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Natural resources, structural change, and industrial development

Local content in Zambia—a faltering experience?

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Abstract: This paper traces the role of local content in Zambia's mining sector in supporting industrialization and economic diversification. It assesses productive linkages and manufacturing competitiveness during import-substitution industrialization and post-1991 liberalization and privatization, and the adequacy of the current policy environment. Despite diminished productivity and export competitiveness during import-substitution industrialization, that era was successful in terms of domestic manufacture of mining goods. Privatization and liberalization stymied local content capabilities, retarding industrialization and economic diversification. Post-2000 policies emphasize local content development and export competitiveness. Their success, however, depends on addressing continuing weaknesses in the regulatory environment; human and technological capital; endogenous entrepreneurship; and the macroeconomic environment.

Keywords: industrialization, local content, linkages, productivity, mining, manufacturing

JEL classification: L5, L6, O2, O3, O4

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1 Introduction

At independence in 1964, Zambia inherited an economy driven by copper mining. This has not changed despite post-independence policies to industrialize and diversify the economy. Copper mining continues to dominate the economy, accounting for over 70 per cent of the country's foreign exchange earnings. Between 2006 and 2015, the total contribution of mining to the gross domestic product (GDP) averaged 12.9 per cent, with a high of 14.6 per cent in 2014. Its contribution to GDP is second only to that of services, the fastest-growing sector in the economy over the same period. The mining sector is also a significant employer, providing direct employment to 82,725 people in 2014 (GRZ 2017).

To counter the dominance and vicissitudes of commodity dependence, Zambia began to build its industrial sector shortly after independence. Both the initial and subsequent development plans prioritized agriculture and manufacturing as growth poles for industrialization and economic diversification. In 1965, manufacturing value added (MVA) contributed about 7 per cent to GDP. Over the period 2011–15, the MVA contribution to GDP averaged 7.5 per cent, indicating stagnation in real manufacturing output over time. In contrast, between 2004 and 2013 the Zambian economy grew at an average of 7.7 per cent, spurred by high levels of investment in the mining industry. These occurred on the back of high copper prices that persisted during the period. Yet according to the 2016 'Human Development Report', the incidence and depth of multidimensional poverty increased between 2006 and 2010 (UNDP 2016: xviii). It hence appears that the conversion rate from high economic growth rates to welfare gains to the poor has not been sufficient.

The dominance of copper mining in the economy makes it a good choice to drive industrialization and local content (LC) growth. Estimates of input goods and services are reported to be as high as US\$5 billion annually (Fessehaie et al. 2015: 55). The share of domestic firms in the mining market is less than 4 per cent, while that of indigenous firms is about 1 per cent (Fessehaie et al. 2015; UNDP 2016). It is hence clear that localizing a significant portion of the supply chain, through manufacturing linkages, would not only contribute to industrialization and economic diversification; it would support greater welfare gains through increased employment and wealth redistribution.

This paper reviews the state of LC in Zambia through the lens of the country's efforts at industrialization and economic diversification. Section 2 provides a short review of the literature on LC and industrialization, particularly focusing on production linkages and their key drivers. Section 3 traces the evolution of LC in Zambia, framed within the context of its industrial policies to diversify the economy since independence. Section 4 evaluates the current policy and legislation environment and its alignment to LC development and industrialization. Section 5 summarizes the structural impediments that have hobbled LC development and industrialization, while Section 6 provides policy suggestions to address the challenges observed.

2 LC and industrialization: a brief review

2.1 What constitutes LC?

The term 'local content' commonly refers to domestic purchases of goods and services, and/or the employment of nationals in an extractive operation. However, LC is often extended to local

workforce or supplier development or the provision of infrastructure and services to communities around a mining operation. Thus 'local' can refer to the spatial spread of benefits in the vicinity of a project, in a district or national economy, or even in a regional economy. When applied to the supply of goods and services, 'local' can also have ownership connotations. The benefits to the national economy depend on the ownership of the 'local' firm. This is illustrated in Figure 1, which posits that the highest economic value added is created when the supplier firm is a locally owned and operated manufacturer, sourcing its inputs locally. Conversely, the lowest value added arises from a foreign-owned importer and distributor.

Figure 1: Classification of local supplier firms of goods and services



Source: Author's illustration, adapted from AfDB and BMGF (2014: 11).

For the above reasons, some countries consider that LC is fully met when goods or services are provided by firms that are owned or controlled by domestic capital (OECD 2017). These broad definitions of LC extend its scope to linkages with other economic sectors (AfDB 2016: 7; OECD 2017: 7; Tordo et al 2013: 1). They are particularly favoured by developing countries, keen to extract the greatest economic and social benefits from exhaustible resources. Typically, extractive projects create few domestic linkages in these countries (UNCTAD 2007: 140).

How well LC supports industrialization and economic transformation depends on the policy space. For this reason, LC tends to also be defined in terms of its long-term policy objectives. These commonly include technology transfer; research and development (R & D) to improve innovation and national competitiveness; and downstream value addition to deepen the natural resources value chain (AfDB and BMGF 2014; OECD 2017; Tordo et al. 2013).

2.2 LC, economic linkages, industrialization, and structural change

The extent to which an extractive operation generates linkages with other economic sectors is a fundamental aspect of LC. The principal commercial linkages are the upstream (backward) links, which connect the extractive operation to its suppliers of goods and services, and the downstream (forward) links, which process the operation's output into intermediate manufactures and final products. These linkages are commonly termed production or industrial linkages. They involve

flows of information and/or materials between two or more industrial sectors or firms, and are based on the notion of value added to raw materials or intermediate semi-manufactures (Braunerhjelm 2010; Kragelund 2017; OECD, UNCTAD, and WTO 2013).

Morris et al. (2011: 8) make an important distinction between the breadth and depth of linkages. The upstream breadth refers to the share of inputs that is acquired locally, while on the downstream side, breadth represents the proportion of production processed by local firms. The depth, on the other hand, is the extent of domestic value added to locally acquired inputs upstream or locally processed outputs downstream. By and large, the breadth and depth of linkages determine the strength of capital-formation structures, and the degree of industrial development and economic diversification. LC is therefore a key driver of industrialization and, through inter-firm production linkages, enables product specialization and a division of labour. This boosts productivity and competitiveness due to efficiencies in factor allocation.

The literature abounds with empirical evidence linking aggregate factor productivity to economic growth. Bartelme and Gorodnichenko (2015) use an input-output approach to quantitatively analyse the empirical relationship between linkages and their aggregate productivity. Their results show that the strength of linkages, measured as the average output multiplier across industries and/or sectors, strongly determines total factor productivity. Their work confirms the importance of specialization and factor allocation efficiency in economic growth and development.

Production linkages are in effect manufacturing associations. Manufacturing is hence a key driver of aggregate growth and industrialization (Hernesniemi et al. 1996; Karmiloff 1989) and an increase in its share directly raises growth. Tyler (1980) provides empirical evidence that the competitive manufacture of goods for domestic consumption, but more so for export, correlates with economic growth and industrialization. For a sample of 55 middle-income countries,¹ he found a strong correlation between GDP and growth in manufacturing output and exports. Manufacturing takes place at firm level. Newman et al. (2017) explore the empirical relationship between export performance and productivity at firm level using panel data from Vietnam. They find strong evidence that productive firms self-select into export markets and that export performance is associated with increased firm-level productivity. These effects are cumulative over time, with productivity gains arising from years of exporting experience. They conclude that firms actually learn by exporting, and that the extent of learning is related to their capacity to adapt and change in order to benefit from export possibilities in liberalized markets.

2.3 The importance of technological change and entrepreneurship

While classical economics emphasizes the importance of investment and capital accumulation in economic growth, neoclassical economists postulate that innovation and entrepreneurship are more critical to transforming factors into increased economic output. This has led to the so-called new growth theory, whose central argument is that technological advances and innovation are more critical to boosting productivity than improvements in capital stock (Colander 2017; Hernesniemi et al. 1996; Porter 1990). Technological change is further postulated to create significant spillover effects, thus providing other economic sectors with new ways of improving productivity. These spillovers are important to structural transformation and industrialization.

There exists a strong body of empirical evidence linking technological innovation to manufacturing and industrialization. Examples include several studies undertaken under the Learning to Compete (L2C) project which confirm the importance of investing in R & D and innovation to boost

¹ Defined as having a GDP per capita of US\$300 or less in 1977 dollars.

within-firm productivity and improved manufacturing export competitiveness (Mattoussi and Ayadi 2017; Newman et al. 2017). Demonstrative evidence indicates that the quality of R & D in sciences and engineering provides the greatest source of innovation. Similarly empirical evidence from OECD countries indicates that increased entrepreneurship, as measured by business ownership rates, is associated with higher rates of employment growth (Braunerhjelm 2010). These insights suggest that while technological innovation creates new knowledge, innovative entrepreneurship is the main link between knowledge, commercialization, and output growth. They are highly relevant to African countries, such as Zambia, where R & D, innovation, and endogenous entrepreneurship are seriously constrained.

2.4 Global and regional value chains and LC

Global value chains (GVCs) are production networks typically coordinated by multinational enterprises (MNEs). GVCs have become a key feature of production, accounting for about 84 per cent of international production networks and over a quarter of global GDP (UNCTAD 2017). Some 90,000 MNEs have a combined total of US\$27 trillion in foreign direct investment (FDI) stock in nearly 1 million foreign affiliates worldwide. Fundamentally, GVCs exploit differences in factor productivity across countries, creating manufacturing value added to raw materials or intermediate feedstock. The competitiveness of the final product is dependent on aggregate productivity across the production networks and the value added at each stage of production.

GVC growth has been rapid, facilitated by technological advances in transport and information and communication technologies which have reduced trade costs. Whereas in many G20 countries the domestic content in gross exports decreased between 1995 and 2009, the income derived from exports of value added by GVCs increased by 106 per cent during the same period (OECD, UNCTAD, and WTO 2013: 12). This increase was more pronounced in emerging economies, particularly the BRIC economies (Brazil, Russia, India, and China). Domestic value added derived from foreign final demand increased in China by 600 per cent, in India by 500 per cent, and in Brazil by nearly 300 per cent. To the contrary, Africa's share in GVCs has remained limited.

Although GVCs are coordinated by MNEs, empirical evidence suggests a substantial contribution to aggregate innovation and production by small entrepreneurial firms (Braunerhjelm 2010; UNCTAD 2010). In Sweden, once a natural-resources-driven country but now a major mining equipment and machinery manufacturer, one-third of patented applications in manufacturing emanate from small businesses of less than 25 employees. Significantly, a substantial proportion of patenting small firms have links to a Swedish MNE (Braunerhjelm 2010). This underscores the significant role innovative small and medium-sized enterprises (SMEs) play in GVCs, and highlights the need for Least Developed Country (LDC) government and firm strategies that embrace GVCs as a means of upgrading production.

The regional milieu offers GVCs opportunities for spatial agglomeration. These include enterprise clustering and developing manufacturing linkages; sharing of business development services; and access to knowledge and skills (Braunerhjelm 2010; Pietrobelli and Rabellotti 2010; UNCTAD 2010). Several studies undertaken by the United Nations Economic Commission for Africa (UNECA) argue that South Africa's superior knowledge-creation institutions, and research institutes in mining, represent a growth opportunity for southern Africa, which is essentially a mining economy (UNECA 1997). It is hence unsurprising that South Africa has several GVCs operating in the Zambian mining industry.

3 The evolution of LC in Zambia

3.1 LC, manufacturing, and industrialization in Zambia: a historical perspective

LC and import-substitution industrialization, 1964–91

At independence in 1964, Zambia inherited a mono-economy dominated by copper mining. This accounted for about 50 per cent of GDP and 95 per cent of export revenues. Manufacturing value added contributed only 6.9 per cent to GDP (UNDP 2016). It is therefore unsurprising that diversifying the economy dominated the country's initial development plans.² The cornerstone of these plans was an import-substitution industrialization strategy (ISI) targeting the manufacture of intermediate and consumer goods; the development of linkages in the economy; and the production of a surplus for exports (Karmiloff 1989; UNDP 2016). Broadly viewed, ISI was in effect an LC development strategy.

ISI swiftly gained traction during the first decade (1964–74), aided by the nationalization of productive assets and buoyant commodity prices. Nationalization included the acquisition of majority (51 per cent) shares in Roan Copper Mines and Nchanga Consolidated Copper Mines, the two main mining assets, and their merger in 1983 to form Zambia Consolidated Copper Mines (ZCCM). The chief reason for nationalization was to assert control over a private-sector-driven economy in which capital accumulation was foreign-controlled, profit repatriation deemed excessive, human resources development limited, and investment in production selective (Kaunga 1993).

Manufacturing value added grew rapidly at 13 per cent per year in constant 1970 prices (Karmiloff 1989) and by 1980, state participation in manufacturing GDP and employment had risen to 56 per cent and 54 per cent respectively (Kaunga 1993: 4–5). The bulk of import substitution, and state participation, occurred in the consumer goods subsectors of food, beverages, textiles, and tobacco, which by 1970 accounted for 60 per cent of total manufacturing output. These are generally the soft subsectors of manufacturing, with low technological barriers (Morris et al. 2012). The larger rates of growth, however, occurred in chemicals, plastics and rubber, and metal products—subsectors of direct relevance to LC. Together these subsectors accounted for about 40 per cent of total manufacturing output and had the larger share of private sector firms, particularly in basic metal and metal fabrication (Karmiloff 1989: 6).

The high growth rates in the subsectors of rubber products, chemicals, non-metallic minerals and metals, and machinery was a boon for LC growth in the mining industry. Zambia swiftly established comprehensive manufacturing facilities for mining inputs in these subsectors. Rubber products included rubber linings, seals and couplings, tyres, and V-belts. Metallic products included wear-resistant crusher parts, mill balls, valve components, wire ropes, roof bolts, rock drills, rock drill steels, conveyor idlers and pulleys, pumps, and valves; while the chemical side included explosives, fuses, and detonators.

Downstream of the copper value chain, manufactured products included copper rod, electric cables, and transformers. From a side-stream viewpoint, engineering facilities for the manufacture of components mushroomed. They included foundry, machine, and fabrication workshops. However, the facilities were typically low-end and suffered from a lack of in-house engineering

² These were the Transition Development Plan (1964–66) and the First National Development Plan (1966–71).

expertise. This, coupled with limited imports of specialty steels, led to poor operating practice and invariably uncompetitive poor-quality products.

From a skills viewpoint, a comprehensive study by UNECA found that Zambia had well-established education and training facilities at degree, technician, and artisan levels (UNECA 1996). However, there were skill deficits especially in specialized areas such as engineering, mine and mineral process design, project engineering, ore estimation, and operations research. Regulatory-level skills, including in policy design, mine safety, and environmental management, were also qualitatively and quantitatively deficient. These weaknesses were partly attributed to a lack of industry participation in skills development and knowledge generation, and to poor funding of universities and technical and vocational training facilities by government (UNECA 1996).

ISI had a number of structural deficiencies (described in Section 5) and by the mid-1970s, the strategy struggled as industrial production declined. A rapid fall in world copper prices led to a dramatic decline in Zambia's economic fortunes, and ISI was abandoned altogether in 1991 with the change in government. Nevertheless, the period is generally described in the literature as the most successful of Zambia's attempts at LC growth and industrialization (AfDB 2017; Karmiloff 1989; UNDP 2016).

LC, market liberalization, and privatization, 1991–present

The new government refocused policy on macroeconomic stabilization and economic liberalization as the main catalysts for re-igniting industrial growth. The main aim of the measures was to remove any structural distortions and inefficiencies created by the ISI policy and improve competitiveness in the manufacturing sector. Restrictions on imports and exports were eliminated, tariffs decreased, and most foreign exchange controls removed. However, exports, rather than increasing, declined on the back of weak commodity prices and a depreciation in the exchange rate. The import-intensive heavy manufacturing industries that supported LC further weakened and, by 2000, total manufacturing value added had fallen to about 10 per cent of GDP from about 25 per cent in 1991. The unintended consequence of liberalization was a collapse of manufacturing (UNDP 2016).

This led to a shift in policy in 2001 towards export-oriented industrialization and improving beneficiation in the copper value chain. This policy has been accompanied by the introduction of Multi-Facility Economic Zones (MFEZ). These aim to support the emergence of clusters of firms that benefit from spatial proximity to grow various industrial processes, from primary to tertiary processing. There are several MFEZs at present. The Chambishi MFEZ reportedly focuses mainly on the copper supply chain, and houses both heavy and light industries, including copper smelting; manufacture of copper wire and cables; household appliances such as stoves; motor parts; and agro-processing (UNDP 2016: 22). However these products probably require verification: an assessment done for this paper suggests that the list might be exaggerated. The new Kafue Iron and Steel MFEZ is being designed around the Integrated Kafue Iron and Steel plant and is expected to focus on engineering, machinery, and equipment manufacture for economic sectors including mining, agriculture, manufacturing, construction, chemical, and infrastructure development.

Privatization stymied LC development and the manufacturing sector

Privatization of the mining industry from the early 2000s hastened the collapse of a struggling manufacturing sector. At the time, Zambia was in a very weak bargaining position given its heavy indebtedness to the Bretton Woods institutions, and it inadvertently made over-generous concessions through the Development Agreements (DAs) signed with individual mining

companies (Simpasa et al. 2013). These included imports of capital equipment free of customs and excise duty; capital write-off of any expenditure on imports of plant and machinery and a reduction in corporate tax through such imports; and carry-forward losses that limited tax payments until profitability was regained.

These provisions are commonly cited as a major source of tax leakages (Tordo et al. 2013). They provide cost-accounting opportunities to legally circumvent tax payments through aggressive capital recovery, and asset creation to redeem costs that might constitute normal business losses. Generally, cost- and production-reporting continue to raise concerns in the industry (ICMM 2014); according to PricewaterhouseCoopers, ‘cost reporting requires increased consistency and transparency across the industry’ (PwC 2013: 42). Other than being a potential source of tax leakages, these provisions have had the effect of rewarding mine owners for importing their inputs rather than sourcing goods from domestic manufacturers. The legal provisions do not oblige mine owners to purchase inputs locally and there are no preferences for Zambian suppliers. These factors have led to reversals in LC growth from the ISI era.

Despite the above weaknesses, forward linkages persist within the copper value chain. Copper is mostly exported in smelted and refined forms, representing a number of value-added stages beyond mining. Traditionally, downstream processing of refined copper into rods and wire was exclusively undertaken by one company. However, with the large Chinese investment in the Chambishi MFEZ, forward linkages are reported to have deepened with expansion in exports of semi-fabricates (Morris et al. 2011; UNDP 2016). Available information is, however, patchy, suggesting the need for a more thorough survey to establish the current state of linkages.

3.2 Current LC initiatives

Current LC initiatives in Zambia include a collaborative public–private initiative, the Zambia Mining Local Content Initiative (ZMLCI), funded by the World Bank and the International Finance Corporation. This operates under the joint leadership of the Chamber of Mines (CoM) and the Zambia Association of Manufacturers (ZAM). It seeks to enhance local content and use of locally manufactured inputs in the Zambian mining industry. The (UK) Department for International Development-funded Private Enterprise Programme (PEP-Zambia) seeks to create sustainable business partnerships between Zambian SMEs and large corporations and offers business development services for small businesses. This programme also runs business plan competitions to promote endogenous entrepreneurship (AfDB 2017). These programmes are ongoing and it is probably premature to gauge their success.

Individual mining firms maintain their own LC initiatives in addition to providing employment estimated at 82,725 people in 2014 (GRZ 2017). While these numbers are large, they represent less than 2 per cent of the labour force for a sector that contributed 12.9 per cent to GDP in 2015 (UNDP 2016). This underscores the capital intensity of the industry. Non-employment-industry LC initiatives include running supplier development programmes, providing support to trades training institutes, and investing in infrastructure and community development programmes. KCM, for example, has a Local Economic Development Strategy which includes a vendor development programme in which it has identified a range of products for possible local sourcing. The company also runs the Kitwe Trades Training Institute. Mopani provides training for SMEs through workshops and employs dedicated staff to help SMEs with tender procedures. Mopani also provides support to the Kitwe Trades Training Institute. FQM has a supplier development programme providing training in tendering and cost estimations. It also provides financial and teaching support to the Solwezi Trade Training Institute. Due to the remoteness of its operations, FQM has also invested heavily in extensions to the electricity grid, construction of the airport at Solwezi, and road maintenance in North Western Province (AfDB 2017).

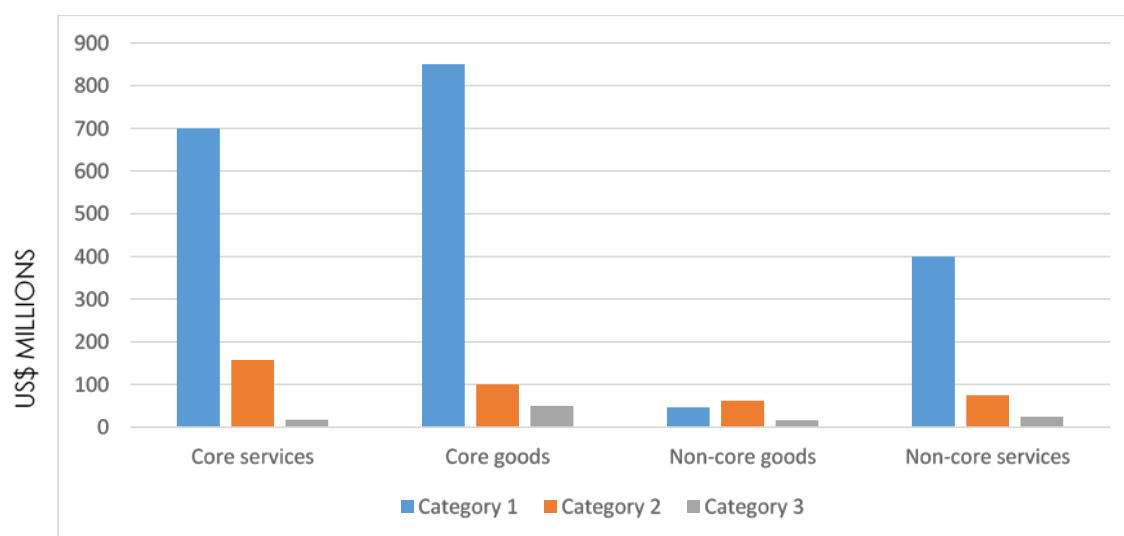
While industry itself views as considerable its contribution to LC growth and Zambia's industrial development (ICMM 2014), various reports and field surveys suggest that stakeholders, including government, view these efforts as ad hoc and insufficient (AfDB 2017). There is widespread scepticism about the value of industry supplier development programmes, with stakeholders suggesting regular audits of their effectiveness and sustainability, as well as their alignment to public policy on industrialization. Judged by the low value of local suppliers participating in the mining supply chain (see next section), these sentiments appear justified.

3.3 LC, supply chains, and domestic supplier firms

Figures vary for the supply of goods and services to the Zambian mining industry. A study prepared for the ZMLCI in 2012 estimated local sourcing at approximately US\$2.5 billion per year, while later ZMLCI stakeholder consultations in 2014 raised this estimate to about US\$5 billion (Fessehaie et al. 2015). The ZMLCI study categorized expenditure into **core mining services** (drilling services, underground development, instrumentation services, contract mining, etc.); **core input goods** (explosives, mill balls and rods, chemicals, plant spares, etc.), **non-core services** (security, catering, customs handling, cleaning, transportation, etc.); and **non-core goods** (safety and office equipment, stationary, nuts and bolts, light fittings, etc.). That study, and others (ILO 2014; Morris et al. 2011), generally distinguish three types of suppliers of goods and services. Category 1 comprises international suppliers, mainly subsidiaries of overseas equipment manufacturers (OEMs), large distributors, and representatives of GVCs that have a local presence. They have no manufacturing facilities and hence create little domestic value added. Category 2 comprises international suppliers with no local presence, while Category 3 consists mostly of indigenous traders, commonly referred to as 'briefcase businessmen' (Morris et al. 2011: 54), and a number of small manufacturing firms producing a range of mining inputs. The inputs include metallurgical plastics and rubber products, engineering products, and paints. This group also includes the domestic manufacture of packaged explosives and explosive accessories; timber for underground support systems; and agricultural lime and quicklime.

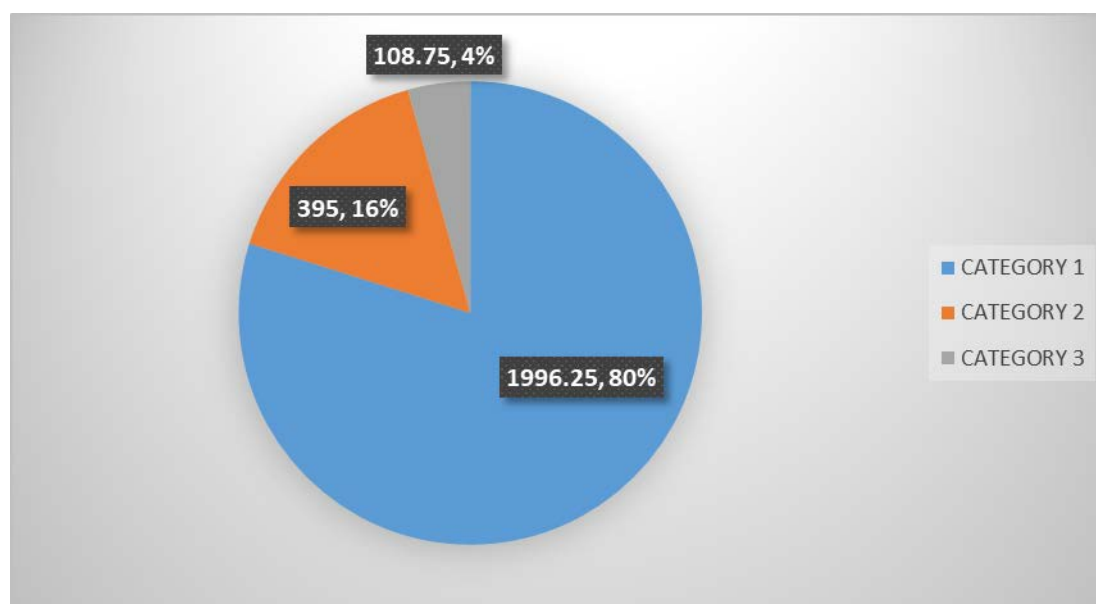
Figure 2 summarizes the distribution of expenditure among the three categories of suppliers in the four expenditure classes, based on the lower amount of US\$2.5 billion per year. The figure indicates that foreign suppliers, with or without a presence in Zambia (i.e. Categories 1 and 2), dominate all classes of goods and services supplied to the mines. Percentage-wise, they account for 98 per cent of core services, 95 per cent of core goods, 87 per cent of non-core goods, and 95 per cent of all non-core services provided. Aggregately, Figure 3 shows that the foreign suppliers account for 96 per cent of goods and services procured by the mines, while domestic manufacturers and traders share 4 per cent. The 4 per cent includes resident multinational manufacturing companies (e.g. in explosives, cement, drill steels, etc.), and resident haulage companies. Indigenous Zambian suppliers of goods and services are estimated at about 1 per cent and are mostly found in simple non-core services, such as catering, security service, and office maintenance. The conclusion is hence manifest that the industry supplier development programmes at firm level have not succeeded in upgrading Zambian indigenous suppliers to provide core goods and services.

Figure 2: Market share of goods and services by supplier origin (US\$ millions)



Source: Author's illustration based on ZMLCI data (Fessehaie et al. 2015: 53).

Figure 3: Estimated composition of Zambia's mining procurement expenditure, 2012 (US\$ millions and %)



Source: Author's illustration based on ZMLCI data (Fessehaie et al. 2015: 53).

Yet the small domestic input manufacturers hold the greatest potential for generating domestic MVA and growing LC. However, their capabilities are limited by a range of weaknesses. These include a lack of access to long-term capital; inability to access engineering design expertise and production technologies; high costs of production inputs; and low-level facilities that lack full quality control of production.

The above weaknesses result in poor-quality goods that do not meet industry standards. Structured support is required to grow the capabilities of this group for a predetermined set of low-entry core goods and services. This could include margins of preference; incentives for imports of raw materials and equipment; technical mentorship; and access to technology and structured finance. Mentorships have proved particularly useful in South Africa and are part of global best practice (see Genesis Analytics 2014: 15–20).

4 The policy and legislative space for LC

Zambia's long-term development context is guided by Vision 2030. Adopted in 2006, the Vision foresees the country attaining the status of a '**prosperous middle-income nation by 2030**' (GRZ 2006). By that date, Zambia's economy is envisaged to be well diversified with a strong industrial sector, a modern agricultural sector, and an efficient services sector. It is further envisaged to be technologically proficient, fully able to adapt, innovate, and invest using its human and natural resources. From an LC viewpoint, the economy is envisioned to have strong cohesive industrial linkages in the primary, secondary, and tertiary sectors, supported by sound and well-maintained socio-economic infrastructure (GRZ 2006). These attributes are a good basis for LC growth.

The Vision is broken down into a series of sectoral sub-visions and targets for development. Some of the key sectors that impact on LC development are shown in Table 1. Vision 2030 is implemented through five-year national development plans (NDPs). The current plan, the Seventh National Development Plan (7th NDP), seeks greater responsiveness and alignment to Vision 2030 (GRZ 2017). It sees the sources of accelerated economic growth and industrialization as: a full exploitation of Zambia's comparative resource endowments; a strong export-oriented manufacturing and industrial base with solid backward and forward linkages; improved productivity through greater human capital development and technological innovation; and graduating micro and small to medium-scale enterprises.

The Plan sees mining as a source of value-added intermediate inputs for manufacturing and other economic sectors, increased productivity, and export competitiveness. It forms a good base for industrialization and LC growth. However, visions and development plans are actualized through policies and legislative and other regulatory provisions. An excellent review of how well the policy and legislative environment supports industrialization and LC growth has recently been undertaken by the African Development Bank (AfDB 2017). The main findings of the review are that a number of sectoral policies are supportive of Vision 2030. However, subordinate pieces of legislation are generally aligned neither to the Vision nor to the policies they claim to implement.

Table 1: Visions and goals of certain economic and social sectors relevant to LC development

Sector	Vision	Targets/goal
Mining	Private-sector-led mineral resource exploration and exploitation that contributes to sustainable socio-economic development by 2030.	Increase in share of mineral output used in industrial production to 30% by 2030.
Manufacturing	Technology-based and export-focused manufacturing sector that adds value to abundant natural resources by 2030.	Increase in share of general manufacturing contribution to GDP to 36% by 2030; increase in manufactures exports as a share of merchandise exports to 71% by 2030.
Infrastructure	A well-developed and -maintained socio-economic infrastructure by 2030.	Develop and implement public–private partnerships; achieve affordable and efficient connectivity.
Energy	Universal access to clean, reliable, and affordable energy at the lowest total economic, financial, social, and environmental cost by 2030.	Abundant and reliable supply of affordable energy; export-led energy industry.
Science and Technology	A nation in which science, technology, and innovation are the driving forces in national development, and which competes globally by 2030.	Build and sustain human resource capacities and capabilities by 2030; strengthen linkages between productive sectors and research institutions in the economy by 2030.
Employment and Labour	Sustained full employment by 2030.	Have an efficient and effective labour market information system in place.
Education and skills development	Innovative and productive lifelong education and training for all by 2030.	Comprehensive and diversified curricula responsive to social and economic needs; increase university and skills training output by 2% per annum.

Source: Author's illustration based on AfDB (2017: 24).

A good example of misalignment is that which exists between the 2013 Mineral Resources Development Policy and the 2015 Mines and Minerals Development Act, both under current implementation. The Policy emphasizes improved downstream processing to create export goods; forming linkages with other economic sectors; enhancing the acquisition of relevant skills; and raising levels of R & D and innovation. These principles are absent in the Act, which serves more as a licensing than an industrialization tool. Metrics for increasing LC are inadequate, while the use of incentives, taxes, and tariffs—all common tools for deepening linkages in the mineral value chain—has been counterproductive to LC development, as earlier outlined.

Similarly, the Employment and Labour Market Policy seeks to develop ‘an efficient and effective labour market in order to enhance productivity in the economy’ and to ‘resort to foreign labour only in those fields still lacking adequate qualified human resources’ (GRZ 2004: 6). The Policy further aims to create relevant skills for the labour market, especially in generating value added. However, there are no triggers for these elements in the Employment Act, which contains no provisions preferencing the employment and training of nationals, or limiting the employment of expatriate staff (AfDB 2017).

The Industrial Policy, adopted by Cabinet in 2018, envisions ‘an industrialised and competitive nation with a diversified, innovative and globally competitive industrial base, which contributes to sustainable growth and employment creation by 2027’ (GRZ 2018: 14). The Policy aims to address weaknesses of low productivity; lack of export competitiveness; unclear incentive packages for LC growth; limited beneficiation; and restricted access to affordable long-term investment finance.

Two of the main pieces of legislation subordinate to the Industrial Policy are the Zambia Development Agency (ZDA) Act³ and the Citizens Economic Empowerment (CEE) Act. These Acts are aligned to Vision 2030 and are consistent with LC growth and the 7th NDP. The ZDA Act, for example, targets SME growth; increased R & D and innovation; and improved industrial productivity and export competitiveness. Similarly, the CEE Act requires all companies and state institutions to ensure the broad representation of qualified citizens in all occupational categories; and companies to prepare and implement employment equity plans with numerical targets. The Act empowers the Commission to determine thresholds to be prescribed for the participation of targeted citizens, citizen-empowered companies, and citizen-influenced companies in tenders for the procurement of goods and services. Both the ZDA Act and the CEE Act are, however, poorly implemented on account of persistent budget deficits.

Kragelund (2017) refers to the influence of other policies and legislation as contextual factors whose cohesion is necessary for successful LC initiatives. The above examples and field survey findings (AfDB 2017) suggest fragmentation and incoherence across policies and acts in relation to industrialization and LC growth. These contextual factors need to be fixed for LC and industrialization to succeed.

5 LC and industrialization: the structural impediments

Earlier analysis shows that industrialization, the growth of LC, and structural transformation are principally determined by the quality of production linkages, whose drivers are:

- a. efficiency of factor allocation, and the productivity of firms participating in LC linkages;
- b. investment and capital accumulation, especially in infrastructure;
- c. quality of skills and endogenous entrepreneurship;
- d. technological change, the rate of innovation, and spillover effects; and
- e. a supportive policy and institutional environment.

These elements provide context for the analysis of the structural impediments to LC development and industrialization that follows.

Morris et al. (2012) frame the story of industrialization in most sub-Saharan African (SSA) countries as dirigiste import-substitution policies (which initially built domestic industrial capabilities, albeit of low productivity and internationally uncompetitive), followed by structural adjustment policies (which generally eroded many of the industrial capabilities of the preceding era), and, more recently, the promise that SSA economies can emulate the export-oriented success of some East Asian economies (Morris et al. 2012: v). This certainly appears to be the case for Zambia.

5.1 ISI: a defective industrialization and LC agenda?

To recap, ISI aimed to develop manufacturing linkages for intermediate and consumer goods and to grow exports. While the policy initially succeeded in creating a burgeoning manufacturing sector, there were structural distortions in the production linkages that emerged. Firstly, there were inefficiencies in factor allocation. ISI was more successful in the consumer goods subsectors of food, beverages, textiles, and tobacco. These subsectors increased domestic backward linkages, as

³ Under revision at the time of writing.

evidenced by the decline in the share of manufactured imports in total consumption from 66 per cent in 1965 to 46 per cent in 1972 (Karmiloff 1989: 12). However, from the viewpoint of substituting for imported mining input goods, these subsectors were inconsequential. The subsectors of rubber products, chemicals, non-metallic minerals and metals, and machinery were of greater consequence to substituting imported mining input goods. These capital-intensive subsectors absorbed over 70 per cent of investment during the decade 1964–74, and no less than 45 per cent of all new investment during the period 1975–85. Yet they had poor backward linkages into intermediate goods and a high import dependence. There was no investment made in the manufacture of domestic intermediate goods to offset the high import dependency.

ISI was also characterized by distortions in factor productivity. Driven by the large initial investments in chemicals, rubber, and plastics, assets per worker in these subsectors rose dramatically by about 75 per cent in the first decade. However, despite initial upward blips, total factor productivity (TFP)⁴ and MVA both declined dramatically over the period 1965–80. The largest decline occurred in base metals, reflecting the low capital productivity of the mining industry, starved of capital reinvestment. More generally, there were large deteriorations in output-to-capital ratios in industrial chemicals and plastics, as firms directly dependent on the mining industry struggled to cope with shortages of the capital required to keep plants operational (Karmiloff 1987: 19).

The productivity distortions of ISI should be understood in the context of the economic challenges of the time. A global recession and a slump in copper prices in the 1970s sent the copper industry into a spiral of falling export revenues and diminishing production volumes. Zambia's economic growth as a whole floundered (UNDP 2016). Table 2 indicates that by 1985, GDP growth had declined to –0.3 per cent, largely due to ballooning consumption and to shrinking copper exports and gross domestic investment (Karmiloff 1987: 5). ISI growth in manufacturing hence took place in the context of stagnating aggregate output, crippled by low capacity utilization in the mining industry itself and in the import-intensive subsectors that supported it.

Table 2: Growth and structure of GDP, 1960–85

Average real growth of GDP, %	1960–70	1970–80	1980–85
	8.3	1.0	–0.3
<i>Sources of GDP</i>	1970	1980	1985
Government consumption	16	26	23
Private consumption	39	55	62
Gross domestic investment	28	23	14
Exports less imports	17	–4	–3
<i>Sectoral contribution</i>			
Agriculture	11	14	15
Manufacturing	10	19	21
Mining, quarrying, public utilities	37	33	15
Wholesale and retail trade	10	12	13
Transport and communications	4	6	5
Other services including government	20	27	28

Source: Author's illustration based on Karmiloff (1985: 5).

The manufacture of mining inputs requires a range of skills and technological capabilities (Morris et al. 2012). There was a lack of technological skills and expertise especially in engineering

⁴ Combining capital and labour inputs.

subsectors including high-end foundry, fabrication, and machining facilities (AfDB 2017). The absence of an iron and steel industry during the ISI era is cited as the single most constraining factor due to limitations in imports of various steels for the engineering subsector. The decline in TFP, in the face of expansion in capital assets, has been largely attributed to these weaknesses (AfDB 2017) and the difficulty in endogenous assimilation of technologies embodied in new capital equipment (Karmiloff 1987). Under these conditions, ISI led to a proliferation of poor and uncompetitive products, with exports of manufactures at less than 2 per cent of total exports per annum.

5.2 Post-1991 reforms: an elusive industrialization and LC agenda?

Market liberalization had the aim of improving factor allocation and productivity in order to stimulate the export competitiveness of the manufacturing sector. It also aimed to improve beneficiation in the copper value chain (UNDP 2016). ISI had similar objectives, hence these were not new goals. Table 3 shows growth in the real GDP and economic sectors over the period 1991–2015. GDP growth was high, particularly during the period 2006–10, on the back of significant FDI in the mining sector. From 2005 to 2014, FDI inflows averaged US\$1.2 billion annually, facilitated by exceptionally high copper prices during the period. These inflows made investment funds in commodities liberally available and greatly increased copper output to about 800,000 tons in 2017.

FDI inflows have unfortunately been disproportionately concentrated in the mining sector, with the five largest mining companies accounting for nearly 100 per cent of the inflows. This has crowded out investment in the manufacturing and agriculture sectors, perceived to be the main sources of diversification and industrialization (UNDP 2016). Table 3 shows that despite the post-2000 policy aim to build a strong manufacturing sector, the share of manufacturing in real GDP continually declined from an average of 25.3 per cent during 1991–95 to 7.5 per cent during 2010–15.

Table 3: Real GDP and sectoral growth over the period 1991–2015

Average % growth	1991–95	1996–2000	2001–05	2006–10	2011–15
Real GDP	-3.0	2.8	4.8	8.7	5.2
<i>Sectoral growth</i>					
Agriculture	4.9	-2.4	-1.4	7.4	9.1
Industry (mining, manufacturing, construction, and utilities)	4.1	0.6	12.1	12.3	2.9
Manufacturing	1.0	2.3	5.7	3.8	6.7
Services (wholesale and retail trade, transport, other)	-2.4	7.0	5.8	9.3	7.2
<i>Sectoral contribution, % of GDP</i>					
Agriculture	21.8	20.0	17.2	12.5	8.3
Industry	43.5	29.9	27.7	33.7	35.1
Manufacturing	25.3	12.5	10.9	9.3	7.5
Services	34.7	40.2	45.1	53.7	56.6

Source: Author's illustration, based on data calculated from Africa Information Highway (2018).

Of consequence in Table 3 is the dramatic rise in the share of services, which accounted for more than 56 per cent of GDP over the period 2011–15. This represents the meteoric rise in the wholesale and retail trade, mostly among South African chain stores, as well as the high transportation costs of a highly import-dependent economy. With the notable exception of the growth in services, there has been little structural diversification in Zambia's capital formation.

The technological formation of manufacturing continues to be narrow. A review in 2010 revealed that resource-based manufactures (mainly in the food, beverages, and tobacco subsectors) and low-tech manufactures (fabricated metal products) accounted for 87 per cent of manufacturing GDP (GRZ 2014; UNDP 2016). Only 13 per cent of total manufacturing output was medium- to high-tech manufactures, comprising mainly the chemical and machinery subsectors. The observed ISI structural weaknesses in areas crucial to industrialization and LC growth have hence persisted. Labour productivity has reportedly been declining partly due to weak physical capital, lack of access to technologies of production, and low levels of productive skills (GRZ 2014: 63). The unavailability of skilled labour has been more acute in the areas of chemicals, rubber, plastic, electrical machinery and equipment, and repair and installation of machinery—all vital areas for industrialization.

Endogenous entrepreneurship, important for growing domestic capabilities, has also continued to be weak. The *prima facie* view demonstrated by Figure 1 is that locally owned firms are more deeply embedded in the local economy and, crucially, are more committed to LC development than fleet-footed foreign-owned firms. In their seminal work, Morris et al. (2012) explore the impact of ownership of lead-commodity firms and their suppliers on the direction and pace of domestic linkage development in natural-resource-exporting African countries, including Zambia. They demonstrate that ownership origins matter in jurisdictions like Zambia where there is no local ownership in the lead-commodity firms and their suppliers. The Western owners, including South African mining firms, have typically adopted the ‘global-sourcing-follower-supply’ model of supply chain management. This requires first-tier suppliers to co-locate with the commodity producer. Hence, GVCs such as Caterpillar, Atlas Copco, and others have followed the mining firms into Zambia but have very limited links with the domestic supply chains. This explains their complete dominance in the supply chains demonstrated earlier.

On the other hand, the ‘going-out policy’⁵ has shaped the behaviour of Chinese mining firms. Backed by the strategic intent to command access to resources, Chinese investment in mining in Zambia has grown rapidly from the original acquisition of Chambishi Copper Mine by the China Non-Ferrous Metals Company. This investment has now expanded into an industrial park, the Zambia China Economic and Trade Cooperation Zone, hosting about 39 manufacturing enterprises that extend the Chinese mining value chain in Zambia. Chinese mining firms have focused less on outsourcing and have tended to internalize supplies. The locally based suppliers are increasingly Chinese-owned, not just with respect to technology-intensive inputs but also in relation to the provision of relatively simple inputs which can characteristically be supplied by domestic suppliers (Morris et al. 2012).

These issues underline the importance of distinguishing between localization, which is deepening domestic value added, and indigenization, which is increasing the share of national ownership in the linkages (Morris et al. 2012). While there has been some localization, albeit at a relatively minor level, there has been very little indigenous participation in LC development in Zambia in either the pre- or the post-privatization eras. Industrialization without growing endogenous entrepreneurship and domestic technological capabilities cannot be sustainable. There are no demonstrative precedents for this approach.

The policy and institutional environment for LC growth and natural-resources-led industrialization has continued to be weak. Zambia did not have an industrialization policy until 2018, and an LC policy is under development, presumably with an LC Act to follow. This should improve policy

⁵ This provides China with access to natural resources through the provision of preferential loans for infrastructure and social development in exchange for natural resources companies.

cohesion and alignment to the industrialization goals of Vision 2030. Institutionally, industrialization and LC development fall under the Ministry of Trade Commerce and Industry. However, responsibility for industrialization activities spans several ministries, as seen earlier. Co-ordination has proved to be a challenge. Other institutional factors that impede industrialization include the inadequate levels of quality infrastructure, particularly rail and energy (UNDP 2016), and the limited availability of long-term finance, which constrains the growth of SMEs. Also, business procedures remain cumbersome, while enterprises with market power commonly practice price discrimination. This applies, for example, to electricity, fuels, copper metal, cement, and water. Aggregately, these factors raise the costs of manufacturing inputs, thereby making production uncompetitive for domestic and export markets (GRZ 2014).

6 Back to basics: mending the role of LC in industrialization

6.1 Improve the competitiveness and productivity of the manufacturing sector

Structural fault-lines in productive linkages have hobbled LC and industrialization. The subsectors of consequence to LC growth and industrialization continue to have high import dependence on account of poor backward linkages into intermediate goods. This, combined with poor skills and access to technological innovation, has been responsible for the poor capital and labour productivity levels in subsectors relevant to LC, and those of manufacturing in general. To improve the competitiveness of manufacturing, and exports, Zambia needs to do several things:

Develop a domestic raw material base

This is necessary to provide intermediate goods to key subsectors of manufacturing. Of importance is the new integrated iron and steel industrial cluster. This has been included in the 7th NDP to stimulate industrialization and LC growth particularly in the areas of chemicals, rubber, plastic, and machinery and equipment manufacture for the economic sectors, including mining, agriculture, manufacturing, construction, and infrastructure development.

It will be necessary to identify and develop target goods for which manufacturing capabilities either are available or can competitively be built up in a reasonable time. These are goods that present low technology entry points and are already being, or have previously been, manufactured locally. Examples have been provided in the text. For these ‘low-hanging fruits’, it will be necessary to evaluate the domestic market potential, technologies of production, and sources; local raw material sources; and the business partnerships required for their manufacture.

Improve workforce skills

Labour productivity depends on workforce skills and capabilities. The paper notes Zambia’s poor stock of skills across the key sectors critical to industrialization, particularly in various engineering fields. This is exacerbated by the weak participation of industry in education and training (E & T), and the detachment of company career paths from institutions of learning.

There will be a need, as part of incentives and legislative provisions, to explore how industry participation in E & T can be improved. The AfDB (2017) report recommends that an industry skills survey be undertaken, which should serve as a basis for a workforce development model; a skills forecasting model; and integrating industry competency-based schemes with E & T learning. Industrialization and structural transformation will also require the state to develop, as matter of

urgency, a medium- to long-term human resource development plan to align secondary and tertiary education, and skills training to meet the strategic needs of industrialization.

Improve R & D and innovation

The depth of technological innovation determines capital productivity and the capability to produce exportable manufactures. R & D and a national system of innovation are the most important sources of technological upgrading. Zambia has to develop a national system of innovation to drive the pace and direction of technological innovation for manufacturing. Targeted policy interventions are required that adapt imported technologies through indigenous R & D and innovation. Industry participation in R & D and innovation will need to be scaled up through the use of appropriate incentives to reward companies investing in R & D or in areas that are key to industrialization and LC development.

6.2 Strengthen the policy and legislative base for LC growth and industrialization

While the planning and policy frameworks are supportive of developing productive linkages and of industrialization, the subordinate legislation generally is not. Weak alignment and poor implementational coordination are impediments to industrialization, structural transformation, and LC growth. Several actions will be required to reinforce the legislative provisions:

Strengthening mineral legislation

The 2015 Mines and Minerals Development Act is inadequate in its current form. There will be a need to deepen LC and industrialization provisions by:

- a. aligning the Act to its policy objectives and those of Vision 2030;
- b. providing incentives that reward mining and other companies engaging in high-level skills-building and domestic R & D to develop products and processes that extend the mineral value chain;
- c. introducing targets preferencing the employment of nationals and their integration into company career paths, especially at higher technical and managerial levels; and
- d. providing targets preferencing local suppliers, supported by monitorable firm-level LC plans for supplier development.

Rationalizing the use of incentives

The current incentives structure, inherited from the Development Agreements, rewards mining firms for importing goods rather than encouraging their domestic manufacture. At the same time, there are no incentives, such as import tariffs, to protect nascent manufacturing industries for goods that can be manufactured locally. Nor are there any export tariffs on unbeneficiated mineral products to encourage local processing. The entire area of incentives needs to be evaluated to determine their impact on domestic manufacturing and industrialization; innovation, productivity, and export competitiveness; and mineral tax revenues. This should lead to improved targeting of incentives towards broad industrialization goals. Targeted incentives could also encourage some GVCs to relocate part of their production to Zambia.

Harmonizing legislation across sectors

Examples have been provided of incoherence in several pieces of sectoral legislation in respect of industrialization and LC objectives. There will be a need for a detailed review of the coherence of the legislative provisions across the different policies and acts, to harmonize their support for

industrialization and LC growth. This probably requires the development of a stand-alone LC policy and act in order to accommodate key provisions relating to industrialization and LC development.

6.3 Build the capabilities of endogenous SME manufacturing firms and suppliers

The literature reviewed confirms the role of endogenous entrepreneurship in business start-ups and employment creation, as well as in providing innovative inputs into GVCs. In Zambia, a dearth of endogenous entrepreneurship has limited SME growth to the supply of simple non-core services to the mining industry. There is need for long-term programmes to remove the intractable lack of skills and technological accumulation among SMEs, coupled with improving their access to structured long-term finance. It would be useful to review how nationals can best be supported to acquire lower-end manufacturing technologies and expertise through mentorships and foreign partnership arrangements. Mentorships are particularly useful in graduating SMEs into providing core mining input goods and services.

6.4 Strengthen the macroeconomic environment

LC development and industrialization require a stable macroeconomic environment, efficient infrastructure, and supportive institutions. Inflation and monetary policy will need to aim at reducing the cost of capital through a stable financial sector that facilitates long-term project borrowing.

Road, rail, and energy infrastructure will need further improvements to support industrialization efforts. Rail infrastructure continues to be in poor shape to support bulk movement of cargo. Zambia has been in an energy deficit, with frequent outages since 2009, and by 2020 demand is projected to be twice the current generation capacity. Zambia needs to double generation capacity by that date.

Physical infrastructure for skills-building and R & D to support innovation are dysfunctional. Industrialized countries that succeeded in developing out of commodities had major programmes to support skills acquisition and R & D to assimilate and improve technologies. An improvement in national institutions will be required to enhance technological innovation in manufacturing firms relevant to industrialization and LC growth.

On the soft infrastructure side, it will be necessary to widen the scope of the Zambia Bureau of Standards (ZBS) to accommodate standards for broader engineering goods. Government functions too will need to be reorganized to better support LC growth and industrialization. It may be necessary to create an apex Ministry of Industrialization to improve the coordination of LC development and industrialization efforts.

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