AFRICAN DEVELOPMENT BANK GROUP

AFRICA INDUSTRIALIZATION INDEX 2022

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African Union

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About the Africa Industrialization Index

The African Development Bank (AfDB), the African Union (AU) and the United Nations Industrial Development Organization (UNIDO), three premier institutions championing industrial development in Africa, have joined forces to fill the data and evidence gap on industrial development on the continent. They have developed a set of knowledge products aimed at better tracking, gauging, and understanding sector progress towards inclusive and sustainable industrial, in line with the Third Industrial Development Decade for Africa (IDDA III) framework. The African Industrialization Index (AII), developed by the African Development Bank, is one of the flagship products of this initiative.

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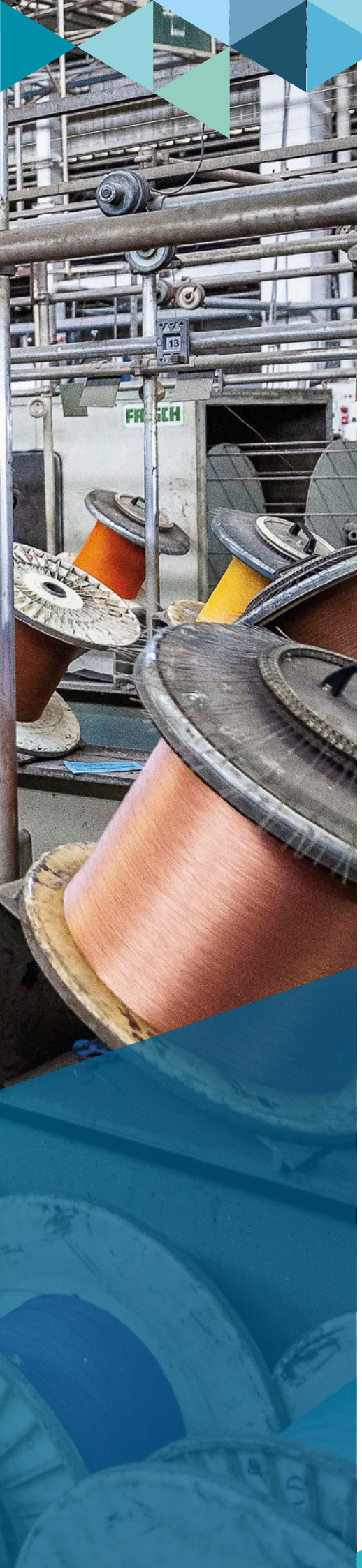
Table of contents

List of tables

List of figures

List of boxes



Executive summary

Industrialization is central to Africa's development prospects. With its young labour force, abundant natural resources and fast-growing internal markets. Africa has the potential to become the next global frontier for industrial development. Africa's development strategies, from the Sustainable Development Goals to Agenda 2063 and the African Union's 2011 Action Plan for the Accelerated Industrial Development of Africa, all clearly identify industrial development as a foundation for inclusive growth, the creation of decent jobs and many other development goals. Industrialization is also a strategic priority for the African Development Bank (AfDB) under its Ten-Year Strategy (2013–2022), and one of the High 5s priorities. Under its Industrialize Africa strategy, the Bank is committed to helping African countries to accelerate their industrialization and unlock their economic potential.

Yet progress remains disappointingly slow. Africa's share of global manufacturing output has dwindled over recent decades, to below two percent of global manufacturing output. Too many African economies remain dependent on unimproved commodities, leaving them vulnerable to fluctuating global demand. The COVID-19 pandemic, which has disrupted global trade and generated an unprecedented shock on both the demand and supply sides, epitomizes the threat that excessive reliance on external suppliers and markets poses to Africa. The outbreak of the Russia-Ukraine conflict, which led to sudden increases in energy and other commodity prices and provoked global supply disruptions, has again exacerbated the vulnerability of the continent before even it could recover from the COVID-19 crisis.

Against this backdrop, and within the broader context of climate change that urges Africa to strengthen its resilience capacity, there is a growing consensus that African governments need to promote industrial development more actively – not just by putting in place the enabling conditions for industrialization, including infrastructure, a skilled workforce and a favourable investment climate, but also by identifying and nurturing infant industries. This as an approach that a number of African countries have pursued with success in recent years.

The African Industrialization Index (AII), presented here in its inaugural edition, is a flagship initiative by the African Development Bank (AfDB or Bank) to strengthen knowledge around drivers of industrial development. It aims at providing the first ever comprehensive picture of the progress being made on industrial development across the continent,covering 52 of 54 African countries for the period 2010 to 2019.

Good data is a foundation for successful industrial policy, providing insightful information to decision-makers. In Africa, however, availability of such quality data is limited due to both shortages in countries' statistical and surveying capacity and the nature of economic activity on the continent, which is predominantly operated by an informal and small-scale private sector. This narrows the scope of indicators tracking the patterns and dynamics of domestic production, while the lack of data harmonization at the continental level does not allow for comparisons between countries.

Against this backdrop, this index can only build on existing data which are proven reliable, particularly those which have been methodologically consolidated by recognised international and regional data providers such as the World Bank and the United Nations. Although the latter endeavour to provide a wide variety of industrial data on Africa, it must be kept in mind that here lies a critical limitation of any statistical exercise aiming at capturing the African reality.

The African Industrialization Index

The Index mirrors the Bank's understanding of the components of successful industrialization. Based on a comprehensive set of available relevant and comparable data. It provides an overall ranking of African countries, built up from three sub-indices:

- **Performance:** How well are African countries generating manufacturing output and exports?
- **Direct determinants:** How well do they direct their endowments (capital and labour) towards industrial development?
- **Indirect determinants:** How well are they creating an enabling environment for industrialization, including macroeconomic stability, sound institutions and infrastructure?

With annual data collected from 2010, the Index enables African countries to track their progress over time across these different dimensions of the industrialization challenge. They can also benchmark their performance against other African countries, whether neighbours, competitors or role models. For the AfDB itself, the Index will inform policy dialogue with African governments and tailored support to help them identify opportunities for pressing forward with industrial development.

African Industrialization Index results

The results of this first edition of the African Industrialization Index show that most African countries are making slow and steady progress on industrial development. A handful of countries have already developed sophisticated manufacturing capabilities. The top quintile in the All ranking includes South Africa, three North African countries (Morocco, Tunisia and Egypt), along with Mauritius, Eswatini, Namibia, Côte d'Ivoire, Equatorial Guinea and Senegal. Encouragingly, the Index shows that industrial development is taking place across the continent. The strongest progress was seen in Benin, Ethiopia, Eritrea, Gabon, Guinea, Mauritania, Mozambique, Senegal and Seychelles, all of which lifted their ranking by five or more places over the 2010–2019 period.

In the 'Performance' sub-index, countries that perform well include those that generate the highest manufacturing value-added per capita, with a substantial share of their manufacturing output destined for export. In particular, Eritrea and Mauritania improved their rankings significantly, driven by strong export performance.

The 'Direct Determinants' sub-index reveals a number of countries that have risen through rankings on the back of strong private sector growth

and increases in foreign direct investment (FDI). Mozambique, in particular, rose 32 places into the top quintile, driven by large increases in total FDI, although much of this went into the oil and gas sector. The 'Indirect Determinants' sub-index shows that a good range of countries, including Burkina Faso, Côte d'Ivoire, Kenya, Mauritania, Niger, Tanzania and the Seychelles, have improved their business climates, while Burkina Faso, Côte d'Ivoire and Tanzania have all seen improvements in their market size and the quality of their infrastructure.

On the need for more active industrial policy

The AII reveals bright spots of successful industrialization are emerging across Africa, and that a range of countries are making steady progress in putting in place the essential elements for industrial transformation. Yet overall, the pace of industrial development remains too slow. Jobs are not being created at the pace required to match rapid population growth and take advantage of the resulting demographic dividend.

There is a growing consensus that African countries need more proactive industrial policies, to foster growth in the most promising industries. Industrial policy has a chequered history on the African continent, and for many years African governments have been advised to limit their efforts to creating a level playing field for private investors. In recent years, however, a number of African countries – including Ghana, Ethiopia and Mauritius, among others – have begun to work in collaboration with the private sector to identify and support infant industries, based on 'educated guesses' about their growth potential. They are developing new policy instruments that enable them to make targeted investment in infrastructure and skills, help firms access capital, technology and export markets, and broker linkages between manufacturers, investors and customers. While these initiatives remain at an early stage, there is good reason to believe that interventions of this kind are essential for kickstarting Africa's industrialization.

The African Development Bank is strongly committed to supporting African countries to strengthen their industrial policies. The African Industrialization Index is a key part of that commitment. It assembles the first ever comprehensive picture of the progress being made on industrial development across Africa, to help African countries benchmark themselves with others and identify where they are making progress and where they need to intensify their efforts.

We hope that the African Industrialization Index will encourage African countries to redouble their ambitions on industrial development. The AfDB stands ready to support them.

Introduction

Industrialization is central to Africa's development. Building productive industry is the most promising strategy for creating formal jobs at scale and promoting growth whose benefits are widely shared. This is recognised in the Sustainable Development Goal (SDG) of promoting "inclusive and sustainable industrialization". It is also the foundation for achieving many of Africa's development objectives. Its importance is clearly articulated in the African Union's 2011 Action Plan for the Accelerated Industrial Development of Africa and reaffirmed in Agenda 2063.

Industrialization is also a strategic priority for the African Development Bank (AfDB) under its Ten-Year Strategy (2013–2022), and one of the High 5s priorities. Under its *Industrialize Africa* strategy, the Bank is committed to helping African countries to accelerate their industrialization and unlock their economic potential.

With its fast-growing internal markets and large labour force. Africa has considerable potential for industrial development. Yet its progress has been slow. A few countries have acquired sophisticated manufacturing capabilities, and others have made good progress in putting in place conditions favourable for industrial development. But across the continent as a whole, manufacturing has declined as a share of output. The typical African manufacturing firm remains small and informal, producing basic goods for local markets. Africa's share of global manufacturing has declined to less than 2% and the continent is largely absent from global value chains.

The COVID-19 pandemic, which has disrupted global trade and generated an unprecedented shock on both the demand and supply sides, epitomizes the threat that excessive reliance on external suppliers and markets poses to Africa. The war in Ukraine is expected to aggravate and prolong the situation, exacerbating the vulnerability of the continent before even it could recover from the COVID-19 crisis. To reverse these trends, African countries need more proactive industrial policies, to build an enabling environment for manufacturing and encourage and nurture nascent industries. Successful industrial policies are knowledge-intensive – they call for a detailed understanding of the constraints and opportunities facing each country.

The Africa Industrialization Index (AII) is a flagship initiative by the African Development Bank (AfDB) to strengthen data on Africa's industrial development. Covering 52 of Africa's 54 countries for the period 2010 to 2019, the AII explores industrial development in each country across three dimensions: the performance of the manufacturing sector, the direct determinants of manufacturing (capital and labour), and the indirect determinants or enabling environment, including macroeconomic stability and quality policies and institutions.

This report first provides an overview of Africa's progress on industrialization, identifying key trends, opportunities and constraints. We then introduce the Index, explaining the significance of each of the indicators, before presenting the data. The goal is that this Index will become a valuable source of data for African countries, enabling them to assess their progress, benchmark themselves against others and formulate more effective industrial policies.

1. Industrialization in Africa

For this inaugural edition of the Index, we include a brief introductory section on Africa's current on industrialization, and its key opportunities and constraints. It sets out the Bank's understanding of the kinds of industrial policy instrument that African countries will need to make use of, in order to nurture infant industries and kickstart structural change in their economies. The data in this Index has been selected to inform the development of more active industrial policy.

Africa's industrialization is making slow progress

Since the beginning of the century. Africa has enjoyed a period of sustained economic growth, brought about by widespread improvements in governance and economic policy, growing internal markets and, for most of the period, strong global demand for its natural resources. Yet growth has been concentrated in particular sectors and geographic areas. Many African economies remain dependent on unimproved primary commodities, leaving them vulnerable to the uncertainties of global supply and demand. Structural change towards more productive sectors and activities has been limited, and job creation remains well below the rate required to absorb new entrants to the labour market. As a result, Africa's current pattern of economic growth is neither inclusive nor sustainable.

The COVID-19 shock has shed light on the structural insufficiencies that remain active on the continent, putting once again the challenge of industrialization under the spotlight. With the pandemic, strong dependency on foreign manufactures and intermediate goods has resulted in detrimental shortages on African markets, starting with a shortfall in the pharmaceuticals and medical devices required to respond the health crisis. This episode raises concern for a continent where multiple transitions take place as people urbanize, become wealthier and change their consumption habits, expressing growing needs for an increasingly diversified and complex basket of goods, most of which are not produced in Africa. On the other hand, the COVID-19 crisis has highlighted the weak integration of Africa into global value chains, except for the few participant countries, like Morocco and South Africa, that have been affected by the disruptions reported in the global supply chains.

Yet, a growing number of African countries have sought to diversify their economies and promote industrial development in recent years. A small number already have advanced manufacturing sectors, including Algeria, Botswana, Gabon, Mauritius, Namibia and South Africa. Other countries show promising signs of new industries emerging – such as leather in Ethiopia and pharmaceuticals in East Africa. Some countries, including Ethiopia, Rwanda and Morocco, are building networks of industrial parks and special economic zones (SEZs), along with other measures to promote SME development. These investments have shown some good returns: in Ethiopia, manufacturing value-added grew fourfold from 2010 to 2019, to just under $5 billion.

Despite these bright spots, Africa's overall performance on industrial development remains disappointing. While industrial output and value-added are growing, in all but four countries

(Angola, Ethiopia, Nigeria and Tanzania) they have not kept up with overall economic growth. As a result, Africa as a continent continues to deindustrialise. In sub-Saharan Africa, manufacturing declined as a share of GDP from 13% in 2000 to 10% in 2017, while in North Africa the decline over the same period was from 28% to 20%.

Poor manufacturing performance has left Africa largely excluded from the development of global value chains. The Economic Commission for Africa (ECA) estimates Africa's share in world manufacturing value at just 1.5% in 2010 – down from 1.9% in 1980. Around 80% of African manufactures are consumed domestically or traded in intra-African markets. Most of Africa's exports are unimproved commodities: Africa adds value to only 14% of its exports, compared to 27% for emerging Asian economies. This is a missed opportunity to gain more benefit from natural resource wealth and leaves many African economies vulnerable to fluctuations in global prices.

Some of the conditions are now in place for industrial take-off...

While progress so far has been slow. Africa today offers a more promising environment for industrial development than ever before.

Africa is increasingly stable and well governed. This is reflected in the continent's strong growth performance of the past two decades. Economic management has improved, promoting macroeconomic stability and better use of public resources. Basic services have expanded, creating a labour force that is healthier and better educated. Access to financial services is expanding steadily.

Africa has the youngest population of any continent, and by 2050 will be home to the world's largest labour pool. A rapidly growing workforce is a key resource for Africa, making it well placed to take on labour-intensive manufacturing. As labour costs rise in China and other emerging economies. Africa should enjoy an increasing labour-cost advantage. A favourable worker-to-dependant ratio will also boost growth. The new generation of Africans are better educated and enjoy better health than any previous generation. However, Africa will only benefit from this demographic dividend if it is able to equip its young people with skills that are needed by enterprises.

Africa is an increasingly attractive investment destination, for both foreign and domestic investors. Though still small in absolute terms, foreign direct investment (FDI) has risen rapidly and is increasingly directed towards manufacturing and services. Africa's major cities, such as Cairo, Lagos, Johannesburg and Nairobi, are magnets for investment, creating nodes that link African markets to global value chains. Across the continent, Africa's growth urban centres and middle classes are creating new markets for consumer goods and new opportunities for domestic industries (Box 1). There is an early but promising trend of Asian companies shifting manufacturing operations to Africa, and more investors are being attracted by Africa's improved business environment and affordable workforce.

African is moving rapidly towards an integrated economic space. The ratification of the Africa Continental Free Trade Agreement (AfCFTA) in 2019 was a milestone in Africa's regional economic integration – an essential condition for industrial development. Manufacturing has long been held back by small internal markets and high tariffs on regional trade. This inhibits the emergence of specialised producers and larger manufacturers able to achieve the economies of scale needed to compete successfully with imports. A growing network of free trade arrangements, along with improved border management, are reducing the time and costs involved in trading across borders. However, there is still much to be done to overcome non-tariff barriers, linked to inconsistent regulatory requirements across countries and regions.

Box 1. Growth of domestic-market industries

With the growth of the urban middle class, many African countries are experiencing a surge in domestic demand for manufactured goods. It is estimated that Africa could increase its manufacturing output by $322 billion by 2025 simply by meeting growing domestic demand, especially for food, beverages and similar processed goods.

Many African countries are now prioritising industrial sectors with strong local demand, to reduce their reliance on imports. In Nigeria. Rwanda. Kenya and Ethiopia, food and beverages is now the dominant manufacturing sector, and it is also recording strong growth in Tanzania. Uganda and Zambia, helping to make up for a decline in other manufacturing in the face of steep competition from Asian exporters. The growth of agro-processing has proved an important generator of employment. For example, in Kenya, the fruit, vegetable and cut flower sectors employ an estimated 200.000 people in farming, processing and logistics, while generating over $1 billion in export revenue each year.

There is also unrealised potential in the garment sector. For example. Tanzania is the largest producer of cotton in East Africa, but most of it is exported, even as domestic garment producers import material. The government is attempting to address this through its Cotton Clothing Strategy 2016–2020, which focus on value chain integration, domestic processing and promoting the use of locally produced textiles.

Source: UNCTAD (2018), Economic Development in Africa Report 2018: Migration for Structural Transformation. UNCTAD, New York and Geneva.
Te Velde DW et al. (2018). Five new ways to promote African industrialization, Overseas Development Institute

...but substantial constraints still need to be overcome

While more of the underlying conditions for industrial development are in place, there are still substantial obstacles to overcome.

Inadequate infrastructure is the most pressing constraint on industrialization. Half of Africans currently have no access to energy and 30% lack access to clean water – two essential inputs for agro-processing and other industries. The average cost of electricity to manufacturing firms in Africa is four times higher than industrial rates elsewhere in the world, while poor quality supply leads to idle workers, lost production and damaged equipment. Africa's paved road density is just 2 km per 100 km^2 of land area, compared to 25 in Asia and 122 in Europe. Inadequate or poorly maintained transport infrastructure makes it more expensive for firms to access raw materials and deliver their goods to consumers. Overall, the African Development Bank has estimated the continent's infrastructure needs at $130–170 billion per year, with a financing gap of $68–108 billion.[1]

Industrial development needs better educated and skilled workers. While Africa has made major progress towards universal basic education, it lags behind other regions in the quality of its education, and in access to higher education and vocational training. By 2030, only 52% of working age Africans will have completed secondary education. There is a substantial gap between the skills available in the labour force and the needs of the manufacturing sector, with digital and technical skills in particularly short supply. This gap will become more pronounced as technology continues to transform manufacturing practices.

Access to finance is another hurdle. Despite the spread of mobile money, barely half of Africans have access to finance, which inhibits the emergence of small manufacturing enterprises. In most African countries, the financial sector is underdeveloped, providing only limited finance to the private sector. These leaves firms dependent on retained earnings for investment capital, which limits both the scale and efficiency of capital investment. FDI flows to African manufacturing is on the increase, but is largely restricted to the most advanced countries and markets. Public finance to support industrial policies is held back by a combination of poor domestic resource mobilisation and a lack of political commitment.

There is still much to be done to improve the business environment. Investors need confidence that the regulations and administrative processes governing their sectors are fair, transparent and reliable. Without that confidence, capital will gravitate towards short-term trading activities, rather than

1 Figures from *African Development Bank (2018) African Economic Outlook 2018. African Development Bank.*

investment in fixed capital. In many countries, economic policies are still perceived to be unreliable, with frequent reversals undermining business confidence. Furthermore, the regulation of industry often involves high levels of bureaucratic discretion, which creates uncertainty and fosters corruption.

… and the strategic approach must be refined

Apart from the few countries reporting a relative maturity in their industrial development, most African countries are latecomers in the global industrialization process. This puts additional pressure on those countries seeking to industrialize because the conditions for succeeding change rapidly as global manufacturing itself changes, preventing them from duplicating entry strategies implemented by countries of other regions in the past. For instance, the rise of automation is on the verge of annihilating a wide range of opportunities for developing countries trying to insource labour-intensive tasks bound to be soon operated by robots. Likewise, technology changes and massive digitalization have increased the tradability of services on the international stage, opening-up new opportunities for developing countries to primarily participate into global manufacturing value chains as outsourced service providers[2]. Moreover, the retreat of globalism, a trend that the world has been witnessing for many years and which might be exacerbated by the COVID-19 crisis, could entail a contraction of global value chains and transnational linkages in the industry, as advanced countries will be endeavouring to relocate their manufacturing activity domestically.

This era of uncertainty, both on the political and industrial fronts, compels Africa to adopt innovative strategies that anticipate the upcoming transformation of the industry opportunities and competitiveness factors. This is all the more critical given that policy actions implemented today may take several years to materialize. It requires from governments an in-depth reflection on the most promising strategic options in terms of growth sectors, educational and vocational priorities, spatial arrangements of the production system, market orientations, etc, and on how to translate them into effective industrial policies.

African governments are moving towards more proactive industrial policies

Industrial policy in Africa has a controversial history. A first generation of state-led import substitution policies in the post-colonial era led to an early industrial boom, followed by stagnation and widespread macroeconomic instability. After years of painful structural adjustment, a dominant view emerged that the role of the state was to create an enabling environment for investment (institutions, infrastructure and human capital), while refraining from intervening directly into the market. While this approach reduced the risk of distortions and helped to restore stability, it has failed to reverse the continuing decline of African manufacturing.

Since the turn of the century, several African countries have been developing more active industrial policies, in order to nurture infant manufacturing industries. These policies continue to focus on traditional business environment concerns, but also include measures to promote the development of particular industrial centres or sectors (Box 2). For example, the Ethiopian government has taken on a more active role in coordinating private investment in the textiles, leather and agro-processing sectors. Ghana has introduced policy measures intended to improve the competitiveness of domestic manufactures and promote the development of its crafts industry for export. Mauritius helped to promote the uptake of new technology and improve quality standards in its textile industry. A number of countries have invested in Special Economic Zones and enterprise incubators.

While the track record of these initiatives is mixed, there is evidence that a combination of traditional investment climate reforms and more targeted measures are needed to promote early industrial development. While the risks of 'picking winners' are well recognised, there is an emerging consensus that developing infant

2 Newfarmer. R.. Page. J.. & Tarp. F. (2019). *Industries without smokestacks: Industrialization in Africa reconsidered* (p. 480). Oxford university Press.

Box 2. The smart use of trade policy to promote industrialization

Trade and trade policy offer important tools for African countries to achieve their industrialization objectives.

- **Special Economic Zones and Industrial Parks** can promote linkages between trade and industry. Through incentives such as tax breaks, favourable customs regimes, government subsidies and targeted infrastructure, they can help support the establishment of new export-oriented industries. Ethiopia's growing network of industrial parts have proved a smart of aligning its trade and industrial policies, boosting investment in export-oriented manufactures such as textiles and apparel, leather products, pharmaceuticals and agro-processing.
- **Tariffs policy** can also help to boost domestic production. The Nigerian government is using tariff policy to encourage the revival of the country's automotive industry, by raising tariffs on fully assembled vehicles and lowering tariffs on component parts. It anticipates that the assembly industry could create as many as 70.000 direct jobs and another 200.000 indirect jobs.
- **Non-tariff trade costs:** Non-tariff barriers to trade directly correlate with barriers to industrialization. Action to address access to credit, infrastructure and skills enhance policy in other areas.
- **Continental Free Trade Agreement (AfCFTA):** Intra-regional trade has the potential to facilitate increased economies of scale, diversification and value addition. However, it currently accounts for only around 15% of total African trade volumes (2015). This unrealised potential is largely due to the high cost of trade across the region. The introduction of the AfCFTA has the potential to boost trade in goods among African countries by 52.3%, with industrial products leading the way.

Source: Calabrese L. and M. Mendez-Parra (2018). Smart industrialization through trade in the context of Africa's transformation. Briefing/policy papers. Overseas Development Institute.
Te Velde et al. (2016). Developing export-based manufacturing in sub-Saharan Africa. Research report. Overseas Development Institute.

industries requires new forms of collaboration between the public and private sectors, based on educated guesses about which industries will prove viable. While the design of such new orientations must rely on improved coordination mechanisms and enhanced public-private dialogue before all, potential implementation measures include targeted investments in infrastructure and skills development, support to firms with accessing capital, technology and export markets, and brokering linkages between manufacturing firms, investors and customers.

African governments that wish to promote industrial development need to bring together their initiatives into comprehensive industrial policies that match their individual opportunities and constraints. They need to invest in the institutional capacity required to implement industrial policy. They also need to acquire a better data on emerging industries, so they can make evidence-based interventions. This includes building effective communication channels between government and the private sector, to conduct competitiveness enhancement initiatives, to create feedback mechanisms and ensure that government action is based on a nuanced understanding of the challenges facing firms.

The AfDB is committed to working with African countries to develop effective industrial policies, as a flagship initiative under its 'Industrialize Africa' strategy. This Africa Industrialization Index is a flagship initiative designed to equip African governments with a robust source of comparable data to inform the development, implementation and monitoring of industrial policies.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2. The Africa Industrialization Index

About the Index

One of the key conditions for more effective industrial policy is better data. The Africa Industrialization Index is a contribution by the AfDB to filling the data gaps, by building a comprehensive set of standardised indicators on Africa's progress on industrialization. This inaugural edition covers 52 African countries (no data is currently available for Somalia and South Sudan).

What is industrialization? Delineating industrial activities

Traditionally, industrialization is defined as the transformation away from an agricultural or resource-based economy toward an economy based on mass manufacturing. As such, it is with the development of the services sector, one of the two key drivers of structural change, a concept depicting the process whereby an economy modernizes and grows by moving economic resources from low to higher productivity activities[1]. Historically, this phenomenon can be traced in most parts of the world that experienced a shift from an agrarian economy to a more complex and diversified economy predominantly comprised of manufacturing and services activities. In Africa, a comparable development took place, but in a singular way. The services sector has dramatically expanded, accounting nowadays for about the half of the continent's GDP, but agriculture remains an essential activity, standing by far as the main provider of jobs. In other words. Africa has not undergone the industrialization stage, which makes of manufacturing the missing component of its transformation towards a more diversified, job-generating, and self-sufficient economic development.

Against this backdrop, it is essential to clarify what activities fall under the scope of industrial development as understood within the framework of the structural change concept. A key first step is to distinguish between non-manufacturing and manufacturing activities in the industrial sector. This division is structurally unclear, as the intertwining productive linkages occurring within a same sector blur the lines between each type of activity. To overcome this difficulty, one usually adopts an extensive approach to the definition of industrial activities, based on various classifications acknowledged at the national or international level.

In this index, we refer to the United Nations industry classification system, the International Standard Industrial Classification of All Economic Activities (ISIC)[2], which is the taxonomy the AfDB, the UNCTAD, and the ILO refer to in the statistical data used in the set of indicators. The ISIC statistically acknowledges the division between non-manufacturing and manufacturing activities of the industry sector. While the former encompasses most of the non-agriculture and non-service activities related to raw material extraction (mining and quarrying), construction, and the physical supply of raw resources (electricity, water, and gas), the latter refer to "units engaged in the physical or chemical transformation of materials, substances, or components into new products"[3].

As part of the definition of manufacturing activities, the ISIC specifies that "the materials, substances, or components transformed are raw materials that are products of agriculture, forestry, fishing, mining or quarrying as well as products of other manufacturing activities".

1 AfBD. 2013. *African Economic Outlook: Structural Transformation and Natural Resources*. Tunis: AfDB.

2 United Nations. 2008. International Standard Industrial Classification of All Economic Activities Revision 4. Department of Economic and Social Affairs Statistics Division. New York.

3 Industry corresponds to ISIC divisions 10–45. Manufacturing industries belong to ISIC divisions 15-37.

Furthermore, the manufacturing output includes both finished products ready for utilization and semi-finished products used as an input for further manufacturing. This point is key when it comes to tracking the evolution of manufacturing activities within the African context, since it means that the processing of agricultural products and extracted materials activities, including at the earliest stages of the transformation value chains (bottling, crushing, grinding, etc.), are considered as part of manufacturing-led industrial development. This is a critical aspect for Africa, whose industrialization is often envisioned in conjunction with its large endowments in agriculture and mineral raw resources.

While delineating what industrial development refers to in terms of economic activity, it is not sufficient to capture the entire set of factors driving industrialization. Manufacturing activities are not insulated and autonomous activities but stem from and expand in a conducive environment made up of enabling policies, market demand, adequately skilled workforce, and a wide network of support services. This poses a statistical challenge to the measure of industrialization. Services to the industry, such as transportation, logistics, and financing, are deemed to account for over 30% of the total value added in manufactured goods worldwide[4], but do not enter into the accounts of the industrial output, despite being almost exclusively industry-oriented. The same problem applies to the intangible factors of industrialization such as policy support, infrastructure, business climate, and so on, which are equally determinants for any sustainable industrial development.

In view of the structural patterns of industrialization, the focus on manufacturing data turns out to be incomplete and insufficient to accurately assess an industrial trajectory. The index therefore considers three types of indicators aimed at capturing not only countries' performance in terms of industrial production but also direct and indirect determinants reflecting or influencing the conditions under which they undertake to industrialize. This leads to distinguish between three spheres of indicators: i) the performance indicators, which focus on measuring manufacturing activity in terms of trade and output ; ii) the direct determinants, which are aimed at measuring the general economic and private sector environment; iii) and the indirect determinants, which are focused on the broad governance context in which industries operate. The selection of the set of indicators for each sphere is discussed in the next section.

Framework and limitations

The index is faced with two types of constraints and limitations. First, as a scoring system aiming at allowing comparisons between peer countries, it must rely on consolidated, harmonized, and frequently updated data. For Africa, the spectrum of indicators is limited by the lack of available of such comparable quality data at the continental level, particularly when it comes to measuring industrial output performance. This reflects both shortages in governments' statistical and surveying capacity and the nature of economic activity on the continent, which is predominantly operated by an informal and small-scale private sector, limiting the possibility to widen the scope of indicators tracking the patterns and dynamics of domestic production. For the existing indicators, this gap is addressed by an extrapolation method based on earlier survey results that takes into account corrective factors reflecting the specific conditions of reporting, such as informality, illegal activities and unrecorded or unreported operations[5]. This explains how difficult it is to build additional reliable indicators within the African context.

The second limitation has to do with the organisational patterns of the manufacturing sector, which has been undergoing an important process of "servicification" in the last decades. The distinction between industry and services in statistics has artificially resulted in a global deindustrialization phenomenon due to the fact that, since the 1980's, the industrial companies have progressively outsourced services activities so to focus on their core production activities, including R&D. As a result, services activities such as IT, logistics, banking, insurance, and transportation, which are essential inputs to the production process, enter now into the services sector's accounts. Inversely, services activities such as tourism and construction, which may involve industrial activities through spillover effects, are not posted in the industry sector. This distinction, which can be eluded through the "value chains" holistic approach, has implications on the industrial development count, as it statistically overlooks an important aspect of industrialization.

4 AfDB. OECD. UNDP (2014). African Economic Outlook 2014: Global Value Chains and Africa's Industrialization.

5 See for instance World Bank Metadata: *https://databank.worldbank.org/reports.aspx?source=2&type=metadata&series=NV.IND.MANF.ZS*

Structure of the index

The Index enables African countries to analyse their progress relative to Africa as a whole and to their neighbours and peers. It is organised around three dimensions:

1. **Performance:** How well are African countries generating manufacturing output and exports?

2. **Direct determinants:** How well do they direct their endowments (capital and labour) towards industrial development?

3. **Indirect determinants:** How well are they creating an enabling environment for industrialization, including macroeconomic stability, sound institutions and infrastructure?

Each dimension consists of a set of indicators representing common challenges to be addressed in promoting industrialization (see Table 1).

This data is intended to help African countries identify their strengths and weaknesses across the different dimensions of the industrialization process. In due course, it will provide them with a means of monitoring their progress over time – although it may take some years before the results of new initiatives are reflected in the data.

The Index also offers governments with a means of identifying comparator countries, whether neighbours, competitors or role models, so they can benchmark their own performance. To facilitate this, we present the results of the Index in the form of an overall ranking, while also grouping countries with their regions and their peers at similar levels of industrial development.

The Index is also intended a useful tool for the Bank itself, providing a basis of dialogue with Regional Member Countries on their industrial policies and how to overcome challenges.

Dimensions and indicators

Performance

In this index, industrial performance refers to the capacity of countries to produce and export manufactured goods. Among the indicators allowing to assess this capacity at a macro-level, only a few are available in an aggregated and consolidated form for all African countries. These include two complementary indicators focused on measuring the value added of manufacturing output and the volume of manufacturing exports, as well as two relative indicators measuring their share in the GDP and total exports, respectively. These indicators allow both to track the growth dynamic of manufacturing in a select country and its importance in the whole economy, capturing two key features of performance: the magnitude of manufacturing production and its contribution to structural change. This set of performance indicators is completed by two relative indicators referring to the share of manufacturing value-added and manufacturing exports as a share of the African total. In this comparative index, these indicators are not weighted by the size of the population or the economy because they are only aimed at tracking and highlighting African countries progress with respect to their peers of the continent or the region they belong to.

The first dimension is therefore built upon the six following indicators:

- **Manufacturing value-added per capita** is the total net-output of all resident manufacturing units, obtained by adding up outputs and subtracting intermediate inputs. It thereby measures the share of the manufacturing process that takes place on the territory of each country. As a per capita figure, it allows for comparison across countries irrespective of their size.

- The second indicator measures the **value of manufacturing exports**, also on a per capita basis. Manufacturing exports are an important measure because, in a globalised economy, export-oriented manufacturing firms tend to be the most productive. This indicator shows the ability of the country's manufacturing sector to compete in international markets.

- **Manufacturing value added as a share of GDP** shows the weight of manufacturing within the economy and can therefore be used to track structural economic change. It corresponds with Target 9.2 of the Sustainable Development Goals, which calls for doubling industry's share of output in low-income countries by 2030.

- **Manufacturing exports as a share of total goods exports** shows the extent to which the country is adding value to its commodities prior to export. This is a key measure for countries that are trying to reduce their dependence on unimproved commodities.

› The fifth and sixth indicators – **manufacturing value-added** and **manufacturing exports as a share of the African total** – measure each country's manufacturing performance relative to other African countries.

Sustainable Development Goal Target 9.2: "Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries."

Direct determinants

The second dimension of the Index measures two essential inputs for manufacturing: investment and a skilled labour force. The capacity of a country to attract or generate capital investments, both public and private, is a critical factor of industrial development, as manufacturing activities rely both on specific facilities (plants, equipment, machinery, etc.) and basic infrastructure (transportation assets, electricity, viable lands, etc.), which can be considered as external input to manufacturing production. Gross capital formation is the main indicator allowing to track capital accumulation resulting from acquisition and replacement of capital goods by the public and private sector, giving an overall picture of the domestic conditions of production and their evolution over time. To assess the specific contribution of the private sector to the constitution of domestic assets, one refers to a separate sub-indicator. Gross fixed capital income by the private sector, which covers gross outlays by the private sector.

A second indicator related to investments is the stock of inward FDI, which measures the total level of direct investment at a given point in time. It includes the value of foreign investors' equity in and net loans to local enterprises[6]. Unlike FDI flows, which might be marked by strong year-to-year volatility. FDI stocks reflect the long-term trends of FDI attractiveness in the considered economy, providing evidence of stable links with foreign investors. To facilitate comparisons between African countries, this indicator must be weighted by the size of the population in the form of the FDI inward stock per capita indicator, which can be then assessed, for each country, in its relative share to total FDI inward stock in Africa.

A third indicator relative to investment is the Domestic credit to the private sector, as a share of GDP. This indicator measures the extent to which the domestic financial sector is able to provide capital to private firms. This is a critical factor of industrial development as domestic players are the backbone of any national production system. In this regard, MSMEs and large firms are equally important constituent parts of the industrial fabric in Africa. Large firms embedded in the local markets might play a strategic role by spearheading value chain development through horizontal and vertical linkages with suppliers and acting as bridgeheads for foreign investors wishing to enter the market. MSMEs can play the role of suppliers linked to broader, local, regional or global value chain systems, or of manufacturers of finished goods scaled to meet the still small but emerging demand among the general population. Both for large firms and MSMEs, access to credit is critical to finance the required capital acquisitions or their innovation process, and the domestic financial sector is often the single provider, particularly for MSMEs. This is why the magnitude of domestic credit to the private sector gives an indication on how likely to get access to credit the local private sector is, even if the indicator includes credit provision to foreign companies. In recent years, both the consolidation of the financial markets and the emergence of fintech solutions have spurred the

Besides investment, the second input considered as a direct determinant of industrial development is the workforce and the level of adequacy of its skills. Workforce availability is first measured through the employment in manufacturing as percentage of total employment indicator, which quantifies the total number of individuals employed in the sector at a given point in time. With yearly time series, this indicator allows to track shifts in the pool of labour, particularly from agriculture, which is one of the manifestations of structural change. Skills adequacy of the workforce is assessed through the School life expectancy (primary to tertiary), which is the number of years that a child of school-entering age can expect to achieve, based on current enrolment rates. The assumption

6 Source: https://data.oecd.org/fdi/fdi-stocks.htm

is that a longer school life leads to a labour force better qualified for producing more sophisticated manufacturing goods, knowing that basic education increases peoples' capacity to learn and to use information and better perform more productively basic tasks, while secondary and tertiary level education endows people with necessary skills for adopting, implementing and creating technological innovation. Average school life expectancy therefore provides not only information on the overall availability of manufacturing labour force and estimates on its level of productivity, but also allows to assess the maturity of the labour skills and the preparedness of a country to host capital and technology intensive activities.

Three indicators cover investment:

- **Gross capital formation by the private sector** measures investment in fixed assets plus net changes in inventory levels among firms. It is a useful short-term indicator of capital investment by business.
- **FDI inward stock as a share of total Africa FDI** measures what level of foreign investment is being attracted into the country relative to other African countries.
- **Domestic credit to the private sector**, as a share of GDP, measures the extent to which the domestic financial sector is able to provide capital to private firms.

For comparability with other indicators, we would ideally measure investment flows into the manufacturing sector, but this data is not yet available in many countries.[7]

There are two indicators relating to labour inputs for manufacturing:

- **Employment in manufacturing** is the total number of individuals employed in the sector.
- **School life expectancy** (primary to tertiary) is the number of years that a child of school-entering age can expect to achieve, based on current enrolment rates. The assumption is that a longer school life leads to a labour force better qualified for producing more sophisticated manufacturing goods.

Indirect determinants

The third dimension of the Index, indirect determinants, is built on three pillars which cover the key underlying conditions enabling industrial development: the business environment, infrastructure development, and macroeconomic stability (Box 3). The state of business environment is captured through four complementary indicators. The first one is focused on the market size of a given country, assessed through the GDP proxy that has been preferred to other proxies like the size of the population, because it better reflects the scale of industrial development potential. The second indicator is the Ease of Doing Business score, updated on a yearly basis by the World Bank, which is a comprehensive indicator that encompass most of the regulation issues affecting the way of doing business, including investments. The third indicator is focused on corruption, often seen as a major obstacle to sustainable industrial development, acting as an additional factor of uncertainty for investors. The level of corruption in a country is assessed through the Corruptions Perceptions Index, compiled by Transparency International, which measures perceived levels of public sector corruption. The fourth indicator is focused on safety and rules of law, a fundamental aspect of governance, that offers an insight into the institutional regime of a country and give a picture of is political stability outlook. This includes assessing the deepness of the legal system that supports

Box 3. Dramatic improvements in Rwanda's business climate

Rwanda's latest five-year plan, the National Strategy for Transformation (2017–2024), reprioritised industrialization. In view of Rwanda's position as a small, landlocked country, previous policy had focused on leapfrogging industrial development and developing a sophisticated service sector, particularly in IT. However, the imperative of creating jobs and reducing imports has driven the new strategy, which sets out to create 200.000 off-farm jobs each year for a young and growing population.

To achieve this, Rwanda has focused on improving its business climate, achieving dramatic results. Rwanda now ranks 38th of 190 countries on the World Bank's East of Doing Business index – up from 139th ten years ago. Combined with high-quality infrastructure and trade logistics, Rwanda's favourable business climate provides a foundation for attracting FDI into export-based manufacturing.

Source: Te Velde DW et al. (2018). Five new ways to promote African industrialization, Overseas Development Institute

7 This means that the scores on this sub-index may be too favourable for countries with high levels of FDI into the extractive industries, as was the case with Mozambique during the period covered by the Index.

and enforces the basic rules of commerce and production and protects property rights, including property rights. This area is measured through the Safety and rule of law indicator from the Mo Ibrahim Index of African Governance.

The second pillar of the indirect determinants dimension is the level of infrastructure development. It first looks at the digital and IT infrastructure, which refers both to the reliability and efficiency of the physical transmission networks and to access to hardware and software equipment, particularly Internet. With the surge of new technologies and digitalization in the manufacturing sector, which entails a reduction of both transaction and distance costs. IT infrastructure increasingly becomes the backbone of industrial development and a factor of competitiveness. The digital and IT infrastructure indictor, drawn from the Mo Ibrahim Index, shows the level of connectivity, serving as a proxy for the country's readiness to take advantage of new technologies. Besides IT infrastructure, basic infrastructure also remains an essential indirect input to industrial development, laying the ground for the operationalisation of the manufacturing activities and associated physical flows, which require electricity, water, roads, etc. The advancement of infrastructure development is captured by the comprehensive African Infrastructure Development Index, compiled by the AfDB, which encompasses most of the basic infrastructure areas such as energy, transportation and water and sanitation.

The third pillar is focused on macro-economic stability. This is an overarching component of the index because the macroeconomic context in which industries operate influence market growth, capital expenditures, accessibility to finance, and price competitiveness related to monetary stability and currency valuation, among other parameters. In the index, two critical indicators are selected to feature this dimension at the country level. First, the total public debt as a percentage of GDP gives prominence to the sustainability degree of indebtedness in the considered economy, which acts either as an incentive or a deterrent to investment and industrial development. This indicator is completed by another key indicator of macro-economic stability: Inflation (consumer price index). Inflation stability, generally at low levels, is an important factor monitored by investors of the manufacturing sector.

The business environment is measured by:

- **GDP**, as a proxy for market size, which has been selected over population size as indicative of

Box 4. Potential future additional indicators for the AII

There are various other indicators that would be useful additions to the Index but have not been included in this edition due to gaps or discrepancies in the data across African countries.

- **Employment generation: Manufacturing employment growth rate/Manufacturing value-added growth rate.** Job creation is one of the primary objectives of industrial policy. This employment elasticity indicator measures how well the manufacturing sector generates new (formal) employment as it expands.
- **Complexity: The technical sophistication of manufacturing processes.** It would be useful to measure advances in the use of more sophisticated manufacturing technologies.
- **Import dependence: Manufacturing exports/Manufacturing imports.** A key challenge facing manufacturing in Africa is dependence on manufactured imports, with serious consequences for trade balances. This indicator compares manufacturing export performance with import performance, in order to assess how import dependence is changing over time.
- **Resource transformation: Manufacturing value-added/Domestic material consumption.** One of the principal objectives of industrial policy in Africa is to transform and add value to natural resources. This indicator compares how efficiently countries are able to transform the resources they consume into manufacturing value-added. Domestic material consumption can be understood as a physical equivalent to GDP.
- **Economic resilience/diversification: Top 3 manufactured products/Total manufactured exports and Top 3 export partners/total manufactured exports.** Since the global economic crisis, increasing the resilience of national economies has been a key policy objective. For manufacturing, resilience is tied to product and market diversification. A simple way to measure this is to measure the weight of the top three manufactured products and trading partners in total manufactured exports. This gives a sense of how diversified a country's exports are and therefore how vulnerable they are to shocks in demand.

It may be possible to add some of these indicators to the AII in future editions, as more data becomes available.

the potential for manufacturing development.

- **Ease of Doing Business score**, from the World Bank index, assesses the quality of laws, regulations and administrative processes from a business perspective.
- **The Corruptions Perceptions Index**, compiled by Transparency International, uses expert assessments and surveys to measure perceived levels of public sector corruption to produce a global ranking.
- **Safety and rule of law** is a composite indicator from the Mo Ibrahim Index of African Governance, made up of 27 indicators of the rule of law, transparency and accountability, personal safety and national security.

Infrastructure is measured through two composite measures:

- **Digital and IT infrastructure**, drawn from the Mo Ibrahim Index, shows the level of connectivity, serving as a proxy for the country's readiness to take advantage of new technologies.
- **The African Infrastructure Development Index**, compiled by the AfDB, measures each country's overall progress across electricity, transport, ICT, and water and sanitation infrastructure.

Finally, there are two measures of macroeconomic stability.

- **Total public debt** (percentage of GDP) is included, because high levels of public indebtedness acts as a deterrent to investment and industrial development.
- **Inflation** (consumer price index) is also relevant, as price stability is important for attracting investment into manufacturing.

Table 1. **Composition of the Africa Industrialization Index**

Dimension	Indicators	Source
I. Performance	Manufacturing value added per capita	AfDB
	Export of manufactured goods per capita	UNCTAD
	Manufacturing value added (% of GDP)	AfDB
	Export of manufactured goods as of total goods exports	UNCTAD
	Manufacturing value added as a share of the Africa	AfDB
	Export of manufactured goods as a share of the Africa	UNCTAD
II. Direct determinants	**Capital**	
	Gross capital formation – private sector in % of GDP	AfDB
	FDI inward stock per capita as a share of Africa	UNCTAD
	Domestic credit to the private sector (% of GDP)	WEF/WB
	Labour	
	Employment in manufacturing (%)	ILO
	School life expectancy. (primary to tertiary, both sexes) in years	UNESCO
III. Indirect determinants	**Business environment**	
	Market size (GDP)	AfDB
	East of doing business – global score	WB
	Corruption Perceptions Index	TI
	Safety and rule of law	Mo-Ibrahim
	Infrastructure	
	Digital and IT infrastructure (EIU/ITU)	Mo-Ibrahim
	Africa Infrastructure Development Index (AIDI)	AfDB
	Macroeconomic stability	
	Total debt outstanding (% of GDP)	AfDB
	Inflation, consumer prices (annual %)	AfDB


QUAD DISPLAY 1
UNIT 2
QUAD DISPLAY 2
COMMON
UNIT 1
FEEDWTR FLOW
STEAM FLOW TOT
AIR FLOW
FURN PRESS
0.882 Kg/s
0.000 Kg/s
0.00 mmH2
MAIN ST HDR PR
STEAM TEMP
MAIN ST pH
0.63 Barg
33.42 °C
6.422 pH
RHTR PR
RHTR TEMP
ECON INL CC
0.53 Barg
49.84 °C
1.172 µS/cm
MAZOUT PRESS
NTRL GAS PRESS
MAIN ST DCC
0.41 Barg
0.00 Barg
0.466 µS/cm
CONDENSER PRESS
LOAD DMD
1.013bara
1.013bara
1.008 MW
BOILER MASTER CONTROL
EXTRACTION STEAM AND FEED WATER HEATER
VENT LINE TO DEAERATOR
FROM FEEDWATER 8B
VENT LINE TO DEAERATOR
FROM FEEDWATER 8A
VENT LINE TO DEAERATOR
_2AFL1071A : Trend Display
1 Hour *
735.00
305.00
-125.00
10:40
11:00
Object Name
Object Description
FWH#7A LEVEL
FEEDWATER HEATER NO. 6
8.44 mm
LSH
162.05 °C
428.02 °C
13.70
16.54
60.16
100.0
0.07
TO DEAERATOR
MAIN
FWHs 1A, 1B 2A, 2B & Cond
FWHs 3, 4 & Deaerator
FWHs 6, 7A, 7B
FWHs 8A, 8B
NG Flow
FO Flow
Condenser Press
Furnace Press
Cond A
Cond B

3. Methodological Framework

Measuring industrial development

The 2015 agreements on Sustainable Development Goals (SDGs) has defined under SDG 9 a global indicator framework to "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation." This framework defines 12 indicators, split into eight targets that cover economic, social and environmental dimensions, to measure industrial development.

Furthermore, the UN Industrial Development Organization (UNIDO) has also attempted to measure industrial performance and competitiveness through the development of the Competitive Industrial Performance (CIP) index. The CIP index covers eight indicators, split into three categories, namely the capacity to produce and export, technological upgrading and deepening, and the impact on world production and trade. Among the eight indicators included in the CIP, three are taken from SDG 9's global indicator framework.

AII's approach

The methodological framework of the AII uses an approach tailored to fit the African Development Bank's vision of industrial development for the continent, whereby African countries need to embark on a bold agenda driven by private sector-led investments in industrial transformation. Therefore, industrialization is multi-sectoral with a synergy between public and private actors.

A critical diagnosis of both sectors – private sector development and government policy – about the challenges of industrialization, has led to the selection of 19 indicators, split into three dimensions, namely performance, direct determinant and indirect determinant (Cf. Table 1, p. 21).

The Performance dimension assesses the competitiveness of manufacturing activity output. In other words, this component captures African economies' capacity to produce and export industrial goods, as well as their share of Africa's aggregated trade. The direct determinant dimension assesses some key inputs for manufacturing sector development, including private sector-led investments and the workforce in the manufacturing sector. The third dimension, indirect determinant, measures industrialization readiness by taking into account the general business environment and macroeconomic stability. This component captures how government actions facilitate industrial development through macroeconomic policy, law enforcement, security, and infrastructure development.

Construction of the AII

Under the theoretical framework and after a critical review of available data to cover the maximum number of countries, nineteen indicators were identified to constitute the AII. Data was collected from various sources and cover fifty-two (52) Regional Member Countries (RMCs) over the period 2010 to 2021[1].

The scores of the Africa Industrialization Index (AII) and its three dimensions range from 0 (worst) to 1 (best) for comparability over time and across countries. The construction process is a statistical exercise based on the User Manual on the Construction of Composite Indicators of the European Commission (JRC / OECD. 2008). Once the raw data is collected, the process follows six steps of data transformation, including the imputation of missing data, outlier identification and cleaning, multivariate analyses, normalization and aggregations (Annex 6.2 details the approach used in each step).

In essence, once indicators are normalized, they are aggregated through an equally weighted geometric mean to generate the dimension indices. Subsequently, the African Industrialization Index is computed as a weighted arithmetic mean of the dimension indices (the weights are as indicated in table 2 below).

Table 2. Distribution of weights by dimension and indicator

Dimension	Weight	Indicator	Weight
Performance	3/6	1. Manufacturing value added per capita	1/19
		2. Export of Manufactured goods per capita	1/19
		3. Manufacturing value added (% of GDP)	1/19
		4. Export of Manufactured goods as of total goods exports	1/19
		5. Manufacturing value added as a share of Africa	1/19
		6. Export of Manufactured goods as a share of Africa	1/19
Direct determinant	2/6	7. Private sector, gross capital formation (% of GDP)	1/19
		8. FDI Inward stock as a share of Africa	1/19
		9. Domestic credit to private sector (% of GDP)	1/19
		10. Employment in manufacturing (%)	1/19
		11. School life expectancy (primary to tertiary, both sexes), in year	1/19
Indirect Determinant	1/6	12. Market size-GDP	1/19
		13. Ease of doing business, global score	1/19
		14. Corruption Perceptions Index	1/19
		15. Safety & Rule of Law	1/19
		16. Total debt outstanding as share of GDP	1/19
		17. Inflation, consumer prices (annual %)	1/19
		18. Digital & IT Infrastructure	1/19
		19. Africa Infrastructure Development Index (AIDI)	1/19

Source: AfDB. Statistics Department.

The underlying idea of the equal distribution of weight on indicators (1/19) is driven by the multivariate analysis, which returns positive (negative for total debt and inflation) and statistically significant correlations among indicators. In addition, the geometric mean was used to aggregate indicators because it has the advantage of being less sensitive and limits any compensation in the country's scores, which is not the case for the arithmetic mean, particularly when several indicators are

1 Somalia and South Sudan stand out due to lack of data.

involved in the aggregation. Thus, using the geometric mean allows a well-balanced comparison among countries as any country needs to record higher values for all indicators to achieve a better score.

Following discussions with industry experts in the Bank, it was agreed to use a system of varying weights for the dimensions to calculate the overall AII. The underlying idea is that the main component in the appreciation of industrial development is the capacity to produce and export industrial goods, which is captured in the performance dimension. The second important component comprises the direct determinant, which remains important, but at a lower degree compared to the performance dimension. Furthermore, since the direct determinant is more closely related to industrial development than the indirect determinant, it is allocated a greater weight than the latter.

Finally, the use of the arithmetic mean for calculating the overall AII is motivated by the use of unequal weights for the dimensions, and because its simplicity makes the Index easier to interpret for policy purposes.

Sensitivity analysis and robustness of the AII

Developing a composite index involves many assumptions or choices, including the selection of indicators, gap fill of missing values, outlier identification and clearing, method of aggregation, and the distribution of weights by dimension and indicators. These choices could result from subjective judgments, which is why policymakers are often less motivated to use composite indices to guide their policy, as it may send misleading messages if uncertainty and sensitivity analyses have not been conducted to remove all doubts on the index robustness.

The uncertainty and sensitivity analyses aim to verify the quality of a composite indicator (M. Saisana, A. Saltelli and S. Tarantola. 2005) by answering two main questions:

- does the use of one normalization method and one set of weights in the development of the composite indicator provide a biased picture of the countries' performance? and;
- to what extent do the uncertain input factors (normalization methods, weighting schemes and aggregation method) affect countries' ranks?

To perform this robustness analysis, the four main assumptions (which are considered as uncertainty factors) in the AII's default construction have been changed: 1- the number of indicators (default number versus equal number of 5 indicators per dimension); 2- normalization method (min-max versus distance to reference country); 3- aggregation method (arithmetic versus geometric mean); and 4- the weights at the final step (default weight versus equal weight among dimension).[2] The impact is measured on a single change in the assumptions as well as on joint changes in order to determine whether or not the impact of such a change is significant.

The uncertainty analysis (joint changes) depicts that only the change in the aggregation scheme (assumptions 3.1, and 3.2, in Annex 6.5) is responsible for the strong variation in the country's score, which is owing to the great sensitivity of the arithmetic mean compared to the geometric mean. With only the assumptions 1. 2 and 4, the uncertainty (and conversely the credibility) associated with the constructed index ranges from 1.46% for Tunisia's score to 26.92% for Guinea-Bissau, with an average of 9.55% in the whole sample.

The sensitivity analysis for a single change depicts nearly the same outcome and confirms the robustness of the Index. The variations in the score associated with the assumptions 3.1. and 3.2. (Table 3) are more visible than elsewhere, while the other changes record on average no more than 6.9% variation in the scores. Furthermore, the average of the absolute differences in the ranking of countries as regards to the default method rank shows that the different methods produce nearly the same result in terms of ranking. The Spearman rank correlation returns positive and statistically

2 The default method is defined in section 2.2 as: nearest year for imputation, distance to a reference country method for normalization, equally-weighted geometric mean to generate dimension indices, and weighted arithmetic mean to aggregate dimension indices for the AII overall score.

significant correlations between the AII's values from the default method and those from changed assumptions (more than 0.98 on the assumptions 1, 2 & 4). This second level analysis indicates that the impact of a single change is not significant on the ranking of countries. While scores may differ, the country's ranks do not differ much.

The uncertainty and sensitivity analyses depict that there would not have been significant changes in the country ranks if an alternative assumption was applied in the development of the AII (Table 3). The values and ranks obtained with the applied methodology of the AII are robust and can effectively be used to drive industrialization policy in Africa.

Table 3. Impact on ranking and score when modifying one assumption

	Change made in the assumptions	Average of variation score (%)	Average of absolute difference in ranking	Spearman correlation
Assumption 1	Equal number of indicators per dimension (5 indicators)*	-1.4	1.115	0.9927
Assumption 2	Min-Max normalization	-6.9	1.808	0.9838
Assumption 3.1	Arithmetic aggregation instead of geometric at dimension level	-47.1	6.577	0.8365
Assumption 3.2	Geometric aggregation instead of arithmetic for AII aggregation level	-66.6	1.154	0.9943
Assumption 4	Equal weight	6.9	1.885	0.9838

* In order to have five indicators per dimension, indicators 5 and 6 in Table 1 were combined through arithmetic mean to form one indicator. Indicators 16 and 17 were combined in the same way, and indicators 15 and 18 omitted.
Source: AfDB. Statistics Department.

How to use the AII

The AII score, as well as its underlying sub-indices, measures African countries' industrial development, which encompasses the performance and competitiveness of manufacturing activity, the potential in terms of inputs for manufacturing sector development, and the readiness of the general environment toward industrialization. This tool allows any African country to assess and benchmark their development in the sector compared to other countries in the region. Since the coverage of the AII is limited to Africa, the Index cannot be used to compare African countries to the rest of the world.

For a given country, any positive change in the overall Index means progress in industrial development. However, this analysis should not be made separately from the analysis with respect to dimensions, in order to ensure that all dimensions contribute positively to the overall result and that the latter is not driven by any compensation among the dimensions.

As a benchmark tool, the AII conveys lessons and best practices for policymakers as they can identify factors or policies on which their partners or competitors successfully perform. For this purpose, the analysis made in this report examines how countries can prioritize the AII's three dimensions (cf. Annex 6.6). Furthermore, country grouping by quintile (top, upper-middle, middle, lower-middle and bottom) helps to identify similarities, strengths and weaknesses of each group. Countries with the most similarities could combine their resources, as part of the African Continental Free Trade Area (AfCFTA), and collectively implement corrective policy measures.

Comparison with other composite measures

The CIP index from UNIDO can be considered the most similar index to the AII. The CIP covers 135 countries in the world, including only 33 African countries in 2019, and 8 indicators, fewer than the AII's 19 indicators. The AII provides an easy-to-use measure covering a wider range of factors, but restricted in terms of coverage to African countries (52 over 54). Furthermore, only the performance component in the AII can be strictly comparable to the CIP Index.

While being developed using different approaches, both indices aim to assess industrial development. The fact that both indices share this common goal raises some non-negligible similarities. This is confirmed by the Spearman rank correlation test, which returns a statistically significant correlation of 0.938.

In addition, the AII's grouping by quintile does not significantly differ from what is conveyed by other development indices, such as the Human Development Index (HDI). As found with the CIP, the Spearman rank correlation test returns a statistically significant correlation of 0.735 between the AII and the HDI. The high correlation is to be expected since countries recording higher performance in terms of human capital and income levels tend to have a higher level of industrial development, as depicted on the direct and indirect determinant dimensions of the AII.


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4. AII 2022 Highlitghts

The overall scores under the AII for each year from 2010 to 2021 are presented in Table 4, with the countries shown in ranking order and divided into five quintiles by rank. It shows a group of leading manufacturing countries (South Africa, Morocco, Tunisia, Egypt and Mauritius) that are well ahead of their peers, and a small group of mainly conflict-affected countries that are lagging well behind.

Table 4. Africa Industrialization Index 2022

Economy	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Quintile 2019
South Africa	0.8957(1)	0.8937(1)	0.8948(1)	0.8888(1)	0.8829(1)	0.8764(1)	0.8669(1)	0.8746(1)	0.8752(1)	0.8696(1)	0.8498(1)	0.8404(1)	Top
Morocco	0.7643(3)	0.7996(2)	0.8035(2)	0.8155(2)	0.8219(2)	0.8104(2)	0.8201(2)	0.8302(2)	0.8369(2)	0.8333(2)	0.8387(2)	0.8327(2)	
Egypt	0.7578(4)	0.7525(4)	0.7663(4)	0.7792(4)	0.7745(4)	0.7731(4)	0.7813(4)	0.7667(4)	0.7699(4)	0.7755(4)	0.7934(3)	0.7877(3)	
Tunisia	0.7895(2)	0.7991(3)	0.7938(3)	0.8044(3)	0.8073(3)	0.7869(3)	0.7914(3)	0.7871(3)	0.7777(3)	0.7808(3)	0.7808(4)	0.7714(4)	
Mauritius	0.6802(5)	0.6909(5)	0.6983(5)	0.7018(5)	0.7128(5)	0.7081(5)	0.7061(5)	0.6965(5)	0.6889(5)	0.6872(5)	0.6794(5)	0.6685(5)	
Eswatini	0.6426(6)	0.6439(6)	0.6355(6)	0.6408(6)	0.6357(6)	0.6312(7)	0.6247(7)	0.6373(6)	0.6385(7)	0.6485(6)	0.6405(6)	0.6423(6)	
Senegal	0.5547(14)	0.5772(11)	0.5833(10)	0.5867(14)	0.5847(15)	0.5813(13)	0.5880(11)	0.5968(10)	0.6015(10)	0.5979(10)	0.6116(10)	0.6147(7)	
Nigeria	0.5766(10)	0.5792(10)	0.5817(11)	0.5901(13)	0.6207(7)	0.5991(10)	0.5635(17)	0.5734(15)	0.5921(12)	0.6133(9)	0.6122(9)	0.6046(8)	
Kenya	0.5723(11)	0.5837(9)	0.5936(9)	0.6025(11)	0.6090(11)	0.5939(11)	0.5983(10)	0.5887(12)	0.6029(9)	0.5964(11)	0.6042(11)	0.6029(9)	
Namibia	0.6106(7)	0.6133(7)	0.6136(7)	0.6193(7)	0.6107(8)	0.5998(9)	0.6009(8)	0.6189(8)	0.6434(6)	0.6189(8)	0.6139(8)	0.6014(10)	
Algeria	0.5635(12)	0.5678(12)	0.5605(14)	0.5768(16)	0.6095(9)	0.6042(8)	0.6001(9)	0.5973(9)	0.6331(8)	0.6339(7)	0.6359(7)	0.5978(11)	Upper-middle
Gabon	0.5190(18)	0.5379(19)	0.5639(13)	0.5680(17)	0.5778(16)	0.5551(17)	0.5822(13)	0.5744(14)	0.5812(15)	0.5891(12)	0.5902(14)	0.5834(12)	
Côte d'Ivoire	0.5391(16)	0.5321(21)	0.5475(18)	0.6046(10)	0.5867(14)	0.5899(12)	0.5776(14)	0.5911(11)	0.5819(14)	0.5811(14)	0.6003(12)	0.5830(13)	
Ghana	0.5129(19)	0.5495(16)	0.5521(17)	0.6066(8)	0.5928(13)	0.5809(14)	0.5850(12)	0.5884(13)	0.5739(17)	0.5859(13)	0.5940(13)	0.5799(14)	
Equatorial Guinea	0.5949(9)	0.6124(8)	0.5966(8)	0.6066(9)	0.5932(12)	0.5596(16)	0.5645(16)	0.5522(19)	0.5895(13)	0.5672(17)	0.5356(26)	0.5666(15)	
Congo, Democratic Republic of the	0.4507(33)	0.4797(30)	0.4860(32)	0.5042(32)	0.4935(33)	0.5468(19)	0.5387(23)	0.5674(16)	0.5951(11)	0.5677(16)	0.5605(17)	0.5646(16)	
Botswana	0.5561(13)	0.5524(14)	0.5573(15)	0.5528(21)	0.5702(17)	0.5703(15)	0.5672(15)	0.5620(18)	0.5718(18)	0.5724(15)	0.5707(16)	0.5587(17)	
Benin	0.4520(32)	0.4777(31)	0.4778(33)	0.5204(28)	0.5246(27)	0.5124(29)	0.4942(33)	0.5123(30)	0.5246(26)	0.5083(29)	0.5236(28)	0.5497(18)	
Zambia	0.5002(24)	0.5343(20)	0.5566(16)	0.5672(18)	0.5623(18)	0.5497(18)	0.5527(18)	0.5651(17)	0.5582(20)	0.5443(21)	0.5436(21)	0.5423(19)	
Uganda	0.4988(25)	0.5293(22)	0.5454(20)	0.5561(19)	0.5594(20)	0.5453(20)	0.5506(19)	0.5434(22)	0.5507(22)	0.5479(19)	0.5603(18)	0.5418(20)	
Tanzania	0.4922(27)	0.5073(26)	0.5245(23)	0.5225(27)	0.5262(25)	0.5236(25)	0.5190(26)	0.5208(25)	0.5506(23)	0.5357(23)	0.5425(24)	0.5389(21)	
Lesotho	0.5350(17)	0.5382(18)	0.5346(21)	0.5401(22)	0.5315(22)	0.5412(22)	0.5495(20)	0.5455(20)	0.5564(21)	0.5567(18)	0.5518(19)	0.5372(22)	Middle
Congo	0.5477(15)	0.5645(13)	0.5331(22)	0.5904(12)	0.6094(10)	0.6346(6)	0.6512(6)	0.6276(7)	0.5742(16)	0.5286(25)	0.5431(22)	0.5322(23)	
Cameroon	0.5079(21)	0.5522(15)	0.5456(19)	0.5536(20)	0.5489(21)	0.5410(23)	0.5419(21)	0.5443(21)	0.5476(24)	0.5435(22)	0.5458(20)	0.5300(24)	
Ethiopia	0.4579(31)	0.4582(36)	0.4648(35)	0.4890(34)	0.4942(32)	0.5007(31)	0.5134(28)	0.5185(28)	0.5164(28)	0.5192(27)	0.5280(27)	0.5242(25)	
Togo	0.4753(28)	0.4940(28)	0.4961(29)	0.5263(26)	0.5160(29)	0.4997(32)	0.5300(25)	0.5193(27)	0.5112(30)	0.5223(26)	0.5429(23)	0.5191(26)	
Seychelles	0.5106(20)	0.5490(17)	0.5112(27)	0.5124(30)	0.5297(24)	0.5180(28)	0.5178(27)	0.5355(23)	0.5590(19)	0.5465(20)	0.5752(15)	0.5097(27)	
Madagascar	0.4720(29)	0.4887(29)	0.4957(31)	0.5045(31)	0.5064(31)	0.4920(33)	0.5075(31)	0.5025(32)	0.5103(32)	0.5155(28)	0.5189(29)	0.5040(28)	
Libya	0.6028(8)	0.5216(23)	0.5688(12)	0.5860(15)	0.5613(19)	0.5201(26)	0.5021(32)	0.5059(31)	0.5191(27)	0.5330(24)	0.5372(25)	0.5036(29)	
Mozambique	0.4286(37)	0.4614(35)	0.4957(30)	0.5125(29)	0.5250(26)	0.5042(30)	0.5115(30)	0.4938(33)	0.5139(29)	0.5082(30)	0.5126(30)	0.5027(30)	
Cabo Verde	0.5061(23)	0.5176(24)	0.5161(25)	0.5290(24)	0.5093(30)	0.5429(21)	0.5331(24)	0.5247(24)	0.5105(31)	0.5003(31)	0.5124(31)	0.5007(31)	

Economy	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Quintile 2019
Zimbabwe	0.4939(26)	0.5044(27)	0.5209(24)	0.5308(23)	0.5306(23)	0.5189(27)	0.5120(29)	0.5208(26)	0.5058(33)	0.4995(32)	0.4941(33)	0.4974(32)	
Djibouti	0.3674(50)	0.3869(48)	0.4015(47)	0.4123(44)	0.4074(46)	0.3878(47)	0.4701(36)	0.4927(34)	0.4877(34)	0.4966(33)	0.5045(32)	0.4936(33)	
Angola	0.5076(22)	0.5158(25)	0.5135(26)	0.5272(25)	0.5227(28)	0.5366(24)	0.5391(22)	0.5176(29)	0.5429(25)	0.4725(34)	0.4923(34)	0.4865(34)	
Rwanda	0.4173(41)	0.4177(41)	0.4286(40)	0.4384(40)	0.4466(41)	0.4466(41)	0.4385(41)	0.4480(42)	0.4594(39)	0.4695(35)	0.4655(40)	0.4754(35)	
Burkina Faso	0.4229(39)	0.4469(38)	0.4564(37)	0.4607(38)	0.4662(39)	0.4504(40)	0.4640(37)	0.4581(39)	0.4618(37)	0.4595(39)	0.4784(37)	0.4699(36)	
Mauritania	0.3964(43)	0.4376(40)	0.4468(39)	0.4515(39)	0.4760(36)	0.4574(38)	0.4512(39)	0.4642(37)	0.4737(36)	0.4605(38)	0.4819(36)	0.4632(37)	
Mali	0.4645(30)	0.4696(32)	0.4579(36)	0.4649(36)	0.4808(35)	0.4745(35)	0.4623(38)	0.4916(35)	0.4739(35)	0.4614(37)	0.4867(35)	0.4612(38)	
Niger	0.4393(35)	0.4678(33)	0.4765(34)	0.4906(33)	0.4858(34)	0.4864(34)	0.4747(35)	0.4832(36)	0.4607(38)	0.4462(41)	0.4701(39)	0.4606(39)	
Guinea	0.3822(46)	0.3941(47)	0.4115(45)	0.4229(42)	0.4440(42)	0.4517(39)	0.4197(44)	0.4569(40)	0.4537(41)	0.4487(40)	0.4716(38)	0.4562(40)	
Sudan	0.4501(34)	0.4648(34)	0.4961(28)	0.4733(35)	0.4712(38)	0.4710(36)	0.4853(34)	0.4589(38)	0.4551(40)	0.4667(36)	0.4614(41)	0.4522(41)	Lower-middle
Liberia	0.4229(40)	0.4413(39)	0.4533(38)	0.4648(37)	0.4737(37)	0.4597(37)	0.4448(40)	0.4552(41)	0.4506(42)	0.4419(42)	0.4385(42)	0.4409(42)	
Malawi	0.4351(36)	0.4552(37)	0.4243(41)	0.4276(41)	0.4533(40)	0.4409(42)	0.4380(42)	0.4346(43)	0.4299(43)	0.4277(44)	0.4333(43)	0.4229(43)	
São Tomé & Príncipe	0.4249(38)	0.4165(42)	0.4092(46)	0.4035(47)	0.4133(45)	0.3906(46)	0.3997(47)	0.3998(48)	0.4052(48)	0.4131(48)	0.4070(48)	0.4198(44)	
Chad	0.3972(42)	0.4097(43)	0.4125(44)	0.4100(45)	0.4203(43)	0.4267(43)	0.4275(43)	0.4176(46)	0.4211(44)	0.4282(43)	0.4263(44)	0.4178(45)	
Comoros	0.3879(44)	0.3968(46)	0.3855(50)	0.3965(48)	0.4027(47)	0.3848(48)	0.3933(48)	0.4071(47)	0.4106(47)	0.4141(47)	0.4074(47)	0.4078(46)	
Eritrea	0.3769(47)	0.4083(44)	0.4176(42)	0.4185(43)	0.4136(44)	0.4090(44)	0.4021(46)	0.4197(45)	0.4123(46)	0.4222(45)	0.4255(45)	0.4041(47)	
Central African Republic	0.3839(45)	0.3863(49)	0.3953(48)	0.3712(50)	0.3745(49)	0.4074(45)	0.4071(45)	0.4257(44)	0.4131(45)	0.4198(46)	0.4135(46)	0.4018(48)	
Sierra Leone	0.3724(48)	0.4012(45)	0.4134(43)	0.4079(46)	0.3708(51)	0.3668(50)	0.3771(49)	0.3815(49)	0.3892(49)	0.3837(49)	0.3848(49)	0.3777(49)	
Guinea-Bissau	0.3306(51)	0.3429(51)	0.3411(51)	0.3542(51)	0.3537(52)	0.3507(52)	0.3524(51)	0.3624(51)	0.3704(50)	0.3696(50)	0.3757(50)	0.3663(50)	
Burundi	0.3215(52)	0.3281(52)	0.3332(52)	0.3456(52)	0.3713(50)	0.3646(51)	0.3702(50)	0.3633(50)	0.3698(51)	0.3592(51)	0.3630(51)	0.3483(51)	
Gambia	0.3700(49)	0.3794(50)	0.3912(49)	0.3885(49)	0.3889(48)	0.3782(49)	0.3433(52)	0.3490(52)	0.3664(52)	0.3558(52)	0.3614(52)	0.3455(52)	Bottom

Note: Figures in bracket are the countries' ranks in the corresponding year.
Source: AfDB. Statistics Department.

An overall improvement in AII 2022 scores

Overall, many countries have made significant gains in their industrial development over the coverage period 2010–2021, with 37 of 52 Regional Country Members improving their AII score. However, some countries recorded only a marginal improvement, thereby falling in the ranking as the score was not enough to boost it, while others performed satisfactorily. Only 25 countries improved their rank and 4 remained in the same position as in 2010 (cf. Table 10 in annex).

The median score rose from 0.4930 in 2010 to 0.5144 in 2021, a 4.3% increase, while the AII imputed for the entire continent rose from 0.5026 in 2010 to 0.5270 in 2021. The range of scores of the top ten countries narrowed from 0.5766-0.8957 in 2010 to 0.6014–0.8404 in 2021. In addition, the range of scores of the bottom ten countries improved from 0.3215-0.3972 in 2010 to 0.3455-0.4409 in 2021.

Countries in the bottom quintile recorded the highest improvement over the coverage period, with 9.7% gains, followed by the lower-middle quintile (9.5%) (Table 5). The top quintile is the only one reporting a decrease in its score (- 0,9%), owing to a serious deterioration in the direct determinant component. Generally, improvements in performance and direct determinant components are the main sources of progress, but a marked deterioration in the indirect determinant component dampens, without fail, the overall improvement. Progress in the performance component is more pronounced among countries in the bottom quintile (16.4%), followed by the countries in the middle quintile (10 %), while both the top and upper middle quintiles record a deterioration in this component. On the other components, all quintile groups improved at a steady pace, excluding the top quintile, whose direct and indirect determinants scores both regressed over the period.

It is worth noting however that the 2022 score mirror the impact of the COVID19 global crisis that emerged in 2020, and which has directly affected Africa's industrial trajectory. This is evidenced by the drop of 1,7% in the average score of all African countries between 2020 and 2021. Interestingly, all dimensions of the index – performance, direct determinants, and indirect determinants – have decreased at a same rate that year. This corroborates the assumption that all these dimensions are tightly interlinked.

Table 5. AII 2022 – Classification into quintiles

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2010–2021 growth %
Bottom quintile	0.3715	0.3883	0.3954	0.3981	0.4021	0.3986	0.4013	0.4127	0.4153	0.4144	0.4196	0.4075	9.7%
Lower-middle quintile	0.4344	0.4529	0.4604	0.4696	0.4753	0.4709	0.4689	0.4711	0.4756	0.4709	0.4751	0.4759	9.5%
Middle quintile	0.4868	0.5019	0.5091	0.5218	0.5208	0.5184	0.5220	0.5224	0.5231	0.5119	0.5222	0.5116	5.1%
Upper-middle quintile	0.5347	0.5521	0.5489	0.5692	0.5741	0.5716	0.5760	0.5763	0.5781	0.5736	0.5819	0.5627	5.2%
Top quintile	0.6807	0.6809	0.6860	0.6941	0.6936	0.6781	0.6745	0.6756	0.6849	0.6840	0.6805	0.6747	-0.9%

Source: AfDB. Statistics Department.

Country by country comparisons

The AII 2022 results are presented in Figure 1 and its three component indices in Figure 1. The scores range from 0 (worst) to 1 (best), and countries are ranked from the best to the worst score

The AII 2022 shows that 25 of 52 countries stand above the average imputed for the entire continent. Half of the North African countries stand in the top-ranked countries (having a score above the average of Africa), Algeria and Libya, formerly in the top quintile, having slipped to the upper middle and middle quintile respectively – Mauritania stands in the lower-middle quintile. South Africa is the only sub-Saharan country to perform better than the North African countries. Mauritius, Eswatini, Namibia (top), Botswana and Zambia (upper-middle) follow South Africa in the top-ranked countries within the Southern region. In West Africa, Senegal, Nigeria (top), Cote d'Ivoire, Ghana and Benin (upper-middle) are the advanced countries in industrial development. Kenya and Uganda (upper-middle) stand at the best in East Africa, whereas Central Africa is led by Gabon, followed by Equatorial Guinea and the Democratic Republic of Congo (upper-middle), Congo and Cameroon (middle). These countries are characterized mainly by the strong performance of their manufacturing sector compared to other countries (Figure 2).

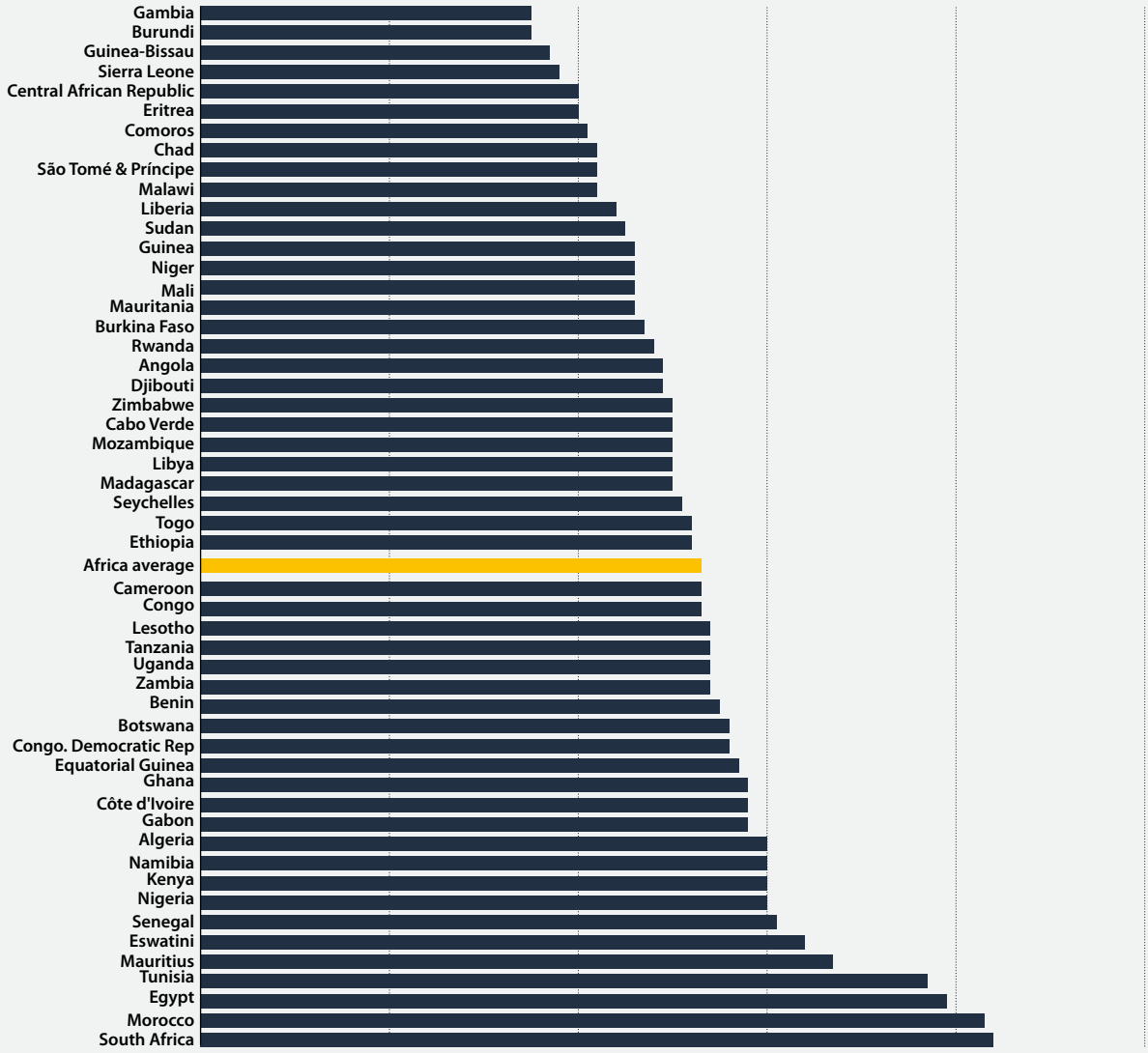
A detailed table on the AII score, ranking, and quintile grouping by country is presented in Annex 6.1 (Table 10 –16).

Performance index scores, being the lowest among the three sub-indices (Figure 2), depict that the main concern of Africa industrialization is its manufacturing sector performance and competitiveness. Eswatini is the only country having recorded the highest score on this component, meaning that all African countries should pay more attention to and prioritize this component as part of their industrial policy. Increasing the capacity to produce and export emerges as the first challenge of Africa. Despite the improvement recorded on this component over the coverage period (5% on average), additional efforts are needed.

Direct determinant emerges as the component on which most African countries received the highest scores. The range of the sub-index's scores goes from 0.4809 for Gambia to 0.0.8438 for South Africa in 2021. Furthermore, 29 countries stand above the average imputed for Africa on this component, while 23 countries scored above average for performance and indirect determinant components.

Many African countries showed slower progress in the indirect determinant component, with 11 of 52 countries having recorded a deterioration. This component drove the most significant improvements in the AII ratings, 6% on average. Excluding Kenya, Senegal, Botswana and Nigeria, the indirect determinant score for countries in the AII's top ten did not improve.

Figure 1. AII 2022 – Country score



Source: AfDB. Statistics Department

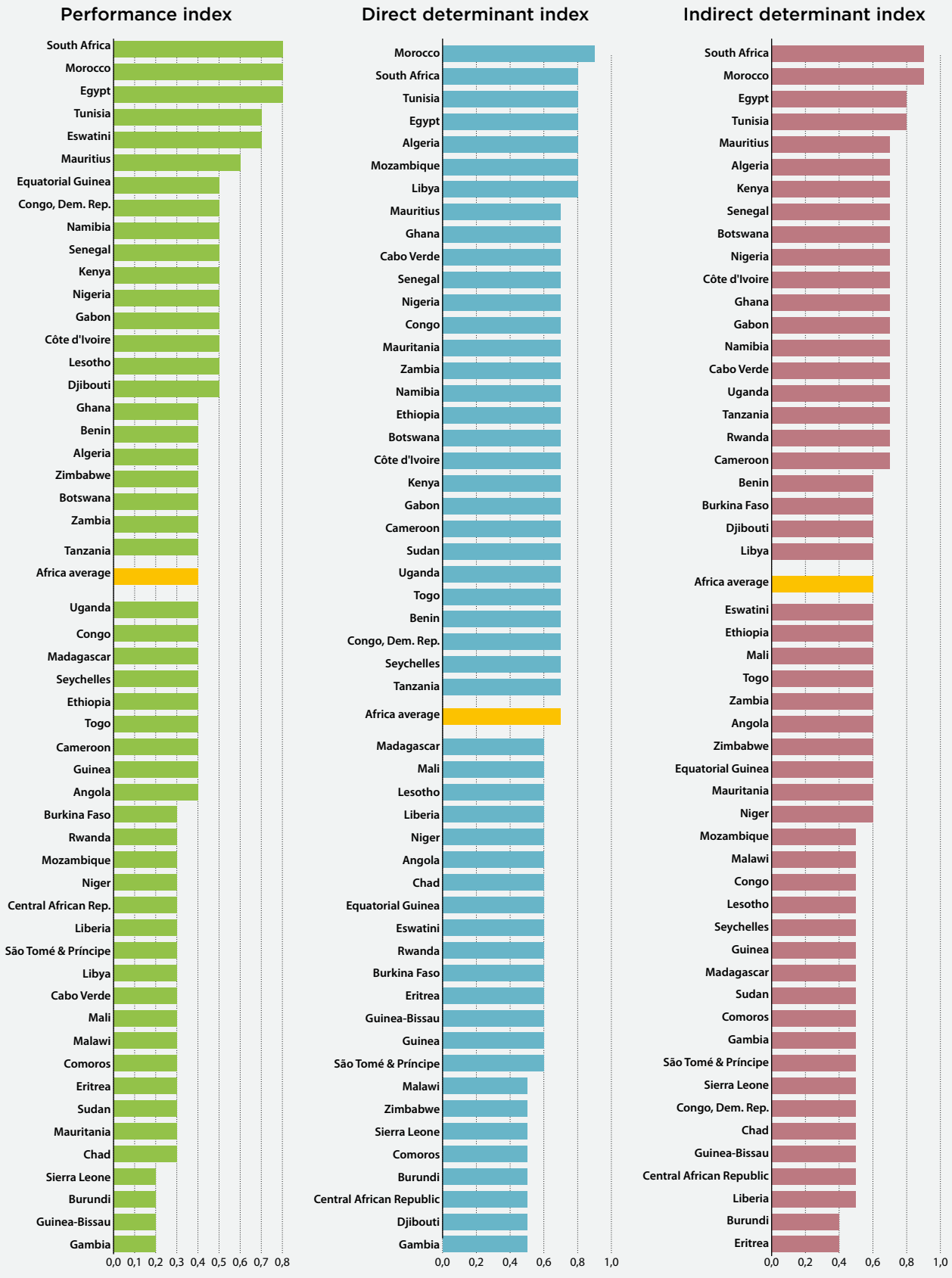
The top performers and main losers

The top ten performers

South Africa is the closest economy to the frontier with an industrial development score of 0.8404 in 2021. The country's performance has however been shrinking in the last decade, from 0.8957 in 2010, its highest score in the 2010-2021 period. It now stands 0.1596 points away from the frontier mark of 1, which depicts that while the country stands as the top-ranked economy, it could still improve its performance. (cf. Table 6).

Morocco (0.8327), Egypt (0.7877), Tunisia (0.7714), Mauritius (0.6685), and Eswatini (0.6423) round out the top 6 performers (cf. Figure 1). The ranking of this top 6 remains unchanged over the coverage period 2010–2021, with South Africa retaining the first rank, except in 2015, 2016 and 2018, when Congo (2015 and 2016) and Namibia (2018) took temporarily the 6th position to Eswatini. All these countries report a decline in their 2021 score as compared to 2010, except Egypt and Morocco which gradually took the second and third ranks to Tunisia, which felt from the second position in 2010 to the fourth one in 2021. In 2010, the top ten was rounded out by Namibia (0.6106), Libya (0.6028), Equatorial Guinea (0.5949), and Nigeria (0.5766), while in 2021, Senegal (0.6147), Nigeria (0.6046), Kenya (0.6029)

Figure 2. AII 2022 – Country sub-index score



Source: AfDB. Statistics Department

and Namibia (0.6014) joined the group as Libya and Equatorial Guinea came out.

Top ten performers in terms of ranking

Comparing the last three years to the 2010 state, some countries have made significant gains in their industrial development. In terms of ranking, Djibouti, Benin, Mozambique, Senegal, Ethiopia, Guinea Rwanda, Tanzania, Ghana, and Uganda were the top performers, getting five or more places over the coverage period (Table 6). Benin improvement is owing to a strengthen of capital investment and sound policies enabling industrialization environment. Djibouti, Eritrea, and Mauritania experienced an increase in the competitiveness of their manufacturing sector. Guinea, Senegal and Gabon's economies showed an industrial improvement owing to simultaneous significant contributions of the three AII's components, except for the latter which experienced a slight deterioration of industrialization environment. For Mozambique, the improvement came mainly from the direct determinant, where the country switched from the lower middle to the top quintile.

Table 6. **Top performers in terms of ranking**

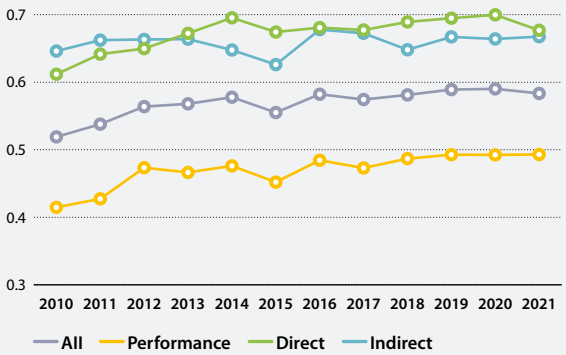
Country	2010		2019		2020		2021	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Djibouti	0.3674	50	0.4966	33	0.5045	32	0.4936	33
Benin	0.4520	32	0.5083	29	0.5236	28	0.5497	18
Mozambique	0.4286	37	0.5082	30	0.5126	30	0.5027	30
Senegal	0.5547	14	0.5979	10	0.6116	10	0.6147	7
Ethiopia	0.4579	31	0.5192	27	0.5280	27	0.5242	25
Guinea	0.3822	46	0.4487	40	0.4716	38	0.4562	40
Rwanda	0.4173	41	0.4695	35	0.4655	40	0.4754	35
Tanzania	0.4922	27	0.5357	23	0.5425	24	0.5389	21
Ghana	0.5129	19	0.5859	13	0.5940	13	0.5799	14
Uganda	0.4988	25	0.5479	19	0.5603	18	0.5418	20

Source: AfDB. Statistics Department.

Table 7. **Select country profiles**

Country profile: Gabon

Gabon has achieved steady industrial development since 2010, rising 6 places in the All ranking. Declining oil reserves have encouraged the government to prioritise other sectors. It has focused on adding value to its timber industry by exporting in higher-value forms, such as plywood and veneer sheets. Gabon also has an emerging agribusiness sector. The government has taken measures to attract foreign investment through the modernisation of infrastructure, human capital development and opportunities for public-private partnerships. It has introduced special economic zones where firms enjoy tax advantages and simplified customs procedures. Gabon recently attracted a USD 50–100 million progressive investment in a high-quality furniture factory in Libreville.

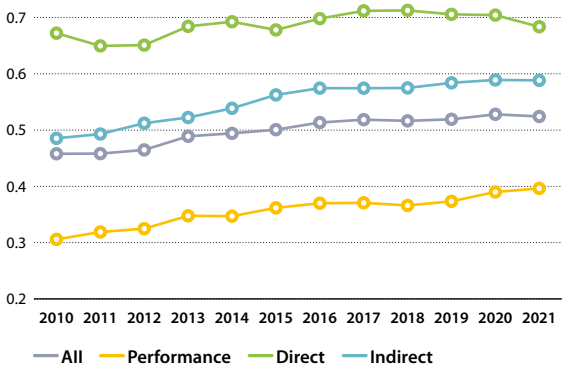


All ranking: 18 (upper-middle quintile)
Change since 2010: +6

Country profile: Ethiopia

Ethiopia is one of few countries to have achieved consistent progress on all dimensions of the Index, rising 6 places overall since 2010, despite a slowdown in the end of the period. Manufacturing value-added has increased by an average of 20% per year since 2010 and exports of manufactures as a proportion of total exports has almost doubled. The government has supported industrial development through various policy instruments, including incentives for capital investment and exports, industrial financing and the use of state-owned enterprises to shape strategic sectors. In 2021, the country developed a new industrial policy with the support of the African Development Bank. Its target sectors include leather and leather goods, textiles and apparel, food and beverages, cement and steel. While outcomes have been mixed, the Ethiopian experience suggests that well-targeted interventions can help to nurture nascent industries.*

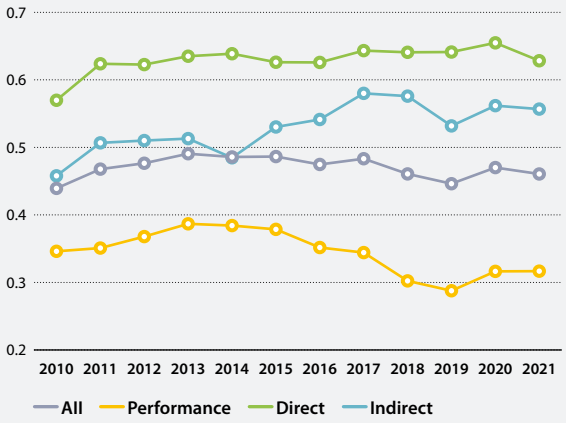
* Arkebe Oqubay. *Industrial Policy and Late Industrialization in Ethiopia*. AfDB Working Paper Series No. 303. Jun 2018



All ranking: 25 (lower-middle quintile)
Change since 2010: +6

Country profile: Niger

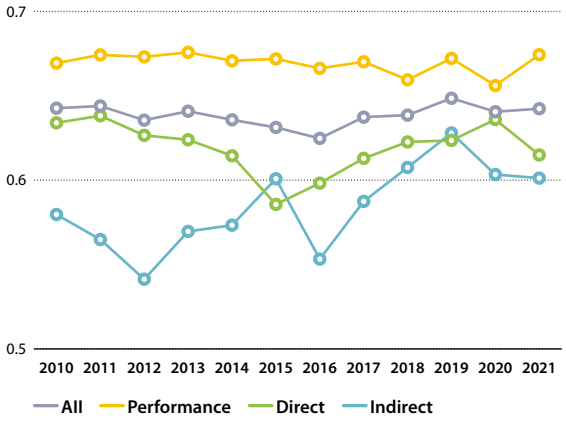
Niger ranks 39th on the All index, losing 4 ranks as compared to 2010. While the country has steadily improved its direct and indirect determinants scores since 2010, the performance score has failed to take off and has even dropped, driving down the overall All score, despite steady growth in MVA and MVA per capita. Decline in manufacturing export indicators is the main cause to this development. As evidenced in the 2022–2026 Economic and Social Development Plan, the government is committed to addressing the gaps hindering industrial development and promoting local manufacturing production and exports. To this end, the country plans to develop an industrial policy with the support of the AfDB and implement several programmes such as the One Region One Industry programme, focused on the development of specialized development poles across the country.



All ranking: 39 (lower middle quintile)
Change since 2010: -4

Country profile: eSwatini

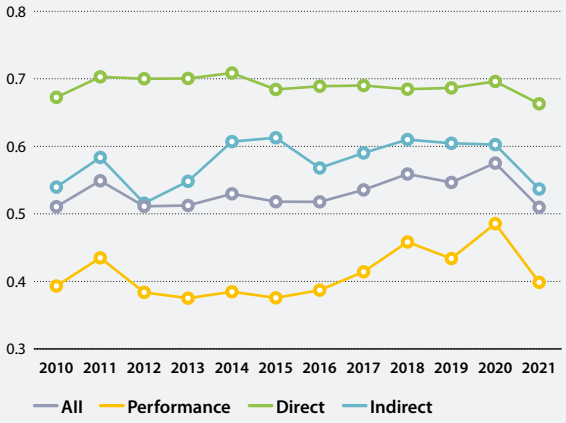
Manufacturing plays a critical role in eSwatini's economy. Ranking no. 6 on the Index the country boasts the highest share of manufacturing value-added to GDP on the continent, at 33% in 2021. It is 2nd when it comes to manufacturing value added per capita. Manufacturing exports continue to perform well, accounting for 65% of total exports by value. Between 2010 and 2021, the country achieved a steady 1% annual growth rate in exports, led by intermediate food products and processed sugar



All ranking: 6 (top quintile)
Change since 2010: no change

Country profile: Seychelles

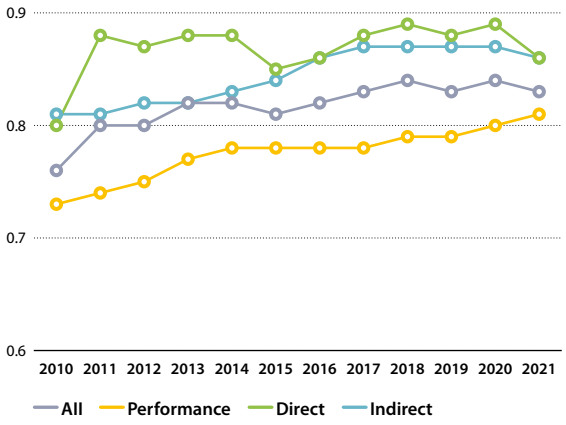
Seychelles stands out as a continental leader on resource transformation. With only modest natural resources, Seychelles is able to produce approximately US$ 410 of manufacturing value-added per tonne of material resource consumed. This has been achieved primary through small-scale and environmentally sustainable agro-processing, well suited to a small-island economy. Despite a drop of 7 ranks in the index, which stems from the severe impact of the COVID pandemic on the island country's industrial performance, the Seychelles experience demonstrates that achieving high levels of resource-efficiency does not always require large economies of scale.



All ranking: 27 (middle quintile)
Change since 2010: -7

Country Profile: Morocco

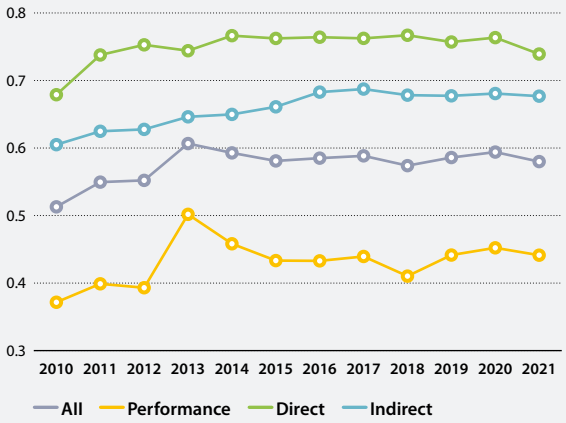
Morocco is one of Africa's strongest manufacturing economies, registering continuous improvement across all dimensions of the Index since 2010. The government has prioritised industrial development, particularly in the automotive sector. Morocco exports electrical distribution equipment, motor vehicles, fertilisers and women's garments to global markets, including Europe, the United States and Brazil. Strong performance in exports has allowed the country to become the second largest exporter of manufactures on the continent after South Africa. It now accounts for 21,1% of total manufacturing exports in Africa, outdistancing direct competitors like Tunisia and Egypt.



All ranking: 2 (top)
Change since 2010: +1

Country profile: Ghana

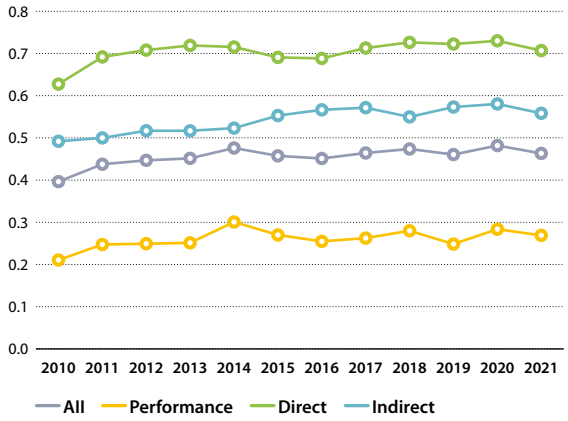
Ghana has been undergoing economic transformation from a commodity-based economy to an industrialised one. Capitalising on a stable political and economic environment, the government's industrial transformation agenda has prioritised diversification, support to local industries and SMEs, and value-added exports – all part of a strategy to reduce aid dependence. It has introduced measures to improve the competitiveness of domestic manufactures and promote the development of its crafts industry for export. As a result, Ghana has achieved steady growth in manufacturing value-added, average 5% per year since 2016, despite a slowdown in 2020 due to the COVID shock



All ranking: 14 (upper-middle quintile)
Change since 2010: +5

Country Profile: Mauritania

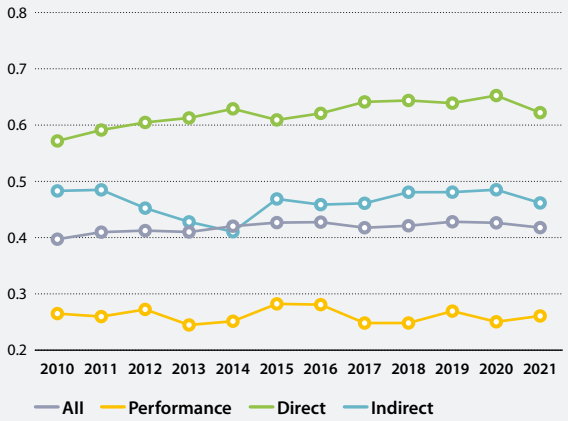
Mauritania has demonstrated consistent improvement in its ranking on the AII, gaining 6 places from 2010 and leaving lastingly the bottom quintile up to the lower middle quintile as from 2012. Its major gains have been in the Performance sub-index indicators. Specifically, manufacturing value added per capita increased by 16% between 2010 and 2021, from USD 107,8 USD to USD 124,8, an annual growth rate of 1.3% on average. Mauritania also raised the value of its manufacturing exports from $2 per capita in 2010 to $8 in 2018, particularly from works of art, while the share of manufacturing goods in its total export basket increased from 0,3% in 2010 to 1,1% in 2021.



All ranking: 37 (lower middle quintile)
Change since 2010: +6

Country profile: Chad

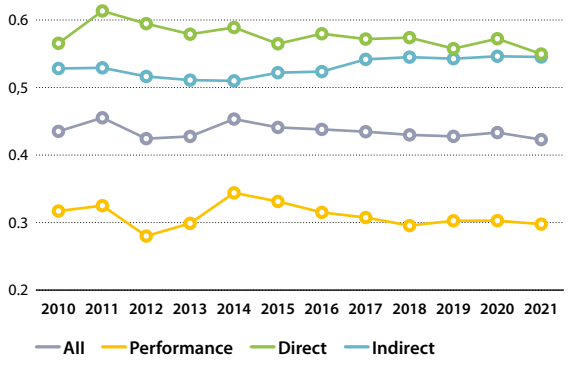
Despite a lower-middle quintile performance in in the direct determinants dimension, Chad has remained in the bottom quintile of the index all over the period, reflecting low progress in the performance dimension. The country, whose economy is affected by regional conflicts and strong vulnerability to climate change, has recently undertaken to boost industrial development and economic diversification, launching a new industrial masterplan in 2020. This strategy focus on enhancing road and energy infrastructure and facilitating private sector development, and identifies twelve pillar value chains to be promoted, including livestock, cotton, metalworking, and construction materials.



All ranking: 45 (bottom)
Change since 2010: -3

Country profile: Malawi

A rural-based economy, with one of the least rate of urban population in the world, Malawi has remained at the edge of the bottom quintile since 2012. The country's score has decreased in all dimensions of the index, attesting to the low effectiveness of the national industrial policy adopted in 2014, which aimed to address the gaps that hinder private sector development, such as poor infrastructure and lack of connectitivty to markets. Looking forward, the small market size and lanclocked country could harness its potential in agriculture-led industrialization, with an increased focus on tapping the domestic and regional markets.



All ranking: 43 (bottom)
Change since 2010: -7

The bottom ten losers

The bottom ten countries of the African Industrialization Index remained globally unchanged over the period. Six countries (Burundi, Central Africa, Comoros, Gambia, Guinea-Bissau and Sierra Leone) remained positioned in the bottom quintile each year, and three countries left it only once (Chad and São Tomé & Príncipe in 2010, Eritrea in 2012). Djibouti, Guinea, and Mauritania improved the industrial development level to stand among the lower-middle quintile as from 2015, 2017, 2011 respectively, while Malawi dropped to the bottom quintile as from 2017. The bottom ten in 2021 includes Malawi (0.4229), São Tomé & Príncipe (0.4198), Chad (0.4178), Comoros (0.4078), Eritrea (0.4041), Central African Republic (0,4018), Sierra Leone (0,3777), Guinea-Bissau (0,3663), Burundi (0.3483), and Gambia (0.3455). Generally, these countries remain at the bottom of each AII component and are experiencing significant de-industrialization, as many of them are fragile states or emerging from conflict.

Main losers in terms of ranking

Angola, Mali, Congo, Cabo Verde, Sudan, Seychelles, Malawi, Zimbabwe, Lesotho and Niger experienced the biggest drop in the ranking (Table 8). Most of these countries experienced a decline in manufacturing sector performance and a shrinking pace in enhancing key input of industrial development.

Table 8. **Main losers in terms of ranking**

Country	2010		2019		2020		2021	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Niger	0.4393	35	0.4462	41	0.4701	39	0.4606	39
Lesotho	0.5350	17	0.5567	18	0.5518	19	0.5372	22
Zimbabwe	0.4939	26	0.4995	32	0.4941	33	0.4974	32
Malawi	0.4351	36	0.4277	44	0.4333	43	0.4229	43
Seychelles	0.5106	20	0.5465	20	0.5752	15	0.5097	27
Sudan	0.4501	34	0.4667	36	0.4614	41	0.4522	41
Cabo Verde	0.5061	23	0.5003	31	0.5124	31	0.5007	31
Congo	0.5477	15	0.5286	25	0.5431	22	0.5322	23
Mali	0.4645	30	0.4614	37	0.4867	35	0.4612	38
Angola	0.5076	22	0.4725	34	0.4923	34	0.4865	34

Source: AfDB. Statistics Department.

Sub-regional analysis

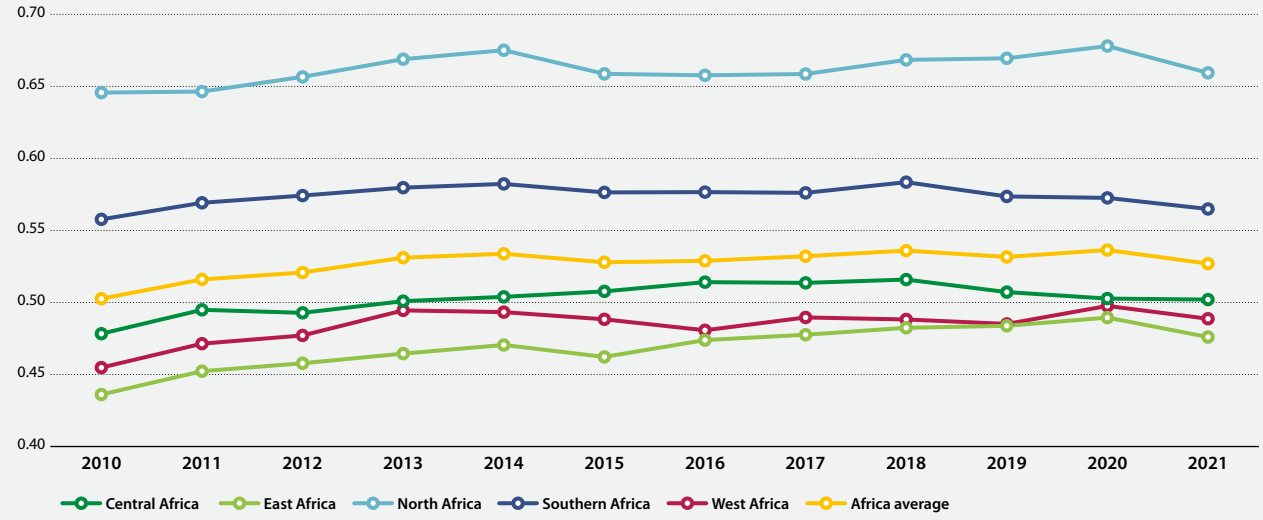
In 2021, North Africa (0.6594) remains the most advanced region in industrial development in Africa, followed by Southern Africa (0.5649), Central Africa (0.5020), West Africa (0.4887) and East Africa (0.4760). The ranking of these five regions remains unchanged over the coverage period 2010–2021. The West, Central and East regions remain markedly below the two others and show relatively the same level of industrial development (Figure 3). It is important to note that these regions cover the middle part of Africa and as depicted by the analysis, the countries from this part seem to be facing almost the same challenges in the process of industrialization.

In terms of improvement, the best performing sub-region is East Africa, with a growth rate of 0.8% per year, followed by West Africa (0.66%). Southern Africa recorded the smallest improvement across Africa's five subregions, with only 0.12% growth rate per year.

Regarding the AII's sub-components, North and Southern Africa remain the most advanced (Figure 4). However, East and West Africa still recorded the best progress over 2010–2021.

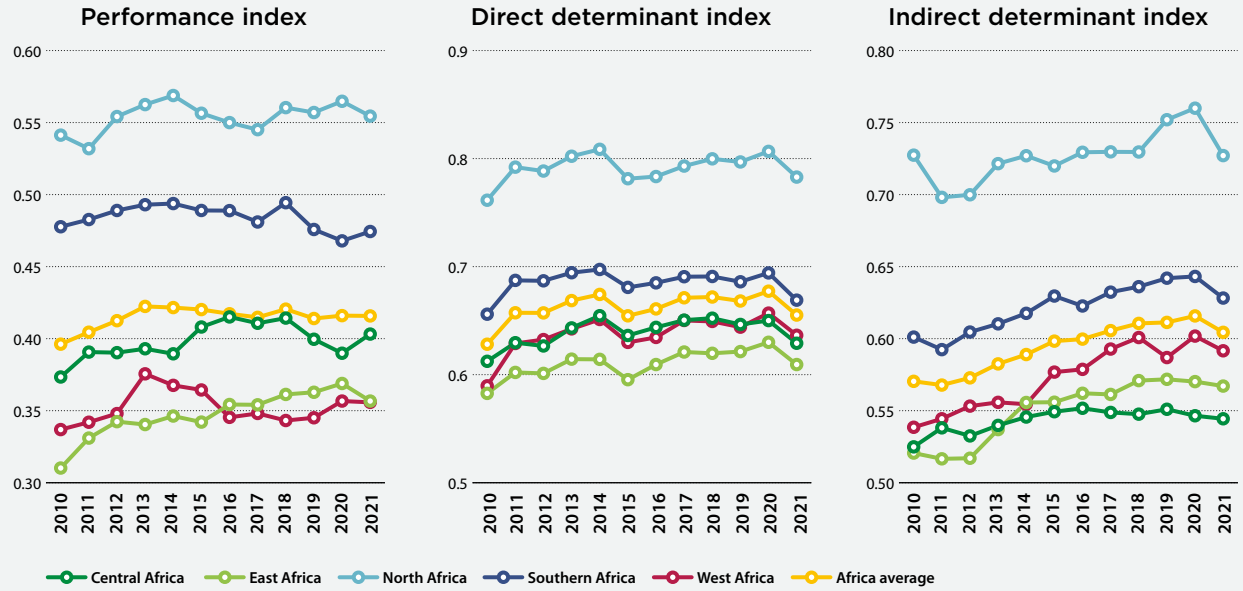
Direct determinant is the component on which improvements are the weakest. Southern Africa, recorded only a slight annual growth of 0.18% score variation. Central and North Africa recorded a slight growth of 0.25%. The only regions recording a sizeable improvement (above the African average) are West and East Africa. Regarding the indirect determinant component, all regions recorded an improvement, except Central and North Africa, whose score has stagnated.

Figure 3. AII trend in regional score



Source: AfDB. Statistics Department

Figure 4. Sub-regional trend on the three AII's components



Source: AfDB. Statistics Department

However, there remains a large gap between the North and the other regions, despite the former recording the lowest progress on average. Furthermore, North countries lead the performance component as in the previous components described, with the highest improvement over the coverage period after the East Africa region (+1.28%). Southern Africa is the only region having recorded a deterioration on this component.

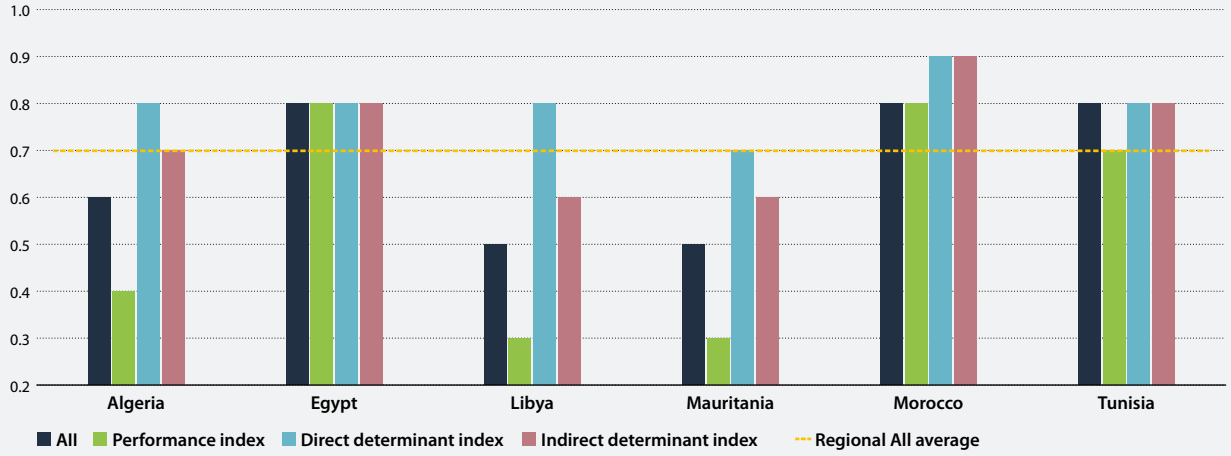
In general, the improvement recorded by East, West, as well as Central Africa, despite an index score lower than the Africa average, depicts that these subregions still have room for considerable improvement.

Table 9 present the Index scores by sub-region. It is useful to countries in benchmarking their performance against other sub-regional economies, who are likely to be both competitors and collaborators in regional value chains. It also shows the distinctive paths being taken by the different regions towards industrialization.

Table 9. **AII 2022 scores by sub-region**

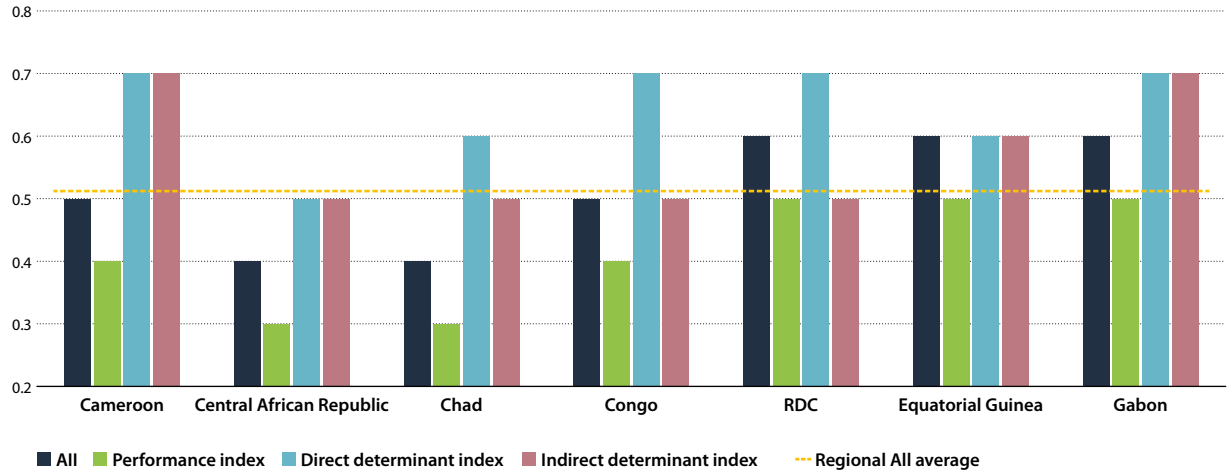
North Africa

North Africa is the top-performing sub-region in the AII. Three of its six countries rank within the top 10 countries on the Index, and its average score is around 0.7. Morocco, Egypt, and Tunisia perform well on each sub-component of the AII. The strong results reflect a long history of national efforts to promote key industries and develop strong infrastructure, backed by an intensification in industrial policy over the past decade, with governments developing new policy tools to support nascent industries and reduce import dependence. Key industries in the region include inorganic chemical processing, fertilisers, automotive, electrical goods and textiles. Libya and Algeria still have some way to go to achieve the objective of diversifying away from hydrocarbons. The sub-region benefits from its close proximity to the European Union but would benefit from stronger connectivity among its members countries and improved North-South corridors with hinterlands and the rest of the African continent.



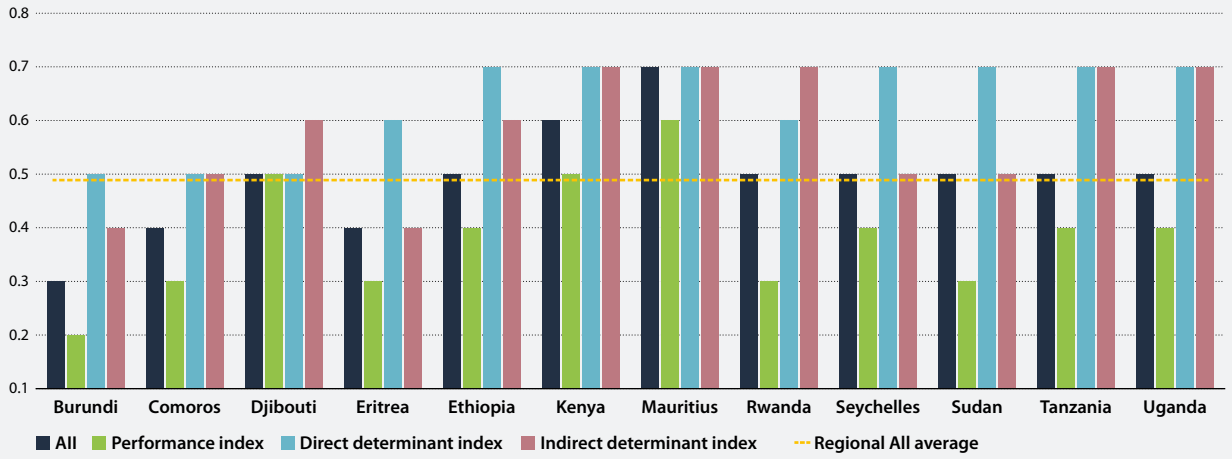
Central Africa

Central Africa is one of the continent's most resource-rich regions, which tends to work against industrial development by raising the value of local currencies and making exports less competitive. Poor infrastructure and persistent conflict over the past 30 years in landlocked parts of the sub-region, including the Central African Republic, Chad, and eastern parts of the Democratic Republic of Congo, have contributed to underdeveloped infrastructure and weak business environments. Equatorial Guinea, that was among the top performers in 2010, is now outdistanced by Gabon, the best ranked country in the region.



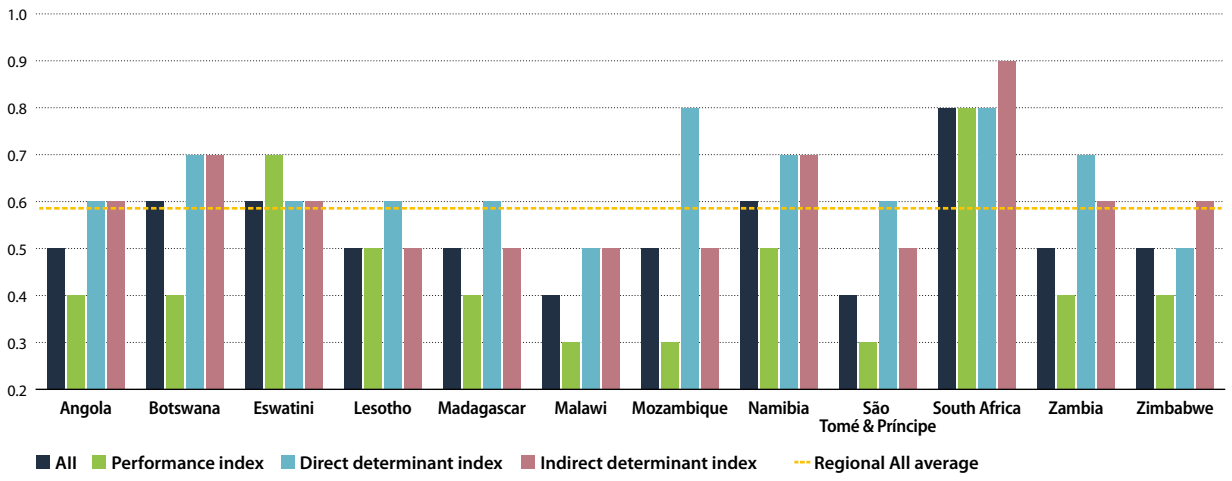
East Africa

East Africa features a number of high performing countries, including Mauritius, and is host to half of the top performers in terms of ranking over the 2010-2021 period (Djibouti, Ethiopia, Rwanda, Tanzania, Uganda). Despite this positive trend, the region's average AII score remains the lowest of any sub-region. Strong regional integration and significant levels of investment in infrastructure and trade promotion have supported the development of robust value chains in the textile and horticulture industries, particularly in Ethiopia, Tanzania, and Kenya. Countries in the region have also been able to harness the benefits of SEZs as a tool for promoting economic development. The region is a leader in digitisation, particularly Kenya, and countries like Ethiopia, Rwanda and Tanzania have reprioritised industrialization in their latest development plans, in an overall drive to create quality jobs.



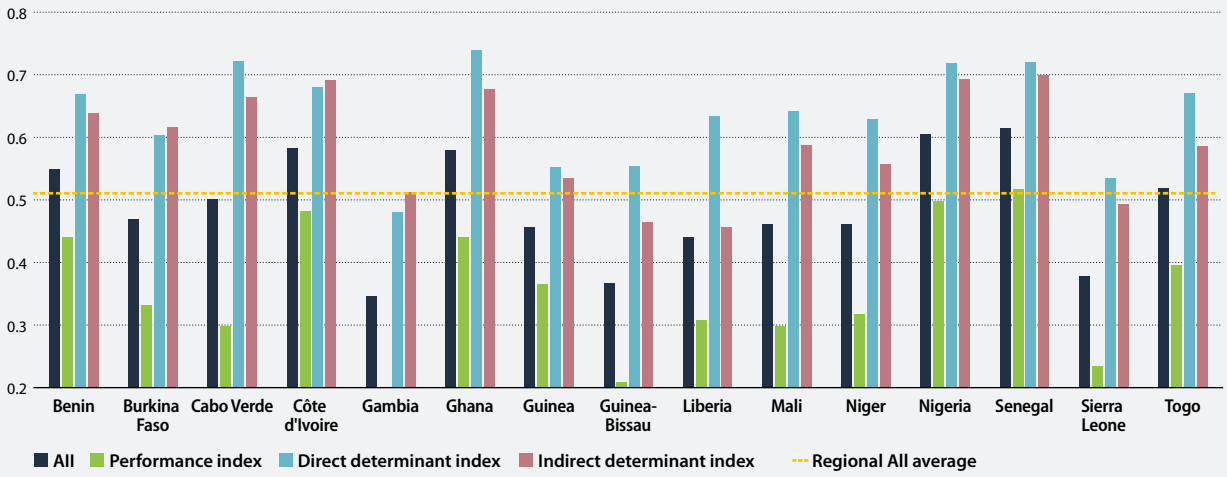
Southern Africa

Southern Africa is dominated by the high levels of industrial development in South Africa, the top performing country in this year's AII. While this creates an imbalance in the region, leading to high rates of labour migration, it also helps to drive industrial development across the sub-region through trade and integrated production in regional value chains. South Africa is the most important trading partner for its regional neighbours. The region also has well developed value chains for equipment and services related to mining, benefitting the mineral-rich countries (Botswana, Zambia, Zimbabwe, and Mozambique). SADC has also been playing an important role in facilitating regional industrialization. Other high performing countries in the region include Eswatini, which has achieved a manufacturing trade surplus and remains in the top quintile, and Namibia, which has particularly well in creating manufacturing jobs.



West Africa

West Africa is a large and diverse region. Of its 15 countries, Senegal and Nigeria rank in the top 10 countries on the AII. Côte d'Ivoire and Ghana are consistently good performers, benefitting from large coastal economies and steady growth. All three are investing heavily in reviving industry to service growing domestic markets. The region also benefits from growing economic integration. There is a currency union in eight countries, which is due to extend to the ECOWAS area, with the adoption of a single currency in 2027. This offers the potential for promoting industrial development through economies of scale and greater firm specialisation.



5. The AfDB's role in supporting industrial development

The African Development Bank is strongly committed to supporting industrialization across Africa. 'Industrialize Africa' is one of the Bank's High 5 Priorities, alongside Feed Africa. Light Up and Power Africa. Integrate Africa and Improve the Quality of Life for the People of Africa. Together, these priorities aim to accelerate the continent's progress towards meeting the Sustainable Development Goals and securing a prosperous, inclusive and sustainable future.

The Bank's Industrialization Strategy for Africa (2016–2025) provides a roadmap for how the Bank will support this industrial transformation. Through strategic partnerships, the Bank will actively support African governments with developing their industrial policies, including by helping to identify potential sectors for support and developing policy instruments to promote value chain development. The Bank's role will include advisory and technical assistance, and where appropriate operational support.

At the core of the Bank's strategy are six 'Flagship Programmes'. These have been selected as enabling the Bank to best leverage its experience, capacities and finances to fast-track Africa's industrialization. They include:

1. **Foster successful industrial policies;**
2. **Catalyse funding for infrastructure and industry projects;**
3. **Grow liquid and effective capital markets;**
4. **Promote and drive enterprise development;**
5. **Promote strategic partnerships;**
6. **Develop efficient industry clusters.**

Foster successful industrial policies

African countries need comprehensive and resolute industrial policies, in order to initiate and accelerate transformative industrialization. These must be adjusted to specific local contexts and aligned with countries' development goals.

The Bank will work with national partners to provide policy advice and technical assistance for the development, implementation and monitoring of regulatory and institutional frameworks. It will also help to fund key public-private partnership initiatives.

The Bank has already embarked upon this targeted support. In Morocco, we are providing support for the development of the country's industrialization acceleration plan. This includes planned budget support for structural reforms.

Catalyse funding for infrastructure and industry projects

The Bank aims to contribute new and additional funding for strategic projects in infrastructure and industrialization, whether led by private or public actors. By acting as a strategic investor or mandated lead arranger, the Bank can help partners to raise their own funds or acquire domestic or foreign investment.

The Bank prioritises high-value industrial projects that have a catalytic effect on national economies. In 2018, the Bank approved over $300 million in loan facilities to support projects with high industrial impact.

Box 5. Investing in strategic industrial projects

The Bank approved a $100 million senior loan to the Nigerian fertilizer company. Indorama, to increase its productive capacity, create jobs and target export markets. The job created 9.000 construction jobs and nearly 500 long-term jobs, while benefitting over 330.000 farmers through outgrower schemes. As well as boosting exports, the projects promote more use of fertiliser, addressing one of the major constraints on Nigeria's agricultural development

Two AfDB loans helped the OCP Group in Morocco to expand its phosphate and fertiliser production and storage facilities, helping it to compete in regional and global markets. As well as creating thousands of jobs, the investments have contributed significant to government revenues through the payment of dividends, increased taxes and duties and contributions to the country's foreign exchange earnings.

Grow liquid and effective capital markets

Access to finance is a key requirement for industrial expansion. Capital market constraints remain a significant major barrier across the continent.

The Bank aims to improve access to market finance for African enterprises by advising governments, stock exchanges and regulators on how to develop liquid capital markets or invest directly in capital markets to increase liquidity.

Promote and drive enterprise development

The Bank aims to contribute to the development of small and medium enterprises (SMEs) by improving the business environment and increasing investment and finance opportunities. It also provides technical assistance to strengthen SME-focused entities, such as incubators, establish linkages between SMEs and other producers, and provide training to increase management capacity.

Box 6. SME support in Liberia

In 2018, the Bank provided a US$4 million line of credit to local banks in Liberia to provide liquidity to small and medium enterprises. The Bank also provided a US$8 million risk participation agreement to allow local banks to confirm letters of credit issued by businesses.

Promote strategic partnerships in Africa

The Bank aims to link African enterprises and major projects with potential partners and investors around the world. It contributes through promotional events and activities, and by assisting with the facilitation and management of investor relations (for example, through support for contract negotiations). Working closely with a wide range of partners, the Bank helps to advance projects to bankable stages, raise capital and accelerate the financial closure of deals.

The Africa Investment Forum (AIF) is one high-profile initiative supported by the Bank, held annually following a successful launch in 2018. The AIF is Africa's first transaction-based investment marketplace. Its goal is to bring showcase investment opportunities in Africa for global investments and close Africa's investment gap. At the most recent forum, in November 2019 in Johannesburg, 57 deals for a combined value of $67.8 billion were table for boardroom discussions.

Develop efficient industry clusters

The Bank aims to support governments in developing efficient industry clusters across Africa through technical assistance and funding of implementation and monitoring.

The Bank has funding available to support initiatives such as the development of Special Economic Zones. It is actively encouraging the development of 'special agro-industrial zones' in rural areas, enabled with infrastructure such as roads, power and water supply. This will reduce the cost of agri-businesses and reduce post-harvest losses.

Partnerships for Industrial Development

The aspiration to more than double Africa's industrial GDP over the next ten years will require collaboration across a wide range of partners. The Bank aims to use its unique mandate, its close partnerships with African government and its convening power to help catalyse and coordinate the efforts of a wide range of stakeholders, both public and private.

The Bank will strive to facilitate government and private sector dialogue on industrial development. This African Industrialization Index is one of the Bank's flagships initiatives to promote evidence-based dialogue.

The Bank has also begun to develop strategic partnerships. In May 2018, the Bank and the UN Industrial Development Organisation (UNIDO) agreed to step up collaboration to boost Africa's industrialization, focus on shared interests such as agro-industry development, the circular economy (including measures to design out waste and pollution and promoting sustainable resource use), eco-industrial parks, investments in innovation and technology, enterprise development, trade and capacity-building.

Policy agenda

Industrialization is widely recognised as an essential component of Africa's development and a foundation for the achievement of other development goals. Only the manufacturing sector is capable of generating decent jobs on the scale required to absorb the labour market entrants expected over the next two decades. Industrial development will allow Africa to capture more value from its natural resources while becoming less vulnerable to volatile commodity prices. It is a foundation not just for sustained economic development, but for a wide range of development goals.

The African Industrialization Index provides for the first time a set of rigorous, comparable data on the progress being achieved across African countries. It confirms the overall picture of slow and steady progress across the continent, bracketed by strong performance from the leading industrial economies and lagging performance in a small number of countries, especially those affected by conflict or instability. It also highlights bright spots. A number of countries – including Algeria. Ethiopia, Gabon, Ghana and Guinea – have made real progress with industrial development, advancing up the rankings. Others have had considerable success with putting in place the required building blocks, such as macroeconomic stability and improvements to their business environments, both of which help to promote investment.

However, it is clear that this progress must accelerate in the coming period. There is a growing consensus that African countries need more active industrial policies. These should be qualitatively different from the state-led important substitution policies of the past. But nor can they rely solely on improving the business environment. They should involve targeted measures that help to support and shape infant industries – while being careful to avoid distorting markets over the longer term.

To do industrial policy well, African governments will need to develop new policy instruments. They should analyse the opportunities and constraints facing their industries, with detailed breakdown of data by sector and geographical area. They should make educated guesses about which industries offer the best potential for development, and work with private producers to shape those industries in sustainable ways.

At the same time, they must continue to work on getting the basics right. This mean investing in strategic infrastructure for industry, including electricity, transport and clean water, ensuring that supplies are both affordable and reliable. They should work to reduce the burden of red tape on businesses, while promoting useful and efficient regulation that ensures that industrial development is both inclusive and sustainable. They should promote access to finance for firms and SMEs, through more efficient financial sectors. They should continue to invest in basic education, while supporting vocational training that meets the needs of manufacturing firms.

Regional integration will continue to be an important component of effective industrial policies. By pressing ahead with regional free-trade initiatives and improving the hard and soft infrastructure needed to trade across borders. African countries can help their manufacturing firms take opportunities for greater specialisation that comes with larger markets.

Successful industrial policy will also require investment in government capacity. African governments need to invest in their own capacity to implement new policy initiatives. Good industrial policy is knowledge-intensive, calling for a deep understanding of the challenges facing firms in specific sectors. It also requires the public sector to forge new partnerships with private firms, with feedback loops to identify new opportunities and constraints.

We hope that this inaugural edition of the Africa Industrialization Index will provide both encouragement and useful data to African governments as they develop their industrial policies. The African Development Bank stands ready to support them in this vital endeavour.


LOME CONTAINER TERMINAL

6. Conclusion: challenges and recommendations

The Africa Industrialization Index (AII) is an analytical tool initiated by the African Development Bank to assist African countries in their industrial development policies.

The three sub-components covered under this initiative are all important. It is recommended that countries with a lower score in the AII should act simultaneously on each sub-component to achieve any significant improvement of the overall index.

Key lessons

Despite the significant impact of the COVID-19 shock on industrial development on the continent, that ubiquitously hit all African economies, an encouraging lesson of this first edition is that strong improvers of the 2010–2021 period can be found across all quintiles of the classification. This shows that it is not just countries with advanced manufacturing sectors that are able to achieve industrial growth. For example, Djibouti has lifted itself 17 places from the bottom quintile in 2010 to the lower-middle group in 2021, thanks to concurrent improvements in all spheres of indicators, particularly significant in the performance score.

While the African industrialization process is marked by a strong country heterogeneity in terms of resource endowments, industrial maturity, political stability and development trajectories, this index allows to identify common and unalterable, albeit non-exhaustive, features of industrial success on the continent.

The importance of manufacturing exports

The top performers are not necessarily those with the biggest economies, but those that generate high manufacturing value-added per capita, with a substantial share of manufacturing goods destined for export. Benin and Ethiopia have achieved noticeable rises of 14 and 9 places respectively in the performance sub-index, both from the lower scores of the 2010 ranking. Both countries significantly increased their export of manufactured good per capita and the share of exports of manufactured goods of total exports.

Strong growth in the private sector and FDI

Looking at the direct determinants, Mozambique, Zambia, and Guinea-Bissau have achieved impressive improvements of over 15% in the dimension score and subsequent rises in the ranking, through a combination of private sector growth and increases in total FDI. Mozambique has experienced a dramatic rise of 23 places into the top quintile, driven largely by increases in total FDI, although a large share of this investment went into non-manufacturing sectors such as oil and gas.

Improvements to the business environment

On the indirect determinant dimension, many countries have improved the climate for industrial development. Tanzania, Ethiopia,

Niger, Côte d'Ivoire Benin, Burkina Faso and Guinea have recorded a growth by 15% or more of the indirect determinant dimension score. All have moved up the ranking by six places or more in this dimension. Some of these countries – particularly Côte d'Ivoire and Tanzania, have also seen significant increases in their market size and infrastructure.

Looking forward: technical challenges of the index

Concerted efforts, as the Africa Industrialization Index highlights, can improve the lives of people in Africa since industrialization remains a powerful driver of economic and social change, and offers a high potential for growth and job creation. An important challenge in this regard is the availability of quality data to track this industrialization. Easily accessible, reliable, up-to-date and exhaustive data will expose the real state of African countries.

During the literature review, numerous useful variables for the AII were identified. However, due to the lack of data for several countries and the differences in methodology for the compilation of the data they could not be included in the AII. Some noteworthy indicators include:

- the number of industrial establishments;
- variable on innovation;
- variable on higher education and training;
- development of the financial system (credit to manufacturing/ private sector);
- the share of FDI going to the manufacturing sector;
- variables aimed at capturing social and environmental performance of manufacturing; and
- index of industrial production.

The Africa Industrialization Index remains an innovative initiative that has strong linkages to the Bank's High 5s priorities and the Sustainable Development Goals (SDG 2, 8 and 9). It is recommended that the Index be further improved and effectively used to track industrial development in Africa. In this context, the following actions are recommended:

- Improving the collection process of relevant data;
- Training and capacity building of country officials in regional country members;

Institutionalize industrialization data collection in Africa by mainstreaming industrialization statistics in the work programs of National Statistical offices.

Annexes

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Africa Industrialization Index and its three dimension scores

Table 10. 2022 Africa Industrialization Index

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Quintile 2021
South Africa	0.8957(1)	0.8937(1)	0.8948(1)	0.8888(1)	0.8829(1)	0.8764(1)	0.8669(1)	0.8746(1)	0.8752(1)	0.8696(1)	0.8498(1)	0.8404(1)	Top
Morocco	0.7643(3)	0.7996(2)	0.8035(2)	0.8155(2)	0.8219(2)	0.8104(2)	0.8201(2)	0.8302(2)	0.8369(2)	0.8333(2)	0.8387(2)	0.8327(2)	
Egypt	0.7578(4)	0.7525(4)	0.7663(4)	0.7792(4)	0.7745(4)	0.7731(4)	0.7813(4)	0.7667(4)	0.7699(4)	0.7755(4)	0.7934(3)	0.7877(3)	
Tunisia	0.7895(2)	0.7991(3)	0.7938(3)	0.8044(3)	0.8073(3)	0.7869(3)	0.7914(3)	0.7871(3)	0.7777(3)	0.7808(3)	0.7808(4)	0.7714(4)	
Mauritius	0.6802(5)	0.6909(5)	0.6983(5)	0.7018(5)	0.7128(5)	0.7081(5)	0.7061(5)	0.6965(5)	0.6889(5)	0.6872(5)	0.6794(5)	0.6685(5)	
Eswatini	0.6426(6)	0.6439(6)	0.6355(6)	0.6408(6)	0.6357(6)	0.6312(7)	0.6247(7)	0.6373(6)	0.6385(7)	0.6485(6)	0.6405(6)	0.6423(6)	
Senegal	0.5547(14)	0.5772(11)	0.5833(10)	0.5867(14)	0.5847(15)	0.5813(13)	0.5880(11)	0.5968(10)	0.6015(10)	0.5979(10)	0.6116(10)	0.6147(7)	
Nigeria	0.5766(10)	0.5792(10)	0.5817(11)	0.5901(13)	0.6207(7)	0.5991(10)	0.5635(17)	0.5734(15)	0.5921(12)	0.6133(9)	0.6122(9)	0.6046(8)	
Kenya	0.5723(11)	0.5837(9)	0.5936(9)	0.6025(11)	0.6090(11)	0.5939(11)	0.5983(10)	0.5887(12)	0.6029(9)	0.5964(11)	0.6042(11)	0.6029(9)	
Namibia	0.6106(7)	0.6133(7)	0.6136(7)	0.6193(7)	0.6107(8)	0.5998(9)	0.6009(8)	0.6189(8)	0.6434(6)	0.6189(8)	0.6139(8)	0.6014(10)	
Algeria	0.5635(12)	0.5678(12)	0.5605(14)	0.5768(16)	0.6095(9)	0.6042(8)	0.6001(9)	0.5973(9)	0.6331(8)	0.6339(7)	0.6359(7)	0.5978(11)	Upper-middle
Gabon	0.5190(18)	0.5379(19)	0.5639(13)	0.5680(17)	0.5778(16)	0.5551(17)	0.5822(13)	0.5744(14)	0.5812(15)	0.5891(12)	0.5902(14)	0.5834(12)	
Côte d'Ivoire	0.5391(16)	0.5321(21)	0.5475(18)	0.6046(10)	0.5867(14)	0.5899(12)	0.5776(14)	0.5911(11)	0.5819(14)	0.5811(14)	0.6003(12)	0.5830(13)	
Ghana	0.5129(19)	0.5495(16)	0.5521(17)	0.6066(8)	0.5928(13)	0.5809(14)	0.5850(12)	0.5884(13)	0.5739(17)	0.5859(13)	0.5940(13)	0.5799(14)	
Equatorial Guinea	0.5949(9)	0.6124(8)	0.5966(8)	0.6066(9)	0.5932(12)	0.5596(16)	0.5645(16)	0.5522(19)	0.5895(13)	0.5672(17)	0.5356(26)	0.5666(15)	
Congo. Democratic Rep	0.4507(33)	0.4797(30)	0.4860(32)	0.5042(32)	0.4935(33)	0.5468(19)	0.5387(23)	0.5674(16)	0.5951(11)	0.5677(16)	0.5605(17)	0.5646(16)	
Botswana	0.5561(13)	0.5524(14)	0.5573(15)	0.5528(21)	0.5702(17)	0.5703(15)	0.5672(15)	0.5620(18)	0.5718(18)	0.5724(15)	0.5707(16)	0.5587(17)	
Benin	0.4520(32)	0.4777(31)	0.4778(33)	0.5204(28)	0.5246(27)	0.5124(29)	0.4942(33)	0.5123(30)	0.5246(26)	0.5083(29)	0.5236(28)	0.5497(18)	
Zambia	0.5002(24)	0.5343(20)	0.5566(16)	0.5672(18)	0.5623(18)	0.5497(18)	0.5527(18)	0.5651(17)	0.5582(20)	0.5443(21)	0.5436(21)	0.5423(19)	
Uganda	0.4988(25)	0.5293(22)	0.5454(20)	0.5561(19)	0.5594(20)	0.5453(20)	0.5506(19)	0.5434(22)	0.5507(22)	0.5479(19)	0.5603(18)	0.5418(20)	
Tanzania	0.4922(27)	0.5073(26)	0.5245(23)	0.5225(27)	0.5262(25)	0.5236(25)	0.5190(26)	0.5208(25)	0.5506(23)	0.5357(23)	0.5425(24)	0.5389(21)	
Lesotho	0.5350(17)	0.5382(18)	0.5346(21)	0.5401(22)	0.5315(22)	0.5412(22)	0.5495(20)	0.5455(20)	0.5564(21)	0.5567(18)	0.5518(19)	0.5372(22)	Middle
Congo	0.5477(15)	0.5645(13)	0.5331(22)	0.5904(12)	0.6094(10)	0.6346(6)	0.6512(6)	0.6276(7)	0.5742(16)	0.5286(25)	0.5431(22)	0.5322(23)	
Cameroon	0.5079(21)	0.5522(15)	0.5456(19)	0.5536(20)	0.5489(21)	0.5410(23)	0.5419(21)	0.5443(21)	0.5476(24)	0.5435(22)	0.5458(20)	0.5300(24)	
Ethiopia	0.4579(31)	0.4582(36)	0.4648(35)	0.4890(34)	0.4942(32)	0.5007(31)	0.5134(28)	0.5185(28)	0.5164(28)	0.5192(27)	0.5280(27)	0.5242(25)	
Togo	0.4753(28)	0.4940(28)	0.4961(29)	0.5263(26)	0.5160(29)	0.4997(32)	0.5300(25)	0.5193(27)	0.5112(30)	0.5223(26)	0.5429(23)	0.5191(26)	
Seychelles	0.5106(20)	0.5490(17)	0.5112(27)	0.5124(30)	0.5297(24)	0.5180(28)	0.5178(27)	0.5355(23)	0.5590(19)	0.5465(20)	0.5752(15)	0.5097(27)	
Madagascar	0.4720(29)	0.4887(29)	0.4957(31)	0.5045(31)	0.5064(31)	0.4920(33)	0.5075(31)	0.5025(32)	0.5103(32)	0.5155(28)	0.5189(29)	0.5040(28)	
Libya	0.6028(8)	0.5216(23)	0.5688(12)	0.5860(15)	0.5613(19)	0.5201(26)	0.5021(32)	0.5059(31)	0.5191(27)	0.5330(24)	0.5372(25)	0.5036(29)	
Mozambique	0.4286(37)	0.4614(35)	0.4957(30)	0.5125(29)	0.5250(26)	0.5042(30)	0.5115(30)	0.4938(33)	0.5139(29)	0.5082(30)	0.5126(30)	0.5027(30)	
Cabo Verde	0.5061(23)	0.5176(24)	0.5161(25)	0.5290(24)	0.5093(30)	0.5429(21)	0.5331(24)	0.5247(24)	0.5105(31)	0.5003(31)	0.5124(31)	0.5007(31)	

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Quintile 2021
Zimbabwe	0.4939(26)	0.5044(27)	0.5209(24)	0.5308(23)	0.5306(23)	0.5189(27)	0.5120(29)	0.5208(26)	0.5058(33)	0.4995(32)	0.4941(33)	0.4974(32)	
Djibouti	0.3674(50)	0.3869(48)	0.4015(47)	0.4123(44)	0.4074(46)	0.3878(47)	0.4701(36)	0.4927(34)	0.4877(34)	0.4966(33)	0.5045(32)	0.4936(33)	
Angola	0.5076(22)	0.5158(25)	0.5135(26)	0.5272(25)	0.5227(28)	0.5366(24)	0.5391(22)	0.5176(29)	0.5429(25)	0.4725(34)	0.4923(34)	0.4865(34)	
Rwanda	0.4173(41)	0.4177(41)	0.4286(40)	0.4384(40)	0.4466(41)	0.4466(41)	0.4385(41)	0.4480(42)	0.4594(39)	0.4695(35)	0.4655(40)	0.4754(35)	
Burkina Faso	0.4229(39)	0.4469(38)	0.4564(37)	0.4607(38)	0.4662(39)	0.4504(40)	0.4640(37)	0.4581(39)	0.4618(37)	0.4595(39)	0.4784(37)	0.4699(36)	
Mauritania	0.3964(43)	0.4376(40)	0.4468(39)	0.4515(39)	0.4760(36)	0.4574(38)	0.4512(39)	0.4642(37)	0.4737(36)	0.4605(38)	0.4819(36)	0.4632(37)	
Mali	0.4645(30)	0.4696(32)	0.4579(36)	0.4649(36)	0.4808(35)	0.4745(35)	0.4623(38)	0.4916(35)	0.4739(35)	0.4614(37)	0.4867(35)	0.4612(38)	**Lower-middle**
Niger	0.4393(35)	0.4678(33)	0.4765(34)	0.4906(33)	0.4858(34)	0.4864(34)	0.4747(35)	0.4832(36)	0.4607(38)	0.4462(41)	0.4701(39)	0.4606(39)	
Guinea	0.3822(46)	0.3941(47)	0.4115(45)	0.4229(42)	0.4440(42)	0.4517(39)	0.4197(44)	0.4569(40)	0.4537(41)	0.4487(40)	0.4716(38)	0.4562(40)	
Sudan	0.4501(34)	0.4648(34)	0.4961(28)	0.4733(35)	0.4712(38)	0.4710(36)	0.4853(34)	0.4589(38)	0.4551(40)	0.4667(36)	0.4614(41)	0.4522(41)	
Liberia	0.4229(40)	0.4413(39)	0.4533(38)	0.4648(37)	0.4737(37)	0.4597(37)	0.4448(40)	0.4552(41)	0.4506(42)	0.4419(42)	0.4385(42)	0.4409(42)	
Malawi	0.4351(36)	0.4552(37)	0.4243(41)	0.4276(41)	0.4533(40)	0.4409(42)	0.4380(42)	0.4346(43)	0.4299(43)	0.4277(44)	0.4333(43)	0.4229(43)	
São Tomé & Príncipe	0.4249(38)	0.4165(42)	0.4092(46)	0.4035(47)	0.4133(45)	0.3906(46)	0.3997(47)	0.3998(48)	0.4052(48)	0.4131(48)	0.4070(48)	0.4198(44)	
Chad	0.3972(42)	0.4097(43)	0.4125(44)	0.4100(45)	0.4203(43)	0.4267(43)	0.4275(43)	0.4176(46)	0.4211(44)	0.4282(43)	0.4263(44)	0.4178(45)	
Comoros	0.3879(44)	0.3968(46)	0.3855(50)	0.3965(48)	0.4027(47)	0.3848(48)	0.3933(48)	0.4071(47)	0.4106(47)	0.4141(47)	0.4074(47)	0.4078(46)	
Eritrea	0.3769(47)	0.4083(44)	0.4176(42)	0.4185(43)	0.4136(44)	0.4090(44)	0.4021(46)	0.4197(45)	0.4123(46)	0.4222(45)	0.4255(45)	0.4041(47)	
Central African Republic	0.3839(45)	0.3863(49)	0.3953(48)	0.3712(50)	0.3745(49)	0.4074(45)	0.4071(45)	0.4257(44)	0.4131(45)	0.4198(46)	0.4135(46)	0.4018(48)	
Sierra Leone	0.3724(48)	0.4012(45)	0.4134(43)	0.4079(46)	0.3708(51)	0.3668(50)	0.3771(49)	0.3815(49)	0.3892(49)	0.3837(49)	0.3848(49)	0.3777(49)	
Guinea-Bissau	0.3306(51)	0.3429(51)	0.3411(51)	0.3542(51)	0.3537(52)	0.3507(52)	0.3524(51)	0.3624(51)	0.3704(50)	0.3696(50)	0.3757(50)	0.3663(50)	
Burundi	0.3215(52)	0.3281(52)	0.3332(52)	0.3456(52)	0.3713(50)	0.3646(51)	0.3702(50)	0.3633(50)	0.3698(51)	0.3592(51)	0.3630(51)	0.3483(51)	
Gambia	0.3700(49)	0.3794(50)	0.3912(49)	0.3885(49)	0.3889(48)	0.3782(49)	0.3433(52)	0.3490(52)	0.3664(52)	0.3558(52)	0.3614(52)	0.3455(52)	**Bottom**

Note: Figures in bracket are the countries' ranks in the corresponding year.
Source: AfDB. Statistics Department.

Table 11. Performance Index

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Rang 2021	Quintile 2021
South Africa	0.8951	0.8833	0.8946	0.8819	0.8735	0.8671	0.8569	0.86	0.8609	0.8558	0.827	0.8238	1	Top
Morocco	0.7282	0.7393	0.7529	0.7678	0.7789	0.7752	0.7809	0.7814	0.7921	0.7924	0.7956	0.8063	2	
Egypt	0.7033	0.7073	0.7369	0.7496	0.7496	0.7545	0.7518	0.7255	0.7257	0.7386	0.7579	0.7599	3	
Tunisia	0.7798	0.7771	0.777	0.789	0.7817	0.7625	0.7656	0.7542	0.753	0.7528	0.7524	0.7489	4	
Eswatini	0.6693	0.6742	0.673	0.6757	0.6707	0.6718	0.6662	0.6701	0.6594	0.6721	0.656	0.6743	5	
Mauritius	0.6153	0.6366	0.6437	0.6497	0.6608	0.6564	0.6451	0.6261	0.6156	0.6097	0.5864	0.5949	6	
Equatorial Guinea	0.556	0.6002	0.5709	0.5908	0.5666	0.5136	0.5221	0.5038	0.5542	0.523	0.4606	0.5296	7	
Congo, Democratic Republic of the	0.3642	0.3769	0.3759	0.3914	0.3599	0.4766	0.4582	0.5283	0.5796	0.5157	0.5016	0.524	8	
Namibia	0.5581	0.5566	0.5564	0.5588	0.5401	0.5022	0.5056	0.5363	0.5807	0.5352	0.5132	0.5176	9	
Senegal	0.4801	0.5	0.501	0.5001	0.4997	0.4902	0.4923	0.4924	0.4941	0.4874	0.4991	0.5166	10	
Kenya	0.4916	0.5036	0.5205	0.5168	0.5197	0.5089	0.5077	0.4891	0.4916	0.491	0.4959	0.5119	11	Upper-middle
Nigeria	0.4488	0.434	0.4401	0.4512	0.4957	0.4676	0.3945	0.411	0.4521	0.5021	0.4921	0.4986	12	
Gabon	0.4147	0.4273	0.4734	0.4664	0.4761	0.452	0.4844	0.473	0.4868	0.4927	0.4924	0.493	13	
Côte d'Ivoire	0.4701	0.4613	0.4526	0.5406	0.4929	0.5092	0.4754	0.4854	0.4659	0.4682	0.4917	0.4819	14	
Lesotho	0.4622	0.4829	0.4784	0.464	0.4462	0.4761	0.5061	0.4871	0.4945	0.4927	0.4691	0.4671	15	
Djibouti	0.2285	0.2773	0.2951	0.3036	0.323	0.3326	0.4365	0.4637	0.463	0.4591	0.4617	0.4543	16	
Ghana	0.3716	0.3989	0.3931	0.5018	0.4582	0.4333	0.4329	0.4394	0.4103	0.4415	0.4522	0.4413	17	
Benin	0.3276	0.3434	0.3518	0.4048	0.4206	0.3903	0.3605	0.3648	0.3816	0.3656	0.3828	0.4409	18	
Algeria	0.3529	0.3641	0.3726	0.3704	0.4178	0.4231	0.419	0.4058	0.4659	0.4621	0.4592	0.44	19	
Zimbabwe	0.4091	0.393	0.4337	0.4408	0.4491	0.432	0.4186	0.4256	0.4334	0.4356	0.4188	0.4366	20	
Botswana	0.4687	0.4463	0.4483	0.4286	0.4525	0.4593	0.4373	0.4233	0.433	0.4246	0.4142	0.4303	21	
Zambia	0.4181	0.4138	0.446	0.4552	0.4403	0.4204	0.4227	0.4237	0.431	0.4133	0.4099	0.4249	22	Middle
Tanzania	0.3866	0.3828	0.4145	0.4088	0.4028	0.4134	0.3999	0.392	0.4434	0.409	0.4127	0.4198	23	
Uganda	0.3983	0.4219	0.4533	0.461	0.4554	0.4461	0.4472	0.4226	0.4181	0.4146	0.4341	0.4156	24	
Congo	0.4577	0.4846	0.435	0.506	0.523	0.5719	0.5985	0.5541	0.4566	0.3737	0.4142	0.4059	25	
Madagascar	0.3901	0.393	0.3943	0.4066	0.4018	0.3925	0.4103	0.4003	0.4047	0.4097	0.4041	0.4002	26	
Seychelles	0.3931	0.4349	0.3837	0.3751	0.3846	0.3756	0.387	0.4142	0.4583	0.4338	0.4855	0.3986	27	
Ethiopia	0.3058	0.3189	0.3248	0.3477	0.347	0.3618	0.37	0.3708	0.3661	0.3734	0.39	0.3964	28	
Togo	0.3654	0.372	0.3645	0.3971	0.3748	0.3512	0.4178	0.3933	0.369	0.3867	0.4182	0.396	29	
Cameroon	0.4032	0.4499	0.4358	0.4426	0.4242	0.421	0.4155	0.4063	0.4095	0.4053	0.4106	0.3924	30	
Guinea	0.2876	0.2773	0.3009	0.3198	0.3443	0.3615	0.2849	0.357	0.3447	0.3414	0.3825	0.3655	31	

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Rang 2021	Quintile 2021
Angola	0.3462	0.3686	0.3678	0.3951	0.3938	0.4203	0.4277	0.388	0.45	0.3176	0.3571	0.3609	32	
Burkina Faso	0.304	0.3154	0.3304	0.3188	0.3394	0.3068	0.3128	0.2914	0.2946	0.3076	0.3258	0.3319	33	
Rwanda	0.2793	0.2842	0.2949	0.2992	0.3024	0.2965	0.2805	0.2816	0.2901	0.3066	0.3137	0.3231	34	
Mozambique	0.2738	0.3193	0.3264	0.3452	0.3445	0.3145	0.344	0.3135	0.3252	0.308	0.3117	0.3185	35	
Niger	0.3461	0.3509	0.3679	0.3868	0.3842	0.3786	0.3517	0.3442	0.3023	0.2877	0.3164	0.3167	36	**Lower-middle**
Central African Republic	0.2537	0.2553	0.287	0.2475	0.2454	0.3136	0.3059	0.3417	0.3086	0.3259	0.3163	0.3134	37	
Liberia	0.2907	0.2938	0.3047	0.3402	0.3543	0.3445	0.3076	0.3203	0.3094	0.3186	0.2942	0.3072	38	
São Tomé & Príncipe	0.2724	0.2717	0.2717	0.2547	0.2691	0.234	0.255	0.2301	0.2712	0.2911	0.2733	0.3062	39	
Libya	0.4732	0.3565	0.4366	0.447	0.384	0.3535	0.328	0.3414	0.3457	0.348	0.3402	0.3026	40	
Cabo Verde	0.3142	0.3214	0.325	0.355	0.3038	0.3783	0.3592	0.3078	0.315	0.3026	0.304	0.2988	41	
Mali	0.3534	0.3455	0.3267	0.336	0.3449	0.3394	0.3211	0.3511	0.3132	0.3002	0.331	0.2988	42	**Bottom**
Malawi	0.3171	0.3251	0.28	0.2989	0.344	0.3313	0.3151	0.3075	0.2956	0.3027	0.3029	0.2977	43	
Comoros	0.2807	0.265	0.2557	0.2614	0.2709	0.2462	0.2503	0.2757	0.2817	0.3013	0.2783	0.2908	44	
Eritrea	0.2309	0.292	0.3113	0.3113	0.3115	0.303	0.2864	0.3049	0.3076	0.3182	0.3118	0.2834	45	
Sudan	0.2827	0.2843	0.3531	0.3134	0.3101	0.3168	0.34	0.2829	0.2921	0.304	0.2859	0.2785	46	
Mauritania	0.2106	0.2473	0.2493	0.2513	0.3007	0.27	0.2548	0.2625	0.2799	0.2484	0.2837	0.269	47	
Chad	0.265	0.2597	0.2724	0.2448	0.2514	0.2823	0.2809	0.2482	0.2483	0.2694	0.2504	0.2608	48	
Sierra Leone	0.26	0.2619	0.2973	0.309	0.2219	0.2323	0.2433	0.2363	0.2509	0.2398	0.2377	0.2349	49	
Burundi	0.2109	0.2276	0.2313	0.2142	0.2382	0.2336	0.237	0.2351	0.2441	0.2264	0.2322	0.2144	50	
Guinea-Bissau	0.1898	0.2038	0.1934	0.1975	0.1988	0.2094	0.2127	0.2142	0.2138	0.2062	0.2065	0.2083	51	
Gambia	0.2445	0.2505	0.2711	0.2747	0.2806	0.2738	0.2138	0.2128	0.2312	0.2214	0.2157	0.1993	52	

Source: AfDB. Statistics Department.

Table 12. Direct determinant Index

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Rank 2021	Quintile 2021
Morocco	0.796137668	0.8832	0.8735	0.8847	0.8817	0.8463	0.8590	0.8827	0.8857	0.8770	0.8886	0.8572	1	Top
South Africa	0.891036911	0.9185	0.9073	0.9089	0.9045	0.8776	0.8783	0.8985	0.8897	0.8808	0.8662	0.8438	2	
Tunisia	0.832195951	0.8611	0.8578	0.8700	0.8684	0.8361	0.8348	0.8506	0.8418	0.8345	0.8318	0.8114	3	
Egypt	0.79384185	0.8191	0.8123	0.8160	0.8145	0.7951	0.8195	0.8262	0.8356	0.8320	0.8329	0.8013	4	
Algeria	0.778253691	0.7701	0.7637	0.7809	0.7920	0.7766	0.7830	0.7924	0.7953	0.7910	0.8038	0.7692	5	
Mozambique	0.62768921	0.6504	0.7070	0.7429	0.7601	0.7418	0.7612	0.7524	0.7734	0.7713	0.7869	0.7564	6	
Libya	0.740880609	0.7274	0.7159	0.7427	0.7796	0.7436	0.7157	0.6937	0.7141	0.7245	0.7534	0.7514	7	
Mauritius	0.74271044	0.7707	0.7696	0.7819	0.7731	0.7477	0.7521	0.7674	0.7614	0.7536	0.7683	0.7404	8	
Ghana	0.678953646	0.7378	0.7528	0.7441	0.7664	0.7623	0.7641	0.7624	0.7670	0.7570	0.7635	0.7392	9	
Cabo Verde	0.7291	0.7616	0.7439	0.7501	0.7672	0.7313	0.7501	0.7757	0.7236	0.7135	0.7482	0.7217	10	
Senegal	0.630020686	0.6766	0.6815	0.6879	0.6973	0.6732	0.6818	0.7075	0.7188	0.7178	0.7372	0.7195	11	Upper-middle
Nigeria	0.720969419	0.7482	0.7458	0.7654	0.7848	0.7592	0.7506	0.7516	0.7438	0.7389	0.7500	0.7193	12	
Congo	0.679426969	0.6894	0.6862	0.7427	0.7638	0.7801	0.7924	0.7780	0.7622	0.7529	0.7374	0.7155	13	
Mauritania	0.627398766	0.6918	0.7080	0.7190	0.7154	0.6907	0.6883	0.7129	0.7263	0.7224	0.7300	0.7069	14	
Zambia	0.590496603	0.6963	0.6999	0.7150	0.7341	0.7288	0.7302	0.7437	0.7296	0.7194	0.7251	0.6964	15	
Namibia	0.66622609	0.6861	0.6870	0.7030	0.7031	0.7095	0.7171	0.7219	0.7157	0.7153	0.7221	0.6944	16	
Ethiopia	0.672222923	0.6496	0.6510	0.6843	0.6926	0.6780	0.6981	0.7119	0.7127	0.7057	0.7043	0.6837	17	
Botswana	0.639533411	0.6709	0.6798	0.6783	0.6773	0.6673	0.6726	0.6904	0.7030	0.7031	0.7148	0.6829	18	
Côte d'Ivoire	0.615747228	0.6172	0.6535	0.6829	0.6885	0.6725	0.6795	0.7008	0.6982	0.6850	0.7032	0.6806	19	
Kenya	0.661205948	0.6991	0.6813	0.6959	0.7080	0.6727	0.6810	0.6947	0.6992	0.6921	0.7041	0.6804	20	
Gabon	0.611854668	0.6416	0.6498	0.6724	0.6954	0.6743	0.6809	0.6773	0.6893	0.6948	0.6998	0.6769	21	
Cameroon	0.608960948	0.6716	0.6716	0.6853	0.6943	0.6719	0.6802	0.6974	0.7027	0.6985	0.6955	0.6755	22	Middle
Sudan	0.651800671	0.6930	0.6925	0.6874	0.6747	0.6634	0.6707	0.6788	0.6937	0.6803	0.6892	0.6748	23	
Uganda	0.607631899	0.6782	0.6768	0.6738	0.6895	0.6705	0.6765	0.6873	0.6942	0.6900	0.6961	0.6740	24	
Togo	0.618792309	0.6729	0.6768	0.7163	0.7146	0.6975	0.6755	0.6864	0.6781	0.6807	0.6919	0.6699	25	
Benin	0.593272189	0.6299	0.6346	0.6598	0.6667	0.6507	0.6568	0.6742	0.6837	0.6817	0.6884	0.6686	26	
Congo. Dem. Rep.	0.589386734	0.6493	0.6365	0.6650	0.6761	0.6530	0.6636	0.6659	0.6732	0.6684	0.6880	0.6667	27	
Seychelles	0.672544771	0.7029	0.7001	0.7005	0.7085	0.6842	0.6890	0.6900	0.6846	0.6865	0.6961	0.6630	28	
Tanzania	0.63	0.6768	0.6772	0.6788	0.6842	0.6576	0.6565	0.6645	0.6668	0.6702	0.6817	0.6596	29	
Madagascar	0.597887635	0.6378	0.6426	0.6532	0.6591	0.6377	0.6410	0.6546	0.6692	0.6665	0.6737	0.6463	30	
Mali	0.58924972	0.6202	0.6237	0.6298	0.6346	0.6169	0.6239	0.6438	0.6426	0.6501	0.6562	0.6415	31	

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Rank 2021	Quintile 2021
Lesotho	0.64	0.6304	0.6254	0.6480	0.6541	0.6272	0.6276	0.6296	0.6418	0.6559	0.6662	0.6394	32	
Liberia	0.611524583	0.6595	0.6652	0.6560	0.6586	0.6290	0.6362	0.6524	0.6559	0.6191	0.6450	0.6335	33	
Niger	0.569780347	0.6238	0.6226	0.6350	0.6387	0.6261	0.6258	0.6433	0.6408	0.6412	0.6548	0.6283	34	
Angola	0.71786737	0.7051	0.6954	0.6943	0.6849	0.6908	0.6838	0.6739	0.6595	0.6472	0.6513	0.6266	35	
Chad	0.571835822	0.5912	0.6047	0.6127	0.6289	0.6092	0.6208	0.6412	0.6437	0.6390	0.6525	0.6221	36	Lower-middle
Equatorial Guinea	0.672885915	0.6485	0.6447	0.6438	0.6426	0.6151	0.6197	0.6132	0.6492	0.6313	0.6415	0.6201	37	
Eswatini	0.633941675	0.6381	0.6265	0.6239	0.6144	0.5856	0.5982	0.6129	0.6226	0.6235	0.6359	0.6149	38	
Rwanda	0.540897572	0.5502	0.5630	0.5733	0.5809	0.5799	0.5972	0.6125	0.6200	0.6203	0.6334	0.6149	39	
Burkina Faso	0.545502637	0.5760	0.5906	0.6057	0.6114	0.5878	0.6066	0.6193	0.6251	0.6234	0.6278	0.6035	40	
Eritrea	0.598136736	0.5845	0.5740	0.5891	0.5755	0.5742	0.5688	0.5953	0.5685	0.5840	0.5946	0.5733	41	
Guinea-Bissau	0.47472301	0.5043	0.4984	0.5351	0.5464	0.5011	0.4999	0.5419	0.5515	0.5601	0.5765	0.5544	42	
Guinea	0.486931796	0.5394	0.5480	0.5523	0.5739	0.5663	0.5803	0.5800	0.5826	0.5668	0.5712	0.5528	43	
São Tomé & Príncipe	0.6350255	0.6116	0.5900	0.5962	0.5858	0.5694	0.5598	0.5965	0.5621	0.5573	0.5626	0.5514	44	
Malawi	0.565496245	0.6134	0.5946	0.5790	0.5889	0.5648	0.5797	0.5718	0.5739	0.5576	0.5723	0.5496	45	
Zimbabwe	0.585285519	0.6401	0.6177	0.6196	0.6283	0.6142	0.6068	0.5979	0.5751	0.5536	0.5599	0.5462	46	
Sierra Leone	0.495974991	0.5681	0.5489	0.5121	0.5223	0.5039	0.5227	0.5439	0.5458	0.5456	0.5508	0.5342	47	Bottom
Comoros	0.488450782	0.5287	0.5287	0.5318	0.5370	0.5225	0.5283	0.5421	0.5436	0.5385	0.5446	0.5298	48	
Burundi	0.445044636	0.4515	0.4544	0.5103	0.5241	0.5145	0.5190	0.5199	0.5184	0.5108	0.5243	0.5078	49	
Central African Rep.	0.529503844	0.5335	0.5293	0.5285	0.5502	0.5174	0.5331	0.5342	0.5361	0.5300	0.5235	0.5045	50	
Djibouti	0.488618131	0.4832	0.4905	0.4974	0.4511	0.3945	0.4652	0.4774	0.4630	0.5055	0.5128	0.4925	51	
Gambia	0.484684081	0.4977	0.5018	0.5030	0.4953	0.4702	0.4645	0.4703	0.4822	0.4796	0.4901	0.4809	52	

Source: AfDB. Statistics Department.

Table 13. **Indirect determinant Index**

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Rank 2021	Quintile 2021
South Africa	0.90676335	0.8753	0.87	0.8694	0.8679	0.9018	0.8742	0.8704	0.8895	0.8886	0.8854	0.8836	1	
Morocco	0.80882657	0.8131	0.8152	0.8204	0.8317	0.844	0.86	0.8717	0.8736	0.8684	0.8683	0.8626	2	
Egypt	0.8490824	0.7547	0.7624	0.7943	0.7694	0.7846	0.7932	0.7711	0.7712	0.7731	0.8207	0.8438	3	
Tunisia	0.73336208	0.7412	0.7163	0.7193	0.7618	0.7619	0.7821	0.7588	0.7237	0.7572	0.7643	0.7588	4	
Mauritius	0.74976168	0.694	0.7196	0.6977	0.7481	0.7841	0.7972	0.7658	0.764	0.7865	0.7806	0.7456	5	
Algeria	0.76585266	0.7741	0.7175	0.788	0.8194	0.8027	0.7777	0.7815	0.8106	0.8353	0.8303	0.7282	6	**Top**
Kenya	0.63677679	0.5933	0.6375	0.6726	0.6789	0.6912	0.7046	0.6757	0.7439	0.7208	0.7292	0.7213	7	
Senegal	0.62797589	0.6097	0.6339	0.6437	0.6141	0.6707	0.6875	0.6886	0.6891	0.6893	0.6983	0.6998	8	
Botswana	0.65168231	0.6337	0.6393	0.6745	0.7094	0.7093	0.7462	0.7213	0.7261	0.7543	0.7519	0.6954	9	
Nigeria	0.67102281	0.6766	0.6784	0.6564	0.6678	0.6733	0.6961	0.704	0.7089	0.6959	0.6972	0.6932	10	
Côte d'Ivoire	0.59309579	0.5741	0.6205	0.6399	0.6644	0.6667	0.6808	0.689	0.6971	0.7117	0.7201	0.6911	11	
Ghana	0.60496552	0.6248	0.6276	0.6462	0.6498	0.661	0.6828	0.6873	0.6783	0.6773	0.6807	0.6768	12	
Gabon	0.64613996	0.6623	0.6633	0.6638	0.6477	0.6261	0.6779	0.6725	0.6481	0.6671	0.6641	0.6675	13	
Namibia	0.65665731	0.6379	0.6379	0.6336	0.6378	0.6733	0.6545	0.6608	0.6868	0.6772	0.6994	0.6669	14	
Cabo Verde	0.63598693	0.6183	0.6338	0.6088	0.6102	0.6596	0.6208	0.6735	0.6708	0.6671	0.666	0.6646	15	
Uganda	0.58	0.5533	0.5589	0.6057	0.611	0.5924	0.6087	0.6185	0.6616	0.664	0.6673	0.6561	16	**Upper-middle**
Tanzania	0.53768604	0.5419	0.5492	0.5513	0.5804	0.5862	0.6011	0.6197	0.6398	0.6467	0.6534	0.6545	17	
Rwanda	0.5843058	0.5534	0.5612	0.586	0.6107	0.6301	0.5948	0.6182	0.6459	0.6565	0.5847	0.6531	18	
Cameroon	0.62014144	0.6204	0.6232	0.6233	0.6325	0.6389	0.6443	0.652	0.6516	0.6484	0.6516	0.6518	19	
Benin	0.54270349	0.5765	0.5424	0.5884	0.5526	0.6018	0.5704	0.6313	0.6354	0.5898	0.6166	0.6385	20	
Burkina Faso	0.53458042	0.5829	0.5661	0.5965	0.5563	0.6064	0.6322	0.6357	0.637	0.5874	0.6377	0.6169	21	
Djibouti	0.54173322	0.5226	0.543	0.5684	0.5733	0.5404	0.581	0.6104	0.6112	0.5917	0.6162	0.6136	22	
Libya	0.71527003	0.6057	0.6711	0.6899	0.6566	0.5731	0.597	0.6237	0.649	0.7051	0.6959	0.6109	23	
Eswatini	0.57962041	0.5648	0.5413	0.5696	0.5733	0.6008	0.5532	0.5874	0.6075	0.6279	0.6033	0.6012	24	
Ethiopia	0.48535464	0.493	0.5122	0.5224	0.5387	0.5625	0.5745	0.5744	0.5749	0.584	0.5891	0.5884	25	
Mali	0.54834106	0.5412	0.5201	0.522	0.5811	0.5951	0.5628	0.6086	0.6187	0.5675	0.6149	0.5881	26	
Togo	0.51803395	0.5019	0.5294	0.5341	0.5426	0.5499	0.5759	0.5632	0.6042	0.6121	0.6188	0.5865	27	**Middle**
Zambia	0.57	0.5717	0.6016	0.6073	0.585	0.5794	0.5877	0.6325	0.5971	0.5872	0.5818	0.586	28	
Angola	0.57150293	0.5787	0.5868	0.5896	0.5847	0.5771	0.5841	0.5936	0.5883	0.5879	0.5796	0.5833	29	
Zimbabwe	0.56532102	0.5676	0.5886	0.6229	0.5796	0.589	0.6029	0.652	0.5849	0.5831	0.5885	0.5825	30	
Equatorial Guinea	0.5558132	0.5769	0.5772	0.5794	0.5746	0.5867	0.5814	0.5755	0.5762	0.5714	0.5488	0.5707	31	

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Rank 2021	Quintile 2021
Mauritania	0.49202592	0.4999	0.5169	0.5168	0.5231	0.5529	0.5665	0.5715	0.5497	0.5731	0.5804	0.5583	32	
Niger	0.4578729	0.5067	0.5101	0.513	0.4846	0.5302	0.5413	0.58	0.5759	0.5318	0.5618	0.5567	33	
Mozambique	0.49510263	0.5095	0.5811	0.5535	0.5959	0.5984	0.5148	0.5177	0.5607	0.5827	0.5667	0.5479	34	
Malawi	0.528176	0.5292	0.5164	0.511	0.5099	0.522	0.5236	0.5417	0.545	0.5427	0.5463	0.5452	35	
Congo	0.55429518	0.554	0.5208	0.5393	0.5601	0.5317	0.5268	0.5472	0.5513	0.5448	0.5414	0.5443	36	**Lower-middle**
Lesotho	0.53989089	0.5195	0.5219	0.5525	0.5421	0.5647	0.5233	0.5523	0.5714	0.5503	0.5712	0.5431	37	
Seychelles	0.53958749	0.5835	0.5158	0.5482	0.607	0.6127	0.5679	0.5902	0.61	0.6045	0.6025	0.5368	38	
Guinea	0.45660343	0.4536	0.4705	0.4734	0.4831	0.4928	0.5027	0.5106	0.5227	0.5347	0.5397	0.5349	39	
Madagascar	0.4656809	0.4778	0.506	0.5012	0.5149	0.4991	0.5319	0.5049	0.5089	0.5308	0.554	0.5308	40	
Sudan	0.54861653	0.5502	0.5325	0.5248	0.5474	0.5489	0.5502	0.5472	0.4667	0.5278	0.5323	0.5282	41	
Comoros	0.50836598	0.5286	0.4882	0.5313	0.5297	0.5256	0.5522	0.5312	0.5311	0.5038	0.5202	0.5147	42	
Gambia	0.51710488	0.5298	0.5301	0.501	0.5011	0.5075	0.4896	0.5149	0.5406	0.5117	0.5409	0.5132	43	
São Tomé & Príncipe	0.46230534	0.4607	0.4598	0.4643	0.5007	0.5027	0.5134	0.5155	0.493	0.4908	0.4969	0.4974	44	
Sierra Leone	0.46247959	0.4853	0.4907	0.496	0.5143	0.4963	0.4874	0.492	0.4909	0.4915	0.4944	0.493	45	
Congo. Dem. Rep.	0.43255053	0.4491	0.515	0.5206	0.5291	0.5447	0.5304	0.4874	0.4854	0.5222	0.4823	0.4817	46	
Chad	0.44473241	0.4966	0.4484	0.5	0.5098	0.4951	0.4811	0.4789	0.4948	0.4827	0.5015	0.4803	47	**Bottom**
Guinea-Bissau	0.46486757	0.4371	0.4695	0.4621	0.4331	0.4734	0.4766	0.4479	0.478	0.4783	0.4818	0.464	48	
Central African Rep.	0.48304829	0.4849	0.4524	0.428	0.4105	0.4687	0.4586	0.461	0.4807	0.4808	0.4851	0.4616	49	
Liberia	0.44217206	0.4476	0.4754	0.4561	0.4621	0.467	0.4735	0.4651	0.4639	0.4573	0.4582	0.4567	50	
Burundi	0.40618596	0.383	0.3966	0.4108	0.4647	0.4581	0.4719	0.4348	0.4493	0.4543	0.4324	0.4309	51	
Eritrea	0.37234346	0.4048	0.4238	0.3987	0.3959	0.3967	0.4153	0.4126	0.4139	0.4103	0.4285	0.4277	52	

Source: AfDB. Statistics Department.

Table 14. Sub-regional Index. 2010–2021

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
All												
Central Africa	0.4783	0.4949	0.4928	0.5009	0.5039	0.5077	0.5141	0.5136	0.5159	0.5072	0.5027	0.502
East Africa	0.4361	0.4523	0.4578	0.4645	0.4705	0.4622	0.4739	0.4776	0.4824	0.4838	0.4895	0.476
North Africa	0.6457	0.6464	0.6566	0.6689	0.6751	0.6587	0.6577	0.6586	0.6684	0.6695	0.678	0.6594
Southern Africa	0.5577	0.5692	0.5742	0.5797	0.5823	0.5764	0.5766	0.5761	0.5835	0.5736	0.5726	0.5649
West Africa	0.4548	0.4714	0.4771	0.4945	0.4933	0.4883	0.4807	0.4896	0.4882	0.4851	0.4976	0.4887
Africa average	**0.5026**	**0.516**	**0.5208**	**0.5311**	**0.5338**	**0.5279**	**0.5289**	**0.5321**	**0.536**	**0.5316**	**0.5364**	**0.527**
Performance												
Central Africa	0.3734	0.3907	0.3903	0.393	0.3895	0.4081	0.4151	0.4107	0.4143	0.3996	0.3899	0.4032
East Africa	0.3102	0.331	0.3424	0.3404	0.3463	0.3421	0.3543	0.3541	0.3613	0.3628	0.3689	0.3567
North Africa	0.5413	0.5319	0.5542	0.5625	0.5688	0.5565	0.55	0.5451	0.5604	0.557	0.5648	0.5545
South Africa	0.4777	0.4827	0.489	0.493	0.4938	0.489	0.4889	0.481	0.4944	0.4758	0.4679	0.4744
West Africa	0.3369	0.342	0.348	0.3756	0.3676	0.3644	0.3454	0.3481	0.3432	0.3451	0.3567	0.3558
Africa average	**0.3962**	**0.4045**	**0.4125**	**0.4224**	**0.4216**	**0.4202**	**0.4173**	**0.4148**	**0.4205**	**0.414**	**0.416**	**0.4158**
Direct determinant												
Central Africa	0.6124	0.6296	0.6266	0.6433	0.6546	0.6363	0.6438	0.6505	0.6523	0.6465	0.6501	0.6291
East Africa	0.5827	0.6021	0.6012	0.6144	0.6142	0.5954	0.6094	0.621	0.6198	0.6214	0.63	0.6094
North Africa	0.7615	0.7921	0.7885	0.8022	0.8086	0.7814	0.7834	0.7931	0.7998	0.7969	0.8067	0.7829
South Africa	0.656	0.6873	0.6869	0.6944	0.6974	0.6808	0.685	0.6907	0.6909	0.686	0.6942	0.669
West Africa	0.5897	0.6289	0.6325	0.6424	0.6511	0.6299	0.6345	0.6502	0.6493	0.644	0.657	0.6365
Africa average	**0.6282**	**0.6573**	**0.6572**	**0.6686**	**0.6743**	**0.6545**	**0.6609**	**0.6712**	**0.6719**	**0.6682**	**0.6773**	**0.6552**
Indirect determinant												
Central Africa	0.5249	0.5381	0.5325	0.5398	0.5456	0.5493	0.5517	0.5488	0.5476	0.551	0.5465	0.5444
East Africa	0.5206	0.5166	0.517	0.5369	0.5557	0.5559	0.5621	0.5613	0.5709	0.5718	0.5702	0.5671
North Africa	0.7274	0.6981	0.6999	0.7215	0.727	0.7199	0.7294	0.7297	0.7296	0.752	0.76	0.7271
South Africa	0.6011	0.5924	0.6046	0.6103	0.6176	0.6296	0.6227	0.6323	0.6361	0.642	0.6432	0.6282
West Africa	0.5385	0.5444	0.5532	0.5558	0.5545	0.5768	0.5787	0.5928	0.6008	0.5869	0.6018	0.5916

Source: AfDB. Statistics Department.

Table 15. Rank variation of the top performers on the AII's sub-indices, 2019–2021

Country	Performance					Direct determinant					Indirect determinant				
	2010	2019	2020	2021	2010–2021 variation	2010	2019	2020	2021	2010–2021 variation	2010	2019	2020	2021	2010–2021 variation
Djibouti	49	17	16	16	33	47	51	51	51	-4	29	24	23	22	7
Benin	32	30	30	18	14	35	25	27	26	9	29	25	22	20	9
Mozambique	42	37	40	35	7	25	6	6	6	19	38	31	34	34	4
Senegal	10	14	9	10	=	23	14	13	11	12	14	12	11	8	6
Ethiopia	35	29	29	28	7	15	17	18	17	-2	40	29	27	25	15
Guinea	38	32	31	31	7	49	42	44	43	6	47	38	41	39	8
Rwanda	41	39	38	34	7	44	39	39	39	5	18	18	29	18	=

Source: AfDB. Statistics Department.

Table 16. Rank variation of main losers on the AII's sub-indices. 2019–2021

Country	Performance					Direct determinant					Indirect determinant				
	2010	2019	2020	2021	2010–2021 variation	2010	2019	2020	2021	2010–2021 variation	2010	2019	2020	2021	2010–2021 variation
Malawi	33	41	42	43	-10	42	44	43	45	-3	34	37	38	35	-1
Seychelles	22	20	14	27	-5	14	23	23	28	-14	31	23	26	38	-7
Sudan	39	40	44	46	-7	18	27	26	23	-5	26	41	42	41	-15
Cabo Verde	34	42	41	41	-6	6	13	10	10	-4	13	15	16	15	-2
Congo	15	28	24	25	-10	11	9	12	13	-2	25	36	39	36	-11
Mali	28	44	34	42	-14	38	32	32	31	7	27	34	24	26	1
Angola	30	36	32	32	-2	10	33	35	35	-25	21	26	32	29	-8

Source: AfDB. Statistics Department.

Methodology of compilation

The compilation of the AII follows the following steps:

Step 1. Gap fill of missing values. There were a few data gaps in the series. particularly for the more recent years. Missing values were either estimated or imputed. as they can significantly affect the value of the different sub-indices (Saisana and Saltelli. 2010) and the final value of the overall index. The main method used is the nearest year (Chen and Shao 2000. Engels and Diehr 2003. Zhang 2008).

Step 2. Outlier identification and cleaning. To avoid any bias in the country score and the comparison. the raw data were analysed to identify and treat values that lie far away from the rest of the distribution. However. it was decided to consider the wide disparity among African economies. This reality indicates that while some values stand far away from the mass. they cannot be strictly labelled as outliers. For this reason. instead of applying one method to identify outliers. two methods were combined.

- **Method 1.** The Tukey fences formula has been used. However. instead of the interquartile range (Q3–Q1). the difference between the 90th percentile and 10th percentile has been used. which is multiplied by 130% instead of 150%. This choice is motivated by the disparity among African countries. The formula then becomes:

$$Upper\ limit\_1 = Q_{90} + 1.3 * (Q_{90} - Q_{10})$$

$$Lower\ limit\_1 = Q_{10} - 1.3 * (Q_{90} - Q_{10})$$

- **Method 2.** The process uses the trimmed moments. Observations that were in the bottom 2.5% and top 2.5% have been removed. while keeping the 95% central part of the distribution as the trimmed sample. The upper and lower limits are then given by:

$$Upper\ limit\_2 = trimmed\ mean + 3 * trimmed\ standard\ deviations$$

$$Lower\ limit\_2 = trimmed\ mean - 3 * trimmed\ standard\ deviations$$

Combining both methods. any value greater (respectively lower) than the maximum between the Upper limit 1 and 2 (resp. the minimum between Lower limit 1 and 2) is considered an outlier and replaced by the maximum (resp. the minimum).

In the AII computation. four variables were treated for outliers: manufacturing value added per capita. export of manufactured goods per capita. total debt outstanding as a share of GDP. and domestic credit to the private sector as a share of GDP.

Step 3. Multivariate analysis. This step was applied to identify and figure out how indicators are associated. What are the main components that emerge from the dataset?

Step 4. Normalization Procedure. The units of measurement may introduce bias in the calculation of the sub-components. The observations of each indicator are normalized to take values between 0 and 1 over the indicated period. In the literature. several methods can be used for the normalization of indicators. After analysis of the data. it was decided to use the distance to a reference country for indicator normalization. as it is used in many composite index studies and has the advantage of being simple. user-friendly and matches with the use of the geometric average method selected for the aggregation at the dimension level.

The distance to a reference country method takes the ratios of the variable x_c^t for a generic country c and time t with respect to the value $x_{c=\bar{c}}^t$ for the reference country at the time t. For each indicator. the reference country has been set as the best country. It means that for the indicator having a positive trend with industrialization. the best country is the maximum:

$$x^t_{c=\bar{c}} = \frac{x^t_c}{x^t_{c=\bar{c}}} \text{ ; where } x^t_{c=\bar{c}} = \max(x^t).$$

In regards to indicators that trend oppositely with industrialization such as the total debt. the formula below was used. since the best country is the minimum.

$$x^t_{c=\bar{c}} = 1 - \frac{x^t_c}{x^t_{c=\bar{c}}} \text{ ; where } x^t_{c=\bar{c}} = \max(x^t).$$

In this case. the worst (most indebted) country. which should receive 0 after applying the normalisation formula. will receive instead the lower value among countries that is different to 0. This means the score of the second worst country in the year. This treatment avoids the concerning country to have 0 in the dimension score as the geometric mean will be used for the aggregation.

The inflation indicator has also followed a different method of normalization as the best values of inflation are those within [0; 3[. while some countries record inflation below 0 or higher than 3.

$$x^t_{c=\bar{c}} = \begin{cases} 0.25 & \text{if } x^t_c < 0 \\ 1 & \text{if } 0 \le x^t_c < 3 \\ 0.5 & \text{if } 3 \le x^t_c < 5 \\ 0.25 & \text{if } 5 \le x^t_c < 7 \\ 0.1 & \text{if } 7 \le x^t_c \end{cases}$$

Step 5: Calculate a Composite Index for each Dimension. The composite index is calculated as a weighted geometric mean of indicators for each dimension. Based on the correlation test. an equal weight of 1/19 were set among indicators. Then. for each dimension. we have for the country c and year t:

$$D^t_c = \left(\prod_{i=1}^{n} X^t_{ci} \right)^{1/19}$$

where X^t_{ci} is the normalized value of the indicator i. and n is the number of indicators per dimension: 6 in the first dimension. 5 in the second and 8 in the third.

Step 6: Generate the AII. The AII score is generated using the sub-index scores of the three dimensions calculated in the previous step through a weighted arithmetic mean. The ponderation 3. 2 and 1 is used respectively for the performance dimension. the direct determinant dimension and the indirect determinant dimension. For a country c and year t. the AII score is given by:

$$AII^t_c = \frac{1}{6} \left(3 * Score_{Performance} + 2 * Score_{Direct\ determinants} + Score_{Indirect\ determinants} \right)$$

Following the AII calculation. indices by sub-region (North. Southern. West. East and Central Africa) are calculated as a simple arithmetic average of the country scores.

Calculating the AII: an example

To illustrate. consider the employment in manufacturing (as a percentage of total employment) of Côte d'Ivoire. which was 5.67% in 2019. The reference country records in this year 18.52%. Côte d'Ivoire's normalized employment in manufacturing score is then given as:

$$\frac{5.67}{18.43} = 0.3077$$

The same process is applied to all indicators with a positive impact on the AII. The normalized inflation score is equal to 1. as the inflation ranges between 0 and 3. and finally. its normalized total debt as a share of GDP score is given by:

$$1 - \frac{35.12}{172.83} = 0.7968$$

For total debt as a share of GDP. the impact direction is negative and this reversed transformation formula ensures that the scores remain between 0 and 1. and still match for the worst and the best performance respectively.

To compute dimension indices. the equally weighted geometric mean of the normalized scores is applied. In the case of Côte d'Ivoire in 2019. the scores of its direct determinant indicators are: private sector. gross capital formation 0.3338. FDI Inward stock as a share of Africa 0.0714. domestic credit to the private sector (% of GDP) 0.1621. employment in manufacturing 0.3077. and school life expectancy (primary to tertiary. both sexes) 0.6442. Then. the direct determinants index is given by:

$$(0.3338 * 0.0714 * 0.1621 * 0.3077 * 0.6442)^{1/19} = 0.6855$$

The other dimension indices follow the same process. which generates 0.4724 for performance dimension and 0.7437 for indirect determinants.

Cote d'Ivoire's industrialization index score in 2019 is calculated as:

$$\frac{1}{6}\ 3 * 0.4724 + 2 * 0.6855 + 0.7437 = 0.5887$$

Description of indicators and data sources

Table 17. **Indicators and data sources**

Dimension	Indicator	Description	Source
Performance variables	1. Manufacturing value added per capita*	Sum of the value added of all manufacturing activities divided by the total population	AfDB. ECST
	2. Export of manufactured goods per capita**	Total value of manufactured goods exported divided by the total population	UNCTAD
	3. Manufacturing value added (% of GDP)	Sum of the value added of all manufacturing activities over the GDP	AfDB. ECST
	4. Export of manufactured goods as a share of total good exports	Total value of manufactured goods exported over the total exports of goods	UNCTAD

Dimension	Indicator	Description	Source
	5. Manufacturing value added as a share of Africa	Sum of the value added of all manufacturing activities over the total aggregated for Africa	AfDB. ECST
	6. Export of manufactured goods as a share of Africa	Total value of manufactured goods exported over the total aggregated for Africa	UNCTAD
Direct Determinant	7. Private gross capital formation (% of GDP)	The outlays on additions to the fixed assets plus net changes in the level of inventories by the private sector	AfDB. ECST
	8. FDI inward stock as a share of Africa	The inward FDI stock is the value of foreign investors' equity in and net loans to enterprises residing in the reporting economy	UNCTAD
	9. Domestic credit to private sector (% of GDP)	All financial resources such as loans. purchases of non-equity securities. and trade credits provided to the private sector	WEF/WB
	10. Employment share in manufacturing	Total employment in manufacturing sector over the total employment in all sectors	ILO
	11. School life expectancy (primary to tertiary. both sexes). in year	Number of years a person can expect to spend from primary to tertiary level	UNESCO
Indirect Determinant	12. Market size-GDP	Measured by the Gross Domestic Product	AfDB. ECST
	13. Ease of doing business. global score	Assesses business regulations	World Bank
	14. Corruption Perceptions Index	Captures the degree of corruption; frequency of corrupt acts. the amount of bribes paid. or the gain	Transparency International
	15. Safety & Rule of Law	Measures law enforcement. security. transparency and accountability	Mo-Ibrahim
	16. Total debt outstanding as share of GDP	Total external debt stock in percentage of GDP	AfDB. ECST
	17. Inflation. consumer prices (annual %)	Annual percentage change in the cost to the average consumer of acquiring a basket of goods and services as measured by the Consumer Price Index (CPI)	AfDB. ECST
	18. Digital & IT Infrastructure	Captures the extent to which IT infrastructure is adequate for business needs; subscriptions to a mobile telephone service; households with a computer; and internet subscriptions. It consists of four sub-indicators	Mo-Ibrahim
	19. Africa Infrastructure Development Index (AIDI)	Evaluates the status and progress of infrastructure development in African countries covering the following areas: roads. water and sanitation. electricity. transport. and IT	AfDB. ECST

* Manufacturing goods refer to goods belonging to the Standard International Trade Classification (SITC) 5 to 8 less 667 and 68 (revision 4). This means manufactured goods are (5) chemicals and related products. not elsewhere specified. (6) manufactured goods classified chiefly by material. (7) machinery and transport equipment and (8) miscellaneous manufactured articles. and do not include (667) pearls. precious & semi-precious stones and (68) non-ferrous metals.
Manufacturing refers to industries belonging to the International Standard Industrial Classification (ISIC) divisions 15–37.
Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.
** Exports of goods represent the value of merchandise provided to the rest of the world.
Source: AfDB. Statistics Department.

Increasing industrial performance

In the first dimension. six indicators were identified to capture the performance of African economies through their capacity to produce and export industrial goods. as well as their share over the aggregated Africa's trade. Increasing performance remains quite vital to the industrial sector development. as it provides economic opportunities not only for people. but for other sectors in the economy as well.

Manufacturing value added (per capita. as a share of GDP or Africa) is a key measure of the performance of the sector. This indicator measures the level of transformation of raw materials of the country. either for the domestic market or for exports. Export of manufactured goods is also an important indicator of the manufacturing sector (per capita. as a share of total export or Africa) that captures the competitiveness of the economy to export manufactured goods.

The indicators (manufacturing value added and export of manufactured goods) are calculated on a per capita basis to adjust for the country size. Indicators calculated as a share of GDP or total exports capture the importance of manufacturing activities in the economy. Finally. indicators calculated as a share of the

aggregate for Africa measure how much each African country is contributing to world trade compared to other countries in the region. For each of the six indicators. an increase indicates relative progress. while a decrease indicates lower performance.

Enhancing the direct key determinants for industrial development

In order to enhance the capacity to produce and export manufactured goods. it is critical to promote direct key factors. Industrialization is successful when supported by sufficient capital. private sector-led investments. and a well-educated labour force.

The private gross capital formation indicator captures the outlays on additions to the fixed assets plus net changes in the level of inventories by the private sector. Domestic credit to private sector measures the level of resources allocated to the private sector. FDI Inward stock as a share of Africa depicts the ability of a country to attract foreign direct investment. Although it would be more appropriate to capture only those involved in the manufacturing sector. this indicator refers to the private sector as a whole due to data constraints.

Other key determinants include employment in the manufacturing sector and school life expectancy. which are used to measure the labour force engaged in the sector and how long people stay in school respectively. based on the assumption that a longer school life leads to a more qualified labour force that can produce higher value added manufactured goods. Any increase of these indicators. as well as the previous ones. indicates relative progress. while a decrease indicates a deterioration.

Readiness for industrial development

The general business environment and macroeconomic stability are critical factors for investment and industrial development. Readiness for industrial development is captured through indicators of macroeconomic policy. law enforcement. security. and infrastructure development.

GDP is used as a proxy for the market size. which has been preferred to total population. The safety and rule of law indicator measures law enforcement. security. transparency and accountability. The corruption perceptions index is used to capture the degree of corruption. which refers to the frequency of corrupt acts. the amount of bribes paid. or the gain (financial or otherwise). The ease of doing business index assesses business regulations.

Other indirect determinants of industrial development include inflation and public debt. Higher public debt is a deterrent to investment and industrial development. Inflation is also relevant since price stability remains a critical indicator to attract investment and develop manufacturing activities.

Finally. the establishment of appropriate infrastructures is important to facilitate industrial development. Digital and IT infrastructure and the Africa Infrastructure Development Index assess the adequacy of countries' infrastructures for business needs. This encompasses roads. water and sanitation. access to electricity. transport. access to modern technology. mobile subscriptions and internet access.

Relative uncertainty associated with the AII

The calculation of the uncertainty follows this formula:

$$\frac{\Delta X}{\overline{X}} = t.\frac{s}{\sqrt{n}} / \overline{X}$$

where X is the composite index AII. t is the Student statistics at $n\text{-}1$ degrees of freedom. s the standard deviation of the AII obtained with the assumptions. and n is the number of assumptions.[1] The absolute uncertainty ΔX measures the maximum error that could be committed in the evaluation of the index. Relative uncertainty $\frac{\Delta X}{X}$ measures the magnitude of the maximum error that could be made in relation to the calculated value of the index at a certain degree of confidence (95% in our calculation).

Table 18. **AII's values from a single change in the assumptions and the uncertainty generated**

Country	AII – Default	Assump. 1	Assump. 2	Assump. 3.1	Assump. 3.2	Assump. 4	Uncertainty
Algeria	0.6410	0.620	0.623	0.340	0.312	0.701	9.249
Angola	0.5271	0.510	0.468	0.194	0.165	0.559	11.603
Benin	0.5284	0.517	0.514	0.286	0.167	0.568	7.444
Botswana	0.5742	0.563	0.559	0.313	0.229	0.632	9.335
Burkina Faso	0.4824	0.471	0.456	0.254	0.128	0.536	11.378
Burundi	0.3700	0.364	0.309	0.177	0.059	0.414	18.691
Cabo Verde	0.5037	0.508	0.488	0.335	0.145	0.562	9.903
Cameroon	0.5544	0.544	0.533	0.286	0.198	0.600	8.455
Central African Republic	0.4457	0.447	0.394	0.246	0.098	0.468	11.403
Chad	0.4139	0.405	0.352	0.163	0.077	0.457	16.784
Comoros	0.4264	0.425	0.397	0.257	0.091	0.465	10.273
Congo	0.5587	0.553	0.531	0.270	0.183	0.586	6.500
Congo. Democratic Rep	0.5105	0.502	0.466	0.232	0.142	0.536	9.179
Côte d'Ivoire	0.5887	0.569	0.566	0.267	0.241	0.634	8.441
Djibouti	0.5255	0.535	0.459	0.301	0.166	0.556	12.846
Egypt	0.7790	0.765	0.764	0.536	0.483	0.786	2.143
Equatorial Guinea	0.6093	0.617	0.554	0.352	0.232	0.616	7.992
Eritrea	0.4545	0.458	0.381	0.223	0.094	0.463	14.194
Eswatini	0.6482	0.666	0.619	0.526	0.267	0.645	4.822
Ethiopia	0.5235	0.513	0.486	0.213	0.160	0.564	9.912
Gabon	0.5865	0.579	0.558	0.291	0.230	0.619	6.840
Gambia	0.3820	0.367	0.355	0.185	0.068	0.437	15.034

1 Issaka Dialga. Thi-Hang-Giang Le (2014). *Développement d'indices composites et politiques publiques : interactions. portée et limites méthodologiques.*

Country	All – Default	Assump. 1	Assump. 2	Assump. 3.1	Assump. 3.2	Assump. 4	Uncertainty
Ghana	0.5879	0.578	0.570	0.298	0.230	0.630	7.148
Guinea	0.4733	0.465	0.440	0.183	0.120	0.505	8.972
Guinea-Bissau	0.3726	0.363	0.278	0.192	0.061	0.426	26.928
Kenya	0.5939	0.576	0.567	0.257	0.239	0.628	7.316
Lesotho	0.5362	0.538	0.516	0.315	0.166	0.552	4.416
Liberia	0.4720	0.468	0.438	0.222	0.113	0.500	8.572
Libya	0.5790	0.573	0.543	0.275	0.213	0.613	7.907
Madagascar	0.5144	0.501	0.486	0.217	0.147	0.537	6.797
Malawi	0.4313	0.424	0.406	0.201	0.093	0.475	10.733
Mali	0.5252	0.510	0.490	0.237	0.170	0.566	9.817
Mauritania	0.4378	0.419	0.390	0.234	0.084	0.494	15.890
Mauritius	0.6942	0.706	0.686	0.524	0.372	0.724	3.690
Morocco	0.8424	0.830	0.834	0.606	0.615	0.851	1.750
Mozambique	0.5111	0.507	0.485	0.260	0.136	0.546	7.819
Namibia	0.5953	0.592	0.573	0.319	0.238	0.628	6.070
Niger	0.4926	0.479	0.429	0.219	0.131	0.523	13.027
Nigeria	0.5824	0.575	0.538	0.354	0.225	0.624	9.647
Rwanda	0.4726	0.459	0.445	0.226	0.129	0.532	12.775
São Tomé and Príncipe	0.4057	0.412	0.365	0.244	0.075	0.447	13.124
Senegal	0.6052	0.592	0.586	0.313	0.253	0.641	6.378
Seychelles	0.5629	0.580	0.546	0.425	0.208	0.606	7.108
Sierra Leone	0.4032	0.389	0.327	0.155	0.076	0.445	19.907
South Africa	0.8702	0.851	0.856	0.683	0.671	0.876	2.138
Sudan	0.4512	0.447	0.398	0.169	0.091	0.484	12.684
Tanzania	0.5611	0.542	0.533	0.247	0.204	0.600	8.540
Togo	0.5093	0.495	0.489	0.294	0.150	0.554	9.079
Tunisia	0.7834	0.792	0.775	0.564	0.470	0.779	1.463
Uganda	0.5406	0.522	0.517	0.248	0.185	0.588	9.502
Zambia	0.5572	0.548	0.539	0.259	0.188	0.586	5.763
Zimbabwe	0.4887	0.477	0.448	0.223	0.126	0.518	9.462

* Uncertainty associated with the joint assumptions 1. 2 and 4. in percentage.
Source: AfDB. Statistics Department.

Country priorities depicted by the 2022 AII

Based on the 2021 outcome. this analysis provides a hierarchical priority on the basis of the three dimensions. The lowest score is ranked 1. meaning that the concerned dimension requires the most attention in the following year. The highest score is ranked 3. meaning that the concerned dimension requires the least attention. in order to better focus on the others.

As depicted in the figure 5 below. all countries (50 over 52) should pay the most attention to the performance dimension.

Figure 5. African countries' hierarchical priorities in the 2022 AII

Country	Performance	Direct Determinant	Indirect Determinant
Algerie	1	2	3
Angola	1	3	2
Bénin	1	3	2
Botswana	1	2	3
Burkina Faso	1	3	2
Burundi	1	3	2
Cabo Verde	1	3	2
Cameroun	1	3	2
Rép. centrafricaine	1	3	2
Tchad	1	3	2
Comores	1	3	2
Congo	1	3	2
Congo, Rép. Dém.	1	3	2
Côte d'Ivoire	1	2	3
Djibouti	1	2	3
Egypte	1	3	2
Guinée équatoriale	1	3	2
Erythrée	1	3	2
Eswatini	3	1	2
Ethiopie	1	3	2
Gabon	1	2	3
Gambie	1	2	3
Ghana	1	3	2
Guinée	1	3	2
Guinée-Bissau	1	2	3
Kenya	1	2	3

Country	Performance	Direct Determinant	Indirect Determinant
Lesotho	1	3	2
Liberia	1	3	2
Libye	1	3	2
Madagascar	1	3	2
Malawi	1	3	2
Mali	1	2	3
Mauritanie	1	3	2
Maurice	1	2	3
Maroc	1	3	2
Mozambique	1	3	2
Namibie	1	3	2
Niger	1	3	2
Nigeria	1	3	2
Rwanda	1	2	3
São Tomé & Príncipe	1	3	2
Sénégal	1	2	3
Seychelles	1	3	2
Sierra Leone	1	3	2
Afrique du Sud	1	3	2
Soudan	1	3	2
Tanzanie	1	3	2
Togo	1	3	2
Tunisie	2	3	1
Ouganda	1	3	2
Zambie	1	3	2
Zimbabwe	1	3	2

Source: AfDB. Statistics Department.

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