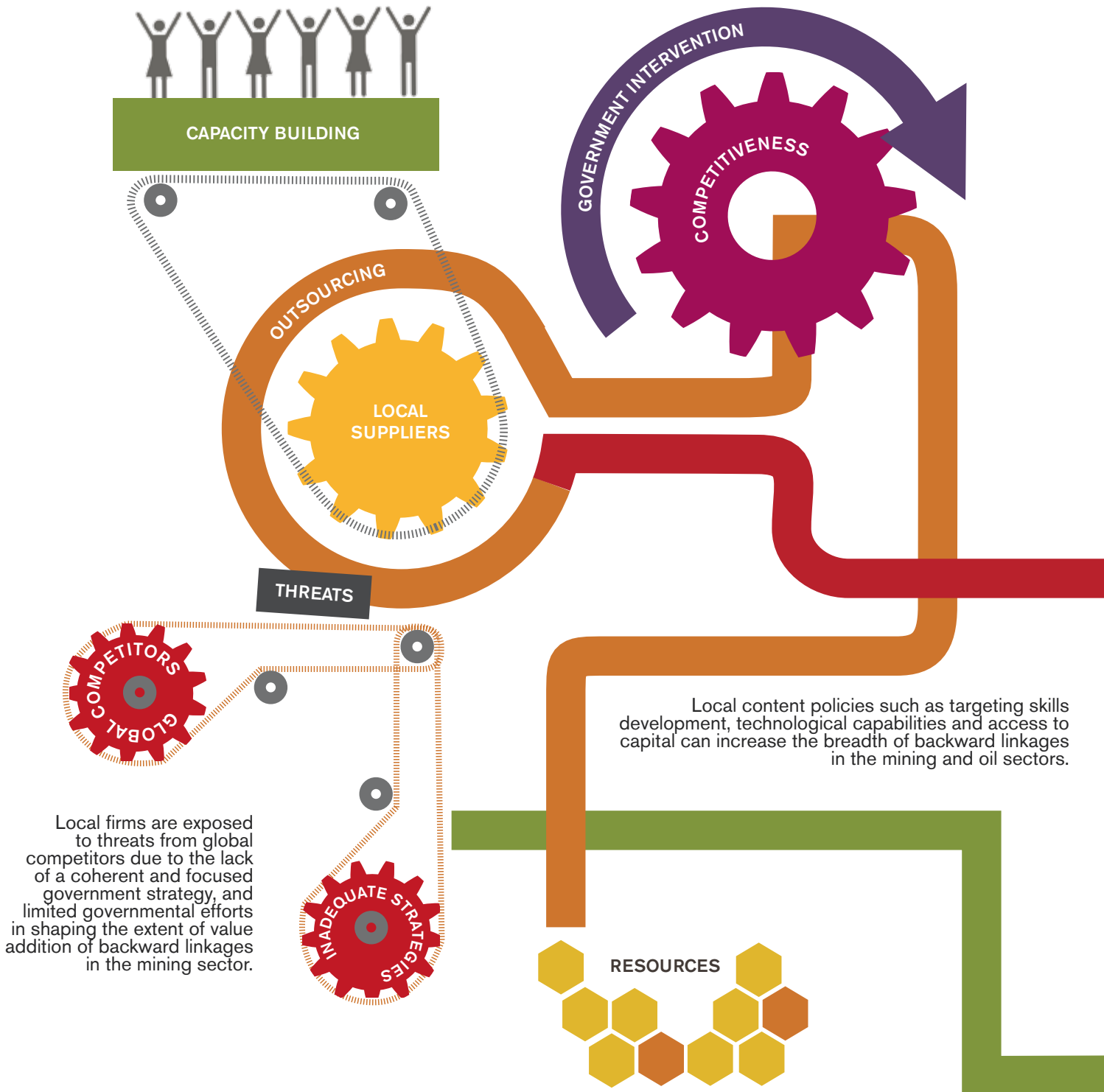

Making the Most of Linkages in Industrial Commodities

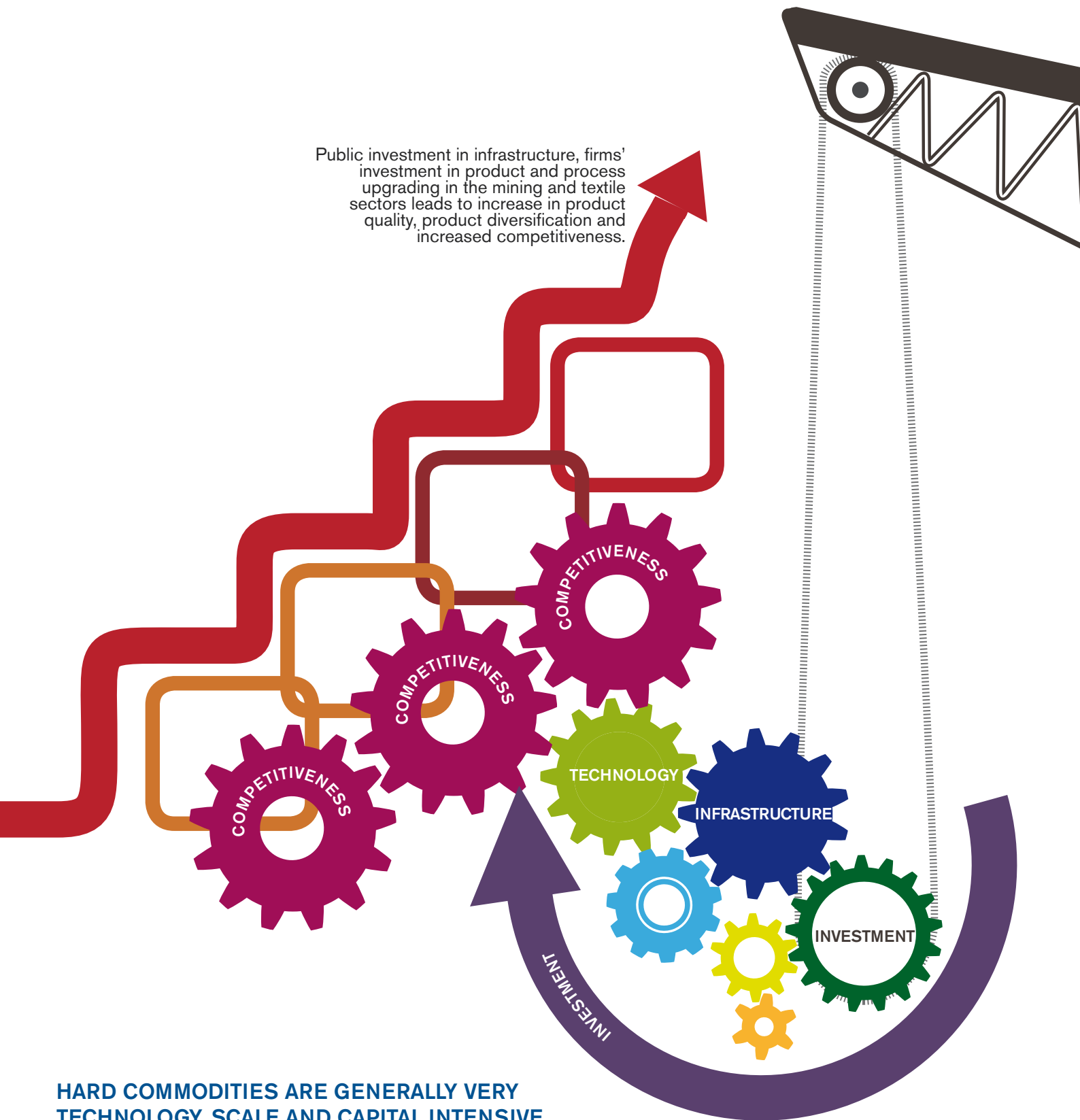
LOCAL CONTENT POLICIES HAVE PROBABLY BEEN THE SINGLE MOST IMPORTANT POLICY DRIVER OF LINKAGES FROM THE COMMODITY SECTOR.

Outsourcing to local suppliers by lead commodity firms in the mining and oil sectors creates an opportunity for capacity building in local content requirements.

Maintaining competitiveness of local firms in the international global chain markets require government intervention and effort.



Public investment in infrastructure, firms' investment in product and process upgrading in the mining and textile sectors leads to increase in product quality, product diversification and increased competitiveness.



HARD COMMODITIES ARE GENERALLY VERY TECHNOLOGY, SCALE AND CAPITAL INTENSIVE AND REQUIRE INFRASTRUCTURE THAT CAN BE USED FOR DEVELOPING OTHER SECTORS.

This chapter focuses on how well Africa is making the most of primary commodities to develop linkages for its industrial commodities and to drive its industrialization. It deals primarily with backward linkages to local suppliers, but also discusses some forward processing and marketing linkages. The industrial commodity sectors discussed are cotton, textiles and clothing (Egypt); leather (Ethiopia); oil (Nigeria); copper (Zambia); gold (Ghana); and mining supplies (South Africa).

The analysis focuses on links along the global value chains (GVCs) driving these sectors and connecting local producers to export markets. It reviews how the lead firms controlling these value chains help or hinder the breadth and depth of forward linkages, the factors that prevent local firms from shifting into valued-added activities, and how government policies can influence domestic industrialization.

The case studies highlight the role of buyers and policies in developing backward and forward linkages. Ethiopia's leather industry and Nigeria's oil supply industry provide examples of countries where linkages are not only developing but also deepening into high value added activities. Nigeria's local content policies date back a few decades, and with time created opportunities seized by domestic businesses and encouraged by policies for developing business and creating skills. Ethiopia is at an earlier stage, although its export tax is accompanied by programmes to build technologies, capital and a trained workforce into which domestic firms can tap. In both cases, buyers have had an incentive to cooperate with local firms and have supported firms' product and process upgrading. Value addition is not necessarily linked to ownership of national firms, but some at least of the linkage development in these two industries has been driven by national companies.

Ghana and Zambia are in the middle of the spectrum. Mining has a long history in both countries, which have seen investment booms—Ghana since the 1980s and Zambia since the

2000s. Governments there have done little to shape backward linkages to mining, such that they have been populated by many domestic and foreign suppliers, which absorb a large share of the mining companies' local operational spending, leading to doubts over how deeply rooted these local supply chains are. It is hard to gauge the extent of value added, but it is clear, at least in Zambia, that most of the local firms surveyed are importing goods with little technological, skills or knowledge content. In Ghana, the local supply chain may well be developing more dynamic capabilities, albeit from a low base. In both cases, little is also known about the extent of domestic ownership.

The Ghanaian and Zambian case studies provide some grounds for optimism, however. First, employment linkages are very significant in size and skills content. The chances of these skills migrating to the supply chain should not be discounted, and indeed some evidence shows that this has already been happening in the oil and mining sectors. Second, skills-intensive services such as engineering, repair and maintenance services have localized because of spatial requirements. Third, the breadth of skills, technology, capital and economies of scale in supply links to mining creates real opportunities for supply firms and countries at different stages of economic development.

South Africa's mining supply industry and Egypt's textile and clothing industry show well-developed linkages with the commodity sectors, which are struggling to remain competitive. Growth in the South African industry was underlined by deep government cooperation with the mining houses and by heavy public investment in the national system of innovation. The industry acquired areas of knowledge that were specific to the deposit type and extraction techniques of local mines, and this enabled it over time to become a global leader in some products and services.

As South African mining houses internationalize, their trust-based relationships with their suppliers could give these suppliers an advantage: if

the houses are confident of their suppliers' quality and competence, they are more likely to continue working with them in operations abroad. However, South African firms are still exposed to global competition and ultimately a South African mining house in Africa or Latin America will decide on the basis of the most competitive—all things considered—offer.

Egyptian cotton is world renowned for its quality. On this basis, the country integrated forward from raw cotton to fabrics to clothing and manufacturing of home textiles (such as carpets, rugs, bed linen and towels). Egypt continues to export successfully, partly through preferential agreements with the US and Europe. Moreover, the textile and clothing firms produce very high value added products. The companies invest heavily in product and process upgrading, which enables them to be strong in product quality and diversification. The most supportive government policy has been infrastructure investment; others had mixed results, largely owing to poor implementation.

Egypt's textile and clothing firms and South Africa's mining supply companies are under increasing threat from global competition. In Egypt, the textile stage of the cotton value chain has been eroded by Asian fabric manufacturers and by poor domestic capabilities. Further downstream, clothing and home textile manufacturers struggle to compete with low-cost Asian exporters in third-country markets, especially after the end of the Multifibre Arrangement.

In South Africa, the mining supply industry struggles to compete at the bottom of the technological spectrum with low-cost, low-tech Asian producers, and at the top of that spectrum with advanced economies such as Australia. In both cases, the lack of a coherent and focused government strategy to help the sectors is to blame. China is a particular threat to manufacturing activities, while Australia is to research and development (R&D)—type activities. The South African experience shows particularly

that linkage development is a cumulative process, and continuous investment is required in technologies, R&D and skills.

Egyptian firms exporting to European and US buyers have to meet stringent requirements and are assisted by global brands and retailers in meeting them. This approach is completely different from firms selling to traders in domestic and regional markets. South African mining companies had intensive linkages with suppliers that helped to jointly develop products that were highly location specific. Nigerian oil companies are cooperating with local suppliers to help upgrade local capabilities.

Similar to the soft commodities analysed in the previous chapter, Ethiopia's leather and Egypt's textile and clothing industries also rely on the quality, volume and consistency of supplies from the commodity sector to be competitive. Again, a strategy targeting the processing industries must be integrated with interventions for commodity producers and primary processors.

Finally, another finding of the case studies is that mining and oil companies see it in their own interest to outsource to local suppliers. Outsourcing has reduced transaction costs, lead times and the need for large stocks, but they only outsource if it is economically efficient, and do so in partnership with other stakeholders. The lead commodity producers' interest in outsourcing is important from a policy point of view because local content requirements coupled with capacity building could be aligned with corporate strategies of lead commodity producers. In a similar vein, Egyptian textile and clothing firms are vertically integrated because they need to internalize market failures in the weaving, dyeing and knitting stages of the value chain—but to perform at optimal capacity, they need to operate in a textile cluster that allows them to outsource these activities. Linkage development policies could therefore be instrumental in supporting broader industrialization strategies and increasing the competitiveness of existing industries.

5.1 COTTON, TEXTILES AND CLOTHING

The global value chain

The cotton to clothing GVC can be divided into several stages (box 5.1 and figure 5.1): raw

material supply, including natural and synthetic fibres; yarns, including spun cotton and filament; textile fabric production and finishing; conversion and assembly of clothing and other textile-based products; distribution and sales at wholesale level; and final distribution at retail level.

BOX 5.1: SOME ELEMENTS IN THE COTTON, TEXTILE AND CLOTHING GVC

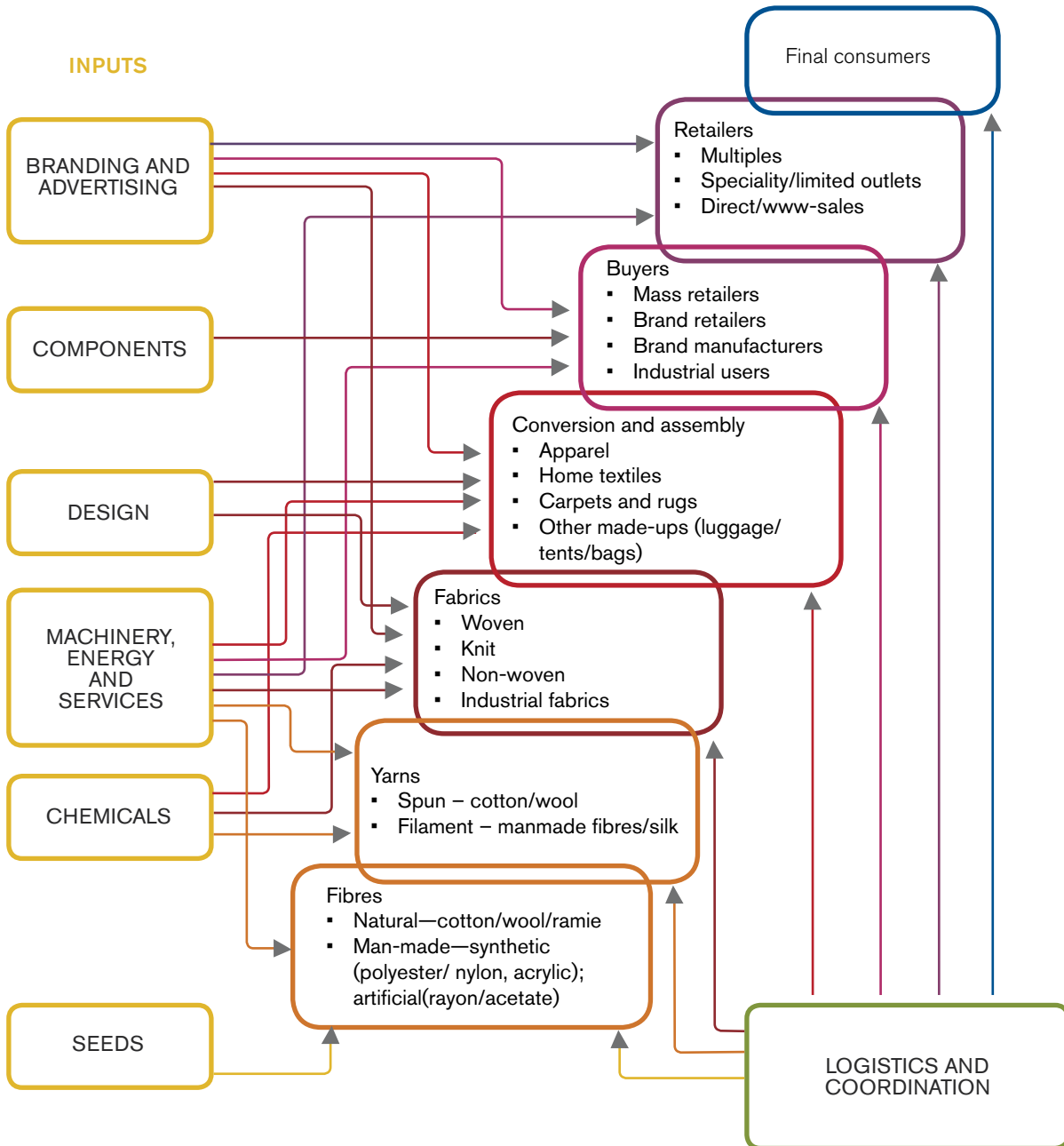
Fibres are processed from plant or chemical-based raw materials and are spun into yarn that is used to produce woven or knitted fabric. The fabric is then finished, dyed or printed, and cut into pieces to produce clothing or products for other end markets (home furnishings, industrial or technical consumer products).

Much clothing production remains labour intensive, has low start-up and fixed costs and requires simple technology—characteristics that have encouraged clothing production to relocate to low-cost areas, mainly in developing countries. Textile production is more capital and scale intensive and demands higher workers' skills. Some has stayed in developed countries or shifted towards middle-income countries.

A series of intangible activities add value to clothing products—product development, design, textile sourcing, distribution, branding and retailing. These are controlled primarily by four main types of lead firm (and by some intermediaries and suppliers): mass-merchant retailers, speciality retailers, brand marketers and brand manufacturers.

Source: Interviews with textile firms, 2012.

FIGURE 5.1: COTTON, TEXTILE AND CLOTHING GLOBAL VALUE CHAIN



Source: ECA and AUC.

Global trends

The US, China and India dominate global cotton production, with around two thirds. Cotton is a major earner of foreign exchange in many African countries and an important means of generating cash income for millions of smallholder farmers.

World cotton yields stagnated for much of the 1990s but rose by 35 per cent during 2004–2006, primarily on technological advances, but these gains did not increase growers' income. Cotton has had very little share in the commodity price boom. As one source put it: "The consensus within the industry is that 'growers are going to have to learn to adjust to lower cotton prices' for the foreseeable future, as a result of more rapid growth in productivity" (Tschirley et al., 2010: 2). Increasing the value added in this sector through moving up the value chain is therefore a necessity for African countries with large cotton sectors.

China is by far the world's largest clothing exporter. Over the past two decades the country has continually increased its export share in clothing trade from 21.5 per cent in 1995 to 28.3 per cent in 2004, and then dramatically jumping to 42.9 per cent in 2010.

The EU-15 and the US are easily the largest clothing importing markets, accounting for above 65 per cent of global clothing imports in 2010. Developing countries' clothing exports are strongly concentrated in those two markets. African countries that produce textiles and clothing are therefore faced with Chinese exports as their most serious competition in home and third-country markets such as the EU and US.

Chinese exports have, however, a positive (complementary) impact as well as a negative (competitive) one. This is an issue that has important policy implications. Cheaper clothing for local consumers has an important welfare-enhancing effect while hurting the local manufacturers who cannot compete at these prices. Similarly, cheaper textiles provide valuable inputs to local clothing production but also threaten the long-term sustainability of regional and local textile–clothing links.

Trade regimes

The clothing (and textile) industry has been one of the most trade-regulated manufacturing activities in the global economy. Although many quotas were removed on 1 January 2005 with the end of the Multifibre Arrangement, and totally in 2009 when Chinese safeguards in the US and EU came to an end, tariffs still play a central role in global clothing trade.

For example, although average most-favoured-nation tariffs on clothing imports are around 11 per cent for the US and EU, they vary widely by product category. US tariffs on clothing products are significant, with duties on cotton products averaging 13–17 per cent and those on synthetic products 25–32 per cent. EU tariffs on clothing products vary between 0 per cent and 12 per cent, but show no systematic differences between cotton and synthetic products. Thus preferential market access to these two economies has a huge impact on global clothing trade patterns and boosts African clothing-producing countries' ability to compete with Chinese and South-east Asian exporters. Preferential trade agreements with the EU and US are thus becoming increasingly critical.

Preferential market access to the EU usually requires fulfilling "double-transformation" rules of origin—regional conversion from yarn to fabric to clothing—but rules of origin requirements changed to "single transformation" for those countries that signed interim Economic Partnership Agreements in 2008 and 2009.

The African Growth and Opportunity Act (AGOA) offers trade preferences to the US for many African countries (see chapter 2). It has been extended several times over the last decade and is now set to expire in 2015, but its temporary nature creates uncertainties for current and potential investors in the clothing industry. AGOA rules of origin requirements state that clothing has to be made 85 per cent from yarns, fabrics and threads from the US or produced in AGOA beneficiary countries. However, a special rule—the Third Country Fabric derogation—applies to less developed countries, allowing them duty-free access for clothing made from fabrics originating anywhere in the world.

Although Egypt is ineligible for AGOA, in 2005 it was accorded preferential trade access to the US through membership of the Qualifying Industrial Zone agreement linking it to clothing and textile production with Jordan and Israel.¹

Excluding North Africa, clothing exports jumped from \$2.1 billion in 2000 to \$3.2 billion in 2004, but after the ending of the Multifibre Arrangement dropped back to \$2.0 billion. Africa's exports to the US as a direct result of AGOA followed a similar pattern, increasing from \$748 million in 2000 to \$1.7 billion in 2004 and then decreasing to \$904 million in 2010.

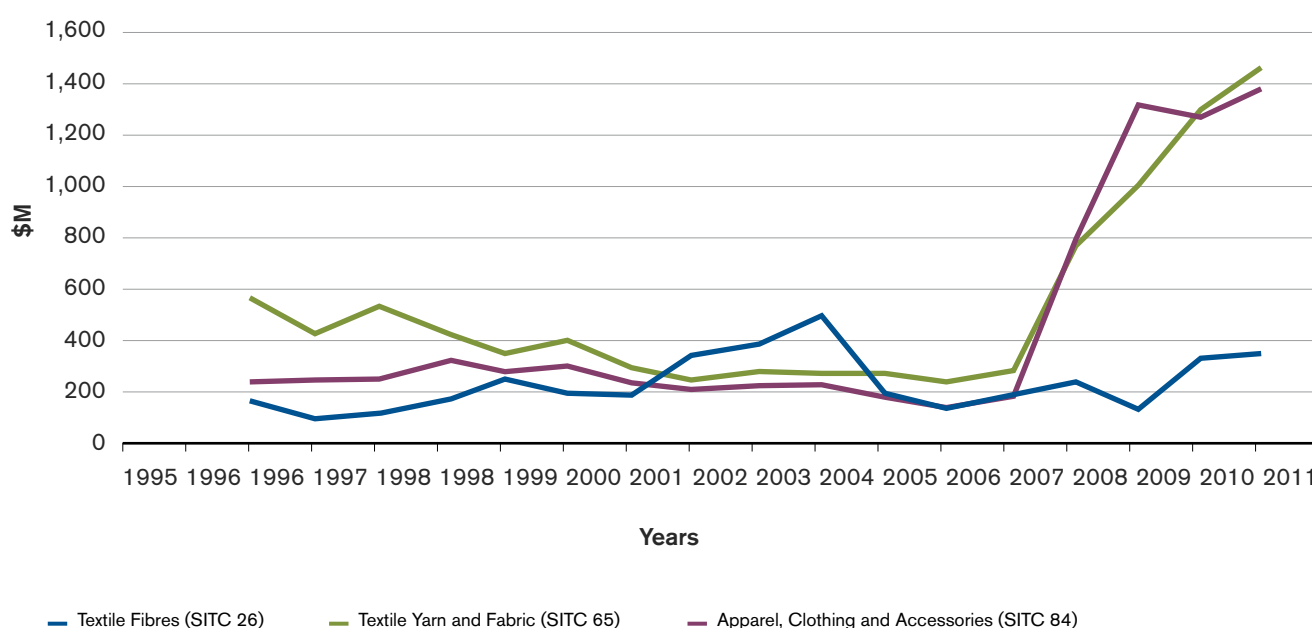
Developing countries have increasingly negotiated their own regional trade agreements. For Africa the most important are the Southern African Development Community (SADC), the East African Community, the Common Market for Eastern and Southern Africa, the Economic Community of West African States and the Southern African Customs Union (SACU), although negotiations and implementation drag out, and textiles and clothing are often put on negative lists.

Since 2006, regional preferential trade access through SACU and SADC to the South African clothing market has emerged as an important growth pole for producers in Lesotho and Swaziland, and Mauritius and Madagascar, respectively. It has increased jobs and reduced poverty, often among women. Mauritius and Madagascar's combined clothing exports to South Africa jumped from \$4 million in 2004 to \$63 million in 2010, and Lesotho and Swaziland's together rose from \$3 million in 2005 to \$105 million in 2010. Yet despite this growth, South Africa's regional clothing imports have remained almost marginal, reaching only 7.7 per cent in 2010, pointing to still-large potential.

Egypt's textile and clothing industry

The industry is one of Egypt's most dynamic (figure 5.2). In 2008, it accounted for 5 per cent of GDP, 26.4 per cent of industrial production and close to 10 per cent of exports. Textile and clothing enterprises account for a fifth of all industrial firms, and are the largest single employer with more than 400,000 workers, almost a quarter of the industrial labour force in 2008.

FIGURE 5.2: EGYPT'S TEXTILE AND CLOTHING EXPORTS, 1995–2011 (\$ MILLION)



Source: UN Comtrade, retrieved from <http://comtrade.un.org/> (accessed 20 October 2012).

More than 6,000 textile-related companies are registered with the Industrial Development Authority. Ready-made garment manufacturers represent 75 per cent of the textile and clothing industry (Egyptian Commercial Service, 2012), home textiles 12 per cent, cotton yarn 8 per cent, and other cotton fabrics and textiles 5 per cent. The bulk of investment in textiles and clothing comes from domestic sources (\$1.3 billion out of \$1.6 billion in 2012).

The end of the quota system in January 2005 had severe consequences for Egypt's textile exports to third countries, as it brought them into direct competition with those from Bangladesh, China, India, Indonesia, Pakistan and Turkey. This has been partly offset by the 2004 Qualifying Industrial Zone² and by the Euro-Mediterranean Partnership agreement (2005) with the EU. These two markets account for more than three quarters of Egypt's textile and clothing exports. Investment in the sector rose strongly in 1995–2007 (table 5.1).

TABLE 5.1: EGYPTIAN INVESTMENT IN TEXTILES AND CLOTHING BY SOURCE, 1995–2007 (\$ MILLION)

Source	1995	2007	Change between 1995 and 2007 (%)
Domestic	76	227	199
Arab	2	49	2,350
Foreign	11	75	582
Total investment	89	351	294

Source: General Authority for Investment and Free Zones Information Center, Cairo, retrieved from www.ameinfo.com/db-3315336.html (accessed 25 July 2012).

Note: Data are converted from Egyptian pounds to US dollars using the year-average official exchange rate, published 31 December 2011. Data cover companies operating under Law 8 of 1997, inland and free zones, and companies organized by Company Law 159 of 1981.

Four firms' perceptions

The firms selected for the Egyptian case study are domestic privately owned firms, two with publicly held minority shares, and two with minority shares owned by regional companies. They are vertically integrated, with subsidiaries or sister companies involved in upstream activities (spinning and dyeing) and downstream activities (trading). Annual turnover in 2011 ranged from \$7 million to \$140 million, and the firms have generally registered growth in the past five years (2007–2012), hampered more recently by political instability and rising raw material costs. The firms are fairly labour-intensive

operations, with one firm employing 7,000 workers.

Egypt's labour market presents severe problems for textile companies, including shortage of skilled labour, low productivity, absenteeism and high turnover. Egyptian labour laws, according to the firms surveyed, fail to address these issues. Firms find it hard to develop human resources and, with few exceptions (box 5.2), struggle to remain competitive.

The case study covers one firm specializing in ready-made garments under a client's licence, two in home textiles (one in carpets, rugs and

mats, and one in bed linen and towels) and one in yarn and synthetic fabric manufacturing and trading, which allows a raft of issues affecting different types of player to be reviewed.

Two of the firms are involved in high value added activities (table 5.2). The ready-made garment manufacturer goes beyond cut, make and trim

operations, which require shallow capabilities, to supply-chain management, knitting, dyeing and embroidery; and the carpet manufacturer adds value through hand-carving by very highly skilled workers, and through designs that include cutting irregular shapes, which creates unique products in a market where product differentiation is essential.

BOX 5.2: PROCESS UPGRADING THROUGH INVESTMENT IN SKILLS

The upgrading of MAC Carpet, a domestically owned textile manufacturer, has been impressive. It increased turnover from \$101 million in 2005 to \$140 million in 2011.

Part of its success is due to investing in human resources. It offers its employees training to enhance their technical and personal skills. The company views that as a main motivator for them, boosting their job satisfaction and loyalty to the company. It offers two types of training: general (functional, technical or vocational) and self-development. The company allocates 1.5 per cent of the annual remuneration budget to training and development.

MAC Carpet applies kaizen—the Japanese concept of continuous improvement—and allows workers at every level to take part. Through teamwork and openness to suggestions, it has improved productivity, raised product quality and secured higher customer satisfaction. Employees learn to spot and eliminate waste during the production stage. The approach creates a framework for a well-organized, disciplined and clean shop floor. The firm has set up 25 suggestion boxes, developed a communication plan, targeted 1,000 ideas and aims to carry out 100, and established a reward system.

TABLE 5.2: PROCESSING ACTIVITIES OF FOUR SURVEYED FIRMS, EGYPT

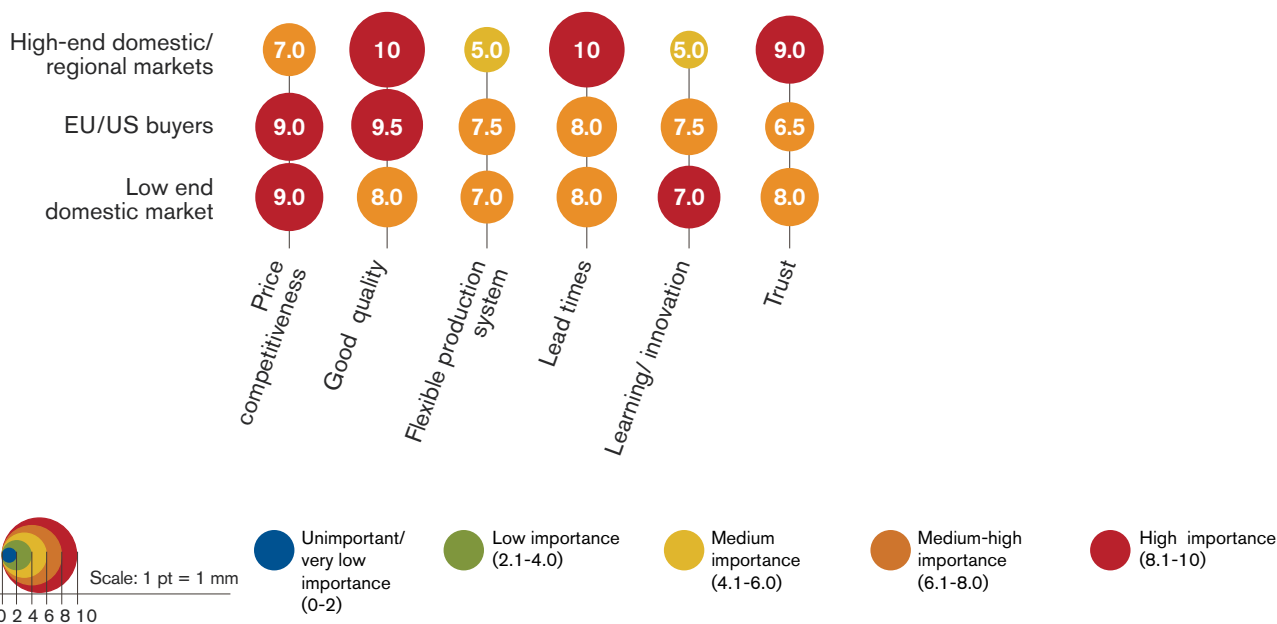
Firm 1 (ready-made garments)	Firm 2 (carpets, rugs and mats)	Firm 3 (bed linen and towels)	Firm 4 (yarn and synthetic fabric)
Knitting	Product design	Cutting	Yarn spinning
Dyeing	Tufting	Embroidery	Preparations
Cutting	Backing	Sewing	Warping
Sewing	Cutting	Assembly	Processing into fabric
Printing	Sewing	Finishing	
Embroidery	Carving		
Packaging	Finishing		
	Packaging		

Source: ECA and AUC.

The firms are in three GVCs (high-end domestic and regional markets, EU/US buyers, and low-end domestic market), which have varying critical success factors, or CSFs (figure 5.3). The carpet and ready-made garment manufacturers export mainly to Europe, less so to the US. The global buyers

for carpets are retailers and wholesalers, and for clothing, retailers and global brands such as Levi's, Macy's, Calvin Klein, and Marks & Spencer. These firms are inserted into buyer-driven GVCs where global buyers outsource labour-intensive stages of their value chains.

FIGURE 5.3: BUYERS' CRITICAL SUCCESS FACTORS IN EGYPT'S TEXTILE INDUSTRY



Source: Interviews with four firms, 2012.

The four firms' CSFs are very demanding (see figure 5.3). Their EU and US retailers and global brands cater to middle-income markets, and so price competitiveness and quality are important. Because price is important, Egyptian firms compete with South-east Asian and Turkish companies. Moreover, these buyers rely on just-in-time delivery, which requires their suppliers in Egypt to supply, on very short lead times, large volumes of highly differentiated products. Innovation and adjusting production to different product lines within short lead times are therefore crucial competencies for Egyptian firms.

Moreover, European and US buyers require compliance with demanding technical standards. To comply, Egyptian suppliers have to ensure

consistency of quality, and to run integrated quality control systems from the yarn warehouse to inspection of final products before packing and shipping. Final quality control takes place in a mini control room, where compliance with American 2.5 Acceptance Quality Limit (AQL) and European 1.5 AQL quality standards is monitored for each order.

Beyond technical regulations, global buyers apply private standards.³ These standards, with technical ones, require traceability. Firms have to monitor their own supply chains to ensure that standards are adhered to further along the value chain.

One of the four firms specializes in small volume, high-quality home textile products (it has fewer than 70 employees). Because this firm supplies

niche markets, product quality is the key CSF, which with fast lead times and trust is sufficient to maintain links to domestic and regional traders. Competition is limited to other Egyptian quality producers. One of the other three firms sells synthetic yarn and fibre to the lower end of the domestic market. In this market, price is paramount and competition from Asian manufacturers stiff.

The variance in CSFs is reflected in different upgrading trajectories by the firms. In domestic and regional markets, incentives to innovation and product quality upgrading are weak. Firms exporting to retailers and global brands have to meet demanding requirements on product differentiation, standards compliance and quality/volume consistency. Hence they invest heavily in product and process upgrading (box 5.3).

BOX 5.3: UPGRADING TO COMPETE—CARPETS AND YARN

The carpet manufacturer surveyed has invested in the latest generation of a highly versatile printing technology known as “JET printing”, which results in the shortest minimum production runs in the industry today (as low as 500 square metres), maximum dye penetration into the highest and most dense piles, and the highest printing resolutions.

The firm applies more than 10 different types of backing, which allows it to produce a wide range of colour designs. This is complemented by various combinations of finishing techniques: surging, tape binding, wide webbing, and cotton or nylon fringes. Packing is tailor made for wholesale and retail markets, and includes bar coding.

The yarn exporter has adopted highly automated fabric-processing operations. Using sophisticated circular and flat-knitting machines, the firm manufactures high value added fabrics, such as single jersey, rib, pique, interlock, drop needle and mini-jacquards. This is backed up by close quality inspection during and after knitting.

Long-term relationships with European and US buyers have enabled the firms to invest in product and process upgrading, and in expanding capacity. In one firm, European buyers have assisted in complying with private standards. Conversely, firms supplying traders in domestic and regional markets operate on market-based arm's-length relationships.

The firms are demanding on their suppliers for quality, price, flexibility, lead times and trust. Local suppliers can match foreign suppliers on price, but underperform on quality, flexibility and trust. Compliance with technical and private standards requires first- and second-tier suppliers to meet not only Egyptian manufacturers' product specifications but also final buyers' public and private standards. Quality includes requirements for product characteristics and production

processes that are essential for staying in the value chain.

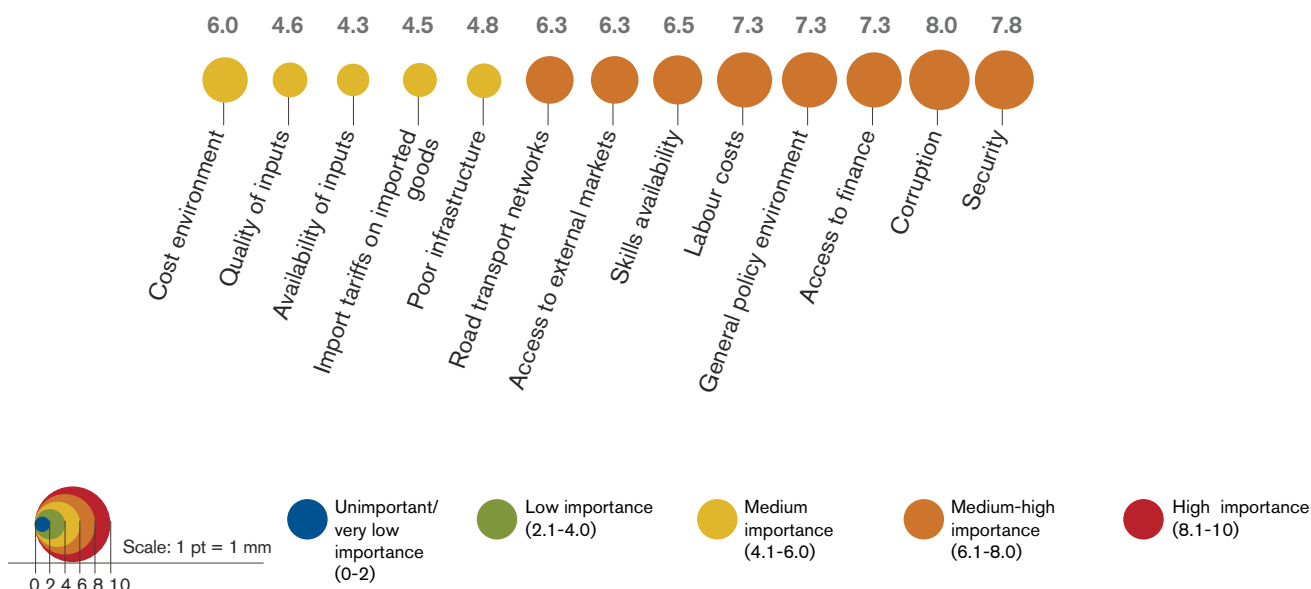
One firm cooperates with its suppliers to address their bottlenecks. It joined the National Supplier Development Plan run by the Industrial Modernization Centre, an independent body set up in 2000 to help build global competitiveness of Egypt's manufacturing. In one exercise, the firm selected 12 of its key suppliers for “gap analysis” on their quality, production, health and safety, and management systems. A gap closure strategy was formulated and an action plan developed, which helped in building the suppliers' capability to meet required standards. But the other firms rarely if at all assist suppliers—indeed, one reported that the procedures of the Industrial Modernization Centre are too burdensome and bureaucratic.

The firms are highly vertically integrated, because this allows them to internalize market failures and minimize transaction costs, but it is not always efficient—for example, one firm's dyeing unit operates at 50 per cent capacity. Ideally, they should outsource labour-intensive activities such as packaging, embroidery and marketing support, which would allow them to focus on their core business. Small and medium-sized enterprises and cluster development

strategies could support their competitiveness.

Opportunities lie both in backward linkages (high-quality cotton fabrics) and forward linkages (new products such as carpet tiles), but these are constrained by several factors (figure 5.4). Interestingly, “soft” infrastructure issues—notably corruption and security—are more prominent than hard infrastructure matters.

FIGURE 5.4: RATING OF FACTORS AFFECTING LINKAGE DEVELOPMENT IN EGYPT'S TEXTILE INDUSTRY



Source: Interviews with four firms, 2012.

Challenges and policies

The Egyptian textile and clothing value chain faces a twin challenge: for intermediate stages,⁴ relocation to Asia; for final product manufacturers, competition from low-cost Asian producers in low and middle domestic and third-country markets. Building competitiveness in manufacturing fabric is particularly important because Egypt needs to specialize in processing its highly prized extra-long staple cotton for market niches, rather than compete on price with Asia.

Around 70 per cent of locally produced yarn is controlled by the public sector. Spinning, weaving and hemming industries have been slow to

privatize because of the high cost of investment and long payback periods on investment. Dyeing and finishing are the weakest stages in the value chain, as they have received the lowest investment. Domestic capabilities in dyeing local cotton are also weak, so too in spinning and weaving where machinery in public companies has not been replaced for more than 25 years (box 5.4). Management in all these stages is underperforming, and deliveries unreliable. In contrast, private companies control 99 per cent of clothing and home textile manufacturing capacity, the result of privatization over the last 15 years.

The 2008 Industrial Development Strategy aims to develop exports and deepen the country's integration

BOX 5.3: THROWING MONEY DOWN THE DRAIN

The quality of spinning, weaving and dyeing is low, often forcing local manufacturers to import yarn and finished fabrics—manufactured in Asia using high-quality Egyptian cotton—from Bangladesh, India, Pakistan, Turkey and Turkmenistan.

Egypt is therefore throwing away substantial added value in a chain where it has a unique commodity—its globally renowned raw cotton. This added value is Egypt's for the taking. The government is, however, aware that these are the least competitive stages of the value chain.

with the global economy, and proposes promotion of medium- and high-tech subsectors to ensure long-run competitiveness of the whole industrial sector (without discarding resource-based and low-tech activities). Yet the government has no coherent strategy for textiles and clothing, largely because of conflicting interests between domestic and export producers. Rather, it has used presidential decrees on cotton growing and three final product groups—textiles (yarn and fabrics), home textiles and ready-made garments.

The government is looking to attract private investment upstream in order to sharpen the country's competitive advantage, while the Textiles Development Center at the Ministry of Industry and Foreign Trade is considering promoting “Technical Textiles”, which can support a broad range of industries. The Textile Development Strategy—Vision 2020 was launched in 2007, and aims to expand exports to \$10 billion and create more than 5 million jobs.

The Industrial Development Authority focuses on attracting new investment to strengthen the upstream supply chain; shortening lead times for clothing exports to the EU; enabling entry to higher-value segments; and diversifying into denim mills and laundries, intimate apparel, premium knitters and premium fabric. Since 2007, Egypt has invested in free economic zones. But investment in the zones is not planned in an integrated way, and political instability has further hampered the effort. Nor is there any cluster development, and the cost of capital is high for local firms.

The firms surveyed believe that the policy framework does not promote technological upgrading. Importing new machinery, for example, is expensive because of burdensome procedures and import duties.

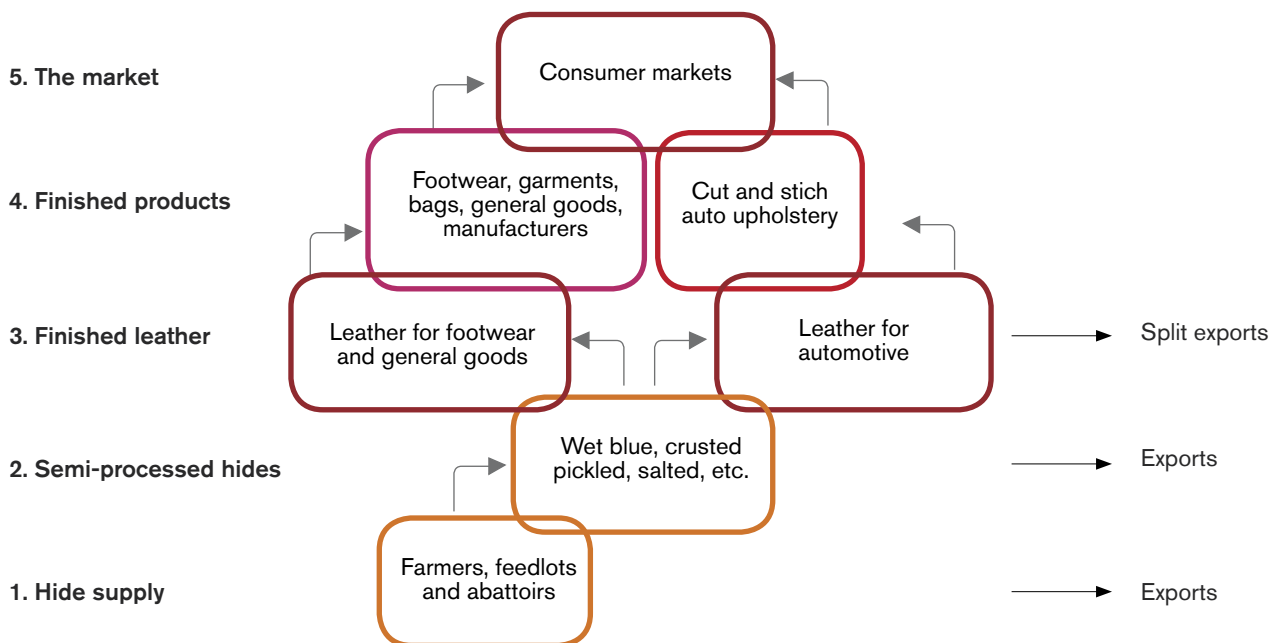
The vertical integration observed in the survey is unsustainable, and integrated clusters need to be developed. To increase local content, the government provides export incentives, depending on the type of product and area of production, among other factors. Firms selling to the domestic market, however, seem unaware of incentives report that they are disbursed inconsistently (depending on funding), or that procedures to claim them are unclear.

5.2 LEATHER**The global value chain**

Aside from the early stage of animal husbandry, the leather GVC starts with supply of hides and culminates with finished leather products for the final market. The principal hides are bovine, sheep and goat. They are processed in tanneries before being manufactured into leather footwear, garments and accessories like travel bags and belts, technical products, or household and automotive upholstery.

The leather value chain has five stages: hide supply, semi-processed hides, finished leather, finished products, and the market. To show exactly where these two streams separate, it is necessary to separate the tanning or semi-processed hides process into two streams (figure 5.5).

FIGURE 5.5: KEY ELEMENTS OF LEATHER GLOBAL VALUE CHAIN



Source: ECA and AUC, 2012.

Five stages

The first processing part of the value chain takes raw hides from suppliers and tans them into semi-processed leather. This is a peculiarity of the chain since it depends on the processes and activities in another value chain—animal production and slaughter for meat. The animal production and slaughter industry has a major impact on the quality of the hides.

The main exporters of bovine and sheep hides are the US, Australia, Spain, France, UK, New Zealand and South Africa. Developing countries are the main producers of bovine hides, sheepskins and goatskins, but are not the dominant exporters of bovine hides. Their share of global exports is

increasing, owing partly to improving husbandry and tanning skills. Because hides are a global commodity, the price of hides is determined on the world market.

Average global hide prices stayed fairly constant in 1988–2001, dipped to a slightly lower base, fell rapidly as the global crisis kicked in and then recovered (figure 5.6). The weak global economic situation affected consumer confidence, with a consequent decline in demand for leather and leather products. Tanners, as well as shoe and leather-goods manufacturers, face increased costs of production also from higher chemicals, energy and freight costs. The lower margins have led to tanners’ unwillingness to offer higher prices for hides.

FIGURE 5.6: WORLD HIDES PRICE, JANUARY 1980–SEPTEMBER 2012 (US CENTS/LB)

Source: International Monetary Fund Primary Commodity Price monthly data, retrieved from www.imf.org/external/data.htm (accessed 20 October 2012).

Note: Heavy native steers, more than 53 pounds, wholesale dealer's price, FOB Chicago.

The next step takes semi-processed hides and re-tans them into finished leather ready for use by manufacturers. The type of finished leather depends entirely on the product that it will become part of, which is why leathers tend to be separated at this stage.

After this stage, hides can travel in one of three directions: footwear tanning, automotive tanning or exports. The orientation of finishing tanneries has altered over the last few decades. Whereas they used only to produce leather for footwear, general goods and furniture manufacturers, many are now also producing leather for automotive upholstery manufacturers.

The final production stage is the manufacture of leather products. This is undertaken by a variety of firms ranging from large, capital-intensive factories to small, labour-intensive enterprises. The GVC is ultimately driven by global marketing agents who sell intermediate and end products, operating at different stages in the chain.

These agents have market knowledge, design capability and a wide network of sales channels, which allows them to control the value chain and derive the greatest rents. They manage the complex

supplier stages of the chain, contract production by enterprises, set the quality standards, sometimes provide the necessary finance and serve the customers in the final markets.

Upgrading activities in developing countries is hence tied to meeting these knowledge-intensive and technical standards, which imposes a major burden on producers in low-income countries, as they often lack the knowledge, managerial capabilities and design skills to identify their own end markets.

Upgrading opportunities and challenges

The importance of the leather industry stems from the fact that it can flourish both in low- and high-wage economies so that, although it offers scope for exploiting natural comparative advantages in commodities, it also offers potential for low-wage economies to follow an upgrade path based on dynamic specialization.

A well-developed hide production and tanning industry is the starting point for upgrading leather-product manufacturing, which cannot develop without local supplies of material. By improving hide and tanning quality, local footwear and leather-product

manufacturers in Africa can upgrade their product quality.

Quality problems are the main factor constraining African suppliers from sustaining exports. The upgrading challenge facing suppliers is demonstrated by a benchmarking exercise undertaken by the United Nations Industrial Development Organization

that compared Kenya, Ethiopia and Italy (table 5.3). Although a decade old, there is little reason to assume that the relationships will have changed dramatically. In any case, the point is to demonstrate that Africa's competitive advantage lies only in the lowest link in the chain where the accruable rents are the lowest. If the aim is to move into value-added linkages, a sustained upgrading effort is required.

TABLE 5.3: QUALITATIVE BENCHMARKING OF FACTORS IN THE LEATHER SUPPLY CHAIN

Factors	Africa		Developed country
	Kenya	Ethiopia	Italy
Availability of raw hides and skins	Abundant	Abundant	Low
Quality of raw hides and skins	Generally poor	Low-high	High
Access to and cost of raw materials	Generally easy	Generally easy	Difficult
Access to financial resources	Difficult	Difficult	Easy
Sustained capital investment	Low	Low	High
Technological sophistication of facilities and equipment	Low-medium	Low-medium	Very high
Process skills	Limited	Limited	Very high
R&D	Limited	Limited	Very high
Product development	Limited	Limited	Very high
Tradition in the industry	Fairly recent	Fairly recent	Early
Unique skills within the sector	Rare	Rare	High
Degree of vertical integration	Low	Low	High
Product perception by the global market	Poor	Poor (high for sheepskin)	Very high

Source: Kiruthu (2002).

Upgrading by developing countries requires enhanced knowledge, improved technology and access to finance (Memedovic and Mattila, 2008).

To achieve business success the public sector needs to assist with productivity and technology centres, training facilities, cleaner production centres

and investment and export promotion bodies to provide information and advice on technical and trading issues. These outfits need to offer practical advice for enterprises so that they can upgrade their manufacturing methods. The main objective of such support is to make enterprises competitive and attractive to the rest of the leather GVC through improving their quality, production methods and productivity. In Africa this also opens up opportunities for intraregional trade of intermediate and final products—leather manufactured products including fashion accessories, as well as inputs to the furniture and automotive industries.

Ethiopia's leather industry

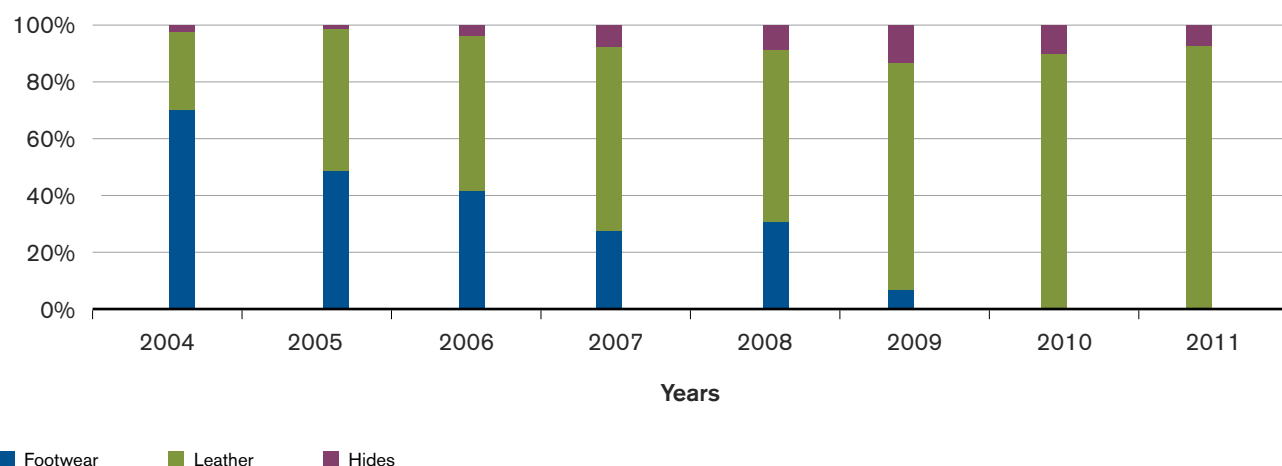
Bati goatskin produces the softest, finest suede.⁵ Ethiopian herders receive about \$10 for the skins that will produce a Bati coat. After tanning and processing to “wet blue” or better levels for export, the exporter collects about \$40–50 for the leather to be manufactured into a coat outside Ethiopia. An importing wholesaler/ manufacturer will then make the coat with a final retail price of at least \$400.

Most animals are slaughtered on individual homesteads, not necessarily by people thinking of transforming hides and skins into high-quality

leather, which throws up several issues, especially on defects. Thus the value chain suffers from miscoordination from the start—animal husbandry—and continues to the delivery of hides and skins to a tannery where the real value-added stages start. That is why for many decades before the turn of the century Ethiopia exported huge quantities of raw and semi-processed hides.

The government has attempted to address this wastage at the bottom end to drive upgrading through the links in the chain. It started in 2002 by restricting exports of low value added hides and semi-processed leather, expanding into new export markets and encouraging higher-value products (Government of Ethiopia, 2002). One of the main measures used to restrict exports of low value added hides included an export tax of 150 per cent on the hides exported. These measures had a notable impact on the composition of the leather industry's exports, helping to shift the leather industry to finished products (figure 5.7). They provide the basis for engaging international lead firms to assist local tanning and manufacturing firms to upgrade their production activities. Still, the overall impact in reducing poverty and expanding the economy also has to consider income reductions for hide suppliers due to lower domestic prices.

FIGURE 5.7: VALUE-ADDED CONTENT OF LEATHER/HIDE EXPORTS FROM ETHIOPIA, 2004–2011 (%)



Source: UN Comtrade data, retrieved from <http://comtrade.un.org/> (accessed 15 October 2012).

Note: Standard International Trade Classification 21, 61 and 85.

It is now beginning to suit the interests of foreign buyers to provide support to local tanners for process (but not product) upgrading in, for example, shortening lead times and increasing production reliability. Bini (2002) noted that local tanneries were helped to produce what they were already manufacturing, but faster and at better quality. Local footwear manufacturers have also upgraded processes (and products). Large firms have installed new machinery, changed the organization of production and raised quality, pulled by export opportunities and pushed so as to lock into GVCs and meet their global buyers' technical requirements (Tegegne and Tilahun, 2009).

The institutional environment (government and agencies) has also facilitated upgrading. The government has supported exports by providing industry zones and assisting large firms to partner international actors. The Leather and Leather Products Technology Institute, established in July 1999, has helped firms to innovate and upgrade

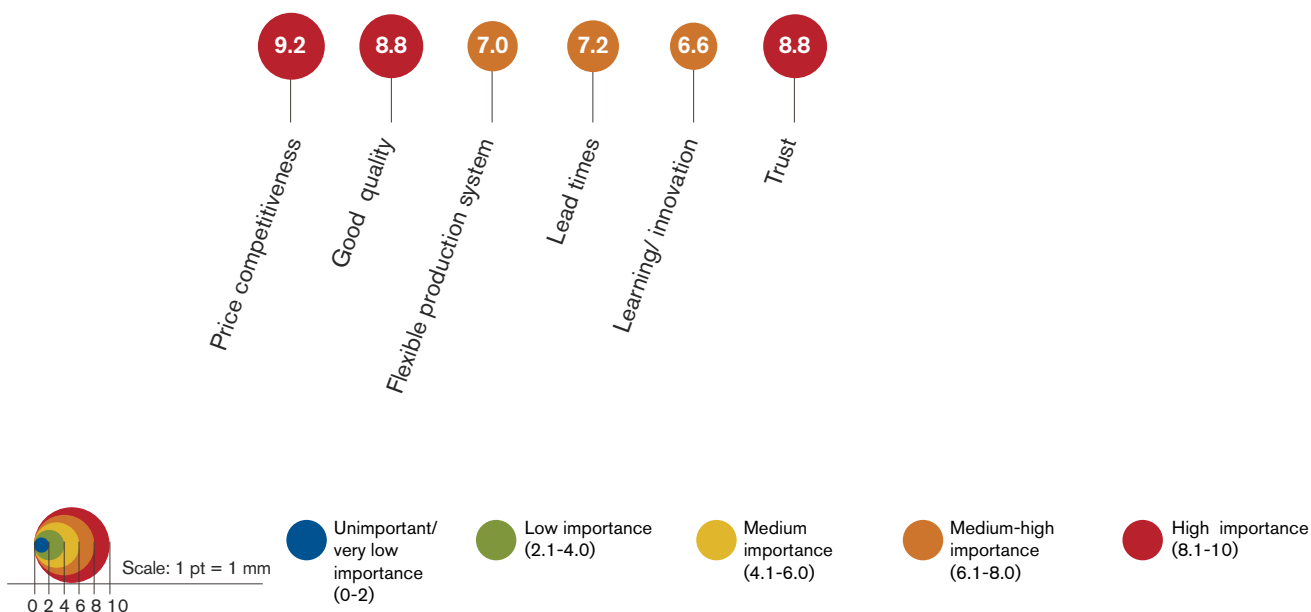
through training in design and shoe production skills for employees of large and medium-sized firms.

The four firms surveyed in this case study are domestic, private companies of varying ages, employing around 300 workers each. (Around 10,000 Ethiopians work in the leather sector, which is characterized by increasing domestic competition.) The firms process hides into wet blue, crust and finished leather. One firm is vertically integrated into shoe manufacturing.

Firms' perceptions

The four firms export to foreign garment buyers and to local traders. The export market used to be dominated by Europe, but is shifting to China and India. Global buyers set a high bar for the CSFs (figure 5.8). US, Italian and other European buyers are particularly demanding, partly because they have to comply with strict technical standards on chemical use and processing techniques.

FIGURE 5.8: BUYERS' CRITICAL SUCCESS FACTORS IN ETHIOPIA'S LEATHER INDUSTRY

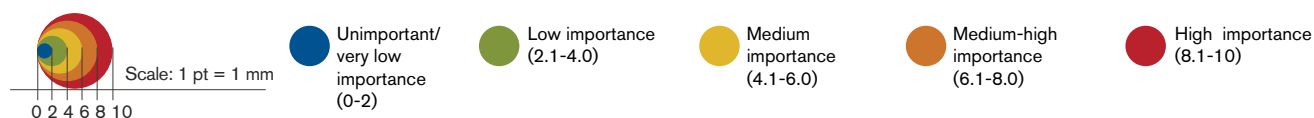
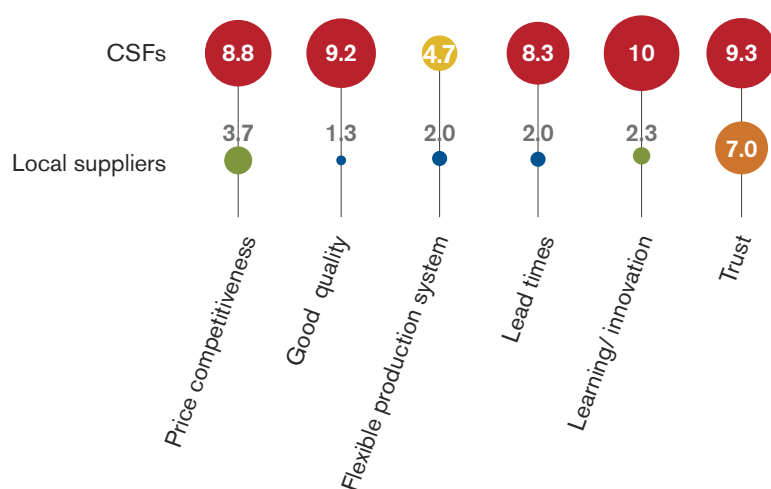


Source: Interviews with four firms, 2012

Because of demanding global buyers, tanneries set equally stiff conditions for their suppliers (figure 5.9), although local suppliers struggle to deliver high-quality skins to tanneries. Moreover, because skins easily deteriorate, poor infrastructure and weak treatment skills often

cause unusable inputs. Trust remains important, and all tanneries support suppliers by providing credit and salt to preserve the skins, but the surveyed firms expressed the need for more support for the upstream stages.

FIGURE 5.9: RATING OF LOCAL SUPPLIERS RELATIVE TO LEAD-FIRMS' EXPECTATIONS IN ETHIOPIA'S LEATHER INDUSTRY



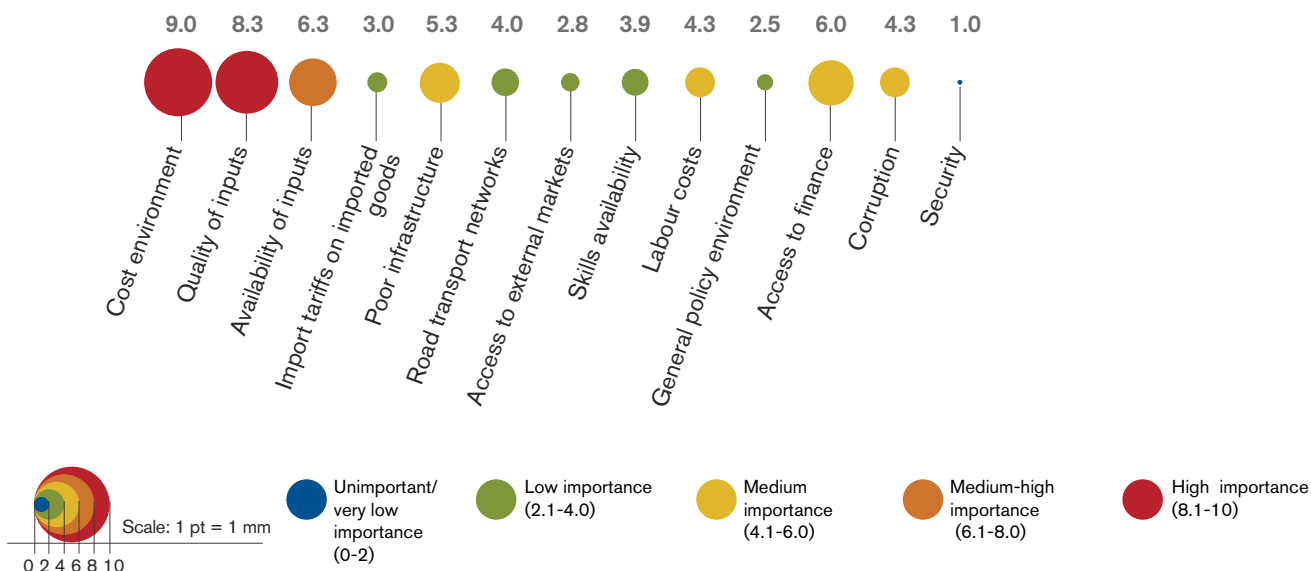
Source: Interviews with four firms, 2012

The surveyed firms believe that further upgrading opportunities lie in diversifying (colour and types of leather) and functionally upgrading into shoe manufacturing (those not already in that market). Ethiopia therefore needs to address key constraints: the cost environment, quality of inputs, availability of inputs, access to finance and infrastructure (figure 5.10).

On access to finance, the Ethiopian Competitiveness Facility, funded by the World

Bank and the government, has provided matching grants to exporting companies engaged in, among other areas, the leather and shoe sectors. The International Finance Corporation (the World Bank's private sector investment arm) provides loans and capital to private investors in manufacturing, but this is not used as much owing to lack of awareness. Finally, the Ethiopian Leather and Leather Products Technology Institute plays a critical role in providing skills to the industry.

FIGURE 5.10: RATING OF FACTORS AFFECTING LINKAGE DEVELOPMENT IN ETHIOPIA'S LEATHER INDUSTRY



Source: Interviews with four firms, 2012.

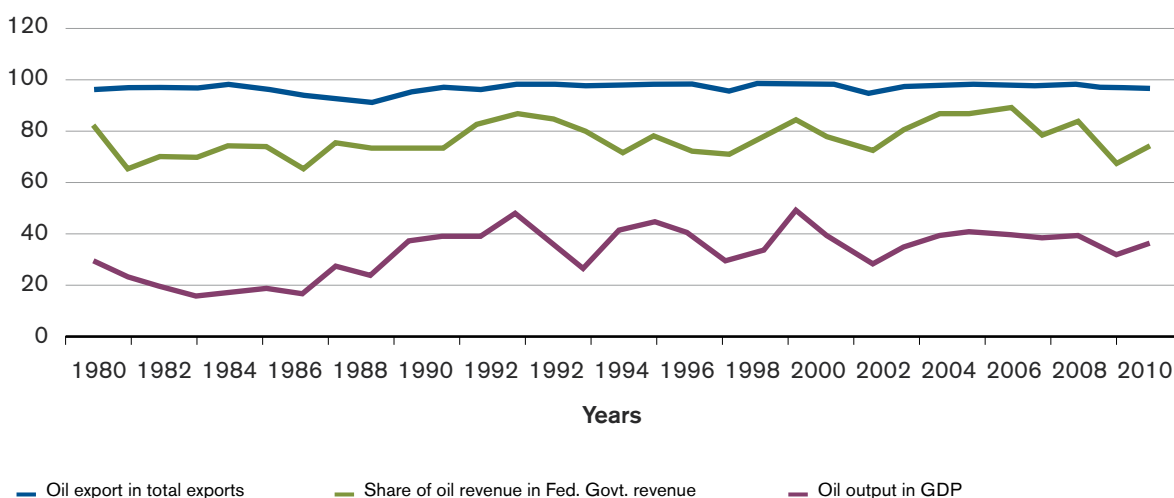
5.3 OIL INDUSTRY

Nigeria's value chain

Nigeria is the world's 10th-largest oil producer and depends heavily on the sector for GDP growth, taxes and, particularly, exports (figure 5.11).

The oil value chain is structured into an upstream sector (exploration and production) and a downstream sector (crude processing and marketing; figure 5.12). The key upstream players are (mainly) multinational and (less so) local companies. Multinational companies have a competitive advantage in the technology required

FIGURE 5.11: CONTRIBUTION OF OIL TO THE NIGERIAN ECONOMY, 1980–2010 (%)

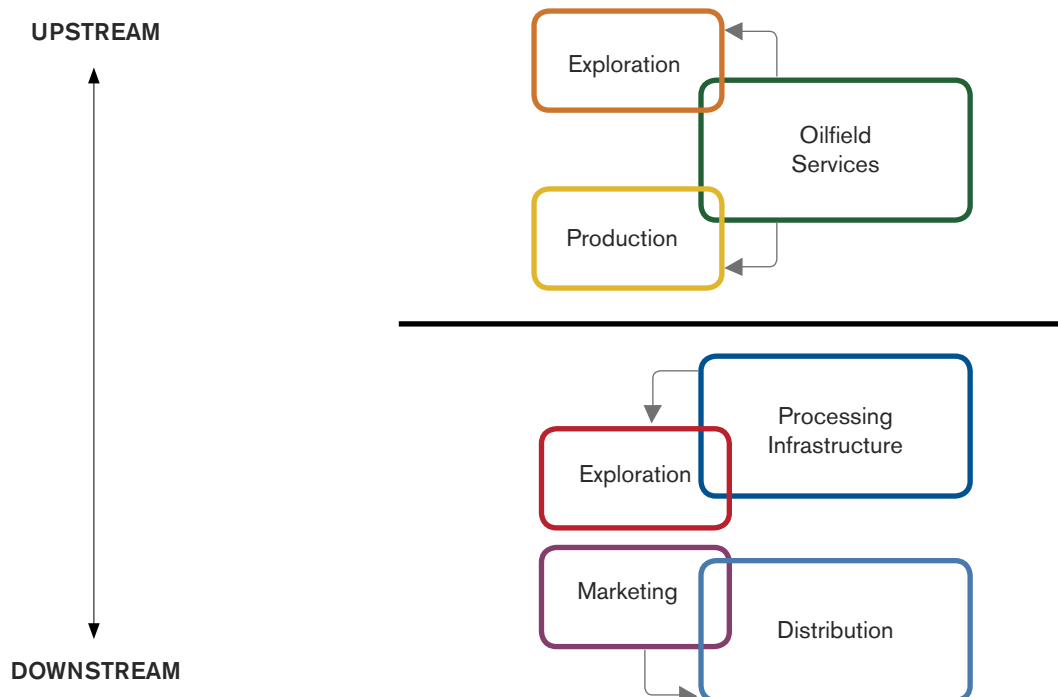


Source: Computed from Central Bank of Nigeria Statistical Bulletin (2011), retrieved from www.cenbank.org/documents/Statbulletin.asp (accessed 15 December 2012).

for prospecting and exploration. Given that oil extraction is intensive in capital, technology and skills, the country has made real efforts to increase local content in skills in the oil industry (box 5.5). The

largest oil producers are Shell Petroleum Development Company Limited, Mobil Producing Nigeria Unlimited, Chevron Nigeria Limited, and Texaco Overseas Nigeria Petroleum Company Unlimited.

FIGURE 5.12: OIL VALUE CHAIN



Source: Teku (2011).

BOX 5.4: UPSKILLING LOCAL WORKERS IN NIGERIA'S OIL INDUSTRY

Efforts include:

- Establishing the Petroleum Technology Development Fund in 1973 for developing, promoting and implementing petroleum technology and human resource development policies via research and training for Nigerians.
- Setting up the Petroleum Training Institute in Delta State in 1973 to train lower- and mid-level personnel to meet indigenous labour requirements.
- Founding the National College of Petroleum Studies in Kaduna in 1995 for high-level staff.
- Making heavy investments in research and education (by oil firms). Shell, for instance, introduced an Intensive Training Programme in 1998 to prepare young graduates for work in the industry.

Source: Oyejide and Adewuyi (2011).

Upstream industries

Nigeria has gradually localized some important upstream industries (Oyejide and Adewuyi, 2011). Focusing on three supply links to the oil and natural gas value chain (fabrication and construction, well construction and completion, and control systems and information and communications technology), Oyejide and

Adewuyi (2011) found that local sourcing by oil companies is broad across goods and services.

The findings of a survey of 15 oil companies based in Port Harcourt and Warri (a third of the total firms based there) point to substantial local linkages: 11 of these oil companies sourced more than half their goods from local firms (table 5.4).

TABLE 5.4: SURVEY ON LOCAL CONTENT OF 15 OIL FIRMS, PORT HARCOURT AND WARRI, 2011

Local shares	%
<i>Input share in the value of final product</i>	
Up to 50%	33.3
Above 50%	33.3
Not indicated	33.3
Total	100.0
<i>Share of local procurement of goods purchased from local firms</i>	
Up to 50%	25.0
51–75%	41.7
Above 75%	33.3
Total	100.0
<i>Share of local service done by local firms</i>	
Up to 50%	25.0
Above 50%	75.0
Total	100.0
<i>Share of final product purchase by local business</i>	
Up to 25%	41.7
26–50%	33.3
Above 50%	25.0
Total	100.0

Source: Oyejide and Adewuyi (2011).

The local supply chain is not only broad but also deep, as shown by the high local content of first-tier suppliers (table 5.5). About 55 per cent of such firms indicate that their output has more

than 50 per cent local content, particularly for suppliers in fabrication and construction, and in well construction and completion. Functional upgrading is also more likely in this segment.

TABLE 5.5: LOCAL CONTENT OF 45 FIRST-TIER OIL-SUPPLY FIRMS, PORT HARCOURT AND WARRI, 2011

Supplier type	Local content			
	0–25%	26–50%	51–75%	76–100%
Control system and ICT	31.6	21.1	21.1	26.3
Fabrication and construction	13.6	22.7	18.2	45.5
Well construction and completion	20.6	20.6	17.6	41.1
Others	40	40	20	-
Total	22.5	22.5	18.8	36.3

Source: Oyejide and Adewuyi (2011).

Buyer–supplier vertical cooperation is tight in oil production, in negotiations and information exchange, as well as in deeper forms of cooperation aimed at improving quality, delivery times and supply reliability, developing quality assurance systems, and ensuring technical upgrades and labour training (Oyejide and Adewuyi, 2011).

Downstream supply firms

Building on previous research, the Nigerian case study covers five downstream firms. Their core business is processing and marketing petroleum products (diesel, kerosene, lubricants, motor oil and jet fuel). All the firms are part of larger groups quoted on the Nigerian Stock Exchange, and two

of the five are foreign owned. Foreign ownership is concentrated in manufacturing, which is capital and technology intensive. The firms' annual turnover ranges between \$29 million and \$1.1 billion, and they employ 115–503 workers, mainly with a tertiary education.

Nigeria's oil processing and marketing companies rely on a combination of imports by local agents and locally produced goods and services, the latter group accounting for 40–45 per cent of total procurement (table 5.6). Only for one smaller, local firm, did locally manufactured goods account for a hefty 65 per cent of total supplies, including food, equipment, spare parts and consumables. This figure on local procurement is consistent with that found upstream.

TABLE 5.6: LOCAL SOURCING BY OIL PROCESSING AND MARKETING COMPANIES, 2011

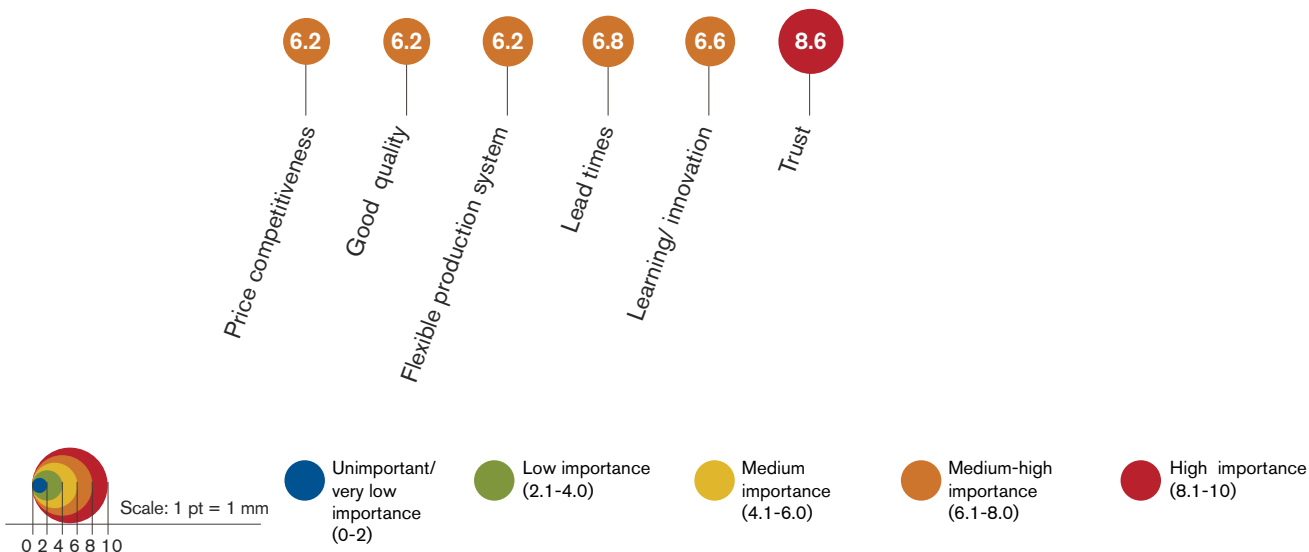
Supply typology	% of total procurement
Goods imported by agents	40–45
Locally manufactured goods	30
Local service providers	21–30

Source: Interviews with five downstream firms, 2012.

Of the parameters set by these five firms for their suppliers, trust is the most important when they select suppliers (figure 5.13). Trust refers both to contractual trust (meeting contractual obligations) and to competence trust (suppliers' ability to deliver).

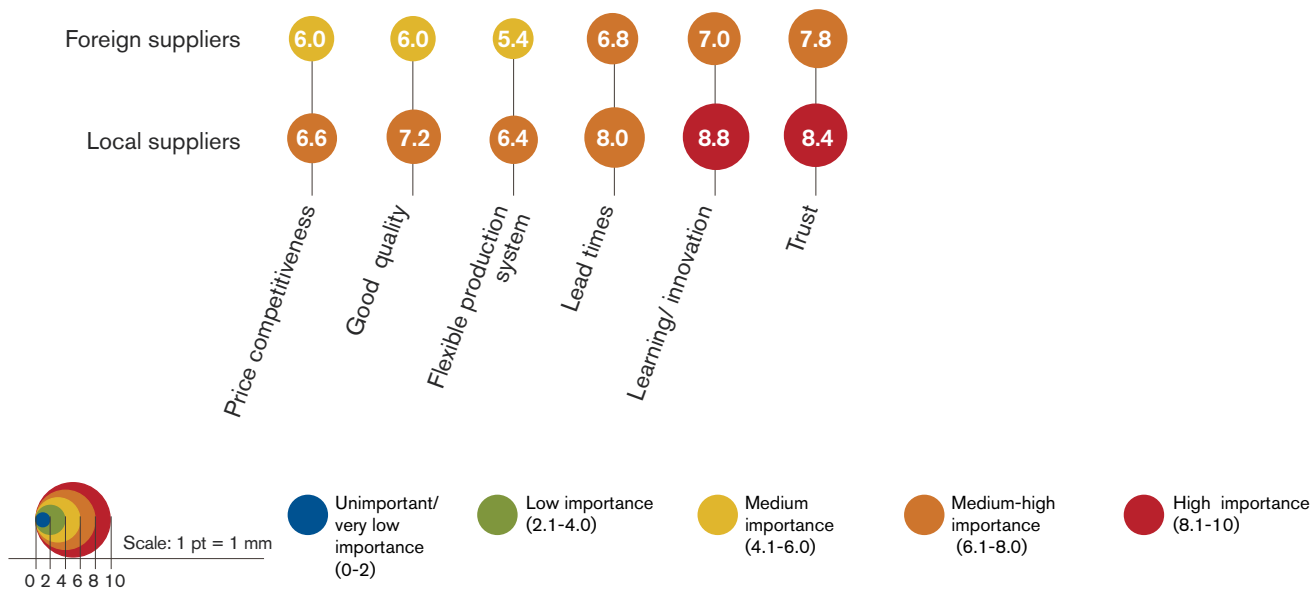
The firms report that local companies tend to underperform (figure 5.14), although trust and price competitiveness are almost as good.

FIGURE 5.13: PROCESSING AND MARKETING FIRMS' VIEWS ON CRITICAL SUCCESS FACTORS IN NIGERIA'S OIL INDUSTRY



Source: Interviews with five downstream firms, 2012.

FIGURE 5.14: RATING OF LOCAL SUPPLIERS RELATIVE TO LEAD-FIRMS' EXPECTATIONS IN NIGERIA'S OIL INDUSTRY



Source: Interviews with five downstream firms, 2012.

To address weak local capabilities, the five firms work with suppliers in a range of areas (table 5.7). They regard cooperation as closer for information exchange, monitoring production efficiency, facilitating access to finance, improving technical capabilities, and reducing delivery times. Two firms have set up supply-

chain management departments to identify issues and assist local suppliers.

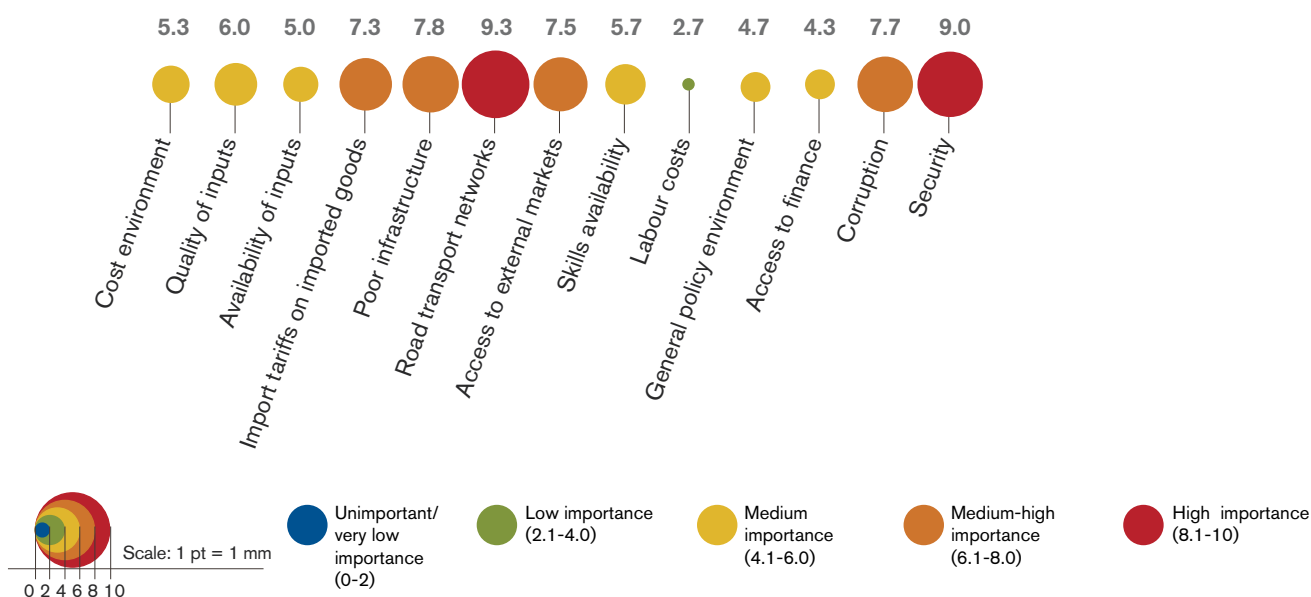
Supply-chain issues are important, but key constraints to deepening local value addition reside elsewhere: poor infrastructure, corruption and security, as well as poor access to finance (figure 5.15).

TABLE 5.7: CORPORATE VISION AND SUPPLY-CHAIN DEVELOPMENT STRATEGY

Question	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5
Information exchange	Consistently	Sometimes	Sometimes	Consistently	Consistently
Monitor production efficiency	Consistently	Sometimes	Often	Consistently	Often
Upgrade production efficiency	Consistently	Sometimes	Often	Often	Sometimes
Upgrade product quality	Often	Often	Often	Often	Consistently
Reduce cost of production	Sometimes	Rarely	Sometimes	Sometimes	Sometimes
Reduce the cost of inventory	Often	Rarely	Sometimes	Rarely	Sometimes
Improve delivery time	Consistently	Sometimes	Consistently	Consistently	Consistently
Improve access to working capital/finance/equity capital	Consistently	Sometimes	Consistently	Consistently	Consistently
Provide skills training	Often	Sometimes	Often	Often	Consistently
Improve technical capabilities	Consistently	Sometimes	Consistently	Consistently	Consistently
Developing internal quality assurance system	Sometimes	Often	Sometimes	Often	Consistently
Joint new product design/development	Consistently	Sometimes	Consistently	Sometimes	Rarely
Financing pre-investment studies i.e. business plan, market studies or feasibility studies	Consistently	Often	Consistently	Sometimes	Sometimes

Source: Interviews with five downstream firms, 2012.

FIGURE 5.15: RATING OF FACTORS AFFECTING LINKAGE DEVELOPMENT IN NIGERIA'S OIL INDUSTRY



Source: Interviews with five downstream firms, 2012.

Policies

Nigeria has deployed linkage development strategies since the 1970s:

- The Petroleum Act of 1969 included a section on protecting indigenous Nigerian firms.
- The NNPC (set up in 1971) and its joint ventures with oil multinationals aimed to raise local participation in oil extraction.
- The Joint Operating Agreement of 1991 and the Production Sharing Contract of 1993 with multinational oil companies aim to have local procurement provisions. Such stipulations also apply to the Niger Delta Development Commission, set up in 2000.
- The Nigerian Content Policy of 2005 has directives on domiciliation of services, award of low-tech onshore supply of goods and services to indigenous firms, and support for domestic procurement.

In 2010, the country enacted a new Nigerian Content Policy to promote local value addition, build local capacity and improve linkages between the oil and gas industry and other sectors of the economy. This policy gives first consideration to Nigerian independent operators in awarding oil blocks, oilfield licences, oil-lifting licences and contracts. The policy has set a minimum local content target of 70 per cent for all works and contracts to be undertaken in, or on behalf of all oil and gas companies operating in, Nigeria.

Nigeria's local content strategy has had mixed success. Local content has indeed increased but not as fast as hoped for. It is estimated that local content ranged from 3–5 per cent in the 1970s to 1990s, 14 per cent in 2003 and about 20 per cent in 2004 (UNCTAD and Calag, 2006). This should be compared with 45–75 per cent recorded in, for example, Brazil, Malaysia, Norway and Venezuela (UNCTAD and Calag, 2006). By 2009, Nigeria had reached 39 per cent (Oyejide and Adewuyi, 2011).

Local content policy has suffered from poor monitoring and supervision capacity by the NNPC, and lack of comprehensive legislation (Oyejide and Adewuyi, 2011). Low funding for the NNPC is an important part of the problem (EIU, 2009), aggravated by the crisis in the Niger Delta region, where instability and violence make business difficult. The views of the firms surveyed confirm these points: they are all aware of government policy to increase local content, but think it would be more effective if coupled with implementation capacity.

investment in infrastructure and housing, and by household consumer-goods manufacturing (Farooki and Kaplinsky, 2012). The supply response to the boom has been slow owing to the long gestation periods involved in mining. Exploration and mine development—the initial stages of the value chain (figure 5.17)—require large capital investment (usually sunk costs) and involve very high risks of exploration failure. Exploration and mining have also been hit by falling ore grades in developed areas (such as the US and Chile), high cost of capital, exchange rate risks, political instability and labour disputes in producing countries, and increasing costs of exploring and mining new areas (ICSG, 2010). The combined effect has been to add upward pressure on prices.

5.4 COPPER

The global value chain

From 2002, copper has seen a price boom (figure 5.16). Demand has been driven by China's

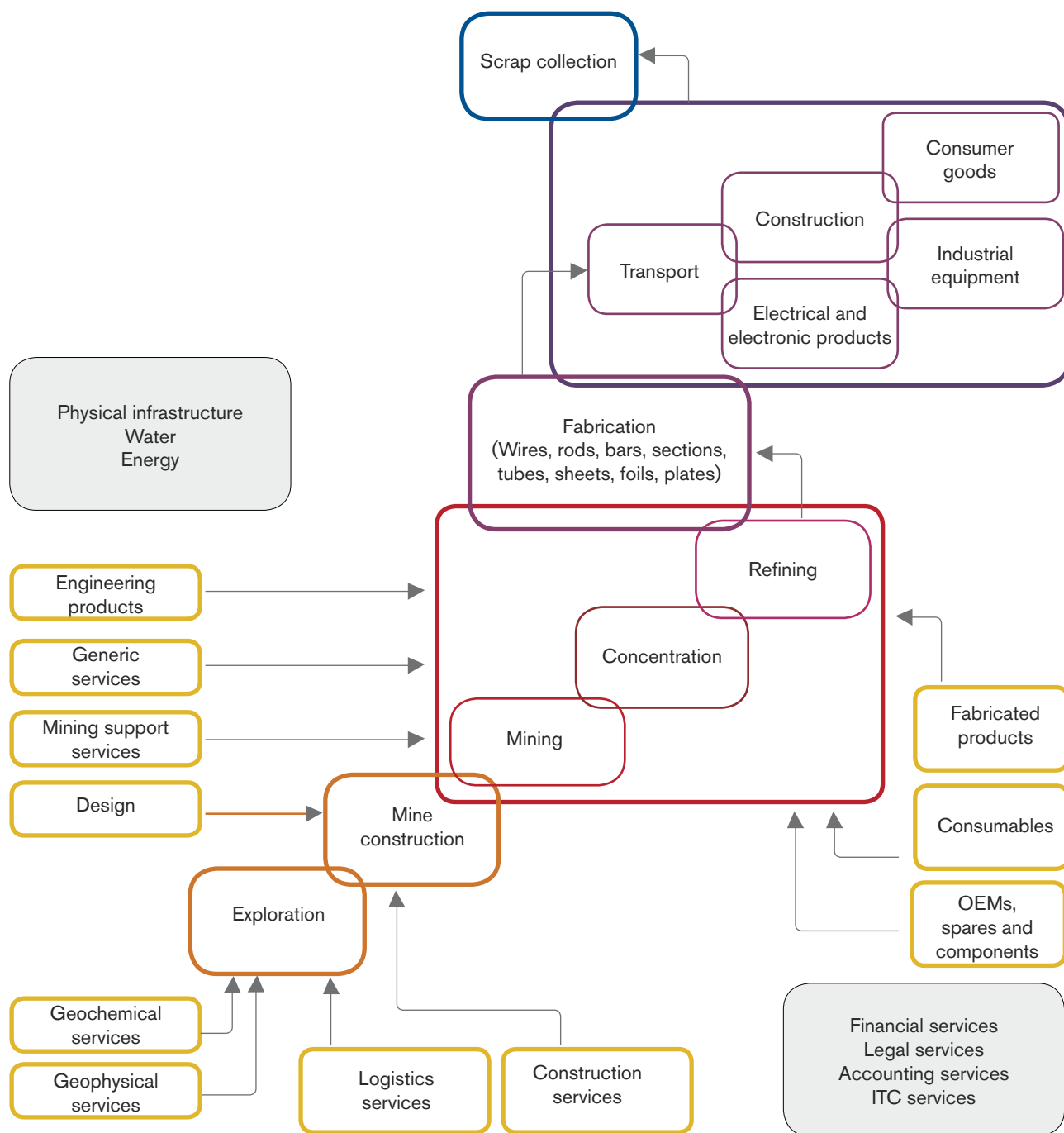
FIGURE 5.16: COPPER, LONDON METAL EXCHANGE SPOT PRICES, JANUARY 1980–SEPTEMBER 2012 (\$ PER METRIC TON)



Source: International Monetary Fund Primary Commodity Price Data, retrieved from www.imf.org/external/data.htm (accessed 20 October 2012).

Note: Grade A cathode, CIF European ports.

FIGURE 5.17: COPPER GLOBAL VALUE CHAIN



Source: ECA and AUC.

Mining, smelting and refining are the activities in the copper value chain associated with higher returns. In light of the above supply-side constraints, and given high profitability of exploration and mining in the last decade, mining companies responded with huge

mergers and acquisitions around the globe (Farooki and Kaplinsky, 2012). Acquiring existing production facilities became the fastest avenue for TNCs to control production, facilitated by the privatizing wave in many developing countries from the 1990s.

An important feature of the copper mining industry is the shift in ownership. By 2009, half the top 30 mining companies came from emerging economies (Humphreys, 2009), including Brazil, Chile, India, Indonesia, Kazakhstan, Mexico, Poland, Russia and South Africa. Eight of those 15 produced copper. The leading copper commodity producers are now huge international concerns, in both industrialized and emerging economies, relying on global networks of suppliers.

The supply chain for copper mining, smelting and refining—the focus of the case study—involves a wide range of goods and services (table 5.8). These include sophisticated and

capital-intensive manufactured goods, such as drilling equipment, conveyors, locomotives, and scrapers. As highly sophisticated services consist of specialized transport services and of engineering services such as mining, electrical, mechanical and civil engineering. (These goods and services tend to be imported, with little local value added.) Mid-range in technology and skills intensity are supplies such as explosives, detonators, process control services and fabrication. Low-tech, low-skills services such as cleaning, catering, security and personnel transport are the supply links often locally outsourced in African producing countries (Morris et al., 2012).

TABLE 5.8: SUPPLIES TO THE COPPER GLOBAL VALUE CHAIN

Stage	Supply
Open-pit mining and underground mining	Explosives, detonators, drilling equipment and parts, conveyors, haulage and excavators and their parts, tyres, consumables (fuel and lubricants), bulk materials handling (conveyors, locomotives, scrapers), pumps and valves, vehicles, head gear (motors, chains, cables), ventilation equipment, services.
Minerals processing	Crushing and grinding equipment, storage tanks, chemicals and reagents, liquid-solid separation equipment, materials handling (conveyors, pumps)
Smelting	Furnaces, dryers, refractories, tapping equipment
Solvent extraction and electrowinning	Reagents, chemicals, lime, handling equipment, vessels
General supplies and services	Personnel protective equipment, health services, electrical equipment, electrical and mechanical engineering services, security services, catering, cleaning, administration, process control, civil engineering services, fabrication products, construction material, rubber products, transport, power, laboratory testing services, pneumatic and hydraulic equipment and services

Source: Fessehaie (2012a).

A strategy aimed at building localized backward linkages to mining can offer opportunities for Africa to develop its manufacturing and services—particularly as investment in copper mining increases—ensuring the soundness of this strategy for some years. Because these backward linkages entail a wide range of technology, skills, capital and minimum scales, African countries at different stages of economic development have a wealth of linkage opportunities.

Zambia's copper industry

Zambia is Africa's largest copper producer, exporting \$6.8 billion of copper in 2011. It contributes around 10 per cent of formal employment, and its share of GDP increased from 6.2 per cent in 2000 to 9.9 per cent in 2010. With a reserve base of 35 million metric tons of copper, even without new discoveries, copper mining could continue at current rates for 60 years (ICSG, 2007).

Copper mining was opened to private investors in the 1990s, after structural adjustment. In 1997–2004, all the mines had been privatized and sold to a heterogeneous group of investors. Alongside mining companies from Europe, North America, Australia and South Africa—most of them listed on stock exchanges—Zambia's copper attracted Vedanta

Resources from India (although listed in London) and the Non-Ferrous Metals Corporation from China.

Most copper is exported refined, reflecting heavy investment in smelting prompted by the copper price boom, as exemplified by the Chinese mining company in a \$310 million smelter.

Forward linkages are few, with one main semi-fabricates manufacturers (Metal Fabricators of Zambia) producing copper wire, copper rods and power cables for the local market and for export (South Africa and other regional markets). Downstream processing capacity may come from a Chinese investment in the Chambishi Zambia–China Economic and Trade Cooperation Zone, worth \$800 million.⁶ This investment has the potential to transform Zambia's copper sector into a platform for industrializing the Copperbelt.

Zambia has a long history of supply linkages for Copperbelt mines (Fessehaie, 2012b). During mining nationalization in the 1970s and 1980s, backward linkage development to copper mining was used to promote local manufacturing, but after the subsequent privatization, most manufacturing capabilities were lost, and the local supply chain became populated by service providers, which may be grouped into several subcategories (box 5.6).

BOX 5.6: SERVICE PROVIDERS FOR ZAMBIA'S COPPER

Agents and distributors supply the mining sector with capital goods, spares, components and consumables (engineering products, electrical equipment, reagents). These firms often provide services with very little value added, especially another subcategory of suppliers—small importers. This is a large group of micro-businesses importing goods from South Africa irregularly, adding very little value. With no overheads and operating largely outside the tax regime, these small traders have pushed more established suppliers out of the value chain. Their lack of technical expertise, facilities or capital often translates into failure to meet delivery times, and in poor advisory and after-sale services. Because of this, after the 2008–2009 copper price collapse, many mining companies squeezed them out of their supply chains.

A small group of agents have higher capabilities. They have managed to upgrade and provide value-added services such as stockholding and stock management, and repair and maintenance services. Some have also developed backward linkages to foreign manufacturers. By becoming sole distributors and operating under technology agreements, they have addressed two key constraints facing Zambian suppliers—access to capital and to knowledge.

Another group of suppliers is highly specialized, and operates in skilled and sometimes capital-intensive supply links. These services include drilling, engineering, specialized transport, and pneumatic and hydraulic systems. Zambian-owned firms have been fairly successful in entering this subsector (as well as the above subcategories, especially when entry barriers were skills related, such as mechanical engineering, rather than capital related, such as specialized transport).

Mining equipment is generally bought through local subsidiaries of original equipment manufacturers. These subsidiaries undertake little or no manufacturing locally, but focus on after-sales services, such as provision of spares and components, repair and maintenance. They invest heavily in skills development, through continuous upskilling, local training centres and sending personnel to South Africa for further training.

Finally are the manufacturing companies supplying inputs such as metallurgical, plastic, rubber, painting and engineering products. Apart from one large steel foundry, they are quite small. This group includes companies established after privatization, mainly by South African and Asian investors, as well as firms established before the 1990s. Of the latter, very few managed to compete with imports from South Africa and Asia, and most closed. The firms that survived include Zambian, European and Asian firms.

Source: Fessehaie (2012b).

Previous research has shown that ownership of the mining companies has important consequences for local supplier upgrading (Fessehaie, 2012a). In particular, supply firms in the supply chains of industrialized countries or South African mining companies were more likely to receive direct and indirect cooperation in product and process upgrading, unlike supply firms in the supply chains of Chinese or Indian mining companies, which had arm's-length, market-based relationships. While at least the Chinese supply chain offered substantial market opportunities and lower entry barriers, neither Chinese nor Indian companies supported local upgrading (Fessehaie, 2012b). The only supply firms that could escape these dynamics were those with strong backward linkages to original equipment manufacturers as subsidiaries or sole distributors.

Two firms' employment, spending and perceptions

The case study looked at the two largest copper producers in the country, both headquartered abroad, which together account for more than half total copper output. Employment is substantial (table 5.9). The interviews found that one company had 8,656 permanent employees in 2012, the other 2843. Around 90 per cent of them are involved in mining operations, and around 10 per cent in management. Of the permanent staff, 22–26 per cent are unskilled, and 35–62 per cent have a school-leaving certificate. In one of the companies almost 38 per cent of staff have a tertiary education.

**TABLE 5.9: STRUCTURE OF EMPLOYMENT IN TWO ZAMBIAN COPPER MINERS, 2012
(NUMBER OF REGULAR JOBS)**

	Firm 1		Firm 2	
	Female	Male	Female	Male
Management level				
Higher	2	19	1	2
Middle	11	55	0	51
Lower	104	831	22	140
Qualifications				
Tertiary education	527	2,731	33	428
School-leaving certificate	150	2,881	90	1,668
Unskilled	32	2,333	6	608
Nationality				
Foreign	3	105	10	148
Local	706	7,842	119	2,566
Total	709	7,947	129	2,714

Source: Interviews with five downstream firms, 2012.

The companies also employ thousands of largely unskilled contract workers (one firm reported employing 14,000). Female workers are largely represented in the tertiary-educated, lower-management sections of the labour structure. Increasing copper prices and investment have led to growing employment—in one company by as much as 20 per cent in 2005–2011.

The companies invest in human resources at different levels—funding primary, secondary and technical education in the local community,

scholarship programmes at tertiary education institutions abroad, and executive business management training for senior management.

The two firms' procurement decisions are made in Zambia, although headquarters abroad are involved in big-ticket items. The structure of local procurement differs, but at first sight local operational spending appears significant in 2012 (table 5.10), at \$400 million–\$800 million, or more than 80 per cent of the total.

TABLE 5.10: SOURCING BY TWO COPPER FIRMS, 2012

	Suppliers				Operational spending (\$ million)			
	Local		Foreign		Local		Foreign	
	Number	%	Number	%	Amount	%	Amount	%
Firm 1	448	58	319	42	801 ^a	83	160	17
Firm 2	926	83	185	17	396 ^b	84	74	16

Source: Interviews with two firms, 2012.

a. Including contract labour; excluding such labour: \$584 million (77% local and 23% foreign); b. Excluding contract labour.

Note: Expenditures exclude fuel, heavy fuel oil, electricity, wages, social expenditures, certain service costs and capital costs.

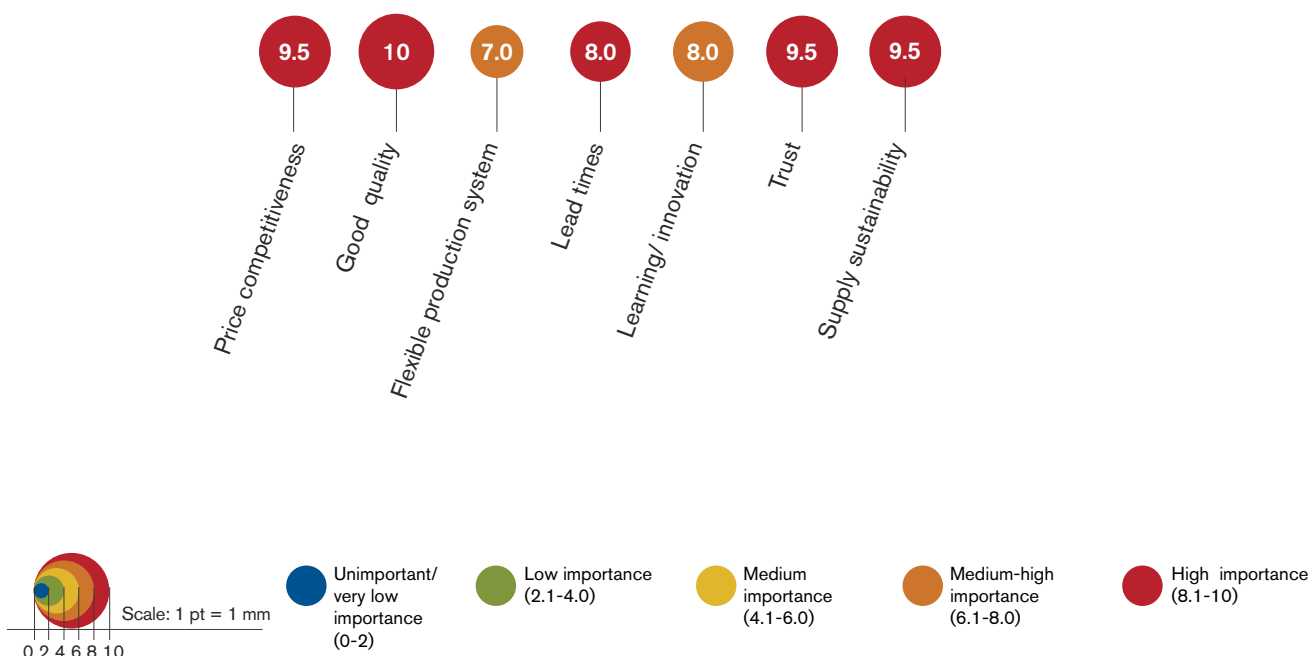
A discussion of these figures requires qualification, however. First, these figures do not reflect the value-added content of the local supply chain. These values are often expenditures on local importing agents, whose operations are characterized by low levels of technology, skills, management and labour. They merely import and add a mark-up, which means that, besides some logistical capabilities, they develop very few capabilities. Second, these figures refer to locally registered suppliers, without distinguishing between Zambian- and foreign-owned businesses. Unfortunately therefore, the data tell us little about value addition and local embeddedness of Zambia's copper supply chain.

The structure of local spending also varies, the result of different procurement strategies (see table 5.10). One of the firms sources from over 900 local suppliers (more than 80 per cent of total suppliers). The average order size is

\$428,000. The other relies on about half that number of local suppliers (only 58 per cent of suppliers), but places average orders of \$1.3 million. The second firm has a procurement strategy that aims to consolidate and rationalize the supply base. By identifying the most capable suppliers and cooperating with them to build their competitiveness, it intends to outsource more, and better, to local suppliers. (The first mining company is not reorganizing.)

Mining companies in Zambia are often certified by the International Organization for Standardization and are required to produce consistently high-quality copper, reflected in the CSFs, along with price competitiveness and trust (figure 5.18). Poor quality or lead times could have onerous financial implications if, for example, mining ceased or if workers' safety was compromised. For these reasons, mining companies set very demanding parameters.

FIGURE 5.18: CRITICAL SUPPLY-CHAIN FACTORS IN ZAMBIA'S COPPER INDUSTRY



Source: Interviews with two firms, 2012

Local manufacturers often lack the technological capabilities, financial resources and economies of scale to enter the most capital- and technology-intensive links of the supply chain. Hence, the two firms report that expenditures on locally manufactured goods tend to be very low.

For local manufacturers to produce mining equipment, there are also significant barriers in terms of patents, standards compliance, R&D requirements and warranty systems enforced by original equipment manufacturers, which ensure that the latter also largely control the supply of spare parts. According to the two firms, local manufacturers could enter manufacturing of mill balls, core trays and protective personal equipment, and assemble light vehicles.

Most of the local expenditures are for local services or imports through local agents, the former mainly drilling, transport, construction, explosive blending, mechanical and electric engineering; the latter mainly mining equipment, spares and materials, largely from South Africa. For one of the firms, the major sources of imports are South Africa (58 per cent), Europe (17 per cent), India and the Middle East (12 per cent each).

The key constraints facing local suppliers include lack of technically trained and experienced personnel, managers' lack of international experience, poor infrastructure (particularly lack of a rail system and border delays), unreliable electricity, weak government support (such as 35 per cent corporate tax), lack of finance and corruption.

To address weak supplier capability, one of the mining companies designed a Local Business Development Plan, which focuses on improving delivery time, improving access to finance, providing skills and technical know-how, and developing internal quality assurance systems. The plan is implemented by the procurement department and is contributing to long-term relationships with local suppliers.

Policy

Historically, policy in Zambia played a key role in the extent and nature of local linkages (Fessehaie, 2012a,b). After privatization, the policy framework for upstream linkages to the mining sector was set by development agreements between the government and mining companies, which included provisions

on local procurement. The companies were to grant local firms adequate opportunities to bid for tenders and to ensure no unfair discrimination. They also had to submit a local business development programme, monitored by a cabinet-appointed, interministerial committee drawn from the Ministry of Mines and Mineral Development and the Ministry of Commerce, Trade and Industry.

The development agreements' provisions on local suppliers were, however, largely disregarded by both the mines and the government, for three reasons.⁸

First, the years after privatization were focused on recapitalizing the mines. Later, policymakers and the public focused on revenue and miners' wages (Mutesa, 2010). Also, until 2007, the contents of the agreements were largely unknown to the public, hamstringing civil society's efforts to lobby for enforcement (Haglund, 2010).

Second, policymakers failed to see the potential for private sector development in localizing upstream linkages. In 2012, they were not included in the Commercial, Trade and Industrial Policy nor in any private sector policy or programme.

Third, the ministries had poor institutional capacity. They failed to conduct any comprehensive assessment of the supply chain, set up monitoring mechanisms or design support programmes. This stemmed from high staff turnover and a highly personal management style that built on individual rather than institutional capabilities. Neither strong political guidance nor resources were invested in this area.

Ultimately, policy failed to encourage mining companies to increase local content or to upgrade local suppliers' capabilities. The 2008 Mines and Minerals Development Act, which abrogated the development agreements, removed the only legal obligation on the mines to develop local supply clusters.

5.5 GOLD

The global value chain

World prices for gold have soared in the last decade (figure 5.19), driven by demand, especially from emerging economies such as China. In 2009,

central banks, notably those of China, India, the Philippines and Russia, used considerable amounts of their liquid reserves to buy gold as a means of diversifying their reserves assets in the aftermath of

the global financial crisis (Bloch and Owusu, 2011). At the same time, new products have been devised for investment, notably exchange-traded funds.

FIGURE 5.19: WORLD GOLD PRICE, JANUARY 1970–AUGUST 2012 (\$ PER TROY OUNCE)



Source: UNCTADStat, retrieved from <http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx> (accessed 18 October 2012).

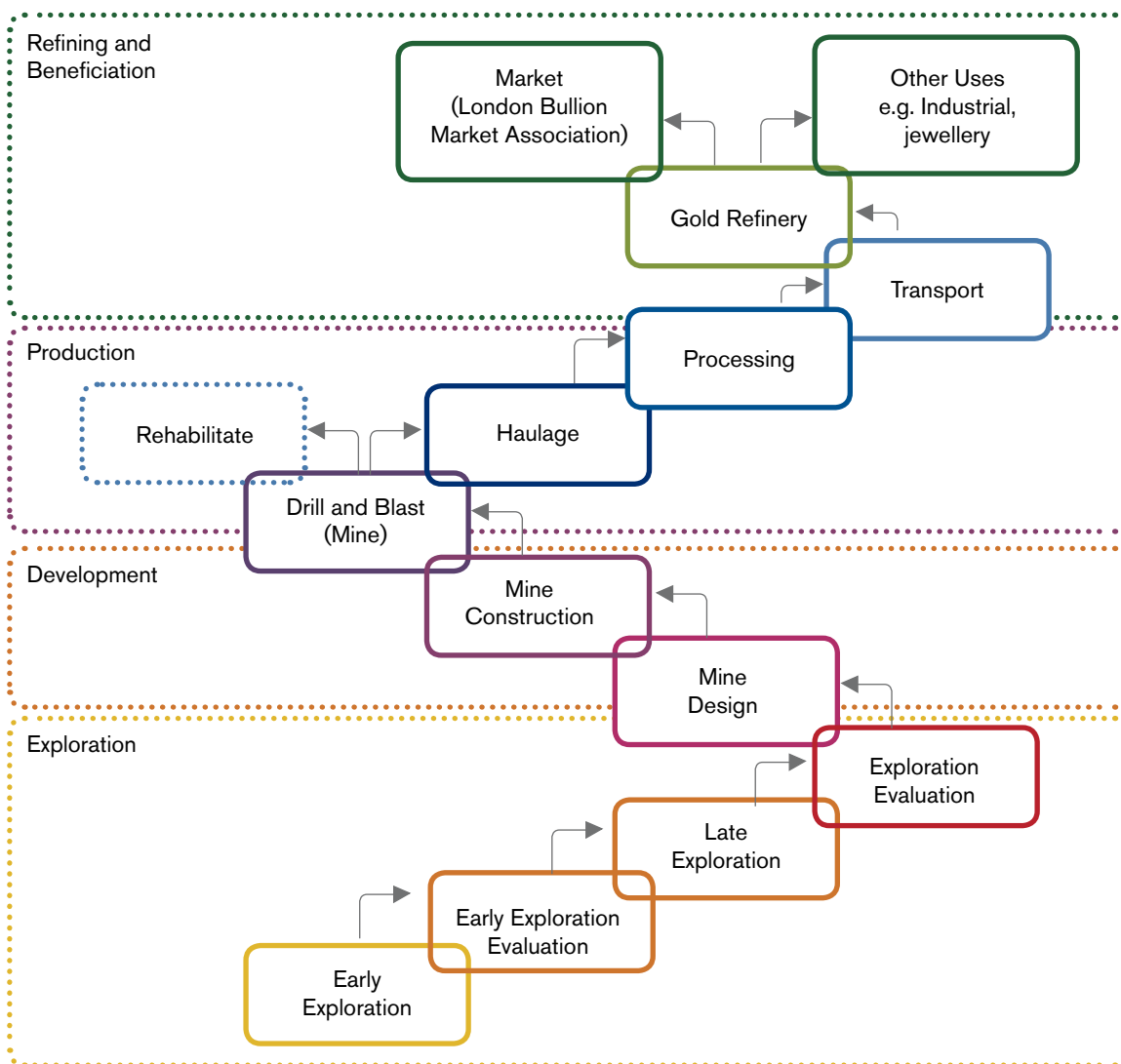
Note: Gold 99.5 per cent fine, afternoon fixing, London.

Historically gold production has been dominated by a few countries, namely South Africa, the US, Canada, Australia and the former Soviet Union. South Africa has been the leading producer of gold, accounting at peak levels for 60 per cent of world mine production (Mjimba, 2011). Declining levels of production in South Africa have been offset by increasing production in smaller producing countries, including Ghana and some other countries in West Africa (Bloch and Owusu, 2011). West Africa's output (Mali, Guinea, Burkina Faso, Mauritania and Côte d'Ivoire) rose by 65 per cent in 2006–2011, to 8 per cent of global output. A total of 55 companies are

involved in 123 projects in 10 West African countries, including Ghana.

The gold GVC is divided into four stages: exploration, mine development, production, and refining and beneficiation (figure 5.20). Final destinations include jewellery and industry (electronics and dentistry), as well as financial investment. The supply chain for gold production, similar to copper production, includes drilling equipment, conveyors, locomotives, scrapers, specialized transport services, engineering services, fabrication and low-tech services (cleaning, catering, and security and transport personnel).

FIGURE 5.20: THE GOLD GLOBAL VALUE CHAIN



Source: Mjimba (2011).

Ghana’s gold industry

Gold mining has for long been an important element of Ghana’s economy (the colonizers after all called it the Gold Coast) and more recently of social development. Ghana now ranks 10th in worldwide production and second in Africa, after South Africa.⁷

Mining’s contributions are manifold. The sector was the largest source of corporate tax revenue in 2010 and accounted for \$5.0 billion in exports in 2011, or 40

per cent of merchandise exports. The industry accounts for more than 50 per cent of foreign direct investment inflows and, with oil, accounted for 8.5 per cent of GDP in 2011. Mining showed growth of 18.8 per cent in 2010, and the extractive industry 206.5 per cent in 2011, when commercial oil production began, taking GDP growth to 14 per cent that year. Estimates from the Ghana Mineral Commission indicate that total gold production rose from 2.0 million ounces in 2004 to 3.7 million ounces in 2011. Mining and quarrying account for about 1 per cent of jobs, employing some 20,000

Ghanaians directly in large mining, 6,000 in mine support services and about 500,000 in small gold, diamond and quarry production.

Ghana has 13 large mining companies producing gold, diamonds, manganese and bauxite, and more than 300 registered small mining groups and 90 mine-support service companies. Large mining is dominated by foreign multinationals from South Africa, Canada, Australia, US, UK and Norway. Small mining is dominated by Ghanaians, largely as a result of the Minerals and Mining Act of 2006 that keeps it for locals. (It is an increasingly important source of direct and indirect employment to young Ghanaians.) A worrying trend is the growing antagonism between small and large mining companies, as they compete for concessions and their operations

encroach on each other.

Three firms' spending and perceptions

The case study involves three large, foreign-owned gold mining firms established in 1993–2004. They employ 2,100–5,500 workers, and appear to make substantial investments in developing human resources.

Their local sourcing is heavy, at 67–79 percent of total operational spending, or \$254 million–\$300 million in 2011 (table 5.11). They relied on 1,062–1,324 local firms (66–71 per cent of the total number of suppliers). Yet as with Zambia's copper mines, these figures are not indicative of local value addition or of domestic ownership of local businesses.

TABLE 5.11: SOURCING BY THREE GOLD MINING COMPANIES, 2011

	Number of suppliers		Value of operational expenditures (\$ million)	
	Local	Foreign	Local	Foreign
Firm 1	1,062 (68)	497 (32)	254(77)	74(23)
Firm 2	1,324 (71)	530 (29)	300(67)	150(33)
Firm 2	1,142 (66)	578 (34)	271(79)	79(21)

Source: Interviews with three firms

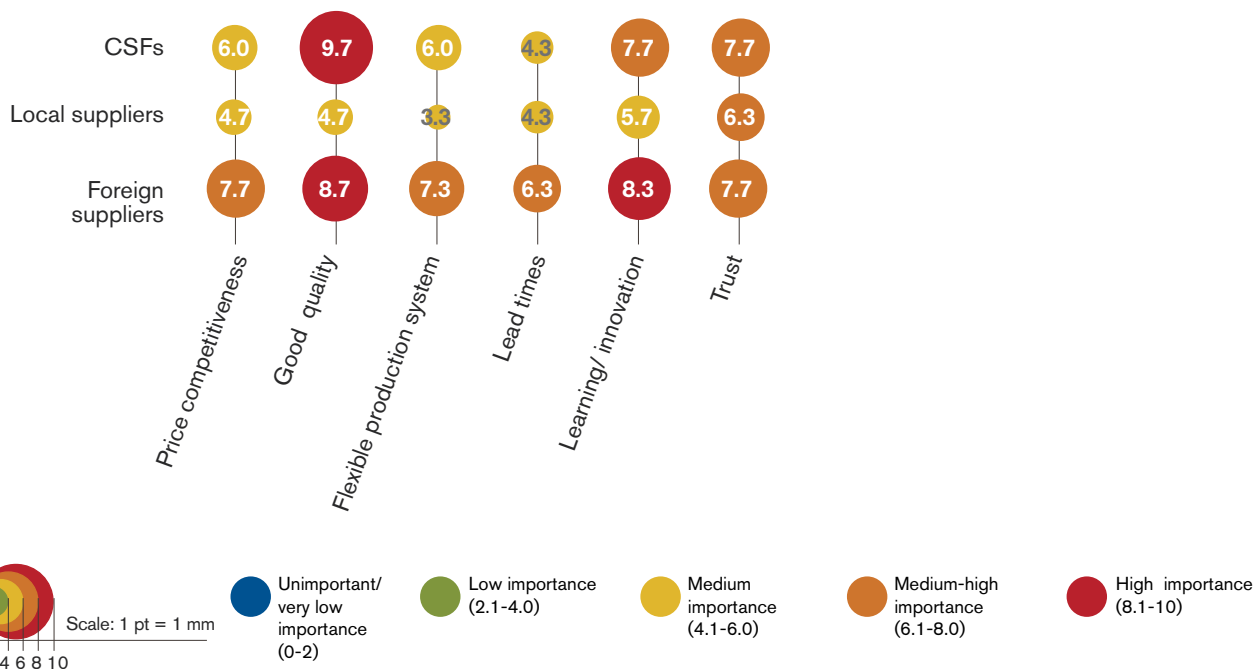
Note: Expenditures exclude fuel, electricity and wages capital costs. Figures in parentheses are percentages.

Local firms are involved in providing smaller equipment, components, simpler and basic manufactured products (bolts, protective equipment, fans, etc.), consumables, as well as maintenance and repair services. The problem is that those produced locally rarely meet industry requirements, so that local suppliers also import these items. According to a senior officer at the Minerals Commission, it is encouraging foreign companies that supply these local suppliers to

relocate and operate in Ghana.

The firms have strict standards on occupational safety, health and the environment, which are passed down the value chain. Suppliers need to comply with them in order to enter the supply chain. In terms of CSFs, the chain is quality driven: quality is the most important criterion in selecting suppliers, followed by learning/innovation and trust (figure 5.21).

FIGURE 5.21: RATING OF LOCAL SUPPLIERS RELATIVE TO LEAD-FIRMS' EXPECTATIONS IN GHANA'S GOLD INDUSTRY



Source: Interviews with three firms, 2012

The firms have found that local suppliers (relative to foreigners) underperform on quality particularly, and that they have weaker production flexibility and learning/innovation. Their competitiveness is affected by bad roads, lack of a rail system, power shortages, limited access to finance, corruption and poor security, and a weak local business culture (for example, in respecting agreed lead times). Mobile communication has been helpful in improving supplier performance, however.

To address supply-chain bottlenecks, buyers cooperate with suppliers. They allocate staff to identify local suppliers and build capacity. Information exchange takes place through annual suppliers' summits and buyer-seller forums, and has seen local suppliers' capabilities improve on increased competition and technological capacity. Finance, skills and technological competency are other areas of cooperation.

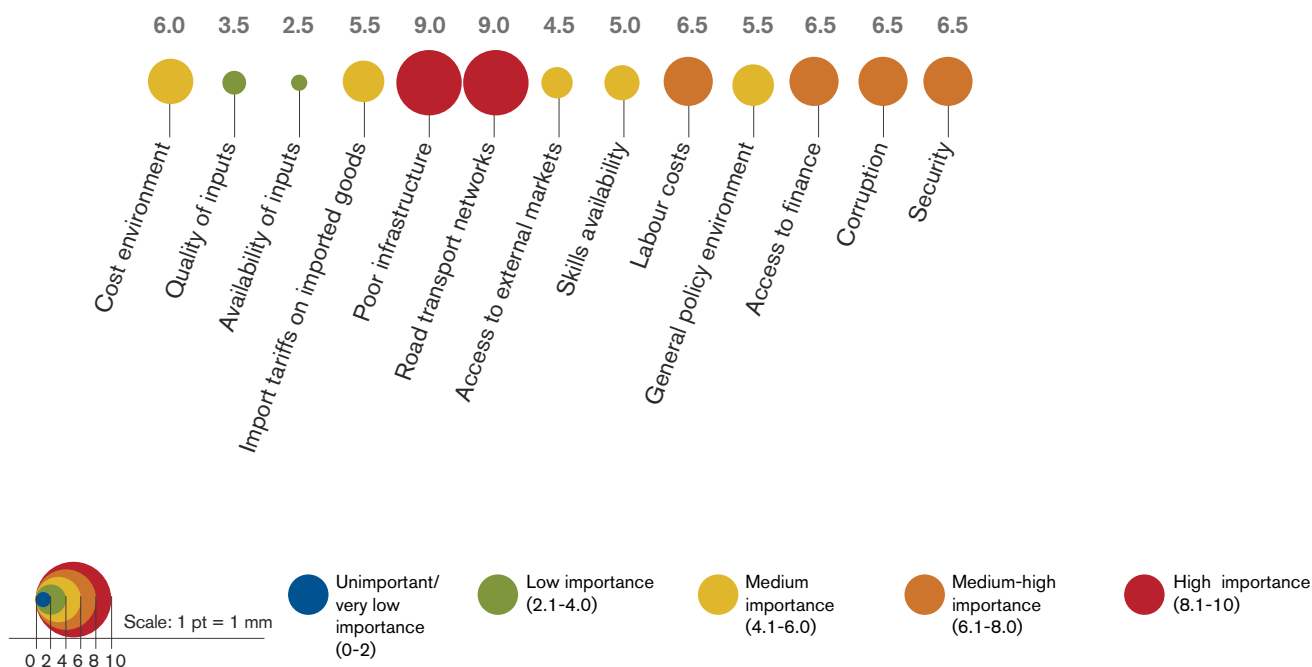
The firms also identify challenges to increasing local processing (figure 5.22). Gold refining and further manufacturing into jewellery, medals, and industrial uses are hampered primarily by poor infrastructure, the single most important hindrance in developing forward and backward linkages.

Policy

The policy framework (encapsulated in the Minerals and Mining Act of 2006) reflects the government's effort to manage Ghana's mineral resources along the lines of sustainability and broad-based development. It focuses on skills creation, workers' safety and health.

Arising from the recent discovery and exploitation of oil and gas reserves, the issue of local-content backward linkages has taken on a new importance. A new draft policy, to be placed before the cabinet,

FIGURE 5.22: RATING OF FACTORS AFFECTING LINKAGE DEVELOPMENT IN GHANA'S GOLD INDUSTRY



Source: Interviews with three firms, 2012.

aims to establish a more comprehensive and forward-looking framework for mining. It highlights local content to facilitate backward linkage and community development, as well as regional economic integration.

5.6 A THREE-COUNTRY COMPARISON: NIGERIA, ZAMBIA AND GHANA

These three countries' linkage development is summarized in table 5.12.

TABLE 5.12: SUMMARY COMPARISON: NIGERIA, ZAMBIA AND GHANA

Nigeria (oil)	Zambia (copper)	Ghana (gold)
<i>Deep linkages and upgrading</i>	<i>Broad but shallow linkages and no real upgrading</i>	<i>Growing linkages, but from a low basis</i>
<ul style="list-style-type: none"> Buyer cooperation Local content policy CSFs: trust, lead times Constraints: poor infrastructure, safety, corruption 	<ul style="list-style-type: none"> Buyer cooperation varies Employment linkages are more important CSFs: trust, lead times, price, consistency Constraints: skills, finance, infrastructure 	<ul style="list-style-type: none"> Buyer cooperation Skills development CSFs: quality, technical standards, innovation Constraints: infrastructure, finance, corruption
Strong local content policies	No policy framework	New local content policy

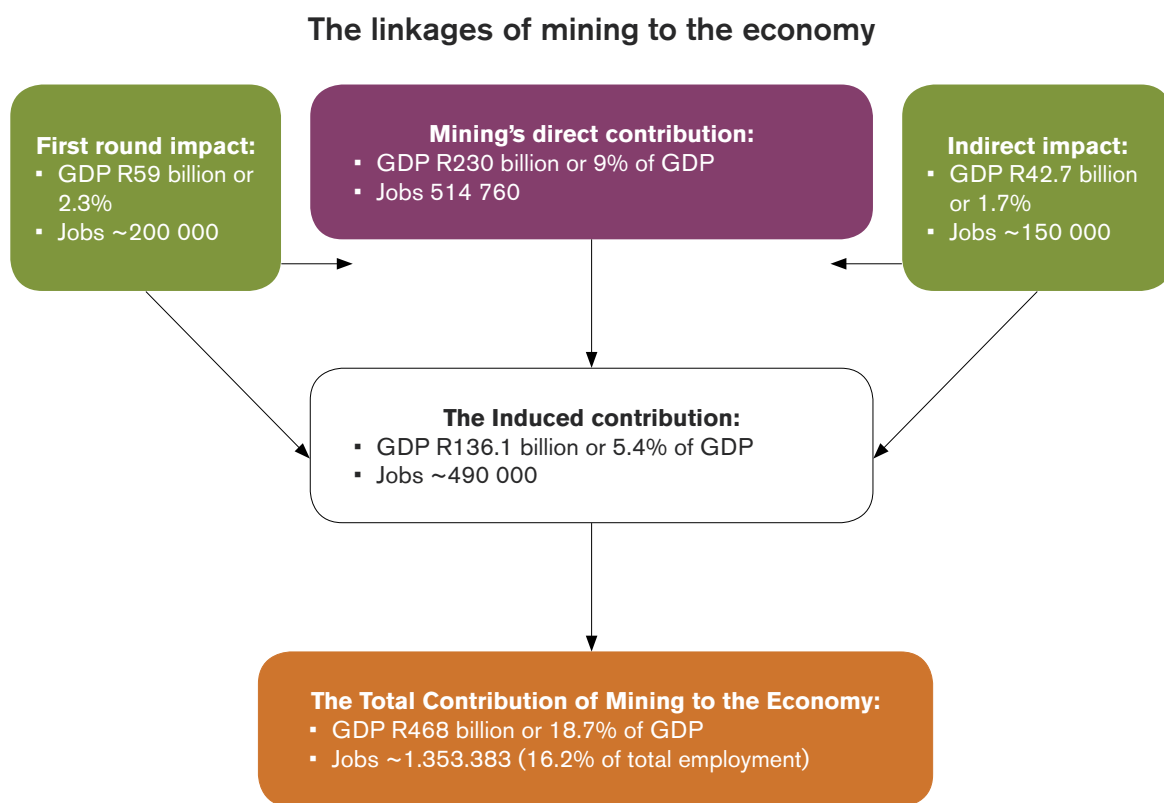
5.7 SOUTH AFRICA'S MINING SUPPLY INDUSTRY

Features

Mining plays a major role in South African history and economic performance, including industrialization (figure 5.23). In the second

quarter of 2012, for example, mining and quarrying contributed R 66 billion to nominal GDP, which stood at R 768 billion, or a little more than 8 per cent (Statistics South Africa, 2011). The mining industry's own assessment (including the induced impact on other sectors) is close to 19 per cent of GDP, and a little more than 16 per cent of total formal sector employment (CMSA, 2012).

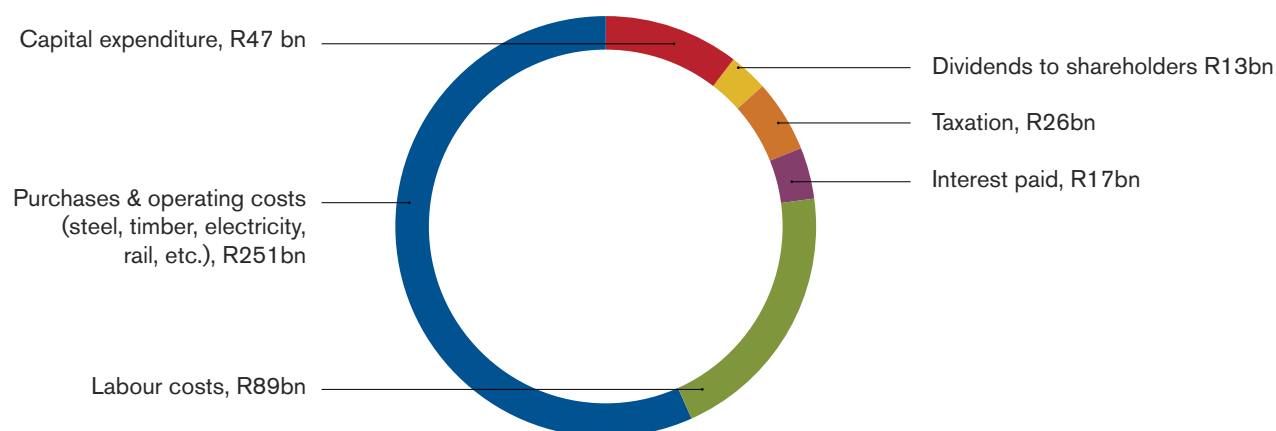
FIGURE 5.23: LINKAGES FROM SOUTH AFRICA'S MINING SECTOR TO THE REST OF THE ECONOMY



Source: Quantec and IDC, 2010 data, retrieved from www.quantec.co.za/data (accessed 20 November 2012).

Total income of the mining industry (after depreciation and impairments) were R447 billion in 2011, and total expenditures (on the same basis) came to R437 billion. Purchasing and

operating costs account for the largest share of income, followed by labour costs and capital spending (figure 5.24).

FIGURE 5.24: SOUTH AFRICA'S MINING SECTOR EXPENDITURE, 2011 (RAND)


Source: Statistics South Africa (2011).

Although no precise data are available, a very large share of spending is local—of the R437 billion, an estimated 89 per cent in the country. This is why mining has such a big impact on the rest of the national economy—the money from mining circulates throughout the economy, affecting sectors as diverse as financial services and housing. Some of the spending goes towards importing equipment (such as drag-lines) that is not made in South Africa but that helps to improve mining's capital stock and the economy's productive base.

The export performance of the mining equipment and specialist services sector is indicative of its global position. Using the classification of the South African Capital Equipment Export Council (SACEEC), mining equipment is one of South Africa's largest exports, constituting 8.5 per cent of the total in 2005–2009 and 55 per cent of capital equipment exports. South Africa's global export share of the SACEEC categories over the same period averaged 0.9 per cent, which compares with South Africa's share of all global exports of 0.4 per cent. The revealed comparative advantage for mining equipment is therefore 2.25 (0.9/0.4), which is substantial.

Exports of mining equipment were put at R29 billion in 2011, having increased by 20 per cent from the previous year (SACEEC). To this figure one should add around a third, representing exports of specialist mining services in areas such as geology, exploration, mining and refining.

The local content of exports of mining equipment and specialist services is very high—estimated at 90 per cent—largely explained by the country's dense network of supplier industries and the raw materials and skills required. In terms of manufacturing value added, these exports are particularly significant. Furthermore, this industry does not enjoy tariff protection (with few exceptions), nor does it receive much in the way of government subsidies. In short, it is an internationally competitive industry.

South Africa has a strong trade surplus in mining equipment with the rest of Africa (table 5.13). The share of Africa (excluding North Africa) in mining exports has risen in recent years, improving the overall trade balance, although the fastest-growing market for South African mining equipment is Latin America, according to the SACEEC. Latin America has many new mining projects, and South African exporters have a strong presence there.

TABLE 5.13: SOUTH AFRICA'S TRADE IN MINING EQUIPMENT, 2005–2009 (\$ MILLION)

	2005	2006	2007	2008	2009
<i>With the world</i>					
Exports	3,292	4,722	6,201	6,743	4,130
Imports	3,174	4,286	5,988	6,175	3,669
Surplus	119	436	213	568	461
<i>With Africa(excluding North Africa)</i>					
Exports	787	1,026	1,494	1,936	1,543
Imports	11	13	15	24	32
Share of total exports (%)	24	22	24	29	37

Source: UN Comtrade, retrieved from <http://comtrade.un.org/> (accessed through the World Integrated Trade Solutions, 25 February 2011).

Before 1994, South African mining houses were very largely domestically focused, but the ending of apartheid allowed them to greatly expand operations abroad, a trend generally accelerating as they find that investments abroad are more attractive than those in South Africa.

It is important to analyse how much this expansion abroad boosts exports of South African mining equipment and specialist services—in other words, whether South African mining houses “take with them” South African suppliers. Interviews with mining houses and key suppliers provided differing perspectives as to whether locally known and trusted suppliers were at a competitive advantage.

The overall assessment was that this was a factor, but only to a limited extent. Most of the work is done on an open tender basis and, while knowledge and trust of local suppliers are of some consequence, tendering is highly competitive. The view of a major mining house is probably representative: “Almost all that we procure is on open tender. Sole source is a real exception. Trust is some advantage. It may also bring synergies with existent businesses. The South African supplier advantage is there, but it is on the margin.”

A key marketing issue is that, once a product has been tried and tested and seen to work in South African conditions, it is recognized that it will work

anywhere. South African mining houses are known to be very sophisticated and knowledgeable on what is available, and so firms that succeed with them and in South African conditions have the capacity and “pedigree” to succeed in global markets.

When operating abroad, mining houses and suppliers use very little local input, unless domestic supply firms are highly capable. Local sourcing is usually confined to labour and basic goods. There is no hostility on the part of South African mining firms to procuring products and services locally, indeed this is seen as advantageous, saving logistical costs and reducing delays and uncertainties. However, local procurement needs to be cost effective and reliable. The mining industry is also becoming more willing to procure locally, if this happens within a framework of economic sustainability and partnership with other stakeholders.

A regional hub

South Africa's role as a regional hub in the mining industry deserves particular attention. A first dimension is that some multinational firms use South Africa as a base from which they service and adapt their offerings to the rest of Africa. This was seen in interviews with some of the Scandinavian (Finnish and Swedish) companies. They have large operations in South Africa—among the largest of

their operations outside their home country.

What attracts these firms to South Africa is large domestic demand for their products, a very dense network of competent supply industries and high-level skills, more especially experiential skills. South Africa is a regional hub for TNC mining companies that service and support continental operations, although some mining companies are said to have moved their research outside South Africa.

A second dimension is that some firms there provide a full-scale service in mining engineering, procurement and construction management. These firms can undertake the full gamut of tasks to bring a mine into operation, providing turnkey solutions from exploration to a working mining operation. They also undertake contract mining.

These firms are important to the industry because they provide a market for other local input providers. In an industry where trust is some advantage and with much tacit knowledge, experience with trusted suppliers is also very important. These firms are in a highly competitive market with global players (generally much larger players) and there is little room for any “local charity.” So, domestic firms have to meet the requirements and have to be cost effective. This use of local inputs is also encouraged by domestic policy. Where South African firms get export credit finance, they must use at least 65 per cent local product.

A third dimension is that mining projects are administered and directed from South African head offices.⁹ Sasol's operation in Mozambique, for example, produces liquid natural gas, which also entails a plant to process and compress the gas and pipe it to South Africa under a local company manager for on-site operations, but with ultimate control from South Africa.

Still, the advantages of directing global activities from South Africa may be declining. This is partly a function of a growing exposure to activities abroad—South Africa tends to be a declining share of group output. But it is also a function of the greater perceived risks in South Africa and declining relative advantages of support infrastructure. On the latter, the infrastructure is regarded as improving elsewhere (often from a low

base) whereas it is generally declining in South Africa.

The absence of government policy is also important. South Africa is not positioning itself as a hub and has no policies to encourage hub activity. By contrast, Botswana and Mauritius provide incentives for such activities and are very easy on work permits for skilled persons.

Competitiveness issues and policy implications

South African suppliers are global leaders in areas such as washing spirals, underground locomotives, submersible pumps, hydropower equipment and mining fans. The country's firms are also leaders in a raft of mining services—prospecting; geological services; shaft sinking and turnkey new mine design and operation services, as well as many others. They have a global competitive advantage in the following four main areas.

Mine safety is particularly strong and growing very fast. A third of members of the export council make safety equipment or safety-oriented equipment. This subsector includes many smaller companies, and is a very dynamic product area with new-firm entry and new products. Tracked mining—especially rail-based track mining and the use of underground locomotives—is dominated by one major company. Another company is also active and has developed fuel cell technology and associated products using platinum. In the area of shaft sinking, especially vertical shaft sinking, South Africa is the global leader. This subsector is dominated by large companies but there are many small companies managed by larger companies headquartered abroad. Finally, ventilation has been an area of considerable expertise for a very long time with a well-established society, journal and multiple companies.

Development in these areas is strong and considered much greater than in comparable mining countries such as Chile or Australia, although at least some of these areas have limited applicability to Africa, which has very little deep mining. South African capacity is generally well developed where there is considerable local demand, but in oil and gas, for example, the country has limited capacity outside ancillary services such as environmental evaluation and the generic construction and plant-

maintenance skills of technicians, plumbers and welders, etc.

Several factors contribute to South Africa's competitive advantage. The most important are skills, especially experiential skills; well-established companies with leading-edge products and competencies; public research linked to firms; highly sophisticated customers; well-developed and dense networks of local supply industries and services; and geographical clustering—mining houses are clustered around Johannesburg, supply industries around East Rand. However, some of these advantages are declining or are not being further developed.

There are skills shortages at every level, particularly engineers and artisans, and many firms believe that standards are declining. Publicly funded research has fallen significantly. Mining and mining-related activities are ignored in South Africa's innovation policies. There is less research in the universities and declining links between firms and science councils. Companies increasingly see their major areas of operation outside the country, and regard South Africa as a less attractive place from which to direct and administer mining projects. The decline of South African mining output and lack of new investments is reducing the overall size, holding back the technological advance for local suppliers. Lastly, the sector is under increased competition from China at the lower end, especially equipment production, and from Australia at the upper end, especially R&D. The result is growth well below the optimum—although the industry is still very technologically sophisticated with global reach and high local content.

Mining equipment and specialist services have not received any explicit government subsidy

at any stage in their development, although mining supply firms benefit from government programmes on loans, and support for studies in SADC countries and Export Marketing and Investment assistance. But some public support remains highly problematic: beyond the need to boost publicly funded R&D in research institutions and universities, university training needs to be expanded (particularly engineers) and weak artisanal training improved and recognized in other countries.

Addressing these problems is particularly urgent in the light of growing manufacturing competition (principally from East and South-east Asia) and of rising knowledge and innovation competition (mainly from Australia).

A further policy challenge is to support the spread of mining-input technologies and companies into non-mining products and markets (to some limited extent this is already happening). Some firms fail to see potential applications outside known areas and customers. But the South African capital equipment sector is highly organized with an active export association, which lets the government investigate, with the industry and association, how firms could apply their technological capacities to new products and new markets.

Precise policy modalities will differ, but South Africa can learn from Finland's experience (box 5.7). The emphasis on diversification through promoting linkages and spillovers between industries, a systemic approach to an integrated industrial and technology policy, and the development of policy in close collaboration with firms, industry associations and research bodies, provide a guideline for encouraging the lateral movement of technological competencies (Kaplan, 2012).

BOX 5.7: A NORDIC APPROACH

Finland is a paradigmatic example of successful diversification from natural resource-based industries. Its governments adopted a systems approach to industrial and technology policies, emphasizing linkages and spillovers among industries, research organizations and universities. They promoted knowledge production and formulated policy through public-private partnerships involving economic research bodies, industry federations and firms (Dahlman et al., 2006).

That firms who move into new areas take risks while much of the benefit of success falls to follower firms (second movers) constitutes a market failure, and this potentially provides a space for public policy.

One possible direct mechanism to encourage the spread of frontier technologies into new products and markets would be a “challenge fund”, which would support firms to use their mining-related technological capacities in this way. The fund would meet part of the costs incurred by the firm. Qualifying items would be public goods such as training and infrastructure. Applications for support should be judged on competitiveness and by an arm's-length group composed principally of business people with industry knowledge. Such a fund could signal to firms the government's commitment to enhance new product and market development.

5.8 CONCLUSIONS

The case studies convey an important message for any African country interested in developing linkage industries: policies such as local content measures can be successful in increasing the breadth of backward linkages—the range of goods and services sourced locally by mining and oil companies. However, to increase the depth of such linkages—the value added of local activities—measures are

When backward and forward linkages have been developed successfully, government effort is required to maintain the international competitiveness of local industries.

essential to target skills development, technological capabilities, access to capital and so forth. Buyer–supplier cooperation is also critical at every stage of the value chain.

The same holds for forward linkage policies, such as export taxes or incentives to processing industries. These need to be supported by complementary policies targeting competencies of processing industries and of local suppliers.

If governments wish to embed linkages by promoting domestic ownership of the targeted supply or processing firm, the focus of policy should still be on increasing local value-added activities, as these have the most potential to create positive spillovers and to build firms' competencies in new areas.

When backward and forward linkages have been developed successfully, government effort is required to maintain the international competitiveness of local industries. Local upgrading is a continuous process. Industrial policies, ideally coordinated with other sectoral policies, should identify competitiveness bottlenecks in the local value chain, and address them.

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NOTES

¹ Qualifying Industrial Zones are designated geographical areas in Egypt that enjoy duty-free status with the US. Companies in such zones are granted quota- and duty-free access to the US, provided that they satisfy predefined rules of origin, that is, 35 per cent of the commodity is manufactured in a qualifying zone, and a minimum of 10.5 per cent of the product is from Israeli inputs.

² Clothing exports from Egypt to the US through the Qualifying Industrial Zone increased from \$288.3 million in 2005 to \$924.1 million by December 2011.

³ Such as Walmart Ethical Standard, Kohl's Terms of Engagement, Target Standard for Vendor Engagement, SEARS Code of Vendor Conduct and the Disney Code of Conduct for Manufacturers.

⁴ In which cotton lint is transformed into fabrics.

⁵ "Ethiopian Leather," Light Years IP, retrieved from www.lightyearsip.net/scopingstudy/ethiopian_leather.aspx (accessed 15 November 2012).

⁶ Including Chambishi Copper Smelter, acid plants, as well as a copper semi-fabricates manufacturing plant.

⁷ The International Finance Corporation Suppliers' Development Programme was relatively well observed.

⁸ The country also commercially exploits diamonds, manganese, bauxite and aluminium.

⁹ These activities often also include financial and business services.

