African industrial competitiveness report: An overview of the manufacturing industry in the region

ACKNOWLEDGEMENTS

The African industrial competitiveness report is based primarily on the UNIDO Competitive Industrial Performance (CIP) Index developed by the UNIDO Statistics Division.

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1. Introduction

Development economists have long held that industry plays a key role in economic development (Kaldor, 1966; 1975). This notion is based on the observation that industrial activities are typically characterized by high knowledge content and significant opportunities for technological advances. Moreover, industrial development, more often than not, distributes the benefits of its development by accelerating growth in other sectors of the economy, thereby boosting the population's overall welfare.

To extract the full benefits of industrial development, UNIDO promotes the concept of inclusive and sustainable industrial development (ISID), which aims to achieve sustainable industrial development in all its dimensions: economic, social and environmental. In other words, ISID is crucial for achieving a higher level of industrialization that benefits all while fostering environmental sustainability.

Despite playing a crucial role in economic development, industrialization in Africa continues to face significant challenges, even though the international community recognizes the fundamental need for industrialization on the African continent. This fundamental need has been explicitly and repeatedly addressed in the UN General Assembly. Examples include the UN resolutions proclaiming the first, second, and recently the third industrial development decade for Africa (2016–2025). The third industrial development decade for Africa was adopted in the UN general Assembly[1] (A/RES/70/293) on 25 July 2016. It reaffirms the importance of supporting Africa's industrialization efforts on its path towards inclusive and sustainable economic growth and accelerated development. Other examples include the 2030 Agenda for Sustainable Development, which stipulates the objective promoting an inclusive and sustainable industrialization; the Programme of Action for Least Developed Countries for the Decade 2011–2020[2], which emphasizes the significance of building a critical mass of viable and competitive productive capacity in manufacturing; and the African Union's Agenda 2063 that reiterates the importance of transformation, growth and industrialization of African economies through beneficiation and value addition of natural resources (African Union, 2015).

Today, it is impossible to imagine industrial development without exposing the local manufacturing sector to international competition; that is the reason why industrial competitiveness is a fundamental component of industrial development. UNIDO defines industrial competitiveness as the capacity of countries to increase their presence in international and domestic markets whilst developing industrial sectors and activities with higher value added and technological content (UNIDO, 2013).

The main objective of this report is to provide an overview and a quantitative measure of the competitive industrial performance of the African continent. Specifically, this report provides an

[1] Third Industrial Development Decade for Africa (2016–2025), Resolution (A/RES/70/293). Available at https://undocs.org/A/RES/70/293.

[2] Report of the Fourth United Nations Conference on the Least Developed Countries, Istanbul, Turkey, 9-13 May 2011 (A/CONF.219/7), chap. II.

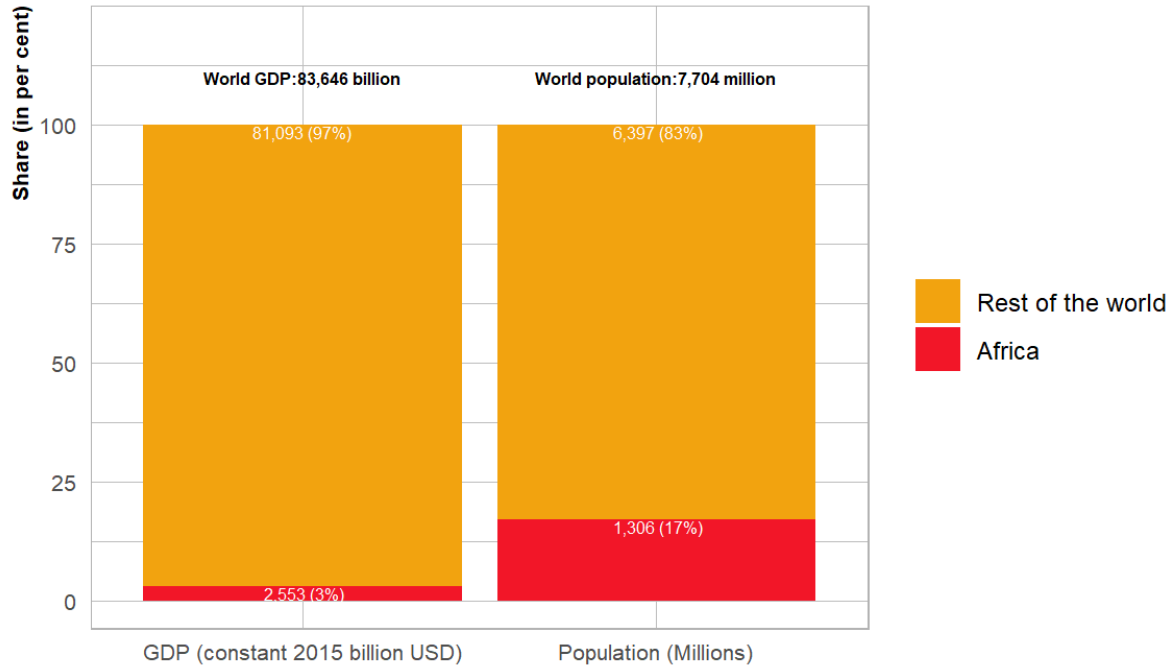
analysis of the continent at regional and country level. African manufacturing performance is reviewed in terms of production, exports and level of technological upgrading and deepening using the most recent data from UNIDO databases. It further examines Africa's export market shares and its revealed comparative advantage by analysing, assessing and comparing the industrial competitiveness of five African regions: Eastern Africa, Middle Africa, Northern Africa, Southern Africa and Western Africa. The report also highlights the gaps in data availability monitoring industrial development and informing industrial policy. Finally, this report presents a case study and delves deeper into the analysis of Kenya's industrial competitiveness and that of three comparator countries.

The structure of the report is as follows. The next section sets the scene by providing some economic context of the African continent in the world. Section 3 presents a regional analysis of the industrial competitiveness of five African regions. In Section 4, the CIP index is described and applied to analyse the competitive industrial performance in Africa's five regions. Section 5 will present a case study and analyses the industrial competitiveness of Kenya and three comparator countries. Finally, Section 6 concludes the report.

2. *Setting the scene: Some general statistics*

According to 2019 data, Africa is the home of 1.3 billion people, which represents close to 17 per cent of the world population. Yet the African continent only generates three per cent of world gross domestic product (GDP).This emphasizes a major disparity in income distribution between Africa and the rest of the world:17 per cent of the world population has access to only 3 per cent of world income (Figure 1). Furthermore, these numbers highlight the income inequality between Africa and the rest of the world, but do not reveal the major income inequalities within the African continent itself. The normal African citizen is exposed to both forms of inequality.[3]

Figure 1. Africa's size in relation to the world economy, 2019



Source: UNIDO, MVA database 2020. This figure is based on available data from 54 African countries, which are listed in Appendix A.

The magnitude of these economic disparities underscores the importance of boosting the continent's economic and social development. Industrialization is key to achieving this goal. Unfortunately, various figures on industrialization are not very encouraging. The disparities between Africa and the rest of the world increase further when we look at manufacturing. Figure 1 shows that

[3] The inequality between Africa and the rest of the world gives us an idea about the continent's average inequality, but averages should always be interpreted with caution in the analysis of income inequality. Due to its skewed distribution, average income is often higher than median income, which implies that a country or region's average income often does not represent a normal citizen's earnings (Fisk, 1961; Kakwani, 1980).

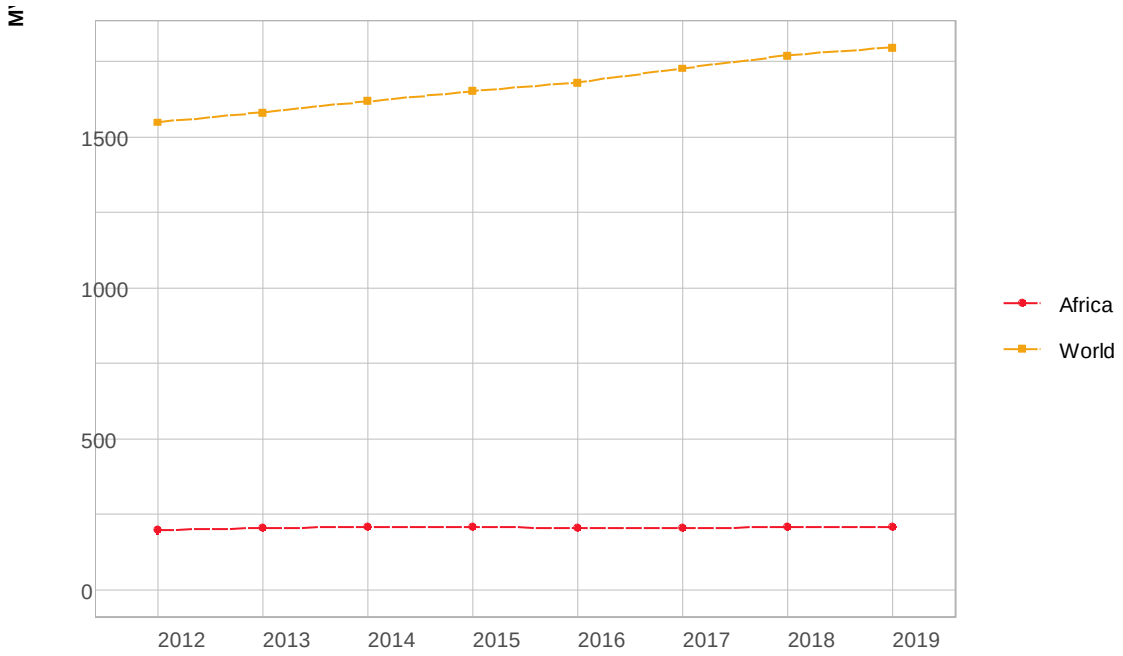
Africa only accounts for 3 per cent of world GDP, but only 2 per cent of world manufacturing value added (MVA) is generated in Africa.

The per capita indicators do not dilute these severe disparities. Africa's major share in world population (17 per cent) together with its low share in world GDP (3 per cent) implies that the average world GDP per capita is nearly six times higher than Africa's. As regards manufacturing, Africa's share in world MVA is around 2 percent; the average world MVA per capita is almost nine times higher than Africa's.

Figure 2 illustrates the development of MVA per capita in Africa and in the world from 2012 to 2019. The trend of world MVA per capita is much steeper than Africa's because it increased at an annual growth rate of 2.1 per cent during this period, while Africa's MVA per capita only grew by 0.7 per cent per year. The MVA per capita growth rates clearly diverge, but before rushing to any conclusion, we must bear in mind that demographics play a major role. While the African population grew at an annual rate of 2.6 per cent, the world population grew only 1.1 per cent.

This huge disparity between levels of MVA per capita is quite disturbing. And yet, the industrial gap between Africa and the world average is not something new. It is a very well-known problem that has mobilized vast amount of people and resources over several decades. It would not be fair to claim that no progress has been made, but there is lots of work to be done. To appreciate the relative progress Africa's MVA per capita has made, we have to take a closer look at the development of Africa's industrial sector over time.

Figure 2. Manufacturing value added per capita in Africa and the world, 2012–2019

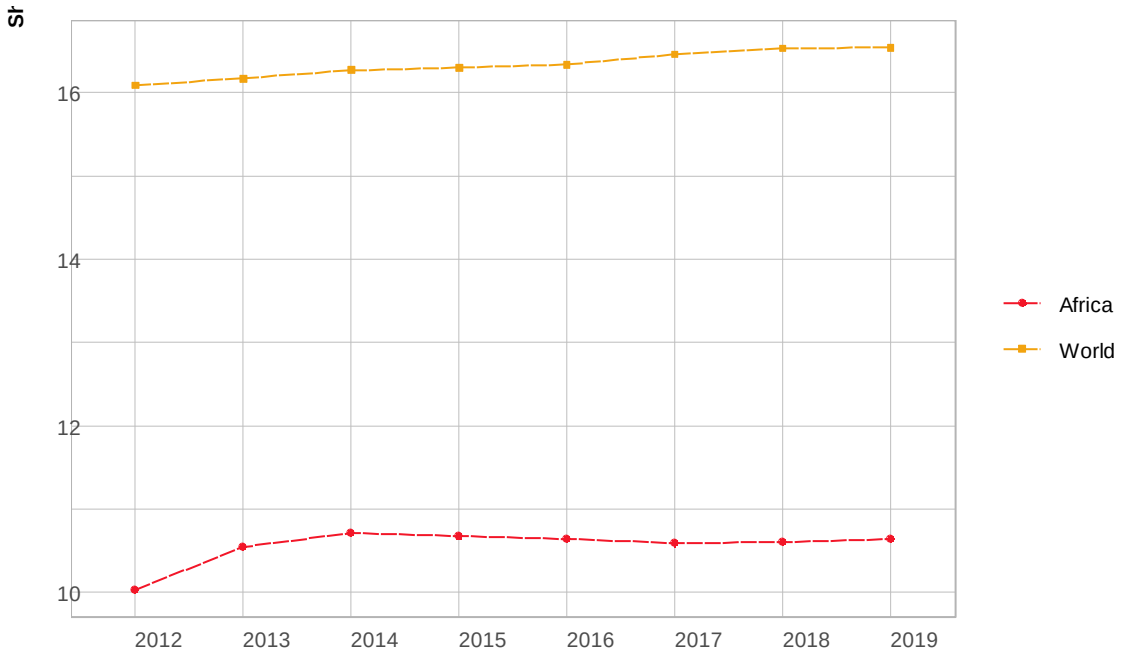


Source: UNIDO, MVA database 2020. This figure is based on available data of 54 African countries, which are listed in Appendix A.

Figure 3 provides an overview of how Africa's industrialization process has evolved over time, which is exempt from demographic factors. It illustrates the share of MVA in GDP of Africa and the world from 2012–2019. The period of analysis starts in 2012, following the independence of South Sudan, to avoid data comparability issues. The data presented in Figure 3 shows that Africa's share of MVA in GDP is considerably lower than the world average, but it is increasing faster. In fact, Africa's share of MVA in GDP increased from 10 per cent in 2012 to 10.6 per cent in 2019, i.e. its share grew 6 per cent within 7 years. The world's MVA share in GDP also increased from 16.1 per cent to 16.5 per cent, i.e. nearly 3 per cent over the same period. In sum, this figure shows that: i) Africa's level of industrialization has expanded in recent years, and ii) Despite the large industrialization gap between Africa and the world average, Africa's MVA share in GDP is increasing slightly faster than the world's and therefore, it is closing the industrialization gap with the rest of the world.

Mention should be made that Figures 2 and 3 are inextricably linked with the Sustainable Development Goals (SDG), in particular SDG Indicator 9.2.1: "Manufacturing value added as a proportion of GDP and per capita", which UNIDO is the custodian agency for. UNIDO's mandate on promoting and accelerating Inclusive and Sustainable Industrial Development (ISID) lies at the core of SDG-9, which aims to "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation". It should come as no surprise that industrial competitiveness lies at the core of ISID and the SDGs (specifically, SDG-9, albeit not exclusively) too, because many of the indicators to measure key areas of competitiveness, such as production capacity (SDG Indicator 9.2.1), export capacity (SDG Indicator 17.11.1) or technological deepening (SDG Indicator 9.B.1), are used by countries to report their progress in the SDG goals.

Figure 3. Share of MVA in GDP for Africa and the world, 2012–2019 (in %)

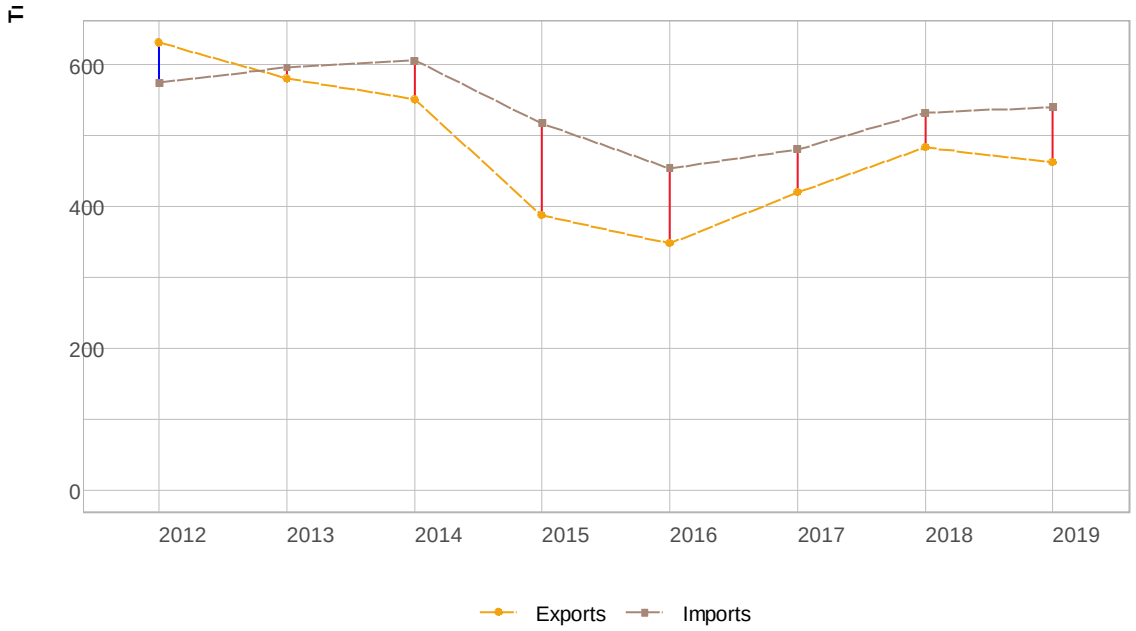


Source: UNIDO, MVA database 2020.

Note: The underlying values of MVA and GDP were measured at 2015 constant prices. The world aggregate was calculated with the available data of 206 economies. The African aggregate was calculated from all 54 African countries with available data, and are listed in Appendix A.

One key component for accelerating industrialization and enabling manufacturing to become the engine of economic growth and social development is improving trade performance; the best way to do so is by expanding the exports of manufactured goods. Competitive manufacturing sectors can diffuse economic growth to several other activities, thereby becoming the main driver of prosperity and poverty alleviation.[4]

Figure 4. African trade in goods, 2012–2019 (billion, in current US dollars)



Source: Own elaboration on the basis of UNCTADstat (2020).

Note: The vertical axis on the left measures the sum of total exports and the sum total imports of all 53 African economies with available data; they are listed in Appendix A, with the exception of South Sudan. These sums are valued in billions of dollars at current prices. The vertical red lines connecting imports and exports represent the deficits in Africa's trade balance, while the blue line represents the trade balance surplus.

[4] Experience has shown that a high export performance does not always translate into a high economic performance. It is widely recognized that a classic, successful example of the capacity of export performance to produce economic growth and increase the population's overall welfare is the automotive industry in the Republic of Korea. A much less successful example is Mexico's automotive industry. There is extensive literature on the necessary prerequisites for a competitive sector to have a strong and positive impact on economic growth; literature is also available on why the Republic of Korea's automotive industry has been so successful in substantially increasing the country's economic growth and standard of living as well as on why the Mexican experience was not as successful. Export performance may be crucial, but it is only one of many other factors that are at play, including: productive linkages, local knowledge creation, institutions, infrastructure, business environment, rule of law, etc.

Figure 4 presents Africa's trade in goods for the period 2012–2019. This graph contains the total exports, total imports and the trade balance, i.e. exports minus imports, of all African goods. For most of the period, imports were higher than exports, denoting a trade balance deficit. In other words, Africa has been purchasing more goods (imports) than it has been selling (exports). The general view is that unsustainable trade deficits are bad for the economy as they create instabilities, which could hamper economic growth and, consequently, job creation.[5]

What may be even more problematic than the existence of a negative trade balance is the fact that the deficit has actually been increasing. In 2012, Africa registered a trade surplus of USD 51 billion, but the balance turned negative the following year and dropped to its lowest point in 2015, with a deficit of USD 136 billion. The trade deficit persisted, with the last observation taken in 2019, when Africa's trade deficit amounted to USD81 billion.

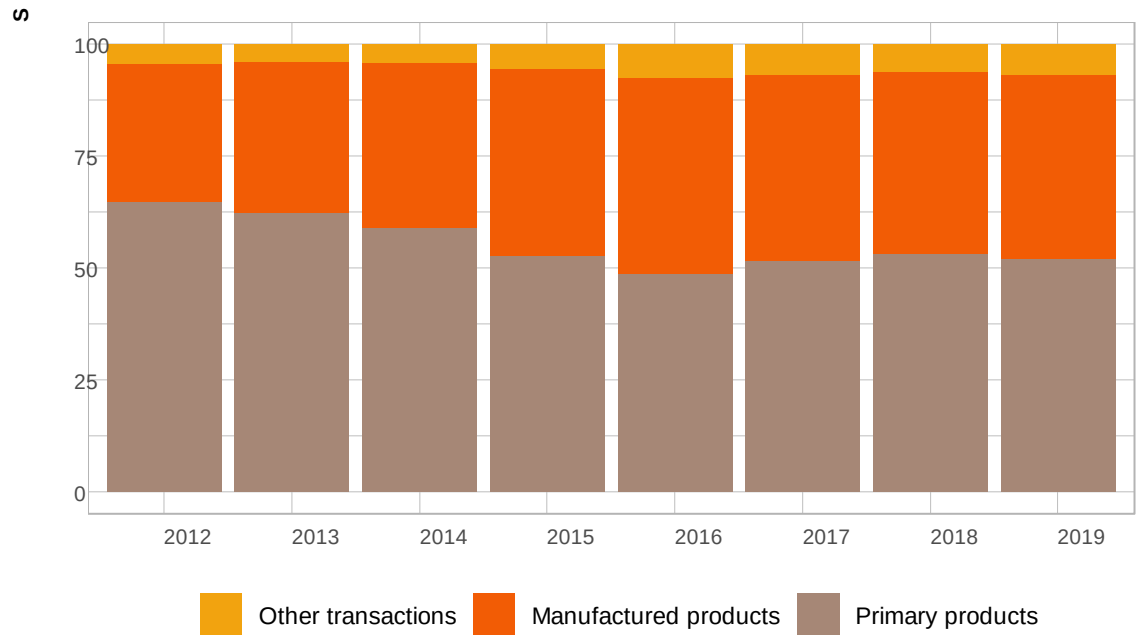
This negative trend due to recurrent and increasing trade deficits was not the result of a strong growth in consumption and consequently of imported goods; on the contrary, imports registered a slight decline from USD 584 billion in 2012 to USD 547 billion in 2019. The main reason for the increasing trade deficit is the lack of dynamism in exports. African exports fell from USD 635 billion to USD 465 billion in the period 2012–2019, which was a larger decline than that registered for imports (which fell by 27 per cent and 6 per cent, respectively). In sum, Figure 4 shows that Africa's overall trade performance has been quite disappointing, the main reason being the decline in Africa's total exports.

As the decrease in total exports is the main reason for Africa's poor overall trade performance, the question arises what role manufacturing plays in Africa's trade performance. To answer this question, we must first consider the structure of African exports. Figure 5 illustrates the structure of Africa's total exports, which are still mostly composed of primary products (52 per cent), followed by manufactured goods (41 per cent) and other transactions (7 per cent).[6]

[5] There is an abundance of literature on the trade balance and its consequences for economic growth. More information on this topic can be found, among others, in the works of Thrilwall (1979 and 2011) and McCombie and Thirlwall (1994).

[6] "Other transactions" is a very mixed category, and includes, among others: electric current, art collections and antiques, non-monetary gold and special transactions and commodities not classified according to kind. Rather than using this 7 per cent to draw conclusions about the continent's development strategy, it should instead be seen as a warning about the quality of Africa's trade statistics, because it suggests that too many transactions and commodities are probably not being correctly classified. For more information on this category, refer to Table B in the Appendix.

Figure 5. Structure of African exports, 2012–2019



Source: Own elaboration on the basis of UNCTADstat (2020).

Note: The African aggregate is based on the 53 economies with available data, which are listed in Appendix A, with the exception of South Sudan.

The reader may have noted a considerable increase in the share of manufactured exports in total exports from 2012 to 2019, but this increase was not the result of a rise in manufactured exports. In fact, it was the result of a major decline in the exports of primary goods. Indeed, total exports fell 27 per cent from 2012 to 2019 and most of this drop was due to the poor export performance of primary products, which fell 41 per cent during the same period. Manufactured exports also fell, but by only 2 per cent. Other transactions registered an increase in exports of 9 per cent.

Figure 6 provides more information on Africa's trade of manufactured goods. It presents the trade balance of both manufactured goods and of total goods for easier comparison. Two points jump out: first, the trade deficit in manufacturing goods is much higher than in total goods, and secondly, there was a clear deterioration of the trade balance of total goods, despite the slight improvement in the trade balance of manufactured goods.

Moreover, the notable disbalance between the manufacturing share in total exports and imports suggests that there is a huge mismatch between Africa's consumption patterns and its propensity to import manufactured goods, and its capacity to produce them[7]. While this disbalance was obscured

[7] This mismatch between Africa's consumption patterns and its capacity to produce manufactured goods is to some extent, reflected in Africa's share of manufactured goods in total exports and its manufacturing share in total imports: in 2019, manufactured goods represented 41 per cent of total goods exports and 84 per cent of total goods imports.

during the commodity boom, from 2000 to 2013/2014, it came into plain view when commodity prices started to fall. The end of the commodity boom seems to have revealed the fragility of Africa's production system, together with its dependence on foreign manufactured products.

Figure 6. African trade in manufactured goods, 2012-2019 (billion, current US dollars)

Source: Own elaboration on the basis of UNCTADstat (2020).

Note: The values are in billions of dollars at current prices. The African aggregate is based on the 53 economies with available data, which are listed in Appendix A, with the exception of South Sudan.

The manufacturing sector's strong capacity to boost the rest of the economy, the population's general welfare rests on the fact that the manufacturing sector adds far more value than extractive industries, increasing the production process's complexity and consequently the value of the goods being produced. Yet the degree of complexity of the manufacturing sector's activities differs. While the production of high-technology products often involves very complex manufacturing processes that entail several inputs and state-of-the-art technology, the production of resource-based manufactured goods and low-technology products are often easier to produce.

In this regard, a country that is specialized in the production of high-technology goods has a higher likelihood to benefit from strong productive linkages and knowledge spillovers across different activities than a country specialized in low-technology manufacturing sectors. The technological complexity of the goods produced in a country is also a factor in the country's industrial competitiveness.

Another advantage linked to a manufacturing sector characterized by technological complexity is the fact that innovative countries, more often than not, tend to be specialized in the production of high-

technology products and have favourable market structures. As a country moves from producing technologically simple to more complex goods, the technological requirements for designing and producing these goods increase as well; consequently, the higher the technological requirements, the lower the number of producers that are able to meet these requirements. This empirical observation is the foundation for the claim that increasing products' technological complexity tends to create more concentrated market structures in favour of the innovators.

It could also be argued that this perspective has strong micro foundations. This view is in line with Schumpeter's work (1934), who asserted that firms expect to benefit from some market power as a reward for their innovations, as there would otherwise not be enough incentive to invest in research and development (R&D). In the extreme, a ground breaking innovation in a highly complex product could reward the innovator monopoly power in the market for a given period. Because they are lagging behind the technological frontier, competitors will lose (at least) some of their market share and will attempt to catch up with the innovator. This premise is reinforced by Nelson and Winter (1982), who find that technological change not only influences market structure, but market structure also influences innovation. They thus conclude that market structure and technological change influence each other and present a bi-directional causation.

The relationship between technology and market structure has straightforward implications for a country's industrial competitiveness: the ability to design and produce technologically complex goods is beneficial for a country's industrial competitiveness because it provides a degree of monopoly power.[8] Similarly to what occurs at firm level, climbing up the technological ladder decreases the number of competitor countries also capable of producing more technologically complex goods and competing in high-tech industries often entails a reduced number of competitors.[9]

Another more obvious reason is that competition in high-tech industries is likely to rely more on innovation than on labour costs. Competitors are therefore more likely to invest in research and development or in skills upgrading rather than in other less socially beneficial measures, for example, reducing employment benefits, which has a much stronger impact on labour-intensive industries than on those that manufacture high-technology goods. Increased investments in research and development and skills upgrading tend to produce positive externalities that extend beyond the manufacturing sector, and hence, benefit the entire economy.

In other words, the expansion of the industrial sector is a positive development, but is even more effective when the manufacturing sector behind this expansion is located high up on the technological ladder. A higher share of medium- and high-technology (MHT) goods in total manufacturing production is often characteristic of an economy with high levels of productivity, innovation and technological progress.

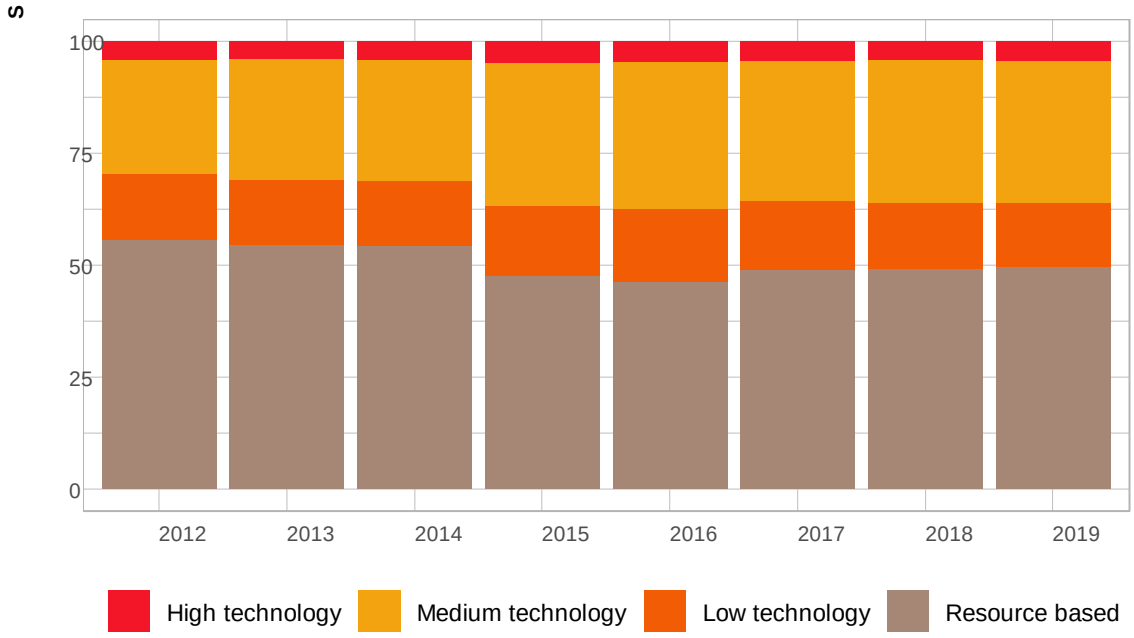
[8] While a large number of statistics are available on the production of manufactured goods, data on design, innovation and other manufacturing services are scarce. It is clear, however, that the complexity inherent in such high-technology products is located in the design and innovation activities rather than in assembly, and consequently, the monopoly power remains with the controller of the innovation (Clelland, 2014).

[9]The majority of countries produce some high-tech products, hence this statement gains strength as a country moves towards higher levels of disaggregation of the economic activities.

Figure 7 illustrates the structure of Africa's manufactured exports by type of technology. It reveals that the structure of Africa's manufactured exports gradually changed with the incorporation of more technologically advanced products in its mix of manufactured exports. Consequently, the share of medium- and high-technology products in Africa's total manufactured exports increased from 26.6 per cent and 4.0 per cent in 2012 to 31.9 per cent and 4.3 per cent in 2019, respectively. The opposite trend is observable in resource-based manufacturing and low-technology products, with their share dropping from 55.6 per cent and 14.7 per cent in 2012 to 49.6 per cent and 14.3 per cent in 2019, respectively. This positive development in the technological upgrading of Africa's export mix unfortunately looks better than it actually is.

Table 1 presents Africa's market share in world exports by type of technology. It shows that Africa's share in world exports experienced a sharp decline. Africa's total exports fell by 28 per cent, from 3.5 per cent in 2012 to 2.5 per cent in 2019. This decline in Africa's total export market share occurred simultaneously with the slump in the exports of primary products, which account for Africa's biggest market share in world exports and in 2019 represented 52 per cent of Africa's total exports.

Figure 7. Structure of Africa's manufactured exports by type of technology, 2012–2019



Source: Own elaboration on the basis of UNCTADstat (2020).

Note: This figure is based on the sum of exports of all 53 African economies with available data, which are listed in Appendix A, with the exception of South Sudan. The tecnological classification of products is based on Lall (2000) and is available in Appendix B.

African exports largely consist of raw materials and natural resources, i.e. commodities. Table 1 shows that primary products account for Africa's biggest market share in world exports. Yet its market share has declined by 25 per cent in recent years. Africa's market share in primary products

fell from 11.7 per cent in 2012 to 8.8 per cent in 2019. Despite this decline, primary products still account for the biggest share of African exports.[10]

Africa's market share in manufacturing exports lags far behind, accounting for only roughly 1.3 per cent of world exports. This share has remained fairly constant in recent years, shrinking from 1.4 per cent to 1.3 per cent over the period of analysis. Resource-based goods account for the biggest market share of manufactured goods (3 per cent in 2019).The shares of all manufacturing categories decreased, with the exception of medium-technology, which witnessed a slight increase in its market share from 1.0 per cent to 1.1 per cent of world exports. Therefore, despite the fact that Africa's medium- and high-tech manufactured exports increased, as shown in Figure 7, the market share of only medium-tech manufactured exports grew at the global level. The export market share of high-tech goods dropped from 0.27 per cent to 0.22 per cent from 2012 to 2019.

Table 1. Export market shares of Africa in world exports by technology group (in %)

Technology group	2012	2013	2014	2015	2016	2017	2018	2019
Primary products	11.7	10.5	9.9	8.8	8.2	8.9	9.0	8.8
Total Manufacturing	1.4	1.4	1.4	1.2	1.2	1.2	1.3	1.3
Resource-based	3.3	3.1	3.3	2.9	2.8	2.9	2.9	3.0
Low-technology	1.2	1.1	1.1	1.0	1.1	1.1	1.1	1.0
Medium-technology	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1
High-technology	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2
Other transactions	5.6	3.8	5.5	5.0	5.9	6.8	7.4	7.4
Total exports	3.5	3.2	3.0	2.4	2.3	2.5	2.6	2.5

Source: Own elaboration on the basis of UNCTADstat (2020).

Note: This table is based on the sum of exports of all 53 African economies with available data, which are listed in Appendix A, with the exception of South Sudan. The export market share is calculated by dividing Africa's exports by world exports for each technology category.

[10] It should be noted that the biggest drop in market share occurred in total exports (-28 per cent) between 2012 and 2019. This may be counterintuitive, as the reader presumably expects a decline that is some sort of weighted average of the sub-categories. However, these shares by technology group have different denominators and therefore, the biggest decline in market share among the sub categories was registered in primary products (-25 per cent), which account for the biggest share of African exports. This fact, in addition to the contraction of this category in total world trade (world exports of primary products fell 22 per cent from 2012 to 2019), explains the -28 per cent drop in total exports.

The revealed comparative advantage (RCA) index can be built using these export market shares. The RCA index was first introduced by Béla Balassa in 1965, and provides valuable information on the relative advantages/disadvantages of a country (or region) in a category of goods or services. The RCA index indicates that a given country (in this case, Africa) has a comparative advantage/comparative disadvantage for the corresponding technology group when it is higher/lower than 1 (Balassa, 1965).

Table 2 comprises five columns of indicators. The RCA index values of African exports for 2019 are presented in Column (1). For example, the RCA index of primary products is 3.5, which is obtained when dividing the market share of primary products (8.8 per cent) by the market share of total exports (2.5 per cent). These market share values are presented in Table 1. The RCA values indicate that Africa has a revealed comparative advantage in the export of primary products and resource-based goods, with values higher than 1. Africa also has advantages in "other transactions", but this group will not be considered here because, as mentioned earlier, it is too risky to draw conclusions on industrial policy from what could be a misleading classification of goods. Column (2) shows the natural logarithm of RCA. The advantage of this logarithm transformation is that it shows the comparative advantages for all positive values and comparative disadvantages for all negative values. This advantage is used in the next figure. Column (3) presents the total growth of world exports from 2012 to 2019. World exports should be equivalent to world imports; total export growth provides an overview of world demand for goods from each technology group.[11] Hence, the higher the growth in a given technology groups, the higher the expected demand for that type of good in the near future. Column (4) provides the same information, but in annualized growth rates, and finally, Column (5) shows the annual growth of each technology group minus the annual growth of total world exports, both presented in Column (4). Thus, Column (5) has the advantage of identifying those technology groups whose international demand has grown more than total world exports (which can be considered a weighted average) and have a positive growth rate, as well as those that have grown less and have a negative growth rate.

The information contained in Table 2 allows a depiction of Africa's relative share in each technology group. To read the table properly, it should be noted that, by definition, a country or region (in this case, Africa) cannot have comparative advantages in all technology groups. This is a direct outcome of using comparative advantages instead absolute advantages in the Ricardian theory of trade. Moreover, international demand cannot grow faster than the average (that is, growth in total exports) in all technology groups.

[11]The growth in international demand is hereby calculated as the growth in world exports. The growth in world imports would be the most intuitive indicator to calculate the growth in international demand, and yet here we use it indistinctively because the sum of all countries' imports should be equivalent to the sum of all countries' exports in the world aggregate. The differences between them should be irrelevant for the world aggregate; if they were not, the use of world imports could be detrimental to the type of analysis we are carrying out here. These differences can be related to mismatches in reporting between countries but also in the timing of reporting. In addition, the most obvious difference is the price valuation of the merchandise, that is, cost, insurance and freight (CIF) and free on board (FOB), which are used for imports and exports, respectively.

Hence, Africa will have technology groups with a comparative advantage and groups with a comparative disadvantage. Moreover, some of these technology groups will grow faster than the world average and some will grow at a slower pace. Ideally, a country or region has comparative advantages in those technology groups that have the highest growth in international demand, while it has disadvantages in those technology groups in which international demand is declining. Such a situation increases the likelihood that world demand will continue to grow in those technology groups in which the country or region is already strong, with a consequent expansion in exports and in economic growth.

Table 2. Revealed comparative advantage (RCA) and growth in world exports, 2012–2019

	(1)	(2)	(3)	(4)	(5)
Technology group	RCA (2019)	Ln(RCA) (2019)	Total growth in world exports (2012-2019, %)	Annual growth in world exports (2012-2019, %)	Growth difference of total world exports (2012-2019, %)
Primary products	3.5	1.2	-21.8	-3.4	-3.8
Total manufacturing	0.5	-0.7	9.3	1.3	0.9
Resource-based	1.2	0.2	-5.3	-0.8	-1.1
Low-technology	0.4	-0.9	10.7	1.5	1.1
Medium-technology	0.4	-0.9	10.6	1.4	1.1
High-technology	0.1	-2.4	22.3	2.9	2.6
Other transactions	2.9	1.1	-17.6	-2.7	-3.1
Total exports	1	0	2.4	0.3	0

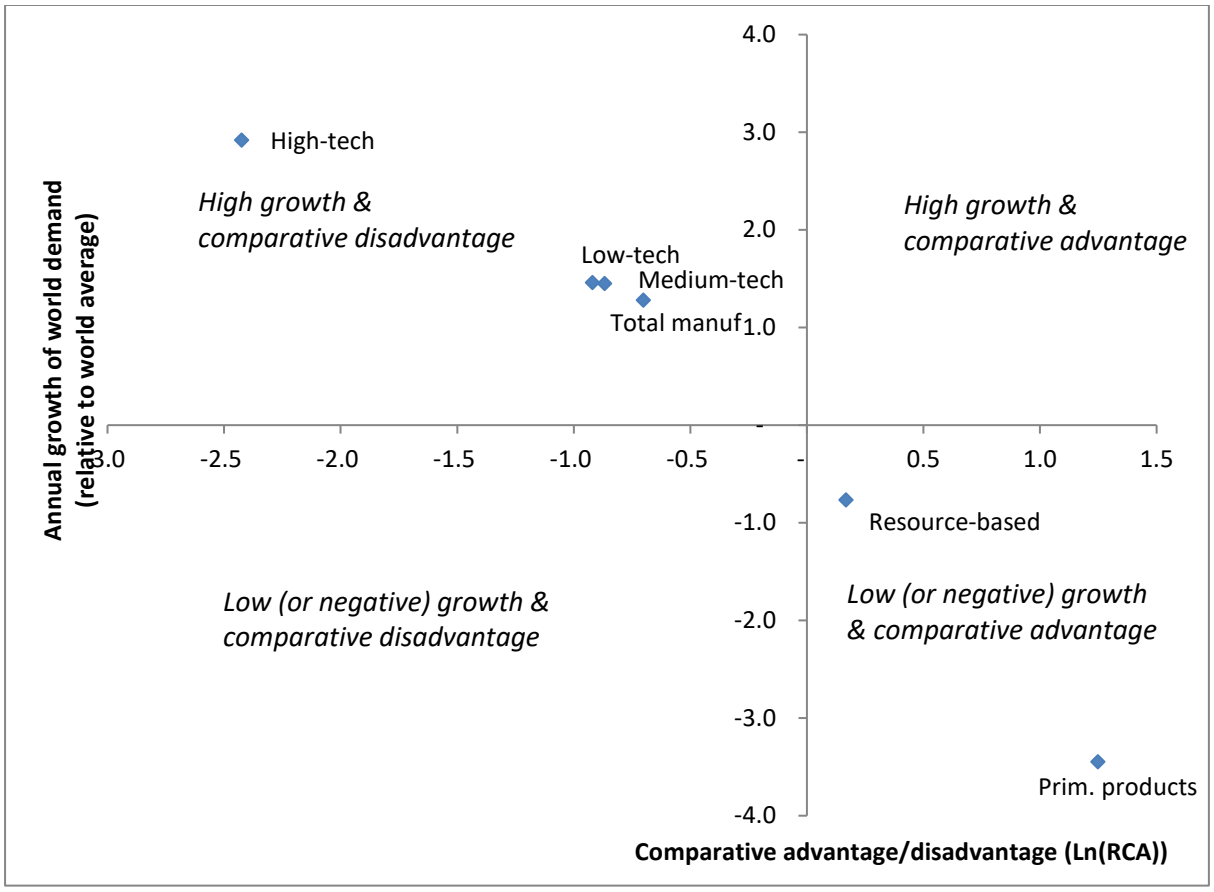
Source: Own elaboration on the basis of UNCTADstat (2020).

Note: This table is based on the sum of exports of all 53 African economies with available data, which are listed in Appendix A, with the exception of South Sudan. The export market share is calculated by dividing Africa's exports from world exports for each technology group. The revealed comparative advantage (RCA) index is calculated as the ratio of Africa's exports of a given technology group to world exports of that same technology group, divided by Africa's share of total exports in the world exports. The index for the technology group j is RCAj = 100*(Xaj /Xwj)/(Xat /Xwt) where (Xaj /Xwj) is Africa's export market share in the given technology group j and (Xat /Xwt) is Africa's export market share in total exports (j=technology group, a=Africa, w=world, X=exports and t=total exports). A value of the index above/below 1 represents a revealed comparative advantage/comparative disadvantage for that particular technology group.

Unfortunately, Africa is nowhere near to achieving this situation. Figure 8 depicts the data presented in Table 2 and in Columns (2) and (5).That is, the comparative advantage/disadvantage is represented in the horizontal axes, and the growth of world demand (in relative to world average) is presented in the vertical axes. Figure 8 shows that the technology groups in which Africa has a comparative advantage are those that registered the strongest contractions in world demand. As

global demand for primary products and resource-based goods fell, prospects for an improvement in exports, trade balance and economic growth weaken.

Figure 8. Africa's comparative advantage and growth in world demand, by technology group (2019)



Source: Own elaboration on the basis of UNCTADstat (2020).

Note: This table is based on the sum of exports of all 53 African economies with available data,which are listed in Appendix A, with the exception of South Sudan. The RCA is calculated as explained in the note of Table 2.The natural logarithm transformation is used to show comparative advantages for positive values and comparative disadvantages for negative values.

Africa's trade data has thus far painted a fairly negative picture. Specifically, Africa's total exports are declining; Africa's manufactured exports are more stable, but are far lower than total manufactured imports, which reveals the difficulties Africa's manufacturing sector has had in competing against foreign competitors, and the African population's high propensity to consume imported manufactured goods. These two factors have caused major trade deficits that hamper Africa's economic growth and consequently, job creation. Moreover, the structure of African exports is heavily based on primary products and resource-based manufactured goods. Indeed, Africa revealed comparative advantages are in these two technology groups. Regrettably, these two technology groups have registered a significant decline in relative world demand, which suggests that Africa's

export performance may continue to decline, with the corresponding negative effects on Africa's future economic growth, unless corrective policies are implemented.

The main message to be gleaned from this section is that the African continent is far from reaching its full industrial potential and therefore, additional efforts should be undertaken to accelerate Africa's industrialization and transform the industrial structure in such a way to enable industry to assume a key role in the continent's economic and social development, bolstering employment, growth and poverty alleviation.

3. *Industrial competitiveness in Africa: An analysis of its regions*

The overall picture of the African continent reflects the "average" situation in its countries. It cannot, however, reflect the specific situation of any African country. Africa is a continent rich in diversity and there are significant differences between its member countries. Particularly relevant for the analysis of industrial competitiveness are the differences in terms of their stage of industrial development.

To provide a more detailed picture of the continent's industrial competitiveness, this section divides Africa into five regions: Middle, Eastern, Northern, Southern and Western Africa. The composition of the economies in each region is available in Appendix A. The reason for this geographic division is that an in-depth industrial competitiveness analysis of every African economy goes beyond the scope of this report. The five regions have similarities—in terms of obstacles and constraints to development—and thus serve as good benchmarks for each other.

It should, however, be noted that these regional aggregates are nothing more than the sum of their members, within which the larger economies tend to contribute more to the aggregated values than smaller economies and therefore, the regional aggregates are likely to more accurately describe the economic situation of the region's biggest contributors. It is therefore useful to gain further insights into the relative contribution of members to each of the regional aggregates, which can be obtained by looking at the regional structure in terms of GDP, MVA, population, exports and imports. This information is available in Appendix C.

Table 3 presents a set of general statistics that shed some light on the differences and similarities between the five African regions. The data in this table refer to the years 2012 and2019. It is immediately evident that Africa's GDP per capita declined during this period. One reason for this decline is the 20 per cent growth in Africa's total population. Another reason are the terrible conflicts in Libya (Northern Africa) and in the Central African Republic (Middle Africa) as well as the poor economic performance in Equatorial Guinea (Middle Africa). The GDP and MVA per capita of Southern Africa dropped as well. This development occurred because despite the fact that GDP and MVA increased, they could not keep up with the rapid pace of population growth in its largest member country: South Africa.

The values for 2019 indicate that Southern Africa is the richest of the five regions, with an average GDP per capita of USD 5,455 and an average MVA per capita of USD 632.5. Southern Africa is followed by Northern Africa, with a GDP per capita of USD 3,461.9 and MVA per capita of USD 422.4. The poorest region is Eastern Africa, with a GDP per capita of USD 896 and MVA per capita of USD 65.5. Regional differences are less pronounced in terms of population density. The most populated region is Eastern Africa, which is home to 1/3 of all Africans (432.7 million), while Southern Africa is only home to 5.1 per cent of the African population (66.6 million).

The higher levels of GDP and MVA per capita in Southern Africa do not necessary imply that this is Africa's most industrialized region. One common measure of industrialization is share of MVA in GDP. This indicator provides a slightly different picture from that provided for GDP and MVA per capita, and suggests that Northern Africa is the continent's most industrialized region. The recent

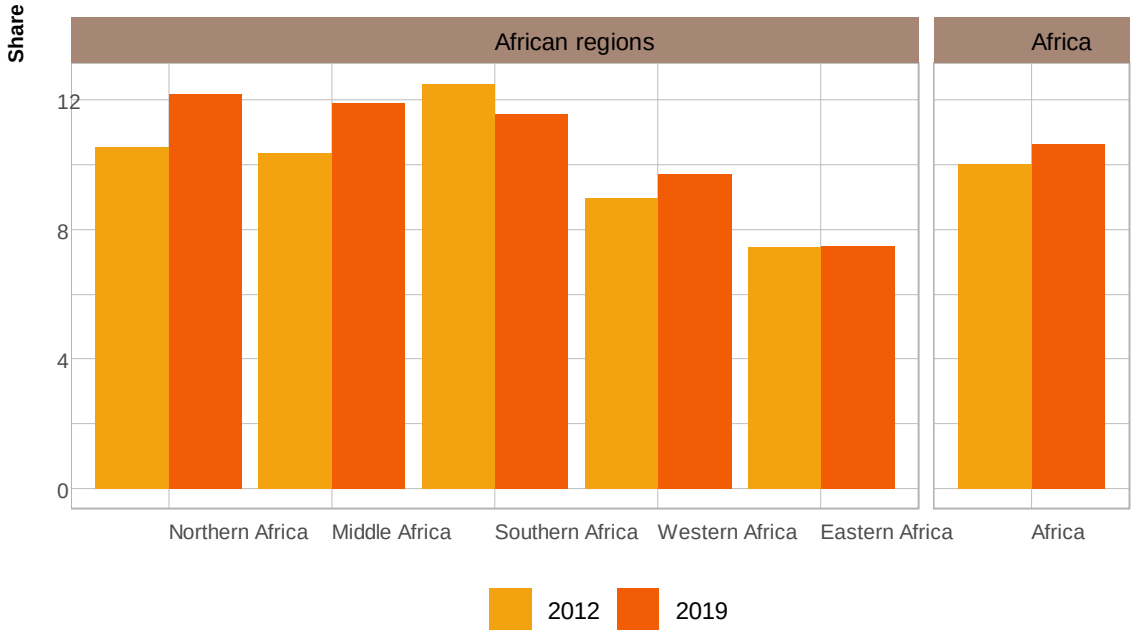
growth of the region's manufacturing sector registered an MVA share of 12.2 per cent in GDP in 2019. Northern Africa is followed by Middle Africa, with a share of MVA in GDP of 11.9 per cent, and by Southern Africa, whose share decreased from 12.5 per cent in 2012 to 11.6 per cent in 2019. Eastern Africa continues to rank low with a stable 7.3 per cent share of MVA in GDP. Western Africa registered a slight increase during the period of analysis and recorded an MVA share in GDP of 9.7 per cent in 2019, which is slightly below the average of the entire continent, namely 10.6 per cent (Figure 9).

Table 3. GDP and MVA per capita, 2012–2019 (at constant 2015 USD)

Region	GDP per capita (constant 2015 USD)		MVA per capita (constant 2015 USD)		Population (million)	
	2012	2019	2012	2019	2012	2019
Eastern Africa	722	896	53	65	358	433
Middle Africa	1,528	1,378	159	164	140	174
Northern Africa	3,711	3,462	392	422	210	241
Southern Africa	5,466	5,455	684	632	60	67
Western Africa	1,768	1,856	159	181	324	391
Africa	1,972	1,954	198	208	1,093	1,306

Source: UNIDO. MVA database 2020. This table is based on the available data of 54 African countries, which are listed in Appendix A.

Figure 9. Share of MVA in GDP, 2012–2019



Source: UNIDO MVA database 2020.This figure is based on the available data of 54 African countries, which are listed in Appendix A.

While the differences in MVA per capita and share of MVA in GDP are quite significant between the different African regions, they follow a very similar trajectory in terms of industrial competitiveness. According to 2019 data, the five regions showed substantial similarities in four points: i) they all have a negative trade balance in manufactured products while achieving a trade surplus in primary products; ii) They all record an insignificant share of high-technology products in total exports, which is the lowest share compared with all other technology groups; iii) The export market share of manufactured products in all regions is smaller than their export market share of total goods; iv) All regions have a revealed comparative advantage in primary products and a revealed comparative disadvantage in manufactured products. This information is summarized in Table D in the Appendix.

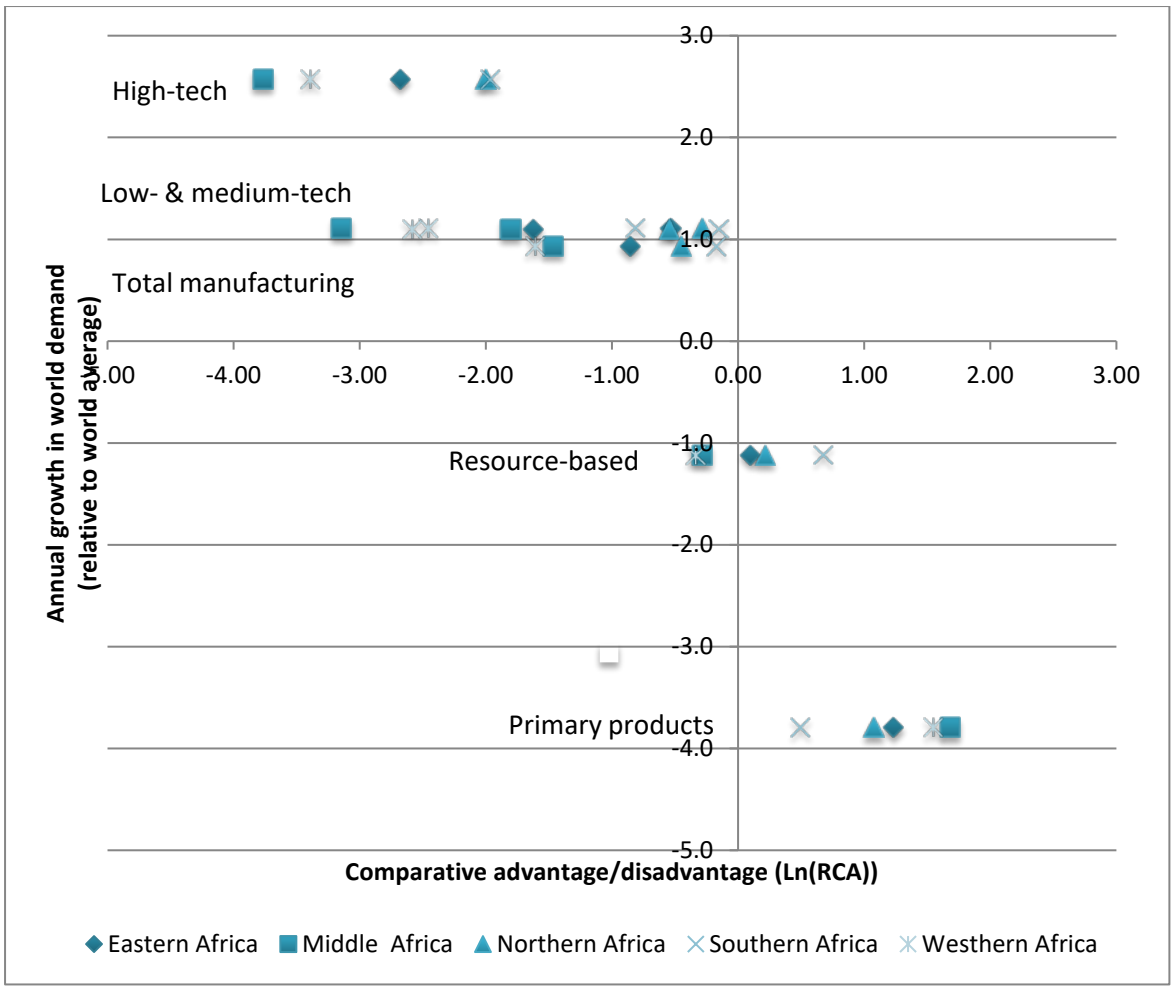
Apart from these clear similarities, there are, nonetheless, some interesting differences. In line with the distinctions in GDP per capita and MVA per capita observed in Table 3, Northern and Southern Africa stand out from the other African regions. For example, in terms of export structure, Eastern, Middle and Western Africa mostly export primary products, while Northern and Southern Africa primarily export manufactured products. In these two latter regions, resource-based followed by medium-technology products registered a higher share in total exports. These regions also show differences in their trade balance in total goods; while Middle, Southern and Western Africa had a trade surplus, Eastern and Northern Africa recorded significant trade deficits. More detailed information is available in Table D in the Appendix.

Figure 10 uses the data contained in these regional tables to recreate Figure 7 which presents the annual growth rate in world demand with the comparative advantages/disadvantages for each technology group. The annual growth rate in world demand remains the same for each technology group, hence the comparative advantage of each region in each technology group is the only variation.

We find that Figure 10 is very similar to Figure 7. There are some differences, for example, Middle and Western Africa show comparative disadvantages in resource-based manufactured products, while Africa (as well as the other African regions) shows an advantage. Additionally, there are slight differences in the magnitude of the comparative advantages between each region and Africa as a whole, but the two figures generally look alike. Most significantly, the only quadrant in the figure that remains empty is the most favourable one in the top right, which represents comparative advantages in those technology groups with rapidly growing world demand.

This finding of the regional analysis should be highlighted in particular, i.e. the fact that no African region has revealed comparative advantages in technology groups with a high growth in world demand. On the contrary, all African regions' comparative advantages are found in sectors with diminishing demand, namely primary products. From 2012 to 2019, world demand for these products reduced by 3.4 per cent per year, that is 3.8 per cent lower than the world average for all products. Given this situation, Africa's trade balance will most likely continue to struggle — importing technologically complex manufactured products while exporting raw materials — thus hampering their future economic growth.

Figure 10. Comparative advantages and growth in world demand, by technology group and African region



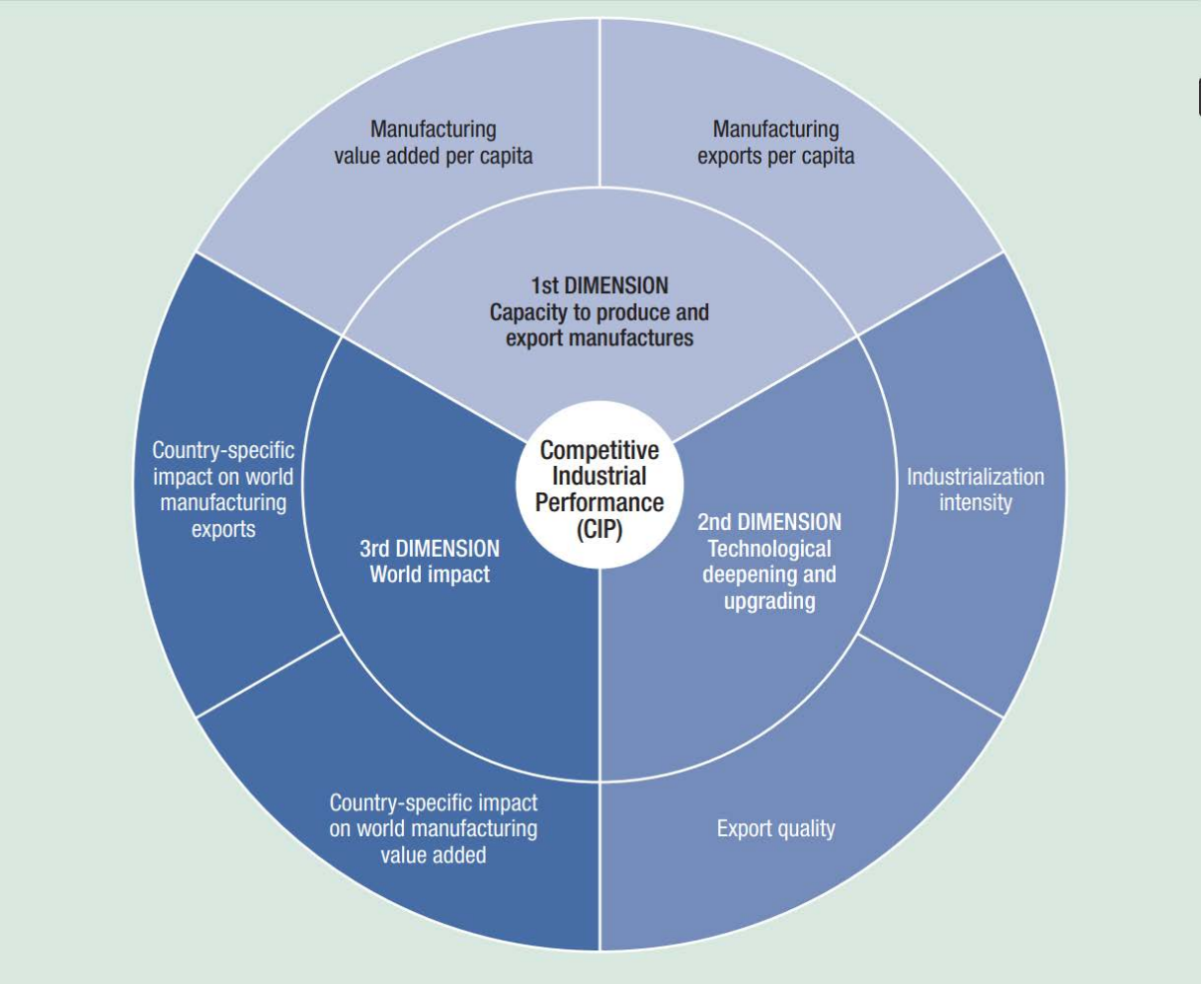
Source: Own elaboration on the basis of UNCTADstat (2020).

Note: This table is based on the sum of exports of all 53 African economies with available data, which are listed in Appendix A, with the exception of South Sudan. The RCA is calculated as explained in the note of Table 2. The natural logarithm transformation is used to show comparative advantages for positive values and comparative disadvantages for negative values.

4. *The Competitive Industrial Performance index and its results for Africa*

Every two years, UNIDO publishes its Competitive Industrial Performance (CIP) report. This year's CIP report focuses on Africa (this is an excerpt of the CIP report). The CIP index provides country measures of industrial competitiveness that enable cross-country comparisons. Specifically, it measures how successful a country's industries are at producing and selling their goods on domestic and foreign markets, and consequently, how much they contribute to structural change and development.

Figure 11. Dimensions of the CIP index



Source: UNIDO (2017).

The CIP index uses six indicators that cover three main dimensions. These dimensions are: i) the capacity to produce and export manufactured goods, ii) technological deepening and upgrading, and iii) world impact. The higher the scores in any of the three dimensions, the higher the country's

industrial competitiveness and its CIP index.[12] Figure 11 provides a graphic explanation of how the CIP index is built.

Capacity to produce and export

The CIP Index's first dimension provides a comparable measure of countries' manufacturing production and exports. Manufacturing value added and manufactured exports give indications about the capacity of production in each country. To make these values comparable between countries of different sizes, the CIP uses per capita manufacturing value added and per capita manufactured exports, MVA_{pc} and MX_{pc} respectively. These indicators allow for country comparisons independent of how populous the countries are.

In a globalized economy, a country's capacity to produce manufactured goods is closely linked to its capacity to also export them. Both, in turn, are key in determining a country's stage of industrial development and play a role in its path of structural change. As locally produced manufactured goods become more competitive, they tend to increase their participation in the local market while out-competing some imported goods. Further improvements in competition help local companies leave behind the limitations of local demand and expand their participation in foreign markets.

Technological deepening and upgrading

As suggested earlier, the expansion of the industrial sector is always positive, but when this expansion can be attributed to medium- and high-technology sectors, it is even better. This does not mean that competition in these sectors is not fierce, but competing in high-tech industries has some advantages that have already been elaborated in Section2 of this document.

The CIP index captures a country's technological deepening and upgrading through two composite indices. First, the degree of industrialization intensity (INDint) estimates the complexity of production processes. INDint consists of two indicators: the share of medium- and high-tech MVA in total MVA (MHVAsh) and the share of MVA in total GDP (MVAsh); and secondly, export quality (MQual), which measures the quality of the integration process of the country's manufacturing sector in global markets. The higher the technological complexity of the country's exported goods, the higher the quality of their integration in global markets. Export quality (MQual) also consists of two indicators: share of MHT manufactured exports in total manufactured exports (MHXsh), and the share of manufactured exports in total exports (MXsh).

World impact

Economies of agglomeration, scope and scale are also a factor of competitiveness. The CIP index groups these effects in the third CIP dimension, world impact, which is the country's impact on the global market of manufactured goods. The underlying idea of this dimension is that a country's

[12] The CIP report 2016 provides more information on the definitions, data sources and others for each of the components, as well as a detailed description of the methodology used to deal with missing values and to calculate the CIP index (UNIDO, 2017).

industrial competitiveness may benefit from a higher world impact, which may imply better access to foreign capital, new investments in infrastructure or even greater negotiating power in trade agreements.

The CIP index captures world impact through two indicators: the country' share in world MVA (*ImWMVA*) and world trade of manufactured goods (*ImWMT*). The higher the values of these shares are, the higher the country's world impact on global production and the trade of manufactured goods.

The 2020 CIP ranking

The 2020 edition of the CIP index assesses and benchmarks the industrial competitiveness of 152 economies. Data limitations are a common problem in many countries, and for this reason, only 33 African economies are present in the CIP ranking.[13] The ranking is based on the most recent available information for all economies, which at the time of writing was data for the year 2018.

The 2020 Global CIP ranking was led by Germany. China, the Republic of Korea, the United States and Japan are among the top 5 countries. Compared to 2012, these economies' CIP scores and ranks changed, but all of them were able to remain in the top 5 (see Table 4). Those economies that have improved their relative position in the ranking will have an upward pointing arrow (↑) in the last column, while economies that dropped positions in the ranking will have a downward pointing arrow (↓).

Table 4. Top 5 economies in the 2020 global CIP ranking

Global rank (2018)	Economy	Global rank (2012)	Global score	Change
1	Germany	1	0.4709	
2	China	5	0.3716	↑
3	Republic of Korea	4	0.3488	↑
4	United States of America	2	0.3454	↓
5	Japan	3	0.3445	↓

Source: UNIDO, CIP database 2020.

African economies are located far behind the top 5. No African economy is actually represented in the first third of the ranking. The best ranked African economy, South Africa, ranks 52nd, and of the 33 African economies included in the CIP index, only 10 reach the top 100.The other 23 fill the last positions in the ranking.

[13] Data availability and their quality will be assessed in the next subsection.

Table 5. African economies in the 2020 CIP ranking

African ranks	African region	Economy	Global rank 2018	Global score 2018	Global rank 2012	Change 2012-2018
1	Southern Africa	South Africa	52	0.0568	48	↓
2	Northern Africa	Morocco	61	0.0406	71	↑
3	Northern Africa	Egypt	64	0.0366	69	↑
4	Northern Africa	Tunisia	67	0.0353	68	↑
5	Southern Africa	Eswatini	83	0.0229	82	↓
6	Eastern Africa	Mauritius	87	0.0191	88	↑
7	Southern Africa	Botswana	89	0.0185	91	↑
8	Southern Africa	Namibia	97	0.0145	92	↓
9	Northern Africa	Algeria	98	0.0139	95	↓
10	Western Africa	Nigeria	99	0.0138	85	↓
11	Middle Africa	Congo	101	0.0134	115	↑
12	Western Africa	Côte d'Ivoire	105	0.0121	99	↓
13	Western Africa	Senegal	106	0.0119	103	↓
14	Middle Africa	Angola	107	0.0118	133	↑
15	Middle Africa	Gabon	110	0.0102	112	↑
16	Western Africa	Ghana	114	0.0088	104	↓
17	Eastern Africa	Kenya	115	0.0088	111	↓
18	Middle Africa	Cameroon	121	0.0078	113	↓
19	Eastern Africa	United Republic of Tanzania	123	0.0071	127	↑
20	Eastern Africa	Zimbabwe	124	0.0069	120	↓
21	Eastern Africa	Zambia	125	0.0063	122	↓
22	Eastern Africa	Uganda	128	0.0049	125	↓
23	Eastern Africa	Mozambique	132	0.0041	131	↓
24	Middle Africa	Central African Republic	133	0.0041	144	↑
25	Eastern Africa	Ethiopia	134	0.0039	150	↑
26	Western Africa	Cabo Verde	136	0.0033	139	↑
27	Eastern Africa	Madagascar	137	0.0032	136	↓
28	Eastern Africa	Rwanda	142	0.0022	140	↓
29	Eastern Africa	Malawi	143	0.0019	141	↓
30	Eastern Africa	Burundi	145	0.0010	148	↑
31	Western Africa	Gambia	148	0.0005	149	↑
32	Eastern Africa	Eritrea	149	0.0000	151	↑
33	Western Africa	Niger	151	0.0000	147	↓

Source: UNIDO, CIP database 2020.

Table 5 presents the 2020 CIP ranking of the African economies. Once again, economies that have improved their relative position in the ranking have an upward pointing arrow (↑) in the last column, while those that lost positions in the ranking will have a downward pointing arrow (↓). Table 5 also includes the CIP global score, which indicates the gap between the leading four African economies and the rest. This gap suggests that the competitiveness of these four economies' manufacturing industries is markedly higher than that of the other African economies.

But beyond the ranking, it would be interesting to examine these results in more detail from the perspective of the three CIP dimensions: i) capacity to produce and export, ii) technological deepening and upgrading, and iii) world impact. In Table 6, each African economy is ranked according to its CIP global ranking. Table 6 also provides information about each African economy's rank in each of these three dimensions. For example, we find that South Africa performs relatively

better in the third dimension (world impact) and relatively worse in the first dimension (capacity to produce and export), while its performance in the second dimension (technological deepening and upgrading) lies somewhere in between. South Africa ranks 39 in the third dimension, but trails in the ranking of the first and second dimensions at 70 and 58, respectively.

If we want to delve deeper into the analysis about why some countries perform better in some dimensions than in others, we have to examine the six CIP indicators (two for each dimension), which are presented in Table E of the Appendix. In our example, South Africa's economy performs better in the dimension world impact than in the capacity to produce and export because it ranks 37 and 43 in terms of its impact on world manufactured exports and on world MVA, respectively, while it ranks 81 and 66 in terms of MVA per capita and manufactured exports per capita, respectively. In other words, given its population size, South Africa has a limited capacity to produce and export its manufactured products, recording values of MVA per capita and manufactured exports per capita that are below those of other economies further below in the CIP ranking, for example, Eswatini and Mauritius. The opposite can be said about the third dimension, world impact: South Africa's shares in world MVA and in world manufactured exports are considerably higher than in many other economies, thus indicating advancements in their relative industrial competitiveness.

The results in Table 6 can be used to calculate regional averages, which are presented in Table E of the Appendix. While those averages provide a quick summary of the data, they need to be interpreted with caution for two main reasons: (i) there are non-random missing data, which introduces a bias (most likely, country with no data are those that perform worse); and (ii) simple averages may not be representative of the overall situation of the economies in that particular region (for example, in Southern Africa). Taking these limitations into account, we observe that the regional averages still provide a similar picture to the one presented in the previous section. The simple average CIP ranking of the countries that make up the Northern and Southern Africa regions places them in the top 100. In fact, the averages of these regions are located in the top 100 in all three dimensions. While Northern Africa performs better in terms of world impact and worse in the capacity to produce and export of manufactured goods, the opposite holds for Southern Africa. Both regions remain somewhere in between in the second dimension, technological deepening and upgrading.

The key message from Table F is that, on average, the poor performance of African economies in the CIP index can mostly be explained by their limited capacity in the production and export of manufactured goods, rather than their technological deepening and upgrading or their world impact. These two latter dimensions, despite the African economies' modest performance, are not the biggest challenge African countries face. Their biggest problem is the one we mentioned at the beginning of this report: Africa's population size does not correspond to its level of production—in MVA and in GDP—and integration in international markets.

Table 6. CIP ranking of African economies

Region	Economy	CIP global rank	Dimension 1 (rank)	Dimension 2 (rank)	Dimension 3 (rank)
Southern Africa	South Africa	52	70	58	39
Northern Africa	Morocco	61	84	32	53
Northern Africa	Egypt	64	105	56	46
Northern Africa	Tunisia	67	72	38	70
Southern Africa	Eswatini	83	57	39	113
Eastern Africa	Mauritius	87	60	89	110
Southern Africa	Botswana	89	65	118	100
Southern Africa	Namibia	97	76	123	109
Northern Africa	Algeria	98	115	147	69
Western Africa	Nigeria	99	134	86	63
Middle Africa	Congo	101	98	90	102
Western Africa	Côte d'Ivoire	105	119	109	88
Western Africa	Senegal	106	118	71	97
Middle Africa	Angola	107	120	132	82
Middle Africa	Gabon	110	83	146	117
Western Africa	Ghana	114	127	140	92
Eastern Africa	Kenya	115	132	115	89
Middle Africa	Cameroon	121	130	126	101
Eastern Africa	United Republic of Tanzania	123	137	111	94
Eastern Africa	Zimbabwe	124	129	116	115
Eastern Africa	Zambia	125	131	134	112
Eastern Africa	Uganda	128	139	127	111
Eastern Africa	Mozambique	132	138	136	119
Middle Africa	Central African Republic	133	136	34	138
Eastern Africa	Ethiopia	134	146	113	104
Western Africa	Cabo Verde	136	122	88	146
Eastern Africa	Madagascar	137	141	145	124
Eastern Africa	Rwanda	142	142	141	135
Eastern Africa	Malawi	143	147	125	137
Eastern Africa	Burundi	145	148	135	143
Western Africa	Gambia	148	149	131	151
Eastern Africa	Eritrea	149	152	142	149
Western Africa	Niger	151	151	104	131

Source: UNIDO, CIP database 2020.

Data availability and quality

Missing values imputation and now-casting for the most recent not yet reported values from the two UNIDO databases, MVA and INDSTAT 2, is carried out during the regular statistical production process of UNIDO STAT, and these estimated values are published in the corresponding databases. However, even after applying these methods, gaps remain or the CIP index's eight indicators, preventing a full calculation of the index. If just one indicator is missing for a country in a given year, the aggregated CIP index cannot be computed for that country. These remaining missing values are filled in using a method known as Last Observation Carried Forward (LOCF). For example, should a 2018 value for an indicator be missing, the method uses this indicator's 2017 value, unless that is missing, too. Should this be the case, the value of 2016 is used to fill in the values for both 2017 and 2018, and so on. Subsequently, the observed and imputed data are analysed on equal footing as if no data were missing.

The following table details the observations for countries with missing data in one or more CIP indicators to produce a complete dataset for the year 2018, which was fed into the computation of the CIP index 2020. No imputation was necessary for four countries in Africa, while 29 countries had one or more imputed indicators. In the remaining 22 countries, imputation was not possible for one or more indicators and these countries were therefore not included in the computation of the CIP index. This is why only 33 African countries are presented in the 2020 edition of the CIP index.

The most complete indicators are those based on the MVA database—only Réunion is missing data on these indicators—and the majority of missing values that prevent computation of the CIP index are in the INDSTAT database – there are 22 such countries, though the quality of this indicator is very low even for some of the countries that participated in the computation of the CIP index, estimated on the basis of past values going back to the 1990s: Central African Republic (1993), Gabon (1995), Nigeria (1996), Côte d'Ivoire (1997), Mozambique (1998), Rwanda (1999), Uganda (2000), Gambia (2004), Madagascar (2006), Cameroon (2008). The exports data are mostly complete but past data had to be used for some countries. It should be noted that this analysis only looks at the availability of data by year, i.e. we do not consider the incompleteness of the data not reported by product in the export data or by activity in the industrial statistics data, which could significantly influence the quality of the respective indicators.

Table 7: Data availability and dealing with missing values in the CIP sub-indicators for the African countries in CIP edition 2020

Country	Exports				MVA			INDSTAT
	MXpc	MXsh	ImWMT	MHXsh	MVApc	MVAsh	ImWMVA	MHVAsh
Countries without any imputed data (4)								
Botswana								
Kenya								
Mauritius								
Zimbabwe								
Countries with imputation in one or more indicators (29)								
Algeria	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				
Angola								OUTPUTsh
Burundi								nearest(2016)
Cameroon	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(2008)
Cabo Verde								nearest(2009)
Central African Republic	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(1993)
Congo	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(2009)
Ethiopia	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(2016)
Eritrea	nearest(2003)	nearest(2003)	nearest(2003)	nearest(2003)				
Gabon	nearest(2009)	nearest(2009)	nearest(2009)	nearest(2009)				nearest(1995)
Gambia								nearest(2004)
Ghana								nearest(2016)
Côte d'Ivoire								nearest(1997)
Madagascar								nearest(2006)
Malawi	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(2012)
Morocco								INDSTAT imp
Mozambique								nearest(1998)
Namibia								nearest(2016)
Niger	nearest(2016)	nearest(2016)	nearest(2016)	nearest(2016)				INDSTAT imp
Nigeria								nearest(1996)
Rwanda	nearest(2016)	nearest(2016)	nearest(2016)	nearest(2016)				nearest(1999)
Senegal								nearest(2015)
South Africa								INDSTAT imp
Eswatini								nearest(2015)
Tunisia	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				INDSTAT imp
Uganda								nearest(2000)
Egypt	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				INDSTAT imp
United Republic of Tanzania								INDSTAT imp
Zambia	nearest(2016)	nearest(2016)	nearest(2016)	nearest(2016)				nearest(2016)
Countries not included in the CIP due to missing one or more indicators (22)								
Chad	...	...	...	...				...
Comoros								...

Democratic Rep of the Congo	...	...	...	...				...
Benin								...
Equatorial	...	...	...	...				...
Djibouti	nearest(2009)	nearest(2009)	nearest(2009)	nearest(2009)				...
Guinea	nearest(2015)	nearest(2015)	nearest(2015)	nearest(2015)				...
Lesotho	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Liberia	...	...	...	...				...
Libya	nearest(2010)	nearest(2010)	nearest(2010)	nearest(2010)				...
Mali	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Mauritania	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Guinea-Bissau	nearest(2005)	nearest(2005)	nearest(2005)	nearest(2005)				...
Réunion	nearest(1995)	nearest(1995)	nearest(1995)	nearest(1995)	...	...	...	...
Sao Tome and Principe								...
Seychelles								...
Sierra Leone	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Somalia	...	...	...	...				...
South Sudan	...	...	...	...				...
Sudan	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Togo	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Burkina Faso								...

Source: UNIDO, CIP database 2020.

Note: OUTPUTsh indicates that the value was estimated as the output share; INDSTAT imp indicates that the value was estimated using the regular INDSTAT imputation procedure; nearest (year) indicates that the value was estimated as the nearest neighbour, using the value of the indicator in the given year.

5. Case study: Kenya's Industrial competitiveness

Context

This section continues the analysis of industrial competitiveness, but focuses on one specific country: Kenya. The Republic of Kenya is an Eastern African country that borders five countries: Ethiopia, Somalia, South Sudan, Tanzania and Uganda. Its national language is Swahili and its official languages are Swahili and English.

Kenya is a resource-based economy that has undertaken several efforts to advance on the path to industrialization. We will only mention some of these efforts here. In 2008, the Kenyan government launched its Kenya Vision 2030, a long-term development blueprint which acts as a national development strategy and roadmap. Its objective is to create a globally competitive and prosperous nation with a high quality of life by 2030. The specific objective for its manufacturing sector is job and wealth creation by increasing the sector's contribution to GDP. In 2012, the Republic of Kenya published its National Industrialization Policy Framework for Kenya 2012–2030, with the objective of "transforming Kenya into a globally competitive regional industrial hub". More recently, in 2015, the Ministry of Industrialization and Enterprise Development unveiled "Kenya's industrial transformation programme", a strategic, comprehensive and integrated programme to guide the country on its path to industrialization (Republic of Kenya, 2008, 2012 and 2015).

The industrial competitiveness analysis presented here aims to examine the role and influence of Kenya's manufacturing sector, focusing on identifying the country's position in terms of competitiveness and potential. Specifically, Kenya's manufacturing production performance, export performance, level of technological upgrading and deepening, and global ranking will be reviewed using the most recent data from UNIDO databases. A number of indices related to manufacturing will be presented, especially in terms of market share and revealed comparative advantages.

Kenya's competitiveness will also be assessed and analysed by comparing it with that in three other countries: Côte d'Ivoire, Ethiopia and Sri Lanka. A comparison between Kenya and these three countries may be interesting in itself, but only acquires true meaning when the reasons behind this selection of comparators are understood.

Selection of country comparators

The selection of country comparators is a delicate matter, because an evaluation of what is a 'good' (or 'bad') comparator country is intrinsically subjective and depends on individual perceptions. However, there are some questions that can provide guidance in this regard. For example: Can the comparators provide useful information? For which activities can the comparators provide useful inputs to? What is a manageable number of comparators? Are these comparators immediate/potential competitors or rather role models? The answers to these questions may not result in us choosing a particular comparator, but bearing these questions in mind during the selection process is recommended.

A more pragmatic approach is to use the popular practice of comparing a country with its neighbours. This is often done due to the geographic adjacency and similarity in socioeconomic

structures. Moreover, neighbouring countries often trade and compete with each other. In this regard, competition may take different forms, ranging from gaining market share in particular niches to compete for foreign investment when transnational companies try to gain access to their region.

Following this common practice, we selected one neighbouring country, Ethiopia, as the first comparator country for the Kenya case study. Ethiopia is also a resource-based economy, with a similar contribution of its manufacturing sector to GDP. In fact, the levels of GDP and MVA are similar in both countries, which provides some indication that the size of the countries' internal markets could be comparable. Moreover, it suggests that these countries may be facing similar challenges in terms of economies of scale. Despite these similarities, it should be mentioned that Ethiopia is far more populous than Kenya and therefore—given their similar GDP and MVA levels—Kenya is considerably richer in terms of GDP per capita and more advanced in terms of industrial development when measured as MVA per capita.

The second comparator was also chosen on the basis of its geographic location, GDP per capita and productive structure. Bearing in mind that Ethiopia is more populous and has a lower GDP per capita and MVA per capita level, it is desirable to choose a similar African country that matches these differences in the opposite direction. Thus, Côte d'Ivoire was chosen as the second comparator because it is also an African country with a slightly higher income per capita than Kenya, it is less populous than Kenya and Ethiopia, but it is also a resource-based economy.

The development path of a country's industrial sector depends heavily on what it produces. In this regard, the fact that these three African economies (Côte d'Ivoire, Ethiopia and Kenya) are resource-based economies may still be too broad. This is because their future industrial development path could depend on sector-specific aspects that could differ considerably, even among resource-based industries. Some examples of these differences in sector-specific aspects could be: production requirements (natural resources, labour force skills, capital or technology), market structures and integration in their global value chains, consumer demands and exposure to international trade, etc.

When looking at Kenya's main export products, we find that tea is a key product in the country's export mix. The list of world leaders (or the world's top competitors) in the production and export of tea include China, India and Sri Lanka. Therefore, we selected Sri Lanka as the third comparator country, given the size of the Chinese and Indian economies, which enjoy various benefits from their internal market and their economies of scale to an extent that it simply unattainable for the Kenyan economy. While Côte d'Ivoire and Ethiopia can be classified as immediate/potential competitors of Kenya, considering that they compete in several resource-based products, Sri Lanka is far more closed to be a role model. It has a higher GDP per capita and MVA per capita, and a higher contribution of its manufacturing sector to the economy.

Table 8 summarizes general statistics. The first five columns on GDP, MVA and population provide an idea of the relative size of the economies as well as how they have developed over time; the columns on GDP per capita and MVA per capita offer a static indication of the levels of economic and industrial development in these countries. The last column on the share of MVA in GDP, indicates the relative contribution of the manufacturing sector to the economy.

Table 8 also provides another piece of information: the only country with a manufacturing sector that grows significantly faster than the rest of the economy is Ethiopia. Furthermore, Ethiopia's

economy also recorded higher GDP and MVA growth rates from 1990 to 2019. Sri Lanka is second best in terms of GDP and MVA growth; both variables rose quickly and at a similar rate. Finally, the manufacturing sectors seem to have difficulties keep up with GDP growth in both Côte d'Ivoire and Kenya. Their GDP growth is still significant, but their MVA growth is sluggish, particularly in Kenya.

Table 8. General data in 2019, selected countries

Economy	GDP (billions)	GDP annual growth rate (1990-2019, %)	MVA (billions)	MVA annual growth rate (1990-2019, %)	Population (millions)	GDP per capita (dollars)	MVA per capita (dollars)	Share of MVA in GDP (%)
Côte d'Ivoire	44.5	3.4	6.0	3.2	25.7	1,729.5	235.2	13.6
Ethiopia	87.2	6.9	6.5	8.5	112.1	778.4	57.8	7.4
Kenya	79.8	3.9	6.7	2.5	52.6	1,517.8	126.6	8.3
Sri Lanka	92.2	5.1	15.0	5.2	21.3	4,325.0	705.4	16.3

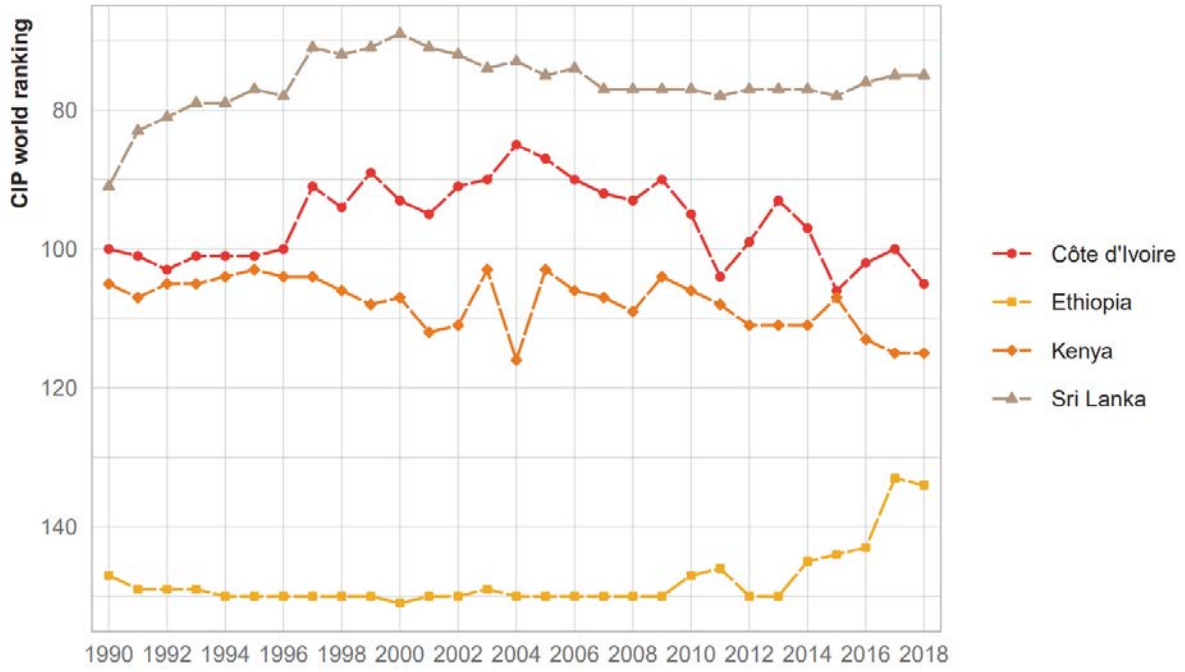
Source: UNIDO, MVA database (2020). Note: The values of GDP and MVA were measured in 2015 constant US dollars.

Kenya in the CIP ranking

The previous section discussed the CIP rankings of all African countries with available data, but not the position of Sri Lanka. Sri Lanka's manufacturing industry is the most competitive of our four case economies, occupying position 75 in the CIP ranking. Following Sri Lanka, we find Côte d'Ivoire in position105, Kenya in 115 and finally, Ethiopia in position 134. These are the countries' ranks in the current 2020 CIP edition based on data of the year 2018, and therefore provide no further information on the development of these countries' industrial competitiveness over time.

Figure 12 presents the global CIP ranks for the selected countries between 1990 and 2018. It not only confirms the existing differences in these economies' industrial competitiveness, but also shows that the order between these countries in the industrial competitiveness ranking has not changed over the last three decades. Furthermore, it reveals that Sri Lanka and Ethiopia managed to achieve some progress and move up in the CIP global ranking during this period, while Côte d'Ivoire and Kenya registered the opposite trend, losing 5 and 10 positions, respectively. These trends have not, of course, been exempt from volatility, as demonstrated by the constant fluctuation of these countries in the global ranking.

Figure 12. Trend of CIP ranking of the selected countries, 1990–2018



Source: UNIDO, CIP database (2020).

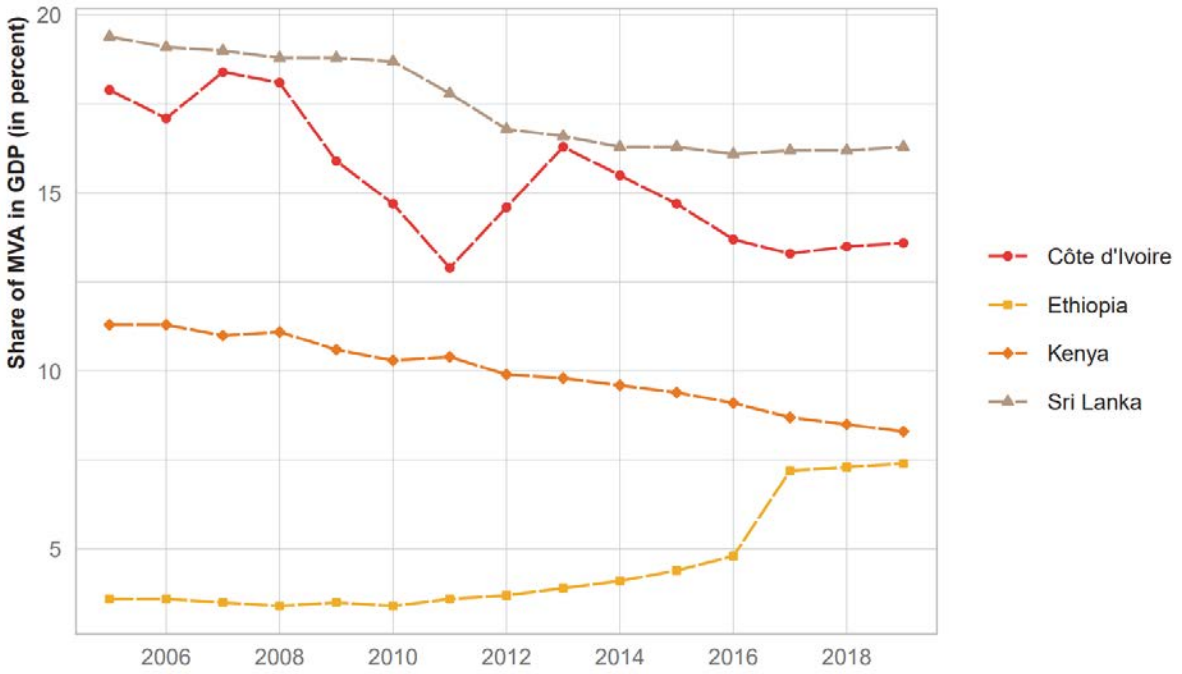
Capacity to produce

As already mentioned, the capacity to produce is one of the pillars of the CIP index and is key for industrial competitiveness. High competitiveness requires a high capacity to produce a suitable amount of quality products within a certain time span to meet the requirements of domestic and foreign markets.

We expect that countries with a greater capacity to produce manufactured goods will also exhibit higher shares of MVA in GDP, as well as a higher MVA per capita. If manufacturing is indeed the engine of growth for a specific country, then the growth rate of MVA should be higher than the rest of the economy, which would imply an increasing share of MVA in GDP, together with a rapidly growing MVA per capita.

Figure 13 depicts the share of MVA in GDP for the four case countries. From 2005 to 2018, the contribution of Kenya's manufacturing industry to its economy fell from 11.3 per cent to 8.3 per cent, by 27 per cent. This decline is only comparable with that of Côte d'Ivoire, whose share fell by 24 per cent over the same period. Sri Lanka also recorded a considerable decrease, with its share of MVA in GDP dropping by 16 per cent. The exception to this negative trend was Ethiopia, which managed to double its share over the last decade. In sum, according to this indicator (MVA in GDP), the decline in Kenya's share resulted in an increase in the gap between the country's production capacity and those countries with a more advanced industrial competitiveness (Côte d'Ivoire and Sri Lanka). The opposite occurred in Ethiopia, where the gap with Kenya narrowed considerably.

Figure 13. Share of MVA in GDP of selected countries, 2005–2019



Source: UNIDO, MVA database (2020). The underlying values of GDP and MVA were measured in 2015 constant US dollars.

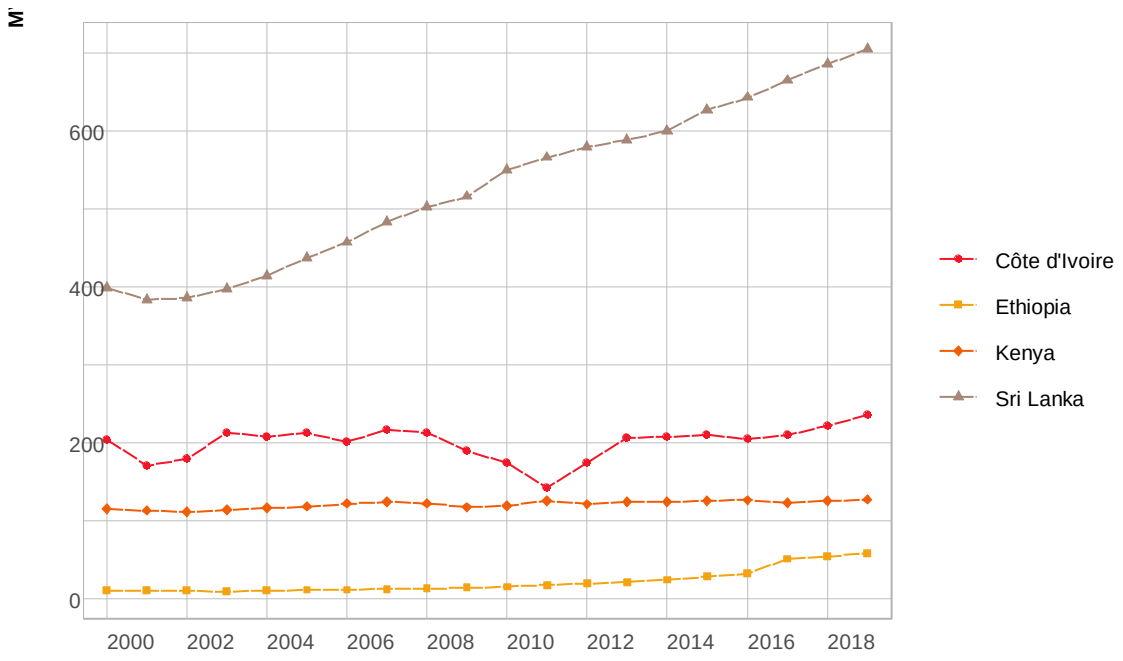
Another useful indicator for examining a country's production capacity is MVA per capita. This indicator allows us to compare the production capacities of economies with different population sizes. Figure 14 depicts the development of this indicator for the four selected economies.

The difference between this figure and the previous one is immediately visible. While Figure 13 indicates that the share of MVA in GDP declined in 3 out of 4 economies, Figure 14 illustrates that all economies registered slight or significant increases in MVA per capita. Does this mean that the two indicators contradict each other? The short answer is no. They simply provide different information.

The declining MVA share in GDP in Côte d'Ivoire, Kenya and Sri Lanka does not necessarily imply that their manufacturing sector is producing less as time goes by. It means that their manufacturing sector is growing at a slower pace compared with the rest of the economy. In other words, the manufacturing sector cannot keep up with the faster growth in other sectors of the economy. The opposite trend is visible for the case of Ethiopia, where the manufacturing sector acts as the engine of growth of its economy.

An increasing MVA per capita provides evidence of the manufacturing sector's growth relative to the country's population size. We find that MVA per capita increased in all four economies during 2000–2019. While Côte d'Ivoire and Kenya only registered marginal increases, Sri Lanka and Ethiopia's manufacturing industries exhibited strong growth.

Figure 14. Trend of MVA per capita in selected countries, in constant 2015 dollars



Source: UNIDO, MVA database (2020). The underlying values of GDP and MVA were measured in 2015 constant US dollars.

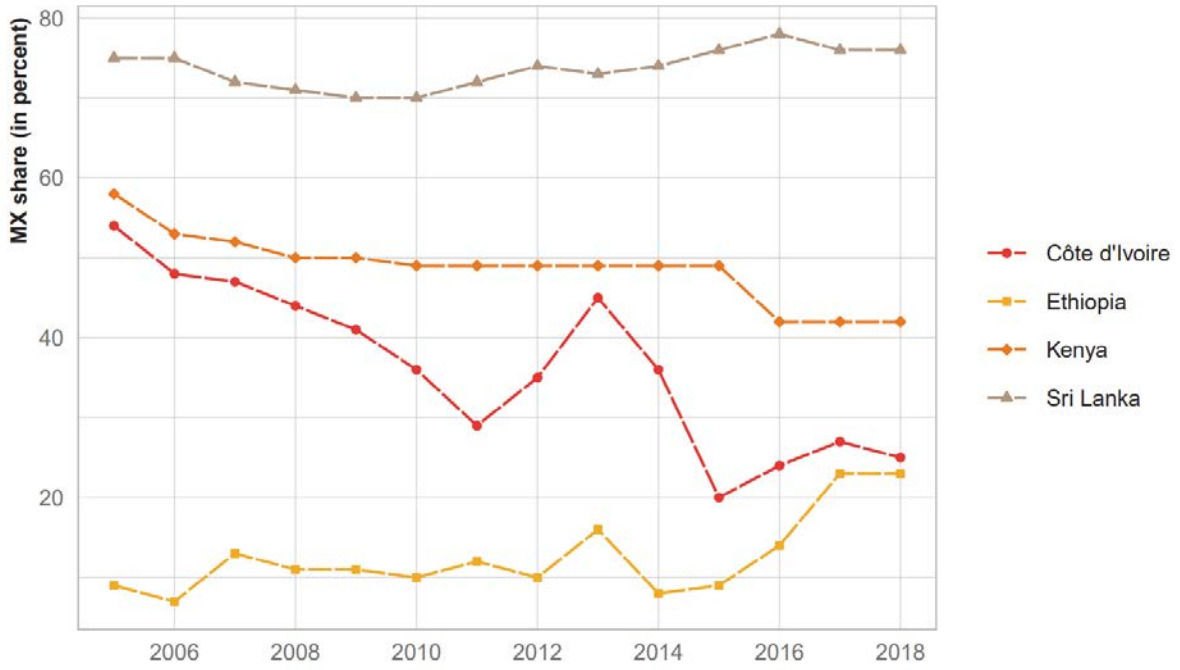
The positive trends in Sri Lanka and Ethiopia require particular attention. These economies have shown high and sustained industrial growth, and given the limited dimension of their internal markets, it is plausible to assume that international demand has played a major role in their industrial development. We will explore this possibility in the next subsection.

Capacity to export

The capacity to export manufactured goods is another pillar of industrial competitiveness and reflects the capacity of the domestic manufacturing industry to meet foreign demand. One widely used indicator to measure a country's capacity to export is its share of manufactured exports in total exports. The higher the manufacturing contribution to the country's total exports, the higher its capacity to export and its relevance for the economy in terms of GDP, trade balance and inflows of foreign currency.

Figure 15 shows the share of manufactured exports in total exports for all case countries. Once again, we find divergent trends between Côte d'Ivoire and Kenya and the other two economies. The share of Côte d'Ivoire and Kenya's manufactured exports in total exports declined significantly, plunging from 54 per cent and 58 per cent, respectively, in 2005 to 25 per cent and 42 per cent, respectively, in 2018. Sri Lanka's manufactured exports registered a high and stable contribution of around 75-76 per cent to total exports. Ethiopia recorded a remarkable increase from 9 per cent to 23 per cent over the same period.

Figure 15. Share of manufactured exports in total exports in selected countries, 2005-2018



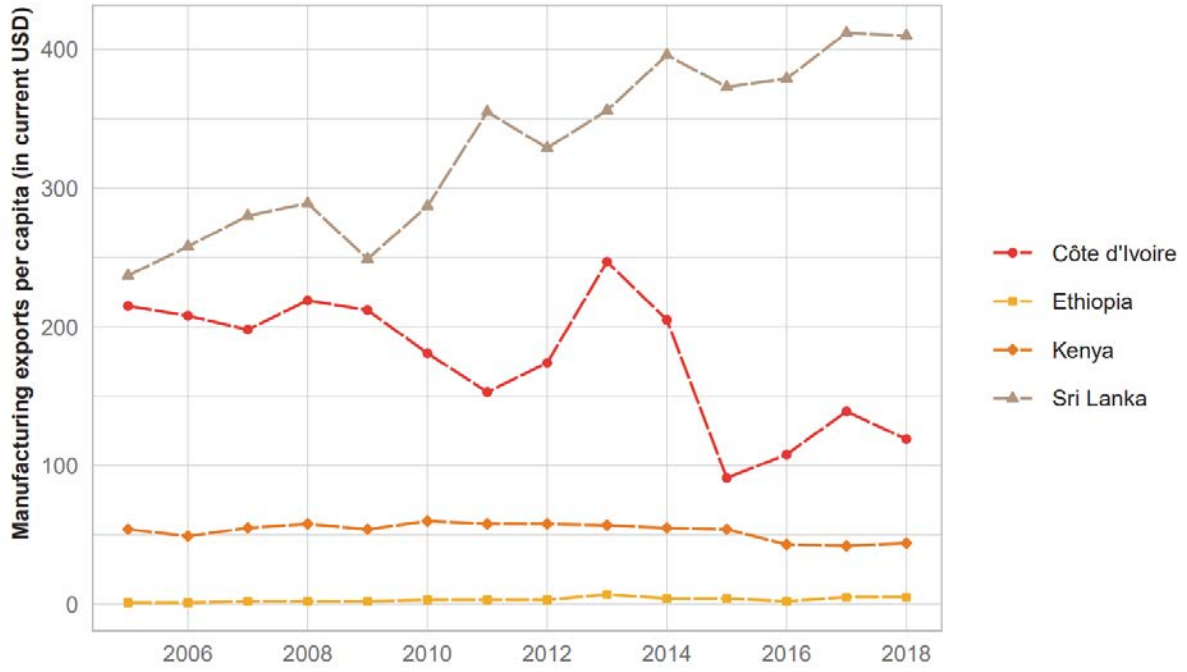
Source: UNIDO, CIP database (2020). The underlying values of manufactured and total exports were measured in current US dollars.

While the share of manufactured exports in total exports gives us an idea of how important the manufacturing sector is for the country's international trade, the indicator 'manufactured exports per capita' provides insights into the development of the country's export performance. This indicator is used to control the effects of population on the capacity to export manufactured goods.

We find a familiar pattern in Figure 16. Once again, Côte d'Ivoire and Kenya show a decreasing trend, which is very different from Sri Lanka and Ethiopia's. Manufactured exports per capita fell in Côte d'Ivoire from USD 215 in 2005 to USD 119 in 2018. Kenya registered a similar decrease, from USD 54 to USD 44 for the same period. Sri Lanka recorded a sustained increase in manufactured exports per capita from USD 237 in 2005 to USD 410. Finally, Ethiopia's manufactured exports per capita rose from USD 1 to USD 5.

Furthermore, it is also interesting to note that in 2005, the value of manufactured exports per capita in Côte d'Ivoire was not very different from Sri Lanka's, and yet, 13 years later, their trajectories evolved in completely different directions, creating a huge gap between these economies. The expansion of this gap in manufactured exports per capita indicates that the two economies took different paths in their approach to meet foreign demand for their manufactured products. These differences should be reflected in the technology upgrading and deepening of their exports as well as in their market shares.

Figure 16. Trend of manufactured exports per capita for the selected countries



Source: UNIDO, CIP database (2020).

Technological deepening and upgrading

As mentioned in the previous sections, the capacity to move up the technological ladder is a pillar of industrial competitiveness. To examine the progress of our four case countries along the technological ladder, we have to look at their export structure by technology group.

Table 9 describes the export structure by technology group in the four selected countries. Based on this information, we can immediately identify the countries' diverse technological trajectories. Additionally, the information contained in Table 9 confirms the results presented in Figure 15: Sri Lanka is the only country in which manufactured products represent the bulk of their export mix. The share of manufactured products in Sri Lanka's total exports has been high and stable over the years at around 75-76 per cent. Low-technology products make up the biggest share of Sri Lanka's exports, representing around half of Sri Lanka's total exports.

Côte d'Ivoire and Kenya have taken a very different path. In the mid-2000s, manufactured products were the main contributor to the countries' total exports; however, this share fell considerably (as shown in Figure 15). Table 9 provides more insightful information, suggesting that the decrease in the share of manufactured exports in total exports is attributable to the decrease in resource-based manufactured goods and an increase in the share of primary products.

Ethiopia is located at the other extreme, as it has not had a significant share of manufactured exports in total exports. Primary products have undoubtedly been its main source of exports, as demonstrated by the high share of primary products in total exports. Yet it should be highlighted that Ethiopia has undertaken major efforts to improve its export mix and climb the technological ladder. Therefore, despite the fact that the country's manufacturing share is still very low, it has

grown considerably due to increases in low-, medium- and even high-technology manufactured products.

Table 9. Structure of exports in selected countries, 2005–2018 (in %)

Technology group	Côte d'Ivoire		Ethiopia		Kenya		Sri Lanka	
	2005	2018	2005	2018	2005	2018	2005	2018
Primary products	44.8	66.5	85.5	71.7	40.8	56.5	22.8	23.1
Total manufacturing	54.5	25.3	9.2	23.3	58.1	42.0	75.1	76.3
Resource-based	31.9	16.1	5.1	3.4	32.7	18.0	16.0	17.7
Low-technology	2.7	3.3	4.0	10.1	16.7	15.0	53.2	50.5
Medium-technology	11.4	5.5	0.1	6.6	7.2	6.7	2.9	6.7
High-technology	8.4	0.5	0.1	3.1	1.6	2.3	3.0	1.3
Other transactions	0.8	8.2	5.3	5.0	1.1	1.5	2.1	0.7
Total exports	100	100	100	100	100	100	100	100

Source: UNIDO, CIP database (2020).

Export market shares

Table 10 presents the participation of our four selected economies in the world market by export market share by technology group. When looking at the last row of Table 10, we clearly see that their participation is very limited, as none of their total export market shares reached a level of 0.1 per cent in world exports. Therefore, instead of addressing these countries' impact on the world market, this subsection will instead focus on the countries' export market shares and the underlying comparative advantages.

Among these countries, Côte d'Ivoire leads in terms of participation in world exports, with an export market share of 0.07 per cent in world exports. This is not a minor achievement, particularly because Côte d'Ivoire is the smallest economy in our group when measured in total GDP. However, most of Côte d'Ivoire's export market share consists of primary products and the only type of manufactured goods that achieved significant values were resource-based manufactured products, and even those experienced a sharp decline between 2005 and 2018. According to the data in Table 10, we can conclude that Côte d'Ivoire is more integrated in the global economy than the other three countries, but the quality of this integration is rather modest as most of its participation is based on products at the bottom of the technological ladder.

Sri Lanka ranks second in terms of participation in world exports, as indicated by its total export market share in world exports, which was stable at around 0.06 percent from 2005–2018. Contrary to Côte d'Ivoire and the other countries, Sri Lanka's largest market share is in low-technology products. As mentioned earlier, Sri Lanka is a world leader in the production of tea (primary product), but its textile industry (low-tech) is also substantial. Hence, despite the fact that Sri Lanka's

export market share in primary products and resource-based manufactured goods is still significant; the country's participation in the global market is not exclusively based on the export of raw materials.

Kenya's market share in total exports trails far behind Côte d'Ivoire and Sri Lanka's, its share being only half of theirs. Additionally, the quality of Kenya's integration in global markets is also modest. As is the case for Côte d'Ivoire, Kenya's biggest export market share is also at the very bottom of the technological ladder, namely in the export of unprocessed natural resources (primary products). Although the country undertook significant efforts in the mid-2000s to add value by processing these resources, the effects of these efforts partially disappeared within a decade, as demonstrated by the decline in the market share of resource-based manufactured goods, which dropped from 0.07 per cent in 2005 to 0.03 per cent in 2018.

Ethiopia's economy is the least integrated in the world trade. Despite being the most populous and the second largest economy of the group measured in total GDP, Ethiopia has the lowest market share in total exports. Similarly to Côte d'Ivoire and Kenya, Ethiopia's biggest market share is in primary products. Despite the relative improvement in its export structure, the data in Table 10 seems to indicate that Ethiopia is so specialized in primary products that all the other technology groups look almost irrelevant in comparison.

Table 10. Export market share by technology group, in %

	Côte d'Ivoire		Ethiopia		Kenya		Sri Lanka	
Technology group	2005	2018	2005	2018	2005	2018	2005	2018
Primary products	0.20	0.30	0.05	0.06	0.09	0.12	0.09	0.10
Total manufacturing	0.05	0.02	0.00	0.00	0.03	0.02	0.06	0.06
Resource-based	0.15	0.06	0.00	0.00	0.07	0.03	0.06	0.07
Low-technology	0.01	0.02	0.00	0.01	0.04	0.03	0.23	0.23
Medium-technology	0.03	0.01	0.00	0.00	0.01	0.01	0.01	0.01
High-technology	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Other transactions	0.01	0.09	0.01	0.01	0.01	0.01	0.02	0.01
Total exports	0.07	0.07	0.01	0.01	0.03	0.03	0.06	0.06

Source: UNIDO, CIP database (2020).

As in the previous sections, the analysis of the industrial competitiveness of Kenya and its comparators continues with an evaluation of the revealed comparative advantage (RCA) indexes for each economy and technology group. In addition to the four countries' RCA indexes, Table 11 includes two additional columns on annual growth in world export by technology group as a measure of world demand. As in the previous sections, this information has been added to

determine whether these countries have developed a comparative advantage in those sectors with growing international demand.

The annual growth rate from 2005–2018 provides an idea about the developments during that period. We find that world exports of resource-based manufactured products grew at 5.2 per cent per year from 2005 to 2018. After "other transactions"[14], resource-based manufactured goods were the technology group with the biggest growth in international demand. This may come as a surprise, as technologically more advanced sectors usually exhibit higher growth, and yet, the reader should bear in mind that manufactured products such as food, refined oil, basic metals and other similar products represented the core of the so-called *commodity boom* that started at the beginning of 21st century and lasted for over a decade. That is, the commodity boom had a significant influence over the period 2005–2018, which means that choosing another period would most probably show a different growth ranking for these sectors.[15]High-technology manufactured goods recorded the second-highest growth rate following resource-based products, followed by low- and medium-tech products, and finally, primary products registered the lowest growth during this period.

Given the fact that it is unlikely that we will experience another commodity boom in the near future, more recent growth rates might better serve as estimators of future demand. Table 11 therefore presents the calculations of the annual growth rates over the last five years, that is, from 2013 to 2018. The order of the technology groups by growth rate is very similar to that presented in the previous sections. High-technology manufactured products rank higher than medium- and low-technology goods, trailed by resource-based goods and primary products, both which recorded negative growth.

In sum, this implies that while having a comparative advantage in resource-based goods in the period 2005–2018was beneficial due to the fast growth in prices, it is now recommended to specialize in high- and medium-technology manufactured products, as the most recent growth rates show that the commodity boom is over. Moreover, primary products and resource-based manufactured products are affected by high volatility in prices, which increases the country's risk and vulnerability to external shocks (Boly, 2012).

In terms of revealed comparative advantages, it can be assumed based on the previous tables that all four economies will exhibit a comparative advantage in primary products. Yet, some interesting nuances emerge. For instance, contrary to the rest of the economies, Ethiopia did not reinforce this comparative advantage, as its RCA index fell from 5.2 to 4.9.

In the case of total manufacturing, Sri Lanka was the only economy that did not have a comparative disadvantage, as its RCA index remained constant and equal to 1, indicating that the country neither has a comparative advantage nor a comparative disadvantage in the export of manufactured

[14] The analysis of the technology group "other transactions" has been excluded for the same reasons mentioned in previous sections.

[15] In the previous sections, the growth rates were calculated after the independence of South Sudan, from 2012 to 2019, and the results were much more predictable: High-tech products registered the highest growth rate, followed by medium- and low-tech goods; they were followed by the resource-based group and finally by primary products, which registered the lowest growth rate.

products as whole. It is also worth mentioning that while Côte d'Ivoire and Kenya's comparative disadvantage increased, Ethiopia is the only country that moved in the opposite direction.

Interestingly, resource-based goods did not provide a clear comparative advantage among our group of countries, which is a huge missed opportunity as they obviously did not manage to take full advantage of the commodity boom. Côte d'Ivoire and Kenya suffered major declines in their RCA indexes, thus eroding most of the comparative advantage they had in this particular technology group. Unfortunately, the technological trajectory for these countries is clear: they regressed from a situation in which they were adding some value to their natural resources to a new situation in which they export pure commodities without processing them.

Table 11. Revealed comparative advantage by technology group

Technology group	Annual growth in world exports		Côte d'Ivoire		Ethiopia		Kenya		Sri Lanka	
	2005-2018	2013-2018	2005	2018	2005	2018	2005	2018	2005	2018
Primary products	3.9	(5.0)	2.7	4.6	5.2	4.9	2.5	3.9	1.4	1.6
Total manufacturing	4.8	1.4	0.7	0.3	0.1	0.3	0.7	0.5	1.0	1.0
Resource-based	5.2	(0.9)	2.0	1.0	0.3	0.2	2.0	1.1	1.0	1,0
Low-technology	4.7	1.4	0.2	0.2	0.3	0.7	1.2	1.0	3.7	3,5
Medium-technology	4.6	2.0	0.4	0.2	0.0	0.2	0.2	0.2	0.1	0,2
High-technology	4.9	2.9	0.5	0.0	0.0	0.2	0.1	0.1	0.2	0,1
Other transactions	5.9	1.6	0.1	1.3	1.0	0.8	0.2	0.2	0.4	0.1
Total exports	4.7	0.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Source: Author's elaboration on the basis of UNIDO, CIP database (2020).

Sri Lanka's biggest revealed comparative advantage is in low-technology products. When we look at Sri Lanka's RCA values, we get an idea how relevant the low-technology industry (and particularly, the textile industry) is for the country. This industry is also important for Kenya, and despite the fact that this technology group has lost some ground; Kenya has neither an advantage nor a disadvantage in this technology group. Côte d'Ivoire and Ethiopia show a clear revealed comparative disadvantage. Yet, by opening to new markets and expanding their low-technology exports, Ethiopia is countering its comparative disadvantage in this technology group.

Regrettably, the RCA values indicate that there are very few opportunities for these countries to generate exports in medium- and high-technology products, given the fact that all these countries have a significant comparative disadvantage in industries that are at the top of the technological ladder.

Concluding remarks

Africa has been gradually industrializing over the last decade, yet there is lots of work to be done. The continent's slow industrialization is causing large trade deficits in manufactured products, which cannot be compensated by the surplus obtained from the export of raw materials and natural resources. Africa's negative trade balance in manufactured products is so large that it turns the continent's entire trade balance negative, hampering Africa's economic growth and consequently, job creation.

The negative trade balance in manufactured goods can be mainly attributed to a lack of dynamism in manufactured exports because manufactured imports have been declining. But there is more than just that. Manufactured exports were fairly stable as well as the magnitude of the deficit in the trade balance of manufactured products. The large magnitude of this deficit only became evident at the end of the commodity boom, when the prices of primary products and resource based manufactures were unable to sustain the consumption of imported manufactured products, thus revealing the significant mismatch between Africa's consumption patterns together with its propensity to import manufactured products and its capacity to produce them.

When exploring its specialization pattern, we found that African countries are heavily specialized in the export of primary products and resource-based products, which recorded a negative growth in terms of international demand. With foreign demand for the main source of African exports declining, competition seems to have intensified, as suggested by Africa's declining market share in both categories. This finding suggests that if no action is taken, Africa's export performance may continue to decline, with the corresponding damaging effects on Africa's future economic growth.

On a more positive note, Africa has already managed to improve its export structure, increasing the share of medium- and high-technology products in its manufactured exports. This is particularly relevant for medium-technology products, as this is the only manufacturing category in which Africa has slightly increased its market share in world exports. Even though Africa still does not have a comparative advantage in low-, medium-or high- technology products, increasing its market share in these categories is highly desirable. It is clear that the African continent is far from reaching its full industrial potential and therefore, additional efforts should be made to accelerate industrialization in Africa and ensure that its industrial sector assumes a major role in the continent's economic and social development, thus generating employment, growth and poverty alleviation.

Our regional analysis confirms the previous findings. The negative trade balance in manufactured products is constant across the African continent as well as the insignificant share of high-technology products in their export structure. Additionally, all African regions have revealed comparative advantages in primary products and disadvantages in total manufactured products as well as in the fast-growing technology groups. In other words, all African regions are specialized in the production of goods that have a relatively slow growth in international demand.

Northern and Southern Africa are the regions that appear to be relatively more advanced in terms of industrial competitiveness. Not only do they have higher GDP and MVA per capita values, they also export more manufactured than primary products, particularly resource-based and medium-technology goods. This expands the range of goods exported by these regions, and places them higher up in the technological ladder in comparison to the others.

The CIP index confirms the higher level of industrial competitiveness in Northern and Southern Africa, with South Africa and Morocco leading in each region and located at the top of the African ranking. An interesting finding is the identification of the biggest challenge African economies face, which was already highlighted at the very beginning of this report: Africa's population size does not correspond to its level of production in MVA and in GDP, and to its integration in international markets. In other words, for its particular level of population, Africa should have a higher capacity to produce and export manufactured goods.

The most important message gleaned from the CIP analysis is the lack of data availability and their quality. There is a clear need to improve data coverage, to obtain more timely and disaggregated data at the sectoral level, which would enable more complete and accurate analyses of industrial performance as well as a detailed monitoring of recent developments that could guide industrial policy and allow for more opportune corrective measures where necessary.

The 2020 CIP index ranks Kenya in the last quarter of the CIP global ranking, namely as 115 out of 152 economies. Our case study reveals some problems of Kenya's industrial competitiveness. In terms of its production and export capacity, Kenya exhibits some fairly negative signs. For example, Kenya's MVA share in GDP and its manufacturing share in total exports are decreasing. The results are mixed for technology, market share and revealed comparative advantage. On one hand, Kenya shows relatively high levels of manufactured exports in its total exports, market share and RCA indexes in resource-based and low-technology products. On the other hand, these levels have been decreasing considerably over time and the only technology group that has reinforced its comparative advantage is primary products. In this sense, while the situation is not yet critical, the technological trajectory of Kenya is pointing towards a deterioration of its technological capabilities, removing some of those activities that were adding value to its natural resources.

From the comparator countries' perspective, these results help explain why the CIP index shows that Kenya's neighbour, Ethiopia, is catching up in terms of industrial competitiveness, while its gap is expanding with the other front-running comparators Côte d'Ivoire and Sri Lanka.

Further research would be necessary to comprehensively analyse Kenya's industrial competitiveness. Sectoral MVA data for Kenya and its comparator countries would be necessary to examine the patterns of production and exports. Additionally, an analysis of revealed comparative advantages and the growth in international demand would have been more meaningful at a more disaggregated level, i.e. replacing the technology groups with Kenya's most important exports.

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Appendix

Appendix A. African economies by region

Eastern Africa		
Burundi	Madagascar	Somalia
Comoros	Malawi	South Sudan
Djibouti	Mauritius	Uganda
Eritrea	Mozambique	United Republic of Tanzania
Ethiopia	Rwanda	Zambia
Kenya	Seychelles	Zimbabwe
Middle Africa		
Angola	Chad	Equatorial Guinea
Cameroon	Congo	Gabon
Central African Republic	Democratic Rep of the Congo	Sao Tome and Principe
Northern Africa		
Algeria	Libya	Sudan
Egypt	Morocco	Tunisia
Southern Africa		
Botswana	Lesotho	South Africa
Eswatini	Namibia	
Western Africa		
Benin	Guinea	Nigeria
Burkina Faso	Guinea-Bissau	Senegal
Cabo Verde	Liberia	Sierra Leone
Côte d'Ivoire	Mali	Togo
Gambia	Mauritania	
Ghana	Niger	

Note: The geographical classification is based on the United Nations publication "Standard Country or Area Codes for Statistical Use" originally published as Series M. No. 49 and now commonly referred to as the M49 standard. Countries with no available data were omitted.

https://unstats.un.org/unsd/methodology/m49/.

Appendix B. Technology classification of exports

Type of export	SITC rev. 3
Primary products	1, 11, 12, 22, 25, 34, 36, 41, 42, 43, 44, 45, 54, 57, 71, 72, 74, 75, 81, 121, 211, 212, 222, 223, 231, 244, 245, 246, 261, 263, 268, 269, 272, 273, 274, 277, 278, 291, 292, 321, 325, 333, 343, 681, 682, 683, 684, 685, 686, 687
Resource-based	16, 17, 23, 24, 35, 37, 46, 47, 48, 56, 58, 59, 61, 62, 73, 91, 98, 111, 112, 122, 232, 247, 248, 251, 264, 265, 281, 282, 283, 284, 285, 286, 287, 288, 289, 322, 334, 335, 342, 344, 345, 411, 421, 422, 431, 511, 514, 515, 516, 522, 523, 524, 531, 532, 551, 592, 621, 625, 629, 633, 634, 635, 641, 661, 662, 663, 664, 667, 689
Low-technology	611, 612, 613, 642, 651, 652, 654, 655, 656, 657, 658, 659, 665, 666, 673, 674, 675, 676, 677, 679, 691, 692, 693, 694, 695, 696, 697, 699, 821, 831, 841, 842, 843, 844, 845, 846, 848, 851, 893, 894, 895, 897, 898, 899
Medium-technology	266, 267, 512, 513, 533, 553, 554, 562, 571, 572, 573, 574, 575, 579, 581, 582, 583, 591, 593, 597, 598, 653, 671, 672, 678, 711, 712, 713, 714, 721, 722, 723, 724, 725, 726, 727, 728, 731, 733, 735, 737, 741, 742, 743, 744, 745, 746, 747, 748, 749, 761, 762, 763, 772, 773, 775, 778, 781, 782, 783, 784, 785, 786, 791, 793, 811, 812, 813, 872, 873, 882, 884, 885
High-technology	525, 541, 542, 716, 718, 751, 752, 759, 764, 771, 774, 776, 792, 871, 874, 881, 891
Other transactions	351, 883, 892, 896, 911, 931, 961, 971

Source: UNIDO (2017)

Appendix C. Regional structure of the main economic aggregate in Africa

Country	GDP Structure 2019	MVA Structure 2019	Population Structure 2019	Exports Structure 2019	Imports Structure 2019
Burundi	0.75	1.10	2.66	0.41	0.99
Comoros	0.29	0.33	0.20	0.12	0.22
Djibouti	0.53	0.27	0.22	0.39	0.99
Eritrea	1.42	1.19	0.81	1.75	1.28
Ethiopia	22.49	22.87	25.90	6.72	17.78
Kenya	20.57	23.49	12.15	14.10	19.44
Madagascar	3.38	2.89	6.23	6.50	4.41
Malawi	1.93	2.40	4.30	2.08	3.26
Mauritius	3.50	5.67	0.29	4.54	6.33
Mozambique	4.32	5.13	7.02	11.40	8.41
Rwanda	2.81	2.27	2.92	2.81	3.04

Seychelles	0.42	0.35	0.02	1.18	1.22
Somalia	0.41	0.13	3.57	1.14	1.40
South Sudan	3.75	1.25	2.56	n/a	n/a
Uganda	7.85	9.00	10.23	8.33	8.38
United Republic of Tanzania	15.16	11.15	13.40	11.27	10.80
Zambia	6.22	6.29	4.13	17.01	8.11
Zimbabwe	4.19	4.21	3.38	10.23	3.93
Eastern Africa	100.00	100.00	100.00	100.00	100.00
Angola	45.27	31.51	18.26	51.64	39.26
Cameroon	15.09	18.88	14.85	6.48	14.95
Central African Republic	0.80	1.28	2.72	0.26	1.17
Chad	4.82	4.06	9.15	3.41	5.94
Congo	4.59	3.22	3.09	10.36	8.43
Democratic Rep of the Congo	18.50	26.15	49.79	9.78	16.52
Equatorial Guinea	4.36	10.74	0.78	7.46	5.22
Gabon	6.41	4.07	1.25	10.59	8.14
Sao Tome and Principe	0.15	0.09	0.12	0.02	0.36
Middle Africa	100.00	100.00	100.00	100.00	100.00
Algeria	21.63	8.05	17.85	26.22	20.10
Egypt	45.97	59.96	41.62	22.21	36.42
Libya	2.78	0.58	2.81	17.69	6.71
Morocco	13.97	17.72	15.12	21.19	23.81
Sudan	10.12	6.90	17.75	1.84	2.88
Tunisia	5.54	6.79	4.85	10.85	10.07
Northern Africa	100.00	100.00	100.00	100.00	100.00

Botswana	4.58	2.19	3.46	5.10	6.65
Eswatini	1.19	3.42	1.72	1.94	1.85
Lesotho	0.73	0.99	3.19	0.98	2.13
Namibia	3.20	3.21	3.74	4.89	7.28
South Africa	90.30	90.19	87.89	87.09	82.09
Southern Africa	100.00	100.00	100.00	100.00	100.00
Benin	1.46	1.96	3.01	2.06	3.01
Burkina Faso	1.83	1.02	5.19	3.00	4.16
Cabo Verde	0.26	0.17	0.14	0.05	0.72
Côte d'Ivoire	6.12	8.56	6.57	11.09	9.63
Gambia	0.23	0.10	0.60	0.10	0.57
Ghana	8.65	10.43	7.77	13.55	11.09
Guinea	1.62	1.55	3.26	2.91	3.02
Guinea-Bissau	0.18	0.18	0.49	0.27	0.27
Liberia	0.38	0.23	1.26	0.46	0.58
Mali	2.30	2.66	5.02	2.93	4.28
Mauritania	0.77	0.59	1.16	2.14	2.55
Niger	1.24	0.69	5.96	0.99	2.48
Nigeria	70.41	66.24	51.34	55.43	46.87
Senegal	3.13	4.92	4.16	3.63	7.41
Sierra Leone	0.70	0.11	2.00	0.42	1.39
Togo	0.70	0.59	2.06	0.96	1.99
Western Africa	100.00	100.00	100.00	100.00	100.00

Source: Own elaboration on the basis of UNIDO, MVA database (2020) and UNCTADstat (2020).

Appendix D. Analysis of the industrial competitiveness of the African regions

	Technology group	Trade balance (billions) 2019	Export structure (percentage) 2019	Export market share (percentage) 2019	RCA (index) 2019
Eastern Africa	Primary products	11.9	51.1	0.77	3.42
	Total manufacturing	-63.6	35.0	0.10	0.42
	Resource-based	-18.0	18.9	0.25	1.10
	Low-technology	-10.3	8.6	0.13	0.59
	Medium-technology	-26.3	6.1	0.04	0.20
	High-technology	-9.0	1.4	0.02	0.07
	Other transactions	4.4	13.9	1.31	5.84
	Total	-47.3	100	0.22	1
Middle Africa	Primary products	50.7	80.1	2.02	5.36
	Total manufacturing	-19.4	19.1	0.09	0.23
	Resource-based	-0.4	12.9	0.28	0.75
	Low-technology	-5.7	0.6	0.02	0.04
	Medium-technology	-9.9	5.1	0.06	0.16
	High-technology	-3.4	0.5	0.01	0.02
	Other transactions	0.4	0.9	0.14	0.36
	Total	31.7	100	0.38	1
Northern Africa	Primary products	22.4	43.7	2.19	2.93
	Total manufacturing	-102.1	52.8	0.48	0.64
	Resource-based	-18.3	21.2	0.92	1.23
	Low-technology	-14.8	11.0	0.56	0.75
	Medium-technology	-48.2	17.9	0.43	0.58
	High-technology	-20.7	2.7	0.10	0.13

	Other transactions	3.8	3.5	1.10	1.47
	Total	-76.0	100	0.75	1
Southern Africa	Primary products	8.4	24.4	0.91	1.64
	Total manufacturing	-7.8	69.6	0.47	0.84
	Resource-based	12.8	33.7	1.09	1.96
	Low-technology	-5.7	6.5	0.25	0.44
	Medium-technology	-3.4	26.6	0.48	0.86
	High-technology	-11.5	2.8	0.08	0.14
	Other transactions	3.8	6.0	1.40	2.52
	Total	4.3	100	0.56	1
Western Africa	Primary products	65.3	70.1	2.93	4.70
	Total manufacturing	-74.1	16.5	0.12	0.20
	Resource-based	-18.0	12.2	0.44	0.71
	Low-technology	-13.6	1.3	0.05	0.09
	Medium-technology	-32.9	2.3	0.05	0.08
	High-technology	-9.7	0.7	0.02	0.03
	Other transactions	14.6	13.4	3.50	5.62
	Total	5.8	100	0.62	1

Source: Own elaboration on the basis of UNCTADstat (2020).

Appendix E. The six CIP indicators for the African economies, classified according to their global rank (2018)

	Dimension 1		Dimension 2		Dimension 3	
Economy	MVA per capita (rank)	Manuf. export per capita (rank)	Industrialization intensity (rank)	Export quality (rank)	Impact on world manufac. exports (rank)	Impact on world MVA (rank)
South Africa	81	66	72	62	37	43
Morocco	93	79	37	35	53	56
Egypt	86	114	59	68	56	32
Tunisia	84	65	49	29	62	77
Eswatini	58	60	25	63	106	113
Mauritius	59	64	112	75	107	110
Botswana	99	50	137	74	81	127
Namibia	89	67	111	123	100	116
Algeria	126	103	149	142	69	70
Nigeria	116	140	67	113	88	35
Congo	130	71	134	24	86	128
Côte d'Ivoire	118	119	82	129	93	83
Senegal	119	118	56	97	103	94
Angola	110	124	135	105	96	68
Gabon	90	82	132	146	113	122
Ghana	115	129	100	148	108	74
Kenya	131	132	116	111	102	79
Cameroon	123	135	89	140	122	84
United Republic of Tanzania	144	130	143	52	92	98
Zimbabwe	135	122	107	121	111	115
Zambia	133	128	128	135	114	107
Uganda	141	138	121	126	121	102
Mozambique	145	137	119	143	123	111
Central African Republic	137	133	70	1	134	140
Ethiopia	143	146	110	106	128	81
Cabo Verde	121	121	91	94	144	146
Madagascar	150	131	145	134	116	131
Rwanda	146	143	138	132	135	134
Malawi	148	144	113	125	141	133
Burundi	151	148	125	139	146	142
Gambia	149	150	148	61	150	149
Eritrea	134	152	142	130	151	141
Niger	152	136	123	90	126	137
Eastern Africa	135	132	125	118	122	114
Middle Africa	118	109	112	83	110	108
Northern Africa	97	90	74	69	60	59
Southern Africa	82	61	86	81	81	100
Western Africa	127	130	95	105	116	103
Africa (average)	120	114	106	99	106	102

Source: UNIDO, CIP database 2020.

Appendix F. CIP averages of the African regions

Region	CIP Global rank	Dimension 1 (rank)	Dimension 2 (rank)	Dimension 3 (rank)
Eastern Africa (simple average between economies)	130	134	125	119
Middle Africa(simple average between economies)	114	113	106	108
Northern Africa(simple average between economies)	73	94	68	60
Southern Africa(simple average between economies)	80	67	85	90
Western Africa(simple average between economies)	123	131	104	110
Africa (simple average between economies)	113	117	106	105

Source: UNIDO. CIP database 2020.