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**Structural Transformation, Economic Development, and
Industrialisation in Africa Post-Covid-19**

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Abstract

Industrialisation is crucial for African countries to transform their economies and create jobs. Africa's industrial growth has been significant over the past two decades. Even though manufacturing's value-added share has slightly declined from 12.6% to 11.3% of GDP between 2000 and 2017, it picked up by 2 percentage points since the trough of 2012, and in real terms (at constant 2010 US dollars), its per capita contribution has increased significantly. Whilst Africa's "premature deindustrialisation" appears to be the dominant global narrative, recent analysis of the data suggests that de-industrialisation is not the common experience for the majority of African countries. Although industrialisation in Africa has been somewhat disappointing so far, this should not be seen as proof of its declining importance. Instead there should be renewed effort and additional policy focus to promote industrialisation.

The African Union and African countries have expressed a strong desire for industrialisation. However, there are several challenges facing the policy framework needed to support it: (i) the current policy environment is still too much focused on general investment climate issues and too little on targeted, facilitatory actions for specific sectors; and (ii) even when there is a commitment to industrial policy, this is not always followed through to implementation because of weak institutions or an unfavourable political economy.

The recent Covid-19 pandemic and its devastating effects on Africa's economy and industrialisation efforts have reinforced sceptical views about Africa's possibilities for accelerated industrialisation in a complex global environment. However, we identify three positive issues that have appeared during the Covid-19 crisis which will be important in economic recovery efforts: (i) repurposing, accelerated pharma production and joint procurement; (ii) increased attention to agro-processing; and (iii) use of technological advances. Beyond the immediate challenges and opportunities, we also identify three major areas of focus for Africa's industrialisation which can be used for Africa to play an increasingly positive role on global industrialisation efforts in the decade ahead: green industrialisation, digitalisation, and regional integration.

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1. Introduction

Export-intensive industrialisation has created jobs and transformed economies across the world over the past few decades. Africa needs to step up its efforts to be part of this trend. Industrialisation is critical if the continent is to achieve structural change and a higher quality of growth that translates its recent modest growth rates into significant social development and the creation of decent jobs. It is through the promotion of appropriate industrial policies and strategic government interventions in the economy's productive structure that structural transformation will be made possible (see e.g. Oqubay and Ohno, 2019; Lopes, 2019; Ansu et al, 2016b). This paper examines Africa's industrialisation record, painting a mixed picture in which manufacturing as a share of GDP has declined over the past two decades, but increased in absolute value. This record does not provide, however, evidence of "premature deindustrialisation". The paper then examines how policies and institutions could be improved to spur the rate of Africa's industrialisation. The Covid-19 crisis has significantly dented these efforts, but there are also reasons to believe there has been a positive structural response. Finally, it argues that green industrialisation, digitalisation, and regional integration all offer significant opportunities for Africa's medium to long-term future.

The role of industrial policy has often been subject to debate (Rodrik, 2013; Ansu et al, 2016b). Recently two reputable IMF economists, Cherif and Hasanov (2019) have broken the taboo within their organisation about the benefits of industrial policy. The Economist (2020) wrote an article about the surprising renewal of calls for industrial policy approaches in Europe, unthinkable just a few years back. They mention that "[Europe]... is espousing statist policies invented in 17th century - and updated in contemporary China - which seek to pick winners and throw taxpayers money at them". Or, as the IMF economists mentioned above indicate in more nuanced language "Governments have directed capital and labour into industrial ventures that firms probably would not have undertaken without appropriate incentives".

These shifts are not unlike the abundant, sterile, ideological debates that revolved around the content and appropriateness of Washington Consensus policies, now apparently buried. It signifies, nevertheless, a turn towards a newfound interest in industrial policy by those who negated its benefits for a long time (Atolia et al, 2018). But, even with this renewed interest, doubts remain on whether Africa can industrialise, whether it has the capacity and what it takes to implement industrial policies. For many analysts Africa has already lost the chance to enter this stage of economic development, given its marginal manufacturing capabilities, poor human and institutional capacity, and technological deficits. The reasons for such strong adverse views could be linked to widespread recent opinion that industrial policy has only been successful thanks to the highly idiosyncratic practices found in the "miracle economies" of Japan, South Korea, Taiwan and Singapore, before being perfected in China, and subsequently spread to its neighbours.

The reality though is that all currently industrialised countries had an industrial policy at some point, they all used trade protectionism and, to a certain extent, mostly went through a catch-up strategy for their economies (Chang, 2002 and 2013; Rodrik, 2004, 2009 and 2011). The question that remains is whether Africa can do the same?

Being amongst latecomers, African countries could theoretically avoid the pitfalls of others and leapfrog using innovation and advances in technology. Even though the policy conditions for Africa's industrialisation are now more difficult than before, due to greater levels of global competition, skewed

intellectual property regimes and renewed protectionism, the rise of countries determined to shift towards structural transformation suggests it may be feasible.

The importance of industrial policy for Africa and the rest of the developing world may be shifting away from the theoretical argument to the practical implementation challenges (ECA and AUC, 2013; Rodrik, 2013). While experts agree on the need for industrial upgrading and state interventions, there are divergent views on whether industrial policy should favour a country's comparative advantage or rather look beyond such a principle and embrace dynamic competitive advantages (Lin and Chang, 2009).

For Africa to realise its full potential, it needs to address some of the challenges it faces, i.e. human capital, infrastructure gaps, policy and regulatory failures as well as the need to mobilise domestic resources. For instance, the lack of a skilled workforce hinders investment in more specialised forms of production. Inadequate energy infrastructure, which often results in frequent power outages in many countries across the continent, reduces manufacturing potential and output while increasing risk factors for value chains. These are real implementation challenges that need institutional capacities and smart approaches.

What is going to make a difference for the success of industrialisation in Africa is a combination of factors, including effective policies and the demonstration of skilled agency. These are characteristics associated with transformative leadership. Africa's path towards accelerated industrialisation will most probably be different from previous experiments in other regions. Even though policy learning is a must, simple imitation is not. What lies ahead is quite different and will require innovation and adaptation.

The 2008-2009 financial crisis was a clear demonstration of the depth of global interconnectivity. At the peak of the financial crisis, in addition to its far-reaching impacts on the US, Europe, China, and Japan, innocent 'bystanders' in countries as far flung as Burkina Faso or Lesotho, amongst many other African countries, found themselves feeling the effects of far-away investors' fears. Such events in the global economy – provoking commodity price volatility and the rise of protectionism - serve as a reminder of the importance for Africa to industrialise, diversify and trade in high value-added products. The current Covid-19 pandemic has reinforced sceptical views about accelerated industrialization in Africa, given the complex global environment. Three issues appear particularly important in the recovery from Covid-19: repurposing, accelerated pharma production and joint procurement initiatives led by the African Union, agro-processing, and use of technological advances.

Beyond the immediate challenges and opportunities, three major issues confront Africa's industrialisation in the decade ahead: green industrialisation, digitalisation, and regional integration. Each of these issues requires active policies to make them a success for the future of African industrialisation.

This paper discusses experiences and issues around performance of industrialisation and policies to support it in Africa. Section 2 discusses historical patterns of industrialisation and structural transformation. Section 3 discusses the role of policies and institutions in supporting Africa's industrialisation including some country examples. Section 4 considers the impact of Covid-19 on industrialisation efforts. Section 5 takes a longer view on issues crucial for the future of Africa's industrialisation. Section 6 concludes.

2. Historical patterns of industrialisation and structural transformation in Africa

The story of Africa's industrialisation is similar in some facets to the historical experience of other regions but is also quite divergent, in many respects. In order to capture the essential threads of the last three decades, it is important to remember the obvious principle that industrialisation is more than just manufacturing. It is about moving the economy into systems of production aligned to industrial methods of work, modern structures, and measurements of productivity (Lopes, 2019; de Vries et al, 2015; Chang, 1996 and 2002).

In any industrialisation effort, manufacturing emerges as a key economic activity because it fosters forward and backward linkages, dynamic economies of scale, innovation and technology diffusion, and positive spill-over effects within and across sectors. Proponents of industrial policy point to the presence of market and coordination failures, knowledge and skills upgrading across sectors, and dynamic economies of scale as key aspects to address (Stiglitz et al., 2013; Rodrik, 2009; Pack and Saggi, 2006). While this view of industrial policy receives considerable support, at least in theory, critics also point to the inability of governments precisely to identify sectors or firms that any such policy should target. The role of the state in addressing such challenges cannot be overemphasized (Amsden, 1990; Chang, 1996 and 2002; ECA, 2011 and 2016b; Kelsall, 2013; Lin, 2010 and 2011; Lopes et al, 2017; Rodrik, 2009). This challenge is the starting point for the discussion about smart state interventions favouring industrial policy.

The literature describes earlier attempts by African countries to industrialise as mostly unsuccessful, with economic production remaining largely agrarian, subsistence-based and with limited value addition (Mkandawire, 2001; Elhiraika et al, 2014; Mbate, 2016; Chang, 2013; de Vries et al., 2013; Lopes, 2015 and 2019).

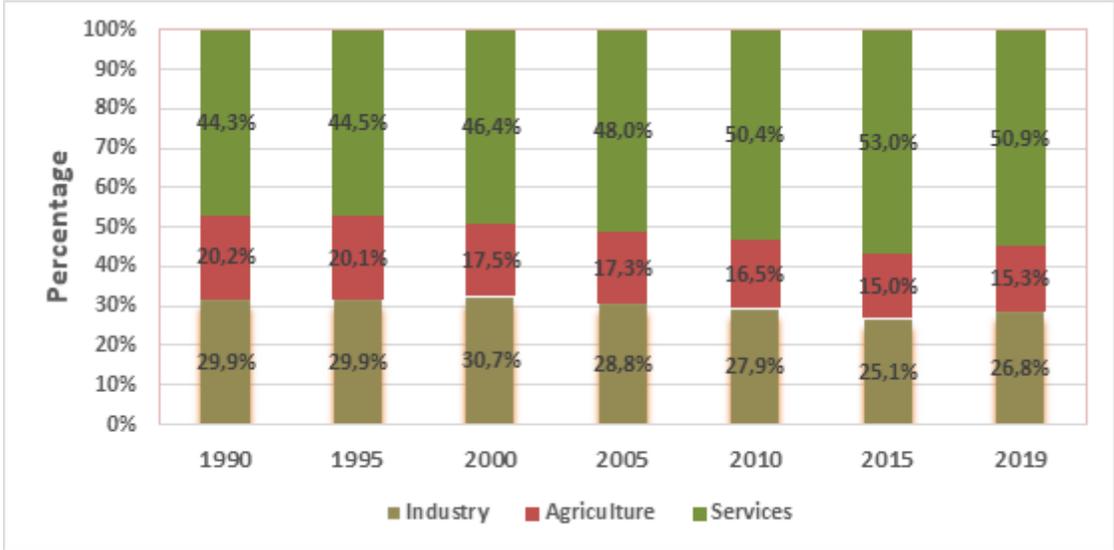
The structural transformation imperative of shifting from subsistence and informal activities into high-productivity activities has been slow. The reasons for such a failure include:

- a weakly articulated policy notion of comparative advantage,
- domestic programmatic failure, such as unsustainable subsidies of production inputs,
- inappropriate monetary and fiscal policies, linked to political economy issues,
- and structural impediments such as infrastructural and human capital deficits (Stiglitz et al., 2013; Mkandawire, 2014; Chang, 2013, Oqubay and Ohno, 2019).

Consequently, observers note that manufacturing has either stagnated or declined over time. It is true that the share of industry and agriculture in Africa's GDP has declined, mostly because of the worldwide surge in the value of services. Therefore, it will not be with this indicator alone that one would identify any Africa distinctiveness (see Figure 1). The exponential growth of activities, such as mobile telephony, financial services and the drastic cost reduction of transmitting information have dramatically expanded the value of services worldwide. From 1990 the services sector has increased from 44.3% of total African combined GDP to 50.9% in 2015, whereas the industrial sector percentage slightly diminished from 29.9% to 26.8% over the same period (Figure 1).

Evidence suggests that the low growth in agricultural productivity is the result of the shift towards services which has increased in value rather than due to MVA decline alone.

Figure 1 Sectoral Composition of Africa's GDP (1990-2019)



Source: *Authors computation using World Development Indicators (2020).*

African manufacturing experienced significant growth in the immediate post-independence period in the 1960s, a period marked by state-led investments, and highly protective trade policies, until the first oil price shock of the 1970s created an adverse environment, interest rates shot up, commodity prices other than oil collapsed, and the limits of state interventionism met corruption and inefficiency. External shocks were magnified in the early 1980s, creating space for the era of structural adjustment policies. These latter policies became a nail in the coffin of an emergent African manufacturing sector for reasons that have been explained elsewhere (see e.g. Signe, 2018, Lopes et al, 2018, McMillan et al, 2014). This situation remained unchanged until the end of the last century, a period where it was almost forbidden to mention industrial policy or promote an active role for the state.

Perhaps assessing the role industry has played in Africa’s growth trajectory since the beginning of this century, the post-structural adjustment period, provides a more balanced view of Africa’s recent trajectory (Lopes, 2019). Dasgupta and Singh (2006) remind us that during the structural adjustment policies of the 1980s and 1990s “countries have begun to specialise according to their current comparative advantage instead of their long-term dynamic comparative advantage. Furthermore, these economies have become more vulnerable to external economic shocks”.

Yet as demonstrated in Table 1 below, industrial growth measured as value addition per capita has been significant. Even though the manufacturing sector’s value addition has declined (as % of GDP), between 2000 and 2017, its per capita contribution at constant 2010 US dollars has increased. Given the change in size of Africa’s combined GDP in Purchasing Power Parity from \$2.9 trillion in 2000 to \$6.7 trillion in 2019, at constant 2017 \$ prices, the change in the size of the continent’s economy has been very significant (World Development Indicators, 2020).

Table 1 Africa’s Industry share of GDP and manufacture relative size of GDP (2000-2017)

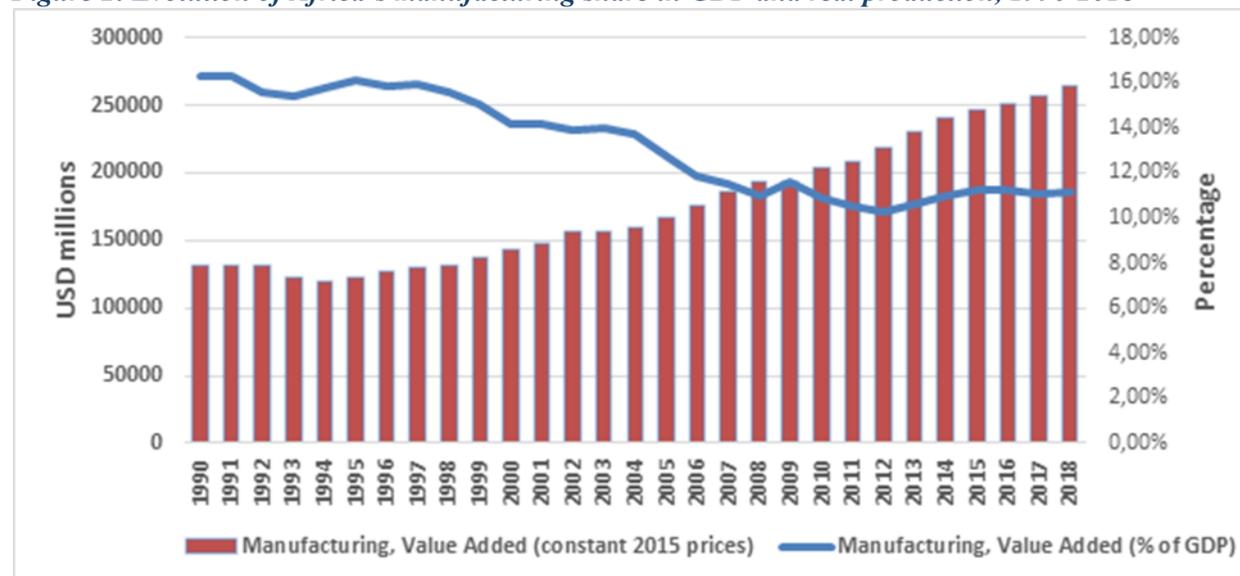
Year	Industry growth (% of GDP)	MVA (% of GDP)	MVA per capita (at constant 2010 USD)
2000	30.7	12.6	159
2005	28.8	11.3	168
2010	27.9	9.7	185
2015	25.1	10.0	197
2017	26.0	10.1	196

Source: World Development Indicators (2020) & UNIDO (2018)

The picture of the continent’s performance is, therefore, more complex than it appears at first glance. Although the manufacturing sector has not been growing as expected – particularly if compared to the recent economic accomplishments of East Asian countries - there is a wide variety of performance patterns within the countries of the continent (some decreasing, other increasing) that is important to assess (Lin 2011 and 2012b; Stiglitz et al., 2013; Newman et al., 2016; Monga, 2017; Naude, 2019).

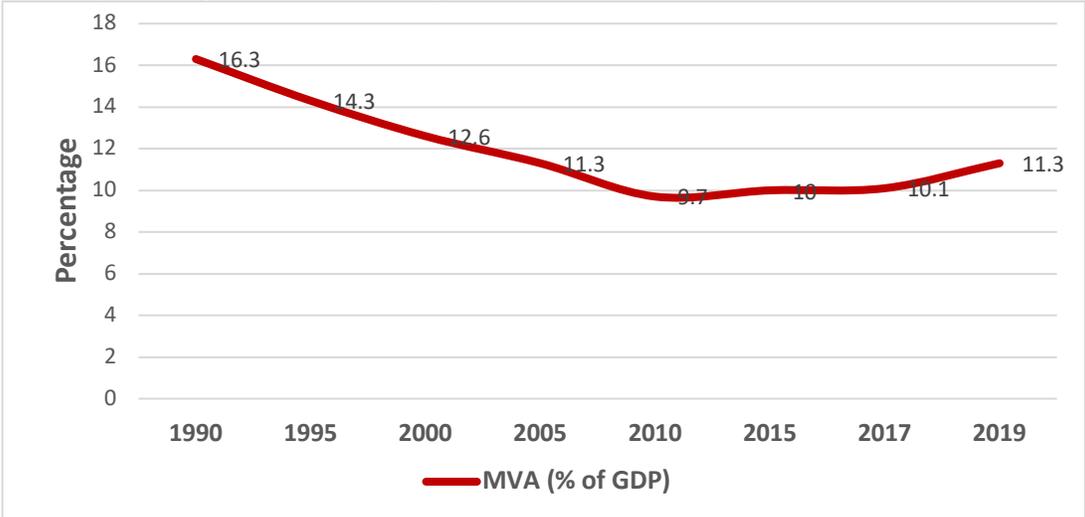
According to UNIDO (2018) the quantity of manufactured goods produced globally has been rising faster than other goods and services. In Africa, though, manufacturing growth is lagging in most countries, but a few have posted acceptable growth (Signé, 2018, Jerome and Adjakaye, 2019), such as Rwanda, Ethiopia and Tanzania. Although MVA as a percentage of GDP has been experiencing a relative decline in Africa, the real level of production grew every year (Table 1). UNCTAD data demonstrate the same trends for the period 1990 to 2018 (Figure 2). The reason for a relative decline in nominal terms is fundamentally due to increased productivity levels with faster production producing lower relative prices — resulting in smaller value addition indicators (RMB, 2020).

Figure 2: Evolution of Africa’s manufacturing share in GDP and real production, 1990-2018



Source: Authors’ compilation using UNCTAD Stats (2020)

Figure 3 Manufacturing Value-Added in Africa (1990-2019)



Source: Authors’ computation using World Development Indicators (2020).

The World Development Indicators (Figure 3) show that Africa’s MVA, as a percentage of nominal GDP, had declined from 16.3% in 1990 to about 9.7% in 2010, before experiencing a partial turn around. In 2019 it was already at 11.3%. According to some authors (te Velde, 2019; Balchin et al., 2016a) Sub-Saharan Africa’s manufacturing production value more than doubled from \$73 billion to \$157 billion, growing 3.5% annually in real terms from 2005 to 2014. They highlight countries with significant growth, such as Uganda with a 5% growth from 2010 to 2014; Zambia with 6% from 2008 to 2012; and Tanzania with more than 7% in the last decade. McKinsey (2016) put continental Africa’s manufacturing production rather at \$500 billion a year, with 70% of that production consumed domestically, about 10% exported across the continent and only 20% exported globally. They projected Africa’s industrial production possibly attaining \$930 billion by 2025, before Covid-19 disturbed such expectations (McKinsey, 2016).

Although the share of total manufactured exports from Africa remains a small fraction of what is imported, there have been some significant strides made in changing this dynamic. The share of manufactures in total exported goods has increased from a low of 18.7% in 2012 to 35.7% in 2017 (RMB, 2020). At a regional level, Southern Africa ranks first, with North Africa lagging by a slight margin. The share of manufactured imports has declined in some regions i.e. East, Central and North Africa (RMB, 2020), suggesting a shift from reliance on imports to more self-sufficient and export-driven economies.

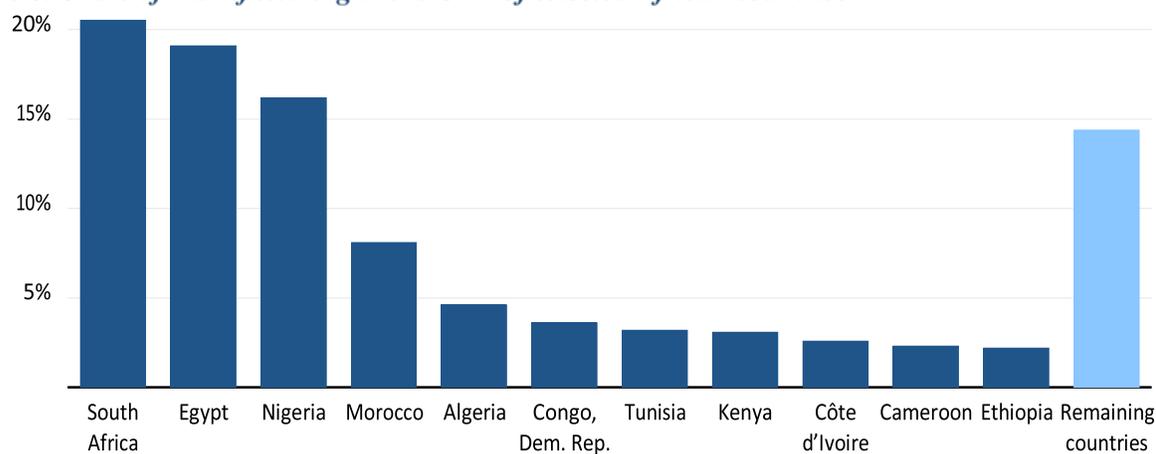
Over the past decade, most African countries - except The Gambia, Sierra Leone, Lesotho, Somalia and Tunisia - have had a growth rate in the manufacturing sector, ranging from 0.1% in Mozambique to 14.6% in the newest African country of South Sudan (RMB, 2020). Obviously looking into just the past decade does not do justice to the full picture. Countries like Zimbabwe or Sudan, to name just two, have lost significant manufacturing capacity in the last two decades.

Of the 400 African corporations with a turn-over above \$1 billion, a larger number than many observers might assume, most are in the industrial and services sectors. And according to a McKinsey survey they are doing better in terms of profits and overall growth performance than their global peers; and this despite the dreadful ecosystem limitations they face (McKinsey, 2016).

For the past several decades, because Africa countries have mistakenly not prioritised industrialisation and value-addition as critical elements of their development strategies, the consequences have been dire (Figure

4). Although the three largest economies on the continent have significant manufacturing in the composition of their GDP, the majority of African economies have been lagging (Signé, 2018).

Figure 4: Share of manufacturing in the GDP of selected African countries



Source: Signé, 2018.

African countries missed opportunities to industrialise by capitalising on the continent’s abundant natural resources, adding value to them, or supporting the development of infant industries, which has driven them into stagnation and higher economic dependence. When they prioritised industrial development, they mostly adopted the Special Economic Zones (SEZ) approach, in the hope of mimicking their success in other geographies, particularly South East Asia, China, Brazil and Mexico (Newman and Page, 2017). But few did well, and most were disappointed (Kweka and te Velde, 2020; Oqubay and Lin, 2020).

Egypt, Kenya, Madagascar, Mauritius, Namibia, Nigeria and Zambia each have more than 10 SEZs. Ethiopia is about to attain the same number. The high expectations associated with SEZs have not been met. The lack of understanding of how to get a foothold in Global Value Chains or how to create meaningful business attractiveness, beyond brick and mortar approaches, reduced the possibilities of success. In fact, the SEZs on their own are not enough to ensure backward and forward linkages and the use of industrial chains to propel productivity through innovation, technology and augmented capabilities. Export-driven industrialisation approaches must be mixed with other tools and tactics.

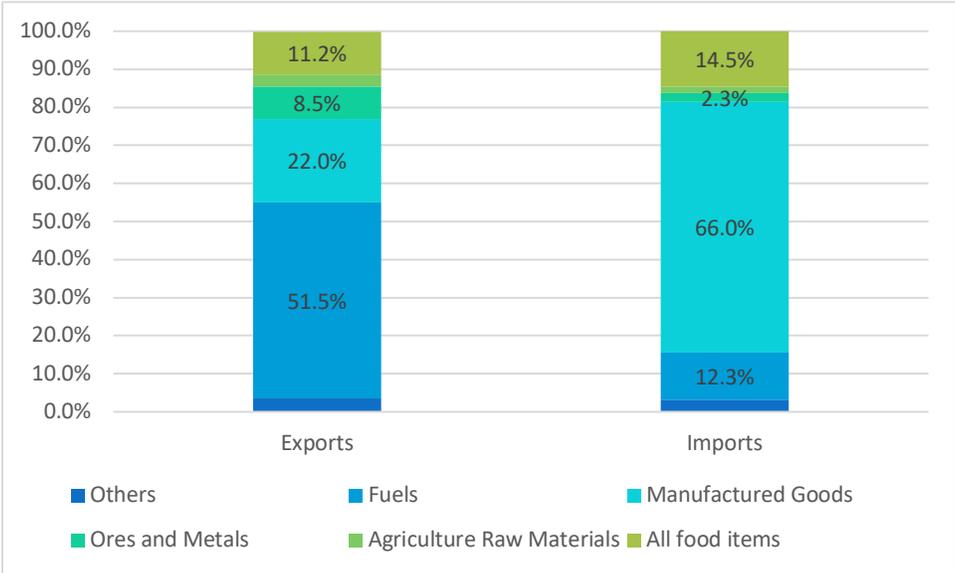
The evidence suggests that most manufacturing production in Africa is still oriented towards domestic - and to some extent regional - consumption. A look into the sectoral manufacturing distribution for the two most industrialised countries in the continent - South Africa and Egypt - shows a stable level of contributions for the main categories of manufacturing, often those with a heavy orientation towards domestic and regional markets.

According to McKinsey (2016), in 2014, African-based corporations accounted for 97% of light manufacturing production. For R&D-intensive manufacturing the domestic and regional percentage share is still at a high of 65%, and almost the same is found for resource processing-related manufacturing at 63%. For food and agro-processing, the figure falls to 52% for domestic and regional businesses, and in remaining categories, multinational corporations dominate the market. In general, there is a high degree of fragmentation in domestic markets, particularly in the sector of agro-processing, which shows the potential for consolidation, higher productivity and returns.

The focus on internal demand is not misplaced. On the continent, 60% of the growth in consumer/household spending is the result of population growth and higher incomes (McKinsey, 2016). An increase in discretionary expenditure is shifting consumption patterns and opening market opportunities for industrial goods and services (ECA, 2017; Lopes, 2019). Regional data confirm the trend. Average African exports for the 2016-2018 period show that manufacturing accounts for 43.7% of intra-African exports, but only 20.8% for African exports to the rest of the world (Luke, 2020). If the AfCFTA succeeds with the elimination of intra-African bilateral tariffs and all non-tariff barriers on goods and services and reduces the time it takes to cross borders, a very substantial \$134 billion or 4.5% of Africa’s GDP could be added (AfDB, 2019).

It is certain that African manufacturing is diverse and part of it is now moderately integrated into global and regional value chains. North and Southern Africa are the sub-regions most integrated into GVCs, with an emphasis on the automotive industry. Other manufacturing sub-sectors include apparel and textiles in Egypt, Ethiopia, Madagascar and Mauritius, agro-processing in Kenya and Namibia, all the way to high-tech industries like aerospace in Morocco and electronics in Nigeria. South Africa, Egypt, Morocco, and Tunisia account for two-thirds of the manufacturing exports from the continent (AfDB et al, 2014). Figure 5 presents the composition of Africa’s trade by sector (Figure 5), which shows that for the majority of countries manufactured goods make up a large share of imports.

Figure 5: Composition of Africa's trade by main sector, 1995-2018 average



Source: Author’s computation using UNCTAD stats (2020).

It is important to mention that Africa has been lagging in innovation, an important factor to increase productivity and facilitate integration in GVCs. Only 0.5 % of the world patents, 0.1% of the utility models and 1.3% of the industrial designs registered by the World Intellectual Property Organization IP database in 2018 were from African individuals and entities. Annually Africans struggle to attain around 1% of world textiles patents registered by residents and non-residents at WIPO¹. In 2018 that amounted to 1400 patents by residents, or 0.16% and 7300 by non-residents, or 1.33% of the world’s total (WIPO IP database).

¹ “Non-resident patents” are patents granted by a patent office of a given country/jurisdiction to an applicant residing in another country/jurisdiction; for example, patents registered in South Africa’s Company and Intellectual Property commission by BMW.

These indicators are relevant to highlight how much Africa lags in its effort to be integrate into GVCs and develop a strategy to acquire credentials for medium and high-tech production systems. Most of the continent's universities and research institutions are not linked to the industrial sector. In South Africa, Egypt, Morocco, Tunisia, Ethiopia and Mauritius it is possible to find such links, but they are still the exception rather than the rule.

Premature de-industrialisation in the offing?

De-industrialisation is a phenomenon on the rise worldwide, and quite pronounced in most mature economies. Authors such as Dasgupta and Singh (2006) assessed the manufacturing experience of both developed and developing countries to check the trends relating to MVA in relation to employment. For three of the fourteen developing countries analysed over the period from 1986 to 2000 they concluded that manufacturing increased with per capita income until it peaked and then fell, starting what is termed "de-industrialisation".

When an economy begins diversifying away from agriculture, as is happening in Africa, normally it creates synergies in the economy that should increase productivity. According to Rodrik (2013), productivity convergence appears to be especially rapid with manufacturing – through sectors that are further away from the technological frontier increasing productivity faster than the more advanced ones. Usually, countries that have successfully industrialised display a clear positive correlation between labour productivity growth in agriculture and share of employment in manufacturing, until the latter's share peaks. Africa has been experiencing such a trajectory since 1996 (Xinshen, 2018, ECA, 2014, de Vries et al, 2015). McMillan and Headey (2014) admit that those lamenting de-industrialisation do not necessarily consider the quiet revolution which has been shaping the shifts in Africa's labour force, with the share of those engaged in agriculture sharply declining while the share working in professional services has been rising.

McMillan, Rodrik and others have been warning, nevertheless, about the fact that Africa's desire to accelerate manufacturing is being met by manifestations of premature de-industrialisation. The evidence suggests, according to them, that many of the continent's economies are becoming service economies - before experiencing significant industrialisation - and are starting to run out of industrialisation opportunities sooner, and at much lower levels of income, compared to countries that followed this path in earlier decades (McMillan et al, 2014, Rodrik, 2016, 2017 and 2018, Stiglitz, 2017).

When a country's economy begins the transition to the service sector too early the economy may not be able to sustain it, resulting in negative effects on growth, causing the economy to stagnate (Kirsch, 2018, Nayyar et al., 2018, Monga and Lin, 2019). Growth propelled by the services sector could lead the shift to higher-productivity jobs and to faster income growth if such services are skill intensive, but this is not the case in Africa, since employment is mostly in categories that are neither technologically dynamic nor tradeable (Rodrik, 2015; ECA, 2017). Rodrik (2016) argued in a global study that included a sample of eleven African countries that SSA trends of premature de-industrialisation were akin to Latin America's, notwithstanding starting from a much smaller manufacturing base.

Nguimkeu and Zeufack (2019) have since provided a more comprehensive analysis of the African trends, based on a much wider sample. They investigated the cross-country patterns and trends in the share of manufacturing in national output and employment among forty-one SSA countries, for the period 1960 to 2016.

Rodrik (2016 and 2017) claims that several developing countries, including those from Sub Saharan Africa, are prematurely de-industrialising because manufacturing began to shrink at levels of income that were

much lower than those at which the advanced economies started to de-industrialise. But Nguimkeu and Zeufack (2019) studied the extent to which African countries differ from other regions regarding the scale, timing and causes of de-industrialisation, based on recent panel data methods. They are based on two main measures of industrialisation, namely the share of MVA in GDP at constant prices and the share of manufacturing in economy-wide employment. Using data from a variety of sources they concluded that de-industrialisation does not appear to be the common experience for the majority of SSA countries. The Southern Africa sub-region appears to be the exception here, mostly because of South Africa's performance which dominates the data. They did not, however, find evidence that even in the Southern Africa sub-region such performance was comparable to the phenomenon of de-industrialisation observed elsewhere.

Newman et al. (2016) state that it is difficult to argue that premature de-industrialisation is already happening in Africa. Their evidence rather points to Ghana and South Africa as the only countries having employment shares during the period of state-led industrialisation (approximately from the early 1970s to the early 1980s) considerably higher than now. That type of state-led industrialisation was, nevertheless, too peculiar to be used for conclusive statements about premature de-industrialisation in Africa today. Our conclusion is therefore that Africa is not experiencing premature de-industrialisation, and the policy focus on meaningful industrial policy should not be hindered by such debates continuing amongst scholars. Although industrialisation in Africa has been somewhat disappointing so far, this should not be seen as proof of its declining importance. Instead there should be renewed effort and additional policy focus to promote industrialisation.

3. Appropriate policies and institutions for African industrialisation

The debate on industrial policy has evolved considerably in recent decades as highlighted in Section 1. From the 1950s to the 1980s, the structuralists (following Hans Singer, Raul Prebisch, and others) suggested a policy of import substitution to promote heavy manufacturing and reduce commodity dependence. By the 1990s, it had become clear that these suggestions led to practical problems and the Latin American debt crisis followed. The Washington Consensus emerged which promoted a reliance on market forces and which did not foresee a role for industrial policies. The World Bank's emphasis on investment climate also had no place for industrial policy; instead it contained a long list of investment climate reforms that would need to be undertaken, although without theoretical underpinning. This was despite the fact that some countries that followed these policies (several Latin American countries) grew unsatisfactorily, whilst others that did not follow these policies (China, Vietnam) experienced rapid industrialisation.

The 2008 Growth Commission report (World Bank, 2008) marked some change by emphasising the key role played by political leadership (and capable government) in promoting economic growth, alongside openness, macroeconomic stability, high rates of saving and investment, and market allocation of resources. Hausmann et al (2008) went further by emphasizing country-specific binding constraints to growth. Using a growth diagnostic tree, the method identifies whether growth is held back either by high costs of financing or by low returns to a project. An interesting feature of this model is that appropriate policies to overcome binding constraints are almost by definition targeted at specific issues, often requiring particular industrial policies (whether it is to enhance skills, or build infrastructure) and political economy considerations, to be considered later.

Lin and Monga (2011) discuss the role of the state in the dynamics of structural change and provide a practical procedure to identify and facilitate growth through a six-step procedure, based on Lin's work on structural economics: 1) select industries in comparable countries, 2) identify constraints to technological upgrading of existing domestic firms, 3) attract new firms, 4) scale up successful private innovations in new industries, 5) build special economic zones or industrial parks, and 6) compensate pioneer firms. However, whilst the key ingredients of growth are recognised, and Lin and Monga (2011) suggest that the recipe is well-known, there are severe challenges in finding good cooks: which individuals and organisations can support and engineer the growth process?

Over the past decade, a range of new policy insights have emerged on promoting industrial growth, some of which are general in nature and others more specific. Common to both types is the fact that they all seem to argue for a more pragmatic and gradual approach (between the extremes of free market and centrally-led concepts of growth). Page (2012) discusses three ways to promote economic growth involving a central role for industrialisation: tilting production towards exports, supporting agglomerations through clustering, and attracting and building firm capabilities. Even IMF economists now acknowledge that industrial policy can be useful.

McMillan et al. (2017) classify a range of public policies that can be used to support economic transformation and industrialisation, summarised in Table 2. Of these, investment climate reforms, classified as general enabling interventions, are one type of policy. These are usually not enough by themselves, and need to be undertaken in conjunction with other interventions, such as infrastructure investments, support to the financial sector, industrial policies, etc. Therefore, it is important to consider complementarity between policies when implementing business environment reform with an intended economic transformation outcome. For example, Rodrik (2013) calls for complementary policies that improve both 'fundamentals' such as education and infrastructure, and policies that target growth in high-productivity sectors.

Table 2: Typology of public actions used to promote economic transformation

	General enabling support	Targeted support
Public actions to support structural change	<ul style="list-style-type: none"> • business environment/investment climate reforms (e.g. registration, land, tax, contracts) • financial sector development • strengthening state business relations 	<ul style="list-style-type: none"> • export push policies • exchange rate and tariff protection • selective industrial policies • spatial industrial policies • national development banks
Public actions to support within-sector productivity growth	<ul style="list-style-type: none"> • building fundamentals (e.g. infrastructure, education) • investments in basic production knowledge <ul style="list-style-type: none"> • managerial good practices as public goods • innovations • promoting competition 	<ul style="list-style-type: none"> • management training • attracting FDI • export diversification • developing GVCs • increasing agricultural productivity

Source: McMillan et al. (2017)

Ansu et al. (2016b) argue that although African countries face difficult challenges in breaking into world manufacturing markets, new developments work in their favour. These include rising wages in China and a rebalancing in Asia away from export-led towards domestic and regional consumption-led growth; Africa’s growing regional markets; falling transport costs; greater access to abundant natural resources in Africa; improved firm productivity and easier access to global value chains; and better general economic policy environments. But governments should not stand aloof; to seize these new opportunities they will have to formulate and implement coherent industrial development strategies. They argue that key elements of new industrial strategies in Africa must include a combination of:

- continued improvements in the basics, including sound macroeconomic management, stronger general investment climate and support for the private sector, and development of public infrastructure and relevant skills
- an export push, including through regional trade and integration by facilitating trade and offering financial incentives
- agglomeration through building and running efficient special economic zones (SEZs) and industrial parks
- active foreign direct investment (FDI) promotion and building linkages with local firms
- supporting productivity enhancement of local small and medium enterprises (SMEs) and their access to technology and long-term finance to help them venture into production of new or technologically more sophisticated products
- improved coherence and implementation coordination within government, and
- strengthened consultation and collaboration between government and the private sector.

Reviewing African industrial policy

Whilst the conceptual thinking about appropriate industrial policies has become clear over time, the practice of African industrialisation policy is often far removed from being active, pragmatic or supportive. Industrial policies in Africa vary across countries, over time, and across national and regional scales.

Tanzania provides an illustrative example through which we can discuss changes over time (Balchin et al., 2016b). The transition from a colonial state to a centrally planned economy and then towards a market and

private-sector-led economy involves a complex historical process of economic change in Tanzania. These changes are reflected in the policies and institutional framework for industrialisation in the country. In the early years of independence (early 1960s), the national economic agenda focused on growth with little attention to structural change or ownership. The colonial pattern of import substitution, involving processing industries and simple consumer goods, continued. The socialist era (1967-1985) introduced principles of socialism and self-reliance, leading to changes in ownership by nationalising the means of production. Public enterprises made most major subsequent investments. It included state-led import substitution, state-led expansion of manufacturing, and a revision of ownership and management of established entities in favour of direct ownership and management by state organisations.

This socialist period was then followed by a period of structural adjustment and liberalisation (1986-1995). The persistence of the economic crisis, especially the shortage of foreign exchange, forced the government of Tanzania to adopt the policy package offered under structural adjustment programmes by the international financial institutions in 1986. It was assumed that if appropriate adjustments could be put in place at macro level, enterprises would receive the right signals through the market. Trade liberalisation forced enterprises to compete with imports. The state had withdrawn as an actor in the industrialisation debate and Tanzania as a single country lacked agency. After this period of reliance on the market, there was a return to the development agenda and renewed interest in industrialisation (1996-2015). However, the state is still searching for a new role in supporting industrialisation, one going beyond large infrastructure projects and involving state facilitation of firm level industrial capabilities.

Industrialisation factors differ across African countries, in terms of how to attract manufacturing FDI: (1) general policy factors (e.g. political stability, governance, investment climate); (2) macroeconomic and structural factors (human resources, infrastructure, market size and growth); (3) specific FDI policies (FDI promotion agencies and incentives packaged in a strategy, investment promotion to address imperfect information, international trade and investment treaties, home-country measures); and (4) firm-specific factors (e.g. technology) and one-off factors, such as the availability of particular natural resources or large-scale privatisation (Dunning, 1993; te Velde, 2002, 2006; UNCTAD, 1999).

Balchin et al (2016a) develop a comprehensive index of measures used to attract FDI, a *Manufacturing FDI Potential Index*, for selected countries. It calculates a total score which ranks countries based on a number of core factors which attract FDI, including past manufacturing FDI stock as a percentage of GDP, recent performance in manufacturing exports, domestic value added in manufacturing, manufacturing value added per capita, economic complexity, labour productivity in manufacturing, population, quality of the business climate and infrastructure, education, and the cost and reliability of electricity. The analysis shows how countries vary in their potential to attract manufacturing FDI, with different policies leading to different potential across countries.

In addition to national efforts, there have been a range of regional initiatives around industrial development in the East African Community and Southern African Development Community (EAC, SADC). The most notable one is the AU's 2063 agenda which aims to "transform, grow and industrialise our economies" and implement the African Industrial Development Action Plan. This pan-African vision provides a useful anchor to which individual countries can look for guidance. However, there remains a large gap between regional plans and national implementation.

Political economy and country-level institutions

Political economy challenges at both national and sector levels hamper effective industrial policy. Recent literature has emphasised a set of conditions that are most crucial for effective industrial policy leading to

economic transformation. According to the contributions in Te Velde (2013), they are (i) mechanisms that enable transparency, ensure the likelihood of reciprocity, increase credibility of the state among the capitalists and establish high levels of trust between public and private agents; (ii) mutual interests, pockets of efficiency and learning for productivity; (iii) embeddedness, discipline and accountability; and (iv) commitment, focus, experimentation and feedback.

Following along these lines, Ansu et al. (2016a) examine successful economic transformation experiences world-wide and distinguish four requirements that appear universally relevant to institutional settings for effective economic transformation policy: (i) constructing a consensus among key actors that establishes economic transformation as a nation-building project, with shared commitments extending well beyond a single electoral term; (ii) giving at least one public agency sufficient autonomy, budgetary control and political authorisation to override interdepartmental coordination problems and engage in a practical way with credible private sector organisations; (iii) creating institutional arrangements that can coordinate a sufficient set of powerful public and private actors so as to ensure both an appropriate level of technically justified public support to promising sectors or firms; and also that this support is conditioned on mutually enforceable performance standards; and (iv) enabling discovery of approaches that work for transformation in the particular country context by means of explicit experimentation, good feedback and timely correction.

While several Asian and a few Latin American countries have embraced arrangements of this kind, examples of their adoption have been quite rare in Africa. ACET and ODI (2018) translate these conceptual aspects into eight crucial practical functions behind a good-quality industrial policy regime:

- Quality of the industrial policy process
- Conduciveness of trade rules and trade facilitation (including corridors) and resisting ill-thought-out protectionism
- Provision and regulation of special economic zones (SEZs), industrial clusters or hubs (including the required infrastructure and skills)
- Effective investment facilitation including aftercare
- Local capability-building where it makes sense
- Supportive infrastructure planning
- Learning with the private sector to address initial and emerging constraints
- Selective, conditional support to building firm capabilities (including finance)

Table 3 compares scores on the core dimensions of these eight industrial policy processes in the case of five East African countries (Ethiopia, Kenya, Rwanda, Tanzania and Uganda), contrasting what we understand to be good performance in a specific area with what is witnessed in each of the countries. There is generally a high level of political commitment to industrialisation, or at least an interest in promoting industrialization, in each of the five countries, and industrialisation objectives are embedded in each country's recent strategies. Ethiopia has pursued the most pro-active industrial policy, grounded within a wider state-led development model. Kenya has placed more significant emphasis on infrastructure and less on industrialisation, and political support for manufacturing has been less of a priority in the past. Instead, much emphasis was on large-scale, high-profile projects. But the recent emphasis on manufacturing as part of the Big Four agenda in Kenya (owned by the Presidency) points to a shift in focus towards a more centralised approach. There is strong political commitment to developing export-oriented manufacturing in Ethiopia and Rwanda, and Tanzania has prepared several strategies to support specific manufacturing sectors (e.g. leather and textiles) though implementation is lagging.

All five countries have plans to expand their networks of existing industrial parks and to establish new SEZs, but there are currently few operational examples (although EPZs are more widespread in Kenya and

there is an array of new industrial parks in Ethiopia). Challenges related to the operationalisation of SEZs are evident in the East African Community (EAC) countries, ranging from the slow pace of amendments to relevant legislation at the EAC level, to shortage of funds for various aspects of SEZ development (e.g. to acquire land for SEZs and finance their development and operationalisation in Tanzania, or to construct infrastructure for industrial parks in Uganda).

There is less clarity on the power of central agencies in Kenya in driving the industrialisation process, which can lead to less coordination compared with countries such as Rwanda and Ethiopia. Kenya, Tanzania and Uganda lack a clear champion or lead agency to drive industrialisation effectively and coordinate industrial policy processes around an agreed industrial development agenda. In the case of Rwanda, the Rwanda Development Board (RDB) appears well placed to perform such a role while the Ministry of Industry is the focal point for manufacturing in Ethiopia.

Improvements to trade facilitation have reduced transit times and alleviated certain issues at border posts and in relation to transport links and access to seaports, especially for landlocked Rwanda. But trade facilitation challenges still persist in the region, especially around border posts and transportation links. Non-tariff barriers also constrain regional trade. An emphasis on import substitution in the trade policies in some countries constrain intra-regional trade in manufactures and sometimes lead to mini-trade wars rather than exploiting complementarities.

Table 3. Industrial policy functions – performance expectations and summary scores in five East African countries

Functional area	Performance expectations	Expert score of conduct and performance ①=weak, ⑤=strong				
		Ethiopia	Kenya	Rwanda	Tanzania	Uganda
Quality industrial policy process	Effective lead agency Robust, inclusive process of formulating and implementing industrial strategies Monitoring of implementation	⑤	②	④	②	②
Conducive trade rules and trade facilitation	Sound tariff regime Active support for exporters Developing trade standards Efficient port procedures	②	③	③	②	③
Provision and regulation of Special Economic Zones, industrial or clusters.	Efficient legislation Coordinated and speedy action around zones	④	③	④	②	①
Effective investment facilitation, including aftercare	Clarity on roles, responsibilities and mandates of EPZAs, government ministries and IPAs Identification of suitable investors Active engagement with firms Supporting firms in-country	④	②	③	①	②
Local capability building (for local content or national capability acquisition)	Capacity building programmes (skills and technology development in tandem with private sector) Local content unit with clear negotiation strategies	②	③	②	③	②
Supportive infrastructure planning	Prioritisation of infrastructure needs of manufacturers Efficient port/airport handling	③	④	③	②	③
Learning with the private sector to address initial and emerging constraints	Trust-based relationships, feedback mechanisms Mechanisms that hold government to commitment	②	②	③	①	②
Selective, conditional support to building firm capabilities (including finance)	Banking system that supports industrial priorities Mechanisms that hold firms to commitment	②	②	②	①	①

Source: SET (Jobs Africa Country Scoping Studies for Kenya, Rwanda, Tanzania and Uganda) and other ODI/SET work covering Ethiopia.

Note: Scoring is indicative based on the authors' interpretation of short country-based analyses; the results should be treated with extreme caution and cannot be seen in isolation from the text in Table 3 and underlying analysis.

There is variation in the quality and effectiveness of investment promotion and facilitation mechanisms and institutions across the five countries. While there is a clear mandate for investment promotion under one agency (KenInvest) in Kenya, and investment promotion has been elevated to the highest level of government in Ethiopia, in the case of Tanzania there is confusion about the respective roles, responsibilities and mandates of the Export Processing Zone Authority (EPZA) and Tanzania Investment Centre (TIC) in relation to promoting and facilitating investment. Similarly, the investor aftercare provided in Rwanda, Tanzania (through TIC), Uganda and Kenya (provided by KenInvest) is limited. There are also clear capacity limitations in the TIC and the Uganda Investment Authority (UIA).

In the face of considerable skills shortages, all five countries have some training programmes in place to enhance local capabilities (including to develop manufacturing capabilities and skills), but these are often limited in scale. Kenya and Tanzania have specific regulations to promote local content, including through government procurement; however, there is variation in the extent to which these are effective (for example, the 40% requirement for local content in public procurement in Kenya is not always adhered to). A lack of funds (as in Kenya) or limited capacity (as in Tanzania) constrain research and development (R&D), and efforts to support local technology and facilitate technology transfers.

Infrastructure deficits pose constraints to industrialisation in all five countries, but approaches to address these deficits through supportive infrastructure planning vary in their effectiveness. Clear and ambitious infrastructure development planning in Kenya and Rwanda (and, to some extent, in Ethiopia) contrasts with limited capacity to plan, prioritise and coordinate infrastructure development in Tanzania.

Firms in each of the five countries face significant financing constraints, which affect the development of the manufacturing sector and further industrialisation. The Rwandan government provides targeted support to employment-intensive manufacturing firms. Similarly, the Development Bank of Ethiopia provides long-term loans to priority sectors – including manufacturing – at subsidised rates. But financial support to commercially viable investments in Tanzania and Uganda is limited as a result of the underfunding of both national development banks.

Finally, there is a clear need in each of the five East African countries for more dialogue between the government and the private sector around industrialisation, and more effective mechanisms to facilitate this dialogue. Private sector representative organisations vary in their ability to influence government policies and priorities, and the implementation thereof. In Uganda, organisations such as the Uganda Manufacturers’ Association and the Private Sector Foundation play important advocacy roles, and the latter is well-embedded in most policy and consultative mechanisms. Similarly, in Kenya, the Kenyan Association of Manufacturers is effective in leading advocacy for the manufacturing private sector. But similar private sector representative organisations appear to be less influential in Tanzania, especially when it comes to following through on implementation.

In summary, the scores suggest there are considerable differences in how industrial policy functions across countries.

Political economy consideration at Africa’s sector level

Much of the dynamism behind industrialisation and economic transformation happens at the sector level. To describe and explain sectoral transformation patterns, Balchin et al (2019) examine experiences of successful sector transformation including: air transport and logistics services in Ethiopia; the automotive industry in South Africa; the revival of the cocoa sector in Ghana; and sector-based strategies in Mauritius. It also considers five cases where sectors did not transform or where a promising initial transformation was not sustained. These cases of relative failure are cashew nuts in Mozambique; pineapples in Ghana; maize subsidies in Malawi in the years 2005–2008; and President Kikwete’s rice initiative in Tanzania.

The review shows how sector dynamics depend crucially on:

- correct identification of the economic opportunities
- conducive political-economic conditions at the sector level
- credible commitments to investors
- reasonably good provision of public goods

- specific efforts to tackle investment coordination problems, and
- taking advantage of a moment of unusual opportunity.

It is important to identify economic opportunities correctly (e.g. opportunities to serve Asian markets through Ethiopian air transport services; supply opportunities for South African automobile assembly presented by the global sourcing strategies of global car brands) but this alone is not enough. Positive sector dynamics also reflect positive political-economic relations. This has varied from centralised economic planning enabling state-led development of Ethiopia's airline, exceptional democratic unity in the post-apartheid years, and effective alignment of interests facilitated through sector-specific structures and support organisations around South Africa's automotive industries, to the development of a consensus view across elites and the wider public and private sectors around the strategic direction for the Mauritian economy.

In the case of failed or disappointing experience, political economy relations soured over time, were weak or entirely absent. In Mozambique, there was a lack of consensus among different actors about necessary reforms in the cashew nut sector. In Ghana, there was little government interest in pineapple production, leaving pioneer investors attempting, ultimately in vain, to address the growing infrastructure and learning requirements of remaining internationally competitive. Similarly, the maize sector in Malawi suffered from weakening political support.

In several of the successful cases, a favourable balance of political and economic interests supported transformation because they resulted in credible commitments to investors. In Ghana, this took the form of cross-party political support for the key institutions in the cocoa sector. In Mauritius, high-level political backing for a consensus view on the desired future direction of the economy was crucial. In Ethiopia, state investments in air transport were backed by a long-term policy vision designed by a regime that is relatively secure. In South Africa, multi-year policy visions provided a credible platform for long-term planning in the automotive sector.

Failures were characterised by uncertain state commitment leading to weak investor confidence. For example, the government's credibility, in the case of cashews in Mozambique, was undermined by poor communication, the perception that the policy reforms were driven by the World Bank and the knowledge that processing could be profitable only with government protection. In Tanzania, the power and political leverage of food-importing businesses undermined the credibility of the presidential rice initiative and the East African Community's tariff rules.

The success cases also involved reasonably good provision of public goods. These included coordinated public infrastructure investments in Ethiopia, investments in the construction of automotive industrial parks and targeted transport infrastructure in South Africa, and improved telecommunications and power supply in Mauritius. In Ghana, the development of quality control systems helped maintain the international price advantage of domestically produced cocoa. On the other hand, poor rural roads and weak extension services affected the maize sector in Malawi, while failure on the part of district governments to maintain medium-size irrigation works hampered the presidential rice initiative in Tanzania.

Specific efforts to tackle investment coordination problems helped successful cases such as in Ethiopia, which involved coordination and sequencing of investment in public infrastructure alongside the airline's own capital investment in key areas such as cargo and maintenance facilities. And in South Africa, the government devised well-coordinated policies – including import duty credits and productive asset allowances – for subsidising investment in exporting cars. On the other hand, there was a lack of effort to coordinate investments to boost raw cashew nut production after export liberalisation in Mozambique,

while a lack of coordinated investment in post-harvest handling and other infrastructure led to weak support for pineapple production in Ghana.

In successful cases, consistent support was provided to investors, and sometimes directed to specific first-mover firms. For example, tariffs and tax incentives available to all investors helped attract Original Equipment Manufacturers (OEMs) to South Africa. Support was provided to whole sectors through targeted support for innovation in Mauritius. In the case of failures, support was provided and then withdrawn. In Mozambique, the government removed export restrictions without investing in firm capabilities. In Malawi, subsidies were not sustained long enough, or supported with sufficient complementary measures.

4. Impact of COVID-19 on African economies

4.1 The Global Context

The impact of Covid-19 has been compared to the Spanish influenza (1918-1920), a pandemic that - according to some estimates - infected half a billion and may have killed up to 50 million people around the globe (Jordan et al., 2020). The comparison sticks for two reasons, despite significant differences. First, like the Spanish influenza this pandemic has criss-crossed the entire planet, and second, the economic impact of both has been significant. In fact, about a century ago the Spanish flu inaugurated the global pandemic response systems we are now familiar with.

The stoppage of economic activities resulting from more than half of the world population being put under some form of confinement is comparable to the reductions in economic activity observed during the Great Depression in the 1930s. This was the longest and deepest such fall recorded by economic data. Tax revenue, profits and prices dropped in all countries, cascading in waves, from one region to another, while international trade halved. Unemployment in the United States rose to 23% and in some industrialized countries it went as high as 33% (Frank and Bernanke, 2007).

According to the US Center for Disease Control : “ The 100-year anniversary of the 1918 pandemic and the 10-year anniversary of the 2009 H1N1 pandemic are milestones that provide an opportunity to reflect on the ground-breaking work that led to the discovery, sequencing and reconstruction of the 1918 pandemic flu virus. This collaborative effort advanced understanding of the deadliest flu pandemic in modern history and has helped the global public health community prepare for contemporary pandemics...” (Jordan et al., 2020).

It was surprising to observe the high degree of unpreparedness to confront the Covid-19 virus from key global actors despite a solid body of knowledge about pandemic risks. The WHO level of preparedness - including an alert system that relied heavily on country by country reporting - has proven inadequate. The general level of national preparedness has also demonstrated shortcomings around the world, given that some countries with the most sophisticated institutions specialising in epidemiology have not shown the best response to the pandemic.

The speed of Covid-19 infection sparked a multitude of quick response measures with immense global economic impact. In a matter of weeks, the world went from high-connectivity normalcy to a standstill. Only a handful of countries resisted drastic lockdown measures. To decrease the transmission rate of COVID-19 and to reduce the burden on healthcare systems, governments adopted a wide range of stringent public health measures to flatten the curve of new infections. To avoid overwhelming their health systems, they put in place higher response capabilities and increased their levels of preparedness. These measures were effective in slowing down the growth of new infections in many countries. However, these measures also distorted economic activity by limiting human mobility and business operations. The pandemic and associated public health controls have greatly disrupted value and supply chains - particularly manufacturing and service sectors - and slowed down economic activity to unprecedented low levels.

4.2 Diagnosis of the repercussions in Africa

In Africa, the measures taken by most Governments to respond to the pandemic were swift. They included partial confinement or strict lockdowns; often preceding equal measures taken in other regions at similar points of the infection curve. This speed reflects three factors specific to the African context: the exposure to previous similar health threats that have confronted the continent, such as HIV-AIDS and Ebola; some under-estimation of the nature and duration of this pandemic and the economic and social repercussions stringent social distancing measures would bring; and the desire to flag the fragility of African health systems upfront, before the vastness of the crisis could submerge African demands for support, given the global panic arising amongst richer countries.

The sanitary dimensions of the crisis were assessed at a continental level by the recently established African Union's Center for Disease Control (Africa-CDC). The institution itself is a significant outcome of the consultations following the West Africa Ebola outbreak in 2014. The Africa-CDC was tasked with strengthening the capacity and capability of Africa's public health institutions to respond to pandemics, introduce standardized approaches and regulations, as well as help the development of partnerships to detect and respond quickly and effectively to disease threats and outbreaks, based on data-driven interventions and programmes.

The establishment of the Africa-CDC is the most visible demonstration of the continental lessons learned from previous pandemics. It represents the desire to coordinate future responses while incentivizing African countries to make their voices heard in the various fora where deliberations are made regarding such health threats. It is, nevertheless, fair to admit that the Africa-CDC faced the Covid-19 pandemic with means below its ambitions, leaving to national governments the responsibility of learning by doing, under immense pressure and constraints on health systems and public resources. The Alliance for Accelerating Excellence in Science in Africa (AESA), an initiative of the African Academy of Sciences (AAS) and the Africa Union Development Agency (AUDA-NEPAD) supported by global partners, launched a Clinical Trials Community programme that ensured shared African learning on vaccine trials.

Social distancing topped the measures adopted by African countries to deal with the outbreak. Popular sanitary measures included facilitating free access to equipment and supplies, educating the population and promoting community-based learning, improved access to water and sanitation, boosting contact tracing and tracking, as well as food aid and other measures to improve levels of immunity.

On the socio-economic front the most popular policies were: tax relief; cash transfers to vulnerable groups; reduced mobile money-transfer charges; easing of access to utilities, such as water and electricity; extension of existing contracts without further paper work; extension of pending or about-to-elapse administrative acts; and bridge financing for SMEs. The reach and contribution of SMEs in African economies are strong. They represent the bulk of businesses on the continent and employ a large proportion of the workforce. However, most African enterprises are informal, small and survivalist, operating with low productivity rates in labour-intensive industries

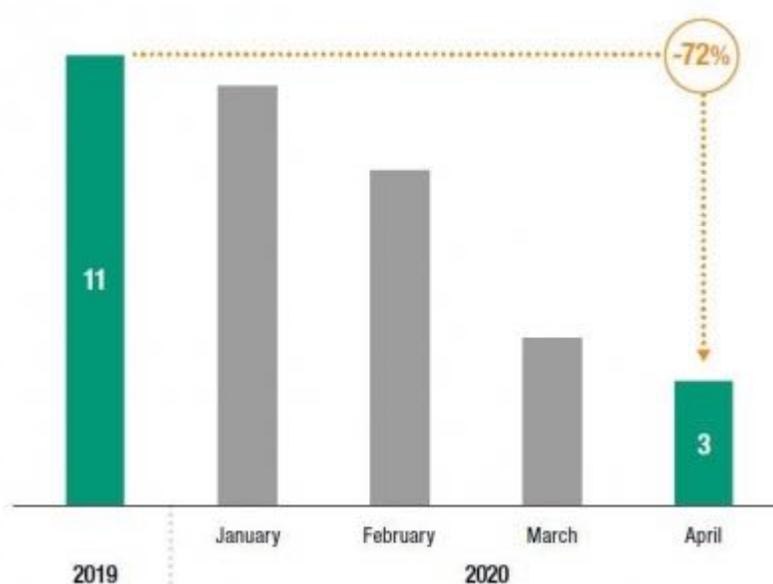
National regulatory authorities and national ethics committees agreed to combine their expertise to expedite clinical trial reviews and, when appropriate, approvals for new multinational preventive, diagnostic and therapeutic interventions related to the pandemic. These joint reviews were based on voluntary cooperation, with each country solely responsible for granting regulatory approvals. This agreement was reached during a virtual meeting convened by the WHO on April 1st, 2020, under the platform of the African Vaccines Regulatory Forum (AVAREF), one of the Continental Technical Committees of the African Medicines Regulatory Harmonization Initiative.

On the economic front the impact has been devastating. From March to May 2020 it took a few weeks to register the same scale of effects that took three years during the Great Depression. Global forecasts are daunting. ILO (2020) estimates 1.6 billion informal jobs at risk, including 81% drop of income in the

informal sector employment in Africa. With 69% of African workers living in countries with stringent confinement measures, ILO estimates a loss of 6 million full-time jobs, a significant portion of which are in manufacturing. According to ILO-modelled estimates, manufacturing employment as a proportion of total formal employment in Africa stood at 7% in Africa (ILO stats, 2020).

UNCTAD (2020) has signalled a possible contraction between 25% and 40% of FDI into Africa in 2020, based on GDP growth projections as well as a range of investment specific factors, of which Covid-19 is just the most important. Mergers and Acquisitions (M&A) have been declining sharply since last year, a trend that is now likely to last for a while until full recovery is envisaged. Africa has registered only 3 M&A in April 2020, a decline of 72% in the monthly average in the number of cross-border deals for 2019 (see Figure 6).

Figure 6: Average monthly number of cross-border M&As, 2019 and January-April 2020



Source: UNCTAD, *World Investment Report (2020)*

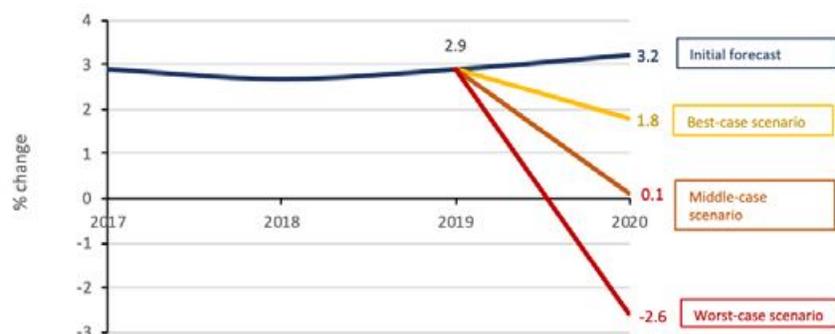
African manufacturing sectors which are integrated in GVCs, representing only 7% of 2019 greenfield investment projects, are likely to be the most deeply affected by the pandemic (UNCTAD, 2020). Anecdotal evidence suggests that fears of engaging under the current unstable macro-economic and health environment have augmented risk perceptions for complex operations and are leading to investment closures.

WTO (2020) is worried about a fall of between 13% and 32% of world merchandise trade, though its most recent forecast is for only a 9% decline. The fall is likely to be more severe in sectors characterized by complex value chain linkages, which include the automotive industry, the star performer in terms of manufacturing investment in Africa, a sector that has contributed growth and stable job creation in countries such as South Africa, Morocco and Algeria.

It is still hard to size the amount of economic damage Covid-19 will cause in 2020. McKinsey (2020c) predicts a GDP loss for the continent of between \$90 and \$200 billion; the World Bank estimates an economic contraction in SSA of between 2.6% and 7%; the IMF (2020) projects a negative growth performance of 1.6% for SSA, the worst on record. ECA (2020b) has presented three possible scenarios to

the African Finance Ministers with the worst predicting a negative growth of 2.6% (see Figure 7). This is in sharp contrast with the IMF pre-Covid-19 outlook (April 2020) forecasting 21 African countries with GDP growth of 5% or more in 2020 or a 2016 survey showing 83% of consumers expecting their household financial situation to improve in the future (McKinsey, 2016).

Figure 7: Growth forecasts for Africa considering Covid-19



Source: ECA estimates (2020b)

Commodity prices, with few exceptions such as gold, have suffered from low demand and disruptions in logistics. The price of oil, which accounts for 40% of Africa’s exports has become quite unstable, while other extractives have experienced severe price contraction. Other African exports, particularly textiles and fresh-cut flowers have also crashed. Tourism, which accounts for up to 38% of GDP for some African countries, has effectively halted as has the airline industry that supports it. Costs of logistics have skyrocketed, and segments of the services sector have equally been depressed by low demand (ECA, 2020b).

According to the IMF (2020) “As a result of the pandemic, the global economy is projected to contract sharply by –3 percent in 2020, much worse than during the 2008–09 financial crisis. In a baseline scenario—which assumes that the pandemic fades in the second half of 2020 and containment efforts can be gradually unwound—the global economy is projected to grow by 5.8 percent in 2021 as economic activity normalizes, helped by policy support.”

The pandemic has changed long-held mainstream views about inflation targeting through austerity and control of budget deficits. The new credo is to ignore budget deficit constraints and revisit some macroeconomic principles in order to introduce more flexibility. The liquidity shock generated by the response of major economies to the pandemic is unparalleled. To continue to live, whether families or businesses, or even governments, the new recommended mainstream rule of the game is to borrow or print as much money as needed, if you can do so. In other words, to ensure the stability of the national economies, governments must do their best to ease economic pressure.

It is realised that fiscal deficits will have to be forgotten for a while, giving room for expansive use of monetary instruments, a tool that had all but disappeared from the radar. If the 2008-2009 global financial crisis took many countries more than five years to recover, a similar approach could take much longer this time, hence the aggressive approach proposed by the IMF in this regard (2020). The 2008-2009 crisis started in the financial sector. By contrast, the Covid-19 crisis is multifaceted and several steps greater in scale, complexity and associated systemic shocks. The shift in approach needs to be commensurate to the size of the “beast”.

As far as African countries are concerned, the debt-to-GDP ratios have dominated the discussion about how to assess their response capacity. Half of African countries recorded fiscal deficits above 3% in 2019, while twenty-two had debt-to-GDP ratios above the African average of 61%. Several promises from international partners, from debt standstill, moratoria or relief, have met resistance from rating agencies. Some African governments are worried about being locked out of future sovereign borrowing opportunities and are discouraged by the fatigue associated with interminable negotiations on debt that translate into too little, too late. Assessing African responses mostly from a debt perspective also provides too narrow a picture.

What the Covid-19 crisis demonstrates is the different treatment given to countries that can afford the full spectrum of monetary options, including some which are quite distant from orthodox neo-liberal beliefs. Many African countries that have restricted access to liquidity and are trapped in high interest, high-risk-rated commercial borrowing - while their currencies depreciate, remittances plunge and capital flight increases - will continue to have a limited volume of concessional lending available. On the other hand, OECD and larger economies have almost limitless access to low (or even negative) interest rates, allowing high levels of sovereign borrowing to cushion the pandemic repercussions. The paradox is enshrined in the terminology itself: those who are becoming increasingly dependent on high interest rates borrowing are categorized as “eligible for concessional lending” but do not get much of this capital, while mature economies, that are supposed to be able to deal with harsher market conditions, can afford extremely low or negative interest rates, which will never be called “concessional”.

4.3 Manufacturing deeply perturbed

The impact of the prevailing macroeconomic environment has been devastating for manufacturing across the continent. It has postponed investments, including in vital infrastructure for transport and energy, paralyzed production, disrupted logistics and supply chains, increased job losses in the sector and accelerated the collapse or closing of fragile business. In South Africa, the most industrialised African country, all industrial output has dropped significantly. In the second quarter of 2020, annualised growth declined by 76.6%, with manufacturing output shrinking by 74.9% (Stats SA, 2020). Several work stoppages, low demand for steel, and the ban on alcohol sales devastated sectors such as metal factories, and food and beverages.

Automotive and textile sectors, representing respectively the most noteworthy segment of global innovation for local markets and the segment of labour-intensive tradables, seem to be the hardest hit across the continent. South Africa, Morocco, Algeria and Egypt dominate the automotive industry on the continent. Although Africans currently only produce 1% of the cars sold in the world (Mordor Intelligence, 2020), this sector was expected to grow considerably with a number of new plants announced in 2019.

South Africa is exhibit A of the Covid-19 impact in this regard. It has the most active automotive industry on the continent, with a contribution of 6.9% to the country’s overall GDP in 2019. The industry employs around 120,000 people in vehicle and component production and exported close to 390,000 vehicles in 2019 (Mordor Intelligence, 2020). The country is a significant export hub for automotive components as well. The installed capacity offers scalability almost second to no other industry. Other African governments and investors alike have been investigating these more mature market conditions to gauge prospects for developing their own automotive production ambitions. Morocco has been particularly aggressive in expanding its market share in this industrial segment.

The impact of Covid-19 in the automotive sector in South Africa has been devastating. In 2019 the industry registered its second highest level of aggregate capital expenditure by major vehicle manufacturers, of R7.2 billion (approximately \$1.8 billion), and the level of optimism was high. The records for the aggregate new

vehicle sales registered in the second quarter of 2020 reveal a massive fall of 63.4% compared to the same period a year earlier, a drop equivalent to sales aggregates of 20 years ago (Gilham, 2020). According to the National Association of Automobile Manufacturers of SA aggregate sales for the first eight months are 34.6% behind the sales at the same stage in 2019 (Furlongher, 2020).

Export sales also registered a significant decline. South African companies exported 156,781 vehicles in the first eight months of 2020, or 40% less than the 261,408 exported for the corresponding period in 2019 (Furlongher, 2020). Availability and supply of local components and raw materials were disrupted, and imported ones ran out of stock due to the stringent lockdown measures imposed from April to July. Multi-shifts in many sites were discontinued due to mobility and social distancing challenges. The large number of local suppliers to this value chain suffered an even larger shock.

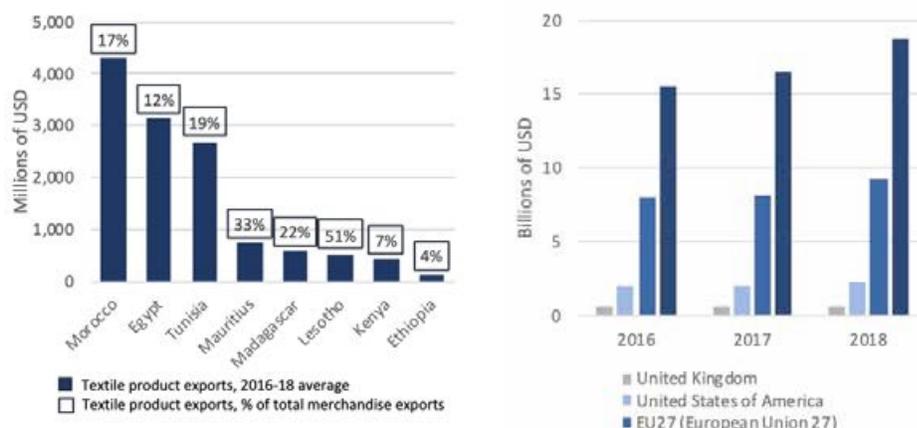
Morocco's installed capacity for annual car production marked a substantial jump to nearly 530,000 units by 2019. During the first 3 months of 2020 automotive sector exports fell by almost a quarter compared to the same period of 2019. Data indicate the decline concerned principally assembly, amongst the finished products. Since May the situation worsened and translated into a drop in exports of almost 40%. A decline of this magnitude is equivalent to 33 billion dirhams (approximately \$3.5 billion) for the entire value chain, for the first 5 months of 2020, the equivalent of 3% of the country's GDP (Ait-Ali, 2020).

Another sector heavily perturbed by the pandemic was textiles, catering for domestic and regional consumption but also being an important source of export revenues for some countries. It generated \$6,899 million in exports in 2018, an increase from \$6,415 million in 2015 (UNCTAD database, 2020; for fibres, yarn, fabrics, and clothing, categories SITC 26 + 65 + 84). South Africa estimates its gross domestic product contribution is R74 billion, or approximately \$4 billion (SAnews, 2020). This value chain goes beyond garments alone, with significant value generated in some countries coming from activities such as cotton processing. As a result of the pandemic response, specific focus was placed on intensifying support for products such as surgical and consumer masks, medical textiles and gloves (SAnews, 2020).

With decimated offline spending in the main African apparel export markets - in the European Union, United Kingdom and the United States - the impact was immediate, with the closing of factories, reduction of shifts and, whenever possible, fast repurposing. For some countries, this industry represents one third of their merchandise exports, such as Mauritius, or even half of total exports for a country like Lesotho that has heavily invested in AGOA-related export opportunities (Figure 8).

Fast growing Ethiopian and Kenyan textile exports also suffered a significant setback. The sector generates 38,000 formal jobs employed by over 200 firms with an additional 75,000 small and micro businesses aggregated within the value chain; in Ethiopia there are already 122 factories installed with 37,000 formal jobs created and 450,000 informal workers associated one way or another in the spill-over effects (ECA, 2020c). Plans for expansion have been suspended until demand resumes. Dynamic industrial policy should lead African textile producing countries to provide cheap credit and other incentives for the processing of local raw materials into finished products. For example, instead of exporting raw cotton or cloth, countries should develop industries that produce high-end clothing products, including supply to niche markets for garments with African designs. African-identifiable fabrics are very popular, without high street consumers on the continent realising that what they have bought is often actually manufactured in China or the Netherlands.

Figure 8: Selected African textile exports and value of exports to key destinations 2016-2018



Source: ECA (2020c) based on data from UNCTADstat. Textile products include textile fibres, yarn, fabrics and clothing (SITC 26 + 65 + 84). Fourth bar in right-hand diagram represents textile exports to all destinations.

The impact of the pandemic has been less severe for the agro-processing sector given its orientation towards domestic consumption markets. Even for countries with significant agro-processed food exports, such as South Africa, Tunisia or Morocco, the blow appeared to be less severe than anticipated, with some large producers posting net gains.

4.4 Three new opportunities

Covid-19 disruption has also opened new opportunities.

First, the protectionist attitudes from richer countries have provoked Africans to address their medical and protective equipment needs through repurposing, accelerated pharma production and joint procurement, all initiatives led by the African Union. Examples include:

- South Africa’s U-Mask shifted production from protective masks for mining to medical respirator masks;
- Africa’s largest e-commerce platform *Jumia* partnered with local authorities to use its logistics network to distribute health products to communities;
- Nigeria’s National Agency for Science and Engineering produced the first national ventilators;
- Morocco mass-produced protective equipment, exporting and distributing domestically, using the pre-existing networks of two milk companies, with 66,000 points of sale across the country;
- Ghana’s Incas Diagnostics developed a Covid-19 test that delivers results in under 20 minutes;
- Senegal’s Pasteur Institute, in cooperation with UK-based company Mologic, manufactures Covid-19 diagnostic kits at \$1 each; and
- FabLab in Rwanda is producing face shields using local materials.

Africa suffers the drag of 25% of the world’s disease burden, while accounting for less than 1% of global health expenditure. It manufactures less than 2% of the medicines it consumes (Lopes, 2020). According to WHO data, over two-thirds of the world’s HIV/AIDS cases and 93% of malaria deaths take place in Africa. The continent also experiences 40% of the global deaths of under-five children, mainly due to

neonatal causes, as well as pneumonia, diarrhoea, measles, HIV, tuberculosis, and malaria (Lopes, 2020). These diseases or conditions are easy to prevent and treat if only the means were available.

There is little doubt that Africa's pharmaceutical R&D and local drug production capacity are amongst the weakest in the world. Thirty-seven countries have some pharmaceutical production, though only South Africa manages to produce active pharmaceutical components. Most countries' production depends on importing active reagents, and the supply of African pharmaceuticals remains heavily dependent on foreign financing, controlled by big global pharma. This is true also for the most sought-after vaccines. The African Union has been promoting the idea of boosting pharma production on the continent with solutions that could include: the strengthening of regulatory systems, the establishment of one-stop-shop arrangements for information, data and business intelligence for industry players, as well as pooled procurement mechanisms to facilitate generic pharmaceutical manufacturers to build plants (AU, 2012).

The production of sanitary equipment and medical-related consumables follows a similar pattern. However, a hidden ability to produce masks, tests and other essentials has emerged in many African countries as a result of the pandemic. This repurposing and increased productivity within existing installed capacity is encouraging and shows the major opportunities offered by the consumption patterns in Africa shifting towards discretionary spending, such as health-related expenditure (McKinsey, 2016).

On medical supplies, ECA (2020b) has identified four key interventions that should be immediately integrated into the pandemic response strategies: (i) de-congest access to emergency medical supplies; (ii) remove African import tariffs on medical supplies; (iii) establish "green lanes" for superfast customs clearance; and (iv) expedite safety standards approval for trusted imports.

Figure 9: African imports of critical Covid-19 relevant medical supplies 2016-2018

	Africa's annual imports (US\$ 2016-18 average)
COVID-19 Test kits and Instruments and apparatus used in diagnostic tests	N/A
Protective garments and the like	748m
Thermometers	58m
Disinfectants and Sterilisation products	9,291m
Other medical devices	1,553m
Medical consumables	589m
Soap (bar, liquid and other)	839m

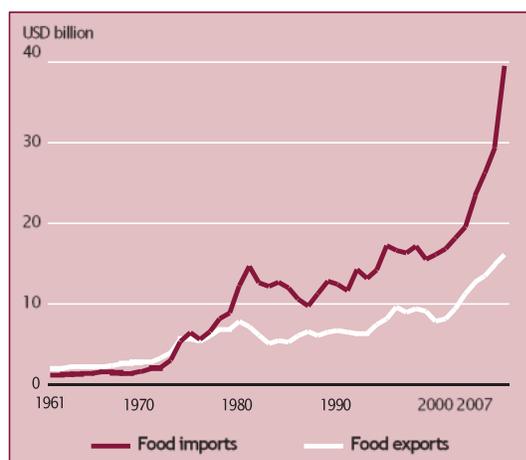
Source: ECA (2020b). *Trade policies for Africa to Tackle Covid-19*. Notes: ITC Trade for annual import estimates and WTO data on MFN tariffs, drawing from World Customs Organisation's Harmonized System classification reference for Covid-19 medical supplies. Note: Soap is an addition to the WCO's list

It is understandable to call for prioritisation that allows for a quick and enhanced response capability given the severity of the sanitary requirements. But it is important to acknowledge all four measures above can potentially undercut African prospects for expanding manufacturing efforts in this critical area. It is one example of the need to think short and long term simultaneously, in order to avoid transforming the sanitary crisis into a lost opportunity for structural transformation (see Figure 9). The amount spent on importing such supplies is considerable, as can be seen, averaging US\$ 13,078m per year over the period 2016-18.

Currently there are 531 African companies manufacturing medical supplies (ECA, 2020b), of very variable size, operating at diverse scales. Their role in the response has, nevertheless, demonstrated possibilities to scale-up and in some cases, such as for several South African and Egyptian corporations, to compete globally. There is ample scope to integrate health and industrial policy, through domestic economic linkages that are equally possible and desirable. Promising areas of potential engagement between the public and private sector remain under-invested. Possibilities to install R&D projects on Covid-19 with African universities have been promoted by the African Academy of Sciences, which are now attracting the attention of policy makers.

Second, if agro-processing was already seen as a promising entry point for Africa's industrialisation (Timmer and Akkus, 2008; Lopes, 2019; ECA, 2017; Newfarmer et al., 2018; das Nair, 2020) this pandemic has added significant weight to the argument. It can help address possible supply chain risks and generate modern jobs. Food imports of approximately \$40 billion (see Figure 11) could largely be met by increasing productivity of African agriculture (Rakotoarisoa et al., 2011; das Nair, 2020).

Figure 10: African trade of food items



Source: *Rakotoarisoa et al., 2011*

Currently African agricultural yields per hectare are 56% less than the world average (ECA, 2013). The population bulge and middle-class growth are expected to multiply demand to at least twice current levels in the next decade, a challenge impossible to meet by current trends in productivity. With the largest reserves of unused agricultural land, Africa could meet its domestic demand as well as the demand of the growing world population. But the order of the day is first to modernize African agriculture, a requirement made urgent during the pandemic.

Droughts in Southern Africa, floods in East Africa, Mozambique, Nigeria, Niger, Senegal, Mauritania, Cabo Verde and Sudan, locust invasions in East Africa, plus environmental-induced conflicts in the Saharan-Sahelian band all demonstrate that the combined impact of climate change and future health threats place a high cost from inaction.

The pandemic has reopened the discussion of agricultural priorities. Many countries with high dependence on rice and wheat imports have been particularly exposed. The introduction of new, advanced, and when possible “frugal technologies”, which are less costly, adaptable and simplified (Lopes, 2019), will create the opportunity for food processing and other agricultural-related industrial activities. In the future the world will eat differently, produce and trade food differently, source from locations different from today, some much nearer the consumer, and manage food chains differently too.

There is an urgent need to move forward with a robust and responsive policy framework that will remove obstacles to agro-industrialisation and encourage investment. Such a framework must, without being restrictive, include the following elements: a) ensure that the right combination of agricultural, industrial and trade policies is in place to encourage the production of agricultural raw materials and their distribution; b) ensure that land and natural resource rights are recognised to enable modernization of land transactions, taking into account, the need for predictability of investments both by small and large land holders alike ; c) find new domestic sources of finance, such as sovereign wealth funds or other national resources, so as to encourage the private sector to invest; d) use public-private partnerships to finance agribusiness and facilitate capacity building through technical and entrepreneurial training.

The most important changes to invigorate agricultural productivity in Africa are likely to be on the technological front. Introducing agritech will have the added advantage of energizing young people’s

interest in agriculture. Challenge number one will be the digital divide – in terms of its accessibility, availability and affordability. As highlighted by the Covid-19 response, the socioeconomic hardships were felt more heavily in places where internet or technological advances were limited, most particularly for the informal sector. African countries can thus use the crisis to identify bottlenecks to technological leapfrogging.

The African Union report “Drones on the Horizon: Transforming Africa’s Agriculture” (AU, 2016) makes the case for agritech to enhance farming. One example they present to demonstrate progress, but also the challenges ahead, is in the use of drones. Only 14 out of 54 African countries have drone regulations in place, many of which are rather obstructive, and even ban civilians from operating them. Another example of how technology will change the current practices is the possibility of blockchain-enabled technology mitigating four cross-industry supply chain issues — traceability, compliance, flexibility and stakeholder management. Most decision-makers seem unaware of such opportunities.

Third, dramatic technological advancements (beyond agriculture), will alter our way of understanding and measuring productivity in all economic activities, including manufacturing, as explained in detail later in this paper. Technological disruptions were in full display during the pandemic. Digitalisation in areas such as education, services, including trade and finance, was accelerated due to measures of social distancing curtailing contact, air travel and overall mobility. The unfolding methods of work are demanding a host of complementary innovations and institutional changes as revolutionary as the ones initiated by the industrial revolution: investments in education, reorganisation of work, new public policies and regulatory frameworks, new political systems approach, and so on.

The responses to Covid-19 have coincided with heightened tension between the US and China - and to a lesser extent other players like the European Union, Japan, the United Kingdom and Russia - for high tech supremacy in different areas. Logistics and connectivity areas were particularly spotlighted in the US-China trade and tech war. These are likely to be areas of high growth in the short to medium term. African countries will have to prioritize investments that will not enlarge their gap in relation to these global trends.

African regulators must step up and meet the requirements of the digital economy. Regulatory frameworks for governance of technology businesses must focus on facilitating adoption, through licensing and registration, to operate at a national and continental level, in line with the AfCFTA. As enablers, the regulators could change the laws to allow for the future digital economy, based on aspects such as mobility in vehicles, drones, smart grids, and cloud computing. An enabling ecosystem should include, apart from regulatory infrastructure in line with technological developments, physical infrastructure, responsive education systems and fit-for-purpose institutions.

The core technologies of artificial intelligence, machine learning, and their combination with existing accumulated knowledge in different areas, will create new products and services. The adaptability of the consumer market to these developments will be higher with the younger generation. Africa already has the largest number of young people and that demographic profile will soon overwhelm countries ageing fast, in terms of their ability to respond to the imperatives of technology, more easily absorbed by a younger population. A young population will in turn contribute to the shift towards patterns of consumption appealing to them. The high concentration of this age group in Africa opens opportunities for expanding the manufacture of technological devices and equipment. Africa is already the second fastest growing consumer market (McKinsey, 2016) and tech-related consumption is the most valuable.

Covid-19 has made more evident the link between technology and care; but also, the link between future health threats and population age concerns. Africa can position itself to be the winner of these new openings given the pivotal demographic dimension brought by the Covid-19 responses. There is, all of a sudden, a realisation that Africa’s demographic profile has shielded it from the devastating infection and mortality

rates that were predicted, while regions with an older population lacked the levels of human care capable of responding to the pandemic impact; and this, despite being better equipped in terms of infrastructure and knowledge.

5. Issues for Africa's future industrialisation by 2030

Beyond the immediate challenges and opportunities arising from Covid-19, three major issues confront Africa's industrialisation in the decade ahead: green industrialisation (Section 5.1), digitalisation (Section 5.2), and regional integration (Section 5.3).

5.1 Green industrialisation

Africa has the largest natural resource wealth. The continent's proven mineral reserves account for an average of 70% of total African exports and approximately 28% of gross domestic product (AfDB, 2016:3). The World Bank (2020) estimates that 3 billion tons of minerals and metals will be required to deploy wind, solar and geothermal power, and energy storage, required to achieve a below 2°C future. As such, mineral deposits found in Africa, for instance, cobalt, lithium, graphite, chromite, diamonds, phosphate, and manganese, hold strategic importance to meet the growing demand for green technologies. Therefore, Africa needs to climb the value-added chain of mineral processing and manufacturing to unlock the full economic potential of its natural resources, underpinned by a decisive legitimate aspirational goal for green growth.

Green industrialisation offers an opportunity for countries to leapfrog from traditional carbon-intensive methods of industrial growth towards cleaner, more sustainable patterns which have become more competitive. Green industrialisation is about the need to “harmonise the requirements of productivity-enhancing structural change with environmental objectives and to align national interests with the protection of global commons” (UNEP et al., 2017). The Covid-19 crisis offers perfect timing to accelerate Africa's industrialisation along a green pathway.

For green industrialisation to become a reality, a roadmap is essential. This means strong leadership commitment and the creation of a national green growth vision and strategy. A number of countries in Africa have developed a green economy strategy or plans of action, such as Burkina Faso, Egypt, Ethiopia, Ghana, Kenya, Mauritius, Morocco, Mozambique, Rwanda, Senegal, Sierra Leone, South Africa, Uganda, Tunisia, and Zambia (ECA, 2016).

Africa is on the frontline when it comes to climate impacts. African nations most vulnerable to climate extremes have a combined GDP which is expected to grow from US\$895 billion in 2018 to about US\$1.4 trillion in 2023 – representing almost half the continent's total (Dahir, 2018). African continental institutions estimate that climate impacts could lead to a 15 per cent reduction in GDP in West and East Africa by 2050; North and Southern Africa could lose up to 10 per cent; and Central Africa 5 per cent (ECA, 2020a). The scale of the climate challenge is daunting, but so is the opportunity that lies within it.

Climate impacts compound significant poverty levels, resulting from a multitude of factors of which one of the most significant is limited access to energy. Providing energy on its own is not going to deal with the complex climate impacts the continent suffers, but it is certainly the most relevant aspect. The continent has about 60% of the global population without access to electricity (Corfee-Morlot, 2019). Yet in 2018, Africa received less than 15% of global energy investment (IEA, 2019). Of the limited funds available, nearly 60% of public finance for energy in Africa went to fossil fuels between 2014 and 2016, an annual average of US\$11.7 billion (OCI, 2018). This represents a great deal of money being spent on yesterday's

technologies. The reality is that today's renewables are out-competing fossil fuels across the world. Africa has the largest solar irradiance exposure and benefits equally from large untapped hydro-power and geothermal potential.

The newfound interest in hydrogen is also good news for Africa, given that its desert coasts possess an extremely attractive geography for such energy production. Clean hydrogen can extend decarbonisation to industries where the direct use of electrical power is difficult, such as steel manufacturing and aviation (IEA, 2020). Hydrogen consumption could attain a share of 13% in final energy demand by 2070, with about 60% of that production consumed in the transport, buildings, power sectors and refineries (IEA, 2020). According to the IEA (2020): "While today global manufacturing capacity stands at around 1.5 GW/year, the average annual deployment rate to 2070 increases to 60 GW/year in the Sustainable Development Scenario. As a result, the average cost of electrolyzers falls from \$850 to \$1 100 per kilowatt electric (kWe) today to below \$300/kWe in around 2050." These technological advances can benefit Africa in the long run in terms of cheaper energy for its accelerated industrialisation. The Anglo-American Platinum Company (Amplats) is building in South Africa the world's largest electrolyser plants to generate hydrogen for a fleet of environmentally-friendly ore haulage trucks (Business Day, 2020). South Africa's Sasol is already the world leader in using hydrogen generated from coal². It could upgrade its technical competence to a larger mix.

According to the Global Commission on the Geopolitics of Energy:

"Renewables have emerged as the fastest growing energy source. The main renewable energy sources are bioenergy, geothermal, hydropower, ocean, solar and wind. Among these, solar energy and wind power are undergoing very rapid growth, while the others are growing more gradually. Solar and wind share a characteristic that is largely unique to them: the amount of power they generate varies with the weather and the time of day. This is why they are called variable renewable energy sources. The impact of the extraordinary growth in renewables has mostly been felt in the electricity sector. Since 2012, renewables have added more new power generation capacity than conventional sources of energy. Solar power added more new capacity in 2017 than did coal, gas, and nuclear plants combined. Wind and solar now provide 6% of electricity generation worldwide, up from 0.2% in 2000. In the aggregate, renewables account for around a quarter of global electricity generation" (IRENA, 2019).

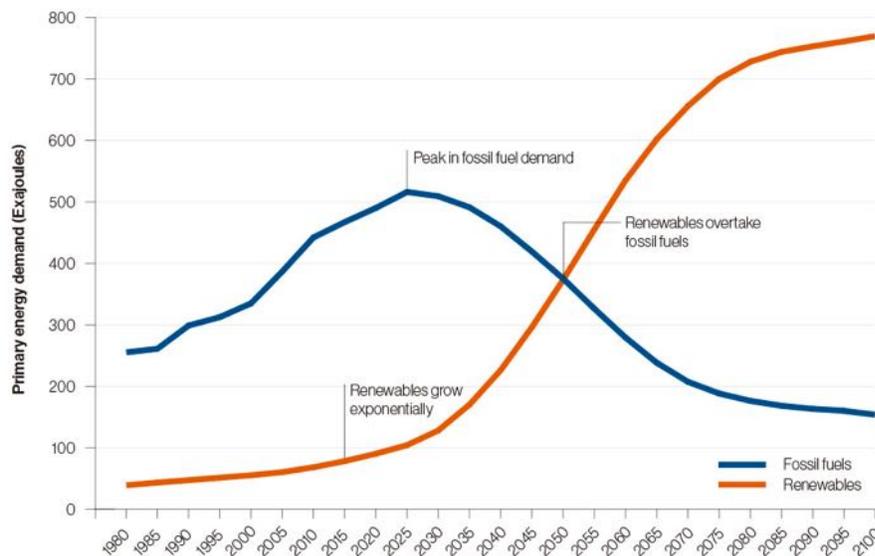
The Covid-19 crisis has catapulted to the public eye a trend that has been accelerating fast: the downfall of fossil fuels in relation to alternative sources of energy, with the consequent geopolitical and economic shifts such a mega-transformation entails. The world of energy is shifting from stocks to flows. It will be more important in the future to control flows since, to a large extent, every country possesses some alternative energy source. It does not make sense for Africa to bank on fossil fuel exports for its future, which currently account for around 40% of export revenue. Recent large discoveries of gas in countries such as Egypt, Mozambique and Tanzania, may delay the exit from fossil fuels, but gas has enormous potential as a transition fuel to even more sustainable forms of energy production. The broad trends are very clear (Figure 11).

The socioeconomic impact of the Covid-19 pandemic has reinforced the idea that Africa now finds itself in a strong position of being able to accelerate its industrialisation at a time when more economical, cleaner, low-carbon solutions, to both energy production and sustainable infrastructure, are available. Oil and coal prices are at an extremely low level, due to depressed global demand and high volumes of stock in some of the largest economies. This translates into a rare chance to get rid of heavily subsidized fossil fuel

² At the same time, Sasol is responsible for very large emissions of greenhouse gases from its Secunda plant, which converts coal into liquid petroleum, generating emissions of 56.5 million tons, greater than entire countries, such as Norway, and Portugal (Williams, C. 2020).

consumption and to dismantle the byzantine tax systems plugged into fuel from the pump. Angola and Tunisia have jumped at the opportunity to do so, following the examples of Morocco and Nigeria, both of which took this course of action just before the manifestations of Covid-19 began.

Figure 11: Energy demand trends



Source: Shell Sky Scenario, 2018.

Unsurprisingly, foreign investors and local financiers are on the lookout for countries with good energy planning and smart regulatory reforms. These attributes strengthen markets for clean energy and help project pipelines to emerge. In order to maximize current investments, and when possible attract more still, countries must now revisit their national policies. Industrial policies that include renewable energy and sustainable infrastructure options now make clear economic sense, apart from being good environmental insurance.

Opting for green industries requires the same dedication as the principles underlying support for infant industries. They need to be nurtured, protected from a regulatory and trade perspective, and integrated into value chains within a sound ecosystem, ideally defined by consistent industrial policy that can look for comparative or dynamic advantages. In the African context, energy is central to such a strategy. It makes sense to start by investing in energy solutions that also contribute to the fabric of domestic production. Having failed to refine most of the oil they consume - despite exporting massive quantities of crude - African countries should learn from such lessons in building up their renewable energy sector. They should aim at producing the equipment and goods necessary to expand the use of renewables, through manufacture, assembly and R&D.

Beyond the energy value chain, it is in manufacturing that Africa can position itself as a leader of green solutions. This may seem unlikely, but in fact looking at the specific conditions for an accelerated industrialisation in Africa, such ambition is quite reasonable. Policy-makers and entrepreneurs must make decisions about the future considering what they believe the demand and opportunities to be (Vidican Auktor, 2017). The risks associated with old technology are becoming ever more evident given the spurt in

various trends, prompted by the pandemic. Investing in outdated technology runs the risk of big write-offs in the near future.

Given that the majority of African countries are now laying the foundations for industrial policy, it would seem nonsensical to opt for old technology at a time its market value is deteriorating fast, its future compromised by enormous stimulus packages promoting green conversion in most of the largest economies, and the temptation is strong to dump erstwhile machinery on the global economy's periphery. Brahmabhatt, Haddaoui and Page remind us that "Economic transformation and green growth both depend on doing new things or doing things differently: making risky investments in new, unfamiliar sectors or products or adopting new, unfamiliar methods, processes, technologies, or inputs. Therefore, they depend crucially on the activity of entrepreneurs, who drive change through their innovation and risk-taking" (Brahmabhatt et al., 2017). Proper incentives will signal to entrepreneurs where the future lies.

Any industrialisation process will increase the absorption of natural resources. The question is whether it is feasible to make such a process greener, in its many dimensions, while remaining competitive. In other words, is it feasible to craft an industrial approach that provides jobs, resists the climate, and is decoupled from environmental degradation? From an economic point of view, pollution and waste generally are reflective of inefficiencies in the use of natural resources. Without bringing environmental considerations into play, they demonstrate bad use of resource-saving techniques and poor planning of future needs. A typical example of this can be seen in the current global value chains transporting raw commodities from Africa to Asia - or other parts of the world - in order to be transformed, before a substantial amount of the tradable goods produced there are shipped similar long distances to some of the larger consumer markets. Emissions from the shipping industry could be partially saved, as well as the unsustainable modus operandi of these value chains, if the manufacturing was done closer to where the natural resources are in Africa (Lopes and Kararach, 2020).

"The large majority of Africa's top 100 companies have driven growth through best-in-class execution and operations, including the development of management and frontline skills" (McKinsey, 2016). African countries have bet on the expansion of their champions by creating the largest free-trade area in the world, in terms of both the number of countries and size of population. This seed needs to be nurtured to ensure successful adaptation to a fast-changing landscape post-pandemic.

5.2 Digitalisation and policies to promote African industrialisation

The increased use of advanced digital technologies, such as 3D printing and robotics, will have a major impact on manufacturing globally. Banga and te Velde (2018a) examined how African countries can harness the digital revolution to boost their industrial growth and employment. Empirical evidence suggests African countries not only face a growing digital divide globally and domestically, but also benefit less from digitalisation compared to other economies, once digital technologies have been installed.

To digitalise manufacturing, African countries need to increase access to the internet and other ICT technologies. Government has a critical role to play in design and implementation of the policy framework needed to incentivise and regulate this sector. This will need to address country-specific conditions and contribute towards improving the investment climate, firm capabilities, national innovation systems and ICT infrastructure, direct financing opportunities and participation in GVCs. Taxes and incentives can serve as important drivers for bridging the rural-urban digital divide, while policies targeting public-access solutions (e.g. roll out of access to broadband in rural areas) can increase access to digital technologies.

Financial support from the government needs to be extended - not only to manufacturing and services start-ups, but also to ecosystem enablers such as technological and innovation hubs.

With technology increasing at a faster rate than skills, the risk of a skill-mismatch is also rising. To increase the impact of digitalisation, it is crucial for African countries to develop complementary skills. Becoming “future-ready” involves revising and re-orienting the curriculum in African educational institutes around STEM subjects. A special focus needs to be given to technical and vocational education and training (TVET), with public-private sector collaborations. For example, Rwanda is directing its efforts towards ICT development and transformation of the economy, through a ‘Digital Ambassadors Programme (DAP)’, which aims at employing 5,000 young Rwandans (50% participation by young girls and women) as digital-skills trainers. These Digital Ambassadors are first trained in ICT and soft skills, and then will provide hands-on training in using internet, mobile applications and other ICT technologies to around 5 million Rwandans across the country.

African countries already faced an uphill struggle to promote traditional manufacturing. Export-based and employment-intensive, higher value-added manufacturing will remain a core objective for the future. Banga and te Velde (2018a) suggest there is a window of opportunity for African countries to move into less-automated sectors, where technology installation has been slow. For example, in the case of furniture manufacturing we find that while robots may become cheaper than American labour in the year 2022, the inflection point for Kenya comes only a decade later, indicating a window of opportunity which could stretch out for roughly 10-15 years. However, to make good use of this, traditional constraints facing the manufacturing sector need to be addressed first; improvements in basic infrastructure, such as a reliable power supply, telecommunications and roads, combined with a targeted approach to building industrial capabilities are needed.

While growth of the digital economy has been higher in developing, compared to developed countries, there remains a significant global digital divide. This digital gap exists between developed and developing countries, as well as between developing countries and Least Developed Countries (LDCs). LDCs are significantly lagging in access to the internet, use of internet for digital technologies such as cloud-computing applications, trade through e-commerce, trade in electronically-transmitted products, and in deployment of smart machines, such as robots and 3D printers. Africa’s share in robots sold in 2015 (around 0.2% of world sales) is more than 15 times lower than its share in world GDP (around 3%).

A crucial factor contributing to this digital divide is that capital is more expensive in African countries, both in absolute value and relative to labour. Even if the cost of robots, automation and digitalisation falls, African countries will still find it hard to *finance* digitalisation, due to the high cost of financing faced by these countries. Other likely factors causing the digital divide include low-digital readiness of African countries in terms of having poorer customs, trade facilitation, logistics and skills (Pathways for Prosperity, 2018).

If African countries address the constraints to digitalisation, then several important opportunities can be realised in terms of improvements in productivity, output and exports, creation of jobs, reduction in cost of production, allowing SMEs to enter the market, and reduction in costs of trading which can enable greater GVC participation. However, if the digital divide persists in the context of a growing global digital economy, then African countries will face continuing challenges. As the cost of capital falls in developed countries, they will find it more efficient to re-shore manufacturing activities from Africa. In recent years, both robot densification in developed countries and re-shoring from developing regions has increased. At the same time, global trade has slowed down, reducing the opportunities for developing countries to catch

up. While there is evidence of convergence in levels of productivity for manufacturing labour across countries, this also has slowed in recent years.

Empirical results in Banga and Te Velde (2018a) suggest that while both technological progress and digitalisation have improved manufacturing labour productivity, by roughly 3% and 10% respectively, the effect of digitalisation on productivity is 8% lower in low-income countries (LICs) compared to middle income countries. This has also been true for Africa. As the economy has become more digital, the impact of this technological progress brings about an increase in productivity, but again this effect is lower in LICs and in Africa. Digitalisation may in fact be reducing convergence, since low-income countries are not able to adopt the new technologies due to the importance of tacit knowledge and the increasing complexity of digital technologies. To increase the impact of digitalisation, skill-development is needed. A skilled workforce could not only increase the impact of technological progress on productivity, but an increase in skills will more than proportionally benefit LICs because skills are required to make more effective use of digital technology.

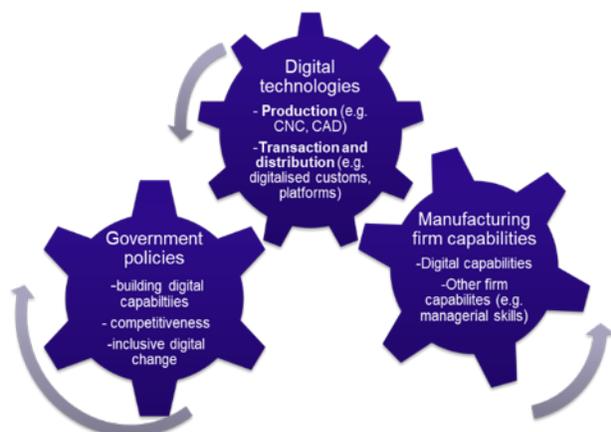
Looking specifically at Kenya, Banga and te Velde (2018b) suggest there are many opportunities associated with the use of digital technologies in Kenyan manufacturing, but one issue causing concern is the impact on labour. Since manufacturing forms part of Kenya's 'Big Four' presidential agenda, primarily due to its job-creating potential, the implications of growing digitalisation, both within Kenya and globally, bring into question the very role of manufacturing as a development pathway towards employment generation. However, based on analysis and firm-level interviews, the study argues that digital technologies can help firms to create efficiencies in manufacturing production, which can increase their total factor productivity, leading to higher output and exports, as well as creation of new jobs linked to these exports. Appropriate policies need to be developed to ensure that Kenya can maximise productivity gains from digitalisation and, through the efficiencies created, can realise large-scale employment gains. Digitalisation will also increase demand for workers in service sectors, such as maintenance and repair, delivery and postal services, along with changing the nature of work through digital platforms and the rise of online work.

Kenyan manufacturing firms face many well-known constraints to greater digitalisation, including (i) high cost of capital, (ii) high cost of electricity and unreliable power supply, (iii) lack of available credit, (iv) high prices of raw materials, (v) lack of relevant skills, and (vi) poor customs and logistics procedures. However, to achieve digital transformation, policies in Kenya need not only to address these challenges but also to build digital capabilities. Digital technologies are increasingly affecting not only manufacturing production but also re-ordering manufacturing through digital platforms and use of mobile currency, such as M-Pesa. This highlights the urgent need for a targeted approach by government to digitalisation, whereby developing countries adopt specific policies to leverage the digital economy, even when it may not fit with their current comparative advantage. Comparative advantage must be seen as a dynamic concept, which can be shaped by appropriate digital industrial policy.

Banga and te Velde (2018a) suggest targeted interventions for building digital capabilities: improving access to ICT goods and services; encouraging innovation and research; updating laws on data localisation, protection, source-code sharing and intellectual property; and using global and regional approaches to digital trade. Currently micro, small and medium enterprises (MSMEs) are the least prepared for building digital capabilities; only 20-40% of MSMEs have an IT policy in place, compared with 78% of large firms. Moreover, while 95-99% of small and medium firms have access to the internet, less than 65% of these firms have a web presence and less than 25% are using cloud computing. Addressing challenges pertaining to the high cost of capital, electricity and infrastructure can also increase competitiveness in the digital economy, and it is important that digital change occurs in an inclusive manner.

Figure 12 shows the interdependencies between (i) digital technologies, (ii) government policies, and (iii) firm capabilities. *Digital technologies* in production can directly affect efficiency of manufacturing, while those in transactions and distribution can have an indirect impact through government policies such as trade facilitation and public infrastructure. *Government policies* for a digital industrial transformation are divided into those that aim to (a) build digital capabilities; (b) foster competitiveness; and (c) deliver an inclusive and accountable process. *Firm capabilities* are divided into digital capabilities and other capabilities.

Figure 12: Linking government policies, digital technology and manufacturing capabilities



Source: Banga and te Velde (2018b)

5.3 African continental free trade area and industrialisation

The African Continental Free Trade Area (AfCFTA) provides an opportunity to deepen regional and continental market integration, boost intra-Africa trade, promote regional and continental value chains, and foster economic transformation of the continent through industrialisation. The AU's Agenda 2063 focuses on transforming African economies and increasing intra-African trade. AfCFTA is instrumental to this strategy, and aims to reduce barriers to trade across the continent and move to a closer integration of all members. Phase I of the AfCFTA aims to reduce significantly tariffs and non-tariff barriers to goods and advance in the liberalisation of trade in services. Phase II, currently under negotiation, involves agreements on investment, competition policy and intellectual property (IP) rights. Phase III will involve provisions on e-commerce.

The AfCFTA provides appropriate mandates and tools to reduce intra-African trade costs and deliver progress towards structural transformation. Trade facilitation measures include addressing non-tariff barriers, investment in standards infrastructure, and strategically harmonising standards in sectors with high AfCFTA potential. Regional trade will encourage cooperation on standards, which can be supported with improved infrastructure, including metrology, standardization, accreditation, quality management and conformity assessment. This encourages trade and industrialisation through: (i) protecting consumers and creating confidence in traded goods; (ii) enhancing trade capacity and competitiveness; (iii) facilitating mutually beneficial trade (particularly in industrial products) and the integration of firms into regional and global value chains; (iv) improving the efficiency of production and trade, and (v) contributing to technology upgrading and absorption. The introduction of a continental simplified trade regime should provide small and informal traders with greater protection, and support their participation in the new export opportunities created by the AfCFTA. Informal cross border trade is an important dimension of intra-

African trade, which ICBT contributes about 30-40 per cent of total intra-regional trade in the Southern African Development Community (SADC) region and 40 per cent in the Common Market for Eastern and Southern Africa (COMESA) region.

African economies have undergone extensive reforms in IP laws and regulations: nevertheless, the use of IP rights, as demonstrated by patents and trademarks, is very limited in Africa compared to other regions, and most patents and trademarks registered in Africa belong to non-residents. Considerable innovation is taking place in Africa, but does not receive protection from IP rights. In this regard, there are three options for regional economic integration in IP rights: (a) arrangements for regional cooperation and sharing of experience on IP rights in general; (b) regional filing systems, usually for patents, but also for trademarks and industrial designs; and (c) development of one substantial law or unification of laws for members of a regional organisation. Different parts of Africa have experience with all three of these models.

A “developmental regionalism” approach (Ismail (2018)) is crucial to provide the best prospects for the AfCFTA to catalyse transformative industrial development, cross-border investment, and democracy, governance, peace and security in Africa. He argues that progress is being made by African economies and the continent in implementing each of the four pillars of “developmental regionalism” approach to the implementation of AfCFTA. But ways must be found to benefit all African countries and advance the objectives of NEPAD, and Agenda 2063. Additionally, the development of regional markets can be a force for opening up opportunities for many SMEs to participate in the global industrialisation process, and in doing so, spur their own national industrial development.

The elimination of trade barriers offers significant opportunities, but on its own it is not sufficient to achieve the objectives. It requires advancing deep integration, including the creation of more competition behind the borders and strengthening the system of intellectual rights protection. It also requires supportive policy to transform the economies of the continent, via the development of competitive manufacturing and modern services. Increasing further the diversification of goods and services to trade within the bloc will also require capital.

Banga et al (2020) argue that intra-African trade, boosted by the AfCFTA, can play a key role in the economic recovery from Covid-19. In the long-run, it is expected that AfCFTA will boost trade and reduce poverty. If implemented fully, the trade pact could boost regional income by 7% or \$450 billion, speed up wage growth for women, and lift 30 million people out of extreme poverty by 2035 (World Bank, 2020). The agreement could reshape markets and economies across the region, leading to the creation of new industries and the expansion of key sectors. Intra-continental exports could increase by 81 percent while the increase to non-African countries would be 19 percent.

Phase II of the AfCFTA includes the negotiation of an investment protocol aimed to boost productive investment within the continent. The investment protocol is expected to have sustainable development and the main objectives of Agenda 2063 as its principal goals. As national economies integrate as part of the AfCFTA, they are expected to increase efficiency-seeking as well as market-seeking FDI.

Drawing from experience in African countries te Velde and Munakula (2015) synthesise how different types of provision in regional integration can support FDI and productivity change. Theory suggests that regional trade agreements will lead to increased FDI from outside the region, but there are more ambiguous results for intra-regional FDI. An important reason for this ambiguity is that multinational enterprises are motivated by exploiting firm-specific assets (e.g. firm-specific fixed costs) and hence want to enjoy economies of scale and scope, in addition to simply jumping trade barriers. Hence, once established in country A, they are less likely to invest in neighbouring countries B, C and D.

Importantly, the *scope* of regional provisions is crucial. Dee and Gali (2003) and te Velde and Bezemer (2006) provide more details on the relevance of different types of regional investment provision. Dee and Gali (2003) suggest that FDI responds significantly to the non-trade provisions of regional trade agreements (including investment provisions). Te Velde and Bezemer (2006) find that membership of a region covered by a trade agreement is not significantly related to inward FDI. By contrast, when the regional trade agreement contains a sufficient number and level of trade and investment provisions (e.g. describing treatment of foreign firms, significant trade preferences), this will help attract more inward FDI to the region, which will then boost further productivity and industrialisation.

6. Conclusions

Industrialisation is a crucial development challenge for Africa. Countries cannot transform their economies and increase the number of quality jobs without industrialisation. The manufacturing sector also has important spill-overs for the rest of the economy. Whilst Africa has experienced industrial growth between 2000 and 2017, manufacturing value addition has slightly declined as a percentage of GDP. For the majority of African countries, this cannot be described as “de-industrialisation”, but it is clear that industrialisation is not playing the same role as it had in the development of several Asian tiger-economies.

The design and practice of industrial policy in Africa today are part of the challenge. While African countries have expressed a strong desire for industrialization, policy faces two major hurdles. First, the current policy environment is still too focused on general investment climate issues and too little attention goes to targeted, facilitatory actions. Our analysis suggests that a combination of general and targeted policies is crucial. Second, even when there is a formal government commitment to industrialisation policy, this is not always followed through to implementation because of weak institutions or an unfavourable political economy, often most clearly seen at sector level. Correct identification of economic opportunities characterizes successes in sector transformation, but negative political economy considerations often lead to failures.

The Covid-19 pandemic has had devastating effects on Africa’s economy and industrialisation efforts. However, one can also identify some positive responses which offer cause for optimism. For example, Africa has seen (i) repurposing, accelerated pharma production and joint procurement; (ii) increased attention to agro-processing; and (iii) increased use of technological advances. These show what can be done when there is focused attention and coordination between government, private sector and civil society.

Beyond the immediate challenges and opportunities, we identify three major opportunities for Africa’s industrialisation in the decade ahead: green industrialisation, digitalisation, and regional integration. Each one requires supportive policies to build productive capacity that can make use of lower cost renewable energy. There are major opportunities stemming from digitalisation, such as increased competitiveness and jobs, but this means moving beyond business as usual, which is likely further to deepen digital divides. Instead, promoting the appropriate skills for the future and supporting firms to build up digital capabilities are essential for African countries now. Finally, Africa needs to deepen regional integration provisions and put in place complementary infrastructure, build industrial capabilities, and invest in the institutions needed to promote trade across the continent.

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