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COMPETITIVE INDUSTRIAL PERFORMANCE REPORT 2020

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Executive Summary

Key messages

→ *The COVID-19 pandemic has had an uneven impact across countries and sectors. A significant part of the impact has been channelled through trade. In this regard, there is an overlap between regions and countries that recorded their highest levels of industrial competitiveness in 2018, and those that have experienced better export performance and faster economic recovery during the pandemic crisis.*

→ *The CIP index indicates that there are significant disparities in capabilities to produce and export manufactured goods, in upgrading as well as in the impact of these economies on world manufacturing trade and world manufacturing value added.*

→ *European countries demonstrate particularly high capacities to produce and export manufactured goods, while Eastern Asian countries stand out in terms of their world impact as well as technological deepening and upgrading.*

→ *African economies have a major trade deficit in manufactured goods, which undermines their future economic growth. These economies are predominantly specialized in the production of primary products and resource-based manufactured goods, which are characterized by relatively slow growth in international demand.*

→ *There is a clear need in many African economies to improve data availability and their quality, which would enable better evidence-based policy making.*

The 2020 edition of the CIP report provides a global overview of the competitiveness of countries' industrial performance around the world, by ranking 152 countries using a composite index based on three dimensions: 1) the capacity to produce and export manufactured goods; 2) technological deepening and upgrading; and 3) world impact. The results of this exercise are analysed using three types of tabulations: development group, indicators, and geographic region.

This edition differs from previous CIP reports: first, it connects the recent COVID-19 pandemic with countries' industrial competitiveness during the pre-pandemic period, and secondly, it takes a regional focus. It includes an extensive analysis on the industrial competitiveness of Africa, starting with an assessment of specific macro aggregates and concluding with the data availability and quality of industrial statistics in the region.

The impact of the COVID-19 pandemic on industrial competitiveness has been uneven across countries and sectors. A significant part of the impact has been channelled through international trade, with the pandemic inducing many countries to adopt protectionist trade policies, causing severe disruptions in global value chains and international trade flows.

The pandemic caused a rise in demand for specific manufactured products, including medical supplies and protective garments and equipment. Those countries that were able to produce these essential goods within their borders found themselves in a better position to quickly and adequately respond to the pandemic. In this sense, the location of production capabilities as well as the production and export mix became a major competitive advantage during the height of the pandemic. Countries that belonged to this group which had these competitive advantages had a better export performance during the pandemic and also experienced faster economic recovery.

The CIP index reveals that there are significant disparities in countries' capabilities to produce and export manufactured goods, in upgrading as well as in the impact economies have had on world manufacturing trade and world manufacturing value added. It also indicates that European countries have particularly high capacities to produce and export manufactured goods, while Eastern Asian countries stand out in terms of their world impact and their technological deepening and upgrading. Jointly, these two regions occupy eight of the top-10 positions in the CIP global ranking, with Germany once again ranking as the world's leading economy.

The performance of the Africa region's industrial competitiveness, on the other hand, is quite disappointing. Africa has gradually been industrializing over the last decade, yet plenty of work still needs to be done. The continent's slow industrialization rate has caused large trade deficits in manufactured products, hampering Africa's economic growth and consequently, job creation. African countries are predominantly specialized in the export of primary and resource-based products, which recorded a negative growth in terms of international demand. A declining trend in foreign demand for the main source of African exports suggests that unless action is taken, Africa's export performance may continue to deteriorate, with the corresponding damaging effects on Africa's future economic growth.

While Northern and Southern Africa appear to be the most advanced African regions in terms of industrial competitiveness, the entire African continent seems to be poorly integrated into global markets, as all of its regions are specialized in the production of goods that have relatively slow growth in international demand. Improving Africa's weak integration in international markets, together with its relatively low levels of production in MVA and GDP in relation to its population size, is one the biggest challenges African economies face on their road towards industrialization.

To tackle this challenge, Africa needs to improve its data coverage and obtain more timely and disaggregated data at the sectoral level, which would enable more complete and accurate analyses of the continent's industrial performance, as well as detailed monitoring of recent developments that could guide industrial policy and allow for more opportune corrective measures, where necessary.

CIP report 2020: Chapter 1

1. The CIP Index

1.1 Introduction

The year 2020 will be remembered as the year of the COVID-19 pandemic. Our lives have changed at both the personal as well as the societal level. To date, over 2 million people have lost their love ones, many have gotten sick, many were sent home to work remotely, while essential workers had to continue to go to work despite the risk of contagion and still many others have lost their jobs. Governments faced a double task: contain the spread of the virus while trying to keep the economy afloat. Inevitably, many businesses observed drastic losses in revenue and had to file for bankruptcy.

The pandemic has had a significant impact on our lives and has forced us to re-evaluate the spectrum of what we consider to be possible. Situations that used to be unthinkable have all of a sudden become a reality. Requesting employees to work from home and imposing lockdowns were necessary measures in many cases. The expansion of the spectrum of possibilities has left us questioning many of our former activities and behaviours. In fact, apparently simple changes, such as paying by credit card instead of cash or choosing online shopping rather than visiting a shopping centre, have had major consequences at the macroeconomic level. In short, the pandemic has not only changed how we perceive our realities, it has also changed our behaviour, and the combination of these changes has affected businesses around the globe.

In this context, it is valid to ask: how will we analyse industrial competitiveness after the pandemic? Has anything truly changed and if yes, then what? To answer these and other questions, we must first understand industrial competitiveness and why it is important.

Industrial competitiveness is a familiar concept and yet, its definition is often vague. The concept of competitiveness—disregarding *industrial* competitiveness for a moment—has always been difficult to define because it is a relative concept; it implies that one country competes against a competitor, and therefore, we are not only interested in the performance of the reference country, but rather in its *performance relative to its competitor*. Furthermore, the word *performance* can have different meanings, but often refers to: i) the country's economic performance and the prosperity of its citizens; and/or ii) trade or export performance (Fagerberg et al., 2005).

UNIDO defines industrial competitiveness as the capacity of countries to increase their presence in international and domestic markets whilst developing industrial sectors and activities with higher value added and technological content (UNIDO, 2013). According to this definition, the improvement of industrial competitiveness requires two essential elements. The first is the expansion in production, which is necessary to increase the presence in domestic and international markets. The expansion in production—measured in value added and/or exports—is often accompanied by an increase in local and foreign market shares in relation to their foreign competitors. The second element is the increase in technological content. That is, while the first element of industrial competitiveness focuses on the expansion of production, the second one covers the "quality" of this expansion. It is not only important to produce more, the types of goods being produced are equally important. This is because the creation of technology-intensive goods tends to be associated with a higher capacity to innovate and adopt new technologies, which is strongly correlated with successful trade performance and higher economic growth (Dosi et al., 1990; Verspagen, 2000).

The enhancement of industrial competitiveness is key to industrial development and is therefore a top priority in the development agenda of many countries. In accordance with the definition of industrial competitiveness, expanding industrial production, moving up the technological ladder and increasing market presence at the local and global level are all effective means to enhance industrial competitiveness, and consequently, are important contributors to a country's industrial development. Yet industrial development is a concept that transcends these economic measurements because its main objective should not only be the improvement of a country's industrial production capacity, but to also the improvement of the population's living standards through industrial progress while protecting the environment. With this understanding of what industrial development entails, UNIDO promotes the concept of inclusive and sustainable industrial development (ISID), which aims to achieve sustainable industrial development in all of its dimensions: economic, social and environmental. UNIDO's mandate on promoting and accelerating ISID implies that no one is left behind, and that all parts of society shall benefit from industrial progress, thus providing countries with the means to address critical social and humanitarian needs. Moreover, ISID lies at the core of the Sustainable Development Goal 9 (SDG9), which aims to "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation". A close relationship also exists between industrial competitiveness and the SDGs, which becomes evident when examining the overlap of several indicators to measure countries' progress on the SDGs, which are the same ones used to measure key elements of competitiveness, such as production capacity (SDG Indicator 9.2.1), export capacity (SDG Indicator 17.11.1) or technological deepening (SDG Indicator 9.B.1)[1]

Despite the close relationship between these variables to the extent of sharing some of the same measurement indicators, industrial competitiveness interprets these measurements slightly differently. This is because industrial competitiveness is a relative concept and therefore, the improvement in any of these indicators increases competitiveness only if it is a *relative improvement* in comparison with the country's competitors. Additionally, this implies that other countries (competitors) can certainly affect the reference country's level of industrial competitiveness. For example, an expansion of manufacturing exports is unequivocally perceived as a positive signal for the country's industrial development and economy, but may not lead to an improvement of competitiveness if the country's competitors record major improvements as well.

Evolutionary economists might describe this situation by quoting the Red Queen from the fairy tale "Alice in Wonderland" as a way to illustrate this idea of fierce competition: "... it takes

[1]The relationship between industrial competitiveness and SDGs has been mentioned in several UNIDO documents (UNIDO, 2018; UNIDO, 2019; and UNIDO, 2020a) and has been extensively elaborated in UNIDO, 2017.

[2]Carroll, Lewis: Through the Looking-Glass and What Alice Found There, Chapter 2.

all the running you can do, just to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!"[2]. This famous quote summarizes what is commonly known as the "red-queen effect" and refers to the fact that in a competitive world, performance differences among competitors can be described as a function of a race to discover profits opportunities. In other words, the red-queen effect suggests that a country's performance should not be evaluated according to the distance from the starting line, but rather as a country's relative progress in comparison with its competitors (Baumol, 2004; Robson, 2005).

The importance of this competitive feature of industrial competitiveness should be interpreted with caution. In an interconnected world in which countries trade countless goods and services on a daily basis, countries' economic performance is also interconnected. This implies that the improvement in any country's performance tends to positively affect the world as whole. The opposite has also proven true, as demonstrated by the progression of several economic crises. This word of caution reminds us to keep in mind that international trade is a key feature of industrial competitiveness, which is not a zero-sum game because the gains of trade do exist. Accordingly, the same definition of industrial competitiveness can be used to frame the discussion on how the COVID-19 pandemic has affected industrial competitiveness, i.e. countries that produce more, move up the technological ladder and increase their market share in local and international markets, should still exhibit a higher level of competitiveness relative to that of other countries; if we are able to identify the pandemic's impact on these variables, we can begin to evaluate the potential effects on countries' industrial competitiveness. This discussion, however, is much more complex, and a significant part of this complexity is attributable to the fact that we are discussing an on-going phenomenon, which has some notable limitations. The most obvious and pertinent among them is that even when certain trends are already visible now, the full extent of the consequences will only be determinable after the event. In other words, a full analysis of the pandemic's consequences on industrial competitiveness can only conducted at a later stage once the pandemic has ended, and its consequences have fully materialized and the corresponding empirical data is available.

The pandemic has clearly had a heterogeneous impact on both countries and economic sectors. A large part of the impact on industrial competitiveness has been channelled through international trade, as COVID-19 induced many countries to adopt several protectionist trade policies which has caused severe disruptions in global value chains and international trade flows (Santiago, 2020). Indeed, according to the World Trade Organization, by the end of April 2020, at least 74 economies had introduced some sort of trade barrier in the form of export prohibitions, licenses or controls. Most of these export prohibitions covered medical supplies and protective garments and equipment (WTO, 2020a and WTO, 2020c)

A timely and adequate response to the health crisis was extremely challenging for all countries, but if the management of the health crisis was difficult in the industrialized world, the difficulties were multiplied in developing countries. In this regard, the location of production capabilities was of major importance to fight the pandemic in a timely manner. Countries with industrial capabilities within their borders found themselves in a better position than those that had to wait for imported goods to arrive; while many industrialized countries lacked medical supplies, even higher amount were missing in developing countries that specialize in the production of commodities or natural resource-based products. The disruption of trade flows therefore had an uneven impact on countries with different industrial capabilities. The World Trade Organization has acknowledged this uneven impact. Their preliminary data show that despite the overall reduction in the world's merchandise exports, which witnessed its most significant decrease during the second quarter of 2020 (-21 per cent year-on-year); merchandise exports from industrialized economies made a stronger recovery compared with resource-based economies (WTO, 2020d). Furthermore, Asian countries suffered much less than other economies. Their exports only decreased by 10 per cent (year-on-year) during the

second quarter of 2020. They also recovered faster than other economies, growing 2 per cent during the third quarter of 2020, while the rest of the world was still recording negative growth of 4 per cent (WTO, 2020b).

Asia's recovery was led by the trade performance of China, Malaysia and Viet Nam; they reported an expansion of merchandise exports (year-on-year) by the end of the third quarter already (WTO, 2020e). Notably, China was the first country to be hit by the COVID-19 pandemic, yet preliminary data suggest that the country's economy achieved one of the highest export performances. It is impossible to explain the resilience of China's export performance without taking the relative strength of its industrial sector into account, because as already mentioned, the pandemic affected industries differently, a fact that is also reflected in China's export data. According to UNCTAD data, the peak of the COVID-19 crisis occurred during the first semester of 2020, and while other major economies such as the United States and the European Union reported negative export growth for all manufacturing industries, the export growth of some of China's industries, for example, textiles, precision instruments, machinery (electrical, office and miscellaneous) and communication equipment, registered positive growth (UNCTAD, 2020a). These industries overlap with products that have been in high demand during the pandemic: medical supplies and protective garments and equipment.

At the time of writing, the pandemic's consequences are not yet fully perceptible and we can therefore only deduce some potential outcomes based on current discussions. It is likely that the idea of reshoring—which implies returning manufacturing production to developed countries—will gain some traction in industrialized countries, if not for manufacturing goods in general, at least for those goods of national interest. It is also likely that the disruption of global value chains (GVCs) will have permanent effects on developing countries, which could lead to a decreasing industrialization trend, as some firms may lose their link with the global market (Hartwich and Isaksson, 2020; UNCTAD, 2020b). Finally, the heterogenous impact across sectors and countries indicates that economies with more advanced technological and production capabilities were in a better position to respond to the crisis, which explains why their economic and export growth experienced a much more moderate decline as well as a faster recovery.

1.2 Measuring industrial competitiveness

UNIDO measures industrial competitiveness using the Competitive Industrial Performance (CIP) index. In line with UNIDO's definition of industrial competitiveness, the CIP index indicates how successful a country's industries are at producing and selling their goods in domestic and foreign markets while moving along the technological ladder. Consequently, the CIP index enables cross-country comparisons of industrial competitiveness while providing strong policy signals, pointing towards developmental obstacles in countries' industrial development.

The composition of the CIP Index has already been extensively explained in previous editions of the CIP report (UNIDO, 2013, UNIDO, 2017 and UNIDO, 2019). Yet, for easy reference, this section briefly reviews its main components and rationale for their inclusion. The CIP index uses six main indicators that cover three main dimensions. In Figure 1.1, the inner circle presents these dimensions, namely: i) the capacity to produce and export manufactured goods; ii) technological deepening and upgrading, and iii) world impact. The higher the scores in any of the three dimensions, the higher the country's industrial competitiveness and its rank in the CIP index. The outer circle contains the six indicators (two for each dimension) that are used in the CIP index, which will be explained in the following.

Figure 1.1: Dimensions and indicators of the CIP index

Source: UNIDO, 2017

1.2.1 First dimension: Capacity to produce and export

In a globalized economy, a country's capacity to produce manufactured goods is closely correlated with its capacity to export them. In turn, both are key factors in a country's stage of industrial development and contribute to its path of structural change. As locally manufactured goods become more competitive, participation in the local market tends to increase and eventually, some imported goods are substituted. Further improvements in competition results in the expansion of participation in foreign markets.

The first dimension of the CIP index covers comparable measures of countries' manufacturing production and exports. These measures provide indications about each country's production capacity. For these values to be comparable between countries of different sizes, the CIP considers manufacturing value added and manufacturing exports in per capita terms, MVA_{pc} and MX_{pc} respectively. These indicators allow for country comparisons, independent of the countries' population sizes.

1.2.2 Second dimension: Technological deepening and upgrading

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

In this regard, a country that is specialized in the production of high-technology goods has a higher likelihood to benefit from strong productive linkages and knowledge spillovers across different activities than a country specialized in low-technology manufacturing industries. The technological complexity of the goods produced in a country is also a factor in the country's industrial competitiveness. In other words, the industrial sector's expansion is a positive development, but is even more effective when the manufacturing industry behind this expansion is located high up on the technological ladder. A higher share of medium- and high-technology (MHT) goods in total manufacturing production is often characteristic of an economy with high levels of productivity, innovation and technological progress.

Additionally, as we move from technologically simple to more complex products, the technological requirements for designing and producing such products increase as well; consequently, the higher the technological requirements, the lower the number of producers that are able to meet these requirements. This empirical observation supports the claim that an increase in products' technological complexity tends to create more concentrated market structures. In the extreme, a ground breaking innovation in a highly complex product may reward the innovator with monopoly power in the market for a certain period of time, while competitors will lose (at least) some of their market share and try to catch up with the innovator. This premise is in line with Schumpeter's work (Schumpeter, 1934), who claimed that firms expect to gain some market power as a reward for their innovations, as there would otherwise not be sufficient incentives to invest in research and development (R&D). This view is also reinforced by Nelson and Winter (Nelson and Winter, 1982), who go one step further and assert that technological change not only affects market structure, but market structure also affects innovation. Market structure and technological change therefore have a bi-directional causation. Similarly to what occurs at the firm level, moving up the technological ladder decreases the number of countries able to produce the more technologically complex goods, i.e. competing in high-tech sectors often entails a reduced number of competitors and consequently entails a certain degree of monopoly power[3].

Moreover, competition in high-tech industries is likely to hinge more on innovation than on labour costs. Competitors are therefore more likely to invest in research and development or to upgrade the skills of their labour force rather than to focus on other less socially beneficial efforts, such as cutting employment benefits, which would have a stronger impact in more labour-intensive industries, which are characteristic of medium-low technology groups. Increased investments in research and development and the upgrading of skills of the labour force tend to produce positive externalities that reach beyond the manufacturing sector, and hence benefit the entire economy.

The CIP index captures technological deepening and upgrading through two composite indices. First, the degree of industrialization intensity, *INDint*, estimates the complexity of production processes. *INDint* is a composite indicator that consists of two supplementary indicators: the share of medium- and high-tech MVA in total MVA ($MHVA_{sh}$) and the share of MVA in GDP

[3] Most countries in the world produce some high-tech products, hence this statement is only valid as economic activities move towards higher levels of disaggregation.

(MVA_{sh}); and secondly, export quality, $MQual$, which is also a composite indicator that measures the quality of the integration process of the country's manufacturing sector. The higher the technological complexity of the country's exported goods, the higher the quality of its integration in global markets. Export quality, $MQual$, is also estimated based on two supplementary indicators: the share of medium- and high-tech manufacturing exports in total manufacturing exports (MHX_{sh}), and the share of manufacturing exports in total exports (MX_{sh}).

1.2.3 Third dimension: World impact

The economies of agglomeration, scope and scale are also factors of competitiveness. The CIP groups these effects in the third CIP dimension, world impact, which depicts the country's impact on the global market of manufactured goods. The underlying notion of this dimension is that a country's industrial competitiveness may benefit from having a higher world impact, and might translate into better access to foreign capital, new investments in infrastructure or even greater negotiating power in trade agreements.

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

1.3 How to use the CIP index

The CIP index can be used for cross-country comparisons of industrial competitiveness. Specifically, it serves as an analytical tool that can be used for three different purposes:

First, the most intuitive use of the CIP index is identifying comparator countries. The CIP presents results by stage of industrialization, geographic region and indicator. These categories can be used to compare the reference country to some comparator countries that have similarities in terms of geography, availability of production factors, or types of goods being produced. Comparator countries may include neighbours, immediate competitors, potential competitors or role models.

Second, the CIP index can be used to benchmark a country's performance. The reference country can be compared with the best performing countries across the index's three dimensions. By identifying the relative performance in these three dimensions, the index suggests which ones require more urgent intervention, and can thus help countries reduce inefficiencies and catch up with the best performers while improving their industrial competitiveness. Moreover, by tracing competitive strengths and weaknesses with respect to different sets of comparators over different periods, the CIP provides valuable information on the evolution of these strengths and weaknesses, which in turn serves to assess the industrial policies that were in place.

Third, structural change is a long-term process and therefore, changes in the CIP index are likely to be reflected several years after policies aimed at increasing the country's competitiveness have been implemented. Yet, by tracing competitive strengths and weaknesses with respect to different sets of comparators over different periods, the CIP provides valuable information, which can be used to assess the industrial policies that were in place. That is, the CIP index can be used as a guideline for more detailed analyses to identify and address potential inefficiencies over the 3 CIP dimensions, thereby contributing to widespread productivity growth and structural change by using feasible targets that depend on the countries' circumstances.

CIP report 2020: Chapter 2

2. Highlights of the CIP report 2020

2.1 Basic facts about the CIP 2020 edition

2.1.1 Data coverage

The CIP index is available from 1990 to 2018. The present report focuses on the latest available year, 2018. The CIP index requires data for all its indicators, i.e. if no country data is available for a given indicator, the CIP index cannot be computed and therefore, that country is excluded from the index. The data required to compute the CIP index are statistics on industrial production and on international trade. They are derived from three databases: the MVA database, the Industrial Statistics database and the Comtrade database. These databases are typically updated annually and require time for their compilation, revision and publication. For example, the data from the database on Industrial Statistics is generally based on annual industrial surveys and censuses. Several national statistical offices (NSOs) collect, compile, revise and distribute these data at different times using different industrial classifications. UNIDO must in some case, therefore, convert the data from one industrial classification to another prior to another round of compilation, revision and publication. The different reporting times of the latest data distribution by NSOs and the workload associated with the transition from one classification to another are main factors to explain why the CIP index is only available until 2018.

The 2020 edition of the CIP index assesses and benchmarks the industrial competitiveness of 152 economies. This new edition adds two more economies, namely Cuba and Uzbekistan. In 2019, the manufacturing sectors of all 152 economies generated a total of USD 13.8 trillion in value added (at constant 2015 prices), which represents 16.5 per cent of global GDP (UNIDO, 2020c).

The present chapter provides an overview of the CIP rankings. The overall ranking for each country is a reflection of its performance across the three dimensions of the CIP index: (1) The capacity to produce and export manufactured goods; (2) Technological deepening and upgrading, and (3) World impact.

As already mentioned in the previous chapter, these dimensions comprise six indicators, which are analysed at the end of this chapter. Although the CIP dataset covers the years 1990

to 2018, the present report focuses on the most recent data available. Thus, the rankings presented in the following pages are based on 2018 data and are tabulated by i) development group, ii) indicator, and iii) geographic region. These different tabulations facilitate identification of comparators and the benchmarking of the performance of industrial competitiveness among and within specific groups.

2.1.2 Data sources and compilation

All the data used in this report are publicly available from the UNIDO Statistics Data Portal. The website provides online access to different sets of data compiled by UNIDO Statistics, including the CIP data set.

The CIP database is updated annually and is primarily based on the UN Statistics Division's National Accounts Main Aggregates database, the World Bank's World Development Indicators database, the OECD's STAN database for structural analysis and the UN Comtrade database. Other supplementary sources include databases maintained by regional agencies such as the Asian Development Bank, the African Development Bank, the Economic Commission for Latin America and the Caribbean and databases of national statistical offices. Occasionally, non-official data sources are used to cross-check the data's consistency. Population data are provided by the UN Population Division. For further details, including the treatment of missing values and outliers and the normalization procedure, see (UNIDO, 2013, UNIDO, 2017).

2.1.3 The CIP ranking

Table 2.1 presents the complete results of the 2018 CIP index, with each economy ranked according to its composite score. Economies are grouped into quintiles of the CIP index—top, upper middle, middle, lower middle and bottom—which are labelled in the first column of the table. The second column presents the latest CIP rank (2018). The colour of the rank depicts the economy's stage of development, differentiating between industrialized economies, emerging industrial economies, other developing economies and least developed countries (LDCs).[1] The CIP score, found in the fourth column, indicates the magnitude of the distance between two consecutive economies. The fifth and sixth columns present the countries' ranks in 2017 and 2012, and the seventh and eighth columns show the variation of those years in comparison with 2018. The comparison with 2017 provides an immediate indication of recent changes over the last year, while the comparison with 2012, offers a longer perspective to evaluate the direction of change in industrial competitiveness. The reasons why specifically the year 2012 was selected will be explained in the next chapter, which focuses on Africa. The year 2012 nonetheless has the advantage of maintaining the consistency between the periods selected in Chapters 2 and 3 of this document, while facilitating data comparability in the Africa region, particularly for Sudan and South Sudan, which gained independence in 2011.

There is a clear correlation between the stage of a country's development and its industrial competitiveness. Most industrialized economies are located in the top quintile, while the majority of LDCs are concentrated in the bottom quintile. Yet there are some exceptions. For example, Morocco is the only economy in the group of "other emerging economies" that reached the upper middle quintile. Morocco demonstrated higher levels of industrial competitiveness than some industrialized economies in lower positions of the CIP ranking. Other remarkable examples are Bangladesh, Myanmar and Cambodia. These LDCs are located in the middle quintile of the CIP and showed clear improvements in their industrial competitiveness, as indicated by the change in their positions relative to 2017 and 2012 (see last two columns of Table 2.1).

[1] For more information on the country grouping in UNIDO statistics, see the original paper (Upadhyaya, 2013) and the recent revision made in the International Yearbook of Industrial Statistics (UNIDO, 2021a).

Table 2.1: Competitive Industrial Performance index

Industrialized economies	Other developing economies
Emerging industrial economies	Least developed countries

Quintile	Rank 2018	Economy	Score	Rank 2017	Rank 2012	Change 2017-2018	Change 2012-2018
Top	1	Germany	0,4709	1	1	0 ↔	0 ↔
Top	2	China	0,3716	2	5	0 ↔	3 ↑
Top	3	Republic of Korea	0,3488	3	4	0 ↔	1 ↑
Top	4	United States of America	0,3454	4	2	0 ↔	-2 ↓
Top	5	Japan	0,3445	5	3	0 ↔	-2 ↓
Top	6	Ireland	0,3304	6	13	0 ↔	7 ↑
Top	7	Switzerland	0,302	7	6	0 ↔	-1 ↓
Top	8	China, Taiwan Province	0,2841	8	8	0 ↔	0 ↔
Top	9	Singapore	0,2591	9	7	0 ↔	-2 ↓
Top	10	Netherlands	0,252	10	9	0 ↔	-1 ↓
Top	11	Italy	0,2443	11	11	0 ↔	0 ↔
Top	12	Belgium	0,2419	12	12	0 ↔	0 ↔
Top	13	France	0,2371	13	10	0 ↔	-3 ↓
Top	14	Austria	0,2051	15	16	1 ↑	2 ↑
Top	15	United Kingdom	0,2049	14	14	-1 ↓	-1 ↓
Top	16	Czechia	0,2019	16	18	0 ↔	2 ↑
Top	17	Sweden	0,1953	17	15	0 ↔	-2 ↓
Top	18	Spain	0,1811	19	19	1 ↑	1 ↑
Top	19	Canada	0,1792	18	17	-1 ↓	-2 ↓
Top	20	Mexico	0,1644	20	20	0 ↔	0 ↔
Top	21	Denmark	0,1617	21	21	0 ↔	0 ↔
Top	22	Poland	0,1587	23	26	1 ↑	4 ↑
Top	23	Malaysia	0,156	22	22	-1 ↓	-1 ↓
Top	24	Thailand	0,1425	24	24	0 ↔	0 ↔
Top	25	Finland	0,1413	25	23	0 ↔	-2 ↓
Top	26	Slovakia	0,1403	26	29	0 ↔	3 ↑
Top	27	Hungary	0,1388	27	27	0 ↔	0 ↔
Top	28	Israel	0,1213	28	25	0 ↔	-3 ↓
Top	29	Turkey	0,1206	29	30	0 ↔	1 ↑
Top	30	Slovenia	0,107	30	34	0 ↔	4 ↑
Top	31	Romania	0,1034	31	37	0 ↔	6 ↑
Upper Middle	32	Russian Federation	0,0972	33	31	1 ↑	-1 ↓
Upper Middle	33	Portugal	0,0971	34	36	1 ↑	3 ↑
Upper Middle	34	Australia	0,0949	32	28	-2 ↓	-6 ↓
Upper Middle	35	United Arab Emirates	0,0892	37	47	2 ↑	12 ↑
Upper Middle	36	Norway	0,0842	35	32	-1 ↓	-4 ↓
Upper Middle	37	Saudi Arabia	0,0837	39	35	2 ↑	-2 ↓
Upper Middle	38	Viet Nam	0,08	41	57	3 ↑	19 ↑
Upper Middle	39	Indonesia	0,08	38	41	-1 ↓	2 ↑
Upper Middle	40	Brazil	0,0786	36	33	-4 ↓	-7 ↓
Upper Middle	41	Lithuania	0,0785	40	43	-1 ↓	2 ↑
Upper Middle	42	India	0,0777	42	44	0 ↔	2 ↑
Upper Middle	43	Philippines	0,0673	43	53	0 ↔	10 ↑
Upper Middle	44	New Zealand	0,0648	44	45	0 ↔	1 ↑
Upper Middle	45	Qatar	0,0633	47	39	2 ↑	-6 ↓
Upper Middle	46	Luxembourg	0,0632	46	51	0 ↔	5 ↑
Upper Middle	47	Belarus	0,0631	48	40	1 ↑	-7 ↓
Upper Middle	48	Estonia	0,0599	52	52	4 ↑	4 ↑
Upper Middle	49	Greece	0,0596	51	50	2 ↑	1 ↑
Upper Middle	50	Chile	0,0583	49	49	-1 ↓	-1 ↓
Upper Middle	51	Bahrain	0,0577	53	46	2 ↑	-5 ↓
Upper Middle	52	South Africa	0,0568	50	48	-2 ↓	-4 ↓

Table 2.1 continued from previous page

Quintile	Rank 2018	Economy	Score	Rank 2017	Rank 2012	Change 2017-2018	Change 2012-2018
Upper Middle	53	Argentina	0,0532	45	38	-8 ↓	-15 ↓
Upper Middle	54	Bulgaria	0,0524	55	58	1 ↑	4 ↑
Upper Middle	55	Kuwait	0,0523	57	42	2 ↑	-13 ↓
Upper Middle	56	Iran (Islamic Republic of)	0,0521	54	63	-2 ↓	7 ↑
Upper Middle	57	Croatia	0,0503	56	59	-1 ↓	2 ↑
Upper Middle	58	Latvia	0,0458	58	64	0 ↔	6 ↑
Upper Middle	59	Trinidad and Tobago	0,0432	59	55	0 ↔	-4 ↓
Upper Middle	60	Peru	0,0414	60	62	0 ↔	2 ↑
Upper Middle	61	Morocco	0,0406	61	71	0 ↔	10 ↑
Middle	62	Serbia	0,0397	63	72	1 ↑	10 ↑
Middle	63	Oman	0,0369	68	61	5 ↑	-2 ↓
Middle	64	Egypt	0,0366	64	69	0 ↔	5 ↑
Middle	65	Venezuela	0,0363	62	54	-3 ↓	-11 ↓
Middle	66	Costa Rica	0,0358	65	65	-1 ↓	-1 ↓
Middle	67	Tunisia	0,0353	67	68	0 ↔	1 ↑
Middle	68	Kazakhstan	0,0353	66	60	-2 ↓	-8 ↓
Middle	69	Ukraine	0,0346	70	56	1 ↑	-13 ↓
Middle	70	Bangladesh	0,034	71	78	1 ↑	8 ↑
Middle	71	Malta	0,0331	69	66	-2 ↓	-5 ↓
Middle	72	Panama	0,0318	72	67	0 ↔	-5 ↓
Middle	73	Colombia	0,0318	73	70	0 ↔	-3 ↓
Middle	74	Guatemala	0,0299	74	74	0 ↔	0 ↔
Middle	75	Sri Lanka	0,0283	75	77	0 ↔	2 ↑
Middle	76	Jordan	0,028	76	73	0 ↔	-3 ↓
Middle	77	North Macedonia	0,0275	78	89	1 ↑	12 ↑
Middle	78	Uruguay	0,0274	77	76	-1 ↓	-2 ↓
Middle	79	Iceland	0,0264	79	75	0 ↔	-4 ↓
Middle	80	Bosnia and Herzegovina	0,0255	81	87	1 ↑	7 ↑
Middle	81	El Salvador	0,0252	80	80	-1 ↓	-1 ↓
Middle	82	Pakistan	0,0238	82	79	0 ↔	-3 ↓
Middle	83	Eswatini	0,0229	83	82	0 ↔	-1 ↓
Middle	84	Myanmar	0,0213	89	98	5 ↑	14 ↑
Middle	85	Cambodia	0,0212	86	96	1 ↑	11 ↑
Middle	86	Ecuador	0,0205	85	81	-1 ↓	-5 ↓
Middle	87	Mauritius	0,0191	87	88	0 ↔	1 ↑
Middle	88	China, Hong Kong SAR	0,019	88	83	0 ↔	-5 ↓
Middle	89	Botswana	0,0185	90	91	1 ↑	2 ↑
Middle	90	Cuba	0,0175	91	90	1 ↑	0 ↔
Middle	91	Cyprus	0,0174	93	102	2 ↑	11 ↑
Lower Middle	92	Uzbekistan	0,0172	92	93	0 ↔	1 ↑
Lower Middle	93	Brunei Darussalam	0,0168	84	84	-9 ↓	-9 ↓
Lower Middle	94	Lebanon	0,0163	94	86	0 ↔	-8 ↓
Lower Middle	95	Honduras	0,0159	95	94	0 ↔	-1 ↓
Lower Middle	96	Georgia	0,0145	97	100	1 ↑	4 ↑
Lower Middle	97	Namibia	0,0145	102	92	5 ↑	-5 ↓
Lower Middle	98	Algeria	0,0139	96	95	-2 ↓	-3 ↓
Lower Middle	99	Nigeria	0,0138	107	85	8 ↑	-14 ↓
Lower Middle	100	Paraguay	0,0137	98	105	-2 ↓	5 ↑
Lower Middle	101	Congo	0,0134	99	115	-2 ↓	14 ↑
Lower Middle	102	Bolivia	0,0132	101	101	-1 ↓	-1 ↓
Lower Middle	103	Armenia	0,0124	103	114	0 ↔	11 ↑
Lower Middle	104	Mongolia	0,0123	106	107	2 ↑	3 ↑
Lower Middle	105	Côte d'Ivoire	0,0121	100	99	-5 ↓	-6 ↓
Lower Middle	106	Senegal	0,0119	104	103	-2 ↓	-3 ↓
Lower Middle	107	Angola	0,0118	118	133	11 ↑	26 ↑
Lower Middle	108	Jamaica	0,0114	105	97	-3 ↓	-11 ↓
Lower Middle	109	Lao People's Dem Rep	0,0105	109	130	0 ↔	21 ↑
Lower Middle	110	Gabon	0,0102	108	112	-2 ↓	2 ↑

Table 2.1 continued from previous page

Quintile	Rank 2018	Economy	Score	Rank 2017	Rank 2012	Change 2017-2018	Change 2012-2018
Lower Middle	111	Republic of Moldova	0,0095	113	119	2 ↑	8 ↑
Lower Middle	112	State of Palestine	0,0095	111	118	-1 ↓	6 ↑
Lower Middle	113	Barbados	0,0094	110	106	-3 ↓	-7 ↓
Lower Middle	114	Ghana	0,0088	112	104	-2 ↓	-10 ↓
Lower Middle	115	Kenya	0,0088	115	111	0 ↔	-4 ↓
Lower Middle	116	Syrian Arab Republic	0,0084	117	110	1 ↑	-6 ↓
Lower Middle	117	Fiji	0,0082	116	117	-1 ↓	0 ↔
Lower Middle	118	Albania	0,0082	114	116	-4 ↓	-2 ↓
Lower Middle	119	Bahamas	0,0079	120	109	1 ↑	-10 ↓
Lower Middle	120	Azerbaijan	0,0078	119	108	-1 ↓	-12 ↓
Lower Middle	121	Cameroon	0,0078	121	113	0 ↔	-8 ↓
Bottom	122	Kyrgyzstan	0,0076	122	126	0 ↔	4 ↑
Bottom	123	United Republic of Tanzania	0,0071	130	127	7 ↑	4 ↑
Bottom	124	Zimbabwe	0,0069	123	120	-1 ↓	-4 ↓
Bottom	125	Zambia	0,0063	124	122	-1 ↓	-3 ↓
Bottom	126	Papua New Guinea	0,0061	125	123	-1 ↓	-3 ↓
Bottom	127	Montenegro	0,0059	126	128	-1 ↓	1 ↑
Bottom	128	Uganda	0,0049	132	125	4 ↑	-3 ↓
Bottom	129	Tajikistan	0,0048	127	132	-2 ↓	3 ↑
Bottom	130	Belize	0,0042	128	124	-2 ↓	-6 ↓
Bottom	131	Suriname	0,0042	129	121	-2 ↓	-10 ↓
Bottom	132	Mozambique	0,0041	135	131	3 ↑	-1 ↓
Bottom	133	Central African Republic	0,0041	131	144	-2 ↓	11 ↑
Bottom	134	Ethiopia	0,0039	133	150	-1 ↓	16 ↑
Bottom	135	Nepal	0,0037	134	134	-1 ↓	-1 ↓
Bottom	136	Cabo Verde	0,0033	139	139	3 ↑	3 ↑
Bottom	137	Madagascar	0,0032	137	136	0 ↔	-1 ↓
Bottom	138	Saint Lucia	0,0032	136	143	-2 ↓	5 ↑
Bottom	139	Bermuda	0,0029	140	138	1 ↑	-1 ↓
Bottom	140	Yemen	0,0029	138	129	-2 ↓	-11 ↓
Bottom	141	Haiti	0,0023	141	142	0 ↔	1 ↑
Bottom	142	Rwanda	0,0022	142	140	0 ↔	-2 ↓
Bottom	143	Malawi	0,0019	143	141	0 ↔	-2 ↓
Bottom	144	Maldives	0,0019	144	146	0 ↔	2 ↑
Bottom	145	Burundi	0,001	145	148	0 ↔	3 ↑
Bottom	146	Afghanistan	0,0009	146	145	0 ↔	-1 ↓
Bottom	147	Iraq	0,0007	147	135	0 ↔	-12 ↓
Bottom	148	Gambia	0,0005	148	149	0 ↔	1 ↑
Bottom	149	Eritrea	0	149	151	0 ↔	2 ↑
Bottom	150	China, Macao SAR	0	150	137	0 ↔	-13 ↓
Bottom	151	Niger	0	151	147	0 ↔	-4 ↓
Bottom	152	Tonga	0	152	152	0 ↔	0 ↔

Source: UNIDO, 2020b.

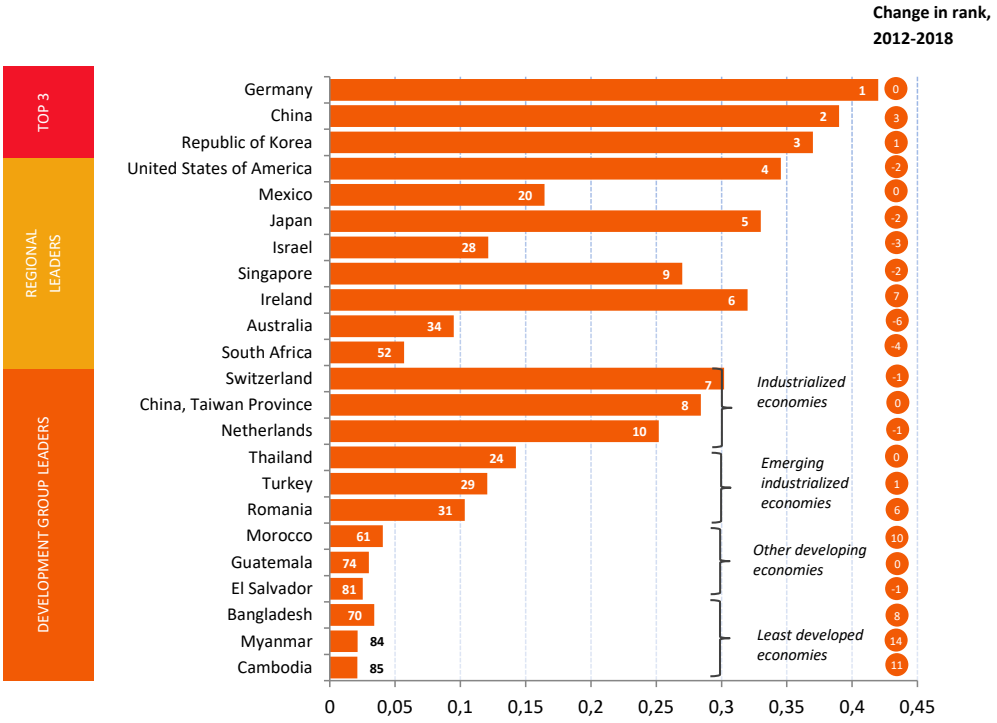
Germany again achieved the highest composite score and thus leads the CIP ranking, as it has been since 2001. It is followed by China in second place and the Republic of Korea in third place. The top-5 is completed with the United States and Japan. These five countries have a long-standing trajectory as industrial leaders: China entered the top-5 group of industrial leaders in 2010, the Republic of Korea in 2005, while the United States and Japan have been in the top-5 since the launch of the CIP database, that is, since 1990. Since entering the top-5, these five countries have remained among the top-5.

By construction, the CIP index can theoretically range between 0 and 1. But in practice, all countries' scores are under 0.5. The reason for this is that the distribution of CIP scores is skewed to the right, which implies that most of the scores are relatively low (under 0.3). In

other words, while only few economies achieve excellence in some of the dimensions of industrial competitiveness, most of them remain far behind the industrial leaders. Moreover, the highest score was only 0.47 (achieved by Germany), which reflects the fact that no country leads in all CIP indicators. The skewness in the distribution of the scores also implies that a positive change in an economy's CIP score is not the same as a change in its CIP rank, and therefore, both values are important to obtain an accurate picture of an economy's overall performance.

Figure 2.1 presents the scores, ranks and change in the ranks of the top performing countries in the 2020 CIP index. Figure 2.1 presents a broader perspective of industrial leaders, setting the competitiveness benchmark in eight geographic regions: (i) Northern America, (ii) Latin America and the Caribbean, (iii) Eastern Asia, (iv) Central and Western Asia, (v) Southern and South-eastern Asia, (vi) Europe, (vii) Pacific, and (viii) Africa, and in four development groups: (i) industrialized economies, (ii) emerging industrial economies, (iii) other developing economies, and (iv) least developed countries.

Figure 2.1: Scores and ranks of the top performing countries in the CIP index, edition 2020



Source: UNIDO, 2020b.

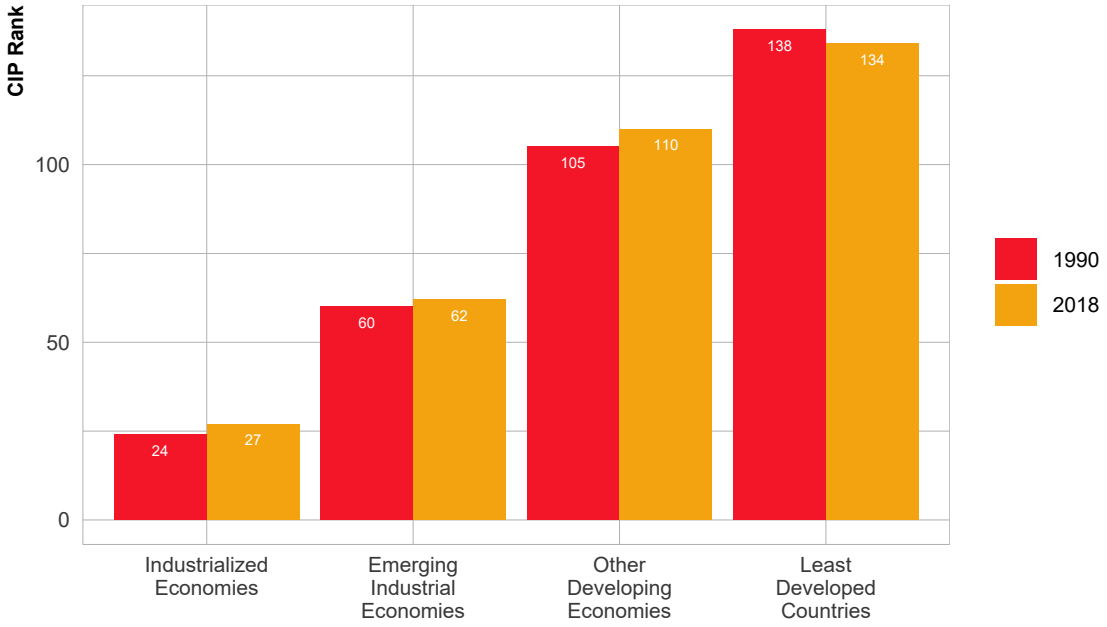
Note: If a country is already listed in the top-3, the runner-up is highlighted in the group of regional leaders. Similarly, if a country is included in the group of regional leaders, the runner-up will come in first among the development group leaders. See Appendix A1 for country classifications.

2.2 Main findings by development country group

When comparing two economies' industrial competitiveness, it is very important to consider their stage of industrial development because of the correlation between these two variables. Therefore, when benchmarking economies that are at different stages of development, the differences in industrial of competitiveness may mainly reflect the asymmetries in the development of the countries' industrial base. The more industrialized the economy is, the higher the likelihood that it occupies one of the positions in the top quintiles of the CIP ranking. The opposite is also valid, and that is why LDCs tend to be found at the bottom of the CIP ranking.

The correlation between economies' stage of industrial development and their corresponding CIP rank has been observed since the launch of the CIP database. Figure 2.2 provides evidence of this empirical fact. It presents the median CIP ranks of the four development groups used in this analysis for the period 1990 and 2018. The reader can observe that after 28 years, little has changed; Figure 2.2 illustrates that more often than not, the more industrialized the economies are, the higher their level of competitiveness. Moreover, the distance between development groups has also shown little change.

Figure 2.2: Median CIP ranks by country group, 1990 and 2018



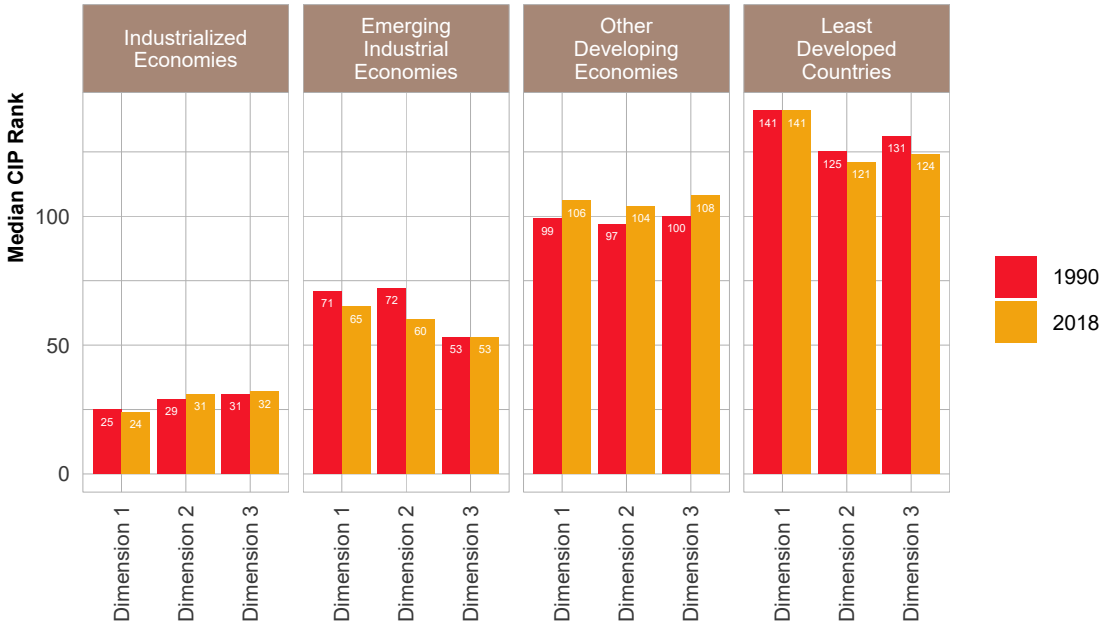
Source: Authors' elaboration based on UNIDO, 2020b.

Figure 2.3 shows the position of development groups within the three CIP dimensions. Once again, we find no major differences between the values of 1990 and those of 2018. More industrialized economies tend to be more competitive in all dimensions when compared with less industrialized economies; however, there are some nuances worth mentioning. Industrialized economies tend to be more competitive, that is, they rank higher in the first dimension (capacity to produce and export manufactured products) than in the other two dimensions, technological deepening and upgrading and world impact; emerging industrial economies tend to perform better in the world impact than in the other two dimensions; other developing economies

have a more homogeneous level of competitiveness across all three dimensions; and finally, least developed countries tend to be more competitive in technological deepening and upgrading and less competitive in their capacity to produce and export manufactured goods.

The relatively better performance in technological deepening and upgrading is an indication that advanced technologies can be transferred to LDCs, most notably through foreign direct investment, but also through imports of high-technology products, foreign technology payment, direct adoption of foreign technology and acquisition of human capital (Soete and Patel, 1985; Osano and Koine, 2016). However, it seems that technology transfer does not suffice to increase industrial competitiveness across all relevant dimensions. In this regard, Rodrik argues that manufacturing know-how is relatively easy to transfer from high-income to low-income countries, but to take full advantage of trade and technology, developing countries need to accelerate their industrialization (Rodrik, 2018).

Figure 2.3: Median CIP rank in CIP dimensions by country group, 1990 and 2018



Source: Authors' elaboration based on UNIDO, 2020b.

2.3 Main findings by indicator

The following section discusses the CIP results from the perspective of its dimensions and indicators. This section presents three figures that summarize the relationship between the relevant indicators in each dimension, and one table that summarizes all indicators by region and development group. Figure 2.4 illustrates the relationship between the indicators used to calculate the first CIP dimension, the capacity to produce and export manufactured goods. These indicators are manufacturing value added per capita (MVA_{pc}) and manufacturing exports per capita (MX_{pc}).

Two important empirical findings emerge from this figure. First, most of the observations are concentrated around the origin, which implies that the capacities to produce and export manufactured goods are very asymmetrically distributed across countries; some countries have significant capacities while the majority face major limitations. Second, those countries with significant capacities are mainly industrialized countries that also tend to be in the top quintile of the CIP ranking. Table 2.2 sheds some light on this aspect by revealing that the countries that perform best in the first dimension are industrialized countries in Europe (e.g. Ireland, Switzerland or Belgium) or in Southern and South-eastern Asia (e.g. Singapore or Malaysia).

Figure 2.4: Indicators on the capacity to produce and export manufactured goods, 2018

Source: Authors' elaboration based on UNIDO, 2020b.

Note: The data for manufacturing exports per capita are in current US dollars; data for MVA per capita are in constant 2015 US dollars.

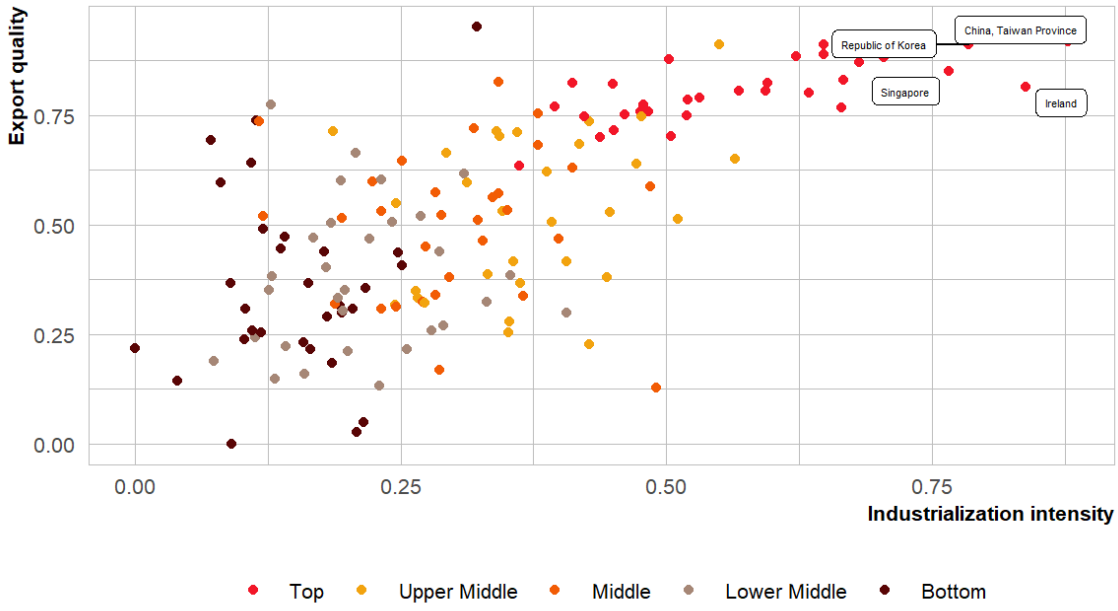
Figure 2.5 shows the relationship between the indicators used for the second dimension, technological deepening and upgrading. Compared with the other dimensions, this figure indicates that the observations are much more dispersed among the different ranges of the graph. With a higher number of countries achieving better scores in technological deepening and upgrading than in the other two dimensions, it can be concluded that it is easier for countries to acquire and upgrade their technology than to transform into an industrial leader with a significant impact

on international markets.

Moreover, the countries with high scores are not exclusively industrialized countries in the top quintile of the CIP ranking, there is in fact much more heterogeneity among the top scores. Thus, while industrialized countries continue to have a strong presence in the top ranks of technological deepening and upgrading (e.g. the Republic of Korea, Ireland and Singapore), they share some of these positions with other countries. One clear example is the Central African Republic, which is an LDC in the bottom quintile, and yet reaches the top ranks in the export quality indicator due to the higher scores the country obtained in the sub-indicators medium- and high-tech export share in total exports (MHX_{sh}) and share of manufacturing exports in total exports (MX_{sh}). Moreover, unlike for the first dimension, the bulk of countries are not close to zero. In other words, most countries present certain degrees of technological deepening and upgrading and those that are close to the origin tend to be more the exception than the rule.

Table 2.2 confirms that the better performing countries are industrialized economies, and yet the differences between industrialized and emerging industrial economies are not as considerable as in the first dimension. Furthermore, the table shows that the best performing countries in these indicators are the industrialized & Southern and South-eastern Asian economies, namely Malaysia and Singapore, and the emerging industrial & Eastern Asian economies, i.e. China.

Figure 2.5: Indicators on technological deepening and upgrading, 2018



Source: Authors' elaboration based on UNIDO, 2020b.

Note: The axes represent the composite score in export quality and industrialization intensity, which range from zero to one. The greater the score, the higher the technological deepening and upgrading capability.

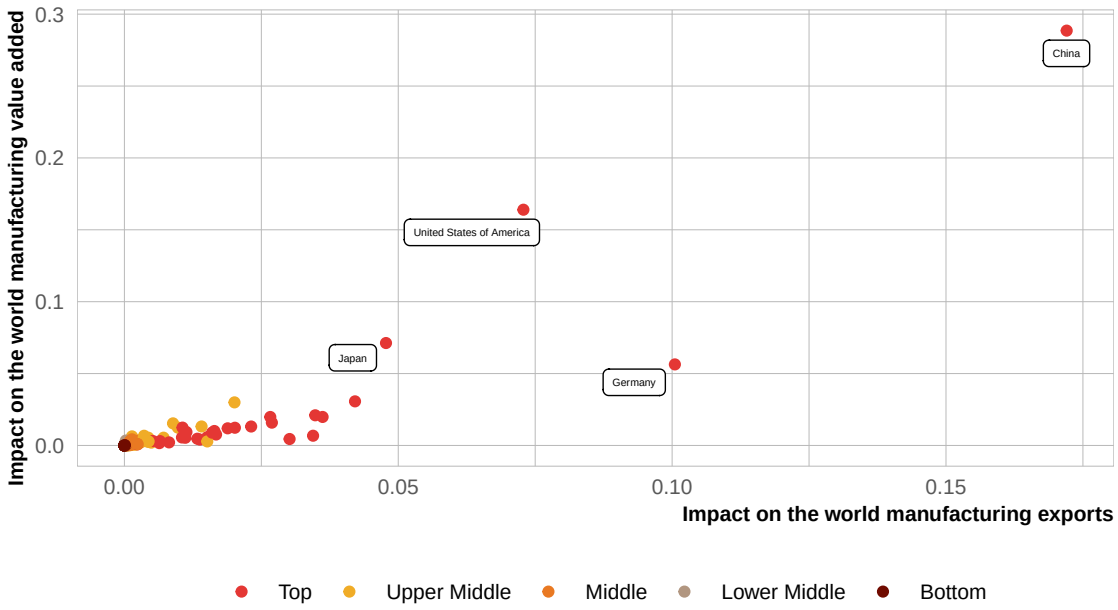
Figure 2.6 illustrates that the observations in the third dimension are even more concentrated than in the first and second dimensions; only few countries hold significant shares in world manufacturing value added and world exports. While most countries have a marginal impact on world trade, only few have a leading role in international markets.

The country with the biggest impact is China, which in 2018 had a share of 17.2 per cent in

world manufacturing exports and a share of 28.9 per cent in world MVA. Other examples of countries with major shares are the United States, Germany, Japan, the Republic of Korea and India. One interesting observation is that those economies with bigger local markets tend to perform better in terms of world impact. Yet, while a larger local market helps local industry benefit from economies of scale, scope and agglomeration, not all big economies have taken advantage of this benefit.

Furthermore, Table 2.2 shows that the best performing country regions again are Eastern Asia in the emerging industrial economies and Southern and South-eastern Asia in the industrialized economies. The performance of European industrialized economies in this dimension is also quite good, together with Southern and South-eastern Asia in the emerging industrial economies, which includes India, Indonesia, Viet Nam and Thailand.

Figure 2.6: Indicators on the world impact, 2018



Source: Authors' elaboration based on UNIDO, 2020b.

Note: The x and y axes represent the country's share in world exports and the country's share in world MVA, respectively.

Finally, Table 2.2 presents quantitative measures of the distance between development groups and regions in each indicator. It also provides an indication on the direction of the change in the global positions since 2012. For instance, the first orange cell in the row of industrialized economies indicates that they improved by two positions (or more) in the ranking of industrialization intensity between 2012 and 2018. The first yellow cell in the following row (Central and Western Asia) shows that industrialized economies in Central and Western Asia lost two positions (or more) in the ranking of MVA per capita from 2012 to 2018.

Table 2.2 suggests that the development groups' overall positions have been fairly stable. For instance, in the first dimension, LDCs are the only group that registered any significant movement in only one of the indicators (MX_{pc}). The strongest movements of LDCs were observed in the second dimension, with a mixed picture for industrialized economies and negative or no movement in the emerging industrial economies and other developing economies. In the third

dimension, only LDCs register a significant improvement. In terms of regions, most of them presents mixed movements. Yet, the Pacific and Latin America and the Caribbean register mostly negative movements across the different development groups, with the exception of Latin America in the LDC group, which reflects the movements of Haiti.

Table 2.2: Changes in mean indicator ranks between 2012 and 2018, by development stage and geographic region

Stage of industrial development and region	Dimension 1		Dimension 2						Dimension 3	
	MVA_{pc}	MX_{pc}	IND_{int}	$MHVA_{sh}$	MVA_{sh}	MX_{qua}	MHX_{sh}	MX_{sh}	$ImWMVA$	$ImWT$
Industrialized economies	28	29	44	36	64	49	49	56	48	41
Central and Western Asia	27	30	48	39	83	97	90	87	58	54
Eastern Asia	43	56	52	41	65	54	48	55	52	50
Europe	25	20	37	32	55	36	39	43	45	34
Latin America and the Caribbean	48	45	61	59	67	92	104	87	72	61
Northern America	37	58	75	49	109	42	27	76	56	56
Pacific	29	40	92	69	111	113	108	105	40	44
Southern and South-eastern Asia	22	15	9	13	15	15	15	38	28	22
Emerging industrial economies	66	70	60	66	58	66	66	72	57	58
Africa	78	77	73	84	58	59	73	57	66	66
Central and Western Asia	56	66	68	67	73	81	67	89	60	67
Eastern Asia	35	58	7	29	4	12	28	4	1	1
Europe	70	51	59	60	61	47	59	50	76	58
Latin America and the Caribbean	61	79	73	76	72	88	79	96	56	65
Southern and South-eastern Asia	73	80	40	55	33	56	57	67	39	46
Other developing economies	105	103	103	104	95	100	102	93	106	108
Africa	110	101	98	107	90	105	102	97	96	98
Central and Western Asia	112	115	108	110	93	100	95	101	103	112
Eastern Asia	102	68	129	134	110	137	143	109	121	94
Europe	111	88	122	113	114	106	110	96	131	115
Latin America and the Caribbean	87	97	89	86	87	90	94	80	104	110
Pacific	114	111	138	126	124	107	121	91	142	127
Southern and South-eastern Asia	124	125	110	106	106	117	138	96	95	102
Least developed economies	136	132	116	122	97	102	100	95	110	118
Africa	140	137	121	118	108	105	89	106	118	125
Central and Western Asia	136	147	126	149	82	101	73	118	103	139
Latin America and the Caribbean	139	145	131	131	115	88	141	58	132	137
Southern and South-eastern Asia	123	115	99	126	68	98	125	71	86	94

Source: UNIDO, 2020b.

Note: Yellow denotes a deterioration in the mean rank that is greater than one position, and orange signifies an improvement that is greater than one position.

2.4 Main findings by geographic region

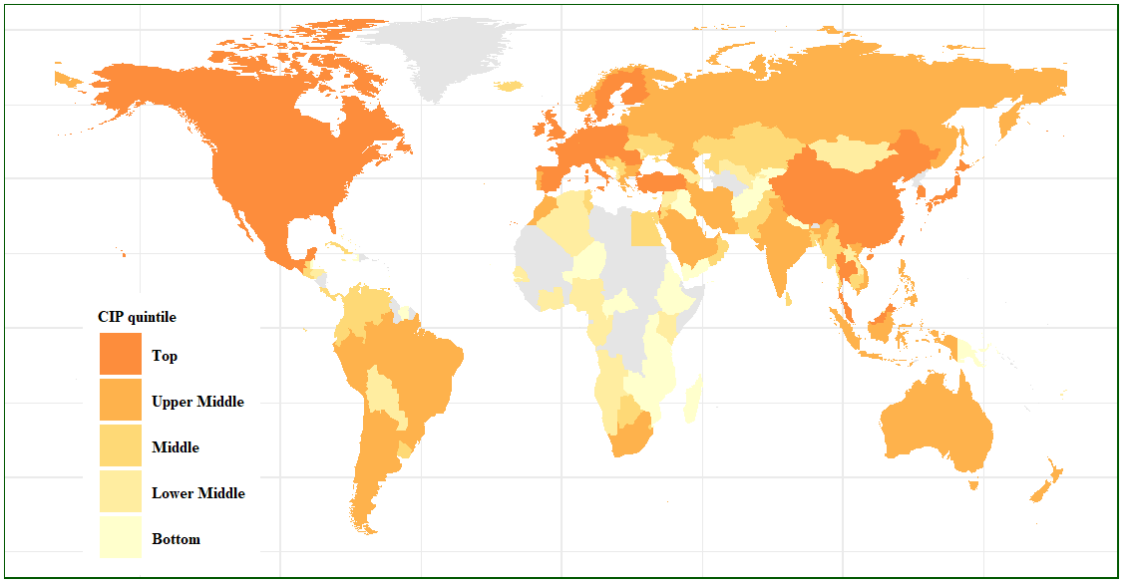
One of the most common uses of the CIP index is comparisons with neighbouring countries. This is because neighbouring countries are often important trading partners or in some cases, close competitors. Additionally, countries within the same region are likely to share several common socio-economic characteristics and have similar features, such as institutional legacies and endowments with natural capital and cultures. They sometimes even share free trade areas, such as under NAFTA, in the EU or ASEAN, and common currencies, such as the euro or the franc-CFA in West and Central Africa.

Figure 2.7 presents the geographic distribution of countries in different CIP index quintiles across the world. The figure provides evidence that countries with high levels of competitiveness are likely to be grouped within the same regions. There are three clusters with highly competitive countries, which are concentrated in Eastern Asia, Europe and Northern America. By contrast, the majority of countries with the lowest levels of competitiveness are located in sub-Saharan Africa.

These three clusters of highly competitive countries in Eastern Asia, Europe and Northern America coincide with the presence of the three largest markets in these regions: China, the EU zone and the United States. This finding is very much in line with gravity models of international trade, which suggest that trade flows are directly related to the economic size of the countries involved. Hence, proximity to large economic markets is closely linked to greater flows of goods, people and investments, which in turn has a positive impact on technology transfer and productivity (Tinbergen, 1962; Bergeijk and Brakman, 2010; Benedictis and Salvatici, 2011).

This section examines the CIP index results for the following geographic regions: (i) Northern America, (ii) Latin America and the Caribbean, (iii) Eastern Asia, (iv) Central and Western Asia, (v) Southern and South-eastern Asia, (vi) Europe, (vii) Pacific, and (viii) Africa. Information on the composition of countries for each region can be found in Appendix A1.

Figure 2.7: Distribution of CIP scores (quintiles) on the world map, 2018



Source: Authors' elaboration based on UNIDO, 2020b.

2.4.1 Northern America

Table 2.3 is the first of a series of regional tables that present the regional and global rankings of the countries within each geographic region, as well as the changes they have undergone over time. Table 2.3 extracts relevant information from Table 2.1 for the Northern America region and adds the countries' ranks for each of the CIP index's three dimensions: i) Capacity to produce and export manufactured goods, ii) technological deepening and upgrading, and iii) world impact. Table 2.3 shows the industrial competitiveness performance of Bermuda, Canada and the United States.

Unsurprisingly, there is great disparity in the industrial competitiveness between the two leading economies of this group and Bermuda. The United States and Canada rank in the top quintile of the CIP index, namely in 4_{th} and 19_{th} position, respectively, while Bermuda ranks at the bottom, in 139_{th} position. Bermuda has consistently been at the bottom quintile of the CIP index, the main reason being that most of the country's high GDP per capita is generated in the financial and insurance service sectors by offshore firms and its manufacturing sector is very small.

In comparison with their 2012 ranks, all three economies have lost some positions in the global ranking, which indicates that they have had reductions in their relative levels of industrial competitiveness. In other words, compared with other economies, these three economies have not been able to keep up with other countries' increases in manufacturing competitiveness.

The United States and Canada experienced a period of stable but rather slow economic growth. The United States grew at an average of 2.3 per cent and Canada at 2.1 per cent per year. While local demand for manufactured products remained stable due to the limitations of this modest economic growth, foreign demand for manufacturing exports was constrained. During the same period, manufacturing exports in the United States grew at an average growth rate of 0.6 per cent and of 0.2 per cent in Canada.

The slow growth of the United States economy—which translates into weakened local demand—in addition to diminishing foreign demand as a consequence of the increasing competition and trade tensions with China, has had a negative impact on the profitability of U.S. businesses and has forced them to look for alternative ways to expand their profitability. U.S. corporations have taken advantage of the low interest rates and increased their corporate debt, which has raised a number of concerns not only regarding the ever growing size of U.S. debt (the U.S. investment-grade corporate debt market has increased by 6.7 per cent since 2013, and reached USD 9.3 trillion by the end of 2018, which was around 44 per cent of US GDP), but also for the destination of these funds which were not allocated to expand businesses' core activities but rather invested in speculative financial instruments (Forbes, 2019b; S&P Global, 2019; IMF, 2019; Forbes, 2019a).

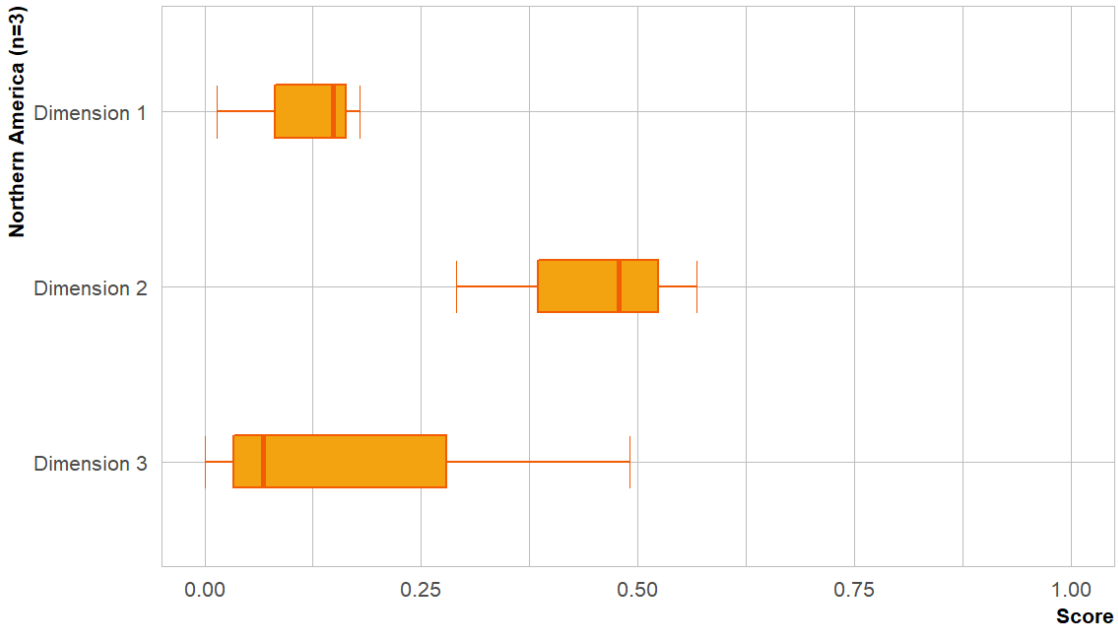
A useful summary of this problem was provided in a report of the investment firm Whitehelm: "Corporations have capitalized on the relative cheap credit on offer, but it has not been used as productively as central banks might have hoped. Many companies have chosen to prioritize short-term profit growth over long-term growth, most notably through debt-funded share buybacks" (Whitehelm, 2019, page 7). The fact that the U.S. (as well as Canadian) businesses have shown a preference to borrow funds to finance buybacks or other similar programmes rather than to expand their productive activities or invest in research and development certainly helps to explain the poor performance of these countries in the first and second dimensions.

Table 2.3: CIP ranks: Global, regional and by CIP dimension, Northern America (2018)

Regional rank	Economy	Global rank	Rank in the first dimension	Rank in the second dimension	Rank in the third dimension	Absolute change compared to 2012
1	United States of America	4	32	30	2	-2 ↓
2	Canada	19	22	50	14	-2 ↓
3	Bermuda	139	91	101	150	-1 ↓

Source: Authors' elaboration based on UNIDO, 2020b.

Figure 2.8: Score distribution, Northern America (2018)



Source: Authors' elaboration based on UNIDO, 2020b.

Figure 2.8 is the first of a series of regional boxplots that allow us to illustrate the score distribution for the countries in each of the three dimensions.[2] This particular region with only three countries is a very simple example to help us understand its score distribution and the boxplot's usefulness. Figure 2.8, in combination with Table 2.3, allows us to identify the precise score of each country. For instance, according to Table 2.3, Canada of the three countries in this region ranks best in Dimension 1, the United States comes in second and Bermuda in third place. As mentioned above, the whisker to the left starts from the minimum value, which we know is Bermuda, i.e. Figure 2.8 shows that Bermuda scored 0.01 in the first dimension, followed by the middle value (median), that is, the United States, which scored 0.15, followed by

[2]Each boxplot presented here is composed of three parts: i) the box in the middle, which represents the middle 50 per cent of observations (the range between 25 per cent and 75 per cent of the countries' scores); ii) the line inside the box, which represents the median or middle value separating the higher half from the lower half of the countries' scores, and iii) the whiskers to each side of the box. The whisker to the left starts with the minimum score and continues up to 25 per cent of the observations, while the whisker to the right starts from 75 per cent of the scores and concludes with the maximum score.

Canada, which has the maximum value of 0.18.

Taking a broader perspective, Figure 2.8 suggests that the region's score is particularly low in terms of its capacity to produce and export manufactured goods, and despite the fact that the United States ranks second in terms of impact on world economy, this region (and the United States) still scores higher in technological deepening and upgrading, which implies that countries generally tend to rank better in technological deepening and upgrading than in world impact. As already discussed in the previous section, it is easier for countries to acquire and upgrade their technology than to become leaders in international markets.

2.4.2 Latin America and the Caribbean

The Latin America and the Caribbean region also had a rather weak performance. With a few exceptions, the majority of Latin American economies registered a decline in industrial competitiveness between 2012 and 2018. One clear example of this trend can be observed when looking at the three major economies in the region (Brazil, Mexico and Argentina); neither improved their global rank (see Table 2.4).

Table 2.4: CIP ranks: Global, regional and by CIP dimension, Latin America and the Caribbean (2018)

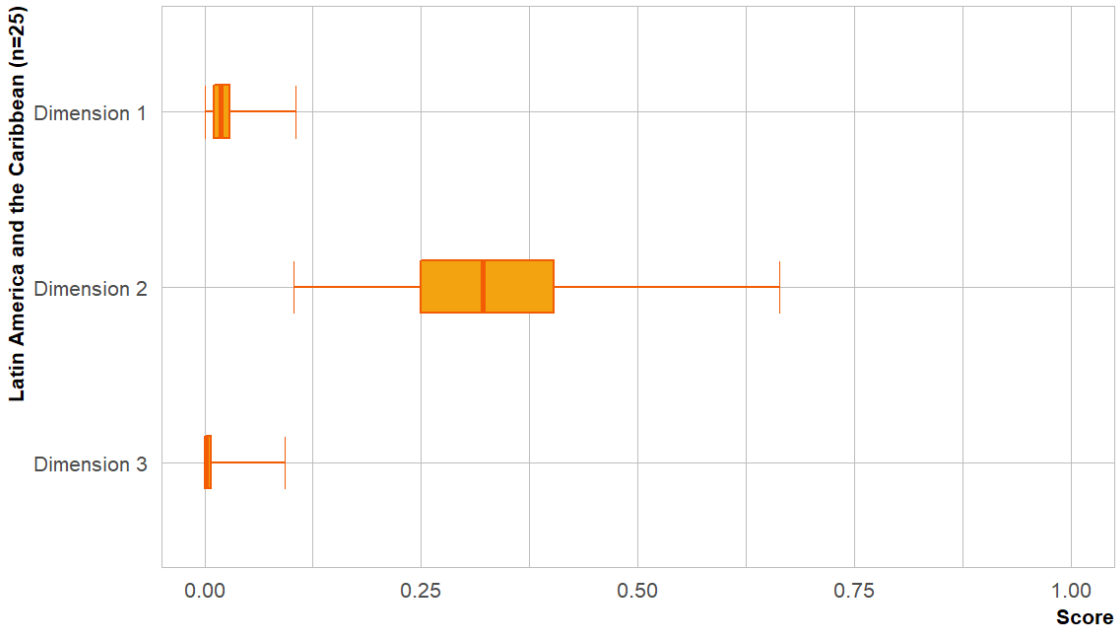
Regional rank	Economy	Global rank	Rank in the first dimension	Rank in the second dimension	Rank in the third dimension	Absolute change compared to 2012
1	Mexico	20	46	17	10	0 ↔
2	Brazil	40	75	59	22	-7 ↓
3	Chile	50	52	97	45	-1 ↓
4	Argentina	53	67	67	43	-15 ↓
5	Trinidad and Tobago	59	41	48	83	-4 ↓
6	Peru	60	69	99	49	2 ↑
7	Venezuela	65	73	117	51	-11 ↓
8	Costa Rica	66	56	64	74	-1 ↓
9	Panama	72	55	100	76	-5 ↓
10	Colombia	73	94	84	52	-3 ↓
11	Guatemala	74	81	57	66	0 ↔
12	Uruguay	78	58	93	85	-2 ↓
13	El Salvador	81	74	52	84	-1 ↓
14	Ecuador	86	90	130	72	-5 ↓
15	Cuba	90	107	66	87	0 ↔
16	Honduras	95	104	77	93	-1 ↓
17	Paraguay	100	101	103	98	5 ↑
18	Bolivia	102	106	133	91	-1 ↓
19	Jamaica	108	97	87	120	-11 ↓
20	Barbados	113	71	54	140	-7 ↓
21	Bahamas	119	82	70	139	-10 ↓
22	Belize	130	108	120	144	-6 ↓
23	Suriname	131	102	148	142	-10 ↓
24	Saint Lucia	138	99	128	148	5 ↑
25	Haiti	141	145	119	134	1 ↑

Source: Authors' elaboration based on UNIDO, 2020b.

Mexico, the second largest economy according to GDP, managed to hold its position and continued to rank at the top of the industrial competitiveness ranking for Latin America. During this period, Mexico underwent a period of modest but stable economic growth (with an average growth rate of 2.4 per cent from 2012 to 2018), and despite some trade tensions with its biggest trading partner, the United States, Mexico's level of industrial competitiveness has remained stable.[3] In 2018, slightly over 75 per cent of Mexican exports were destined for the United States, resulting in the country ranking 10th in the third dimension of the CIP.

Brazil is the economy with the highest GDP in the region. The country suffered an economic and political crisis during the study period, which started in mid-2014 and ended with the impeachment of the country's president and a negative growth rate of around 3.5 per cent during 2015 and 2016. Unfortunately, Brazil's economic growth has been weak, even during its recovery, with growth rates of around 1 per cent during the following three years. With such economic turmoil, it is unsurprising that the Brazilian economy lost seven positions in the industrial competitiveness ranking. Yet given its size, Brazil continues to have a major impact on the global economy.

Figure 2.9: Score distribution, Latin America and the Caribbean (2018)



Source: Authors' elaboration based on UNIDO, 2020b.

Argentina was the economy that lost most positions in the global ranking. The economic crisis hit Argentina particularly hard, a high inflation rate caused a major devaluation of the Argentine peso and resulted in an economic debacle. According to the World Development Indicators (World Bank, 2020), Argentine inflation rose from 22.3 per cent in 2012 to a peak

[3]During this period, Mexico and the United States had some trade disputes, for example, in food products, steel and aluminium, which resulted in both countries fortifying their trade barriers and partially explains the fall in Mexican exports to (and imports from) the United States during 2015 and 2016. In September 2018, Canada, Mexico and the United States reached an agreement to end the North American Free Trade Agreement (NAFTA) and replace it with the United States–Mexico–Canada Agreement (USMCA). For more information, see the Congressional Research Service report (CRS, 2018).

of 41.1 per cent in 2016. In 2018, Argentina's inflation rate was still 40 per cent. In terms of industrial competitiveness, the crisis severely deteriorated Argentinian capacity to produce and export manufactured goods, and the country's scores in all dimensions dropped significantly.

Figure 2.9 presents the score distribution of the Latin American and Caribbean economies. The capacity to produce and export manufactured goods is clearly limited in the region, as indicated by its median score of 0.018. The region scores much better in technological deepening and upgrading, with Mexico reaching a score of 0.66, the highest in the region. Even the lowest score (Suriname) was similar to the highest scores in the other two dimensions. The regional median for the second dimension is 0.32. The region achieved lower scores in the third dimension than in the first one. The regional median is 0.0015, and not even the biggest economies were able to reach a score of 0.1, which once again highlights the difficulty of becoming a leader in international markets.

2.4.3 Eastern Asia

Eastern Asia is one of the regions that is concentrated among the top-ranking industrial leaders. China, the Republic of Korea and Japan rank in the top-5 of the most competitive industries at the global level. China heads the ranking of industrial competitiveness in the region. During the period 2012–2018, the Chinese economy grew by 7.0 per cent per year and its industrial sector by 6.5 per cent per year. Its exports performance was more moderate. During the same period, China's total exports grew at an average annual rate of 3.3 per cent, and its manufacturing exports also rose at the same rate. This manufacturing export performance may not look that impressive, but it is nearly double the average global growth rate.

Exports of tradable goods have been the main contributor to China's recent economic growth (Guo and N'Diaye, 2009), which explains why China ranks highest in the third dimension of the CIP ranking. China does not only export plenty of manufactured products, but most of these products are medium- and high-technology products, as reflected in the ranking of technological deepening and upgrading, which China ranks 9^{th} in (see Table 2.5). Considering all these factors, China moved from the 5^{th} position in the CIP ranking to the 2^{nd} position, pushing out the United States which held that position in 2012.

Table 2.5: CIP ranks: Global, regional and by CIP dimension, Eastern Asia (2018)

Regional rank	Economy	Global rank	Rank in the first dimension	Rank in the second dimension	Rank in the third dimension	Absolute change compared to 2012
1	China	2	47	9	1	3 ↑
2	Republic of Korea	3	12	2	5	1 ↑
3	Japan	5	17	7	4	-2 ↓
4	China, Taiwan Province	8	11	1	11	0 ↔
5	China, Hong Kong SAR	88	86	107	86	-5 ↓
6	Mongolia	104	85	139	105	3 ↑
7	China, Macao SAR	150	124	152	145	-13 ↓

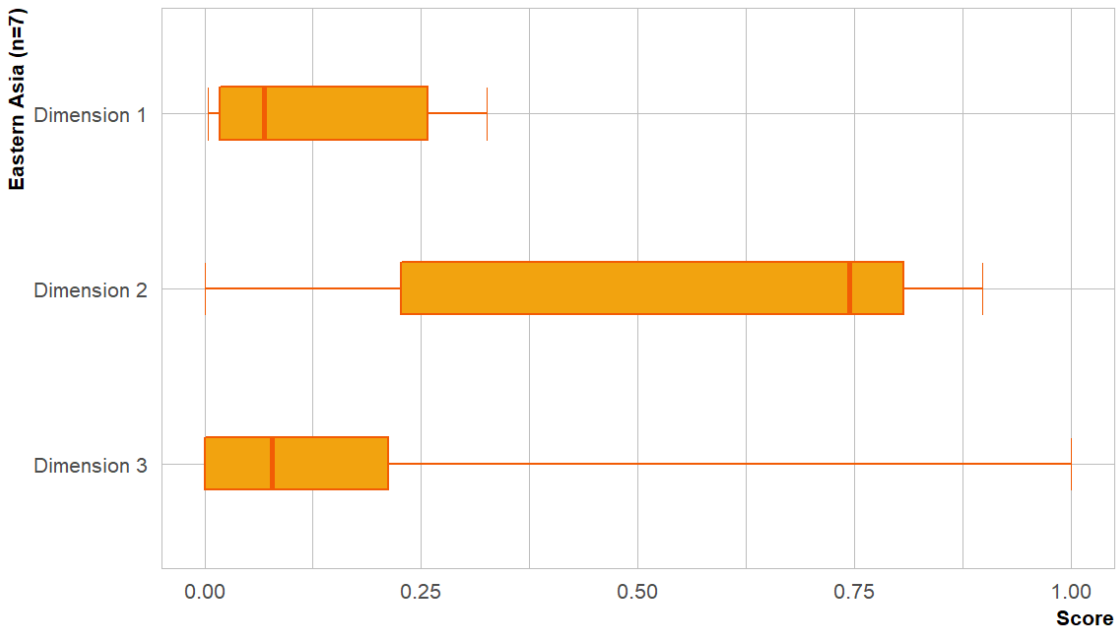
Source: Authors' elaboration based on UNIDO, 2020b.

The Republic of Korea also witnessed a positive shift in its CIP ranking. With a moderate growth in its local market, the Republic of Korea's industrial performance was also based on exports of medium-and high-tech goods. This becomes apparent when looking at the CIP dimensions, because the Republic of Korea holds the second position in the global ranking in terms of technological upgrading and deepening, and the fifth position in world impact.

Japan is another major industrial leader that fell from third position in the global CIP ranking in 2012 to the fifth position in 2018. Japanese exports actually contracted during this period, and its economy did not succeed in maintaining the same levels of industrial competitiveness. The Japanese economy only grew by 1.2 per cent per year between 2012 and 2018, and even if the manufacturing sector's performance was slightly better, the 2 per cent annual growth did not suffice to keep up with its competitors. Moreover, manufacturing exports fell at a rate of 1.6 per cent annually.

Figure 2.10 presents the score distribution in Eastern Asia. Despite having three economies in the top-5 in the global ranking, Eastern Asia does not stand out for its capacity to produce and export manufactured goods, in fact, the regional median was 0.07. The region performed much better in the second and third dimensions. In fact, Eastern Asia had the highest median among all regions in terms of technological deepening and upgrading, with a score of 0.74. China's performance in the third dimension was especially noteworthy, and the country ranked best in the global ranking. The regional median is not particularly impressive, as the region scored 0.08, and yet, it is still the highest score compared with all other regions. This is truly a remarkable achievement for the countries in this region – they achieved the highest median in two out of the three CIP dimensions.

Figure 2.10: Score distribution, Eastern Asia (2018)



Source: Authors' elaboration based on UNIDO, 2020b.

2.4.4 Central and Western Asia

Israel, the top-ranking economy in this region, lost three positions in the global ranking in the period 2012–2018 (see Table 2.6). Despite having a moderate and stable economic growth with an average annual growth rate of 3.6 per cent, the Israeli manufacturing sector did not capitalize on the positive business environment, as reflected in the weak growth rate of its manufacturing sector, which grew at a rate of 0.6 per cent during the same period. Consequently, Israel's CIP scores fell, particularly its capacity to produce and export manufactured goods.

The case of Turkey is different. Turkey's economy was able to improve its position in the global ranking during this period, placing manufacturing at the centre of its economic performance, as shown by its impressive manufacturing growth (6.1 per cent per year), leading to a growth rate of 5.5 per year on the whole. In addition to increasing its manufacturing value added, Turkey also improved its position in the technological ladder, increasing the medium- and high-technology products that were produced and exported. Consequently, Turkey's scores in the second dimension were also improved.

The case of the United Arab Emirates (UAE) was even more positive. The UAE advanced 12 positions in the CIP ranking, by proactively allocating its efforts towards transitioning to a knowledge-based economy, promoting innovation, and research and development. The UAE's successful industrial performance during this period has its roots in 2010, with the launch of the Vision 2021 initiative. In 2014, the UAE launched its National Agenda, which defined very specific national priorities. In relation to manufacturing, the UAE focused its efforts on developing a competitive knowledge economy and providing a first-rate education system, together with the protection of the environment and the expansion of its infrastructure.

Table 2.6: CIP ranks: Global, regional and by CIP dimension, Central and Western Asia (2018)

Regional rank	Economy	Global rank	Rank in the first dimension	Rank in the second dimension	Rank in the third dimension	Absolute change compared to 2012
1	Israel	28	19	29	38	-3 ↓
2	Turkey	29	51	33	20	1 ↑
3	United Arab Emirates	35	28	91	40	12 ↑
4	Saudi Arabia	37	49	61	31	-2 ↓
5	Qatar	45	26	92	60	-6 ↓
6	Bahrain	51	27	51	73	-5 ↓
7	Kuwait	55	39	96	62	-13 ↓
8	Oman	63	53	98	71	-2 ↓
9	Kazakhstan	68	66	110	58	-8 ↓
10	Jordan	76	77	42	79	-3 ↓
11	Cyprus	91	64	73	118	11 ↑
12	Uzbekistan	92	116	82	77	1 ↑
13	Lebanon	94	95	83	95	-8 ↓
14	Georgia	96	93	68	106	4 ↑
15	Armenia	103	89	102	116	11 ↑
16	State of Palestine	112	111	94	121	6 ↑
17	Syrian Arab Republic	116	128	112	99	-6 ↓
18	Azerbaijan	120	117	144	108	-12 ↓
19	Kyrgyzstan	122	121	106	123	4 ↑
20	Tajikistan	129	135	85	130	3 ↑
21	Yemen	140	144	121	132	-11 ↓
22	Iraq	147	143	151	128	-12 ↓

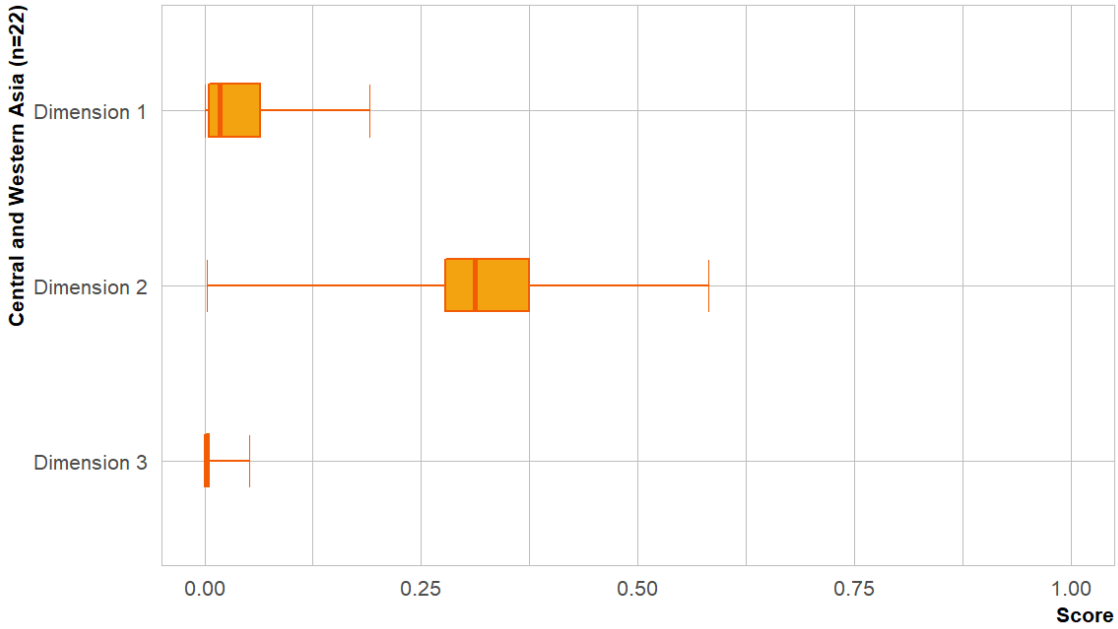
Source: Authors' elaboration based on UNIDO, 2020b.

Today, the Federal Government of the UAE is implementing several strategies and plans. Among these are the UAE Policy for Advanced Industries, the National Strategy for Advanced Innovation and the UAE Strategy for the Fourth Industrial Revolution (Government of UAE, 2020).[4] The UAE's economy and manufacturing sector thus recorded stable and solid growth. They grew at an average annual growth rate of 3.3 per cent and 4.1 per cent, respectively, between 2012 and 2018. Consequently, the UAE significantly improved its scores in all three dimensions.

The overall competitive industrial performance of Central and Western Asia registered some positive and some negative cases. Other positives cases are Armenia and Cyprus, which both advanced 11 positions in their ranking from 2012 to 2018. However, Kuwait, Azerbaijan, Yemen and Iraq experienced similar shifts in the opposite direction, falling between 11 and 13 positions in their ranking.

Figure 2.11 presents the score distribution in Central and Western Asia. The region's performance is comparable with that of the Latin America and the Caribbean region. Central and Western Asia performed poorly in the first dimension, as its capacity to produce and export manufactured goods achieved a median of only 0.018; its performance was even worse in the third dimension, with a score of only 0.0015. These values are equal to those in Latin America and the Caribbean. The region scored better in the second dimension, yet its median was slightly lower than that of Latin America and the Caribbean's, namely 0.31 and 0.32, respectively.

Figure 2.11: Score distribution, Central and Western Asia (2018)



Source: Authors' elaboration based on UNIDO, 2020b.

[4]Moreover, UAE industrial data have also seen a major improvement over the recent years.

2.4.5 Southern and South-eastern Asia

The three industrial leaders in Southern and South-eastern Asia are Singapore, Malaysia and Thailand. Despite being the most competitive industries in the region, none of these economies managed to improve their positions in the global CIP ranking. Yet most of the other countries in this region improved their position in the global ranking, and some of them achieved an outstanding performance. This is the case of Viet Nam, Laos and Myanmar, their industries moving up 19, 21 and 14 positions in the competitiveness global ranking, respectively (see Table 2.7).

From 2012 to 2018, the economies and manufacturing sectors of Viet Nam, Laos and Myanmar registered strong and stable growth. Viet Nam and Myanmar, for example, achieved high economic growth, with average annual growth rates of 6.4 per cent and 7.2 per cent, respectively. The manufacturing sector was the engine of this growth in both economies, growing 10.4 per cent and 9.6 per cent, respectively. Consequently, these countries improved their scores in all three dimensions. Laos' economic growth was also very high (7.2 per cent per year), yet its manufacturing sector, while strongly increasing, could not keep up with the rest of the economy, and grew by 5.5 per cent. Lao's scores in the first and second dimensions improved, while world impact dropped slightly.

Table 2.7: CIP ranks: Global, regional and by CIP dimension, Southern and South-eastern Asia (2018)

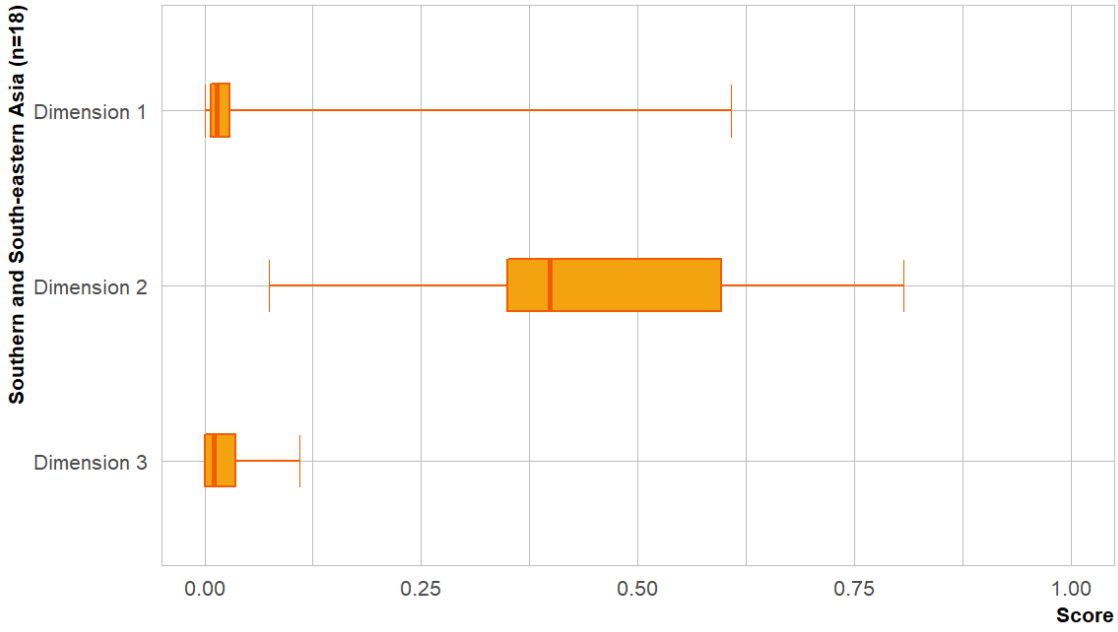
Regional rank	Economy	Global rank	Rank in the first dimension	Rank in the second dimension	Rank in the third dimension	Absolute change compared to 2012
1	Singapore	9	3	4	25	-2 ↓
2	Malaysia	23	37	15	24	-1 ↓
3	Thailand	24	44	12	17	0 ↔
4	Viet Nam	38	68	26	29	19 ↑
5	Indonesia	39	80	41	18	2 ↑
6	India	42	110	36	8	2 ↑
7	Philippines	43	79	13	32	10 ↑
8	Iran (Islamic Republic of)	56	78	60	36	7 ↑
9	Bangladesh	70	113	62	44	8 ↑
10	Sri Lanka	75	87	79	65	2 ↑
11	Pakistan	82	125	65	48	-3 ↓
12	Myanmar	84	114	80	64	14 ↑
13	Cambodia	85	96	78	78	11 ↑
14	Brunei Darussalam	93	54	81	129	-9 ↓
15	Lao People's Dem Rep	109	109	129	103	21 ↑
16	Nepal	135	140	124	127	-1 ↓
17	Maldives	144	123	149	147	2 ↑
18	Afghanistan	146	150	150	136	-1 ↓

Source: Authors' elaboration based on UNIDO, 2020b.

The distribution of this region's scores shows the high heterogeneity of its members (see Figure 2.12). Regarding its capacity to produce and export manufactured goods, this region's median is similar to that of other regions (0.015). Southern and South-eastern Asia has a very high maximum value on account of Singapore, which scored 0.61 in this dimension. Singapore also achieved the best score in the second dimension, with a value of 0.81, which indicates that the country not only produces and exports large amounts of manufacture products, but also that

these products are located in the upper part of the technological ladder. Moreover, the median in this dimension was 0.4, which placed the region in the middle range compared with other Asian regions. Finally, this region has a limited world impact. India's value in this dimension is highest, with the region's median being 0.011.

Figure 2.12: Score distribution, Southern and South-eastern Asia (2018)



Source: Authors' elaboration based on UNIDO, 2020b.

2.4.6 Europe

The European region is led by Germany, which is the top-ranked economy at the global level. Ireland and Switzerland complete the top-3 in this region, which is characterized by numerous industrialized economies among its members.

Germany has been the top-ranked economy in the CIP ranking for the last 18 years. Despite its industrial success, Germany's economic growth has been rather slow during the 2012 to 2018 period, as demonstrated by its average annual growth rate of 1.7 per cent. German industry has performed better, but its growth rate of 2.7 per cent per year was only moderate. While the country's domestic growth is not particularly impressive, Germany's export performance is. In 2018, exports of goods represented 39.5 per cent of its GDP (UNIDO, 2021b). Moreover, around 92 per cent of merchandise exports were manufactured products. Within manufacturing exports, close to 77 per cent were medium- and high-technology products (UNIDO, 2020b). Based on these statistics and some other data, Germany was able to rank 5^{th} in the first dimension, 6^{th} in the second and 3^{rd} in the third dimension, which clearly demonstrates that being accorded the most competitive industry is not about excelling in only one competitiveness dimension, but achieving a high performance across all dimensions.

Despite being a stable region, some European countries registered significant changes. One example of this was Ukraine, which went through a very difficult period and consequently lost 13 positions in the CIP ranking (see Table 2.8). Due to the ongoing conflict, Ukraine's exports were hit hard. While this is certainly

not the only reason for the decline in exports, it contributes to the explanation why Ukrainian manufacturing exports fell by more than one-third between 2012 and 2018. With the drop in foreign demand, local production also shrank, and thus, Ukraine's economy and manufacturing sector registered a negative growth rate of around 1.5 per cent and 3.9 per cent per year, respectively, during this period. Consequently, Ukraine's scores in all three CIP dimensions decreased.

Table 2.8: CIP ranks: Global, regional and by CIP dimension, Europe (2018)

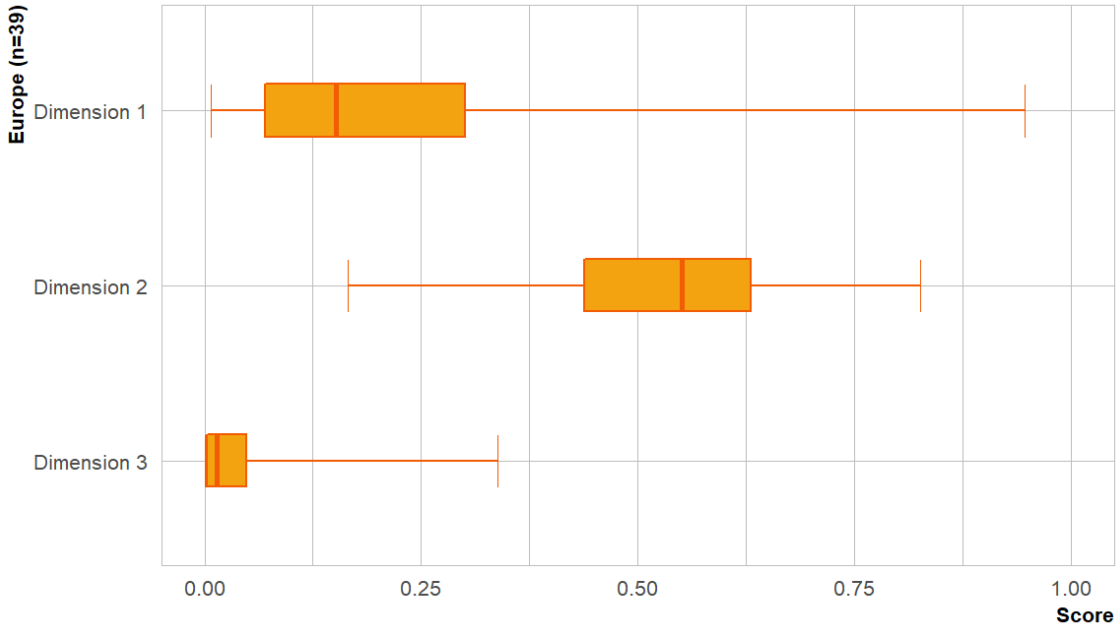
Regional rank	Economy	Global rank	Rank in the first dimension	Rank in the second dimension	Rank in the third dimension	Absolute change compared to 2012
1	Germany	1	5	6	3	0 ↔
2	Ireland	6	1	3	23	7 ↑
3	Switzerland	7	2	11	16	-1 ↓
4	Netherlands	10	6	28	13	-1 ↓
5	Italy	11	18	21	6	0 ↔
6	Belgium	12	4	24	19	0 ↔
7	France	13	21	22	7	-3 ↓
8	Austria	14	7	18	26	2 ↑
9	United Kingdom	15	29	35	9	-1 ↓
10	Czechia	16	13	5	28	2 ↑
11	Sweden	17	9	19	27	-2 ↓
12	Spain	18	31	31	12	1 ↑
13	Denmark	21	8	20	33	0 ↔
14	Poland	22	35	25	21	4 ↑
15	Finland	25	14	27	37	-2 ↓
16	Slovakia	26	16	10	41	3 ↑
17	Hungary	27	20	8	34	0 ↔
18	Slovenia	30	15	14	57	4 ↑
19	Romania	31	42	16	35	6 ↑
20	Russian Federation	32	61	74	15	-1 ↓
21	Portugal	33	34	45	42	3 ↑
22	Norway	36	25	76	47	-4 ↓
23	Lithuania	41	23	37	59	2 ↑
24	Luxembourg	46	10	75	81	5 ↑
25	Belarus	47	48	23	56	-7 ↓
26	Estonia	48	24	44	75	4 ↑
27	Greece	49	45	72	50	1 ↑
28	Bulgaria	54	50	46	61	4 ↑
29	Croatia	57	43	47	68	2 ↑
30	Latvia	58	40	53	80	6 ↑
31	Serbia	62	62	43	67	10 ↑
32	Ukraine	69	92	55	54	-13 ↓
33	Malta	71	36	49	107	-5 ↓
34	North Macedonia	77	59	40	96	12 ↑
35	Iceland	79	30	122	114	-4 ↓
36	Bosnia and Herzegovina	80	63	63	90	7 ↑
37	Republic of Moldova	111	112	69	126	8 ↑
38	Albania	118	103	143	125	-2 ↓
39	Montenegro	127	100	114	141	1 ↑

Source: Authors' elaboration based on UNIDO, 2020b.

Conversely, North Macedonia climbed up 12 positions in the global ranking. North Macedonia is another successful example of a country whose manufacturing sector served as the engine of growth. Its manufacturing sector grew 6.4 per cent annually from 2012 to 2018, which considerably contributed to the growth of North Macedonia's economy, which grew at an average of 2.7 per cent per year. While the local economy and the corresponding domestic demand for manufactured products only grew at a moderate level, foreign demand played a major role in the expansion of North Macedonia's industrial sector. During this period, merchandise exports grew by 9.5 per cent per year and manufacturing exports increased by 10.1 per cent per year. Thus, North Macedonia registered an improvement in all of its CIP scores.

The score distributions in Europe show that this region has a very strong capacity to produce and export manufactured goods (see Figure 2.13). In fact, four out the top-5 ranked economies in this dimension are located in Europe. Thus, the European median is 0.15, the highest of all regions. Europe also scores high in the second dimension, with a value of 0.55 for the European median. The dispersion in this dimension is not that high, which indicates that all European countries are engaged in some production and export of medium- and high-technology products. Europe has a much lower median in the third dimension, 0.014, which reflects that the region's world impact is far smaller than China's and the United States', despite the fact that the top-ranked economy in the world, Germany, is a member of this region.

Figure 2.13: Score distribution, Europe (2018)



Source: Authors' elaboration based on UNIDO, 2020b.

2.4.7 Pacific

The data limitations in this region are severe. Out of the 17 economies that make up this region, only five have enough industrial and trade data to be included in the CIP index. Table 2.9 presents the observations for countries with missing data in one or more CIP indicators to produce the most recent CIP index, with values for the year 2018.Only Australia required no imputation of data, and four of the economies had one or more imputed indicators. It was impossible to fill the missing values through imputation for one or more CIP indicators in the remaining 12 countries. Consequently, these countries were excluded from the 2020 edition of the CIP index.

Within the five economies with available data, the Pacific region can be divided into two visible clusters of countries, each of them with very different characteristics. While Australia and New Zealand are industrialized economies, with highly competitive industries occupying positions in the upper middle quintile of the global CIP ranking, Fiji, Papua New Guinea and Tonga are developing and emerging industrial economies that are located in the lower middle and bottom quintiles of the ranking.

During the period 2012–2018, Australia lost 6 positions in the global ranking (see Table 2.10). The Australian economy is mainly based on the service sector and its manufacturing share in GDP has been in decline since the early 1960s (Australian Government, 2018; Butlin et al., 2014). This decline is in line with the deterioration of the Australian industrial sector's capabilities, which registered a reduction in the scores of all CIP dimensions. It is noteworthy that Australia, despite its level of industrial development, has a particularly poor performance in technological deepening and upgrading, because most of its exports are based on primary products (mainly mining) and resource-based manufactured goods.

Tonga is the last country in the global CIP ranking. During the period 2012 to 2018, Tonga witnessed modest economic growth, with an average annual growth rate of 1.7 per cent between 2012 and 2018. Its industry grew slightly faster at 2.8 per cent per year. While Tonga's domestic growth rate is representable, the small size of its economy poses clear limitations for the development of its industry. Therefore, growth in foreign demand is far more important for Tonga. Yet, Tonga's exports of merchandise and manufactured products registered negative growth, which decreased at an average annual growth rate of 3.3 per cent and 4.8 per cent, respectively. For all of these reasons, Tonga is ranked last in the third dimension as well as in the global CIP ranking.

Despite the differences in the two clusters of countries within this region, the score distribution does not indicate any strong differences (see Figure 2.14). The absence of these economies in the top quintile of the global CIP ranking implies that the regional leaders are far closer to the other countries in this region than in the case of other regions. Generally, this region achieved low medians in all three dimensions of the CIP. Its capacity to produce and export manufactured goods had a median of 0.015, which is similar to that of the Southern and South-eastern Asia region. The Pacific's median in terms of technological deepening and upgrading was 0.269, and although this value is higher than in the first dimension, it was considerably lower than the corresponding value of the Southern and South-eastern Asia region (0.4). The region's world impact is particularly low, as none of the countries has a significant impact on the global market. The median for the third dimension was close to zero and its maximum score, Australia, only registered a value of 0.027, which is far below the maximum value of other regions.

Table 2.9: Data availability and dealing with missing values in the CIP sub-indicators for the Pacific region in CIP 2020 edition

Economy	Exports				MVA			INDSTAT
	MXpc	MXsh	ImWMT	MHXsh	MVApc	MVAsh	ImWMVA	MHVAsh
Countries without any imputed data								
Australia								
Countries with imputation in one or more indicators								
Fiji								INDSTAT imp
New Zealand								INDSTAT imp
Papua New Guinea	Nearest (2012)	Nearest (2012)	Nearest (2012)	Nearest (2012)				Nearest (2001)
Tonga	Nearest (2014)	Nearest (2014)	Nearest (2014)	Nearest (2014)				Nearest (2004)
Countries not included in the CIP due to missing data for one or more indicators								
Solomon Islands								...
Cook Islands	Nearest (2011)	Nearest (2011)	Nearest (2011)	Nearest (2011)				...
French Polynesia	Nearest (2015)	Nearest (2015)	Nearest (2015)	Nearest (2015)				...
Kiribati	Nearest (2016)	Nearest (2016)	Nearest (2016)	Nearest (2016)				...
New Caledonia	Nearest (2015)	Nearest (2015)	Nearest (2015)	Nearest (2015)				...
Vanuatu	Nearest (2011)	Nearest (2011)	Nearest (2011)	Nearest (2011)				...
Micronesia, Federated States of	Nearest (2013)	Nearest (2013)	Nearest (2013)	Nearest (2013)	...	...	...	...
Marshall Islands	...	...	...	...				...
Palau								...
Tuvalu	Nearest (2005)	Nearest (2005)	Nearest (2005)	Nearest (2005)				...
Samoa								...
Guam	...	...	...	...	...	...	...	...

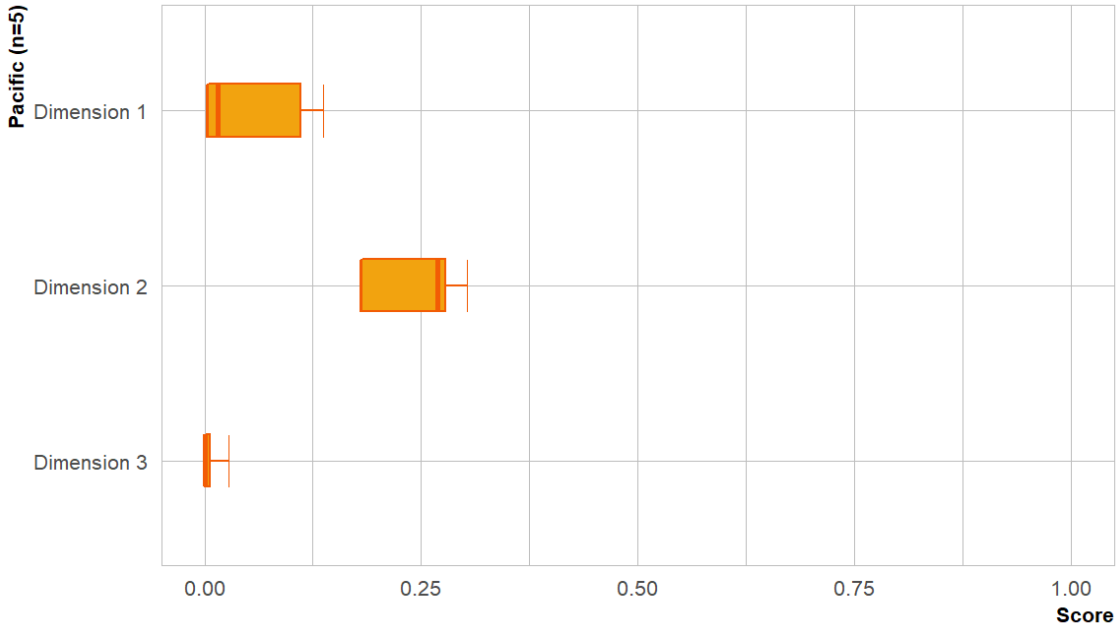
Source: Authors' elaboration based on UNIDO, 2020b.
Note: INDSTAT imp indicates that the value was estimated using the regular INDSTAT imputation procedure; nearest (year) indicates that the value was estimated as the nearest neighbour through Last Observation Carried Forward (LOCF), using the value of the indicator in the given year. The three consecutive points denote missing data (which could not be estimated through LOCF). For more information on how UNIDO deals with missing values imputation and now-casting, see the section on data availability and quality in the next chapter.

Table 2.10: CIP ranks: Global, regional and by CIP dimension, Pacific (2018)

Regional rank	Economy	Global rank	Rank in the first dimension	Rank in the second dimension	Rank in the third dimension	Absolute change compared to 2012
1	Australia	34	38	105	30	-6 ↓
2	New Zealand	44	33	95	55	1 ↑
3	Fiji	117	88	108	133	0 ↔
4	Papua New Guinea	126	126	138	122	-3 ↓
5	Tonga	152	133	137	152	0 ↔

Source: Authors' elaboration based on UNIDO, 2020b.

Figure 2.14: Score distribution, Pacific (2018)



Source: Authors' elaboration based on UNIDO, 2020b.

2.4.8 Africa

The present report focuses on Africa, which the next chapter is dedicated to. To provide adequate continuity to the discussion on the analysis of Africa's industrial competitiveness, its CIP results will be discussed in the next chapter.

CIP report 2020: Chapter 3

3. Industrial Competitiveness in Africa

3.1 The need for industrialization in Africa

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

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

The main objective of this chapter is to provide an overview and quantitative measure of the competitive industrial performance of the African continent. Specifically, this chapter provides an analysis of the continent at the re-

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

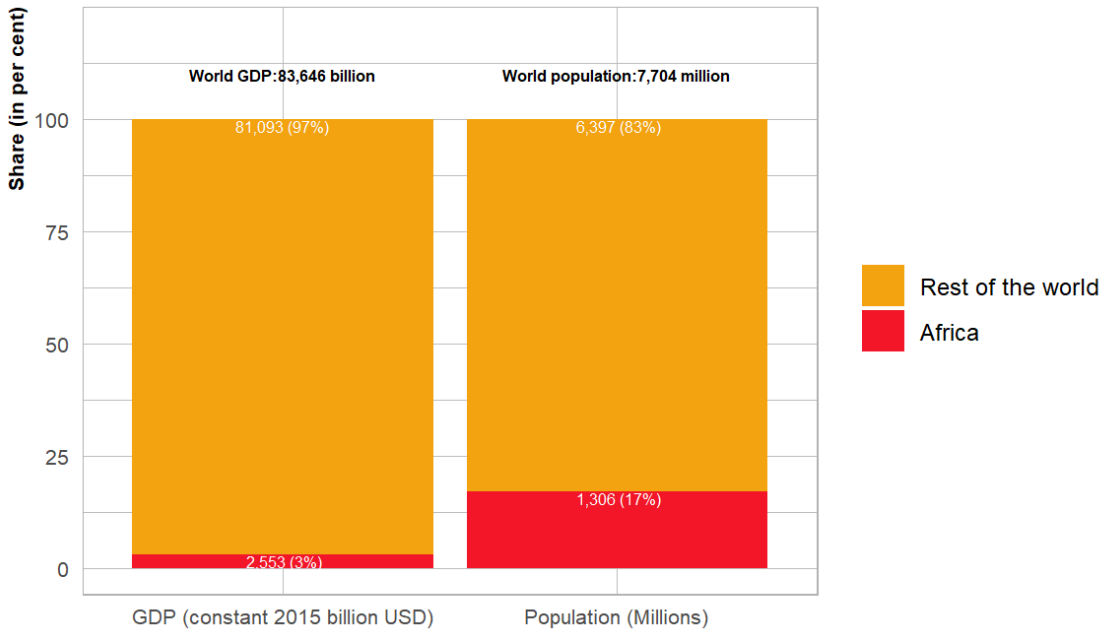
[2] Report of the Fourth United Nations Conference on the Least Developed Countries, Istanbul, Turkey, 9-13 May 2011 (A/CONF.219/7), Chapter II.

gional and country level. Africa's manufacturing performance is reviewed in terms of production, exports and level of technological upgrading and deepening, using the most recent data from UNIDO databases. It further examines Africa's export market shares and its revealed comparative advantage by analysing, assessing and comparing the industrial competitiveness of five African regions: Eastern Africa, Middle Africa, Northern Africa, Southern Africa and Western Africa. Finally, the chapter also highlights the gaps in data availability, monitoring industrial development and informing industrial policy.

3.2 Setting the scene: Some general statistics

According to 2019 data, Africa is home to 1.3 billion people, which is close to 17 per cent of the world population. Yet the African continent only generates three per cent of world gross domestic product (GDP). This accentuates a major disparity in income distribution between Africa and the rest of the world: 17 per cent of the world population has access to only 3 per cent of world income (Figure 3.1). Furthermore, these numbers highlight the income inequality between Africa and the rest of the world, but do not reveal the major income inequalities within the African continent itself. Ordinary African citizens are exposed to both forms of inequality.[3]

Figure 3.1: Africa's size in relation to the world economy, 2019



Source: UNIDO, 2020c.

Note: This figure is based on available data from 54 African countries, which are listed in Appendix A2.

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

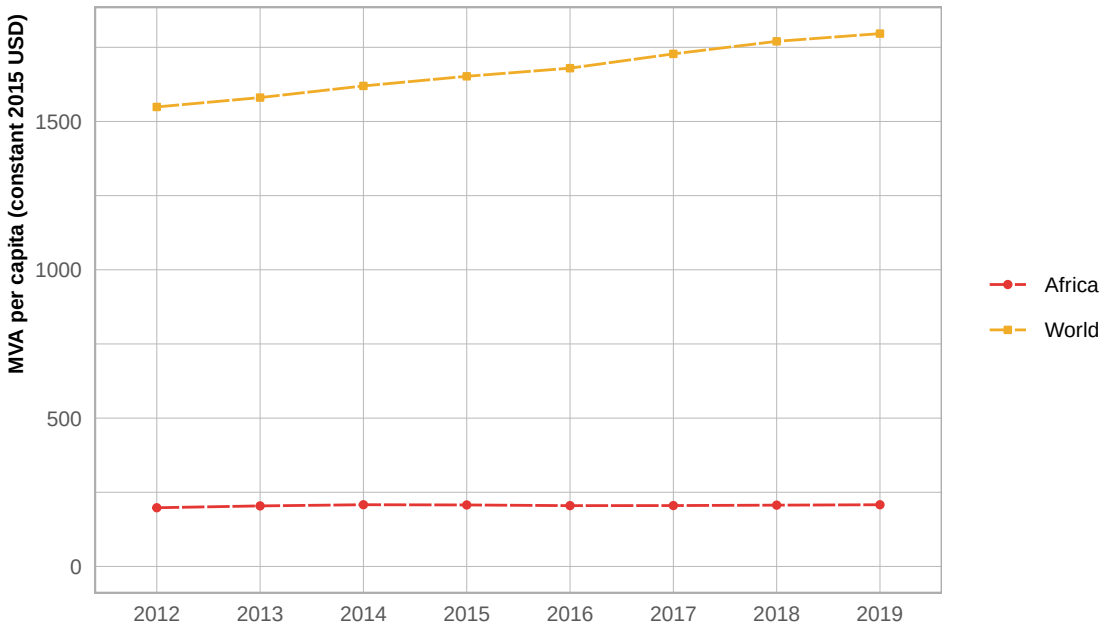
The magnitude of these economic disparities underscores the importance of boosting the continent's economic and social development. Industrialization is key to achieving this goal. Unfortunately, various figures on industrialization are not very encouraging. The disparities between Africa and the rest of the world increase further when we look at manufacturing. Africa only accounts for 3 per cent of world GDP, but only 2 per cent of world manufacturing value added (MVA) is generated in Africa.

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

Figure 3.2 illustrates the development of MVA per capita in Africa and in the world from 2012 to 2019. The period of analysis starts in 2012, following the independence of South Sudan, to avoid data comparability issues. The trend of world MVA per capita is much steeper than Africa's because it increased at an annual growth rate of 2.1 per cent during the relevant period, while Africa's MVA per capita only grew by 0.7 per cent per year. The MVA per capita growth rates clearly diverge, but before rushing to any conclusion, we must bear in mind that demographics play a major role. While the African population grew at an annual rate of 2.6 per cent, the world population grew by only 1.1 per cent.

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

Figure 3.2: Manufacturing value added per capita in Africa and the world, 2012–2019



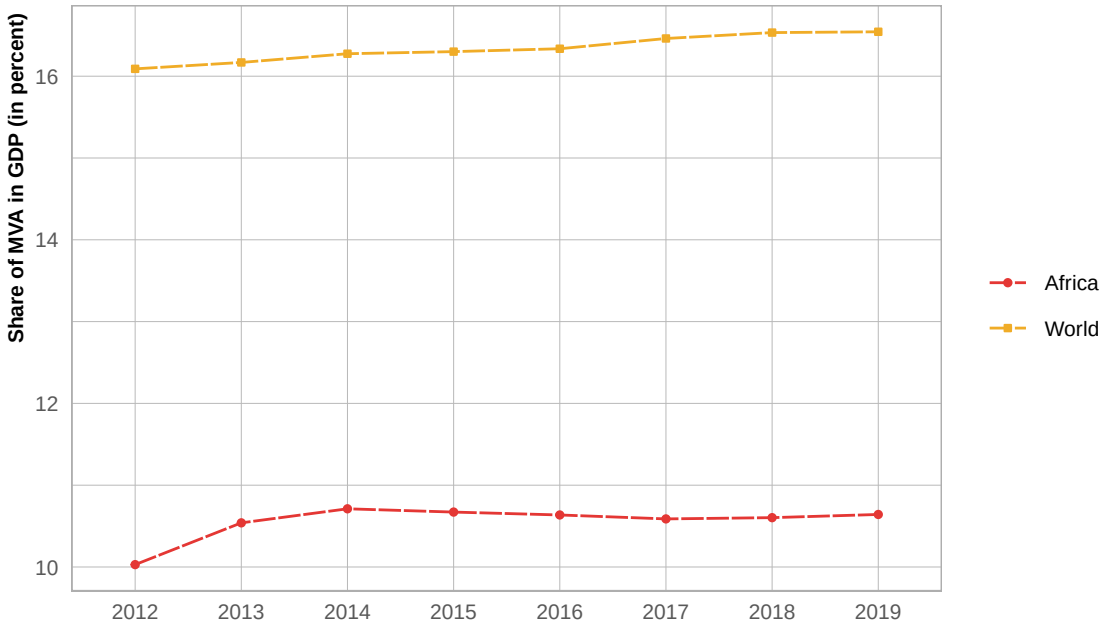
Source: UNIDO, 2020c.

Note: This figure is based on available data from 54 African countries, which are listed in Appendix A2.

Figure 3.3 provides an overview of how Africa's industrialization process has evolved over time, which excludes demographic factors. It illustrates the share of MVA in GDP of both Africa and the world from 2012–2019. The data presented in Figure 3.3 indicates that Africa's share of MVA in GDP is considerably lower than the world average, but it is increasing faster. In fact, Africa's share of MVA in GDP increased from 10 per cent in 2012 to 10.6 per cent in 2019, i.e. its share increased by 6 per cent within 7 years. The world's MVA share in GDP also increased from 16.1 per cent to 16.5 per cent, i.e. by nearly 3 per cent over the same period. Taking this share as an indicator of industrialization suggests that: i) Africa's level of industrialization has expanded in recent years, and ii) despite the large industrialization gap between Africa and the world average, Africa's MVA share in GDP is increasing slightly faster than the world's and therefore, it is closing the industrialization gap with the rest of the world.

Mention should be made that Figures 3.2 and 3.3 are inextricably linked to the Sustainable Development Goals (SDG), in particular to SDG Indicator 9.2.1: "Manufacturing value added as a proportion of GDP and per capita", which UNIDO is the custodian agency for.

Figure 3.3: Share of MVA in GDP for Africa and the world, 2012–2019 (in %)



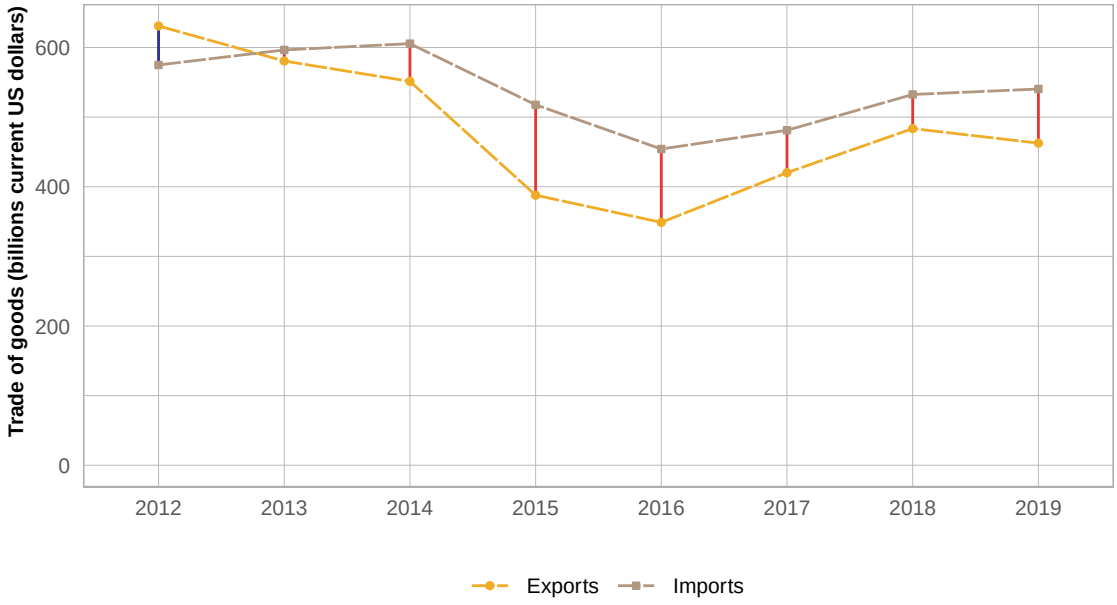
Source: UNIDO, 2020c.

Note: The underlying values of MVA and GDP were measured at 2015 constant prices. The world aggregate was calculated with the available data for 206 economies. The African aggregate was calculated from all 54 African countries with available data, and are listed in Appendix A2.

The share of MVA in GDP does not only provide a straightforward indicator for the level of a country's industrialization; its development over time also gives us important insights about the interaction between the domestic economy's development and its industrial sector. In this regard, industrial development cannot take place without an increase in demand for industrial products, and while the domestic market is a major source of demand in many countries, there are many others that rely much more on rising foreign demand to develop their industry. Indeed,

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

Figure 3.4: African trade in goods, 2012–2019 (billion, in current US dollars)



Source: Own elaboration on the basis of UNCTADstat, 2020.

Note: The vertical axis on the left measures the sum of total exports and the sum of total imports of all 53 African economies with available data; they are listed in Appendix A2, with the exception of South Sudan. These sums are valued in billions of dollars at current prices. The vertical red lines connecting imports and exports represent the deficits in Africa's trade balance, while the blue line represents the trade balance surplus.

Figure 3.4 presents Africa's trade in goods for the period 2012–2019. This figure shows the total exports, total imports and trade balance, i.e. exports minus imports, of all African goods. For most of the period, imports were higher than exports, denoting a trade balance deficit. In other words, Africa has been purchasing more goods (imports) than it has been selling (exports). The general view is that unsustainable trade deficits are bad for the economy as they create instabili-

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

[5]There is an abundance of literature on the trade balance and its consequences for economic growth. More information on this issue can be found, among others, in the works of Thirlwall, 1979; Thirlwall, 2012 and McCombie and Thirlwall, 1994.

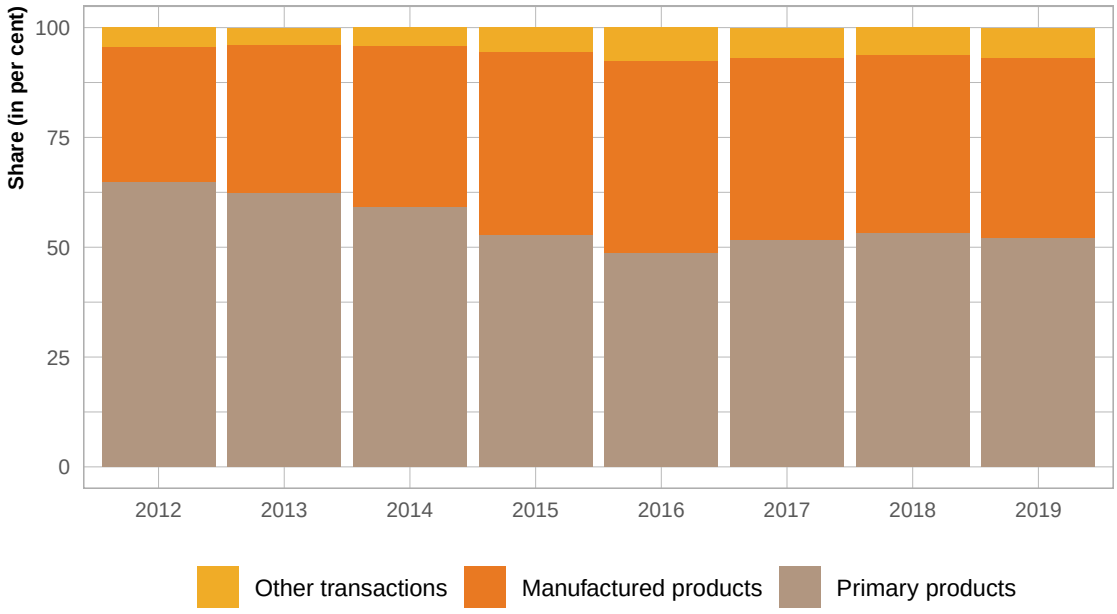
ties, which could hamper economic growth and, consequently, job creation[5].

What may be even more problematic than the existence of a negative trade balance is its persistence over time. In 2012, Africa registered a trade surplus of USD 51 billion, but the balance turned negative the following year and dropped to its lowest point in 2015, with a deficit of USD 136 billion. The trade deficit persisted, with the last observation taken in 2019, when Africa's trade deficit amounted to USD 81 billion.

This negative trend due to recurrent and increasing trade deficits was not the result of a strong growth in consumption and, consequently, of imported goods; on the contrary, imports registered a slight decline from USD 584 billion in 2012 to USD 547 billion in 2019. The main reason for the increasing trade deficit has been the lack of dynamism in exports. African exports fell from USD 635 billion to USD 465 billion in the period 2012–2019, which was a larger decline than that registered for imports (which decreased by 27 per cent and 6 per cent, respectively). In short, Figure 3.4 shows that Africa's overall trade performance has been quite disappointing, the main reason being the decline in Africa's total exports.

As the decrease in total exports is the main reason for Africa's poor overall trade performance, the question arises what role manufacturing plays in Africa's trade performance. To answer this question, we must first consider the structure of African exports. Figure 3.5 illustrates the structure of Africa's total exports, which are still mostly composed of primary products (52 per cent), followed by manufactured goods (41 per cent) and other transactions (7 per cent)[6].

Figure 3.5: Structure of African exports, 2012–2019



Source: Own elaboration on the basis of UNCTADstat, 2020.

Note: The African aggregate is based on the 53 economies with available data, which are listed in Appendix A2, with the exception of South Sudan.

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

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

Figure 3.6 provides more information on Africa's trade of manufactured goods. It presents the trade balance of both manufactured goods and of total goods for easier comparison. Two factors jump out: first, the trade deficit in manufactured goods is much higher than it is in total goods, and secondly, there was a clear deterioration of the trade balance of total goods, despite the slight improvement in the trade balance of manufactured goods.

Moreover, the notable disbalance between the manufacturing share in total exports and imports suggests that there is a huge mismatch between Africa's consumption patterns and its propensity to import manufactured goods and its capacity to produce them[7]. While this disbalance was obscured during the commodity boom from 2000 to 2013/2014, it came into plain view when commodity prices started falling. The end of the commodity boom seems to have revealed the fragility of Africa's production system, together with its dependence on foreign manufactured products.

Figure 3.6: African trade in manufactured goods, 2012-2019 (billion, current US dollars)

Source: Own elaboration on the basis of UNCTADstat, 2020.

Note: The values are in billions of dollars at current prices. The African aggregate is based on the 53 economies with available data, which are listed in Appendix A2, with the exception of South Sudan.

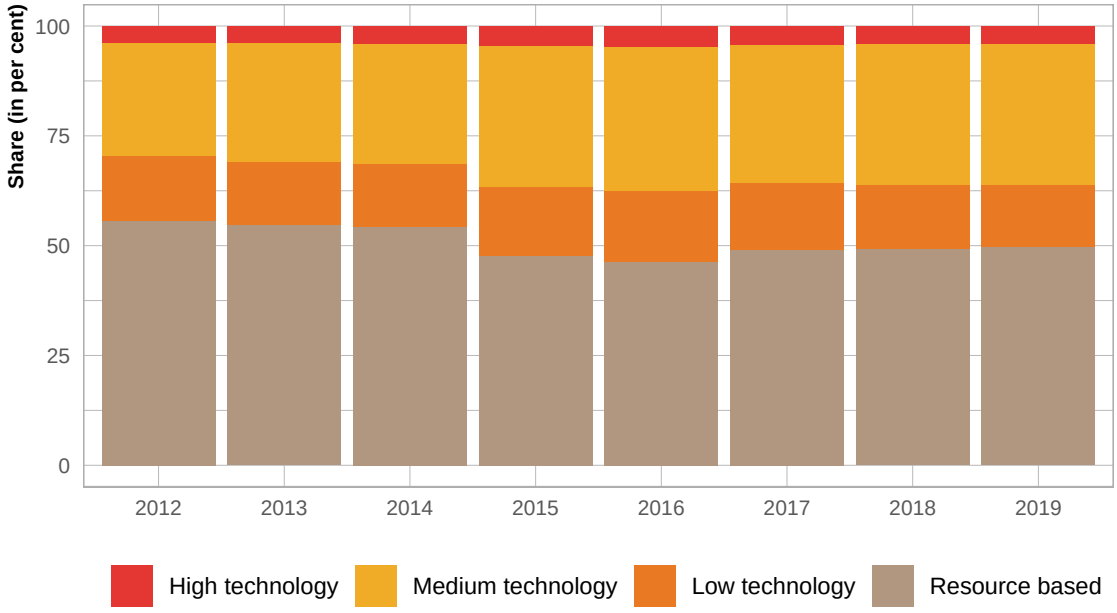
[7]This mismatch between Africa's consumption patterns and its capacity to produce manufactured goods is, to some extent, reflected in Africa's share of manufactured goods in total exports and its manufacturing share in total imports: in 2019, manufactured goods represented 41 per cent of total goods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

As mentioned in the first chapter, the degree of complexity of the manufacturing sector's activities affects its capacity to boost the rest of the economy and the population's general welfare, i.e. the economy's strong capacity to produce and export medium- and high-technology (MHT) manufactured goods is highly correlated with high levels of productivity, innovation and technological progress.

Figure 3.7 illustrates the structure of Africa's manufacturing exports by type of technology. It reveals that the structure of Africa's manufacturing exports gradually changed with the incorporation of more technologically advanced products in its mix of manufacturing exports. Consequently, the shares of medium- and high-technology products in Africa's total manufacturing exports increased from 26.6 per cent and 4.0 per cent in 2012 to 31.9 per cent and 4.3 per cent in 2019, respectively. The opposite trend is observable in resource-based manufacturing and low-technology products, their shares dropping from 55.6 per cent and 14.7 per cent in 2012 to 49.6 per cent and 14.3 per cent in 2019, respectively. This positive development in the technological upgrading of Africa's export mix unfortunately looks better than it actually is.

Table 3.1 presents Africa's market share in world exports by type of technology. It shows that Africa's share in world exports experienced a sharp decline. Its total exports market share fell by 28 per cent, from 3.5 per cent in 2012 to 2.5 per cent in 2019. This decline occurred simultaneously with the slump in exports of primary products, which account for Africa's biggest market share in world exports and in 2019, represented 52 per cent of Africa's total exports.

Figure 3.7: Structure of Africa's manufacturing exports by type of technology, 2012–2019



Source: Own elaboration on the basis of UNCTADstat, 2020.

Note: This figure is based on the sum of exports of all 53 African economies with available data, which are listed in Appendix A2, with the exception of South Sudan. The technological classification of products is based on Lall, 2000 and is available in Appendix B.

African exports largely consist of raw materials and natural resources, i.e. commodities. Table 3.1 shows that primary products account for Africa's biggest market share in world exports. Yet its market share has declined by 25 per cent in recent years. Africa's market share in primary products fell from 11.7 per cent in 2012 to 8.8 per cent in 2019. Despite this decline, primary products still account for the biggest share of African exports[8].

Africa's market share in manufacturing exports lags far behind, accounting for only roughly 1.3 per cent of world exports. This share has remained fairly constant in recent years, shrinking from 1.4 per cent to 1.3 per cent over the period of analysis. Resource-based goods account for the biggest market share of manufactured goods (3 per cent in 2019). The shares of all manufacturing categories decreased, with the exception of medium-technology, which witnessed a slight increase in its market share from 1.0 per cent to 1.1 per cent of world exports. Therefore, despite the fact that Africa's share of medium- and high-tech goods in manufacturing exports increased, as shown in Figure 3.7, the market share of only medium-tech manufacturing exports grew at the global level. The export market share of high-tech goods dropped from 0.27 per cent to 0.22 per cent from 2012 to 2019.

Table 3.1: Export market shares of Africa in world exports by technology group (in %)

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

Source: Own elaboration on the basis of UNCTADstat, 2020.
Note: This table is based on the sum of exports of all 53 African economies with available data, which are listed in Appendix A2, with the exception of South Sudan. The export market share is calculated by dividing Africa's exports by world exports for each technology category.

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

Table 3.2 comprises five columns of indicators. The RCA index values of African exports for 2019 are presented in Column (1). For example, the RCA index of primary products is 3.5, which is obtained by dividing the market share of primary products (8.8 per cent) by the market share of total exports (2.5 per cent). These market share values are presented in Table 3.2. The RCA values indicate that Africa has an RCA in the export of primary products and resource-based goods, with values higher than 1. Africa also has advantages in "other transactions", but this group will not be considered here because

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

it is too risky to draw conclusions on industrial policy from what could be a misleading classification of goods. Column (2) shows the natural logarithm of RCA. The advantage of this logarithm transformation is that it shows the comparative advantages for all positive values and the comparative disadvantages for all negative values. This advantage is used in the next figure. Column (3) presents the total growth of world exports from 2012 to 2019. World exports should be equivalent to world imports, and therefore, total export growth provides an indication of world demand for goods from each technology group[9]. Hence, the higher the growth in a given technology group, the higher the expected demand for that type of good in the near future. Column (4) provides the same information, but in annualized growth rates, and finally, Column (5) shows the annual growth of each technology group minus the annual growth of total world exports, both presented in Column (4). Thus, Column (5) has the advantage of identifying those technology groups whose international demand has grown more than total world exports (which can be considered a weighted average) and have a positive growth rate, as well as those that have grown less and have a negative growth rate.

Table 3.2: Revealed comparative advantage (RCA) and growth in world exports, 2012–2019

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

Source: Own elaboration on the basis of UNCTADstat, 2020.

Note: This table is based on the sum of exports of all 53 African economies with available data, which are listed in Appendix A2, with the exception of South Sudan. The export market share is calculated by dividing Africa's exports from world exports for each technology group. The revealed comparative advantage (RCA) index is calculated as the ratio of Africa's exports of a given technology group to world exports of that same technology group, divided by Africa's share of total exports in the world exports. The index for the technology group j is $RCA_j = 100*(X_{aj}/X_{wj})/(X_{at}/X_{wt})$ where (X_{aj}/X_{wj}) is Africa's export market share in the given technology group j and (X_{at}/X_{wt}) is Africa's export market share in total exports (j=technology group, a=Africa, w=world, X=exports and t=total exports). A value of the index above/below 1 represents a revealed comparative advantage/comparative disadvantage for that particular technology group.

The information contained in Table 3.2 allows a depiction of Africa's relative share in each technology group. To read the table properly, it should be noted that, by definition, a country or region (in this case, Africa) cannot have comparative advantages in all technology groups. This

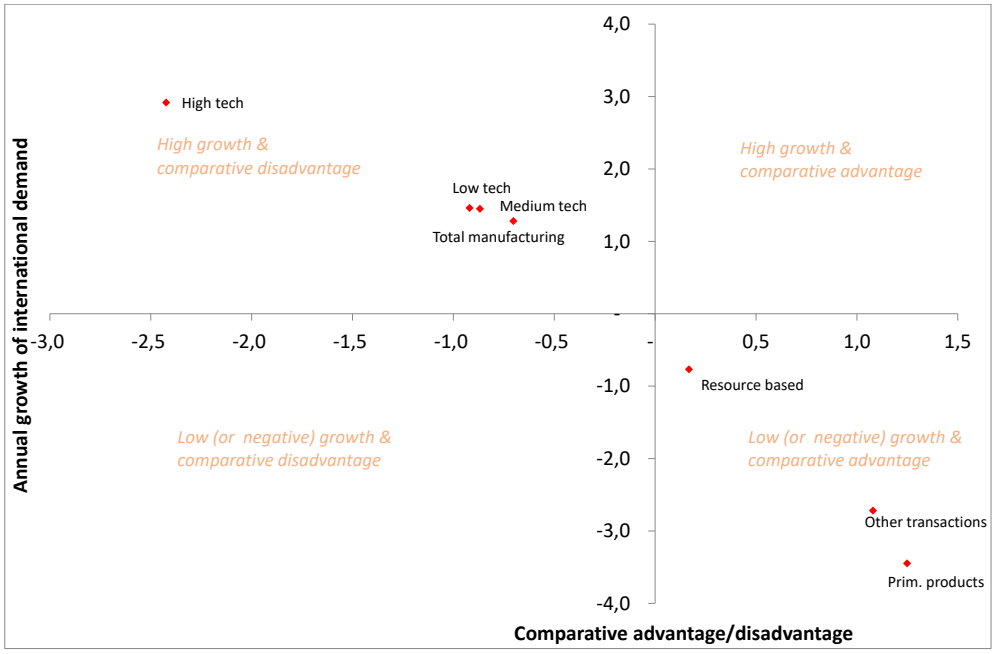
[9]The growth in international demand is hereby calculated as the growth in world exports. The growth in world imports would be the most intuitive indicator to calculate the growth in international demand, and yet here we use it indistinctively because the sum of all countries' imports should be equivalent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

is a direct outcome of using comparative advantages instead of absolute advantages in the Ricardian theory of trade. Moreover, international demand cannot grow faster than the average (that is, growth in total exports) in all technology groups.

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

Unfortunately, Africa is nowhere near to achieving this situation. Figure 3.8 depicts the data presented in Table 3.2 and in Columns (2) and (5). That is, the comparative advantage/disadvantage is represented in the horizontal axis, and the growth of world demand (in relative to world average) is presented in the vertical axis. Figure 3.8 shows that the technology groups in which Africa has a comparative advantage are those that registered the strongest contractions in world demand. As global demand for primary products and resource-based goods fell, prospects for an improvement in exports, trade balance and economic growth weaken.

Figure 3.8: Africa's comparative advantage and growth in world demand, by technology group (2019)



Source: Own elaboration on the basis of UNCTADstat, 2020.

Africa's trade data has thus far painted a fairly negative picture. Specifically, Africa's total exports are declining; Africa's manufacturing exports are more stable, but are far lower than total manufacturing imports, which reveals the difficulties Africa's manufacturing sector has had in competing against foreign competitors, and the African population's high propensity to consume imported manufactured goods. These two factors have caused major trade deficits that hamper Africa's economic growth and consequently, job creation. Moreover, the structure of African

exports is heavily based on primary products and resource-based manufactured goods. Indeed, Africa's revealed comparative advantages are in these two technology groups. Regrettably, these two technology groups have registered a significant decline in relative world demand, which suggests that Africa's export performance may continue to decline, with the corresponding negative effects on Africa's future economic growth, unless corrective policies are implemented.

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

3.3 Industrial competitiveness in Africa: An analysis of its regions

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

To provide a more detailed picture of the continent's industrial competitiveness, this section divides Africa into five regions: Middle, Eastern, Northern, Southern and Western Africa. The composition of the economies in each region is available in Appendix A2. The reason for this geographic division is that an in-depth industrial competitiveness analysis of every African economy goes beyond the scope of this report. The five regions have similarities—in terms of obstacles and constraints to development—and thus serve as good benchmarks for each other.

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

Table 3.3 presents a set of general statistics that shed some light on the differences and similarities between the five African regions. The data in this table refer to the years 2012 and 2019. It is immediately evident that Africa's GDP per capita declined during this period. One reason for this deterioration is the 20 per cent growth in Africa's total population. Another reason are the terrible conflicts in Libya (Northern Africa) and in the Central African Republic (Middle Africa) as well as the poor economic performance of Equatorial Guinea (Middle Africa). The GDP and MVA per capita of Southern Africa dropped as well. Despite the fact that GDP and MVA increased, Southern Africa could not keep up with the rapid pace of population growth in its largest member country, South Africa.

The values for 2019 indicate that Southern Africa is the richest of the five regions, with an average GDP per capita of USD 5,455 and an average MVA per capita of USD 632. Southern Africa is followed by Northern Africa, with a GDP per capita of USD 3,462 and MVA per capita of USD 422. The poorest region is Eastern Africa, with a GDP per capita of USD 896 and MVA per capita of USD 65. Regional differences are less pronounced in terms of population density. The most populated region is Eastern Africa, which is home to 1/3 of all Africans (433 million), while Southern Africa is only home to 5.1 per cent of the African population (67 million).

The higher levels of GDP and MVA per capita in Southern Africa do not necessarily imply that this is Africa's most industrialized region. As mentioned earlier in this document, one common measure of industrialization is the

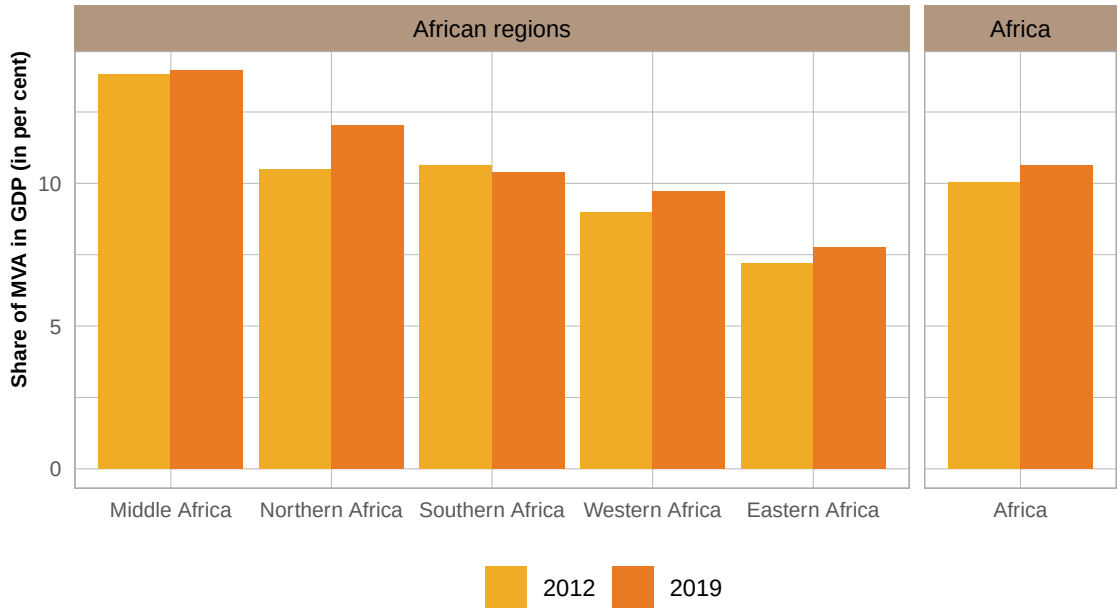
share of MVA in GDP. This indicator provides a slightly different picture from that provided for GDP and MVA per capita, and suggests that Northern Africa is the continent's most industrialized region. The recent growth of the region's manufacturing sector registered an MVA share of 12.2 per cent in GDP in 2019. Northern Africa is followed by Middle Africa, with a share of MVA in GDP of 11.9 per cent, and by Southern Africa, whose share decreased from 12.5 per cent in 2012 to 11.6 per cent in 2019. Eastern Africa continues to rank low with a stable share of MVA in GDP of 7.3 per cent. Western Africa registered a slight increase during the period of analysis and recorded an MVA share in GDP of 9.7 per cent in 2019, which is slightly below the average of the entire continent, namely 10.6 per cent (Figure 3.9).

Table 3.3: GDP and MVA per capita, 2012–2019 (at constant 2015 US dollars)

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

Source: UNIDO, 2020c.
Note: This table is based on the available data of 54 African countries, which are listed in Appendix A2.

Figure 3.9: Africa's comparative advantage and growth in world demand, by technology group (2019)

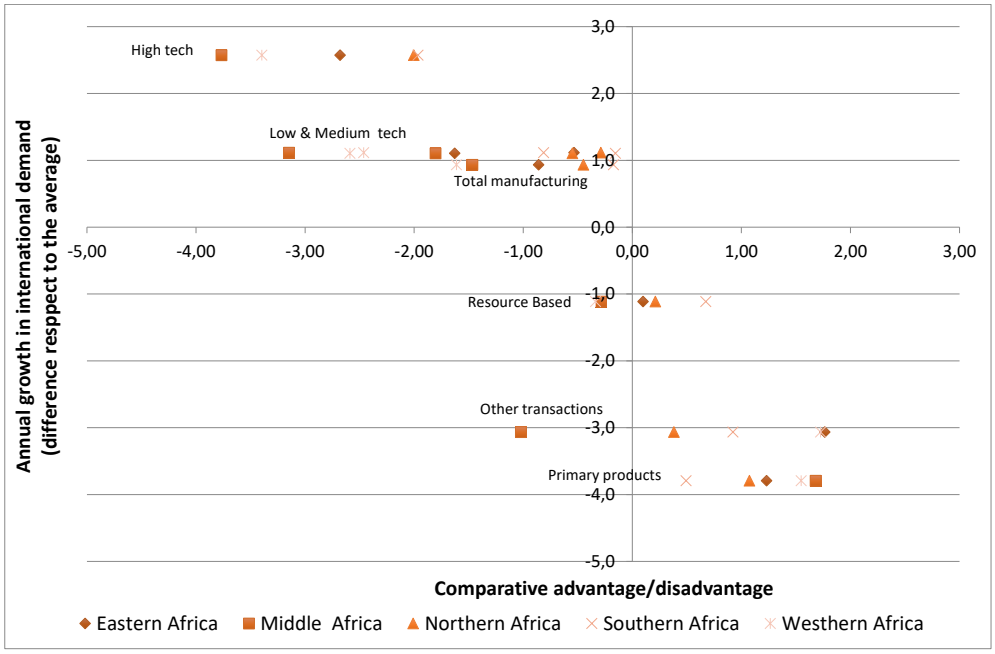


Source: UNIDO, 2020c.
Note: This figure is based on the available data of 54 African countries, which are listed in Appendix A2.

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

Apart from these clear similarities, there are, nonetheless, some interesting differences. In line with the distinctions in GDP per capita and MVA per capita observed in Table 3.3, Northern and Southern Africa stand out from the other African regions. For example, in terms of export structure, Eastern, Middle and Western Africa mostly export primary products, while Northern and Southern Africa mainly export manufactured products. In these two latter regions, resource-based, followed by medium-technology products registered a higher share in total exports. These regions also show differences in their trade balances in total goods; while Middle, Southern and Western Africa had a trade surplus, Eastern and Northern Africa recorded significant trade deficits (see Appendix D).

Figure 3.10: Comparative advantages and growth in world demand, by technology group and African region



Source: Own elaboration on the basis of UNCTADstat, 2020.

Figure 3.10 uses the data contained in these regional tables to recreate Figure 3.8 which presents the annual growth rate in world demand with the comparative advantages/disadvantages for each technology group. The annual growth rate in world demand remains the same for each technology group, hence the comparative advantage of each region in each technology group is the only variation.

It is evident that Figure 3.10 is very similar to Figure 3.8. There are some differences, for example, Middle and Western Africa show a comparative disadvantage in resource-based manufactured products, while Africa (as well as the other African regions) have an advantage. Additionally, there are slight differences in the magnitude of the comparative advantages between each region and Africa as a whole, but the two figures are generally quite similar. Most significantly, the only quadrant in the figure that remains empty is the most favourable one at the top right, which represents comparative advantages in those technology groups with rapidly growing world demand.

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

3.4 African economies in the CIP ranking

Due to data limitations, only 33 African economies are presented in the 2020 edition of the CIP index[10]. None of them is actually represented in the first third of the CIP ranking. The African region is characterized by having the highest concentration of LDCs; 33 out of the 47 LDCs are in Africa. The highest ranked African economy, South Africa, is positioned 52_{nd}, and of the 33 African economies included in the CIP index, only 10 are among the top-100. The other 23 fill the last positions in the ranking.

Table 3.4 presents the 2020 CIP ranking of the African economies by African region. Once again, economies that have improved their relative position in the ranking have an upward pointing arrow (↑) in the last column, while those that lost positions in the ranking have a downward pointing arrow (↓). Table 3.4 also includes the CIP global score, which indicates the gap between 2 consecutive economies. From looking at the scores, we see a distinct difference between the four leading African economies and the rest. This gap suggests that the competitiveness of these four economies' manufacturing sectors is markedly higher than that of the other African economies.

Moreover, Table 3.4 makes it easy to identify the leading economies in the African region and in which region they are located. A quick glance at the table confirms the statement made in the previous section that Northern and Southern Africa stand out from the other African regions. All of those regions' economies are located at the top of the regional CIP ranking, while countries in Middle, Western and Eastern Africa tend to rank much lower. Clearly, Mauritius is a positive exception to this pattern, as it is the only Eastern African economy that is positioned between the Northern and Southern African countries.

South Africa is the top-ranked economy in the African region, and despite the fact that Morocco is quickly catching up, there is still a gap of 11 positions between them. The reduction in the distance between the ranks of these two economies is due to the increase in Morocco's competitiveness, but also to the slowing down of South Africa's economy, which only grew by 1.4 per cent a year during the period 2012–2018. Together with the slowdown of the domestic market, the foreign market experienced a clear contraction, as demonstrated by the negative average growth rate of its merchandise exports, which shrank by 5.2 per year during the same period. Most of these exports (66.4 per cent in 2018) are manufactured products, which also decreased by 5.5 per cent per year. Weak domestic and foreign demand explains the stagnation period suf-

[10] Data availability and its quality for the African region is the main topic of the next section.

fered by the South African manufacturing sector, which, this notwithstanding, grew at an average annual rate of 0.2 per cent during the same period. Considering these negative factors, it is not surprising that South Africa's scores decreased in all CIP dimensions and consequently, dropped four positions in the global ranking. Moreover, Table 3.4 shows that South Africa performs relatively better in the third dimension (world impact) and relatively worse in the first dimension (capacity to produce and export), while its performance in the second dimension (technological deepening and upgrading) lies somewhere in between. South Africa ranks 39^{th} in the third dimension, but trails in the first and second dimensions of the ranking in 70^{th} and 58^{th} position, respectively.

Table 3.4: African economies in the 2020 CIP ranking

Regional rank	African region	Economy	Global rank	Global score	Rank in the first dimension	Rank in the second dimension	Rank in the third dimension	Absolute change compared to 2018
1	Southern Africa	South Africa	52	0.0568	70	58	39	-4 ↓
2	Northern Africa	Morocco	61	0.0406	84	32	53	10 ↑
3	Northern Africa	Egypt	64	0.0366	105	56	46	5 ↑
4	Northern Africa	Tunisia	67	0.0353	72	38	70	1 ↑
5	Southern Africa	Eswatini	83	0.0229	57	39	113	-1 ↓
6	Eastern Africa	Mauritius	87	0.0191	60	89	110	1 ↑
7	Southern Africa	Botswana	89	0.0185	65	118	100	2 ↑
8	Southern Africa	Namibia	97	0.0145	76	123	109	-5 ↓
9	Northern Africa	Algeria	98	0.0139	115	147	69	-3 ↓
10	Western Africa	Nigeria	99	0.0138	134	86	63	-14 ↓
11	Middle Africa	Congo	101	0.0134	98	90	102	14 ↑
12	Western Africa	Côte d'Ivoire	105	0.0121	119	109	88	-6 ↓
13	Western Africa	Senegal	106	0.0119	118	71	97	-3 ↓
14	Middle Africa	Angola	107	0.0118	120	132	82	26 ↑
15	Middle Africa	Gabon	110	0.0102	83	146	117	2 ↑
16	Western Africa	Ghana	114	0.0088	127	140	92	-10 ↓
17	Eastern Africa	Kenya	115	0.0088	132	115	89	-4 ↓
18	Middle Africa	Cameroon	121	0.0078	130	126	101	-8 ↓
19	Eastern Africa	United Republic of Tanzania	123	0.0071	137	111	94	4 ↑
20	Eastern Africa	Zimbabwe	124	0.0069	129	116	115	-4 ↓
21	Eastern Africa	Zambia	125	0.0063	131	134	112	-3 ↓
22	Eastern Africa	Uganda	128	0.0049	139	127	111	-3 ↓
23	Eastern Africa	Mozambique	132	0.0041	138	136	119	-1 ↓
24	Middle Africa	Central African Republic	133	0.0041	136	34	138	11 ↑
25	Eastern Africa	Ethiopia	134	0.0039	146	113	104	16 ↑
26	Western Africa	Cabo Verde	136	0.0033	122	88	146	3 ↑
27	Eastern Africa	Madagascar	137	0.0032	141	145	124	-1 ↓
28	Eastern Africa	Rwanda	142	0.0022	142	141	135	-2 ↓
29	Eastern Africa	Malawi	143	0.0019	147	125	137	-2 ↓
30	Eastern Africa	Burundi	145	0.0010	148	135	143	3 ↑
31	Western Africa	Gambia	148	0.0005	149	131	151	1 ↑
32	Eastern Africa	Eritrea	149	0.0000	152	142	149	2 ↑
33	Western Africa	Niger	151	0.0000	151	104	131	-4 ↓

Source: UNIDO, 2020b.

From 2012 to 2018, Angola improved 26 positions in the global ranking. While the country's economic growth was relatively slow, namely only 0.7 per cent per year, its trade performance was quite impressive. This was the main reason why the Angola's industrial sector grew at an average annual growth rate of 4.7 per cent. Foreign demand has had a decisive impact on Angolan manufactured goods. The country's manufacturing exports per capita nearly tripled during this period, from USD 34 per person to USD 90 per person. Thus, foreign demand was a major boost for all of Angola's CIP dimensions. Table 3.4 points out that the strongest dimension of Angolan industrial competitiveness is its world impact (the country ranks 82^{nd}), while its technological deepening and upgrading is its weakest point (132^{nd} position).

Ethiopia is another positive example of a country whose level of industrial competitiveness has increased. From 2012 to 2018, the country managed to jump 16 positions in the global ranking. Strong local and foreign demand as well as structural change towards more technology-intensive products lie behind this striking increase in Ethiopian industrial competitiveness. Ethiopia's GDP and manufacturing exports experienced major expansions; thus, the country's GDP grew at an average annual rate of 9.6 per cent and its manufacturing exports at 8.0 per cent. Moreover, the share of medium- and high-technology products in manufacturing value added and manufacturing exports increased, rising from 11.4 per cent and 16.1 per cent in 2012 to 17.8 per cent and 41.8 per cent in 2018, respectively. Hence, Ethiopia's scores in all dimensions increased, yet its world impact continues to be its best dimension (ranked 104^{th}).

It is important to note that there are significant differences in the African score distribution across the three CIP dimensions (please see Figure 3.11). Specifically, while African countries' scores in the capacity to produce and export manufactured goods and in this region's impact on the world are minimal and do not present very significant differences between the African countries, the scores in technological deepening and upgrading are much higher and indicate broader differences. Consequently, the median in the first and third dimensions are both close to zero (less than 0.01), while the median in the second dimension is similar to that of other regions and is equal to 0.25.

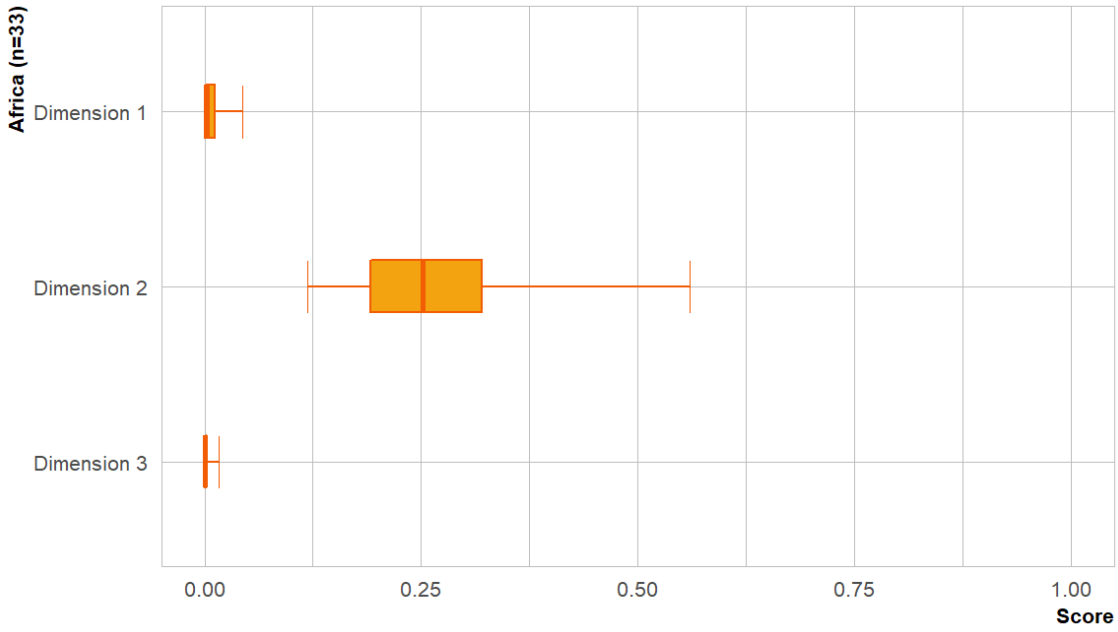
If we want to delve deeper into the analysis about why some countries perform better in some dimensions than in others, we should examine the six CIP indicators (two for each dimension), which are presented in the table in Appendix E. In our example, South Africa's economy performs better in the dimension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

The results in Table 3.4 can be used to calculate regional averages, which are presented in Appendix F. While those averages provide a brief summary of the data, they need to be interpreted with caution for two main reasons: (i) there are non-random missing data, which introduces a bias (most likely, countries with no data are those that perform worse); and (ii) simple averages may not be representative of the overall situation of the economies in that particular region (for example, in Southern Africa). Taking these limitations into account, we find that the regional averages still provide a similar picture to the one presented in the previous section. The simple average CIP ranking of the countries that make up the Northern and Southern Africa regions places them in the top-100. In fact, the averages of these regions are located in the top-100 in all three dimensions. While Northern Africa

performs better in terms of world impact and worse in the capacity to produce and export manufactured goods, the opposite holds for Southern Africa. Both regions remain somewhere in between in the second dimension, technological deepening and upgrading.

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

Figure 3.11: Score distribution, Africa (2018)



Source: Authors' elaboration based on UNIDO, 2020b.

3.5 Data availability and quality

One particularly important factor for African economies is data availability and quality. Missing values imputation and now-casting for the most recent, not yet reported values from the two UNIDO databases, MVA and INDSTAT 2, is carried out during the regular statistical production process of UNIDO Statistics, and these estimated values are published in the corresponding databases. However, even after applying these methods, gaps remain in the CIP index's eight indicators, preventing a full calculation of the index. If just one indicator is missing for a country in a given year, the aggregated CIP index cannot be computed for that particular country. These remaining missing values are filled in using a method known as Last Observation Carried Forward (LOCF). For example, should a 2018 value for an indicator be missing, the method uses this indicator's 2017 value, unless that is missing as well. Should this be the case, the 2016 value

is used to fill in the values for both 2017 and 2018, and so on. Subsequently, the observed and imputed data are analysed on equal footing as if no data were missing.

Table 3.5 details the observations for countries with missing data in one or more CIP indicators to produce a complete dataset for the year 2018, which was fed into the computation of the CIP index 2020. No imputation was necessary for four countries in Africa, while 29 countries had one or more imputed indicators. In the remaining 22 countries, imputation was not possible for one or more indicators and these countries were therefore not included in the computation of the CIP index. This is why only 33 African countries are presented in the 2020 edition of the CIP index.

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

Table 3.5: Data availability and dealing with missing values in the CIP sub-indicators for the African countries in CIP 2020 edition

Economy	Exports				MVA			INDSTAT
	MXpc	MXsh	ImWMT	MHXsh	MVApc	MVAsh	ImWMVA	MHVAsh
Countries without any imputed data (4)								
Botswana								
Kenya								
Mauritius								
Zimbabwe								
Countries with imputation in one or more indicators (29)								
Algeria	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				
Angola								OUTPUTsh
Burundi								nearest(2016)
Cameroon	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(2008)
Cabo Verde								nearest(2009)
Central African Republic	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(1993)
Congo	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(2009)
Ethiopia	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(2016)
Eritrea	nearest(2003)	nearest(2003)	nearest(2003)	nearest(2003)				
Gabon	nearest(2009)	nearest(2009)	nearest(2009)	nearest(2009)				nearest(1995)
Gambia								nearest(2004)
Ghana								nearest(2016)
Côte d'Ivoire								nearest(1997)
Madagascar								nearest(2006)
Malawi	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				nearest(2012)
Morocco								INDSTAT imp
Mozambique								nearest(1998)
Namibia								nearest(2016)
Niger	nearest(2016)	nearest(2016)	nearest(2016)	nearest(2016)				INDSTAT imp
Nigeria								nearest(1996)
Rwanda	nearest(2016)	nearest(2016)	nearest(2016)	nearest(2016)				nearest(1999)
Senegal								nearest(2015)
South Africa								INDSTAT imp
Eswatini								nearest(2015)
Tunisia	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				INDSTAT imp
Uganda								nearest(2000)
Egypt	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				INDSTAT imp
United Republic of Tanzania								INDSTAT imp
Zambia	nearest(2016)	nearest(2016)	nearest(2016)	nearest(2016)				nearest(2016)

Economy	Exports				MVA			INDSTAT
	MXpc	MXsh	ImWMT	MHXsh	MVApc	MVAsh	ImWMVA	MHVAsh
Countries not included in the CIP due to missing one or more indicators (22)								
Chad	...	...	...	...				...
Comoros								...
Democratic Rep of the Congo	...	...	...	...				...
Benin								...
Equatorial Guinea	...	...	...	...				...
Djibouti	nearest(2009)	nearest(2009)	nearest(2009)	nearest(2009)				...
Guinea	nearest(2015)	nearest(2015)	nearest(2015)	nearest(2015)				...
Lesotho	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Liberia	...	...	...	...				...
Libya	nearest(2010)	nearest(2010)	nearest(2010)	nearest(2010)				...
Mali	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Mauritania	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Guinea-Bissau	nearest(2005)	nearest(2005)	nearest(2005)	nearest(2005)				...
Réunion	nearest(1995)	nearest(1995)	nearest(1995)	nearest(1995)	...	...	...	...
Sao Tome and Principe								...
Seychelles								...
Sierra Leone	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Somalia	...	...	...	...				...
South Sudan	...	...	...	...				...
Sudan	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Togo	nearest(2017)	nearest(2017)	nearest(2017)	nearest(2017)				...
Burkina Faso								...

Source: UNIDO, 2020b.

Note: OUTPUTsh indicates that the value was estimated as the output share; INDSTAT imp indicates that the value was estimated using the regular INDSTAT imputation procedure; nearest(year) indicates that the value was estimated through Last Observation Carried Forward (LOCF), using the value of the indicator in the given year. The three consecutive points stand for missing data (which could not be estimated through LOCF).

IV Concluding remarks

Concluding remarks

The COVID-19 pandemic has unquestionably affected industrial competitiveness, yet the effects have been unevenly distributed among countries and sectors. A considerable part of the impact on industrial competitiveness has been channelled through international trade, as COVID-19 induced many countries to adopt protectionist trade policies, which has caused severe disruptions in global value chains and international trade flows. In this context, the location of production capabilities became a competitive advantage, as countries that are able to produce within their borders were in a better position to quickly and adequately respond to the rise in demand for manufactured products that have been essential during the pandemic, such as medical supplies and protective garments and equipment.

The pandemic not only made the limitations to free trade policies evident, but has also revealed the crucial significance of the production mix within each country's manufacturing sector; extensive manufacturing production was not enough in this case to deal with the immense scarcity of the essential goods required in the fight against the pandemic. Those countries in possession of such production capabilities had a better export performance as well as a faster economic recovery. In this regard, industrialized economies witnessed stronger recoveries in their merchandise exports than resource-based economies (WTO, 2020d). The pandemic's uneven effects are also evident at the geographic level. By the end of the third quarter of 2020, notable export performances had been achieved by Eastern and Southern & South-eastern Asia; China, Malaysia and Viet Nam recorded an expansion in merchandise exports while world exports still had a negative growth rate of 4 per cent (year-on-year).

Most of the international trade flows are destined for the world's biggest markets. In this regard, the results of the CIP index suggest that there is a clear link between market size and the level of its competitiveness. The geographical analysis of the CIP reveals that the world has three visible clusters of highly competitive industrial countries. They are located in Eastern Asia, Europe and Northern America, which coincides with the presence of the three biggest markets in these regions: China, the EU zone and the United States. The connection between market size and level of competitiveness should be fairly obvious, because the bigger the size of the domestic market, the easier it is to have a significant impact on world MVA and world manufacturing trade.

World impact is one of the three CIP dimensions—along with the capacity to produce and export manufactured goods and technological deepening and upgrading—used by the CIP to evaluate countries' industrial competitiveness. The analysis of each of the CIP dimensions reveals the existence of two poles in the world impact and in the capacity to produce and export manufactured goods. One pole can be characterized by a selected group of countries that have a major impact on the world and extensive productive and export capacities. The other pole can be described as a much more populated group of economies, which do not have a significant impact on the world and face several limitations in their productive and export capacities. These two distinctive groups cannot be delineated so easily in the remaining CIP dimension, which implies that it is easier for countries to acquire and upgrade their technology than to become leaders in international markets.

One interesting observation is that there is a significant degree of overlap between those regions and countries that recorded the highest levels of industrial competitiveness in 2018, and those that achieved the highest export performance and faster economic recovery from the COVID-19 crisis by the end of the third quarter 2020. For example, we already mentioned that Asian countries and industrialized countries were those that showed strong recovery during the third quarter of 2020. The CIP results indicate that countries in Eastern Asia and in Europe—the continent with the highest concentration of industrialized countries—stand out from the rest as they tend to show higher performances in the three CIP dimensions. While Eastern Asian economies achieved the highest scores (measured as medians) in world impact as well as in technological deepening and upgrading, European countries had the highest scores in their capacity to produce and export manufactured goods. It is noteworthy that this does not suffice to draw a causal link between industrial competitiveness and the response to the pandemic crisis. Once the consequences of the pandemic have fully materialized, much more research needs to be done to establish this causation.

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

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

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

On a more positive note, Africa has already managed to improve its export structure, increasing the share of medium- and high-technology products in its manufacturing exports. This is particularly relevant for medium-technology products, as this is the only manufacturing category in which Africa's market share in world exports has slightly increased. Even though Africa still does not have a comparative advantage in low-, medium- or high- technology products, in-

creasing its market share in these categories is highly desirable. It is clear that the African continent is far from reaching its full industrial potential and therefore, additional efforts should be made to accelerate Africa's industrialization and ensure that its industrial sector assumes a major role in the continent's economic and social development, thus generating employment, growth and ultimately alleviating poverty.

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

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

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

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

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Appendix

Appendix A. Country Classifications

A1. The 152 economies included in the CIP 2020 edition by region and industrial development stage

Industrialized economies	Other developing economies
Emerging industrial economies	Least developed countries

Africa		
Algeria	Eswatini	Namibia
Angola	Ethiopia	Niger
Botswana	Gabon	Nigeria
Burundi	Gambia	Rwanda
Cabo Verde	Ghana	Senegal
Cameroon	Kenya	South Africa
Central African Republic	Madagascar	Tunisia
Congo	Malawi	Uganda
Côte d'Ivoire	Mauritius	United Republic of Tanzania
Egypt	Morocco	Zambia
Eritrea	Mozambique	Zimbabwe
Central and Western Asia		
Armenia	Kazakhstan	Syrian Arab Republic
Azerbaijan	Kuwait	Tajikistan
Bahrain	Kyrgyzstan	Turkey
Cyprus	Lebanon	United Arab Emirates
Georgia	Oman	Uzbekistan
Iraq	Qatar	Yemen
Israel	Saudi Arabia	
Jordan	State of Palestine	

Eastern Asia		
China	China, Taiwan Province	Republic of Korea
China, Hong Kong SAR	Japan	
China, Macao SAR	Mongolia	
Europe		
Albania	Greece	Poland
Austria	Hungary	Portugal
Belarus	Iceland	Republic of Moldova
Belgium	Ireland	Romania
Bosnia and Herzegovina	Italy	Russian Federation
Bulgaria	Latvia	Serbia
Croatia	Lithuania	Slovakia
Czechia	Luxembourg	Slovenia
Denmark	Malta	Spain
Estonia	Montenegro	Sweden
Finland	Netherlands	Switzerland
France	North Macedonia	Ukraine
Germany	Norway	United Kingdom
Latin America and the Caribbean		
Argentina	Cuba	Paraguay
Bahamas	Ecuador	Peru
Barbados	El Salvador	Saint Lucia
Belize	Guatemala	Suriname
Bolivia (Plurinational State of)	Haiti	Trinidad and Tobago
Brazil	Honduras	Uruguay
Chile	Jamaica	Venezuela (Bolivarian Republic of)
Colombia	Mexico	
Costa Rica	Panama	
Northern America		
Bermuda	Canada	United States of America
Pacific		
Australia	New Zealand	Tonga
Fiji	Papua New Guinea	
Southern and South-eastern Asia		
Afghanistan	Iran (Islamic Republic of)	Pakistan
Bangladesh	Lao People's Dem Rep	Philippines
Brunei Darussalam	Malaysia	Singapore
Cambodia	Maldives	Sri Lanka
India	Myanmar	Thailand
Indonesia	Nepal	Viet Nam

Source: UNIDO, 2021a.

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

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

Appendix A2. African economies by African sub-region

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

Source: UNIDO, 2021a.
Note: The geographical classification is based on the United Nations publication "Standard Country or Area Codes for Statistical Use", originally published as Series M. No. 49, and now commonly referred to as the M49 standard. Countries with no available data were omitted.
https://unstats.un.org/unsd/methodology/m49/.

Appendix B. Technology classification of manufacturing exports and production

Technology classification of exports

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

Source: UNIDO, 2017.

Medium-high and high technology (MHT) manufacturing categories

Description	ISIC Rev. 3
Manufacture of chemicals and chemical products	24
Manufacture of machinery and equipment	29
Manufacture of office, accounting and computing machinery	30
Manufacture of electrical machinery and apparatus	31
Manufacture of radio, television and communication equipment and apparatus	32
Manufacture of medical, precision and optical instruments, matches and clocks	33
Manufacture of motor vehicles, trailers and semi-trailers	34
Manufacture of other transport equipment, excluding: ISIC Revision 3: 351 = Building and repairing of ships and boats ISIC Revision 4: 3011 = Building of ships and floating structures 3012 = Building of pleasure and sporting boats 3315 = Repair of transport equipment, except motor vehicles	35

Source: OECD, 2003 and UNIDO, 2010.

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

Country	GDP Structure 2019	MVA Structure 2019	Population Structure 2019	Exports Structure 2019	Imports Structure 2019
Burundi	0.75	1.10	2.66	0.41	0.99
Comoros	0.29	0.33	0.20	0.12	0.22
Djibouti	0.53	0.27	0.22	0.39	0.99
Eritrea	1.42	1.19	0.81	1.75	1.28
Ethiopia	22.49	22.87	25.90	6.72	17.78
Kenya	20.57	23.49	12.15	14.10	19.44
Madagascar	3.38	2.89	6.23	6.50	4.41
Malawi	1.93	2.40	4.30	2.08	3.26
Mauritius	3.50	5.67	0.29	4.54	6.33
Mozambique	4.32	5.13	7.02	11.40	8.41
Rwanda	2.81	2.27	2.92	2.81	3.04
Seychelles	0.42	0.35	0.02	1.18	1.22
Somalia	0.41	0.13	3.57	1.14	1.40
South Sudan	3.75	1.25	2.56	n/a	n/a
Uganda	7.85	9.00	10.23	8.33	8.38
United Republic of Tanzania	15.16	11.15	13.40	11.27	10.80
Zambia	6.22	6.29	4.13	17.01	8.11
Zimbabwe	4.19	4.21	3.38	10.23	3.93
Eastern Africa	100.00	100.00	100.00	100.00	100.00
Angola	45.27	31.51	18.26	51.64	39.26
Cameroon	15.09	18.88	14.85	6.48	14.95
Central African Republic	0.80	1.28	2.72	0.26	1.17
Chad	4.82	4.06	9.15	3.41	5.94
Congo	4.59	3.22	3.09	10.36	8.43
Democratic Rep of the Congo	18.50	26.15	49.79	9.78	16.52
Equatorial Guinea	4.36	10.74	0.78	7.46	5.22
Gabon	6.41	4.07	1.25	10.59	8.14
Sao Tome and Principe	0.15	0.09	0.12	0.02	0.36
Middle Africa	100.00	100.00	100.00	100.00	100.00
Algeria	21.63	8.05	17.85	26.22	20.10
Egypt	45.97	59.96	41.62	22.21	36.42
Libya	2.78	0.58	2.81	17.69	6.71
Morocco	13.97	17.72	15.12	21.19	23.81
Sudan	10.12	6.90	17.75	1.84	2.88
Tunisia	5.54	6.79	4.85	10.85	10.07
Northern Africa	100.00	100.00	100.00	100.00	100.00
Botswana	4.58	2.19	3.46	5.10	6.65
Eswatini	1.19	3.42	1.72	1.94	1.85
Lesotho	0.73	0.99	3.19	0.98	2.13
Namibia	3.20	3.21	3.74	4.89	7.28
South Africa	90.30	90.19	87.89	87.09	82.09
Southern Africa	100.00	100.00	100.00	100.00	100.00

Country	GDP Structure 2019	MVA Structure 2019	Population Structure 2019	Exports Structure 2019	Imports Structure 2019
Benin	1.46	1.96	3.01	2.06	3.01
Burkina Faso	1.83	1.02	5.19	3.00	4.16
Cabo Verde	0.26	0.17	0.14	0.05	0.72
Côte d'Ivoire	6.12	8.56	6.57	11.09	9.63
Gambia	0.23	0.10	0.60	0.10	0.57
Ghana	8.65	10.43	7.77	13.55	11.09
Guinea	1.62	1.55	3.26	2.91	3.02
Guinea-Bissau	0.18	0.18	0.49	0.27	0.27
Liberia	0.38	0.23	1.26	0.46	0.58
Mali	2.30	2.66	5.02	2.93	4.28
Mauritania	0.77	0.59	1.16	2.14	2.55
Niger	1.24	0.69	5.96	0.99	2.48
Nigeria	70.41	66.24	51.34	55.43	46.87
Senegal	3.13	4.92	4.16	3.63	7.41
Sierra Leone	0.70	0.11	2.00	0.42	1.39
Togo	0.70	0.59	2.06	0.96	1.99
Western Africa	100.00	100.00	100.00	100.00	100.00

Source: Own elaboration on the basis of UNIDO, 2020c and UNCTADstat, 2020.

Appendix D. Analysis of the industrial competitiveness of African regions

	Technology group	Trade balance (billions) 2019	Export structure (percentage) 2019	Export market share (percentage) 2019	RCA (index) 2019
Eastern Africa	Primary products	11.9	51.1	0.77	3.42
	Total manufacturing	-63.6	35.0	0.10	0.42
	Resource-based	-18.0	18.9	0.25	1.10
	Low-technology	-10.3	8.6	0.13	0.59
	Medium-technology	-26.3	6.1	0.04	0.20
	High-technology	-9.0	1.4	0.02	0.07
	Other transactions	4.4	13.9	1.31	5.84
	Total	-47.3	100	0.22	1
Middle Africa	Primary products	50.7	80.1	2.02	5.36
	Total manufacturing	-19.4	19.1	0.09	0.23
	Resource-based	-0.4	12.9	0.28	0.75
	Low-technology	-5.7	0.6	0.02	0.04
	Medium-technology	-9.9	5.1	0.06	0.16
	High-technology	-3.4	0.5	0.01	0.02
	Other transactions	0.4	0.9	0.14	0.36
	Total	31.7	100	0.38	1
Northern Africa	Primary products	22.4	43.7	2.19	2.93
	Total manufacturing	-102.1	52.8	0.48	0.64
	Resource-based	-18.3	21.2	0.92	1.23
	Low-technology	-14.8	11.0	0.56	0.75
	Medium-technology	-48.2	17.9	0.43	0.58
	High-technology	-20.7	2.7	0.10	0.13
	Other transactions	3.8	3.5	1.10	1.47
	Total	-76.0	100	0.75	1
Southern Africa	Primary products	8.4	24.4	0.91	1.64
	Total manufacturing	-7.8	69.6	0.47	0.84
	Resource-based	12.8	33.7	1.09	1.96
	Low-technology	-5.7	6.5	0.25	0.44
	Medium-technology	-3.4	26.6	0.48	0.86
	High-technology	-11.5	2.8	0.08	0.14
	Other transactions	3.8	6.0	1.40	2.52
	Total	4.3	100	0.56	1
Western Africa	Primary products	65.3	70.1	2.93	4.70
	Total manufacturing	-74.1	16.5	0.12	0.20
	Resource-based	-18.0	12.2	0.44	0.71
	Low-technology	-13.6	1.3	0.05	0.09
	Medium-technology	-32.9	2.3	0.05	0.08
	High-technology	-9.7	0.7	0.02	0.03
	Other transactions	14.6	13.4	3.50	5.62
	Total	5.8	100	0.62	1

Source: Own elaboration on the basis of UNCTADstat, 2020.

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

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

Source: Own elaboration on the basis of UNIDO, 2020b.

Appendix F. CIP averages of African regions

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

Source: Own elaboration on the basis of UNIDO, 2020b.

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