

Industry in Africa within the Post-2015 Development Agenda

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1. Introduction

Africa has sustained a solid pace of growth in the last decade. Growth in the Gross Domestic Product (GDP) has averaged 5.1% since 2000, doubling the average growth rate of the 1990s and this is set to continue notwithstanding the slowdown in the global economy. Recent statistics from the World Bank indicates that that GDP growth in Sub-Saharan African remained robust at 4.6% in 2012. Indeed, excluding the region's largest and most globally integrated economy, South Africa, GDP growth in the region was at strong 5.8% in 2012, with a third of countries in the region growing by at least 6% (World Bank, 2013).

While the global commodity price boom has certainly contributed to Africa's recovery, there is a different mind-set and a new confidence in Africa's ability to forge its development path. Africa's private sector has become an increasingly powerful engine for change, driving innovation and transforming archaic business models. Foreign direct investment has also increased by a factor of six over the past decade (Ajakaiye and Jerome, 2013). It has been widely acknowledged that Africa is on its way to becoming a potential growth pole, a preferred investment destination, and a place of immense innovation and creativity (UNECA, 2012 and Africa Progress Panel, 2012).

However, recent growth in Africa has not been accompanied by significant structural transformation. Indeed, economic growth is currently largely driven by commodity exports, especially oil and metals. The economic structures of several African countries, especially resource rich countries, have become more concentrated, making them more vulnerable to external shocks. This is in sharp contrast to the growth pattern of other developing regions, especially Asia, where growth has been driven by a solid industrialization agenda underpinned by manufacturing.

Moreover, Africa's recent growth has not been inclusive as it fails to provide remunerative employment opportunities. Over the past 10 years, about 91 million people joined the labour force but only 37 million are in wage paying jobs. About 47 per cent of African workers earn less than \$1.25 per day, working in vulnerable jobs with low productivity (Africa Union, et. al. 2013). Achievements in the area of human development have also been dismal. Africa thus needs to embark on structural transformation as a means of addressing these challenges. Empirical evidence presented in McMillan and Rodrik, (2011) suggests that structural transformation in Africa is still at its formative stage in most countries and has not yet taken a deep root. As a result, the pace of poverty reduction has not been commensurate with the relatively rapid growth attained in many countries.

In September 2000, the United Nations Millennium Summit concluded with the adoption of the Millennium Declaration, which sets out a series of principles and priorities for which there is global consensus and a shared sense of urgency. Subsequently, eight Millennium Development Goals (with eighteen targets and 48 specific indicators) were formulated to facilitate the implementation of the Declaration commitments by 2015. This global pledge, signed by 53 African states in 2000, sets eight benchmarks to eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria, and other diseases; ensure environmental sustainability; and develop a global partnership for development.

The MDGs have no doubt become one of the cornerstones of the international development effort and the primary yardstick against which advances in development efforts are judged (Clemens, et. al. 2005). As the countdown to the 2015 target date for the Millennium Development Goals ticks, there is

¹ The editorial Assistance of Francis Chigunta and Patrick Edozor are gratefully acknowledged.

a renewed emphasis on how these goals can be attained. The MDG Report 2013: Assessing progress in Africa toward the Millennium Development Goals indicates that Africa has made giant strides in implementing the MDGs and the continent would indeed rank among the best with Burkina Faso, Mozambique and Namibia leading the pack if progress is measured by effort. However, the continent is clearly off track in meeting five out of the eight goals (See Table A1). It concludes that while Africa is the world's second fastest growing region, its rate of poverty reduction is insufficient to reach the target of halving extreme poverty by 2015. The proportion of people living in extreme poverty (on less than \$ 1.25 a day) in Sub Saharan Africa fell from 56.5 per cent in 1990 to 48.5 per cent in 2010; about 20.25 percentage points off the 2015 target, compared with just 4.1 points for South Asia. However, more people are joining the ranks of extreme poverty than exiting—some 124 million people fell into extreme poverty over 1990–2010.

Around the world², there are intense consultations to determine what comes after the MDGs in 2015. Several initiatives have commenced at global, regional and national levels to deliberate on measures to accelerate progress on the MDGs and to define the contours of the *post-2015* development agenda. As the European Report on Development (*2013) notes, the consultations for a post-2015 development framework pose a unique opportunity to shift the current paradigm towards a more inclusive model aimed at creating sustained prosperity for all. The slow progress towards the current set of targets in Africa noted above has made this an even more urgent agenda. The continent needs to translate the current growth momentum into growth that is, broad-based, more resilient to external shocks, and conducive to meaningful job creation, reduction of inequality and poverty alleviation.

Indeed, the UNECA-led consultations in Africa with member states, civil society and a wide range of stakeholders confirm the importance of economic transformation to Africa's development and for the post-2015 development agenda. That among others emphasizes structural transformation, economic diversification and inclusive growth through, *inter alia*, the promotion of industrial development, the creation of jobs, the development of infrastructure as a key to integrate the continent, measures to ensure an equitable distribution of the benefits and opportunities of economic growth, increased productivity, improved competitiveness and the promotion of sustainable production and consumption (UNECA, 2013).

Achieving high-level sustainable and shared growth requires certain imperatives, among which is the centrality of industrialization. This issues paper appraises the role of industry in the post 2015 development agenda.

2. Current Status of Industrial Development in Africa and the Growing Relevance in the African Countries Economies.

2.1 Current Status

The record of industrialisation in Africa has been profoundly disappointing. The majority of countries continue to have a weak industrial base without the structural change and diversification experienced by other developing areas. Africa has a weak industrial base and lags behind other developing regions

² In response to the request by governments for accelerating progress towards achieving the MDGs, and also for thinking on ways to advance the UN development agenda beyond 2015 at the High-level Plenary Meeting of the 65th Session of the UN General Assembly (UNGA) on the MDGs held in New York in September 2010, the UN undertook several initiatives aimed at developing a post-2015 development agenda, including: setting up a UN System Task Team on the Post-2015 UN Development Agenda; launching a High-level Panel of Eminent Persons on the Post-2015 Development Agenda; appointing a Special Advisor on Post-2015 Development Planning; and launching national and global thematic consultations.

in industrial performance. Several key statistics from UNIDO illustrate this low industrialization. First, Africa's share of world manufacturing output was a paltry 1.49 % in 2012 corresponding to 10 % of China's MVA. Manufacturing as a share of GDP for Africa was only 10 % in 2012 compared to 23 % in Asia and Pacific and 15 % in Latin America (Table 1). The global average was 16.7 %. In regional terms, Western Africa had the lowest percentage share of manufacturing in GDP at 5.2 % followed by East Africa (7.2 %), Central Africa (7.3 %), North Africa (10.8 %) and Southern Africa (12.6 %). There is only one country (Swaziland) where manufacturing as a share of (GDP) exceeds 25 per cent – the benchmark for considering a country as having achieved critical threshold of industrial take-off. It ranges from 0.3 % in Equatorial Guinea to 30.2 % in Swaziland. MVA as a proportion of GDP is still less than 10 % in 30 African countries (Table A2). Within Africa, the distribution of manufacturing activity is highly skewed with just one country, South Africa, accounting for 38.9 % of total MVA in Africa, followed by Egypt (15.4 %).

Table 1: Manufacturing Indicators

REGIONS	MVA (2012) \$US in 000	MVAPC (\$US in 000)							MVA, 2012 (% of GDP)	MVA, 2012 (% of World Total)
		1990	1995	2000	2005	2010	2011	2012		
Africa	132,456,691	122.08	111.47	117.32	122.03	127.27	126.92	129.51	9.989	1.49
North Africa	48,943,543	193.43	198.29	229.34	247.87	280.41	275.60	287.54	10.843	0.55
Central Africa	4,535,131	113.15	86.50	98.46	103.97	100.74	102.11	104.05	7.343	0.05
Western Africa	13,954,772	41.29	36.96	38.46	39.36	41.94	41.97	43.56	5.224	0.16
Eastern Africa	5,243,059	22.02	20.71	20.36	21.48	24.69	25.45	25.96	7.244	0.06
Southern Africa	59,780,185	227.73	196.10	198.47	205.90	205.62	207.69	208.80	12.628	0.67
Sub-Saharan Africa	13,954,772	41.29	36.96	38.46	39.36	41.94	41.97	43.56	5.224	0.16
African LDCs	15,810,077	28.24	23.97	26.07	28.88	31.93	32.57	33.04	7.706	0.18
Asia & Pacific	3,811,507,105	440.44	492.66	564.26	681.36	844.20	871.97	912.28	23.007	42.80
South Asia	258,270,165	55.20	67.91	78.83	101.06	140.80	148.58	153.97	15.351	2.90
North America	1,959,915,077	4,040.65	4,456.92	5,291.22	5,702.58	5,500.09	5,529.68	5,590.37	13.246	22.01
Latin America	516,788,049	750.98	772.22	838.94	856.78	891.37	912.83	859.02	15.069	5.80
Europe	2,483,933,716	2,585.88	2,493.61	2,853.21	3,054.51	3,013.44	3,080.20	3,030.50	14.470	27.89
World	8,904,600,638	941.13	956.46	1,075.69	1,174.07	1,240.35	1,284.17	1,277.10	16.711	100

Source: Computed from UNIDO Database

In 2010, Africa's share of global manufacturing exports was 1%, lower than India's share of 1.4% and China's 15%. High technology exports account for only 3.5 % of manufactured exports from Africa compared to 32 % in East Asia and developing country average of 22 percent. The export composition of African countries continues to be dominated by primary rather than processed or semi-finished products.

2.2 The Growing Relevance of Industry in African Countries Economies

Recent work by Timmer et. al. (2012) indicates that successful economic transformation is typically associated with a migration of labour out of the rural agriculture sector into the urban industrial sector—leading to higher economy wide productivity levels and progressively raising incomes in the former sector toward the level of incomes in the latter. This is not, however, what they observed in African

countries during most of the first five decades of independence. Driven by urbanization and decades of neglect of agriculture, most countries have seen rapid labour migration out of a stagnating agriculture sector into an informal services sector—with even lower productivity levels reducing Africa's growth by as much as 1.3 percentage points per year on average

Africa's recent economic growth is no doubt masking serious future growth challenges that will need to be addressed if African economies are to join the rank of middle-income economies. In spite of the positive growth performance of African economies since 1995, lack of structural change—the shift of resources from low-productivity to more dynamic higher-productivity sectors—continue to elude Africa and limit the continent's long-term growth prospects and opportunities for productive employment. Africa's relevance in the global economy today seems to be relegated to that of a source of raw materials and this has to change.

It is generally acknowledged that industry is most often the leading high-productivity sector, and recent research indicates that economies with more diverse and sophisticated industrial sectors tend to grow faster. It is also the quickest means for a country to transform to a middle income or developed economy through its contribution to productivity, innovation and trade. Yumkella (2013) in his address to the African Union also established the linkages between industry and poverty reduction. He notes that sustained industrial growth leads to significant reduction of poverty through increased productivity as a result of transitioning from primary commodities to more sophisticated production of manufactures and development of related service sector. It is a win-win situation as ordinary people benefit through increased earnings. Gender equality is also enhances as more women find productive employment in labour intensive manufacturing. Building productive capacity is a sure path to development as a result of the pivotal role it plays in encouraging technological development, increasing productivity, promoting entrepreneurship; generating employment and income and creating sectoral linkages with other sectors. Africa thus needs to industrialize massively to transform its economies structurally. The renewal of interest in Africa's industrialisation is a welcome development.

3. Key obstacles to achieving industrialization on the continent and new opportunities for inclusive and sustainable development in Africa.

3.1. Key Obstacles

Africa's industrialization has been weak and inconsistent due to a multiplicity of several factors some of which are examined below.

Geography, Inadequate and Poor Quality of Infrastructure

The geographical dislocation with respect to input and output markets is a major geographical disadvantage. Africa is divided into 54 countries, with an average population of only 17 million, and the median just half of that. The contrast with Asia is startling, where India and China each have larger population than the whole of Africa. Population density in sub-Saharan Africa is relatively low, and though urbanisation rates are rising, a large share of population resides in rural areas. All these factors result in a high transport intensity of economic activity. Evidence from Limão and Venables (2001) indicate that the median transport costs are much higher in Africa. They estimate intra-regional trade in sub-Saharan Africa transport costs as \$7,600, while the comparable figure for Latin America and the Caribbean is \$4,600; in East Asia under \$4,000; and in the Middle East region just above \$2,000.

Infrastructure is critical to the development of the manufacturing sector. African countries have very poor transport, communication and energy infrastructure (UNIDO and UNCTAD, 2011). For example, firm level studies of productivity in Africa highlight infrastructure deficiencies as a significant barrier to greater competitiveness. Sub-Saharan Africa lags at least 20 percentage points behind the average for low-income countries on almost all major infrastructure measures. Although indicators of infrastructure access rose between the 1990 and 2000s, these were mainly in communications technology—led by the cellular revolution—and water supply and sanitation. There has been little strategic orientation of Africa's infrastructure investments to support international competitiveness and until quite recently little willingness on the part of Africa's development partners to finance infrastructure (World Bank, 2007).

Africa's infrastructure networks are not only deficient in coverage and quality, but the price of the services provided, also exceptionally high by global standards, as revealed by AICD. Whether for power, water, road freight, mobile telephones, or Internet services, the tariffs paid in Africa are several multiples of those paid in other parts of the developing world. The explanation for this is sometimes due to genuine higher costs, and other times due to high profit margins. For example, Nigeria's leading mobile provider, MTN Nigeria, spends in excess of \$5.55m on diesel to power its 6000 generator plants across the country monthly. The weak infrastructure base consequently disrupts the creation of a competitive industrial sector that results in higher production and transaction costs in Africa.

The investment needs in Africa's infrastructure are quite substantial. The Africa Infrastructure Country Diagnostic Study (AICD) estimates the cost of addressing Africa's infrastructure at about \$93 billion a year, about 15 percent of GDP, one-third of which is for maintenance. The region's track record of investment inflows suggest that the private sector by itself is unlikely to provide the kind of near-term funding needed to address these shortcomings. Meeting Africa's infrastructure needs would thus require reforming the way in which business is conducted. There is growing consensus that the public sector must retain a much more important role in financing than previously admitted, while the private sector is expected to help in meeting the significant needs associated with infrastructure construction, operation, and, to some extent, financing in sectors such as telecommunications, energy generation, and transport services in which commercial and political risks are much lower.

Fortunately, Africa's infrastructure is currently receiving considerable attention. The recent attention includes a variety of initiatives launched, often in partnership, by the African Development Bank (ADB), the World Bank, and the umbrella of the African Union and the New Partnership for Africa's Development (NEPAD), as well as several bilateral donors, notably the Department for International Development of the United Kingdom. They focus not just on additional financing from conventional sources, but also on planning and implementing infrastructure projects and policies, especially multi-country regional projects.

The business and regulatory environment

The business climate in Africa has improved substantially over the past decade, particularly in the aspect of commercial law. Countries such as Egypt and Botswana have featured regularly in the top 10 reformers, with Rwanda voted the top global performer in 2010. However, the cost of doing business on the continent is still the highest in the world. Entrepreneurs continue to face greater regulatory and administrative bottlenecks in Africa, and have less protection of property and investor rights than entrepreneurs in any other region. Restrictive access and high cost of financial capital are also significant constraints on the operation and growth of business in Africa. The growth of financial services has been hindered by high transaction costs from

small and widespread markets, poor physical and financial infrastructure and very low transaction volumes.

African policy makers have recognized that for growth to be sustainable over the longer term, it needs to be underpinned by a vibrant private sector. However, the formal private sector in Africa remains limited and encumbered by several constraints including high cost of doing business, infrastructure bottlenecks and critical skills shortages. Although considerable variation exists across Africa, five distinctive structural deficits of the region's enterprise structure that command the attention of policymakers have been identified. These are: (1) Widespread and rising informality; (2) A "missing middle" and lacking upward mobility of enterprises; (3) Weak inter-firm linkages; (4) Low levels of export competitiveness; and (5) Lack of innovation capabilities.

The government has a central role to play in private sector development beyond deregulation, through learning, industrial and technology policies. In contrast to the Africa's earlier failed efforts at industrial policy, states must work with the market. The debate should move away from whether there is a role for government in the industrialisation process to focus more productively on what its exact role in promoting industrialisation and structural change should be. The practical experiences of most transforming economies suggest that an appropriate mix of both horizontal and vertical approaches is more likely to succeed. It is increasingly clear that the success of the 'East Asian Tigers' often involved the use of both vertical and horizontal policies where appropriate. Public action needs to move beyond the regulatory reform agenda pushed by the international financial institutions to address the physical, institutional and knowledge constraints limiting Africa's industrial development. Fiscal incentives should be time bound, reward first movers and subject to rigorous evaluation.

The crisis has also underscored the importance of export diversification to mitigate adverse external shocks. Africa's past experience suggests that lowering barriers to competition alone is not enough. Also, rather than picking winners, policy makers need to design industrial strategy to identify high-potential export sectors. Measures should also be designed to improve state-business relations, support innovative entrepreneurship, strengthen intra-firm specialization and linkages, promote exports and improve financial services with a view to addressing the deficits of Africa's private sector.

Redressing Africa's Technological Deficit

Over time, advances in science and technology have not only been the key sources of growth, but also shaped industrial development. The inability of African countries to participate in the production of high product value chain goods is mostly linked to the lack of scientific and technological skills.

Indeed, international measurements or comparisons of advances in S&T activities among countries usually focus on a composite of indicators: Expenditure and human resources devoted to S&T, innovations, scientific publications, registered patents, technology licensing fees, technology import, FDI related to technological transfer, computers, internet hosts and internet users per inhabitants, etc. According to these indicators African countries rank among the least technologically-advanced countries in the world.

The most severe of Africa's scientific deficits is in investment in research and development, indicated by research and development expenditure. Expenditure in R&D includes the total expenditures by key actors in the country, namely: industry, government agencies and public laboratories, universities, and equivalent higher educational institutions and private institutions. At present, Africa's share of world

R&D is less than 1 per cent. As shown in Table A4., only South Africa is approaching the target of a 1 % GERD/GDP ratio, the level prescribed by UNESCO and, more recently, by the African Union Summit in January 2007. More worrisome is that about 29 countries in Africa either have no records or do not allocate funds at all to R&D. Sub-Saharan Africa produced just 11,142 scientific articles in 2008 about 1.1 percent of the world's output and this is also dominated by South Africa, representing 46.4 % of the continent's share, followed by Nigeria (11.4 %) and Kenya (6.6 %).

There are several contributory factors to this dismal picture. Research and development (R&D) attracts considerably less public investment in sub-Saharan Africa than defense, education or health. The proportion of GDP devoted to R&D averages about 0.3% on the continent, seven times less than that spent by industrialized countries on this sector. South Africa spends most on R&D, with its investment rising from 0.73% in 2001 to 0.94% in 2006 as a proportion of GDP.

Universities are the citadels of higher learning and, quite often, the centres of research in science and technology. Over the years, African governments spurred by donors have focused on boosting primary and secondary education, thus neglecting universities. The end result is the growing evidence of the quality problems with universities in Africa. Only 5 Universities, all in South Africa featured in the top 1000 universities³ in the 2011 "Webometrics Ranking of World Universities". These are Universities of Cape Town (324), Pretoria (507), Stellenbosch (540), Witwaterstrand (699) and Kwazulu Natal (727).

Brain drain, fostered by the absence of measures to promote research and innovation, the gaps in legislation to protect intellectual property and the low wages earned by scientists, constitutes a major concern. According to UNESCO 2011 estimates, in 2009, at least a third of African scientists or those with engineering degrees were living and working in developed countries. The absence of measures to encourage innovation, gaps in the legislation regarding intellectual property rights and low salaries paid to researchers have all contributed to the brain drain. Strengthening science and technology policy in Africa would require a shift from a business as usual approach towards more proactive and engaging culture of technological responsibility. As UNESCO (2011) notes, an abundance of natural resources and low-cost labour do not necessarily imply in themselves decisive comparative advantage for the continent, as the parameters of international competitiveness are increasingly S&T based.

3.2. New opportunities for inclusive and sustainable development in Africa.

African countries must therefore strive to seize the new opportunities for inclusive and sustainable development in Africa to achieve industrialization. The continent needs to take cognizance of the changing global and regional environment some of which are succinctly examined below in order to industrialize.

Global Value Chain

There is a strong need to seize the benefits offered by globalization and strive to be part of the global value chains. Globalization has also changed the pattern and rules of international trade in two critical ways. First, current international trade and division of labour are organized along value chains, and multinational companies play a dominant role in creating and controlling these value chains. Without being integrated into these value chains, it will be difficult for African countries to access larger external

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For more details, visit: http://www.webometrics.info/top100_continent.asp?cont=africa accessed 1 December 2011.

markets. Yet on the other hand, there is the risk that they may be further pinned down at the lower end of the global value chains as their industrial base is weak and their negotiation capacity with multinationals may be low. African countries must thus strategize on how to position themselves in the global value chains and steadily promote value addition towards the higher end of these value chains (AU and UNECA, 2013). The birth of globalization gave rise to new global trade relations that have limited the space for industrial policy in Africa. The various trade agreement entered into by many African countries significantly affected their domestic trade policies and the opening of their markets for trade relations with developed countries. Consequently, Africa must also make effort to conquer the yoke of its opening up to global trade prior to giving its domestic industries the chance to become competitive. Domestic industries must first be given the capacity to contend with high-quality and low cost goods that have penetrated local markets from the developed countries.

Growing South-South Cooperation, especially with the BRICs

The rising labour cost in East Asia also offered opportunities for inclusive and sustainable development for the continent. Low and affordable labour cost that attracted many of the multinationals to the East Asian region in the first instance is now posing as a constraint to the activities. Africa should be able to take advantage of this situation and offer itself as a destination for the multinationals to fast track the process of industrialization. The collaboration opportunities that the South-South cooperation can also generate an inclusive and sustainable development in Africa. AU and UNECA (2013) opined that to obtain access to larger external markets and become integrated into global industrial value chains, Africa must form a proactive strategy to engage the southern partners to effectively enhance its own industrialization process. Africa's bulk of natural resources (non-renewable) are being extracted and exported in their raw forms without any value addition. This is a missed opportunity to industrialize with respect to the benefits offered by a diversified export base. In addition, the exploitation of these non-renewable resources has weak or non-existence linkages with the domestic economies. African countries must therefore customized their industrialization strategies to their domestic economies.

Opportunities exist for promoting industry, trade and poverty alleviation in Africa through South-South co-operation using the economic strength of the South – finance, technology and markets – to accelerate African industrialization. Without any doubt, new industrial powers, such as China, India, Brazil and others, although likely to make it more difficult for industrial latecomers to catch-up and compete in the global market place, can be sought as important South-South partners. South-South co-operation can also and provide market opportunities for African products in the South value chain.

Accelerating regional industrial integration in Africa

Africa countries can take advantage of regional integration to mainstream industrial policy and strengthen regional institutions. This would be essential to the promotion of focused continental, regional and national industrial policies. Regional integration would also be critical to the utilization of national and external resources, especially for infrastructure development – roads, airports, seaports, and efficient ICTs to link up the entire African region.

Industrialization through Value Added on Commodities

The continent needs to make use of its comparative advantage, using its natural resources as the cornerstone of industrial development. The abundant commodity base of many countries presents a

formidable opportunity as it provides the foundation to fuel the engine of growth. The Economic Commission for Africa's Economic Report on Africa (ERA 2013) makes a strong case for this. It notes that Africa has lots of natural resources. But unfortunately and sadly, most of them are exported in their raw form for processing in foreign countries. The challenge has been that, there are no strong industries in the various African countries to add value to raw materials been produced and this result in a greater percentage of the raw materials on the continent being left to the advantage of foreign buyers who come to dictate and manipulate the prices of these materials as they so desire, to the great disadvantage of the African economy. A case in point is the coffee industry where up to 90 per cent of Africa's total income from the commodity, calculated as the average retail price of a pound of roasted and ground coffee, goes to consuming countries in Europe, North America and Asia. African countries can benefit from their raw materials only by adding value to their raw materials.

4. Bridging the gap of industrial development in Africa: SME development, renewable energy, green industry development, private sector development and long term financing for industrialization (Still weak?????)

Africa has not been able to industrialize. McMillan and Rodrik (2011) noted that after a brief period of industrial growth following independence—largely driven by state investment and import substitution—Africa's industrial sector entered a quarter century of decline. Today on average manufacturing in Africa's low-income countries is smaller as a percentage of GDP than it was in 1985, and unlike Chile or India, agro-industry and tradable services have not taken up the space created. As a result, Africa has experienced very little growth enhancing structural change. Indeed, there is some evidence that since 1990 labour in Africa has moved from higher to lower productivity employment (Page, 2012). The failure of the continent to industrialized caused a gap between it and the developed world. There is a need to bridge this gap through SME development, renewable energy, green industry development, private sector development and long term financing for industrialization.

Small and medium scale enterprises can facilitate the bridging of the gap of industrial development in Africa. Industrial production in the global environment are consistently being internalized through the division of production to different stages located in different countries, according to the competitive advantages of each location. Bigsten and Soderbom (2009) opined that by segmenting production into a range of small, narrowly defined tasks, global value chains facilitate the participation of SMEs into international production networks, as it should be relatively easier for SMEs from developing countries to develop comparative advantages in a range of small, narrowly defined items by learning by doing and scale economies. Participation in global value chains also gives SMEs an opportunity to exploit large, profitable world export markets and engage in industrial and technological upgrading (UNIDO, 2004; UNCTAD and UNIDO, 2011). For example, small and medium enterprises played an important role in the development process of Taiwan. In 2003, almost 98% of the approximately 1.2 million enterprises were classified as SMEs, which realized 31.5 % of the total sales and employed 77.5 % of the workforce. Besides, SMEs accounted for 99.4 % of the 112,154 newly established enterprises in Taiwan (Veselka, 2005).

Long term financing for industrialization is also needed to bridge the industrial gap in Africa. While most commercial bank prefers to hub on short-term lending, long-term finance is required for industrial development. The continent can therefore leverage on the development finance institutions. Developing economies of Asia and Latin America utilized their National development banks as important sources of lending for industrial development. As a priority, African countries re-direct the focus of its existing development banks to enhance the accessibility of domestic firms to long-term finance. Clear-cut criteria governing the principle of lending should be situated in the context of encouraging industrial

sector development. Regional and financial institutions such as the African Development Bank (ADB) and the African Finance Corporation (AFC) should not be left out of this vision.

The international standard requirement to mitigate and adapt to climate change and to go green represents also represent an opportunity to bridge the industrial gap. According to UNIDO and UNCTAD (2011) Africa has an opportunity to be at the forefront of the green industrial revolution by implementing green industrial development based on low energy-intensity, low-carbon emissions and clean technologies as a latecomer in the industrial game. While industrially advanced economies will have to bear the costs of transiting towards a low carbon economy in the medium to long run, Africa has an opportunity to avoid such adjustment costs by leapfrogging directly into a clean industrial development right from the start. Doing so will allow the region to develop first-mover advantages over other industrialized economies, while waiting for investment and trade to be integrated in climate-friendly global policies. Future global policy developments for instance may link trade preferences accorded to developing countries to their mitigation and adaptation efforts. A greater number of developed countries may in the future impose environmental standards on imports and favour developing countries that are climate-friendlier production and investment locations. By building a green industrial economy, Africa can place itself ahead of other developing countries in terms of ensuring compatibility between its industrial strategy and its obligations under global climate policies (UNCTAD and UNIDO, 2011).

The wealthy endowment of the Africa's continent in sunlight, deserts, geographical locations situates the African continent as a potential competitive worldwide supplier of renewable energy in the areas of solar power, wind power and biofuels. The development of the renewable energy sector in Africa needs to go hand in hand with industrial development. In particular, renewable energy is needed to fuel the region's industrial growth and can also be a significant component of Africa's industry. African policymakers should redouble their efforts to promote the development and use of renewable energy (AU and UNECA, 2013). Existing initiatives to enhance the production of clean solar and wind energy should be motivated by African policymakers to serve as a basis of fast-tracking the industrial development strategy of the African continent.

Sustainable development of the private sector in Africa is another opportunity that can bridge the industrial gap in the continent. For example, AfDB, OECD, UNDP, UNECA (2012) observes that the Private sector development is key to sustainable inclusive growth. This is because Africa's Structural Transformation is highly dependent on a strong and competitive private sector. Boosting Africa's private sector entails providing support in improving the business environment and access to market opportunities; providing financing, business assistance and advisory services to companies; strengthening institutional frameworks and promoting commerce and the integration of regional markets (Kinyanjui, 2013). In addition (World Bank, 2013) reported that the International Finance Corporation (IFC) in a joint report of 31 multilateral and bilateral development finance institutions recognizes the private sector as a critical stakeholder and partner in economic development, a provider of income, jobs, goods, and services to enhance people's lives and help them escape poverty (Kinyanjui, 2013). Some African countries have recorded high level of success on the basis of close interaction with the private sector.

A number of African countries have successfully experimented with approaches to close coordination with the private sector. Gebreeyesus and Iizuka (2010) revealed that the Ethiopian cut flower industry in which government played an active and apparently successful role with the private sector. Monthly meetings involving representatives of the flower producers took place with both the Minister of Industry and the Prime Minister present. Firms were encouraged to identify barriers to their growth and action

points were agreed. Significantly, the relevant government agencies took prompt and effective action to address the constraints, and progress was monitored in succeeding meetings (Page 2012).

5. What Role for Industry within Africa in the Post-2015 Development Agenda?

5.1 Appraisal of the MDGs

The Millennium Development Goals (MDGs) have effectively forged a global consensus and mobilized public support for eradicating global poverty. They have become a major plank in international development. Their success makes it all the more important that a new global framework for development builds on the evidence and learning that has taken place to date in defining the new international development agenda. Addressing the shortcomings of the MDG narrative is though critical for identifying the most effective way to take the Millennium Declaration agenda forward after 2015.

The MDGs have been criticised on a number of counts. Table 1 presents a summary presented by the UN System Task Team on the Post- 2015 Development Agenda (2012) in the conceptualisation and characterisation of the MDGs. A fundamental problem with the MDGs is their narrow scope and oversimplification of the development process which leaves out some central aspects of development. According to UNIDO (2013), an economic dimension was clearly missing, perhaps as a result of a reaction to 'growth and infrastructure only' policies that held sway in development thinking until the early the 1990s.

Table 1: Strengths and Weaknesses of the MDG Agenda

Strengths	Weaknesses
Key conceptualization and characteristics of the MDG framework	
The integrated framework influenced policies by giving priority and operational meaning to various dimensions of human development;	Lack of consultants at its conception to build ownership led to the perception of a donor-centric agenda;
Simple, transparent and easy-to-communicate framework;	Excluded some important issues embodied in the Millennium Declaration;
It provided the basis for converging advocacy, thereby helping to strengthen the global partnership for development and directing global and natural resources towards poverty reduction and human development;	Inadequate incorporation of other important issues, such as environmental sustainability, productive employment and decent work, inequality;
It recognized the special needs of Africa and LDCs, LLDCs and SIDS and strengthened international commitments to address those needs.	Limited consideration of the enablers of development; Failure to account for differences in initial conditions.

Source: UN System Task Team on The Post- 2015 UN Development Agenda (2012)

The undue emphasis on "outcomes", rather than on development "processes" is seen as a major weakness. While the current MDG framework emphasizes the importance of economic growth and

employment generation to poverty reduction, it is silent about how growth can be promoted in a sustained and equitable way, and vague about the policies needed to achieve the Goals. The Washington Consensus, the implicit macro model of the MDG framework, has led to greater global economic integration but also to slow growth, rising instability and persisting inequalities.

There are also some missing or underemphasized issues which have become some of the most pressing priorities across the world, including: employment creation particularly for youth; climate change and environmental sustainability; inequality within and between countries; threats from violence; instability in global markets for finance, fuel and food; and democratic governance that gives voice to and is accountable to people.

In order to rectify the distortions noted above, there is a strong call, particularly from African governments, for a future framework to focus more on growth and employment, in order to support the productive sectors and promote structural transformation (UNECA, 2012). Poverty eradication remains a central objective, but its achievement and protection will require development strategies that are both inclusive and sustainable because long term poverty cannot be eradicated simply through social provisions. Economic growth is key but it needs to be socially inclusive and environmentally sustainable in order to eradicate poverty decisively.

The international community should pursue a wider and more transformative approach to development than was captured in the MDGs, if poverty is to be eradicated. In this regard, poverty should remain a core focus of this agenda, but the objective should be to tackle its causes by adopting a model of development that is more inclusive and sustainable. A stronger emphasis on promoting structural transformation and particularly job creation will be crucial to foster sustainable economic and social development. This may entail a fundamental reconsideration of the current development paradigm to ensure greater coherence of global action. A transformational agenda will require a greater emphasis on processes and transition paths (European Report on Development, 2013).

5.2. The Final report of the United Nations High Level Panel on the post-2015 development agenda

The United Nations is on the cusp of entering a bold new phase in ending poverty and ensuring meaningful and sustainable development with the release of the UN High-level Panel on the Post-2015 Development Agenda (HLP) at UN Headquarters in New York, on 30 May 2013. The report, produced by a 27-member panel of eminent persons, entitled "A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development." provides a valuable contribution to the ongoing debate on the post-2015 agenda and marks the first substantive stage in the unfolding global debate on what happens after 2015, the target expiry date for the eight Millennium Development Goals set by U.N. members in 2000.

The 81-page report sets out what it calls "five big, transformative shifts" that it argues need to occur to ensure the future of a global population that will have gone from seven billion currently to eight billion by 2030. These include: ending extreme poverty and making sure no-one is denied universal human rights and basic economic opportunities; ensuring sustainable development that halts climate change and environmental degradation; creating more jobs with inclusive economic growth and education; building peace with open and accountable governments; and a new spirit of global partnership.

Building on the lessons learned from the current MDGs and taking into account the follow up of the Rio+20 outcome, the Panel makes it clear that the post-2015 framework should address the whole

range of root causes of poverty and unsustainable development, including equality, equity, human rights, peace and stability.

The Report sets out 12 tentative goals to help focus and mobilize global and national efforts: End Poverty; Empower Girls and Women and Achieve Gender Equality; Provide Quality Education and Lifelong Learning; Ensure Healthy Lives; Ensure Food Security and Good Nutrition; Achieve Universal Access to Water and Sanitation; Secure Sustainable Energy; Create Jobs, Sustainable Livelihoods, and Equitable Growth; Manage natural resource assets sustainably; Ensure good governance and effective institutions; Ensure stable and peaceful societies; Create a Global Enabling Environment and Catalyze Long-Term Finance. Accompanying targets are aimed at the year 2030.

These goals are set to be "debated, discussed and improved" in the coming year and a half, the report contends.

5.3. Evaluation of the High Level Report

From the point of Economic Growth in general and industry in particular, the Report of the UN High-level Panel has made a fundamental shift from the current MDGs and it should be applauded. It substantially takes into account the weaknesses of the current MDGs and identifies transforming economies for jobs as one of the five transformational shifts. In this regard, it calls for a quantum leap forward in economic opportunities and a profound economic transformation to end extreme poverty and improve livelihoods. It posits that this implies a rapid shift to sustainable pattern of consumption and production- harnessing innovation, technology and the potential to create more value and drive sustainable and inclusive growth.

Goal 8 in the 12 illustrative goals and targets takes this forward. It specifies four specific goals to be met. These are:

- 8a. Increase the number of good and decent jobs and livelihoods by x^2
- 8b. Decrease the number of young people not in education, employment or training by $x\%$
- 8c. Strengthen productive capacity by providing universal access to financial services and infrastructure such as transportation and ICT.
- 8d. Increase new start-ups by x and value added from new products by y through creating an enabling business environment and boosting entrepreneurship 2, 3

Undoubtedly, all the goals have implication for industry and structural transformation, issues that are germane to Africa. Perhaps what is needed is how to define the national targets. This is what is taken up in the next section relying on UNIDO background notes.

5.4. Goal on "Promotion of vibrant and inclusive economies"⁴

Unambiguously, economic development, and in particular development of the productive sectors, is a critical driver of enduring poverty reduction. Through its emphasis on productive capacities and value-addition to primary resources, manufacturing has a transformative impact on economic structures and plays a pivotal role in encouraging technological development, productivity, innovation and trade.

⁴ This sub-section is taken from the proposed narrative and targets for inclusive and sustainable economies prepared by UNIDO.

Sustained prosperity requires a long-term strategy, and building a solid manufacturing base implies putting in place an environment of stable economic, legal and political conditions, as well as creating a policy incentive to invest in education, training and knowledge acquisition over time. Beyond this, it also achieves socio-economic impact that is reflected in the generation of employment and income and the promotion of skills and entrepreneurship. All combined, these have proven to be instrumental factors for enhancing human development overall.⁵ The promotion of vibrant and inclusive economies therefore will be key determinant for adequately responding to the persistent development challenges that endured the past decades in order to trigger the necessary social and economic transformation⁶ needed to realize sustained prosperity for all.

The private sector and its constituting characteristics build the foundation for a vibrant and inclusive economy. In developing countries, SMEs are responsible for a large proportion of economic activity and hence are important actors for driving economic growth, equitable development and job creation. A strong enabling environment is needed for the private sector to prosper and to bring about more inclusive market outcomes in the form of more sustainable jobs and income as well as affordable goods and services. The public sector must promote institutional reforms and a pro-active policy environment that incorporates a long-term development vision and builds trust and cohesion. Hence, tailored strategies for investment in infrastructure, education, technological progress and innovation, as well as social services will be needed.

In this context, the importance of trade participation and export promotion has been repeatedly highlighted as a catalyst for development progress.⁷ Engaging in global markets has been a large factor in the success of developing countries in Asia and elsewhere in the past years. For countries to trade internationally, they are increasingly dependent on the attractiveness of their private sector enterprises as partners for transnational corporations and their ability to enter into global value chains. This requires substantial supply-side investments to increase the productivity of producers and help firms diversify into new products with high export potential. Market conformity, enabling these same enterprises to ensure that their products conform to relevant international standards, is of equal importance. In addition, complementary policy reforms are necessary so as to lower the cost of trading for developing countries. Furthermore, trade participation can also drive the stronger integration of corporate social responsibility considerations into the business conduct of enterprises in developing countries.

Fostering "vibrant and inclusive economies" promises to be an effective response to the high priority poor people place on jobs and financial security as it is an essential lever for lifting themselves out of poverty. Such economies would also be more resilient to external shocks as they are well prepared to develop the productive resources, entrepreneurial capabilities and production linkages which allow a country to produce the goods and services that enables it to enjoy more stable, inclusive and

⁵ e.g. "Human Development Report 2013 – The Rise of the South", UNDP (2013)

⁶ As highlighted in the Communiqué from the Meeting of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda in Monrovia, this transformation agenda should: create jobs, develop infrastructure, raise productivity, improve competitiveness and promote sustainable production and consumption.

⁷ "Manufacturing the Future: the next Era of Global Growth and Innovation", McKinsey Global Institute (2012)

sustainable growth. However, it will be crucial to ensure that the pursuit of this goal is well coordinated with the measures to ensure more environmentally sustainable patterns of production and consumption. In regards to implementation, this goal could suggest a meeting point between the aid agenda of traditional donors, priorities of emerging development partners and current development concerns of recipient countries thus laying the foundation to realize a global partnership for sustained prosperity for all.

Related targets:

The "promotion of vibrant and inclusive economies" is dependent on set of interconnected indicators which should include concrete targets on the following issues:

- *productive capacity: value addition (e.g. Manufacturing Value Added, MVA)*
- *an enabling environment for business: ease of doing business; modern regulatory and legal framework; trade facilitation; access to finance; etc. (e.g. IFC's Doing Business Index);*
- *infrastructure: access, quality and sustainability of transport, energy, water, telecommunications systems*
- *employment: highlighting the labour/productivity dimension of industry*
- *entrepreneurship: access and quality of skills training and education for productive activity*
- *integration of local, regional and global value chains*
- *resource mobilization for productive investment*
- *economic resilience and connectedness (e.g. UNIDO's Competitive Industrial Performance Index; UNIDO's Connectedness Index)*

6. Conclusion

The conditions for Africa's sustained growth and development are much more propitious than ever due to several mutually reinforcing factors. First, many African countries have put in place appropriate macroeconomic, structural and social policies, which is contributing to improved GDP growth rates. This has also acted as a buffer in mitigating the adverse effects of the global economic and financial crisis of 2008-09. Following the brief interruption of Africa's economic expansion of the last decade by the global economic and financial crisis, output growth in most of the region's economies has recovered to pre-crisis levels. Second, returns on investment in Africa are among the highest in the world with success of ICT, especially mobile phone penetration, showing how rapidly a sector can grow. Private capital inflows are higher than official development assistance (and FDI is higher than in India). Africa's private sector is increasingly attracting investment, with much of the funding coming from domestic banks and investors. Interestingly, China, India and others are investing large sums in Africa.

Third and perhaps more importantly, there is greater consensus among Africans now on what needs to be done to accelerate growth, reduce poverty and promote sustainable development in the continent. Regional initiatives under the African Union (AU) and the New Partnership for African Development (NEPAD) are allowing African countries to improve governance; assume leadership and accountability for their development; increase trade within Africa and the world; and enhance the provision of regional public goods such as cross-country transportation and electricity pooling. Beyond the structural adjustment programmes of the 1980s and 1990s which contributed to the de-industrialisation of the

continent, African leaders have, in recent years, once again shown a new commitment to the industrialization of the region in both the short and long-term, and have thus taken a number of major initiatives in this regard. This is also a groundswell of activities around industry in Africa. The 6th Joint United Nations Economic Commission for Africa-African Union Commission meeting of Finance, Planning and Development Ministers met in Abidjan on 25th and 26th of March 2013 and deliberated on the theme "Industrialization for an Emerging Economy". What is needed is to sustain the current momentum. Africa needs to take advantage of these developments to reinvigorate industrialization.

The African Union Plan of Action for the Accelerated Industrial Development of Africa (AIDA), which was adopted during the CAMI 18 and endorsed by the leaders of Africa during its January 2008 Summit dedicated to the theme: "the industrialization of Africa." is still very much relevant as Africa's blue print for Industrial development. There is need for the Commission of the African Union to speedily operationalize in collaboration with the United Nations Industrial Development Organization (UNIDO) to operationalize it as Africa's blueprint for Industrial development.

DATA APPENDICES

Table A1. Africa's Millennium Development Goal performance at a glance, 2013

Goal	Status	Best performing countries, selected targets and indicators
Goal 1: Eradicate extreme poverty and hunger	Off-track	Target 1A: Egypt, Gabon, Guinea, Morocco, Tunisia Target 1B: Burkina Faso, Ethiopia, Togo, Zimbabwe Target 1C: Algeria, Benin, Egypt, Ghana, Guinea Bissau, Mali, South Africa, Tunisia
Goal 2: Achieve universal primary education	On-track	Indicator 2.1: Algeria, Egypt, Rwanda, Sao Tome and Principe Indicator 2.2: Ghana, Morocco, Tanzania, Zambia
Goal 3: Promote gender equality and empower women	On-track	Indicator 3.1: The Gambia, Ghana, Mauritius, Rwanda, Sao Tome and Principe Indicator 3.2: Botswana, Ethiopia, South Africa Indicator 3.3: Angola, Mozambique, Rwanda, Seychelles, South Africa
Goal 4: Reduce child mortality	Off-track	Indicators 4.1 and 4.2: Egypt, Liberia, Libya, Malawi, Rwanda, Seychelles, Tunisia
Goal 5: Improve maternal health	Off-track	Target 5A: Equatorial Guinea, Egypt, Eritrea, Libya, Mauritius, Rwanda, Sao Tome and Principe, Tunisia Target 5B: Egypt, Ghana, Guinea Bissau, Rwanda, South Africa, Swaziland
Goal 6: Combat HIV/AIDS, TB, malaria and other diseases	On-track	Target 6A: Cote d' Ivoire, Namibia, South Africa, Zimbabwe Target 6B: Botswana, Comoros, Namibia, Rwanda Target 6C: Algeria, Cape Verde, Egypt, Libya, Mauritius, Sao Tome and Principe, Sudan, Tunisia
Goal 7: Ensure environmental sustainability	Off-track	Target 7A: Egypt, Gabon, Morocco, Nigeria Target 7C: Algeria, Botswana, Burkina Faso, Comoros, Egypt, Ethiopia, Libya, Mali, Mauritius, Namibia, Swaziland
Goal 8: Global partnership for development	Off-track	Target 8F: Kenya, Libya, Rwanda, Seychelles, Sudan, Uganda, Zambia

Source: African Union, et. al. (2013).

Table A2: Manufacturing Value Added (MVA) For Africa

Country	MVA (2012) \$US in 000	MVAPC (\$US in 000)							MVA, 2012 (% of GDP)	MVA, 2012 (Africa's % Share)
		1990	1995	2000	2005	2010	2011	2012		
Algeria	5,757,923	237.16	184.95	167.59	174.32	160.04	158.78	157.81	4.71	4.35
Angola	2,150,436	70.92	42.39	50.55	65.55	97.61	101.33	106.65	3.61	1.62
Benin	362,930	31.77	35.72	41.84	42.19	39.75	39.30	38.81	6.46	0.27
Botswana	478,920	164.34	173.56	171.54	191.83	225.23	229.83	233.28	3.71	0.36
Burkina Faso	990,636	36.90	34.34	38.54	53.92	56.25	56.80	56.67	12.52	0.75
Burundi	145,134	25.65	18.77	18.74	18.31	16.05	16.30	16.59	9.61	0.11

Cameroon	3,282,972	173.52	131.75	160.26	163.04	156.28	157.99	160.39	15.68	2.48
Cape Verde	78,008	115.61	138.11	155.58	123.10	146.55	150.20	154.47	5.28	0.06
Central African Republic	90,386	32.71	30.36	26.30	23.74	19.03	19.30	19.75	5.40	0.07
Chad	293,323	35.02	24.32	22.58	27.96	25.38	25.01	24.79	4.54	0.22
Congo	380,631	73.02	53.69	41.63	68.90	84.70	86.17	89.92	4.47	0.29
Democratic Rep of the Congo	720,870	30.77	13.08	7.85	7.96	9.14	9.71	10.36	6.67	0.54
Djibouti	22,496	41.49	24.49	19.07	20.18	23.25	23.76	24.37	2.27	0.02
Egypt	20,578,919	115.84	131.58	179.39	192.72	238.19	241.41	245.11	16.38	15.54
Equatorial Guinea	38,284	6.59	7.28	8.12	18.15	45.24	48.35	51.71	0.30	0.03
Ethiopia	980,024	9.02	6.17	6.49	7.29	10.33	10.83	11.32	4.23	0.74
Gabon	439,904	236.22	198.62	224.38	260.11	252.58	267.31	281.27	3.91	0.33
Gambia	41,479	198.62	224.38	260.11	252.58	267.31	281.27	27.93	4.87	0.03
Ghana	1,191,056	66.99	34.80	38.78	42.88	43.13	45.41	46.62	6.51	0.90
Guinea-Bissau	41,762	22.04	23.87	22.01	30.12	28.26	28.65	26.43	6.14	0.03
Kenya	2,641,479	64.11	62.05	54.32	55.43	60.24	60.87	61.79	10.27	1.99
Lesotho	324,195	38.82	51.47	71.68	118.00	127.69	137.20	146.23	17.31	0.24
Liberia	56,322	19.69	1.45	9.54	10.34	13.06	13.08	13.27	5.95	0.04
Libya	2,994,576	343.11	379.30	355.33	414.83	444.19	238.39	462.91	6.18	2.26
Madagascar	807,259	41.41	35.11	36.82	35.78	37.73	37.24	38.81	13.33	0.81
Malawi	432,474	31.37	30.72	27.21	17.96	27.44	27.34	27.23	10.06	0.33
Mali	167,022	16.90	17.47	11.34	11.84	9.48	9.53	10.23	2.52	0.13
Mauritania	148,985	69.29	72.38	76.90	66.25	41.84	41.46	41.12	4.80	0.11
Mauritius	1,308,215	634.17	752.46	942.63	868.12	960.80	982.24	995.60	15.52	0.99
Morocco	10,508,880	230.19	239.24	255.01	286.41	310.26	316.33	322.37	12.90	7.93
Mozambique	1,251,873	15.69	12.36	25.60	44.48	44.82	47.82	51.15	11.92	0.95
Namibia	1,195,921	364.13	375.72	351.58	433.80	477.29	490.02	505.89	12.38	0.90
Niger	247,684	23.14	19.67	16.53	15.94	15.29	14.98	14.88	4.88	0.19
Nigeria	5,505,411	22.26	18.57	16.67	22.50	30.09	31.58	33.04	3.09	4.16
Rwanda	283,375	21.25	15.77	14.28	19.72	23.18	24.24	25.14	6.57	0.21
Sao Tome and Principe	9,651	41.69	40.08	40.93	47.40	54.20	55.05	56.11	5.77	0.01
Senegal	1,338,571	101.27	102.27	103.81	105.60	101.75	101.77	102.12	12.18	1.01
Sierra Leone	41,661	20.98	33.16	7.09	6.55	6.30	6.09	6.80	2.00	0.03
South Africa	46,218,273	836.49	748.86	782.30	852.54	878.90	897.41	910.92	15.11	34.89
Sudan	2,352,670	37.03	37.94	56.11	57.83	71.15	69.90	68.55	7.12	1.78
Swaziland	858,118	667.74	681.48	696.55	717.51	735.62	726.93	703.38	30.20	0.65
Togo	239,257	34.99	32.64	33.69	33.41	34.99	36.46	38.08	8.80	0.18
Tunisia	6,750,576	313.64	379.47	474.63	509.79	596.09	610.87	630.80	16.64	5.10
Uganda	1,085,922	7.98	12.35	19.88	22.77	27.32	28.89	30.49	7.24	0.82
United Republic of Tanzania	1,971,163	22.71	19.27	22.40	28.95	37.88	39.57	41.36	8.82	1.49
Zambia	1,130,197	67.83	56.12	59.02	67.05	76.78	79.12	81.40	10.17	0.85
Zimbabwe	778,224	135.75	118.56	103.38	69.23	58.39	60.30	59.80	13.31	0.59

Table A3: Manufacturing Value Added (MVA) For BRICS

Country	MVA (2012) \$US in 000	MVAPC (\$US in 000)						MVA, 2012 (% of GDP)	
		1990	1995	2000	2005	2010	2011		2012
Brazil	151,622,904	690.74	724.41	680.52	736.44	775.31	779.14	764.38	13.26
China	1,552,745,616	117.01	231.81	352.76	561.07	987.01	1,062.55	1,147.12	34.35
India	205,662,229	54.94	69.58	81.36	103.35	149.27	158.00	163.44	14.89
Russian Federation	135,138,319	985.89	521.01	607.52	832.85	867.22	908.84	946.99	13.76
South Africa	46,218,273	836.49	748.86	782.30	852.54	878.90	897.41	910.92	15.11

Table A4: Africa's Science and Technology Indicators

Country	Total number of researchers (FTE)	Researcher per million (FTE)	Technicians per million inhabitants (FTE)	GERD (% of GDP)	GERD (in PPPS thousands)	GERD (per capita PPPS)	Total (2008)
Benin	1,000	119	-	-	-	-	153
Botswana	1732	942	222	0.5	111714	60.7	138
Burkina Faso	187	13	27	0.1	18392	1.2	179
Cameroon	462	26	-	-	-	-	463
Cape Verde	60	132	33	-	-	-	N/A
Central African Republic	41	10	-	-	-	-	N/A
Congo Republic	102	34	37	0.1	-	-	N/A
Cote d'Ivoire	1269	66	-	-	-	-	171
Democratic Republic of Congo	10411	176	26	0.5	75217	1.3	N/A
Ethiopia	1615	21	12	0.2	106753	1.4	364
Gabon	150	107	30	-	-	-	N/A
Gambia	46	30	18	-	-	-	N/A
Guinea	2117	253	92	-	-	-	N/A
Lesotho	20	10	11	0.1	1563	0.8	N/A
Madagascar	937	50	15	0.1	25753	1.4	141
Mali	513	42	13	-	-	-	N/A
Mozambique	337	16	35	0.5	83105	3.9	N/A
Niger	101	8	10	-	-	-	N/A
Nigeria	28533	203	77	-	-	-	1869
Senegal	3277	276	-	0.1	16252	1.4	211
Seychelles	13	157	640	0.3	4519	54.5	N/A
South Africa	18574	382	130	0.9	4100875	84.3	5248
Togo	216	34	17	-	-	-	N/A
Uganda	891	29	18	0.4	128012	4.2	354
Zambia	792	67	106	0.0	3840	0.3	194

N/A – not available

Source: Compiled from UNESCO Science Report, 2010.