AFRICA'S INDUSTRIAL TRANSFORMATION; HARNESSING THE POTENTIAL OF LOW VALUE MINERALS AS A CATALYST FOR INDUSTRIALISATION

By Paul Msoma

1. Introduction

As home to a third of the world's mineral reserves, Africa's extractive sectors can be an important driver of structural transformation on the continent. The African Mining Vision, adopted by the First African Union Conference of African Ministers responsible for Mineral Resources Development, held in Addis Ababa in October 2008 represents a paradigm shift away from commodity export dependency towards enhancing Africa's industrial base through greater local beneficiation and value addition of minerals. The AMV's ultimate strategic goal is to use Africa's mineral resources for sustainable development in Africa, to eradicate poverty and to achieve rapid and broad-based socio-economic development.

Among the key tenants of the African Mining Vision is the promotion of Development Minerals also known as industrial minerals. The mining of Development Minerals has important implications for locally driven industrialization, to date however, these minerals have received less attention for their potential drive towards broad based development.

Development Minerals[1] are recognised as geological materials which are mined for their commercial value and are used in their natural state or after beneficiation either as raw materials or as additives in a wide range of applications. Typical examples of industrial rocks and minerals are limestone, clays, sand, gravel, diatomite, kaolin, bentonite, silica, barite, gypsum, and talc. Some examples of applications for industrial minerals are construction, ceramics, paints, electronics, filtration, plastics, glass, detergents and paper. Minerals under this category are mined not because of their metallic value but for their non-metallic uses— their physical and chemical properties. They are often referred to by their end uses: industrial, agricultural and construction minerals, and often used interchangeably

The African Mining Vision stands out as one of the few continental frameworks that promotes an innovative approach to commodity-led industrialization in a systematic manner. It challenges current approaches that take for granted the old taxonomy that frames Africa's minerals as raw materials for strategic industries in western and eastern countries. This is in contrast to the long held business approach by African countries which emphasis mining first and foremost as rent-seeking rather than opportunity to underpin broad-based structural transformation through developing intersectoral linkages for greater value retention within their economies.

[1] The African Union Specialised Technical Committee (of Ministers) on Trade, Industry and Mineral meeting held in Addis Ethiopia from 16th -24th May 2016 recommended that "Low Value Minerals should be referred to as Development Minerals or industrial Minerals in regional policy frameworks and national development strategies"

2. The Case for Mineral based industrialisation in Africa

The approach towards developing minerals-based linkages aligns with the development agenda of Africa. Industrialization and its structural transformation of economies are top priorities. Mineral-resource led industrialization remains a cornerstone of Africa's continental agenda (ECA, 2013). For the continent to better integrate in the global economy, Africa's industrialization will have to take advantage of its diverse and abundant mineral resources (ECA, 2015). (Porter, 1990), identifies factor endowments including natural resource abundance as competitive foundations of industrial development.

While previous approaches to industrialization prioritize a country-focus analysis, there's a noticeable shift towards sector and firm-specific approaches. Through globalization, geographically dispersed activities have become functionally integrated and organized in complex transnational production networks (Dicken, 1998). The global value chains has led firms to specialize in capabilities rather than wholly manufactured products (Gereffi, 2005).Yet it remains an open debate whether developing countries should concentrate on exploiting their comparative advantages based on commodities or leap into higher value technological products (Lin, 2012).

An effective commodity-led industrialization strategy will therefore require new way of looking at Africa's rich minerals and metals endowment. Their wide range means no one size approach will work for all the metals and mineral commodities in harnessing their varied potential. Every metal and mineral is different in terms of contribution to transform and diversify African economies (Akong, 2016).

3. Strategic Value of Industrial Minerals

From a policy perspective, industrial minerals are usually not at the top of mainstream development debates, often because of their low commodity value. Their exploitation and domestic uses have, however always been inconsistent with their endowment. By their nature they form low value but high volume materials, with indispensable catalytic role in economic development. Globally, non-metallic minerals account for the major part of non-fuel production, both in terms of volume and value. This is unsurprising given the diversity of their uses particularly in key sectors: industry, agriculture and construction. In agriculture, non –metallic minerals like phosphates, nitrates and sulphates rocks (NPK) are used to improve soil fertility as well as conditioners to correct the pH and salt content of soils and to conserve water and soil nutrients.

Africa is blessed with diverse distribution of agricultural minerals. For example West Africa is endowed with important phosphate rock reserves (IFDC 2006). Mali, Senegal, Togo, Niger, and Burkina Faso have phosphate rock deposits, whereas Ghana, Nigeria, and Guinea have natural gas deposits and coal that could be used to produce nitrogen fertilizers as well as potash deposits.

Fertilizer production has increased significantly but not as much to meet the needs in agriculture. Africa produced almost 8 million tons of fertilizers up from 4 million tons in 1990. However,

despite Africa's enormous potential it only accounts for 4% of world's production (Wanzala & Groot, 2013). Morocco alone host about 80% of world's reserves (USGS 2012).

The widest diversity of non-metallic minerals use is in manufacturing and construction industries. Clays and limestone are used in the paint, plastic and rubber industries as fillers, filters and absorbents. Silica sand, kaolin, limestone, dolomite and feldspar find wide application in the manufacture of glass and ceramic products. Bentonite is used in the oil drilling industry as drilling mud. Many more non-metallic minerals find uses in the chemical industry including soaps and detergents, toothpaste, textiles, leather tanning, beauty and pharmaceutical products. In the construction sector limestone, dolomite and granite are used as aggregates for road construction as well as in buildings as dimension stones and for cement manufacturing with other additives such as gypsum. Bricks used intensively for both commercial and domestic buildings are made from clays, sand and gravel.

Unlike other minerals, the biggest strength of non-metallic minerals is that their consumption correlates strongly with GDP growth per capita. Their consumption is the most reliable indicator of structural transformation. Studies show that their uses become very important in the different phases of structural transformation of economies. Their consumption also varies with each mineral, in a sort of hierarchy of economic diversification needs. For example, some minerals are important before the growth accelerating phase of the economy like sand. While some during growth acceleration like cement and others during the mature phase of the economy. Not all industrial minerals follow the transformation curve. Some non-metallic minerals are consumed at a steady rate across all phases of economic diversification.

Given that consumption per head correlates strongly with economic growth, industrial minerals are therefore key to Africa's industrialization. Their strongest consumption is in countries that are undergoing rapid industrialization, declining when the economies matures, for example in post-industrialist economies. (Akong, 2016)

4. Reality for African

The painful and depressing patterns of falling prices are nothing new to the industry and this situation only works to confirm that managing the sector based on externally-driven cycles and events is not sustainable. Further it is now becoming clear that broad-based development of the sector won't happen on its own without deliberate policy and institutional choices which are anchored in long-term vision for sustainable structural transformation of economies. The once in a generation tailwind of commodity-supercycle has arguably faded. And in taking stock, Charles Akong took note of noticeble three key trends which challenge Africa to work in more collaborative fashion and plan long-term for the diversification of economies (Akong, 2016):

First, he notes that Africa deindustrialized over the period of the boom. This is surprising given Africa's comparative natural resource advantage and worrisome to the prospect of long-term structural change for economies. While growth was impressive, with the continent's performance averaging 4.9 percent a year, over the period 2000-2013, the structures of most economies however continue to remain untransformed.

The Economic Commission for Africa reckons that the manufacturing sector's contribution to total output has actually declined, from 12 to 11 percent. The share of industry which has fallen in most African countries over the last twenty five years, remains the smallest among developing regions. Put simply, Africa is less industrialized today than it was in 1990. And this is a tragedy we cannot continue to ignore. At the same time, that Africa is failing to climb the manufacturing ladder, dependence on exporting commodities in their raw forms is increasing. This trend further marginalizes Africa's position in international trade. A situation which underscores the need for more efforts at diversifying economies.

Second, he observed that the impressive growth performance which has been driven in part by high commodities prices remains poor in creating jobs and weak in reducing poverty. Very few countries have achieved high and sustainable standards of living without developing significant manufacturing sector. The International Labour Organization observes that most people who enter the job market during the boom period, ended up in vulnerable jobs. Vulnerable employment in 2012 was estimated at 77.4 percent of all jobs, the highest of all developing regions in the world, this was only 2.3 percentage points lower than in 2001.

This situation contrasts with other developing regions which have shown a larger reduction in the vulnerable employment rate, over the same period. This includes even those regions who have experienced slower economic growth, such as Latin America and Caribbean. In fact, due to their diversified industrial base, with the same level of growth, Asian countries perform better in reducing poverty than Africa. The World Bank reckons that a 10 percent increase in national income translates into 20 percent reduction in poverty in Asia, against only 7 percent reduction in Africa.

Third, countries did not take full advantage of the boom to strengthen their institutions in an effective and sustainable manner. Without coherent Vision and ambition, countries remain stuck with inefficient fiscal institutions, unable to respond optimally to change. Progressivity is yet to become a core principle in the design of fiscal regimes in the mining sector. The inadequate use of profit-based tax instruments leads to a tendency where rules may change in an ad hoc and 'opportunistic manner— in the middle of the game' which may not be efficient for businesses and may not encouraging the rule of law. According to a survey conducted by the African Development Bank, with the exception of South Africa, which imposed a profit-based royalty, all other African countries utilized ad-valorem royalty as of mid-2011. The Africa Progress Panel reports that mining companies' profits increased at four times the rate of government revenues between 2000 and 2011.

It is important to note that it is not for weak institutions and ineffective regulations that countries continue to remain unable to take advantage of booms. It is the lack of clear vision and effective policies that create weak institutions and laws unfit for transforming the mining sector.

For instance a typical mining company spends over 61 percent of its total investment on infrastructure and procurement— more than three times what is paid in taxes. Investment presents opportunities for governments to align their skills development and employment policies in ways that capture greater value from mining.

5. Potential for Developmental Linkages

Depending on the minerals and metals involved, varied forms of linkages could be built as standalones as well as in an overlapping fashion. Albert Hirschman, a pioneer in development economics, reviewed the work of economic historians analyzing industrial growth in Canada and the USA. He proposed three different sets of linkages from the commodity to the industrial sector: fiscal, consumption and production (Hirschman A. , 1981). In addition, there's also the lateral linkage. The fiscal linkages are resource rents which governments are able to harvest from the commodities in the form of corporate taxes, royalties and taxes on the incomes of employees. These rents can be channeled to promote industrial development in sectors unrelated to commodities. While the consumption linkages are the demand for the output of other sectors arising from the incomes earned in the commodities sector. Production linkages include both forward (processing commodities) and backward (producing inputs into the commodities sector) linkages from the resources sector. Lateral linkages, involves the stimulation of dynamic linkages with other sectors of the economy, through the migration of high- technologies, knowledge intensive products, and expertise out of the mining sector, at different phases of diversification of the economy.

In terms of optimising the full transformative potentials of all minerals, as articulated in the AMV industrial minerals, are increasingly becoming the most important category of minerals for diversifying African economies. These minerals, despite their low unit value, offers the highest, most sustained and realistic potentials for greater value retention and linkages with the rest of the economy: domestic and regional.

6. The Missing link

Despite their transformative potential, it is really a paradox that their nomenclature as industrial minerals has been unable to attract attention enough to remove them from the periphery to the center of development agenda. The revenue-first and-most important-imperative that frames current classification of minerals continues to blind policy-makers from appreciating the spatial dimension of industrial minerals: their greater retained and dissipated value in domestic economies space. For most countries, their neglect starts with absence of basic quantitative geological information about their abundance. While this gap shared across all minerals, it is most chronic with non-metallic minerals. In fact, most descriptions of reserve potential remain vague. It is not uncommon to find their economic potential described vaguely as vast, immense and inexhaustible. Very few deposits in the continent are adequately characterized (Akong, 2016)

While geological characterization is grossly inadequate, technical evaluation is almost non-existent. Given their demand-driven nature and specific end-uses, technical evaluation remains very crucial to their optimal exploitation. Most countries lack the capacity to undertake a wide range of test including mineralogical and chemical tests to determine their technological parameters suitable for different end uses. Hence the absence of proper technological characterization, means poor understanding of uses of available minerals. It is therefore not uncommon to read about policy makers complaining about the importation of fertilizers when local

resources are abundant. The capacity gap means that great majority of industrial minerals which require higher level of technical characterization remain unexplored and unproduced. For example, fillers and extenders as well as non-metallic minerals useful in chemical industry require more specifications. And even more specific uses in the ceramic industry (Akong, 2016).

The bulk nature of these minerals means their exploitation must be close to markets. But the proximity to market requirement, poses important logistical challenges, too. For example, although West Africa is endowed with natural gas and phosphate rock, it has not been able to convert these resources into production facilities due to the small size of the market, huge capital requirements, high energy and transportation costs, underdeveloped infrastructure, and management and operational inefficiencies. Nevertheless West Africa has invested in blending plants for producing blended NPK (nitrogen, phosphorus, and potassium) products based on imported straight fertilizers such as urea, diammonium phosphate (DAP), triple superphosphate (TSP), single superphosphate (SSP), and muriate of potash (MOP). Blending plants are available in Nigeria, Ghana, Mali, and other countries. However, because of limited growth in fertilizer consumption, even the blending capacity is not optimally utilized. Approximately a third of the blending capacity was underutilized in Nigeria in 2009 (Wanzala & Groot, 2013).

7. Looking ahead

Despite the challenges as noted above, the African Mining Vision stands out as a unique framework at this time of gloom. The African Mining Vision recognises that every mineral offers unique opportunities for diversifying economies through linkages. Some minerals offer greater potential for linkages. Some are capable of withstanding better global commodity downturns than others.

The consumption of low value minerals provides critical feedstocks and inputs for Africa's industrialization. Domestically produced products from limestone and sand are not only demonstrating strong resilience but also remarkable transformative potentials of African economies. Cement manufactured in the continent from abundant limestone deposits is witnessing spectacular growth at five percent annual consumption, correlating strongly with Africa's GDP as well as suggesting minerals-based structural transformation. In fact, a recent industry report in Nigeria shows that every one percent point increase in domestic production of cement adds over 5 percent points to GDP growth.

The AMV also notes that not every mineral can beneficiated in competitive and profitable manner. Not every economy is large enough to support demand for domestic beneficiation, for every mineral. With its demand-side approach, the AMV targets market failures in the way of regional integration for the emergence of viable regional value chains around mining. AMV therefore seeks to encourage the strengthening of regional markets which offers greater opportunities for harnessing the transformative potentials of mining. Africa's participation in Regional Value Chains remains greater than participation in Global Value Chains, suggesting untapped potential for regional approaches towards linkages.

While intra-African trade remains very modest at 12 percent, it should be noted that more 60 percent of the trade between countries are in manufactured or intermediate products, which contrast with Africa's participation in global trade dominated by the export of primary commodities. The Economic Commission for Africa recently estimated that intra-African export of intermediates products in mining has jumped six folds, while export outside Africa has increased only by four folds (UNECA, 2015).

The global community has launched a new era of development interventions. An era marked by the implementation of the sustainable development goals which will guide our collective efforts at transforming economies. The 17 goals and 169 targets for the next fifteen year, strongly resonates with the principles and priorities of the Africa Mining Vision. Member States including development stakeholders have committed to support countries to integrate greater into value chains and markets by 2030.

A trend towards harmonization of mining regimes is emerging too. For example the SADC Regional Indicative Strategic Development Plan (RISDP), was development with the aim to leverage the regions rich natural resource endowment. The Economic Community of West African States (ECOWAS) recently adopted a Directive on the Harmonization of Guiding Principles and Policies in the Mining Sector.

Achieving the transformative potential of Africa's resources requires a new way of thinking about minerals which aligns with the continent's owned priorities of industrialisation and diversification through processing and beneficiation. The old colonial taxonomy remains a binding constraint to building critical linkages around minerals for the structural transformation of African economies

In terms of optimising full transformative potentials of minerals as articulated in the AMV, industrial minerals, often neglected becomes the most important category of minerals for diversifying African economies. These minerals despite their low unit value, offers the highest, most sustained and realistic potentials greater value retention to the rest of the economy: domestic and regional.

8. Policy Shifts required

In order to optimize the contribution of the industrial minerals to the national economies, African governments are called upon to embark on the following policy shifts:

1. Governments must commit towards the creation of effective industrial minerals based public-private partnerships, the building of knowledge of the sector, networking and niches involving academia, civil society, industry and government actors.

2. Governments must take a lead in the establishment of policy platform which should support efforts towards identifying binding constrains on the industry and build capacity and practical steps required in strengthening local content and value addition. This approach should contribute to a shift in government design and policy that goes beyond an examination of bottlenecks for attracting rents based Investment to focusing on information

asymmetries, capital, skills, organization and infrastructure and their role in hindering development of locally inclusive supply chains and value addition.

3. Countries and other stakeholders must commit to detailed examination of industrial mineral based value chains, from exploration to extraction, processing, beneficiation and value addition. The examination of the value chains must be guided by a firm baseline which brings out an understanding of alternative restrictive socio-economic practices, including limitation and prevention of certain groups of society in participating in `inclusive practices.

4. Government should provide a conducive environment for private sector and other partners to support the generation of locally-driven knowledge, capacity and improved technical expertise aimed at promoting beneficiation, local content, domestic value addition and addressing industry and policy constraints which could strengthen and inform the effective implementation of the country's Local Content Policy and mineral beneficiation objectives.

5. The private sector should consider supporting governments by investing resources in the identification and delineating of policy and legislative frameworks, fiscal regimes, institutions and domestic and transnational legal protection that offer the most supportive environment for efficient participation of all relevant actors in the extractive industry value chains.

6. The private sector must also consider investing in improving knowledge and understanding of the role of the state and non-state actors in creating a mineral sector that is a driver of industrialisation for broad-based development.

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Power point Presentations Referred

Akong Charles - West Africa's Low Hanging Fruits for Diversification and Structural Transformation,

Akong Charles - Harnessing the Transformative Potential of Neglected Development Minerals

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