UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

International Yearbook of

Industrial Statistics

Edition 2024

Progress by innovation with reliable industrial statistics

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UNIDO Statistics

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Acknowledgements

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In this 30th edition of the *International Yearbook of Industrial Statistics*, we recognize the contributions and efforts of all past and present collaborators involved in this publication.

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Abbreviations

AI artificial intelligence

CIP Competitive Industrial Performance *(see glossary)*
CO_2 carbon dioxide
COVID-19 coronavirus disease

EIE emerging industrial economy *(see glossary)*
EU European Union
Eurostat Statistical Office of the European Union

GDP gross domestic product *(see glossary)*
GHG greenhouse gas
Gt gigatonnes

HDI Human Development Index *(see glossary)*

IAEG-SDGs Inter-agency and Expert Group on SDG Indicators
IEA International Energy Agency
IIP index of industrial production *(see glossary)*
ILO International Labour Organization
ISIC International Standard Industrial Classification of All Economic Activities *(see glossary)*
ISIC Rev. 3 Revision 3 of ISIC
ISIC Rev. 4 Revision 4 of ISIC
ISID inclusive and sustainable industrial development *(see glossary)*
IVA industry value added

LDC least developed country *(see glossary)*
LLDC landlocked developing country *(see glossary)*

MHT medium-high and high technology
MUVA mining and utilities value added *(see glossary)*
MVA manufacturing value added *(see glossary)*

NSO national statistical office

OECD Organisation for Economic Co-operation and Development

R&D research and development

SBS structural business statistics *(see glossary)*

SDC statistical disclosure control *(see glossary)*
SDG Sustainable Development Goal *(see glossary)*
SIDS small island developing State *(see glossary)*
SITC Standard International Trade Classification
SNA system of national accounts *(see glossary)*
STEM science, technology, engineering, and mathematics

UN United Nations
UNCTAD United Nations Trade and Development
UNDP United Nations Development Programme
UNIDO United Nations Industrial Development Organization
UNSD United Nations Statistics Division
USD United States dollars

Foreword

Three decades ago, when UNIDO's *International Yearbook of Industrial Statistics* was first published, the global industrial landscape was different from today. High-income economies, the so-called "industrialized world", dominated manufacturing production, and the majority of manufacturing was still in lower-technology sectors, such as food products, fabricated metal goods and petroleum-related products. It was a time when manufacturing industries were still widely defined by high smokestacks and polluting processes. Today, however, even these traditional, backbone sectors of industry are dominated and defined by technological innovation and constant change as the world adapts to a dawning new era of the Fourth Industrial Revolution.

Over its thirty years as the leading global reference point for statistical information and analysis of the world's industries, the *Yearbook* has documented the profound changes that have occurred. Led by China and other countries in Asia and Latin America, middle-income economies now lead industrial production in a long-since globalized world. Innovation and technological advancement now dominate the industrial processes and products. Most importantly, social and environmental standards are now at the center of industrial policy decisions worldwide, while the issue of sustainability overall is being rightly recognized as paramount.

In its 30th edition, UNIDO's *Yearbook* summarizes the long-term transformation of global industry over the past decades as it develops to become the 'Industry of the Future'. This will be defined by intelligent production systems which are powered by sustainable energy, reusing resources and materials, and harnessing the power of digitalization and AI to optimize quality and productivity. In addition to this big picture overview, our *Yearbook* presents the latest and emerging trends in industry worldwide, as well as specifically in the various regions and sectors around the world.

Manufacturing is outperforming other economic sectors. The share of manufacturing in world gross domestic product (GDP) has increased from 14.7 per cent in 2000 to 16.7 per cent in 2023. Globally, the manufacturing sector grew by 2.8 per cent in 2023. Middle-income economies have seen the most growth, at 5 per cent, whereas low-income economies experienced 3 per cent manufacturing growth. While this growth rate is admittedly not enough to achieve the Sustainable Development Goals (SDGs), it is nevertheless a positive development, particularly the fact low-income economies have been outperforming the world average. This is a clear demonstration that a

gradual catching-up process is underway, one which we must increasingly support with all possible effort.

This *Yearbook* also presents the latest evidence of how a decoupling of economic growth from CO_2 emissions is indeed possible and in fact already happening. While industrial activity has continued to increase, there has not been an equivalent increase in greenhouse gas emissions. CO_2 emissions and manufacturing activity have shown signs of decoupling since 2011.

UNIDO's data also point to important developments, which urgently need to be addressed. For instance, new manufacturing growth has not necessarily been accompanied by a parallel increase in employment. We must ensure that industries remain a key driver of job creation with the rise of new technologies such as the next generation of automation and artificial intelligence (AI). The *Yearbook* also shows how women continue to be under-represented in higher-technology industries. We must support and invest in gender equality and skills training which targets women in particular.

Overall, there has been progress towards our SDG 9 targets, but it remains insufficient and we as a global community are capable of achieving so much more. We must accelerate our efforts to support developing to reach a much greater pace in their sustainable industrialization.

This *Yearbook* is an introduction to UNIDO's extensive industrial analytics databases, highlighting the role that industrial statistics has played in the last 30 years in guiding well-informed policymaking worldwide, and will continue to do so in the future.

Gerd Müller
Director General, UNIDO

Progress by innovation with reliable industrial statistics

1 Introduction

1.1 Preface

In recent times, the world has been confronted with a multitude of overlapping crises. Whether short- or long-term, global or local in nature, these crises could have a long-lasting impact on development paths and the attainment of global goals, particularly for lower-income economies or countries with special development challenges.

The industrial sector could play a pivotal role in delivering the solutions required to surmount this situation and return to a trajectory of sustainable development and prosperity [1; 2]. Indeed, industry has a unique potential for creating millions of decent jobs, enhancing food security, promoting green growth, boosting technological progress, increasing productivity and reaching more equitable societies. However, sustained industrial development requires a conducive environment supported by infrastructure, skills, financing and policies. Reliable statistics on all aspects of relevance for industrial development are essential for identifying opportunities and challenges, and guiding an effective policy response.

UNIDO, with its wealth of data encompassing different aspects of industrial activity, is the international reference in this domain. Its databases provide internationally-comparable and consistent information spanning all regions and industrial sectors. The *International Yearbook of Industrial Statistics* is its main statistical publication, featuring a summary of recent developments in industrial sectors worldwide through dashboards, visualizations and concise analysis. It serves as an invitation to delve deeper into recent industrial trends across countries, sectors and regions. The underlying data originates primarily in UNIDO's own databases, which can be freely accessed via the newly revamped UNIDO Statistics Portal [3]. This edition of the *Yearbook* offers a snapshot of the latest data available as of October 2024.

The first chapter presents an introduction to industrial statistics, defining its scope from the perspective of official statistics. It also motivates the study of trends in industrial sectors by emphasizing their role in all aspects of sustainable development.

Industrial statistics comprise several broad sectors, including manufacturing, mining, electricity, water supply, waste management and other utilities. The second chapter presents the most recent developments observed in these sectors from a general perspective. As a custodian agency for the industry-related indicators under SDG 9, UNIDO monitors and reports on progress towards these targets. The chapter delves into the advancements made towards the Goal. Furthermore, it explores the latest competitive performance of industries according to the UNIDO Competitive Industrial Performance (CIP) Index.

Following the general presentation of industrial sectors, Chapters 3 and 4 review the manufacturing sector and the combined mining and utilities sector in more detail. These chapters summarize recent trends in these sectors and present a structural analysis of their industries. In the case of manufacturing, where more extensive information is generally available, a brief overview of indicators related to international trade, employment, gender, productivity, and environmental impact is also provided.

The *Yearbook* features a thematic chapter that provides a statistical perspective on a topic of relevance for industrial development. In this **30th edition** of the *Yearbook*, Chapter 5 presents a long-term overview of changes in the industrial landscape. Backed by consistent and comparable UNIDO data covering more than three decades, it is now possible to evaluate longstanding "megatrends" shaping industrial sectors across the world [4], including the global rebalancing of manufacturing production, the growing relevance of higher-technology and green industrial activities, as well as persistent trends observed in industrial employment and environmental impact. Based on this comprehensive data-driven analysis, the chapter serves as a platform to analyse the implications of these trends on the industrial panorama of the coming decades.

1.2 What is industrial statistics?

The term *industry* generally refers to "a particular form or sector of productive work, trade, or manufacture" [5]. More specifically, in the field of economic statistics, an industry is defined as "the set of all production units engaged primarily in the same or similar kinds of productive activity" [6, p. 9]. This is the definition used by the International Standard Industrial Classification of All Economic Activities (ISIC), which provides the international guidelines for cataloguing economic activity into specific industries, such as agriculture, mining, manufacturing or services.

In this sense, every category of economic activity in ISIC is called an *industry*.

In economics, *industry* usually indicates "activities connected with the processing of raw materials and manufacture of goods in factories" [5]. This definition is rather narrow, however, as it only considers manufacturing activities. For the purpose of UNIDO's statistical products, and this *Yearbook* in particular, *industrial statistics* refers to a broader group of productive activities, as presented in the box below.

Industrial statistics

This class of statistics reflects the characteristics and economic activities of all resident units in the reporting country, which are primarily active in the following productive activities defined in terms of the ISIC [6, pp. 79–172; 7, p. 12]:

- *Mining and quarrying* (ISIC Rev. 4 section B): The extraction of minerals that occur naturally as solids (e.g., coal and ores), liquids (e.g., petroleum) or gases (e.g., natural gas).
- *Manufacturing* (ISIC Rev. 4 section C): The physical or chemical transformation of materials, substances or components into new products.
- *Electricity, gas, steam and air-conditioning supply* (ISIC Rev. 4 section D): The provision of electric power, natural gas, steam, hot water and the like through a permanent infrastructure of lines, mains and pipes.
- *Water supply; sewerage, waste management and remediation activities* (ISIC Rev. 4 section E): Activities related to the management (including collection, treatment and disposal) of various forms of waste; activities of water supply are also grouped in this section, since they are often carried out in connection with the treatment of sewage.

Sections D and E are usually combined under the *utilities* sector. Given its significance for economic development and higher data availability, separate statistical information is usually available for manufacturing. Data for the rest of industrial activities are frequently grouped together under *mining and utilities*.

Mining and quarrying

Manufacturing

Electricity, gas, steam and air-conditioning supply

Water supply; sewerage, waste management and remediation activities

The definition provided in the box is aligned with the standard use of the term *industry* in official statistics. While this is crucial for the presentation of harmonized statistical data in UNIDO Statistics and the United Nations (UN) statistical system as a whole, the reader should be aware of possible deviations from this definition when it comes to the everyday use of the term or its use in specialized literature outside official statistics. Specifically, the narrow definition mentioned at the beginning of this section seems to equate industry with manufacturing, while the definition used in official statistics implies that manufacturing is only one sector within industry. The narrower definition is commonly used in economics and in the literature on industrialization and structural transformation, including within UNIDO. Thus, the reader is advised to consider the possibility of some fluidity in the use of the term *industry* and any derived concepts. Finally, it is worth noting that construction (ISIC Rev. 4 section F) is not part of industry according to the definition currently followed by official statistics.

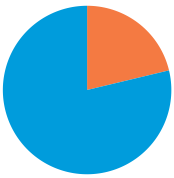
In official statistics, **manufacturing** is only one of four **industrial sectors**

The definitions and classifications mentioned above are based on the fourth revision of the ISIC, dating from 2008 [6]. A fifth revision of this classification, along with its implementation plan, has already been endorsed by the United Nations Statistical Commission [8; 9]. While the new revision does not affect the delineation of industrial statistics, it enhances the relevance of the classification by better reflecting the current structure of the world economy, including at a detailed activity level. Relevant changes for industrial statistics will be described in future UNIDO statistical products, in line with its implementation by national statistical offices (NSOs) worldwide.

The **fifth revision** of the **ISIC** was globally endorsed in 2023–2024

1.3 Why is industry important?

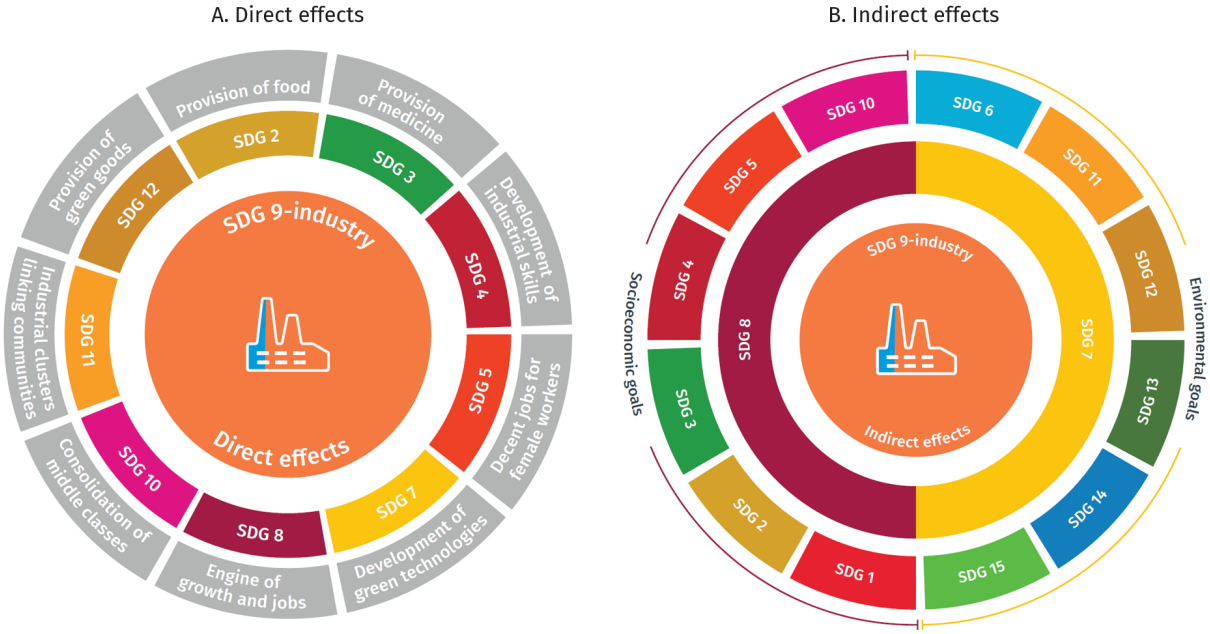
Globally, industry represented 21.3 per cent of gross domestic product (GDP) in 2023. Within industry, manufacturing accounted for 78.6 per cent of value added, while the remaining 21.4 per cent originated from the combined mining and utilities sector [10]. Manufacturing is generally one of the most dynamic sectors in the global economy, both in terms of economic weight and its links with other sectors.



Industrial sectors account for **21.3%** of the global economy

The positive relationship between industrialization and overall economic development originates in manufacturing's role as a driver of technological advancement, which in turn promotes productivity growth, know-how, and innovation, benefiting the entire economy. Furthermore, economies of scale are more easily achieved in manufacturing compared to other sectors. Through its substantial cross-sectoral linkages, progress in the manufacturing sector frequently entails growth in the rest of the economy. Structural change towards

Figure 1.1 | Industry and its direct and indirect links with other SDGs



Source: [2, pp. 37, 44]

higher value-added manufacturing activities has therefore traditionally been considered the main path that economies can take to achieve higher income levels and provide sustainable livelihoods for their population [2; 11].

Industrialization not only contributes to economic growth and capabilities upgrading, it can also directly and indirectly support the achievement of the socioeconomic and environmental objectives embedded in the Sustainable Development Goals (SDGs) through the creation of jobs, improvement of living conditions, and the promotion of innovation and technological change (Figure 1.1), including initiatives towards green production and consumption practices. For instance, recent evidence indicates that the manufacturing sector has explained two-thirds of the country-level growth episodes recorded in the last five decades, spearheaded patenting activity related to frontier technologies and green innovation, and shown a strong multiplier effect on job creation [2]. To account for these direct and indirect effects, it is therefore important to consider broader measures of sustainable development beyond just economic growth when evaluating the full impact of industry and designing supporting policies in this area [12; 13].

Industrial development has significant direct and indirect links to **all SDGs**

Figure 1.2 uses the latest UNIDO country classification[i] to show that industrial development and SDG achievement are strongly correlated in low- and middle-income economies. The graph presents manufacturing value added (MVA) per capita as an indicator of the level

[i] Annex C provides further information on UNIDO's country classification.

Figure 1.2 | Relationship between MVA per capita and the overall SDG Index in low- and middle-income economies

Source: [10; 14]
Note: The figure shows MVA per capita in 2023 and the SDG Index 2024. The horizontal axis is in logarithmic scale. The SDG Index is a composite assessment of each country's overall performance on the 17 SDGs based on official and non-official data. It ranges from 0 to 100, with higher values indicating a better performance; for more information, see [14].
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

of industrialization, while overall progress on the SDGs is measured through the latest score in the SDG Index.[i] Economies with a better industrial performance tend to exhibit a stronger advancement towards the global Goals. The positive relationship is especially strong at lower levels of MVA per capita (up to around 1,000 United States dollars (USD) at constant 2015 prices), showing that industrialization, even from a modest starting point, can lead to significant progress towards sustainable development.

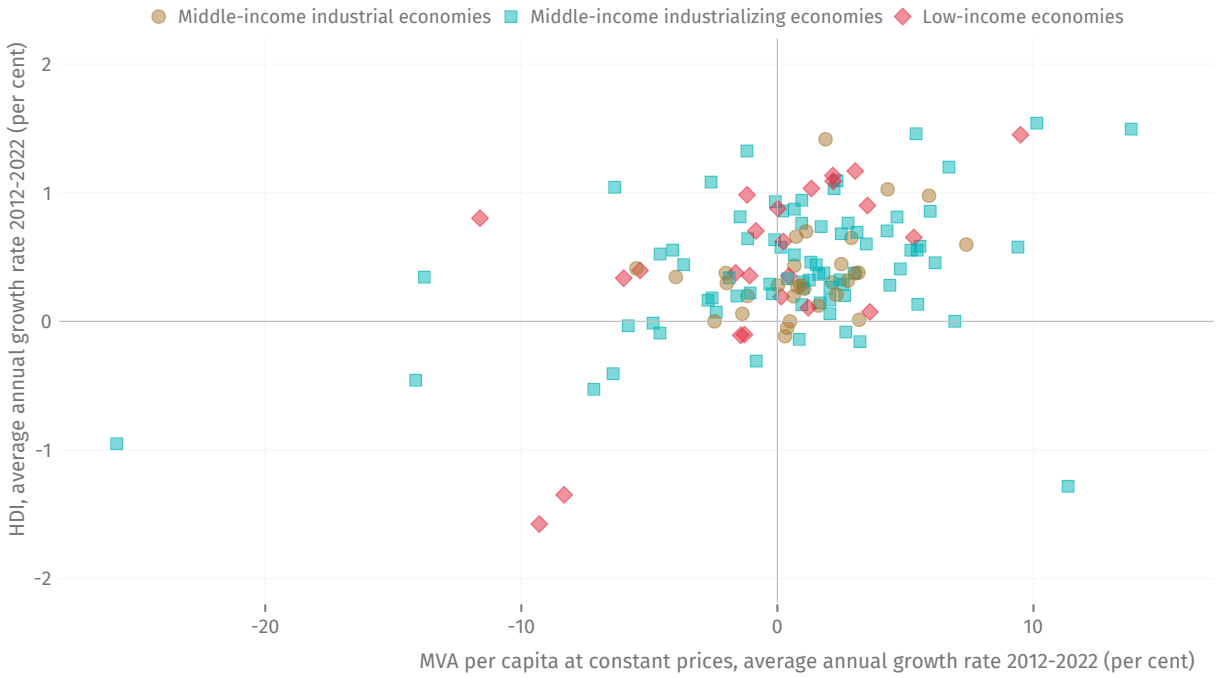
[i] The SDG Index is produced by the Sustainable Development Solutions Network. It represents a composite assessment of each country's overall performance on the 17 SDGs based on official and non-official data. The methodology and 2024 scores are presented in [14].

Figure 1.3 presents further evidence of the strong links between industrialization and human development. The chart shows the average annual growth rate over the period 2012–2022 for MVA per capita, a marker for industrial development, and the Human Development Index (HDI)[i] in low- and middle-income economies. Across income levels, countries that increased their reliance on manufacturing tended to improve their HDI score. Notably, almost all middle-income industrial economies registered an improvement in their human development results over the last decade.

[i] The HDI is a long-standing indicator measuring human development, defined as the process of expanding people's freedoms and opportunities and improving their well-being. The HDI is a composite index of three dimensions: 1) the ability to lead a long and healthy life; 2) the ability to acquire knowledge; and 3) the ability to achieve a decent standard of living. This indicator is published by the United Nations Development Programme (UNDP) [15].

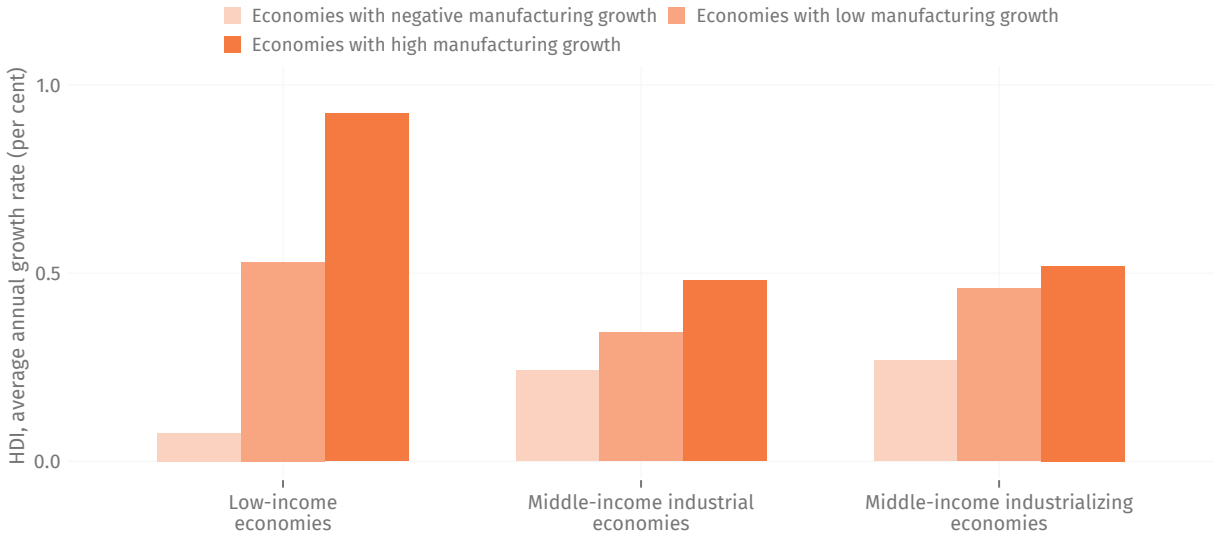
These results are also presented in Figure 1.4, which shows the average annual growth rate of the HDI score in economies classified according to their level of industrial progress over the period 2012–2022. In order to account for initial conditions, economies are first separated according to the UNIDO country classification. The graph shows that,

Figure 1.3 | Relationship between the growth rate of MVA per capita and HDI in low- and middle-income economies, 2012-2022



Source: [10; 15]
Note: Growth rates of MVA per capita are calculated over the values in constant 2015 USD. The HDI is a composite measure of human development. Higher values in the index indicate a better performance; for more information, see [15].
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 1.4 | Average annual HDI growth rate in low- and middle-income economies by manufacturing performance, 2012-2022



Source: [10; 15]
Note: This graph shows the average annual HDI growth in 2012-2022 for low- and middle-income economies classified in three groups according to their average annual MVA per capita growth over the same period: economies with negative manufacturing growth (average annual MVA per capita growth smaller than 0 per cent), economies with low manufacturing growth (average annual MVA per capita growth larger than 0 per cent but smaller than 2 per cent) and economies with high manufacturing growth (average annual MVA per capita growth larger than 2 per cent). The results are robust to the use of different thresholds for obtaining the three groups. Economies are further partitioned according to the UNIDO country classification in order to reduce the impact of their pre-existing industrialization stage. For more information on the HDI, see [15].
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

on average, economies where industry grew at a robust pace also registered the highest increases in HDI score. Further confirming the findings highlighted above, the group of low-income economies with strong industrial growth achieved the largest gain in terms of human development, reflecting the importance of structural transformation as a crucial driver of development.

Industry clearly has a direct impact on economic growth. Moreover, as outlined in this section, a multidimensional analysis reveals that industry also shows positive linkages with overall socioeconomic development and prosperity. This was recognized in the 2030 Agenda for Sustainable Development [16], which considers inclusive and sustainable industrial development (ISID) as one of its Goals, but also highlights the sector's importance for all other objectives. The fundamental connection between different areas of sustainable development, including ISID, has also been corroborated empirically (see, for instance, [17]). As countries strive to achieve their development goals, the interlinkages between industry and the rest of the economy strengthen, amplifying the positive ripple effects of industrial growth throughout the socioeconomic system.

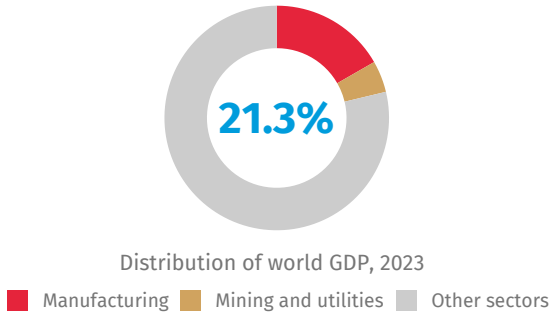
Successful industrializers
among low-income economies recorded the largest improvement in terms of
human development

Industrial Statistics: Data and Visualizations

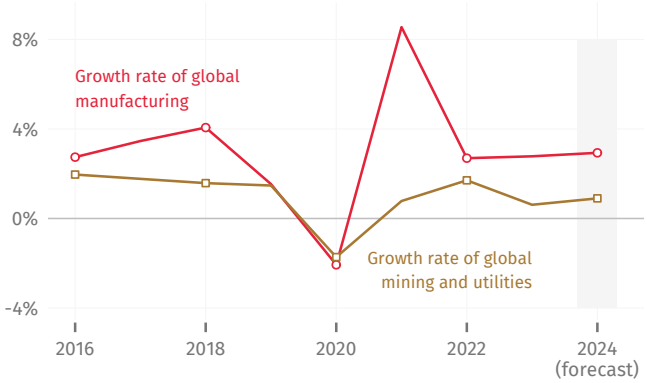
2 Global industrial statistics

2 Global industrial statistics

Key figures



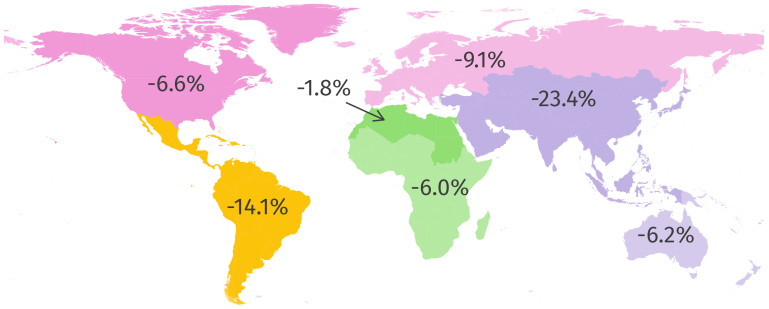
Industry accounted for more than **one fifth** of the global economy in 2023, mostly originating in the manufacturing sector.



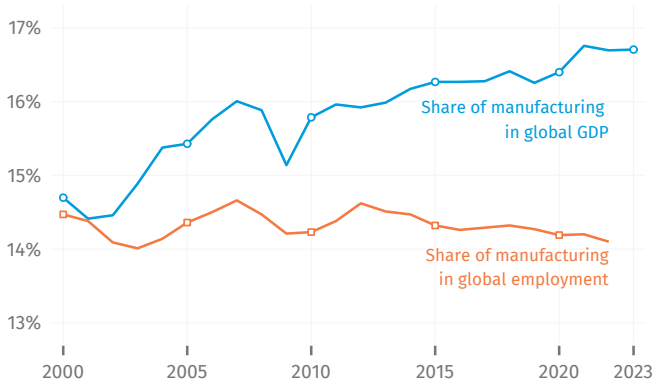
2.4%

Growth rate of industry value added in 2023, with manufacturing showing a greater dynamism since COVID-19.

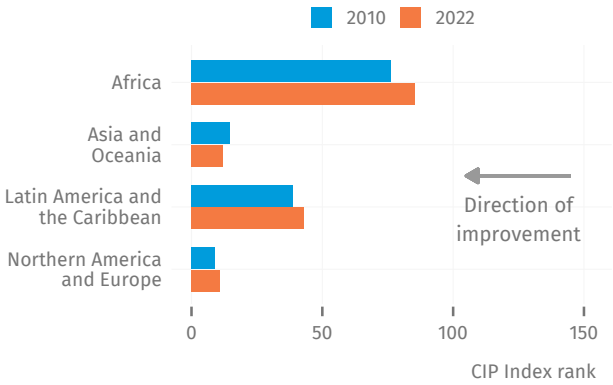
Growth rate of CO_2 intensity of manufacturing between 2015 and 2021



Although CO_2 emissions intensity of global manufacturing is on a decreasing trend since 2010, the sector's CO_2 emissions keep mounting in absolute terms. Following a temporary decline, they rose again and surpassed the **6 Gt** mark in 2021.



While global manufacturing has progressed towards SDG target 9.2 in terms of GDP share, this has not been accompanied by a parallel trend in employment.



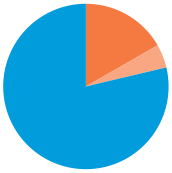
Northern America and Europe reached the highest competitiveness, but Asia and Oceania was the only region to climb up the CIP ranks.

2.1 Recent trends in industrial sectors

This chapter highlights recent global trends observed in industrial sectors. As described in Section 1.2, industry includes all mining, manufacturing and utilities activities. The following sections provide a general overview of all industrial sectors combined, including the impact of recent crises. It also presents in some detail the latest changes in terms of SDG 9 and competitiveness indicators. Manufacturing will be explored in-depth in Chapter 3, while Chapter 4 will focus on the mining and utilities sectors.

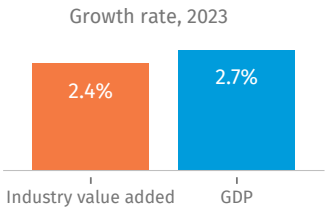
2.1.1 Annual industrial production

In 2023, the industrial sectors accounted for 21.3 per cent of world GDP, equivalent to 19.7 trillion USD in constant 2015 prices. With a value added of 15.5 trillion USD in constant 2015 prices, manufacturing explained 78.6 per cent of total industry in 2023, while mining and utilities were responsible for the remaining 21.4 per cent. However, the relative weight of industrial sectors varies from region to region. Figure 2.1 shows that, in terms of value added, manufacturing is the predominant industrial sector in Asia (with 81.0 per cent of industrial value added in 2023), Europe (80.8 per cent), Northern America (77.5 per cent), Latin America and the Caribbean (72.4 per cent), and Sub-Saharan Africa (55.7 per cent). On the other hand, mining and utilities is the prevailing industrial sector in Northern Africa and Oceania.



In 2023, manufacturing and mining and utilities accounted for more than a fifth of the global economy

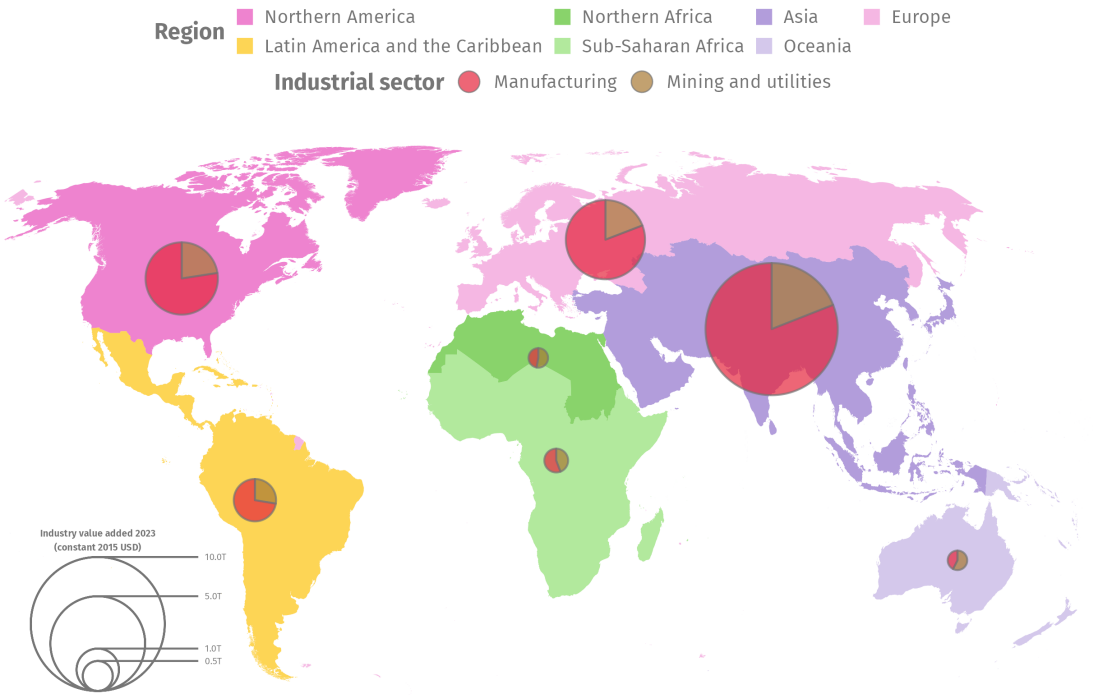
Industrial production returned to a trajectory of moderate growth since 2022, after the disruptions caused by the coronavirus disease (COVID-19) crisis. Figure 2.2 shows that global industry value added (IVA) increased by 2.4 per cent in 2023, below the 2.7 per cent reached by global GDP in the same year.



Global industry value added was outpaced by overall GDP growth in 2023

Middle-income economies were among the most dynamic country groups in 2023, with annual growth rates of industry beyond 4 per cent, followed by low-income economies, where industrial output increased by 3.2 per cent. Moreover, low-income economies were the only group whose industry grew at a faster pace than its GDP. High-income industrial economies, on the other hand, registered a more subdued, albeit still positive, growth rate, while high-income industrializing economies was the only country group in Figure 2.2 that faced a shrinking industrial production in 2023.

Figure 2.1 | Distribution of value added by industrial sector and region, 2023



Source: [10]
Note: The pie charts show the distribution of industry value added (IVA) between manufacturing (MVA) and mining and utilities (MUVA). The distribution is calculated using figures in constant 2015 USD.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

The longer-term trends of the two major industrial sectors, including a forecast for 2024, can be observed in Figure 2.3. According to the latest data, manufacturing maintained a greater dynamism in recent years in comparison to mining and utilities. In 2023, the manufacturing sector recorded a moderate growth of 2.8 per cent, while the mining and utilities sectors grew by 0.6 per cent. These trends are expected to continue in 2024, with manufacturing forecast to expand by almost 3 per cent, and the combined mining and utilities sector by 0.9 per cent.

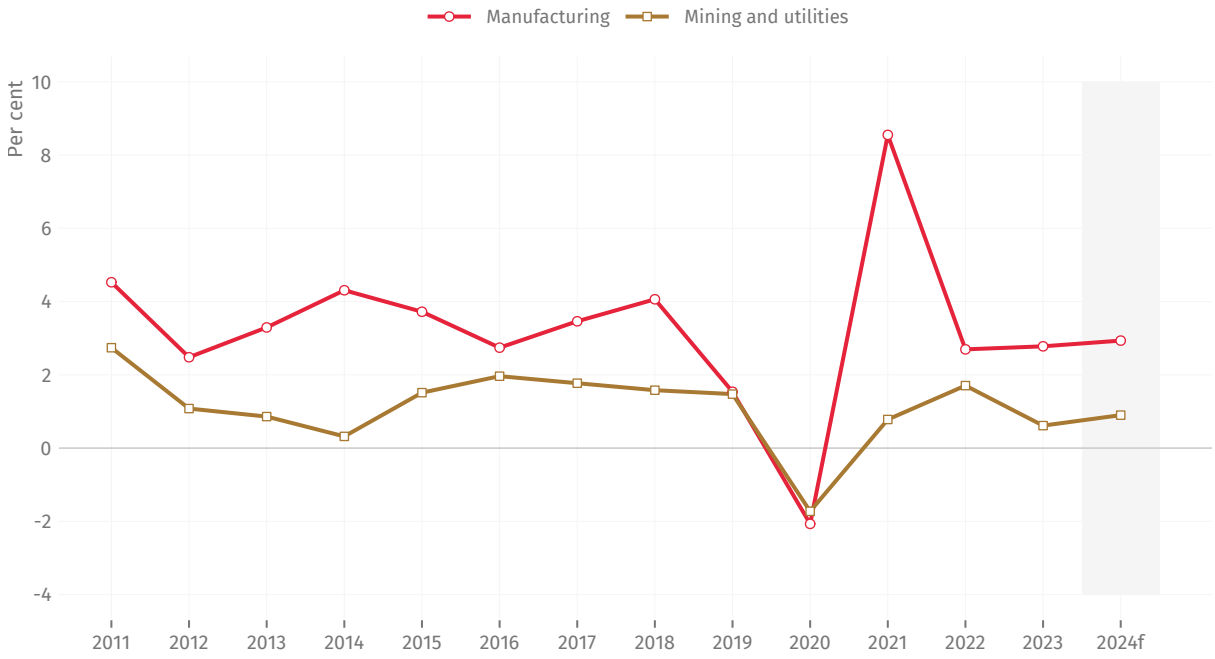
Furthermore, it can be observed that the industrial sectors follow varying growth patterns in the different country groups, as presented in Figure 2.4. This chart shows the individual contribution of manufacturing as well as the mining and utilities sectors on the growth of IVA. Industrial movements at the global level are mostly shaped by the manufacturing sector, due to its larger relative weight and greater dynamism in recent years. A similar distribution is observed in industrial economies, while growth in high- and middle-income industrializing economies registered significant contributions from both sectors. These economies are currently relying on all industrial sectors, even though many of them are generally shifting towards

In recent years, industrial production in low-income economies has achieved comparably greater dynamism than in high-income economies

Figure 2.2 | Growth rate of GDP and industry value added by country group

Source: [10]
Note: Growth rates are calculated over the values in constant 2015 USD. 2024f refers to UNIDO forecasts for the year 2024. Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 2.3 | Growth rate of global value added in manufacturing and in the mining and utilities sectors



Source: [10]
Note: Growth rates are calculated over the values in constant 2015 USD. 2024f refers to UNIDO forecasts for the year 2024. Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 2.4 | Contribution of manufacturing and mining and utilities to industry value added growth by country group

Source: [10]
Note: A sector's contribution to growth depends on its growth rate, calculated over the values in constant 2015 USD, and its respective weight in total industry. 2024f refers to UNIDO forecasts for the year 2024.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

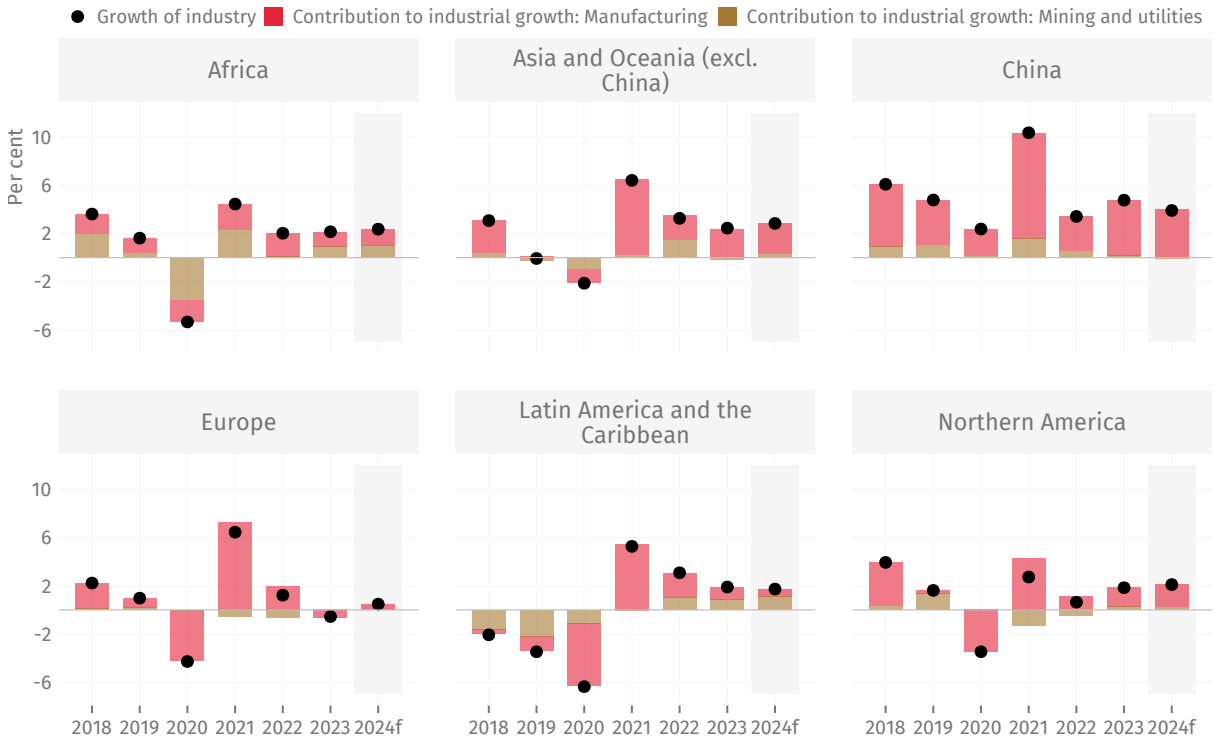
a manufacturing-based economy. In contrast, the industrial performance of low-income economies is significantly dominated by the mining and utilities sectors.

The outlook for industrial production in 2024 also diverges across country groups and industrial sectors. Global industrial production is expected to grow by more than 2 per cent, at similar rates to those in the past two years, mainly driven by the outstanding performance of middle-income economies. Industrial production across the world is facing headwinds from higher commodity and energy prices, volatile geopolitical situations and shortages in goods and commodities, among other factors. Nevertheless, most of the country groups are expected to register moderate production increases.

Figure 2.5 shows the growth of IVA and the contribution of manufacturing and mining and utilities by region. In Asia and Oceania, for example, manufacturing is the sector driving the positive performance of IVA in recent years, while its mining and utilities sectors has only grown to a limited extent. Compared to the other regions, Africa and Latin America and the Caribbean registered a more significant growth of mining and utilities. In 2023, Europe was the only region to enter negative territory, although it is expected to return to growth, albeit at a subdued pace, in 2024. Other regions will likely grow in 2024 at

Mining and utilities
maintains a key role
in low-income economies

Figure 2.5 | Contribution of manufacturing and mining and utilities to industry value added growth by region



Source: [10]
Note: A sector's contribution to growth depends on its growth rate, calculated over the values in constant 2015 USD, and its respective weight in total industry. 2024f refers to UNIDO forecasts for the year 2024.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

similar rates to what was observed in 2023.

2.1.2 Quarterly industrial production

Index of industrial production

The sub-annual index of industrial production (IIP) tracks changes in industrial production relative to a base year. It provides timely information on industrial activity over short- to medium-term periods.

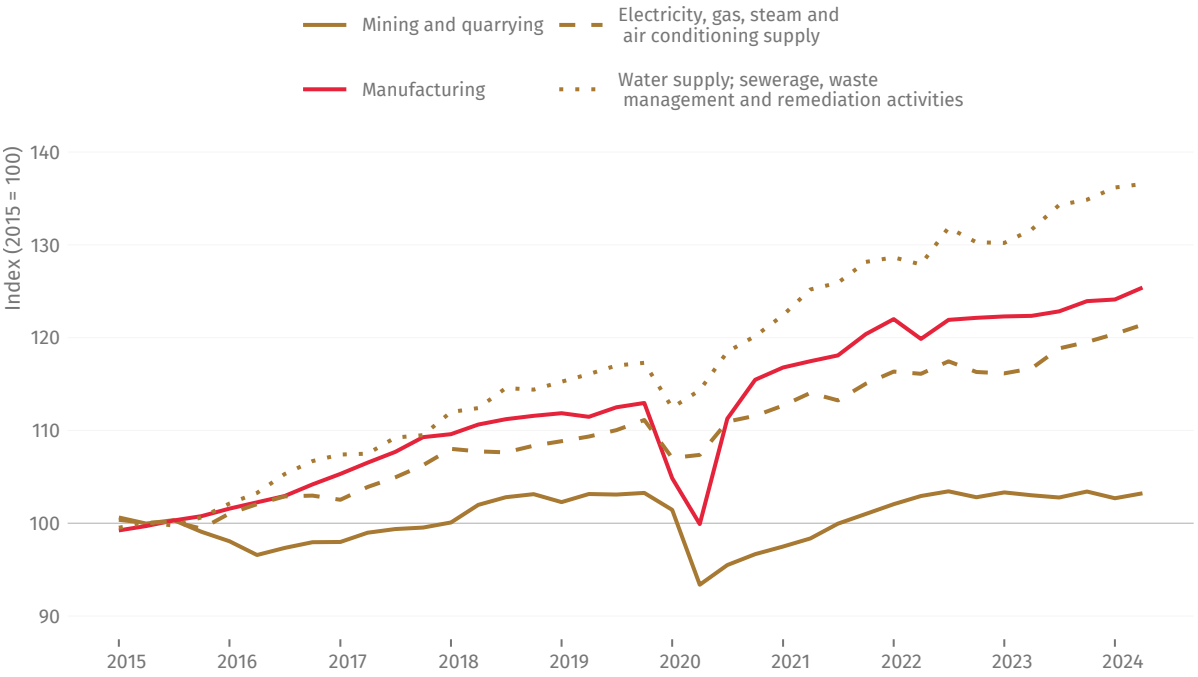
In addition to the annual information described above, UNIDO collects sub-annual IIPs covering all industrial sectors: mining and quarrying; manufacturing; electricity, gas, steam and air-conditioning supply; and water supply; sewerage, waste management and remediation activities. Due to their higher frequency, the IIPs allow detailed and timely analyses of trends and the current performance of these sectors. Annex C summarizes the main characteristics and methodological aspects of these indices.

Figure 2.6 gives a general overview of the four industrial sectors and compares their trajectories since 2015. In-depth information on recent developments in the manufacturing sector and the mining and utilities sectors can be found in Sections 3.1.2 and 4.1.2, respectively.

As shown in the graph, most industrial sectors achieved significant dynamism in recent years. With the exception of mining activities, all industrial sectors swiftly recovered from the impacts of the COVID-19 crisis in 2020 and returned to their previous growth trends. Their

Global production of electricity and water supply continued on a dynamic trend

Figure 2.6 | Global index of industrial production by industrial sector



Source: [18]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

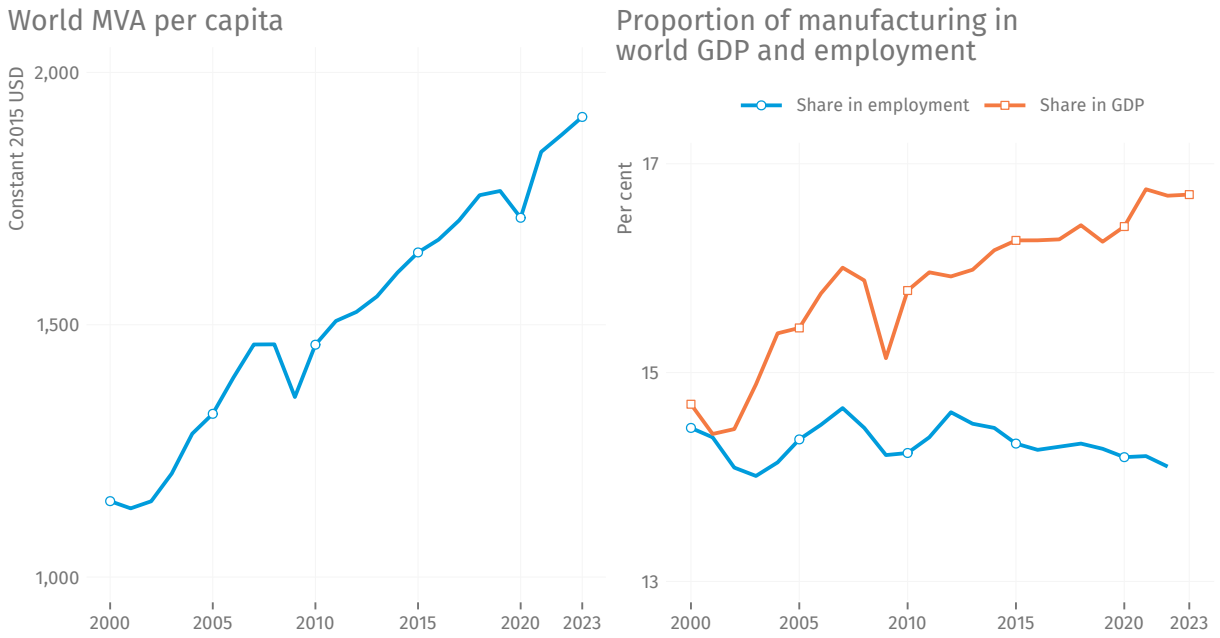
growth even accelerated during the first half of 2024. Water supply has been the most dynamic industrial sector. On the other hand, economic activity in the mining and quarrying sector has maintained a sluggish performance since 2015, with a stalled production level over the past two years.

2.2 SDG 9

Industrialization is a key focus of SDG 9, which seeks to establish resilient infrastructure, promote inclusive and sustainable industrialization and encourage innovation. Although industrialization serves as a universal measure of economic performance, its goals differ depending on a country's stage of development. In lower-income economies, industrialization signifies a shift from traditional agriculture or low-value-added activities to a modern, industry-based economy with higher productivity. Conversely, in higher-income economies, it is characterized by the adoption of capital- and technology-intensive production techniques, a diversified production basket and a specialization in innovation-driven industries. A shared aspect of modern industrialization across all economies is the transition to environmentally sustainable manufacturing practices.

Sustainable Development Goal with three focus areas:
Industry
Innovation
Infrastructure

Figure 2.7 | Global trends in SDG target 9.2: World MVA per capita (left) and proportion of manufacturing in world GDP and total employment (right)



Source: [19]
Note: National accounts figures for 2023 are UNIDO estimates.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

2.2.1 SDG 9.2: Manufacturing production and employment

In recent years, global manufacturing has grown steadily, except for disruptions caused by the 2008–2009 global financial crisis and the COVID-19 pandemic in 2020. The left-side panel of Figure 2.7 shows that global MVA per capita reached a record high of 1,913 USD in constant 2015 prices in 2023, marking a 16.4 per cent increase since 2015. Alongside this growth, the share of MVA in GDP rose steadily from 16.3 per cent in 2015 to 16.7 per cent in 2023. However, the proportion of manufacturing employment has been declining since the global financial crisis, a trend exacerbated by the COVID-19 pandemic. Manufacturing's share in total employment dropped from 14.3 per cent in 2015 to 14.1 per cent in 2022, the most recent year with complete data. This indicates that the recent expansion in global manufacturing has not been matched by a corresponding increase in employment, raising concerns about the sector's established ability to generate jobs and support livelihoods.

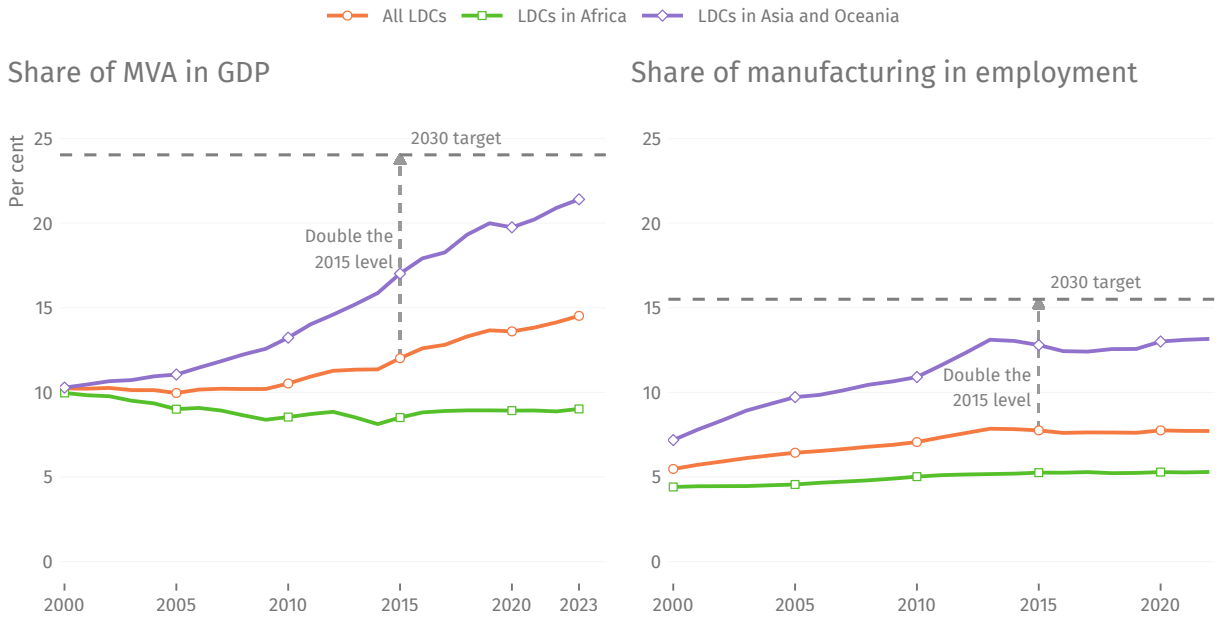
This is particularly concerning for least developed countries (LDCs), the only group for which SDG 9 sets specific industry-related targets: doubling the share of manufacturing in both GDP and total employment to 24.0 per cent and 15.5 per cent, respectively, by 2030. However, as shown in Figure 2.8, LDCs face significant challenges in meeting these objectives. While the MVA-to-GDP ratio has been trending upward, aside from a brief dip during the COVID-19 crisis in 2020, it only

SDG target 9.2

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

- **9.2.1** Manufacturing value added as a proportion of GDP and per capita
- **9.2.2** Manufacturing employment as a proportion of total employment

Figure 2.8 | SDG indicators 9.2.1 and 9.2.2 for LDCs



Source: [19]
Note: This chart shows two indicators: MVA as a proportion of GDP (left) and manufacturing employment as a proportion of total employment (right). 2030 target values for both indicators are set up as doubling their 2015 level, as directly mentioned in SDG target 9.2. MVA as a proportion of GDP for 2023 is a UNIDO estimate.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

reached 14.5 per cent in 2023, still significantly far from the specified target of 24.0 per cent. Similarly, the share of manufacturing employment has remained overall stagnant at 7.7 per cent since 2015, making the goal of doubling it to 15.5 per cent appear increasingly out of reach. Notably, there are differences within this group, with Asian LDCs having made significant progress, while African LDCs have only seen a modest improvement.

Global
MVA per capita
climbed to $1,913 (constant 2015 USD) in 2023, an all-time record

2.2.2 SDG 9.3: Small industrial firms

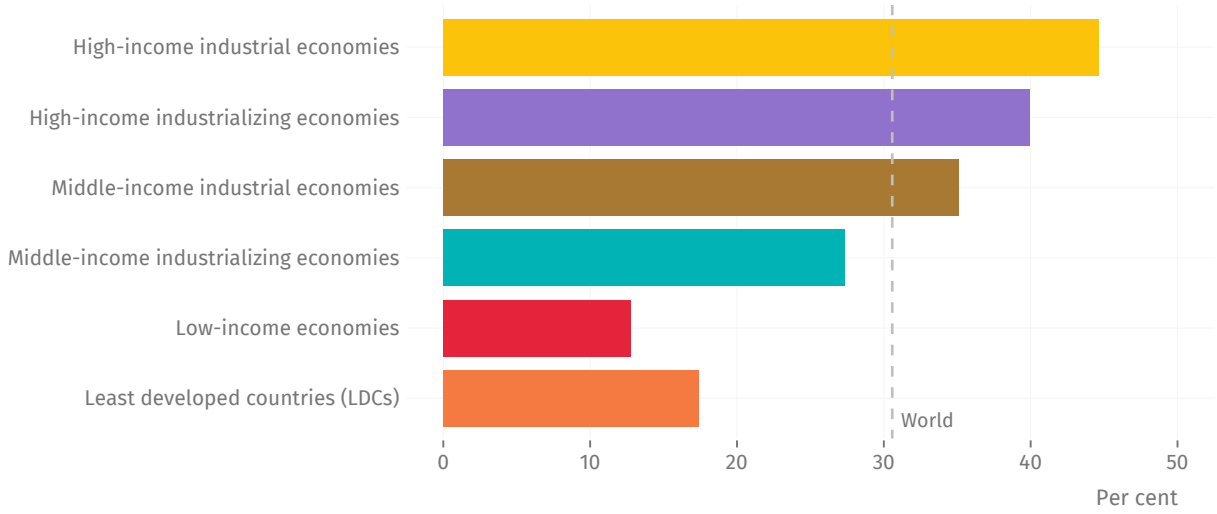
Small and medium-sized enterprises are of considerable importance in most economies, for instance through their significant role in employment generation. Expanding access to financing for small industrial enterprises can drive significant economic growth in every country, regardless of its developmental stage. In particular, financial investments in small manufacturing firms can lead to increased production capacity, the adoption of innovative practices, and the creation of new employment opportunities. In contrast to larger firms, small enterprises typically have the liberty to experiment with novel business strategies, unencumbered by prior investments or established industrial practices. As a result, small-scale industries are seen as key innovators, not only as adaptable firms with flexible production processes but also as start-ups fuelled by emerging technologies [20; 21; 22].

SDG target 9.3

Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.

- **9.3.1** Proportion of small-scale industries in total industry value added
- **9.3.2** Proportion of small-scale industries with a loan or line of credit

Figure 2.9 | SDG 9.3.2: Proportion of small-scale industries with a loan or line of credit, by country group



Source: [19]
Note: Group averages are computed as a simple average of available country-level point estimates. For each economy, only the latest available year of survey data, which can be between 2006 and 2023, is used in this computation. Only surveys adhering to the World Bank Enterprise Surveys methodology [24] are considered.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

However, according to the most recent data from the World Bank Enterprise Surveys [23], the proportion of small manufacturing enterprises having a loan or line of credit remains steady at around 30 per cent. As Figure 2.9 shows, the access to loans is significantly skewed towards higher-income countries, highlighting the urgent need for measures to improve financial service access for small companies in low-income economies and LDCs. This would help sustain and support their operations, especially during times of economic volatility, reducing socioeconomic disparities worldwide. To assess the economic impact of these loans, the share of small-scale firms in total value added should also be closely monitored. However, as illustrated by Figure 2.10, data availability and timeliness for both SDG 9.3 indicators remain a challenging issue.

Access to
loans for small firms
remains skewed towards
higher-income economies

2.2.3 SDG 9.4: Environmental sustainability of industry

After maintaining CO_2 emissions from fuel combustion below 6 gigatonnes (Gt) for five consecutive years, the manufacturing sector exceeded the 6 Gt mark in 2021 again. At 6.1 Gt, global manufacturing accounted for 18.0 per cent of total CO_2 emissions from fuel combustion in 2021, an increase of 2.1 per cent from the preceding year. However, the CO_2 emission intensity of global manufacturing has continued its downward trend, decreasing from 0.49 kg per USD in 2015 to 0.41 kg per USD in 2021.

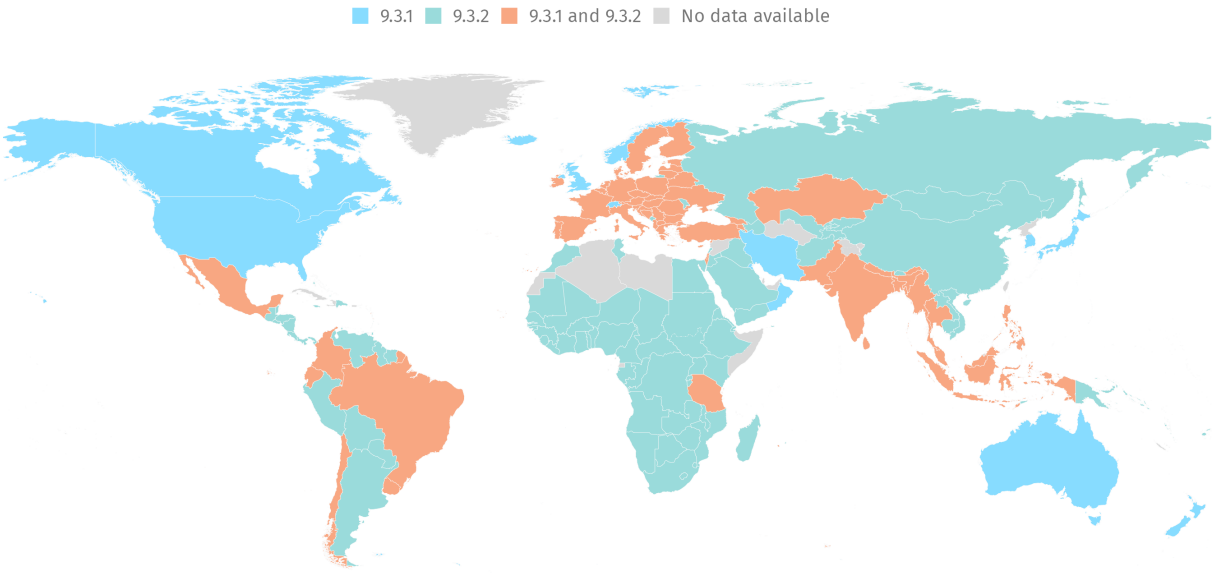
Figure 2.11 distinguishes the economies that experienced an increase or decrease of CO_2 emission intensity in manufacturing between 2015 and 2021. Globally, 63.8 per cent of countries with available data

SDG target 9.4

By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

- **9.4.1** Carbon dioxide (CO_2) emission per unit of value added

Figure 2.10 | SDG 9.3: Data availability of SDG indicators 9.3.1 and 9.3.2, 2006-2023



Source: [19]
Note: For indicator SDG 9.3.2, an economy's data are considered to be available if at least one survey data point exists between 2006 and 2023. Only surveys adhering to the World Bank Enterprise Surveys methodology [24] are considered.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

recorded a decrease since 2015. On a regional level, 77.5 per cent of countries in Europe achieved a reduction, followed by 63.8 per cent in Asia and Oceania, 56.8 per cent in Africa, 52.0 per cent in Latin America and the Caribbean, and 50.0 per cent in Northern America, highlighting disparities in progress across regions.

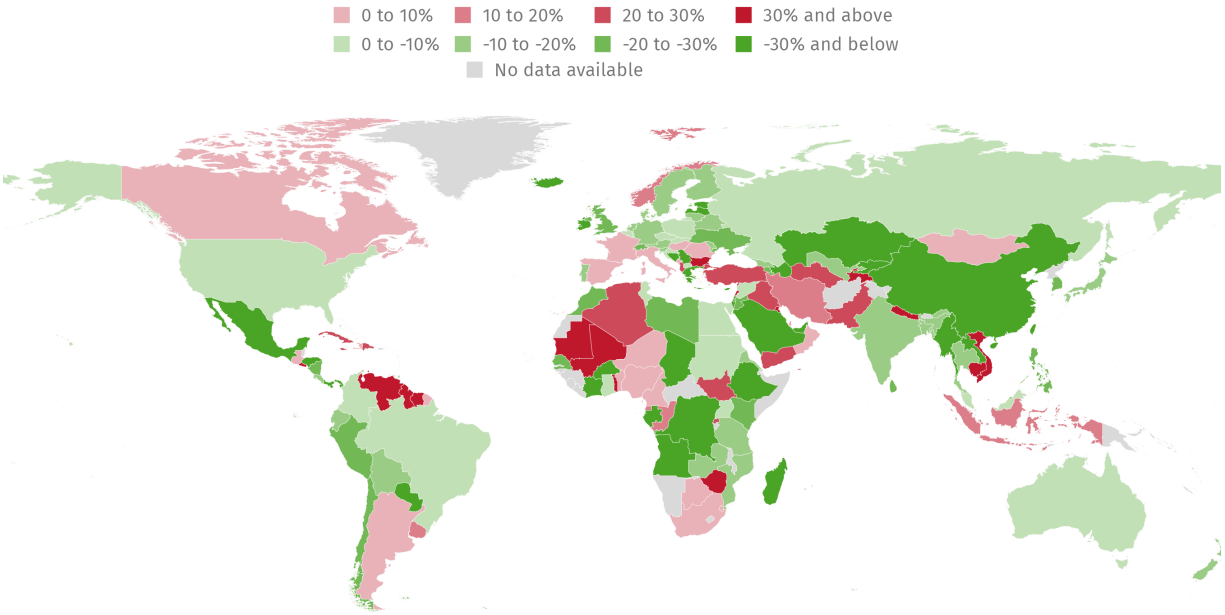
To assess the magnitude of the increases or decreases in CO_2 intensity, Figure 2.12 allows for a direct comparison of CO_2 intensity across UNIDO country groups. Indeed, it shows that high-income industrial economies exhibit the lowest CO_2 emission intensity with a value of 0.16 kg per USD in 2021, down 12.6 per cent from the 2015 level. This trend is the result of a long-term shift towards clean energy sources and a gradual structural change of their economies away from carbon-intensive industries. Industrializing economies, both high- and middle-income, also achieved notable reductions in CO_2 emission intensity, with decreases of 26.2 per cent and 10.7 per cent, respectively. However, both groups remain the largest CO_2 emitters per unit of MVA, largely due to their continued reliance on carbon-intensive industrial sectors. Low-income economies saw the smallest reduction in CO_2 emission intensity among the groups considered in the graph, with a decrease of just 1.7 per cent.

Meanwhile, middle-income industrial economies (excluding China) experienced a 4.4 per cent increase since 2015, which highlights the urgent need for strategies that prevent these countries from following the same carbon-intensive development trajectories that other groups

2.1%
increase in global
CO_2 emissions from manufacturing
between 2020 and 2021

CO_2 emission intensity
of manufacturing on a
decreasing trend
since 2011

Figure 2.11 | Growth rate of CO_2 emission intensity of manufacturing between 2015 and 2021



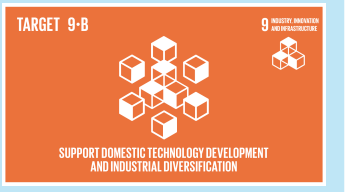
Source: [19]
Note: Each interval includes its minimum growth rate and excludes its maximum growth rate to avoid interval overlaps. Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

pursued before transitioning to green energy sources. China, a middle-income industrial economy presented separately in the figure, was able to significantly reduce its CO_2 emissions from 0.91 kg per USD in 2015 to 0.61 kg per USD in 2021, attributable to its shift towards renewable energy sources and energy efficiency improvements, as well as its structural change towards less emission-intensive industries. While there are clear indications of a decoupling between industrial activity and CO_2 emissions on a global level, significant progress across all regions remains crucial to further minimize the sector's environmental impact.

2.2.4 SDG 9.b: Technological upgrading

Structural change does not only entail the transition of economic activity from agriculture to industry, but also a shift towards higher-value added, higher-productivity sectors within industry. In this context, SDG indicator 9.b.1 monitors the contribution of medium-high and high technology (MHT) industries, as defined in Annex Table E.2.1, to total MVA. Globally, the share of MHT industries in manufacturing has remained relatively stable, fluctuating in a narrow range over the last years. After displaying a gradual decline in 2000–2009, the share reached a proportion of 42.9 per cent in 2009, the minimum over the period with available data (2000–2021). After that, it recovered lost ground, climbing to 45.1 per cent in 2021.

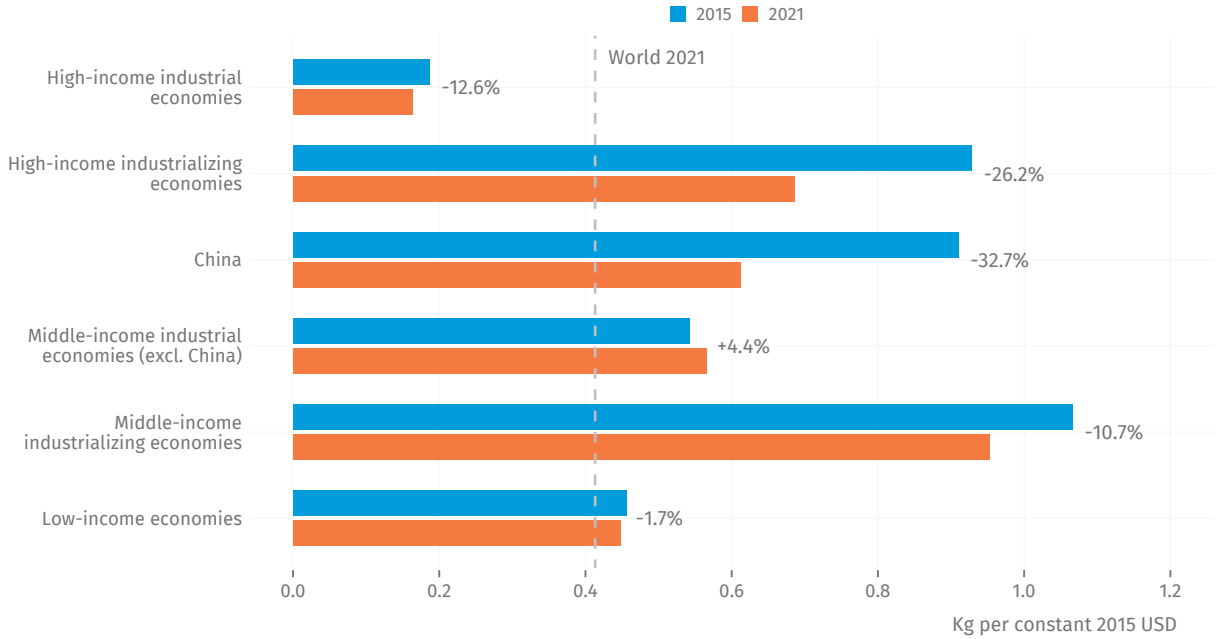
SDG target 9.b



Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.

- **9.b.1** Proportion of medium and high-tech industry value added in total value added

Figure 2.12 | SDG 9.4.1: CO_2 emission intensity of manufacturing by country group



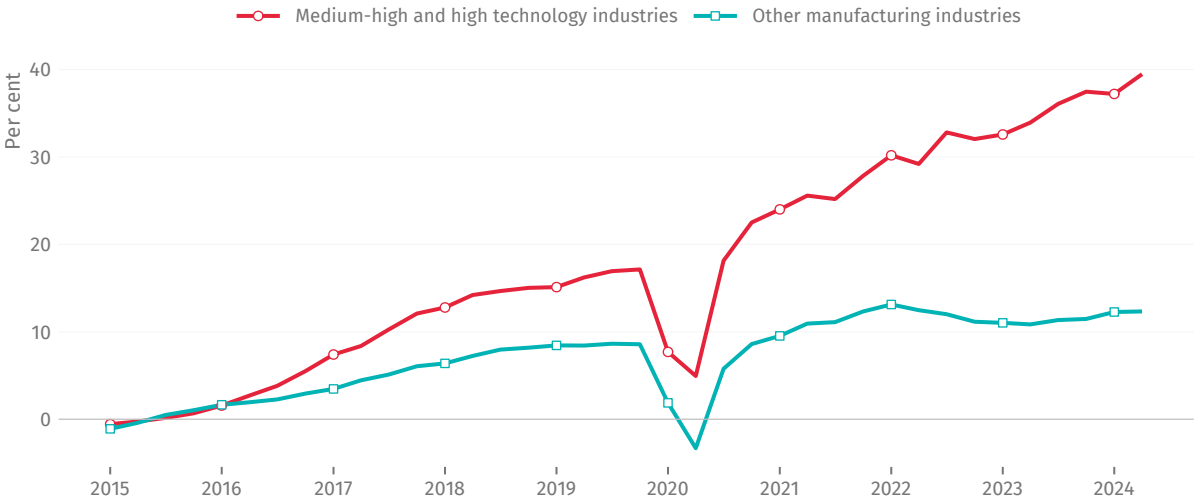
Source: [19]
Note: The numbers next to the bars indicate the change in the CO_2 emissions intensity of manufacturing between 2015 and 2021.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

As this indicator is only available up to 2021, due to low global data availability, it is not possible to track the impact of recent events. However, a complementary indicator can be constructed based on quarterly IIPs, which are regularly published by a large number of countries. Although IIP-based indicators are not fully compatible with SDG 9.b.1, both series are highly correlated.

Figure 2.13 shows the quarterly growth rates of MHT industries and other manufacturing industries, calculated relative to the base year 2015. From 2015 to 2019, the MHT industries demonstrated steady growth, with slight variations in the rate of expansion. However, this upward trajectory was disrupted by the COVID-19 pandemic in the first quarter of 2020, causing a sharp decline that persisted during the second quarter of 2020. Nevertheless, MHT industries rebounded quickly, with recovery evident already by the third quarter of 2020. Since then, their growth has generally accelerated, though with some minor fluctuations. As shown in Section 3.1 of this *Yearbook*, the strong performance of the MHT industries in recent periods has been driven by the computers and electronics sector and the automotive sector, which recorded quarter-over-quarter growth rates of 2.7 per cent and 2.4 per cent, respectively, in the second quarter of 2024. This indicates progress toward SDG target 9.b, but the widening gap between higher-technology industries and other sectors could exacerbate inequalities, as countries focused on lower-technology manufacturing risk falling further behind.

Higher-technology industries show **accelerated performance** compared to low-technology industries

Figure 2.13 | Quarterly growth rate of industries by technological intensity, relative to 2015

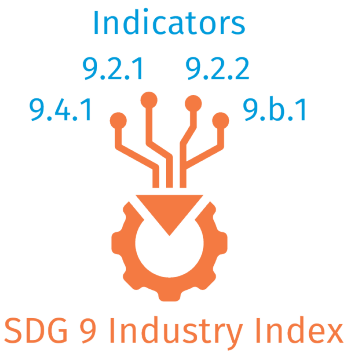


Source: [18]
Note: The lines are based on country-level indices of industrial production. While highly correlated to trends in value added, as relevant for SDG 9.b.1, they are not equivalent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

2.2.5 Overall performance towards SDG 9 industry targets

The UNIDO SDG 9 Industry Index is a composite measure of the industry-related indicators outlined in SDG 9. It was designed to assist policymakers and other stakeholders in assessing a country's overall progress toward industrialization and evaluating performance across dimensions of industrial development, as defined by the 2030 Agenda.

The Index is based solely on the official indicators from the SDG global indicator framework. It encompasses the SDG 9 targets directly related to industrialization, monitored through five indicators that cover all three dimensions of ISID: economic (9.2.1a, 9.2.1b, and 9.b.1), social (9.2.2), and environmental (9.4.1). Due to limited data coverage across countries and time, SDG indicators 9.3.1 and 9.3.2 (*Proportion of small-scale industries in total industry value added* and *Proportion of small-scale industries with a loan or line of credit*) cannot be included in the Index. Future editions may include these indicators if data availability improves, offering a more comprehensive assessment of inclusive industrial development. The Index ranges from zero to one, with higher values reflecting better performance. A brief explanation of the Index and its methodological background can be found in Annex C, while a comprehensive coverage is provided in [25; 26].



The current edition of the SDG 9 Industry Index benchmarks 135 economies between 2000 and 2021. For its computation, the Index requires data for all five indicators, explaining the restricted time coverage despite the availability of some indicators for more recent years.

Figure 2.14 presents the ranking of the top ten economies based on the SDG 9 Industry Index. Compared to 2020, the ranking in 2021 is only marked by a position exchange between Japan and Czechia, as well as between Austria and Slovenia. Japan moved up from the eighth to the seventh position, while Czechia dropped from the seventh to the eighth. Austria climbed from position 10th to ninth, while Slovenia fell from position ninth to 10th. Since the launch of the SDGs in 2015, the top four economies have maintained their positions, with Taiwan Province of China, Ireland, the Republic of Korea, and Germany consistently ranking first, second, third, and fourth, respectively. The fifth position, however, has been alternating between Switzerland and Czechia. Starting at the seventh position in 2015, Czechia demonstrated significant and consistent improvement, rising to and maintaining the fifth position from 2016 to 2019. However, in 2020 it dropped by two positions to the seventh and then fell even further to the eighth in 2021. Switzerland, ranked fifth in 2015, declined to the eighth place in 2017–2018, before gradually climbing back to the fifth position in 2020, where it remained in 2021.

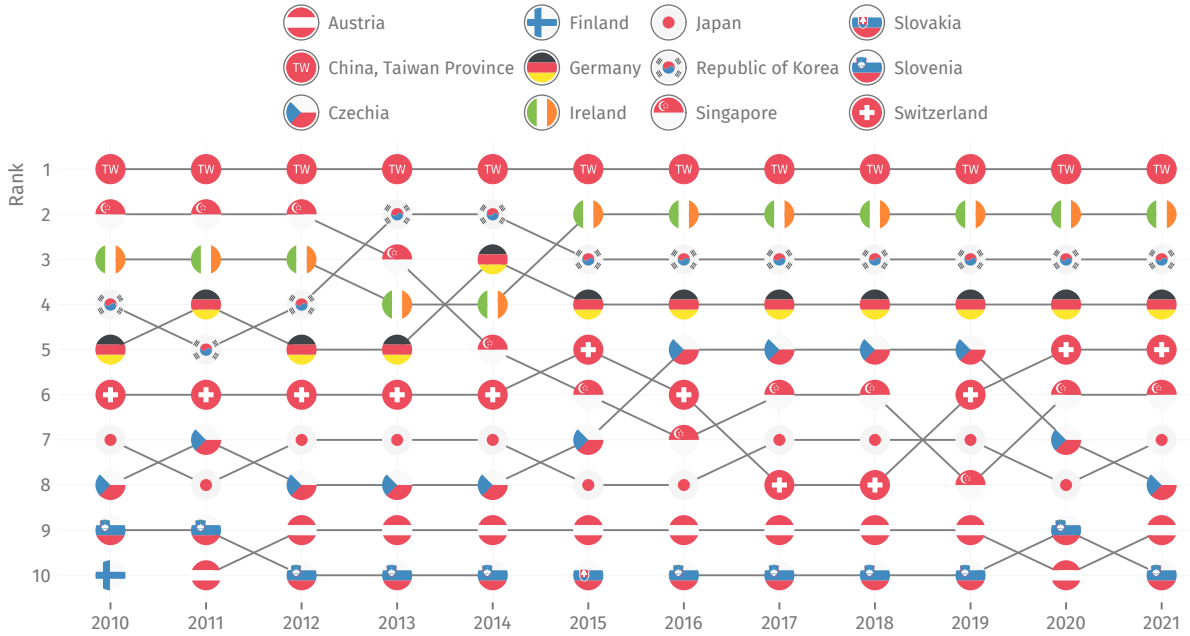
The SDG 9 Industry Index benchmarks 135 economies

The top ten ranked economies are all high-income industrial economies. In fact, only three out of the top 20 economies in 2021 are not part of this group: China (as a middle-income industrial economy ranked 11th), Denmark (high-income industrializing economy ranked 13th), and Malaysia (middle-income industrial economy ranked 18th). Hence there is a strong correlation between industrialization levels, as classified by UNIDO country groups, and performance in the Index.

Figure 2.15 presents the average score in the SDG 9 Industry Index by UNIDO country groups, providing an overview of their progress since the start of the century, while also highlighting the ranking of these groups over time. After the exchange of positions between the high-income industrializing and middle-income industrial country groups in 2003, the ranking of the groups has been unequivocally consistent. Since the adoption of the SDG agenda in 2015, middle-income industrial economies have shown the most significant progress, recording a 6.1 per cent increase between 2015 and 2021, steadily moving toward closing the gap with the top-performing group. Meanwhile, high-income industrial economies (ranked first) have been reporting a gradual deindustrialization, and are the only group experiencing a decline, dropping by 0.9 per cent between 2015 and 2021. The other groups have made notable progress since the introduction of the SDGs in 2015, with high-income industrializing economies (ranked third) growing by 5.9 per cent, low-income economies (ranked last) by 5.0 per cent, and middle-income industrializing economies (ranked fourth) by 4.7 per cent. Despite these improvements, the gap between the two highest-ranked groups and the rest remains pronounced.

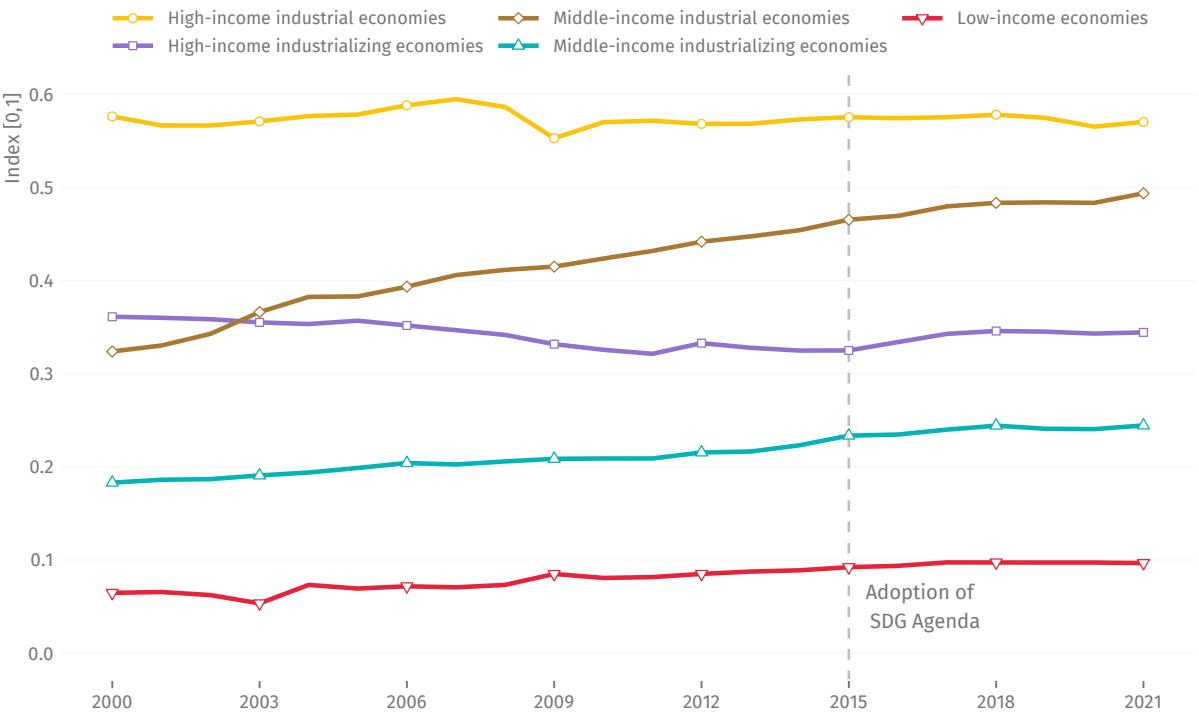
High-income industrial economies remain at the top of the ranking, but middle-income industrial economies are steadily closing the gap

Figure 2.14 | Top ten economies in the SDG 9 Industry Index



Source: [19]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 2.15 | Average score in the SDG 9 Industry Index by country group



Source: [19]
Note: Group aggregates are calculated as weighted averages of countries with available information, using population as weights.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

2.2.6 Interlinkages between SDG 9 and other SDGs

Upon adopting the 2030 Agenda, the UN highlighted that "the interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new Agenda is realized" [16, p. 2]. In response, the UN Statistical Commission proposed the formation of a working group to investigate the interconnections between SDG indicators, with the goal of leveraging these relationships to enhance statistical reporting of the global SDG indicator framework [27]. The working group published two comprehensive reports on SDG interlinkages [28; 29], which for instance provided empirical evidence of strong links between SDG 9 and both SDG 1 (*No poverty*) and SDG 10 (*Reduced inequality*), highlighting the correlation between a country's innovation capacity (SDG 9) and its income level [29].

Due to their integrated nature, SDGs require a holistic strategy to achieve progress towards the targets

Over the years, numerous studies within the scientific community have explored the interlinkages between SDGs as well, thereby revealing a variety of connections to SDG 9: [17] found that SDG 15 (*Life on land*), SDG 11 (*Sustainable cities and communities*) and SDG 7 (*Affordable and clean energy*) are all interconnected with SDG 9, and collectively linked to the environmental pillar of sustainable development; [30] found that SDGs focused on socio-economic well-being (SDGs 1-6), affordable and clean energy (SDG 7), decent work and economic growth (SDG 8), sustainable cities and communities (SDG 11), responsible consumption and production (SDG 12), and climate action (SDG 13) are all interconnected with SDG 9 as well and collectively connected to the economic pillar of the SDG framework; [31] found that "most of the synergies are dominated by the interlinkages between the target variables for SDGs 1-6 and SDGs 7-12". Knowledge of these synergies is crucial for developing effective and efficient policies to advance towards the SDGs. By recognizing and subsequently addressing potential synergies and trade-offs between objectives, policymakers can optimize outcomes and ensure that resources are allocated strategically for maximum impact. Ultimately this approach will lead to a more sustainable and long-lasting progress across multiple development areas.

SDG 9 interlinked with various other SDGs directly or indirectly

2.3 Competitive industrial performance

UNIDO has monitored industrial competitiveness using the CIP Index for more than a decade. This Index evaluates how successful an economy's manufacturing sector is at producing and selling goods in domestic and foreign markets while moving along the technological ladder. A feature of the CIP Index is that it provides a comparative metric of industrial performance, where an economy's outcomes are compared to all other economies in the world. In this way, a true sense

Knowledge of synergies between SDGs is crucial for developing effective and efficient policies

of industrial competitiveness in global markets is embedded in the Index.

The Index therefore allows for cross-country comparisons of industrial competitiveness, while highlighting industrial development challenges. However, it should be noted that the Index considers only economic competitiveness. UNIDO keeps developing broader measures of industrial performance that also consider the sector's social and environmental impacts.

The CIP Index is constructed from statistical indicators along three dimensions:

1. Capacity to produce and export manufactured goods;
2. Technological deepening and upgrading;
3. World impact.

The Index currently covers 153 economies from 1990 to 2022. The overall CIP score can take values between zero and one, with higher values indicating a higher industrial competitiveness. In practice, however, the scores' range is narrower since no country simultaneously excels in all of the Index's dimensions. This section analyses the main results from the most recent update of the CIP Index. The current CIP scores and global ranks for all economies are presented in Annex A.

See [32; 33; 34; 35] for a detailed description of the CIP Index's methodology and historical results. A brief overview of the Index's dimensions and the calculation of the composite index is presented in Annex C. The complete dataset is available in [36].

Three dimensions of the CIP Index

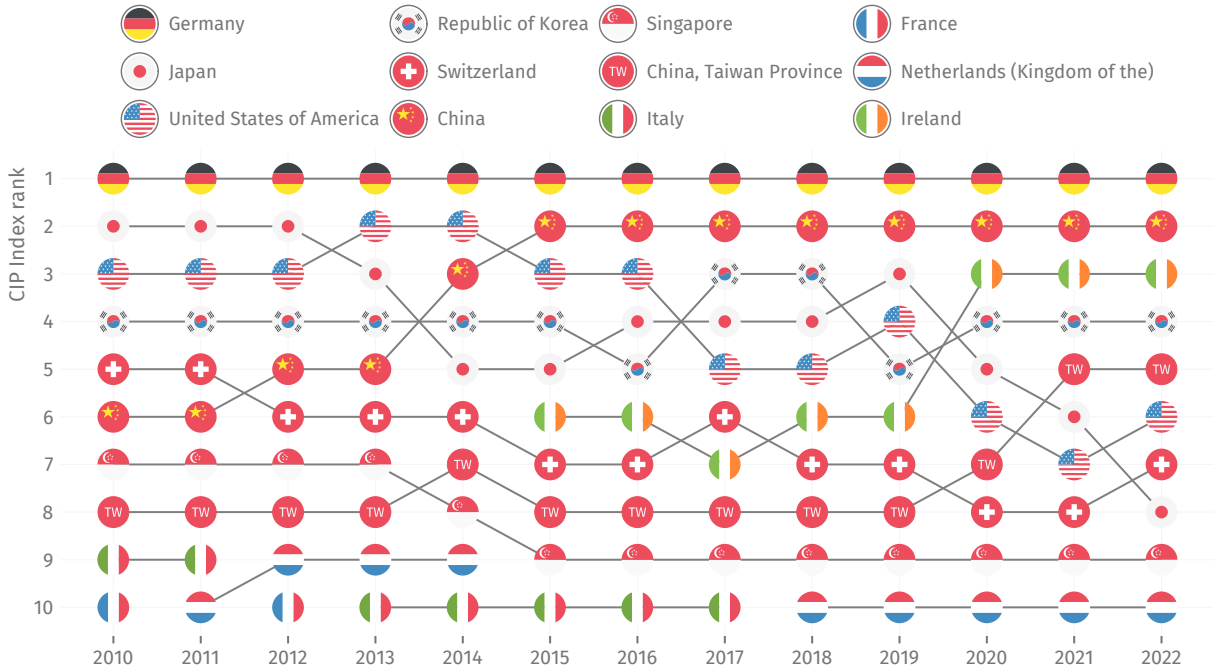
2.3.1 Global results

Figure 2.16 presents the economies with the most competitive manufacturing sector according to the CIP Index. It shows that the three most competitive industrial economies are presently Germany, China and Ireland. These three economies have ranked among the top three since 1990, 2014 and 2020, respectively. The only changes in the top ten between 2021 and 2022 are the United States of America and Switzerland gaining one position each and reaching the sixth and seventh rank, respectively. On the other hand, Japan lost two ranks and fell to the eighth position. This continues Japan's gradual decline since it ranked as the world's most competitive industrial economy in 1994. On the other hand, Taiwan Province of China has made significant progress in the ranking, climbing from the 16th place in 1990 to its current standing as the fifth economy with the most competitive industrial sector.

The full results reveal a significant correlation between income level and industrial competitiveness. Indeed, the top ten economies in the CIP ranking are almost exclusively high-income economies. China, a middle-income industrial economy, is the only exception. The marked presence of high-income economies, classified as either industrial or industrializing according to UNIDO categories, continues throughout the top quintile of the Index, with 25 out of the 31 economies reaching

Germany, China and Ireland
have been the three
most competitive industrial economies
for three years in a row

Figure 2.16 | Top ten economies in the CIP Index



Source: [36]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

this income level. On the other hand, low-income economies are predominantly positioned in the bottom quintile.

Structural transformation and changes in industrial competitiveness are slow processes, normally advancing in gradual increments from year to year. This is reflected in CIP scores and ranks that remain relatively stable between one year and the next. Only a long-time perspective reveals sustained positive or negative industrialization spells and structural changes achieved by countries. The left-side panel of Figure 2.17 highlights the largest winners in the CIP ranking between 2010 and 2022. Ordered according to the number of positions gained, these are Armenia (with an improvement of 28 positions), Brunei Darussalam (27), Nicaragua (27), Viet Nam (25), Cambodia (23) and the United Arab Emirates (23). On the other hand, the right-side panel of Figure 2.17 shows the economies with the largest declines in the CIP ranking between 2010 and 2022, including the Bolivarian Republic of Venezuela (recording a loss of 53 positions), Lebanon (29) and Congo (28).

Changes to **industrial competitiveness** are gradual processes requiring a long-term **statistical perspective**

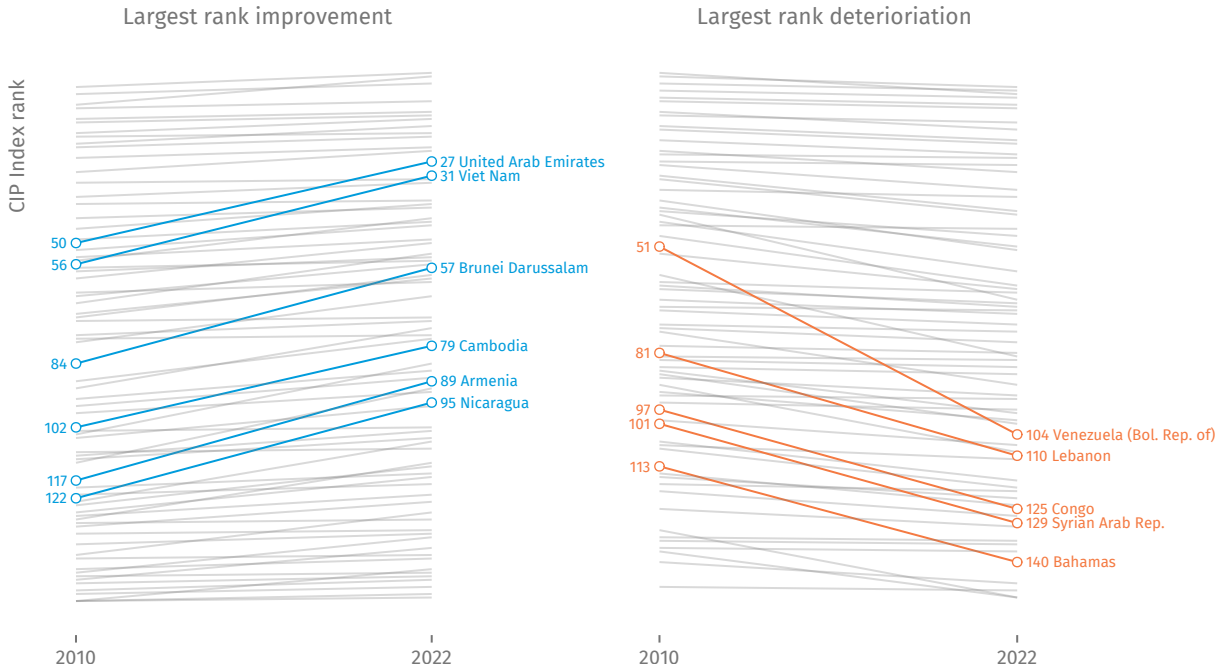
Economies with the best improvement in the global CIP rankings between 2010 and 2022

1. Armenia
2. Brunei Darussalam
2. Nicaragua
4. Viet Nam
5. Cambodia
5. United Arab Emirates

2.3.2 CIP results by UNIDO country group

As mentioned above, there is a clear positive correlation between national income level and industrial competitiveness. However, Figure 2.18 reveals that this degree of association is not perfect and it appears to have weakened in recent years. High-income industrial economies

Figure 2.17 | Economies with the largest increase and decrease in the CIP ranking between 2010 and 2022



Source: [36]
Note: The graphs show the economies recording an improvement (left-side chart) or deterioriation (right-side chart) in the CIP ranking between 2010 and 2022. Each line represents one economy, with the five largest rank improvements and deterioriations highlighted. In case of ties, more than five economies may be highlighted.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

are still ranked as the most competitive group, but as they transition to an economic structure less intensive on manufacturing, the gap with other country groups is narrowing. Their average rank in the CIP Index declined from the seventh spot in 2010 to the ninth in 2022. High-income industrial economies and low-income economies were the only country groups presented in the chart which fell in the global ranking.

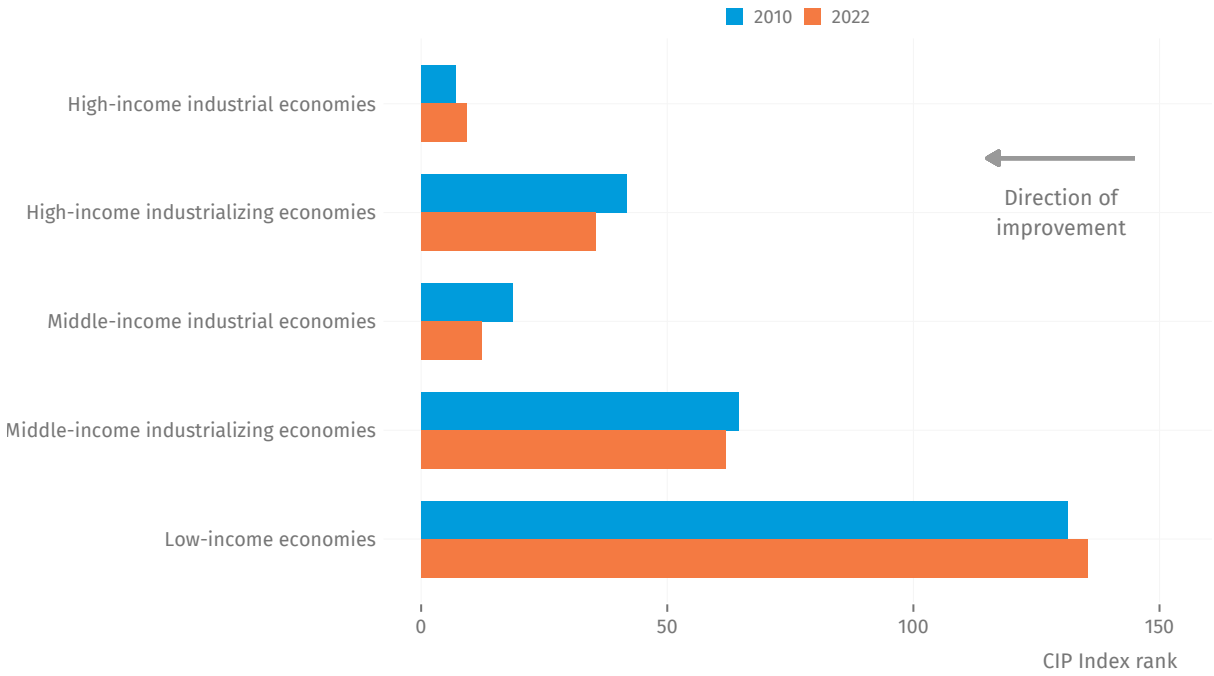
The average scores and ranks for country groups and geographical regions presented in this section refer to weighted averages, using MVA as weighting variable.

On the other hand, middle-income industrial economies climbed on average from the 19th to the 12th position between 2010 and 2022. This was the largest improvement among all country groups and it reflects, in great part, the strong performance of China. High- and middle-income industrializing economies follow in the third and fourth positions among country groups, with average ranks of 36th and 62nd in 2022, respectively. As shown in the graph, their industrial performance has gradually improved in recent years. Lastly, low-income economies trail at the bottom, placed on average at the 135th position in the Index and with no signs of a reversal of the ongoing trend.

Strong but weakening **correlation**
between national income levels and industrial competitiveness

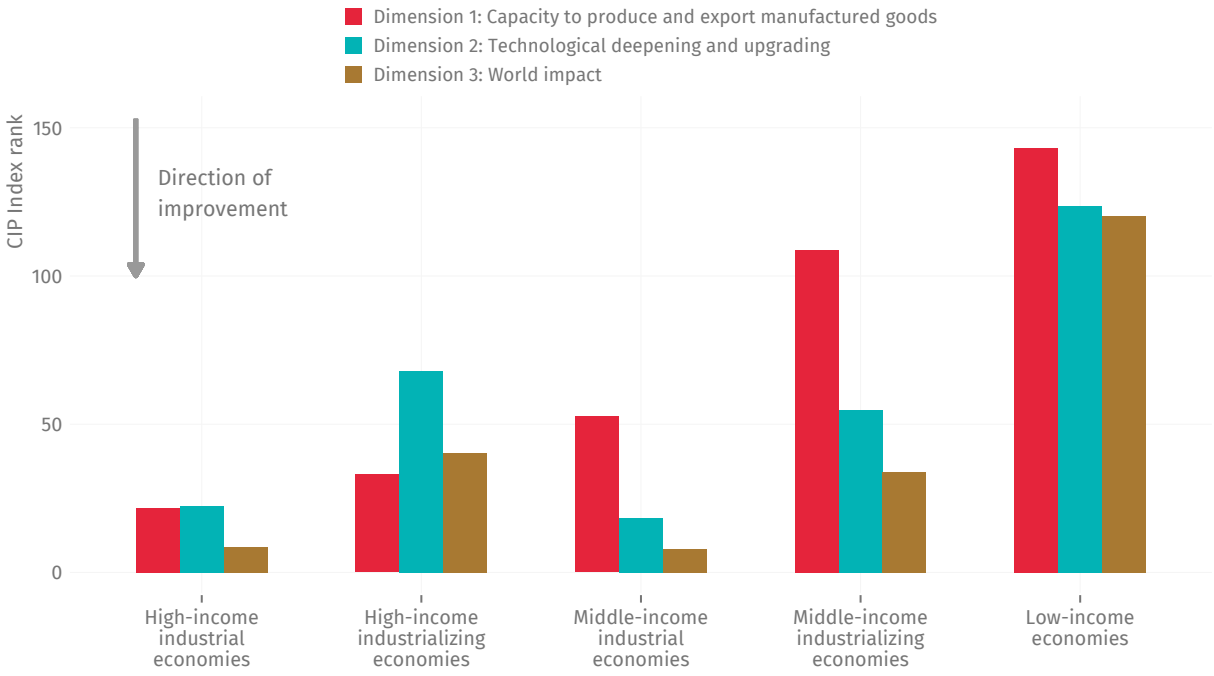
Figure 2.19 presents each group's average rank disaggregated by CIP dimension. This allows for the identification of strengths and weaknesses in each group and provides a more detailed comparison between groups. For instance, the figure reveals that high-income industrial economies perform strongly in all dimensions. However, as

Figure 2.18 | Average rank in the CIP Index by country group



Source: [36]
Note: The bars show weighted average ranks of economies with available information, using their MVA as weights.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 2.19 | Average rank in the CIP Index by dimension and country group, 2022



Source: [36]
Note: The bars show weighted average ranks of economies with available information, using their MVA as weights.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

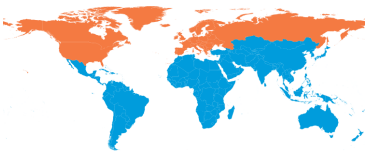
they transition to an economic structure with a lower relative weight of manufacturing, they are expected to fall in the global ranking, especially in terms of their share in world manufacturing activity (third dimension: *World impact*) and their capacity to produce and export manufactured goods relative to other economies (first dimension), although they are expected to maintain a high degree of technological and innovation capabilities (second dimension: *Technological upgrading and deepening*). High-income industrializing economies' strength lies in the first of the three dimensions, although they are positioned at a considerable distance with respect to industrial economies at the same income level.

Unsurprisingly, middle-income industrial economies perform best in the dimension referring to *World impact*. This can be explained by the presence of some of the world's largest manufacturing producers in this group: Brazil, China, Indonesia, Mexico, the Russian Federation, Thailand, and Türkiye, among others. However, this group has also improved its performance in the second dimension, outperforming high-income industrial economies. Middle-income industrializing economies perform best in the third dimension, while they appear to be less competitive in the first one. As shown in the figure, low-income economies face challenges in all competitiveness dimensions.

High-income industrial economies remain at the forefront of industrial competitiveness, but middle-income industrial economies are gradually closing the gap

2.3.3 Regional competitiveness

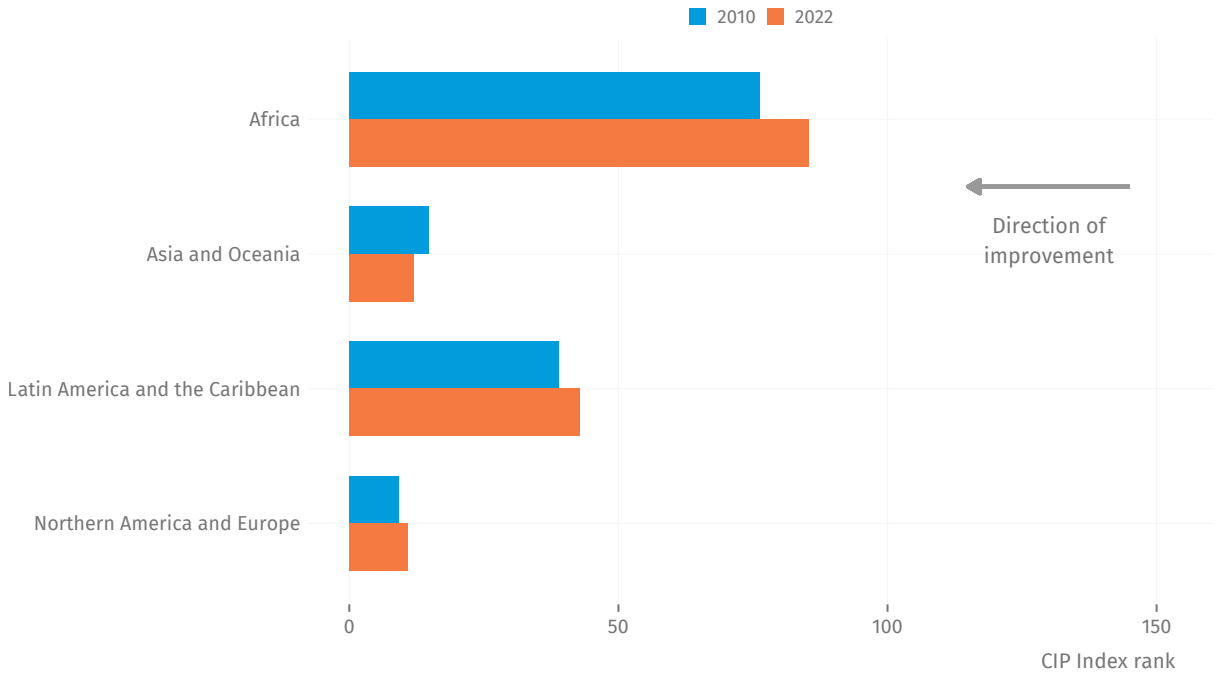
Industrial competitiveness also varies considerably between regions. Figure 2.20 presents the average ranking in the CIP Index by geographical region. The graph shows that the joint region of Northern America and Europe reaches the highest competitiveness among the world's main regions, with an average rank of 11th in 2022. In fact, 13 economies from this region can be found in the top 20 of the CIP ranking. Close behind, Asia and Oceania achieves on average the 12th position, with China, Japan, the Republic of Korea, and Taiwan Province of China taking the lead in this group. Moreover, since 2010 this region has climbed three positions on average and now positions six of its economies in the top 20 of the Index. Latin America and the Caribbean is placed in the 43rd rank, four positions lower than its average rank in 2010. Similarly, Africa lost nine steps during this period and is currently placed at the 85th position.



The region of Northern America and Europe has 13 economies in the top 20 of the CIP ranking

The results by CIP dimensions are summarized in Figure 2.21. Asia and Oceania leads in the second and third pillars of the Index, closely followed by Northern America and Europe. However, the latter is the world's best performing region in the first dimension, *Capacity to produce and export manufactured goods*. Latin America and the Caribbean is relatively well placed in the *World impact* dimension, due to the presence of large manufacturers in the region, including

Figure 2.20 | Average rank in the CIP Index by region

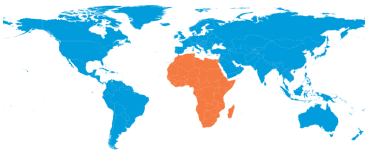


Source: [36]
Note: The bars show weighted average rank of economies with available information, using their MVA as weights.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Brazil and Mexico. However, it remains at a considerable distance from the two leading regions in the other two dimensions. The graph shows that Africa faces considerable challenges across all aspects of industrial competitiveness, ranking last among world regions in the three dimensions of the Index.

Figure 2.22 provides a more granular overview of industrial competitiveness. It allows a more detailed analysis of current performance by subregion as well as trends observed over the last decade. Within the African continent, Southern and Northern Africa are the best performing regions, although both have declined in the global ranking in recent years, especially the former subregion. The only part of Africa that registered an improvement between 2010 and 2022 was Central Africa, although only marginally and from a low starting point.

Eastern Asia is not only the highest performing subregion in Asia and Oceania but overall in the world. It currently holds an average rank of third, thanks to the strong performance of China, Japan, the Republic of Korea, and Taiwan Province of China. This subregion is followed by South-Eastern Asia, which is placed, on average, in the 32nd spot in 2022, supported by the strong results achieved by Singapore, Malaysia, Thailand, and Viet Nam, among others. With the exception of Oceania, all subregions in Asia and Oceania registered a rank improvement between 2010 and 2022.

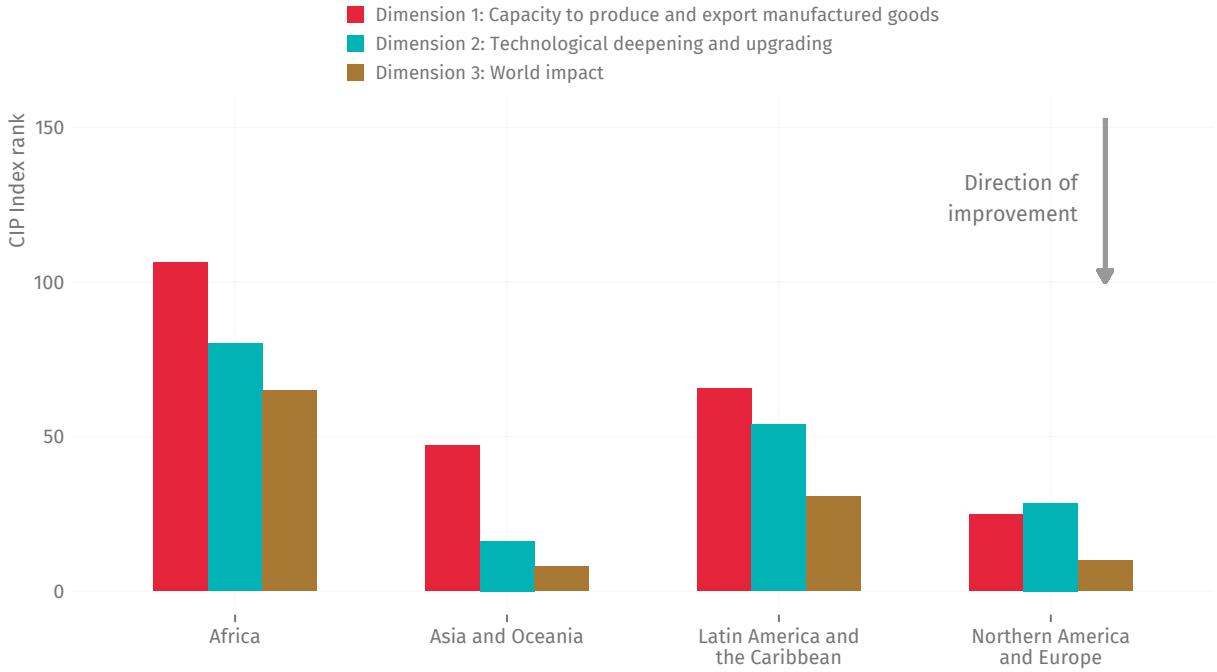


African economies
face challenges across all
competitiveness dimensions

Top 5 subregions in the global CIP Index 2022

1. Eastern Asia
2. Western Europe
3. Northern America
4. Northern Europe
5. Southern Europe

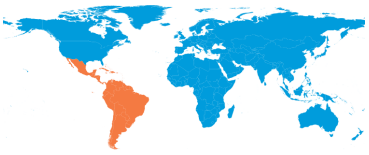
Figure 2.21 | Average rank in the CIP Index by dimension and region, 2022



Source: [36]
Note: The bars show weighted average rank of economies with available information, using their MVA as weights.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

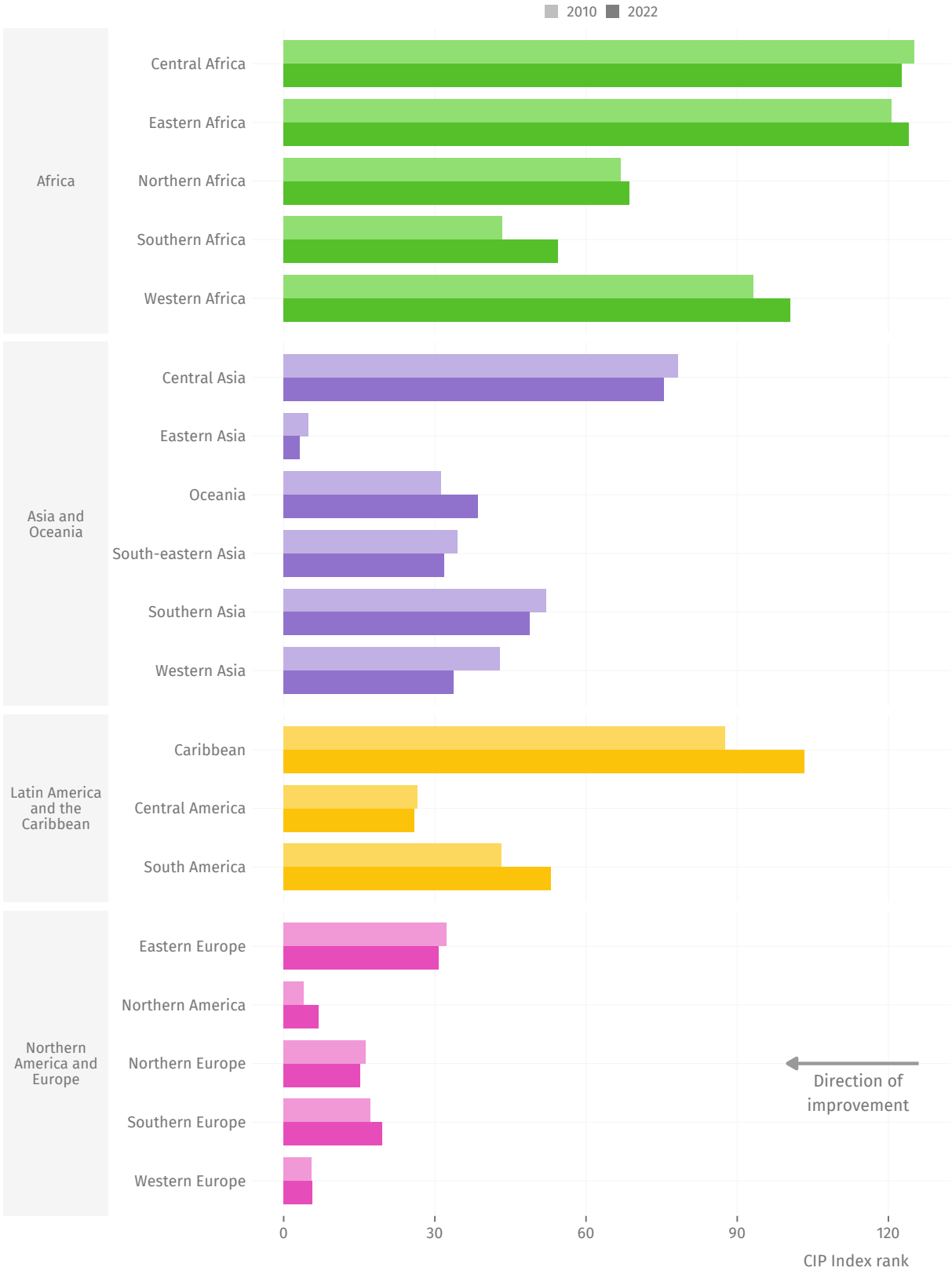
In Latin America and the Caribbean, two of the three subregions suffered a fall in the CIP ranking. Indeed, South America lost 10 places between 2010 and 2022 and now holds an average rank of 53rd, while the Caribbean fell from the 88th to the 103rd position between 2010 and 2022. Central America is the best performing subregion in Latin America and the Caribbean, although its performance has stalled in recent years. This subregion gained only one position between 2010 and 2022, reaching an average rank of 26th in 2022. These results are a possible indication that, as a region, Latin America and the Caribbean is undergoing a premature deindustrialization process. The only economy from this region that reached the top 20 in the CIP ranking in 2022 is Mexico, positioned in the 19th spot.

Finally, Northern America and Europe comprises some of the world's most advanced manufacturers, which also holds for its subregions. Western Europe, Northern America, and Northern Europe are the best ranked subregions, with an average rank of sixth, seventh, and 15th, respectively. However, as described above, their performance is gradually sliding. In fact, among the five subregions, only Northern and Eastern Europe achieved a rank improvement between 2010 and 2022.



The region of
Latin America and the Caribbean
is following a
declining trend
in CIP rankings

Figure 2.22 | Average rank in the CIP Index subregion

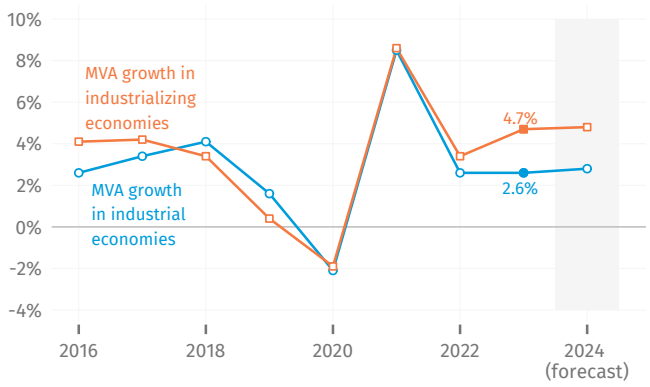


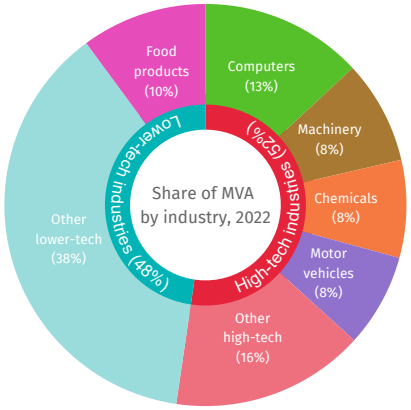
Source: [36]
Note: The bars show weighted average ranks of economies with available information, using their MVA as weights.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

3 Spotlight on manufacturing

3 Spotlight on manufacturing

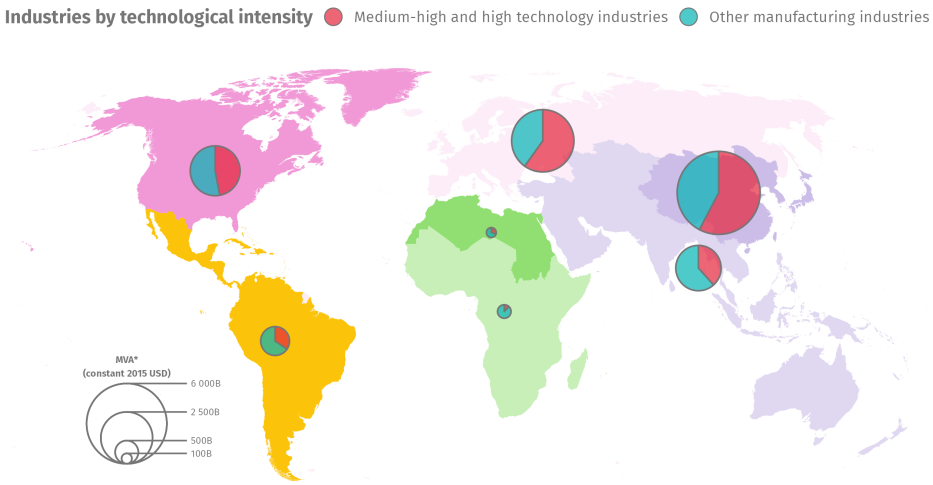
Key figures



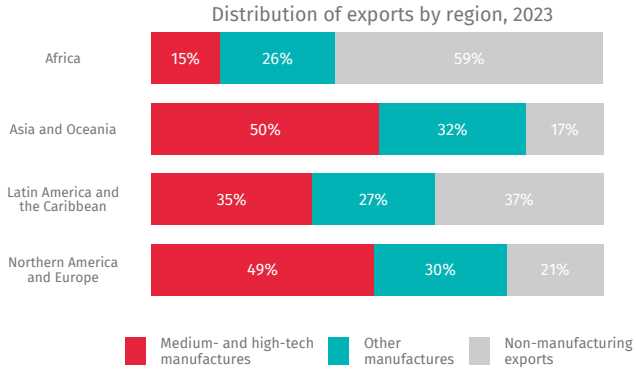


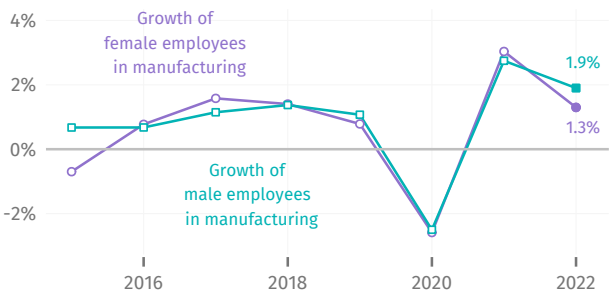
Industrializing economies represent less than 9% of global MVA, but achieved a growth of almost 5% in 2023, while industrial economies grew at a slower pace (2.6%).

Higher-tech industries account for more than **52%** of global MVA. Based on MVA share, lower-tech industries are only represented in the top 5 industries by food products.



Africa accounts for the smallest amount of global MVA. The two regions with the highest share of MVA are Eastern Asia and Europe, also showing a high focus on higher-technology.





In Asia and Oceania and Northern America and Europe, medium- and high-tech manufactures account for around 50% of total exports, while in Africa they only reached a 15% share.

In 2022, male employment in manufacturing grew by 1.9%, while female employment increased by 1.3%.

3.1 Current trends and distribution of world manufacturing

This chapter focuses on the short- and long-term trends observed in the manufacturing sector, which could have direct effects on the global distribution of manufacturing production. A more detailed analysis of the structure of production, disaggregated by manufacturing industries, will follow in Section 3.2. The last four sections cover additional manufacturing indicators, including international trade, employment, productivity, gender equality and environmental impacts.

3.1.1 Annual manufacturing production

Global manufacturing recorded an output increase of 2.8% in 2023

In 2023, global manufacturing continued its upward trend, growing by 2.8 per cent in constant prices, slightly above the previous year's 2.7 per cent increase. This suggests that the trajectory of the manufacturing sector has stabilized after the pandemic-related disruptions, returning to growth rates measured before 2020. Nevertheless, 2023 was significantly influenced by geopolitical disturbances, such as the armed conflicts in Ukraine and the Middle East, causing multiple disruptions, such as higher energy and commodity prices due to trade restrictions and interrupted transport routes. Rising global inflation led to contractionary economic policies which, in addition to emerging uncertainties, deterred investment.

As shown in Table 3.1, both middle-income industrial and industrializing economies recorded impressive increases in MVA during 2023, growing by 4.8 per cent and 5.8 per cent, respectively. China, classified as a middle-income industrial economy, is presented separately due to its size and dynamic growth pattern. This country achieved a significant growth of 5.4 per cent, following a comparably lower growth in 2022, when pandemic-related containment measures were still in place. In general, the group of middle-income industrial economies consists of other high-performing economies, such as Mexico, Indonesia, and Türkiye, who jointly reached a solid growth beyond 3 per cent in 2023, even without China. In contrast, the other groups recorded a more subdued performance in 2023, with high-income industrial economies showing the slowest expansion compared to the previous year. The significantly higher growth rates of almost all country groups in 2021 were mostly attributable to the post-pandemic recovery, with the exception of low-income economies, which have maintained a similar growth over the last three years. LDCs have demonstrated a strong performance for several years, again reaching a growth rate of more than 5 per cent in 2023. This exceptional result is mostly driven by Bangladesh and its successful efforts to become a global manufacturing hub.

Manufacturing in middle-income economies achieved higher growth relative to other groups

Table 3.1 | Growth rate of MVA by country group

	2021	2022	2023	2024f
	Per cent			
World	8.5	2.7	2.8	2.9
Industrial economies				
High-income industrial economies	7.6	1.9	0.5	1.3
Middle-income industrial economies	9.6	3.4	4.8	4.3
Middle-income industrial economies (excl. China)	7.8	3.5	3.4	3.1
China	10.3	3.4	5.4	4.7
Industrializing economies				
High-income industrializing economies	9.7	6.2	2.1	3.0
Middle-income industrializing economies	8.5	2.4	5.8	5.5
Low-income economies	2.0	2.0	2.5	3.6
Other groups				
Emerging industrial economies	9.9	3.5	5.7	5.1
Least developed countries (LDCs)	5.5	7.0	5.6	5.6

Source: [10]
Note: 2024f refers to UNIDO forecasts for the year 2024.
Data used to create this table can be downloaded at the UNIDO Statistics Portal.

In 2024, global manufacturing is expected to continue growing at a pace comparable to that of 2023. High- income industrial and industrializing economies, as well as low-income economies, will likely increase their growth rate this year. Output of middle-income industrial economies, on the other hand, is expected to decelerate marginally relative to the rate achieved in 2023.

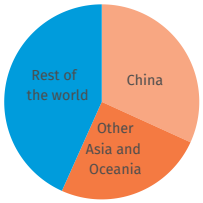
The performance of emerging industrial economies (EIEs) accelerated again in 2023, reaching a growth rate of 5.7 per cent. In the previous year, a comparatively lower MVA growth of 3.5 per cent was observed, mostly attributable to the temporary slowdown of China's manufacturing sector.

The map in Figure 3.1 shows the share of MVA in GDP throughout the world. Currently, overall economic activity in Eastern and Southeastern Asian economies relies to a significant extent on manufacturing production. In several economies of this region, such as China, Taiwan Province of China, and Thailand, manufacturing accounts for more than one quarter of GDP. Some economies in Europe and Latin America also report high MVA-to-GDP ratios. On the other hand, many African economies are still shaped by a higher focus on other sectors, indicating that their structural transformation is still in progress.

Figure 3.2 illustrates the shift of the world's manufacturing center over time, also known as the global rebalancing or redistribution of manufacturing, one of the megatrends observed in the manufacturing sector [2]. In the 1990s, Northern America and Europe had a share of world MVA greater than 60 per cent, while Asia and Oceania had a contribution of less than 30 per cent. In the past thirty years, however, global production gradually moved away from traditional industrial

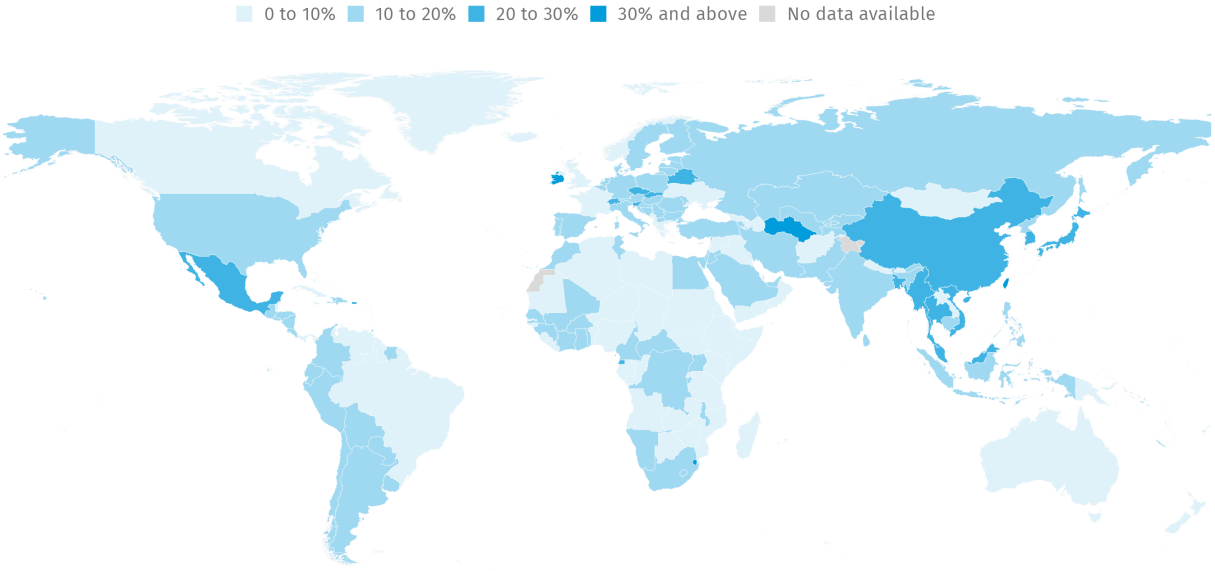
Emerging industrial economies (EIEs) is defined as the group of low- and middle-income economies with the most dynamic manufacturing sector. For more details on the composition of this group, see Annex E.5.

This indicator, already introduced as SDG indicator 9.2.1, measures the contribution of manufacturing to a country's economy, serving as a marker of industrial development and allowing for cross-country comparisons.



Economies in
Asia and Oceania
presently account for
more than half
of global MVA

Figure 3.1 | MVA as proportion of GDP by country, 2023



Source: [10]
Note: The share is based on MVA and GDP in constant 2015 USD.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

economies, leaving Northern America and Europe with a share of only 36.2 per cent in 2023, while the contribution of Asia and Oceania increased to 56.7 per cent.

During the past decades, China became the world's manufacturing powerhouse. This country's share of global manufacturing production increased from 3.0 per cent in 1990 to a staggering 31.8 per cent in 2023. In comparison, the next five Asian producers that follow, Japan (6.6 per cent), India (3.2 per cent), the Republic of Korea (3 per cent), Indonesia (1.5 per cent), and Taiwan Province of China (1.4 per cent), jointly account for only half of China's global share.

On the other hand, the weight of Latin America and the Caribbean in global MVA plummeted from 9.1 per cent in 1990 to 5.1 per cent in 2023, as this region seemingly continues on a path of premature deindustrialization [2]. Africa accounted for the smallest share of global manufacturing among the main regions, with only 2.0 per cent of global MVA.

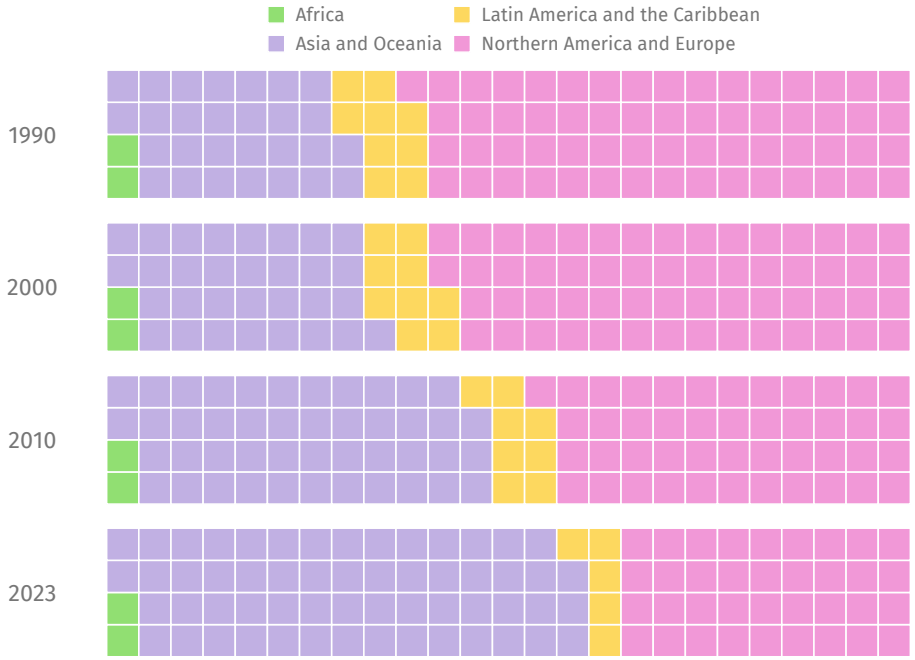
As of 2023, the United States of America was the world's second largest manufacturer, with a 15.0 per cent share of global MVA, while Japan retained the third place, with a share of 6.6 per cent. Germany remains Europe's largest manufacturer, accounting for 4.6 per cent of global manufacturing production. Notably, in 2023 India replaced the Republic of Korea as the world's fifth largest economy in terms of manufacturing production (3.2 per cent of global MVA).

China's contribution to global MVA exceeds 30%, followed by the United States with 15%

Top 10 countries with the largest manufacturing sector and their share in global MVA in 2023

1. China (31.8%)
2. United States (15.0%)
3. Japan (6.6%)
4. Germany (4.6%)
5. India (3.2%)
6. Republic of Korea (3.0%)
7. United Kingdom (1.9%)
8. Italy (1.8%)
9. Mexico (1.8%)
10. France (1.7%)

Figure 3.2 | MVA as proportion of world MVA by region



Source: [10]
Note: One square represents a share of 1 per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

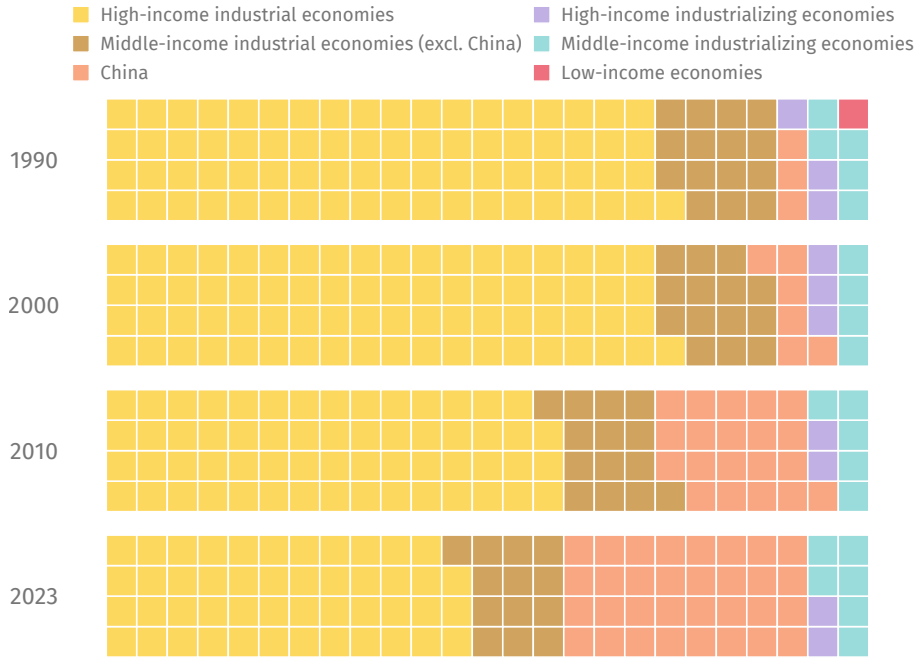
The weight of industrial economies on global manufacturing has remained relatively stable over time, accumulating more than 90 per cent of global production (Figure 3.3). Nevertheless, a clear redistribution is visible within this group, due to China's steadily increasing share since 1990. Industrializing economies achieved a greater dynamism with comparably higher growth rates in recent years. In 2023, for example, their output grew by 4.7 per cent, above the 2.6 per cent of industrial economies. Therefore, this group could gradually increase its weight in global manufacturing in the future. The share of low-income economies in world manufacturing remains low and continues to shrink: from 0.6 per cent in 1990 to 0.3 per cent in 2023. The impact of these economies is so small that it only appears in 1990 in the figure.

India overtook the Republic of Korea and reached the **5th place** in the world's largest manufacturers

Disaggregated data by manufacturing industry at the ISIC Rev. 4 division level is depicted in Figure 3.4, allowing a more granular analysis of recent trends. In 2022, the latest year with available data, most of the industries classified as MHT, such as computers and electronics, electrical equipment, motor vehicles and other transport equipment, achieved a remarkable annual growth. This redistribution towards higher-technology industries is another megatrend observed in global manufacturing, further highlighting the importance of technological upgrading for sustainably increasing income and supporting liveli-

Technological progress as a pathway towards higher income and better **living conditions**

Figure 3.3 | MVA as proportion of world MVA by country group



Source: [10]
Note: One square represents a share of 1 per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

hoods. As already mentioned, global manufacturing has been grappling with various challenges in recent years, including increased uncertainty and shortages in the distribution of materials and components, necessitating the implementation of responsive and resilient policies [2].

Higher-tech industries
reported comparably higher annual growth, spearheaded by
electrical equipment

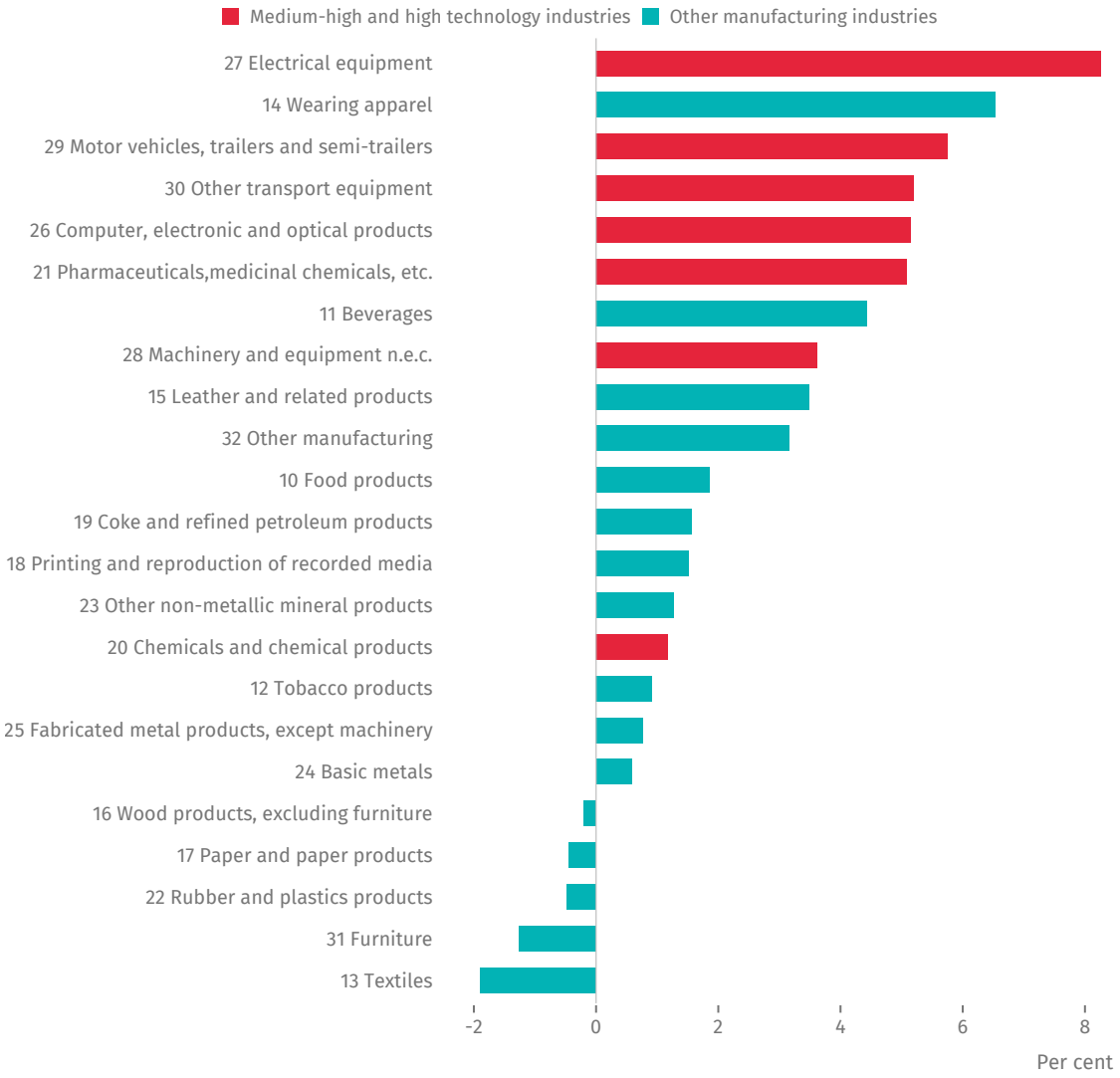
3.1.2 Quarterly manufacturing production

In addition to the analysis obtained from annual statistics presented above, the remainder of this section relies on seasonally-adjusted IIPs on a quarterly base to provide a more timely analysis of trends observed in the manufacturing sector. The IIP is one of the most important sources of information for tracking economic activity in a timely and consistent manner due to its high availability in many countries. Annex C summarizes the main characteristics of this index.

The time series presented in Figure 3.5 depicts two of the most severe global crises of the past decades: the 2008–2009 financial crisis and the COVID-19 pandemic starting at the beginning of 2020. While both crises had similar impacts on global manufacturing, the duration of their recovery periods varied. Nevertheless, these crises demonstrated the resilience of the manufacturing sector, which quickly bounced back after both crises and soon returned to a stable trajectory. According

Global manufacturing
grew by 1%
in Q2 2024, continuing its volatile trend
in recent quarters

Figure 3.4 | Growth rate of global value added by manufacturing industry, 2022



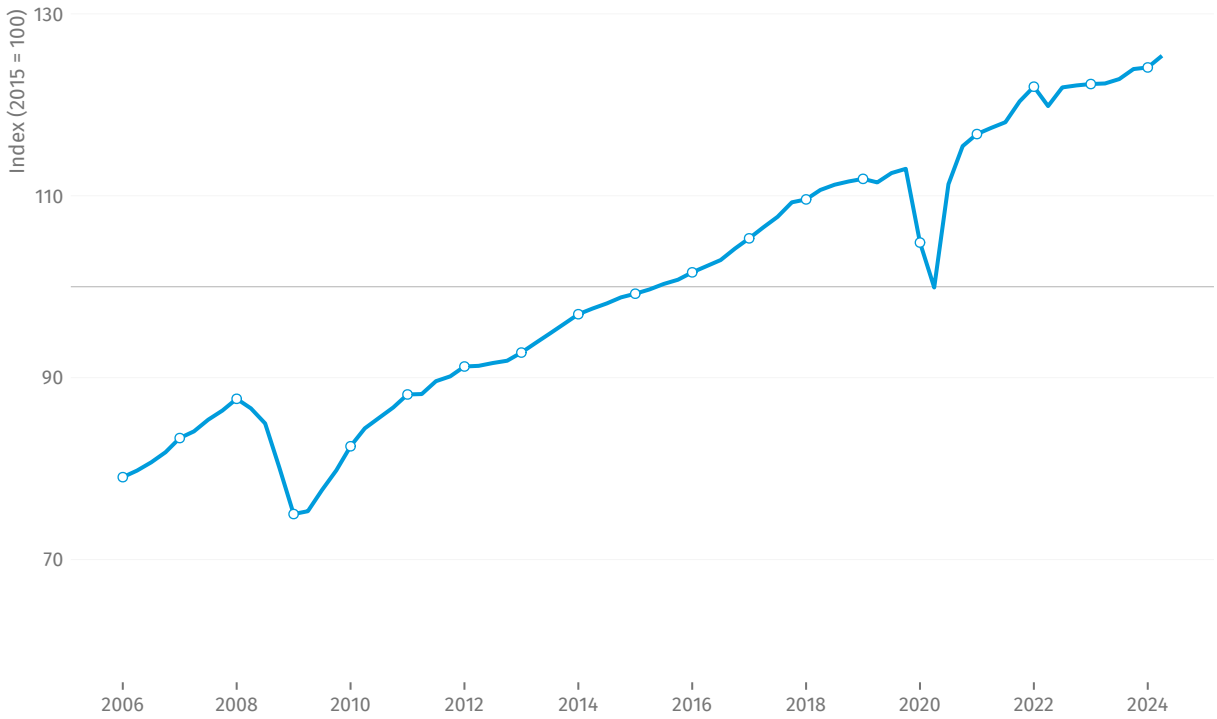
Source: [37; 38]
Note: Manufacturing industries correspont to ISIC Rev. 4 divisions.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

to the latest data, this sector showed a significant quarter-on-quarter growth of 1.0 per cent in the second quarter of 2024, an impressive change of pace compared to the stalled production level registered over the preceding previous quarters.

Therefore, global manufacturing is currently on a dynamic path, but with greater volatility. As previously mentioned, this volatility is the result of numerous uncertainties, such as increasing energy and consumer prices, subdued demand, ongoing shortages of intermediate goods and commodities, as well as natural and geopolitical events with high impacts on global commodity and production markets.

Rising uncertainties
are leading to
instability
in manufacturing output

Figure 3.5 | Index of global manufacturing (2015 = 100)



Source: [18]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Trends disaggregated by country group and region

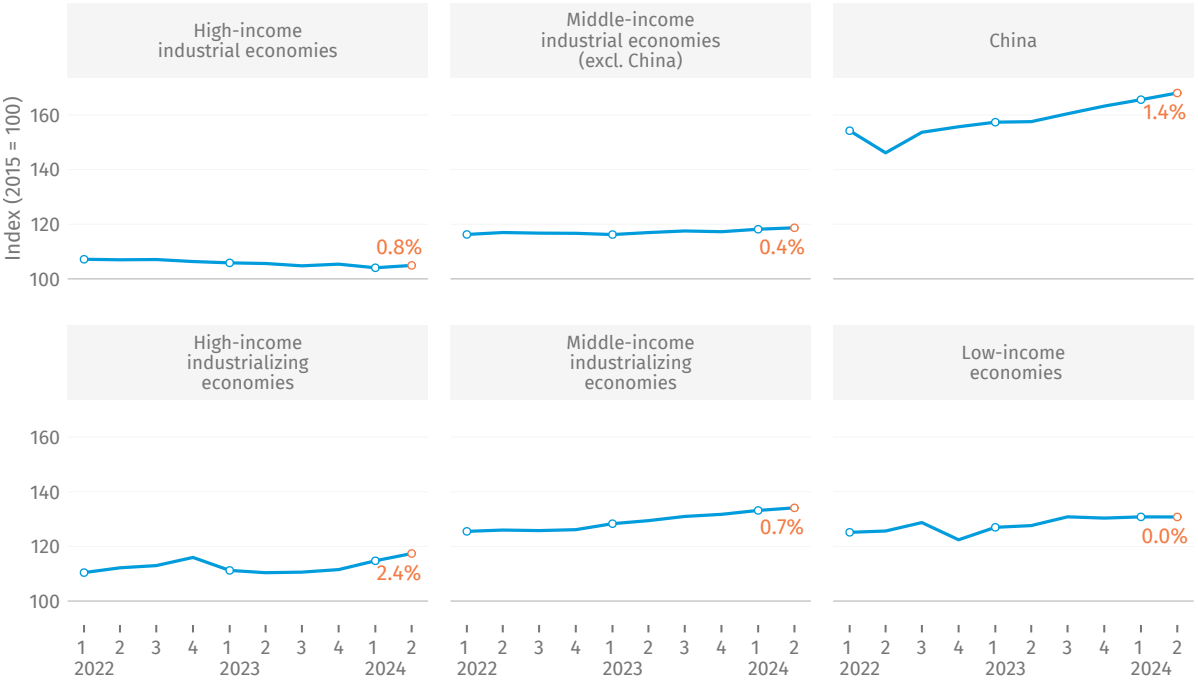
The most recent trends according to UNIDO country groups are presented in Figure 3.6. Most country groups have registered output increases since the beginning of 2022, but with varying magnitude. Only high-income industrial economies experienced a decline in output during this period. In contrast, China, the world's largest manufacturer, achieved steady quarterly growth rates between 1.4 and 2.0 per cent, with only minor fluctuations.

Moreover, the figure also highlights the latest quarter-over-quarter growth rate available, corresponding to the second quarter of 2024. High-income industrializing economies recorded the highest quarterly growth, with a rate beyond 2 per cent over the previous two quarters. China also reached a significant expansion, with a current growth of 1.4 per cent. Middle-income economies showed moderate quarterly increases over the past year, while high-income industrial economies reversed the ongoing declining trend, but they are likely to continue on a long-term downward trajectory. Limited data for low-income economies indicate that manufacturing output has stalled for the past three quarters, although there has been a significant improvement in production levels since 2022. Although differences in the short-term trends of the country groups can be observed, global production is steadily increasing, with only minor setbacks.

High-income industrial economies is the only country group with a declining trend of **manufacturing production**

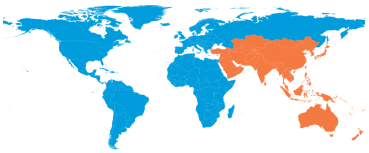
Industrializing economies have achieved solid manufacturing **growth** since 2022

Figure 3.6 | Index of manufacturing production by country group



Source: [18]
Note: The percentages indicate the most recent quarter-over-quarter growth rate, corresponding to the second quarter of 2024. Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

A regional perspective is shown in Figure 3.7. The latest result of global manufacturing and its previous trajectory are distributed in a relatively uneven way. While Asia and Oceania, responsible for more than half of global manufacturing output, achieved a modest growth of 1.6 per cent, the manufacturing sector of the other regions barely grew or even contracted. Over the past years, the positive performance achieved by Asia and Oceania was mostly driven by China's dynamism. Nevertheless, even with the exclusion of China, this group still achieved a higher growth than other regions in recent quarters. The second largest region in terms of MVA, Northern America and Europe, registered subdued growth of 0.4 per cent this quarter, sustaining the stagnant production levels observed over the past several quarters.



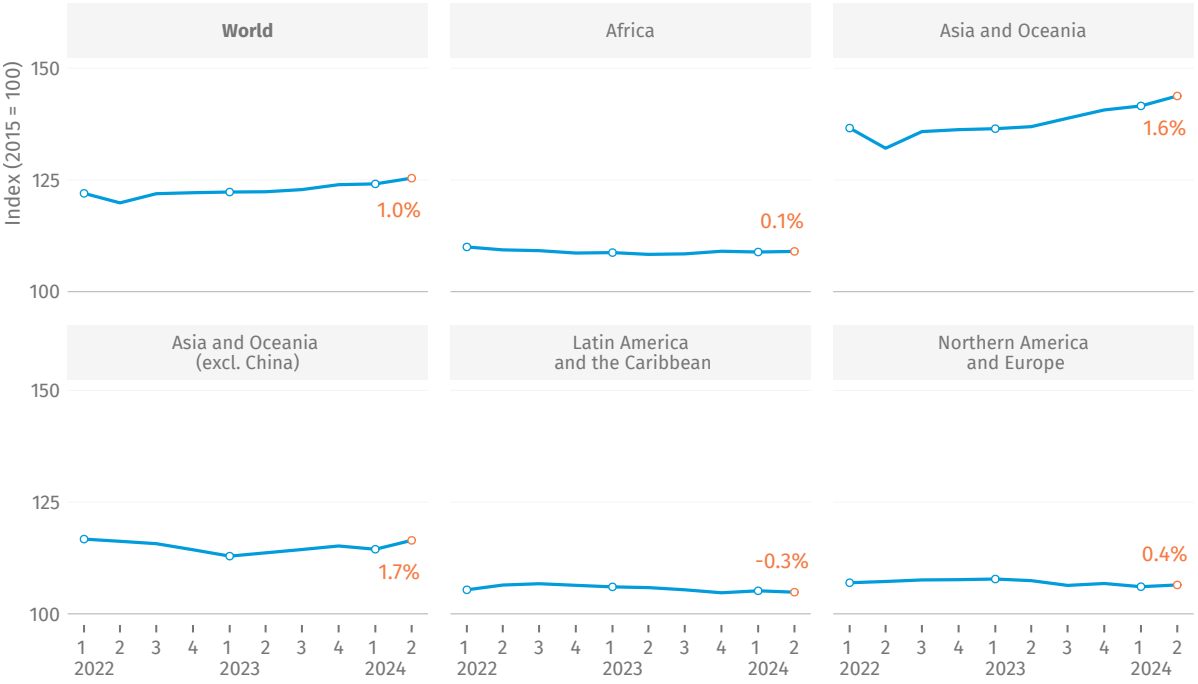
Asia and Oceania
maintained a
dynamic growth
compared to other regions

Developments by manufacturing sector

The current trajectory of industrial production aggregated by technological intensity is shown in Figure 3.8.[i] MHT industries in both industrial and industrializing economies continued their positive development with moderate quarterly increases, but with a certain volatility. For example, MHT industries showed growth rates of at least 0.9 per cent since the second quarter of 2023 in industrial economies, with the exception of early 2024, when a slight decrease was recorded.

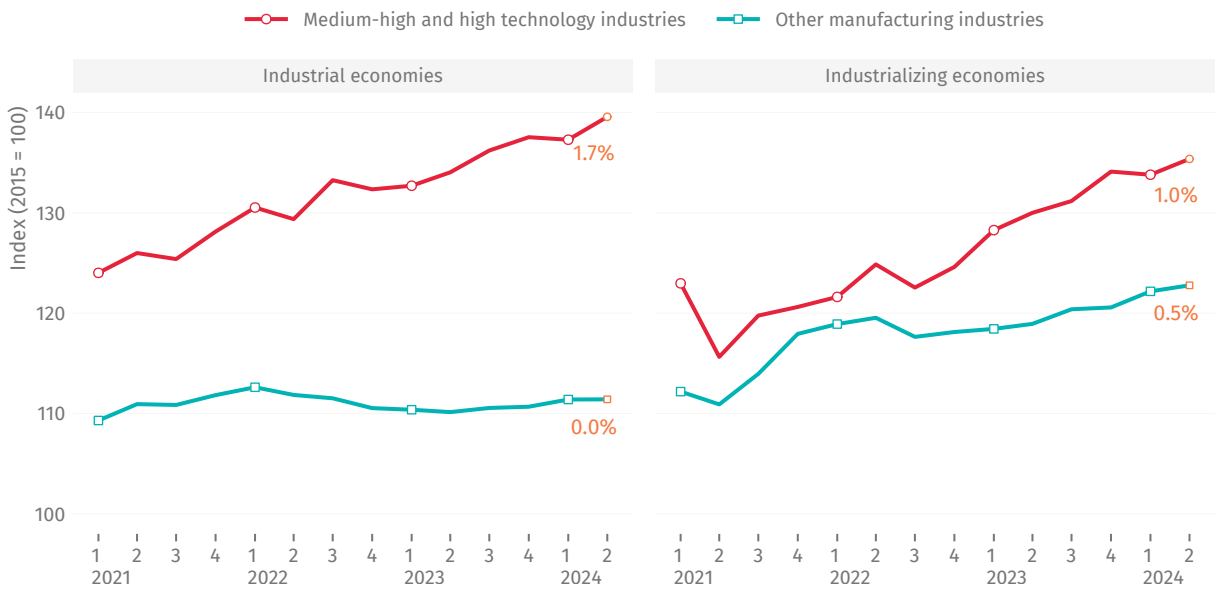
[i] The list of medium-high and high technology industries is included in Annex Table E.2.1.

Figure 3.7 | Index of manufacturing production by region



Source: [18]
Note: The percentages indicate the most recent quarter-over-quarter growth rate, corresponding to the second quarter of 2024.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 3.8 | Index of manufacturing production by technological intensity and country group



Source: [18]
Note: The percentages indicate the most recent quarter-over-quarter growth rate, corresponding to the second quarter of 2024.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Table 3.2 | Quarter-over-quarter growth rates of global production by manufacturing industry

Manufacturing industry		Q3 2023	Q4 2023	Q1 2024	Q2 2024
			Per cent		
10 Food products		0.5	0.1	1.2	0.1
11 Beverages		0.5	0.0	1.6	-0.6
12 Tobacco products		-0.5	0.7	-0.5	-0.3
13 Textiles		0.5	0.0	0.4	1.0
14 Wearing apparel		-0.6	-1.3	1.6	0.7
15 Leather and related products		1.0	1.1	0.4	-0.3
16 Wood products, excluding furniture		0.2	0.5	0.2	-1.3
17 Paper and paper products		0.6	1.1	1.3	1.0
18 Printing and reproduction of recorded media		-1.0	-1.2	1.9	0.7
19 Coke and refined petroleum products		0.9	0.6	1.0	-0.1
20 Chemicals and chemical products		2.2	0.7	0.8	1.8
21 Pharmaceuticals,medicinal chemicals, etc.		0.8	1.5	0.3	1.9
22 Rubber and plastics products		0.8	0.4	0.3	0.5
23 Other non-metallic mineral products		0.0	-0.7	0.1	-1.4
24 Basic metals		1.4	0.3	0.7	0.4
25 Fabricated metal products, except machinery		0.2	0.5	0.1	0.7
26 Computer, electronic and optical products		3.0	3.0	1.7	2.7
27 Electrical equipment		0.6	0.7	-0.7	0.5
28 Machinery and equipment n.e.c.		-0.9	-0.1	-0.9	-0.2
29 Motor vehicles, trailers and semi-trailers		2.8	-0.4	-3.4	2.4
30 Other transport equipment		1.3	1.3	0.6	2.0
31 Furniture		-1.2	0.2	0.2	-0.5
32 Other manufacturing		0.6	0.1	0.2	-1.1
33 Repair and installation of machinery/equipment		-0.5	-0.3	0.9	0.3

Source: [18]
Note: Manufacturing industries correspond to ISIC Rev. 4 divisions. Line charts show indices (2015=100) by manufacturing industry from Q1 2015 to Q2 2024, with the red points indicating minimum/maximum values.
Data used to create this table can be downloaded at the UNIDO Statistics Portal.

Furthermore, lower-technology sectors in industrializing economies were able to achieve an increasing production level, while these sectors have remained stagnant in industrial economies over the past three years. This strong development in industrializing economies was driven by the production of wearing apparels and basic metals, among others industries, which showed a good performance in recent periods.

Table 3.2 highlights recent developments by industrial activities, showing the different trajectories observed since 2015 as well as the quarterly growth rates of the last four quarters. It is evident that there are diverging growth patterns across industries. The production of computers and electronics maintained its dynamic path, resulting in the highest growth rate of the second quarter of 2024. Other industries, such as chemicals, pharmaceuticals, motor vehicles, and other transport equipment, also recorded significant increases in recent periods. As already pointed out, most of the industries classified as MHT recorded solid growth rates in recent quarters, further highlighting the importance of innovation and technological development. In contrast, many lower-technology industries, such as beverages, furniture, other non-metallic minerals, and wood products, were marked by significant decreases in the most recent quarter.

Higher-tech industries reached a positive performance in recent years and outperformed other sectors

3.2 Structure and transformation of manufacturing industries

This section focuses on the contribution of different industrial activities to total manufacturing. It presents industry-level information according to technological intensity and more detailed ISIC Rev. 4 levels. Trends of leading manufacturers in selected country groups and the transformations that have taken place over the past 20 years are described as well.

The development towards a growing importance of MHT industries,[i] already highlighted in previous editions of this *Yearbook*, persisted in 2022, according to the most recent UNIDO estimations at constant prices. Figure 3.9 illustrates the gradual increase of MHT industries over the last two decades, indicating that more than half of global MVA is now generated by these industries. Their faster recovery, especially after the disruptions caused by COVID-19, has been emphasized in previous sections.

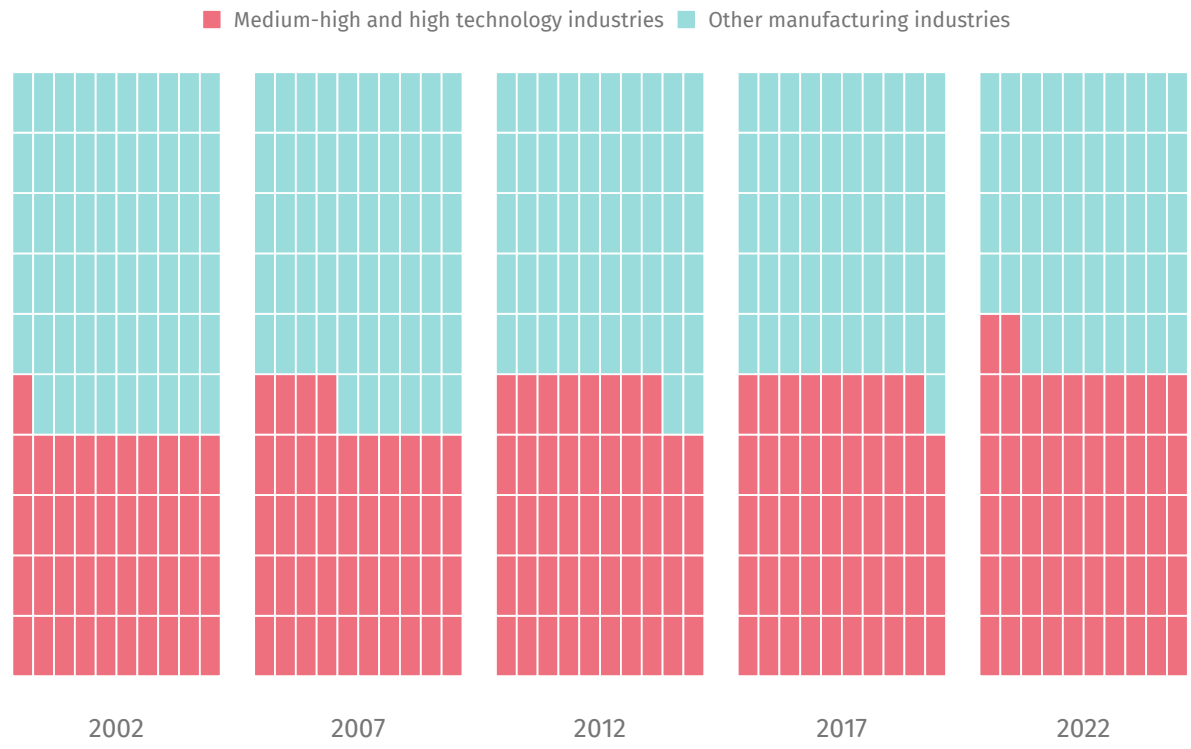
Figure 3.10 provides insights on the impressive advances of most MHT industrial activities. In 2022, six out of the seven biggest contributors to global MVA can be associated with higher-technology industries. Besides computer, electronic and optical products (ISIC Rev. 4 division

Methodological explanation

The figures presented throughout Section 3.2 are based on value added, compiled using base weights for the reference year 2015. These are mainly calculated using data from UNIDO's Industrial Statistics Databases (INDSTAT). However, value-added figures are only available in current prices. The annual IIP is used to present trends over time, free from currency and price variations.

[i] The composition of these categories in the sense of the ISIC classification of economic activities is presented in the Annex Table E.2.1 and is also discussed in more detail in Figure 3.10.

Figure 3.9 | Global MVA composition by industries according to technological intensity



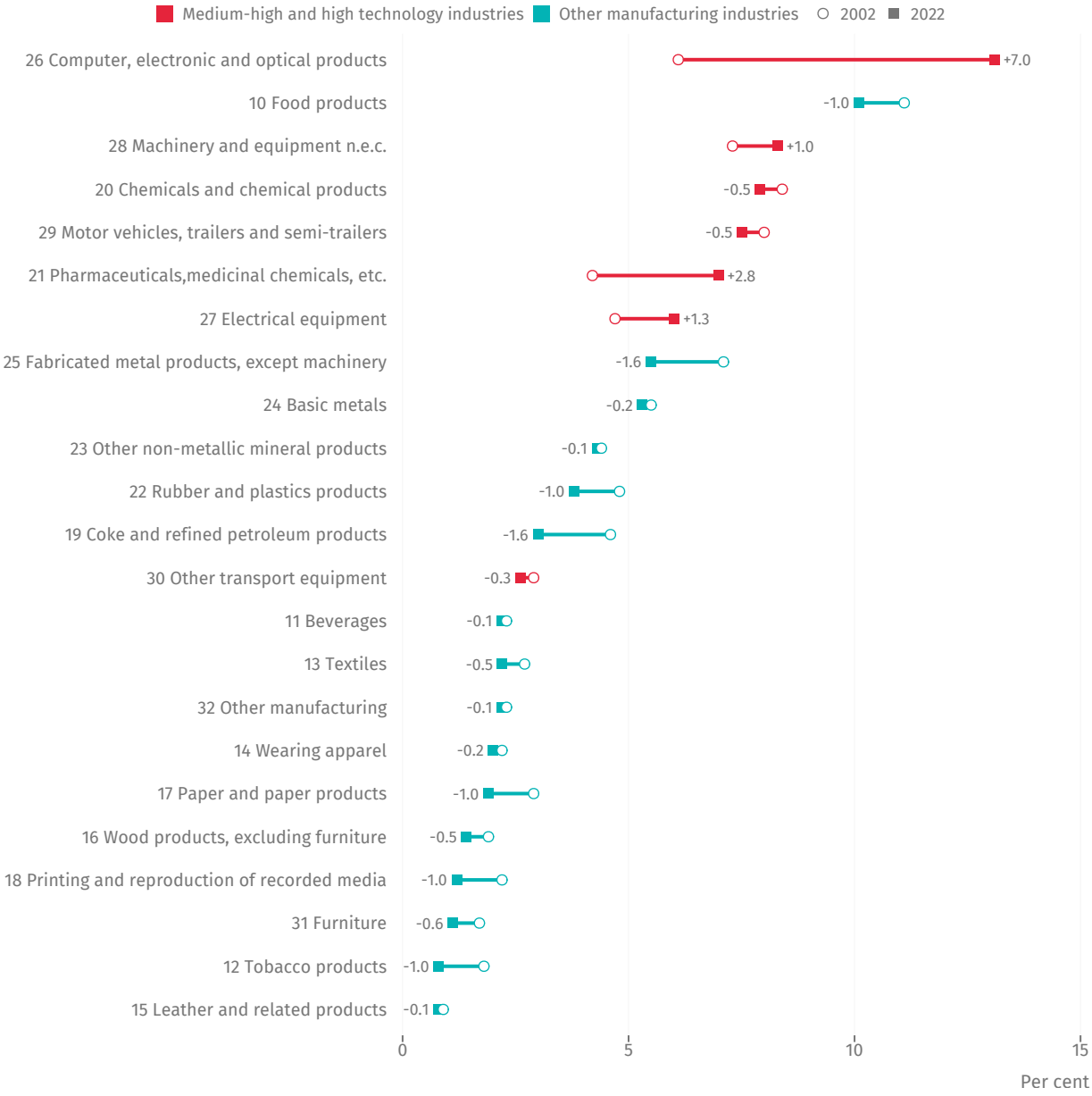
Source: [37; 38]
Note: One square represents a share of 1 per cent. ISIC Rev. 4 industries belonging to the categories of technological intensity are illustrated in Figure 3.10 and Annex Table E.2.1.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

26), the manufacture of machinery (ISIC Rev. 4 division 28), pharmaceuticals (ISIC Rev. 4 division 21), and electrical equipment (ISIC Rev. 4 division 27) were able to widen their share in MVA compared to 2002. Chemicals (ISIC Rev. 4 division 20) and motor vehicles (ISIC Rev. 4 division 29), both also MHT industries, as well as food production (ISIC Rev. 4 division 10) are among the biggest contributors too, despite a slightly lesser representation compared to 2002. Table 3.3 at the end of this section shows the leading manufacturers of these and other ISIC Rev. 4 industries, together with their evolution from 2022.

The manufacture of MHT products has become a defining feature of industrial economies, as shown in Figure 3.11. Computers and electronics (ISIC Rev. 4 division 26) evolved to become the most important activity in terms of contribution to MVA, with its share more than doubling from 6.5 to 14.0 per cent between 2002 and 2022. Additionally, machinery (ISIC Rev. 4 division 28), electrical equipment (ISIC Rev. 4 division 27), and pharmaceuticals (ISIC Rev. 4 division 21) have also increased their relevance in the MVA of these economies. Notably, the latter industry has become increasingly significant in both high- and middle-income industrializing countries too, with increases of 3.9 per cent and 4.7 per cent, respectively. The manufacture of chemical products (ISIC Rev. 4 division 20), which also supplies essential

In 2022, more than
half
of global MVA originated in
higher-technology
industries

Figure 3.10 | Share of manufacturing industries in global MVA



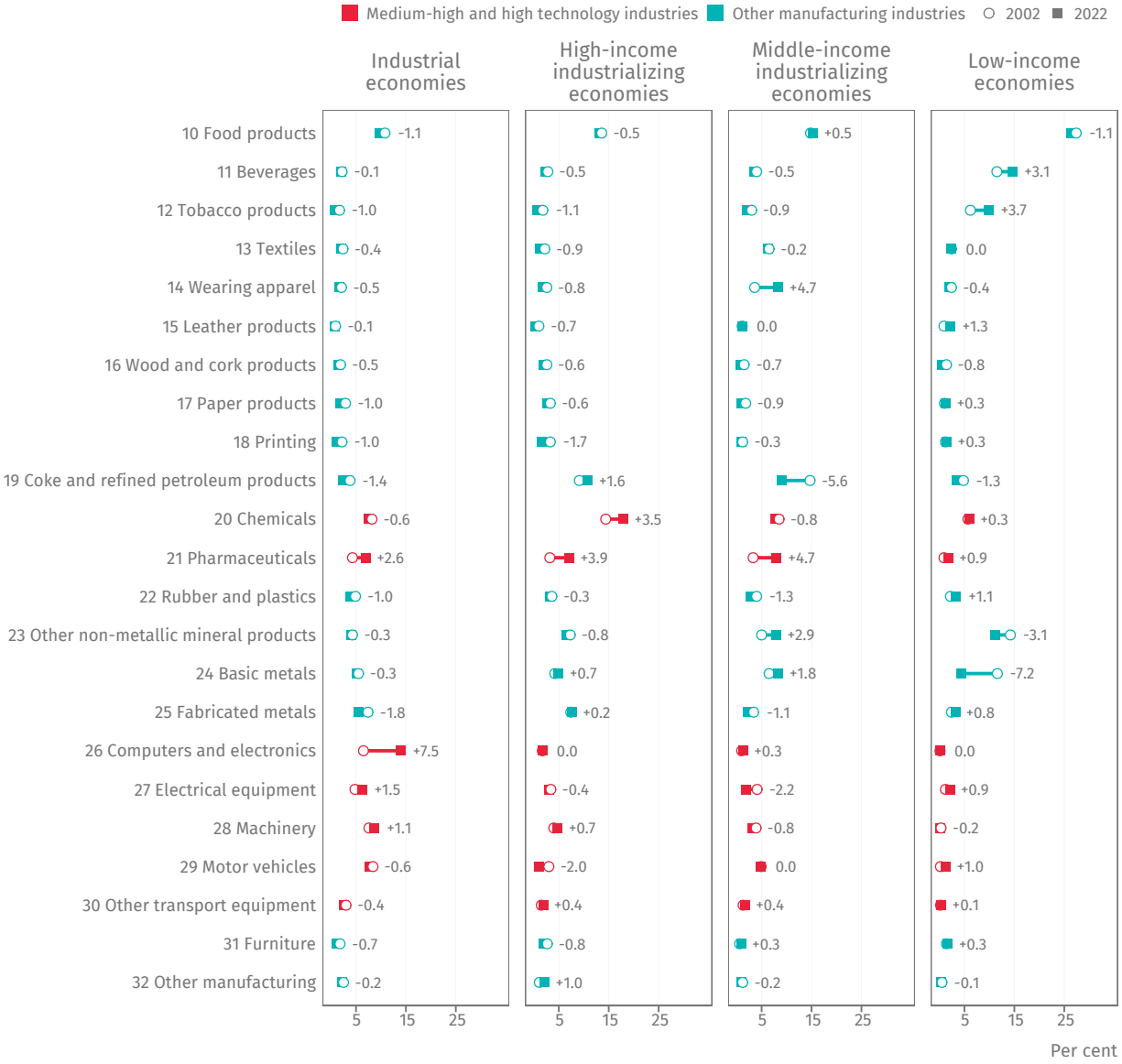
Source: [37; 38]
Note: The chart shows the development between 2002 and 2022, indicating the industry's share of MVA in per cent together with labels showing the change of the proportion over this period. ISIC Rev. 4 industries are ordered by their share of MVA in 2022. Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

intermediates to various other industries, including pharmaceuticals, has asserted its dominance in high-income industrializing economies, accounting for 17.9 per cent of the total MVA representation among these economies in 2022. This is an expansion of 3.5 percentage points compared to 2002. Coke and refined petroleum products (ISIC Rev. 4 division 19) showed the biggest negative dynamism within the group of middle-income industrializing economies, experiencing a reduction in its share by 5.6 percentage points compared to 2002. Nonetheless, it remains one of the two major industries within this group. The manufacture of food products (ISIC Rev. 4 division 10) maintains its

Top 5 industries and their share in global MVA in 2022

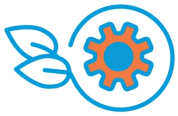
- Computers and electronics (13.1%)
- Food products (10.1%)
- Machinery (8.3%)
- Chemicals (7.9%)
- Motor vehicles (7.5%)

Figure 3.11 | Share of manufacturing industries in MVA by country groups



Source: [37; 38]
Note: The chart shows the development between 2002 and 2022, indicating the industry's share in MVA for economies grouped by their stage of industrial development in per cent. The labels next to the points show the change of this share over the same period.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

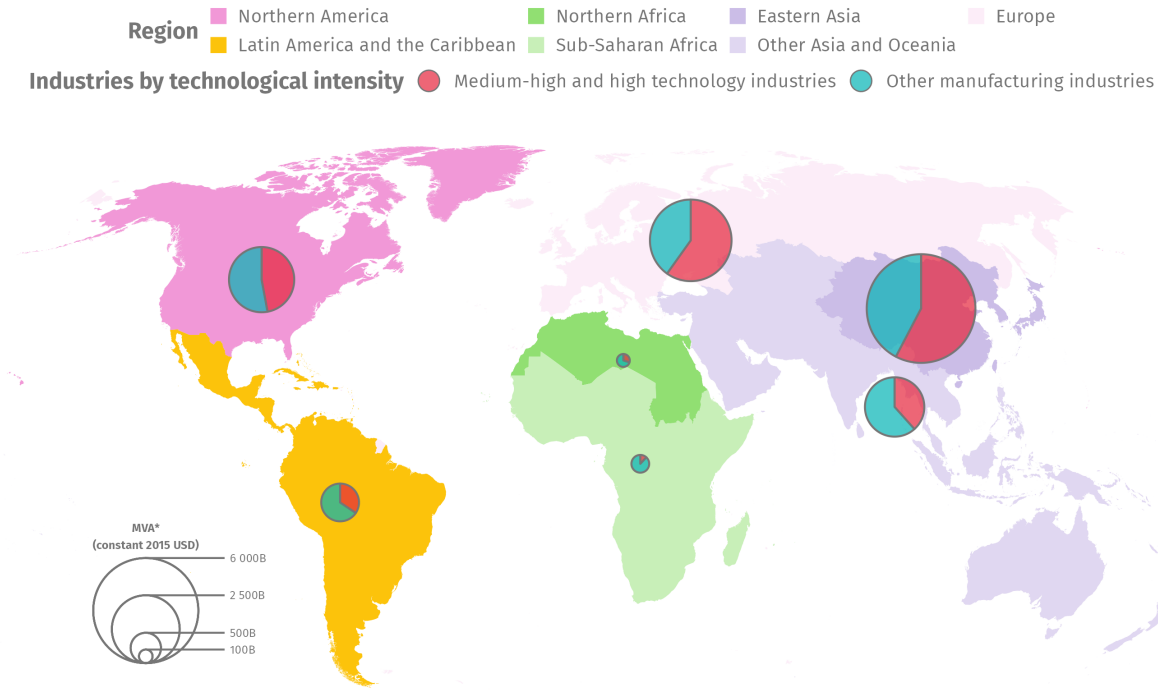
importance across all groups, particularly in low-income economies where it constitutes nearly a quarter of MVA. Within this group of countries, the beverages (ISIC Rev. 4 division 11) and tobacco (ISIC Rev. 4 division 12) sectors have expanded significantly, while the manufacture of basic metals (ISIC Rev. 4 division 24) and other non-metallic mineral products (ISIC Rev. 4 division 23) have seen a significant downturn.



The manufacture of
food products
maintains its
overall importance
particularly in
low-income economies

Besides the examination of the manufacturing production landscape delineated by stages of industrial development, a regional perspective warrants valuable insights. For example, last year's edition under-

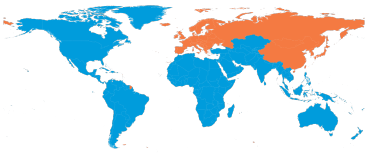
Figure 3.12 | Regional MVA composition by industries according to technological intensity, 2022



Source: [37; 38]
Note: The pie charts embedded in the regional map illustrate the MVA contribution of industries based on their technological intensity as defined in Annex Table E.2.1. Due to the applied methodology and the exclusion of ISIC Rev. 4 division 33 from the calculations, MVA figures can deviate from the figures published in [10].
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

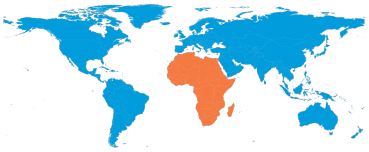
scored the ascension of Asia and Oceania, which has occurred at the detriment of Northern America and Europe [39]. Notably, China has emerged as the world's preeminent manufacturer in recent decades. By 2022, this development positioned Eastern Asia as the sub-region exerting the most significant influence on global manufacturing, as measured by MVA and illustrated in Figure 3.12. The categorization of industries based on their technological intensity is illustrated by pie charts embedded in the regional map and confirms that MHT industries do not consistently play a predominant role in the global manufacturing landscape.

Among the regions displayed, only two areas in 2022 are characterized by a share of MHT industries higher than 50 per cent, namely Europe and Eastern Asia. Northern America, other Asia and Oceania and Latin America and the Caribbean account for significant shares in world manufacturing production too and also show a considerable representation of MHT industries. By contrast, Africa has the lowest impact on global MVA and is still characterized by a low participation of MHT industries, especially Sub-Saharan Africa. Numerous analyses on industrial development (see, for example, [26]) describe the crucial role of technology and innovation in increasing income and reducing poverty. Ultimately, a low proportion of MHT industries hinders the economic advancement of regions and countries.



Higher-tech industries represent more than half of MVA in Eastern Asia and Europe

While such broader regional overviews provide valuable insights for understanding economic performances, it is equally important to examine individual countries to capture the diverse economic structure within regions. For instance, within Latin America and the Caribbean, the Caribbean stands out with a significant contribution of MHT industries to MVA of almost 60 per cent. Among the countries where MHT share estimates could be calculated for 2022, it becomes clear that only Puerto Rico, the largest manufacturer in the Caribbean, is responsible for this dominance of higher-tech industries in the region. Puerto Rico's manufacturing sector is a cornerstone of its economy, with a focus on pharmaceuticals and electronics. The island is recognized as one of the world's top pharmaceutical hubs, contributing to a substantial portion of its GDP. This industry's presence is a result of historical tax incentives and strategic economic programmes aimed at fostering industrial growth (see, for example, [40]).

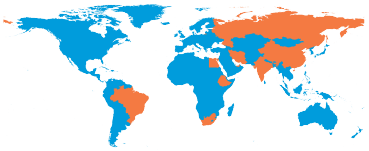


Africa is characterized by a low participation of higher-technology industries

Beyond the analysis of industrial development and regional dynamics, strategic economic and political alliances are poised to redefine the global manufacturing landscape. For instance, the latest expansion of BRICS in 2024 is likely to further enhance its significant role in the evolving pattern of global manufacturing. Initially founded by Brazil, Russia, India, and China in 2009, the bloc saw its first expansion with South Africa joining a year later. Egypt, Ethiopia, the Islamic Republic of Iran and the United Arab Emirates recently became members on 1 January 2024. Further expansions of this bloc are contemplated in the coming years. Figure 3.13 presents these countries in an overview. Similar to Figure 3.12, the embedded pie charts show the weight of each country's manufacturing sector according to MVA 2022 together with the proportion generated by higher-tech and other manufacturing industries. For illustrative purposes the countries are colored according to the four main regions used throughout the *Yearbook*.

Puerto Rico boosts the representation of higher-tech industries in the Caribbean

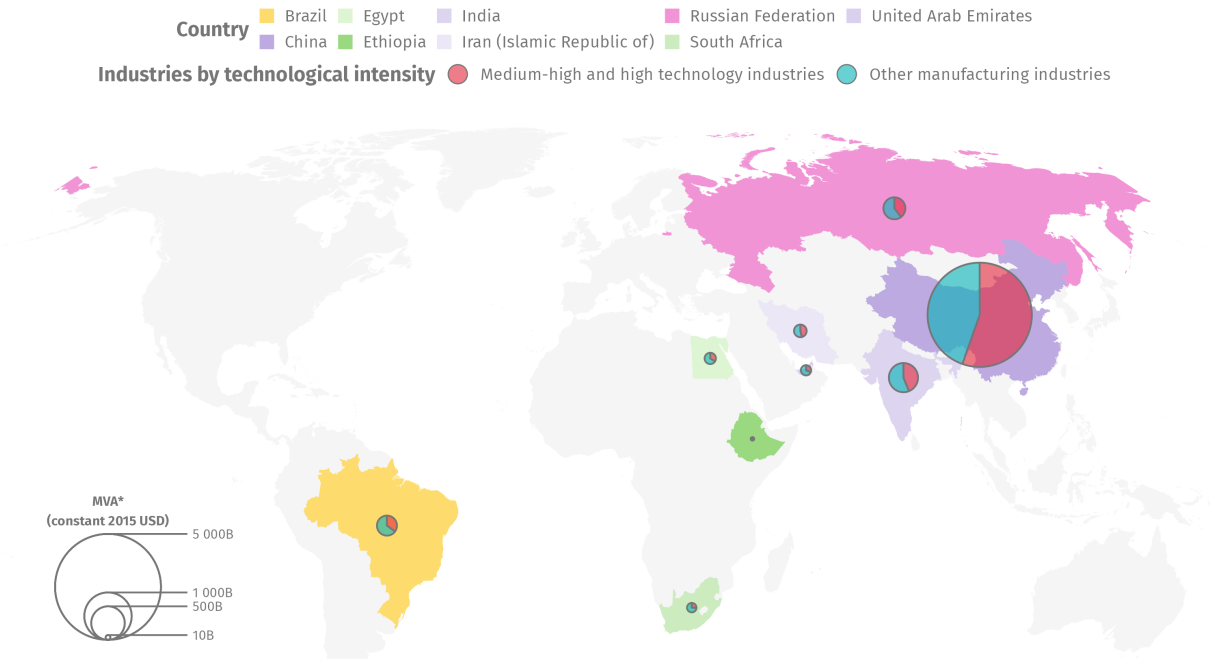
Due to its dominant weight and specific structure with a large MHT sector, China's manufacturing industry stands out as the powerhouse within the group. It accounts for a share of 81.3 per cent. India represents the second largest manufacturing sector (8.0 per cent), followed by the Russian Federation (3.4 per cent), Brazil (3.2 per cent), the Islamic Republic of Iran (1.3 per cent) and Egypt (1.1 per cent). The other members contribute less than 1 per cent each to the group's MVA. In terms of contribution of MHT industries, China's weight is even more dominant and represents 87.2 per cent of the bloc's total. Again, India and the Russian Federation follow second and third with shares of 5.4 per cent and 2.8 per cent, respectively.



With its large higher-tech sector China stands out as the manufacturing powerhouse within BRICS

Altogether, BRICS significantly shapes global manufacturing. In five distinct industries according to ISIC Rev. 4, namely basic metals (ISIC Rev. 4 division 24), leather and related products (ISIC Rev. 4 division 15), electrical equipment (ISIC Rev. 4 division 27), textiles (ISIC Rev. 4 division 13), and wearing apparel (ISIC Rev. 4 division 14), the contribution to

Figure 3.13 | MVA composition by industries according to technological intensity for BRICS countries, 2022



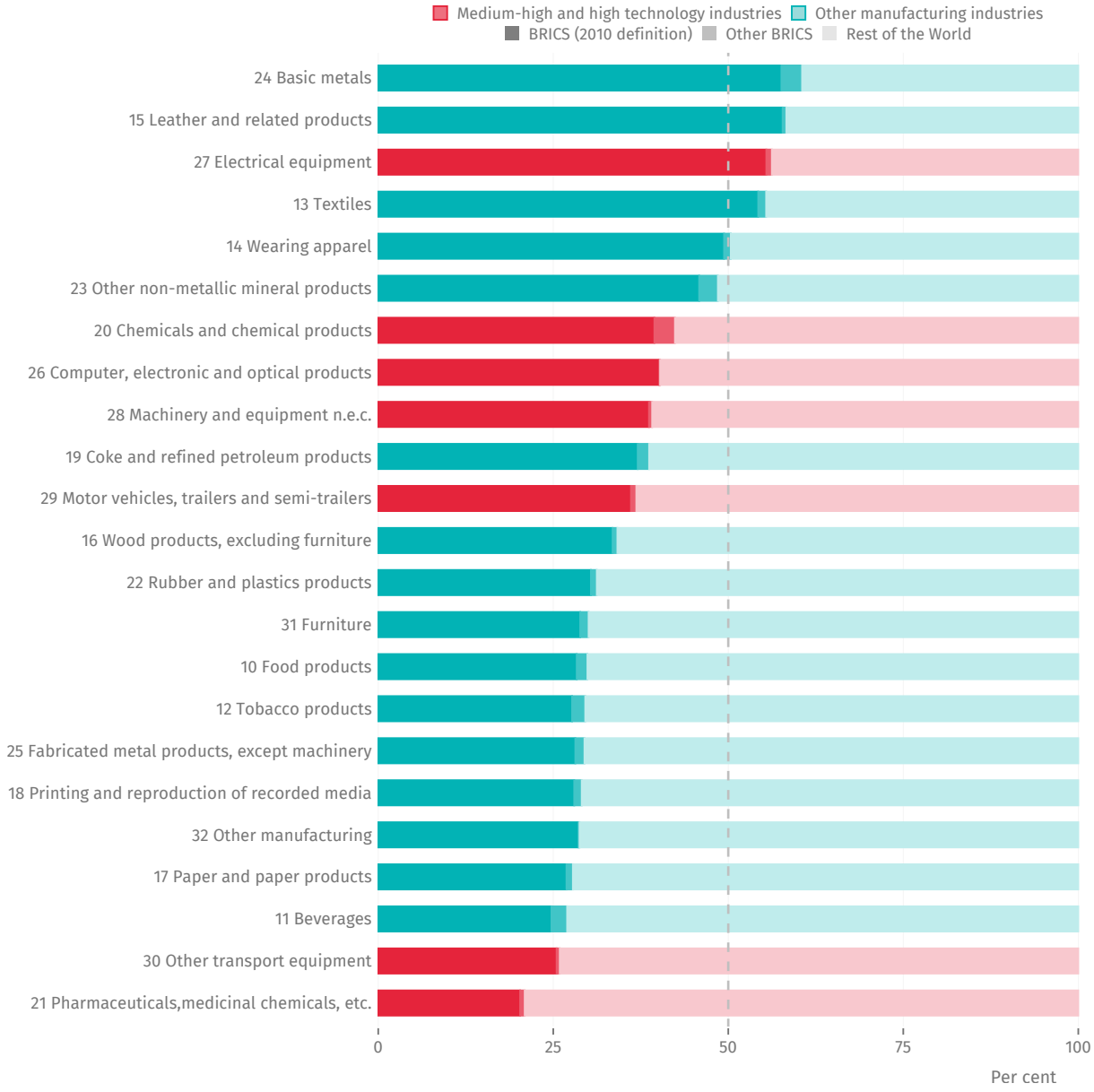
Source: [37; 38]
Note: The pie charts embedded in the regional map illustrate the countries' MVA contribution of industries based on their technological intensity as defined in Annex Table E.2.1. Due to the applied methodology and the exclusion of ISIC Rev. 4 division 33 from the calculations, MVA figures can deviate from the figures published in [10]. For illustrative purposes the countries are colored according to the four main regions used throughout this publication.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

global value added exceeds 50 per cent. The manufacture of basic metals (ISIC Rev. 4 division 24) even sees three out of the top five leading global manufacturers from BRICS, namely China, India and the Russian Federation (see Table 3.3 at the end of this section). Also, in other industries like chemicals (ISIC Rev. 4 division 20) and non-metallic mineral products (ISIC Rev. 4 division 23), a substantial part of the world production takes place in BRICS countries. Besides basic metals (ISIC Rev. 4 division 24) with an addition of 3.0 per cent, these two activities experienced the greatest impact of the BRICS extension in 2024, adding 2.9 per cent and 2.7 per cent to value added generation, respectively.

In contrast to the dominant role in many industries, the bloc's share in the global manufacture of food products (ISIC Rev. 4 division 10) is only about 30 per cent, despite BRICS accounting for about 45 per cent of the world's population in 2022. Although food product manufacturing is only part of an extensive agri-food sector that includes activities from the primary sector, like agriculture and fishing, as well as trade activities and services, this points to the essential need for BRICS to also prioritize food security issues in the future. Also, the manufacture of pharmaceuticals (ISIC Rev. 4 division 21) is comparably small. In 2022, it is the industry where BRICS had the lowest impact

BRICS
represents
45%
of the world's population,
and accounts for
30%
of global industrial food
production

Figure 3.14 | Contribution of BRICS to global manufacturing activities, 2022



Source: [37; 38]
Note: Member countries of BRICS are listed in Annex Table E.5.5. The bars show the share of global value added within each manufacturing industry in per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

on global value added generation, contributing about 20 per cent, despite China and India being among the top five leading manufacturers. Ultimately, however, the pandemic has highlighted the crucial role of a strong pharmaceutical industry. Notably, Switzerland has been able to achieve a dominant position within this industry over the past twenty years, as outlined in Table 3.3. Its global share has surged from 4.2 per cent in 2002 to an estimated 36.1 per cent in 2022.

Switzerland
has emerged as the leading global manufacturer of
pharmaceuticals
over the past decades

Table 3.3 | Leading manufacturers for selected ISIC divisions (World)

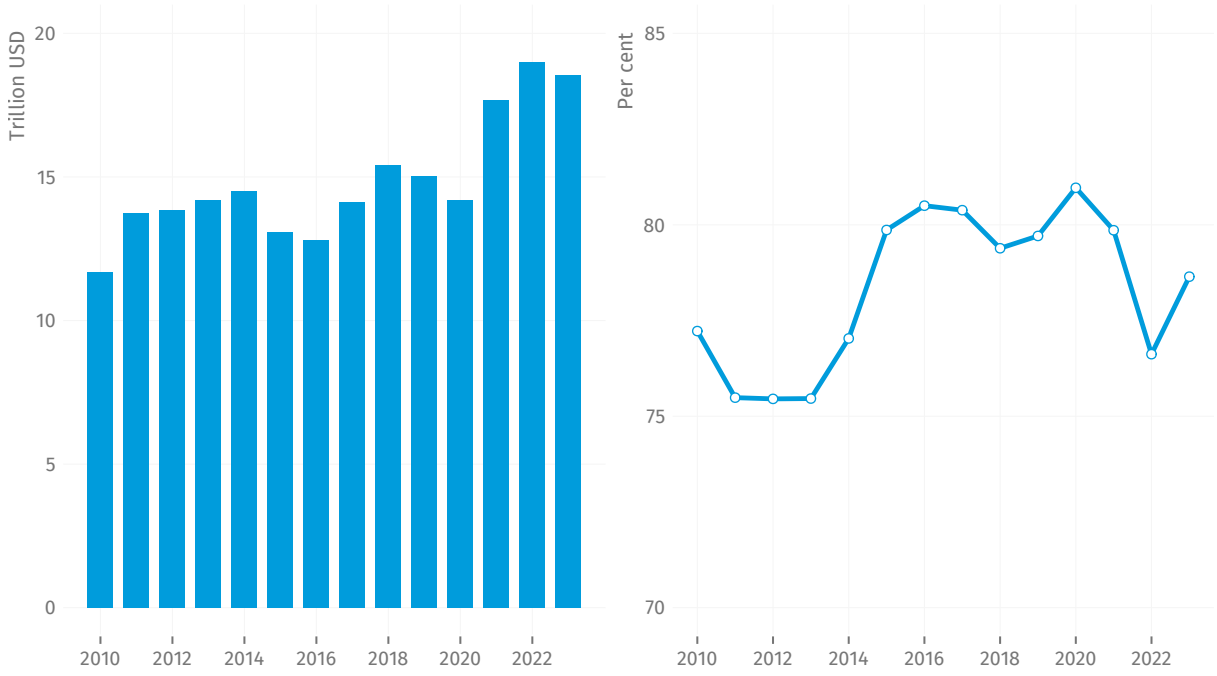
	2002	2022
10 Food products		
China	6.3	22.3
United States	23.8	17.4
Japan	10.1	5.6
United Kingdom	4.1	3.5
Indonesia	1.3	3.2
11 Beverages		
China	4.2	18.2
United States	18.6	16.9
Mexico	5.2	5.8
Japan	9.8	5.3
United Kingdom	4.9	3.2
12 Tobacco products		
China	5.8	22.4
United States	28.6	19.4
Indonesia	5.6	9.6
Japan	3.3	3.5
Mexico	1.5	3.4
13 Textiles		
China	20.8	48.0
Türkiye	4.6	5.5
United States	15.7	4.9
India	7.1	4.8
Indonesia	2.3	3.1
14 Wearing apparel		
China	18.5	44.1
Bangladesh	3.5	13.4
Türkiye	2.8	5.6
India	2.1	3.2
Viet Nam	1.1	2.4
15 Leather and related products		
China	22.4	52.8
Italy	16.1	6.8
Viet Nam	1.0	6.1
Indonesia	4.3	6.0
France	5.2	2.6
16 Wood products, excluding furniture		
China	4.7	29.1
United States	25.7	18.2
Japan	8.1	4.3
Germany	4.6	3.9
Canada	4.9	3.8
17 Paper and paper products		
United States	35.3	24.1
China	5.6	20.4
Japan	9.1	6.4
Germany	4.9	4.3
Brazil	2.3	3.0

	2002	2022
18 Printing and reproduction of recorded media		
China	4.1	23.1
United States	30.4	21.3
Japan	13.8	11.0
United Kingdom	3.7	4.6
Germany	5.3	3.6
19 Coke and refined petroleum products		
United States	21.6	19.9
China	6.8	16.5
India	8.6	11.5
Mexico	10.3	5.8
Russian Federation	4.2	5.8
20 Chemicals and chemical products		
China	8.3	31.4
United States	30.2	17.6
Japan	8.3	5.0
Germany	7.1	3.7
India	4.1	3.6
21 Pharmaceuticals,medicinal chemicals, etc.		
Switzerland	4.2	36.1
China	4.4	15.3
United States	39.8	13.0
India	3.3	3.8
Japan	10.2	3.5
22 Rubber and plastics products		
China	6.9	26.0
United States	25.3	17.8
Japan	14.5	8.8
Germany	6.5	5.4
Korea, Rep. of	3.6	3.0
23 Other non-metallic mineral products		
China	9.8	40.1
United States	17.9	10.0
Japan	9.1	3.8
Germany	4.8	3.1
India	2.5	3.0
24 Basic metals		
China	17.1	47.1
United States	14.9	8.0
Japan	11.6	5.1
India	2.5	5.0
Russian Federation	4.4	3.7
25 Fabricated metal products, except machinery		
China	4.5	24.6
United States	26.6	19.3
Germany	7.8	7.6
Japan	12.5	6.2
Italy	7.2	3.9

	2002	2022
26 Computer, electronic and optical products		
China	16.8	38.2
Switzerland	3.3	11.8
United States	10.4	9.6
Korea, Rep. of	6.2	8.5
China, Taiwan Prov.	4.2	7.1
27 Electrical equipment		
China	12.2	53.2
United States	20.9	8.7
Japan	13.2	5.8
Germany	9.8	5.5
Switzerland	1.2	4.5
28 Machinery and equipment n.e.c.		
China	9.5	34.7
United States	17.6	9.8
Japan	16.9	9.6
Germany	13.5	8.3
Switzerland	2.2	8.1
29 Motor vehicles, trailers and semi-trailers		
China	6.2	31.8
United States	18.7	13.8
Japan	22.0	11.1
Germany	13.8	8.1
Mexico	3.8	5.3
30 Other transport equipment		
United States	39.7	31.0
China	5.8	21.4
Germany	3.5	5.0
United Kingdom	7.3	4.8
France	5.2	4.4
31 Furniture		
China	5.5	24.7
United States	31.0	18.0
Germany	6.5	4.5
Italy	6.7	4.4
United Kingdom	3.4	3.4
32 Other manufacturing		
United States	40.0	26.5
China	9.5	25.8
Germany	6.3	6.1
Ireland	2.1	5.8
Japan	7.3	4.7

Source: [37; 38]. *Note:* Shares in per cent of total value added of the respective group; red points show minimum/maximum values.
Data used to create this table can be downloaded at the UNIDO Statistics Portal.

Figure 3.15 | Global manufacturing exports in absolute values (left-side chart) and as a proportion of total exports (right-side chart)



Source: [42]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

3.3 The manufacturing sector trade

3.3.1 Global trade structure

Figure 3.15 describes the recent trends in global manufacturing exports. The left-hand chart shows that manufacturing exports have generally followed a rising trend, even though this was interrupted in 2015–2016 due to a global economic deceleration and in 2020 during the COVID-19 pandemic. Since 2021, global manufacturing trade has surged across the world, as countries stepped out of the pandemic's shadow. Global manufacturing exports reached a peak value of 19.0 trillion USD in 2022, but later dropped to 18.5 trillion USD in 2023.

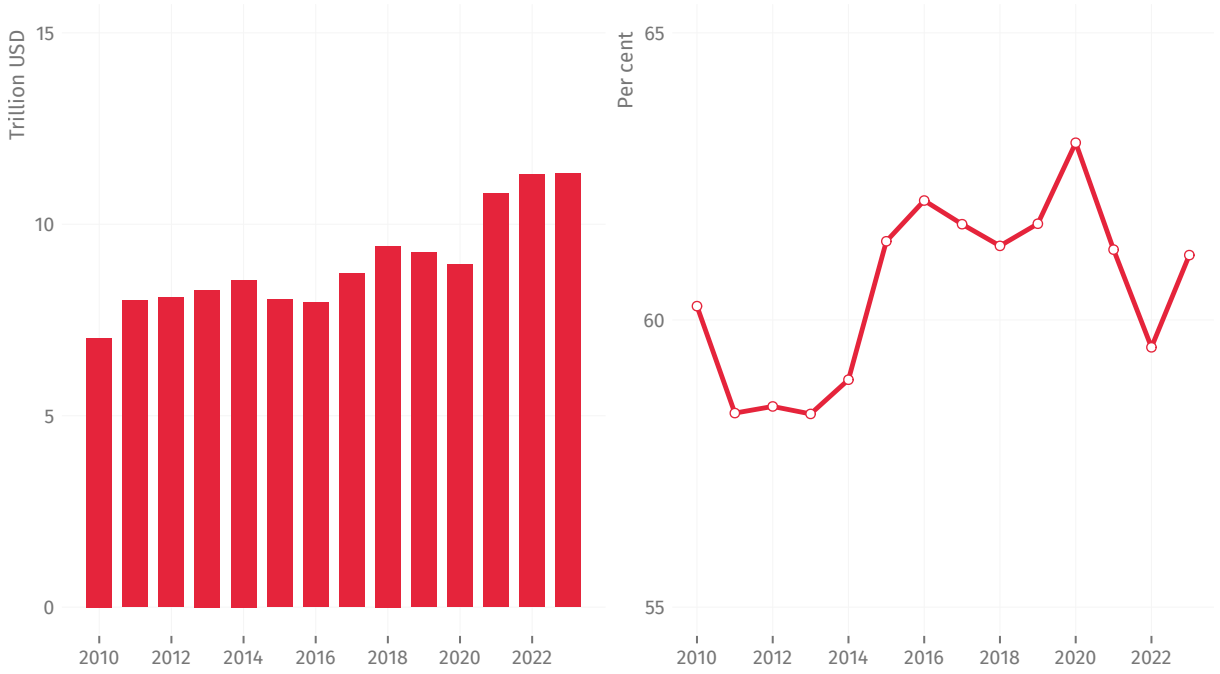
The right-hand side of Figure 3.15 presents the proportion of manufactured goods in total trade. Manufacturing goods accounted for about 75 to 80 per cent of total trade from 2010 to 2023. After a continuous decline between 2020 and 2022, the recovery recorded in 2023, when this proportion rose to 78.7 per cent, proves again that manufacturing trade has overcome the negative influence that the COVID-19 pandemic exerted on the sector.

Figure 3.16 focuses on global exports of MHT manufacturing. The trends are similar to those of total manufacturing exports. Although MHT exports remained at a similar level in 2022 and 2023, with a value of 11.3 trillion USD, their share in overall manufacturing exports

UNIDO Statistics follows the Lall classification [41], in which manufacturing trade includes trade in all commodities except primary agricultural or mineral commodities, non-monetary gold, electric current, and unallocated commodities.

The list of traded commodities counted as MHT, based on the SITC Revision 3, is given in Annex E.2.

Figure 3.16 | Global MHT manufacturing exports in absolute values (left-side chart) and as a proportion of total manufacturing exports (right-side chart)



Source: [42]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

increased 1.6 percentage points, from 59.5 per cent in 2022 to 61.1 per cent in 2023.

Section 3.1 illustrated the ongoing changes in the distribution of world manufacturing production. Similarly, Figure 3.17 presents a long-term view of global manufacturing trade according to its distribution by country group. The left panel of the figure shows manufacturing exports. High-income industrial economies remain the largest group, although their share in world manufacturing trade declined from 75.5 per cent in 2000 to 57.3 per cent in 2023. In contrast, the contribution of middle-income industrial economies increased from 16.2 per cent to 29.3 per cent over the same period, indicating that the rebalancing of manufacturing activities in the world is also reflected in international trade. The share of high- and middle-income industrializing economies gradually increased in this period. However, the contribution of low-income economies to total manufacturing exports reached only 0.3 per cent in 2023, a figure too small to be visible in the graph.

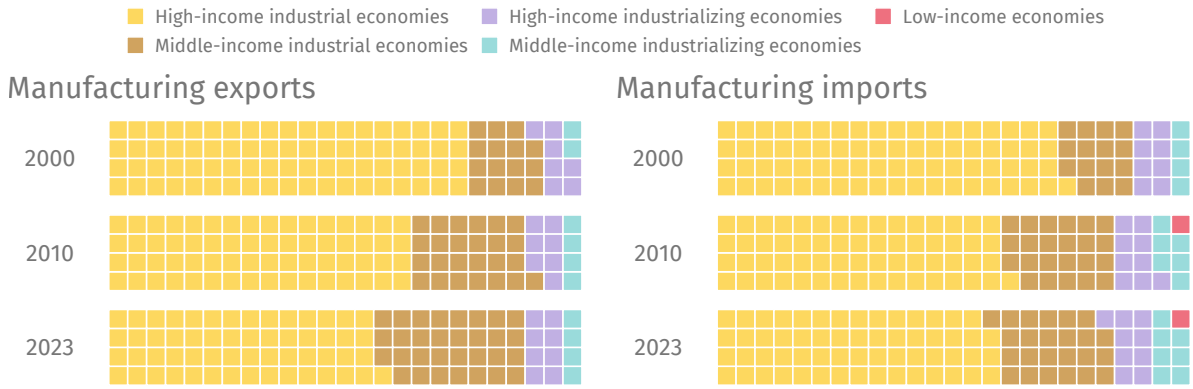
The right panel of Figure 3.17 shows the distribution of world manufacturing imports among different country groups. Similar to exports, while high-income industrial economies remain the largest group, their weight fell from 73.9 per cent in 2000 to 58.4 per cent in 2023. The difference between their share of global manufacturing exports and imports has widened during this period, indicating a growing trade deficit. Meanwhile, the share of middle-income industrial economies

Trade data

All trade data presented in this section can be found in the Manufacturing Trade Database, accessible from the UNIDO Data Portal [42].

A large majority of global exports consists of manufactured goods, almost 80% of the total

Figure 3.17 | Share of manufacturing trade by country group



Source: [42]
Note: One square represents a share of 1 per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

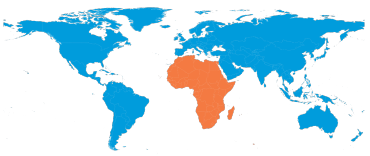
in imports expanded from 15.1 per cent in 2000 to 24.2 per cent in 2023. Although this group's share of exports and imports was approximately the same in 2000, the share of exports outpaced that of imports since then, suggesting an expanding manufacturing trade surplus for middle-income industrial economies. Interestingly, industrializing economies (both high income and middle income) have gradually expanded their share of manufacturing exports and imports, indicating their increasing participation in this sector. However, they have remained net manufacturing importers throughout the period shown in the figure.

Over the last 20 years the export share of middle-income industrializing economies in manufacturing trade almost doubled

3.3.2 Regional and country-level performance

The previous section demonstrated that global trade has rebounded from the COVID-19 pandemic, with manufacturing trade registering steady growth since 2020. However, different regions in the world present different stories, as trends vary across regions.

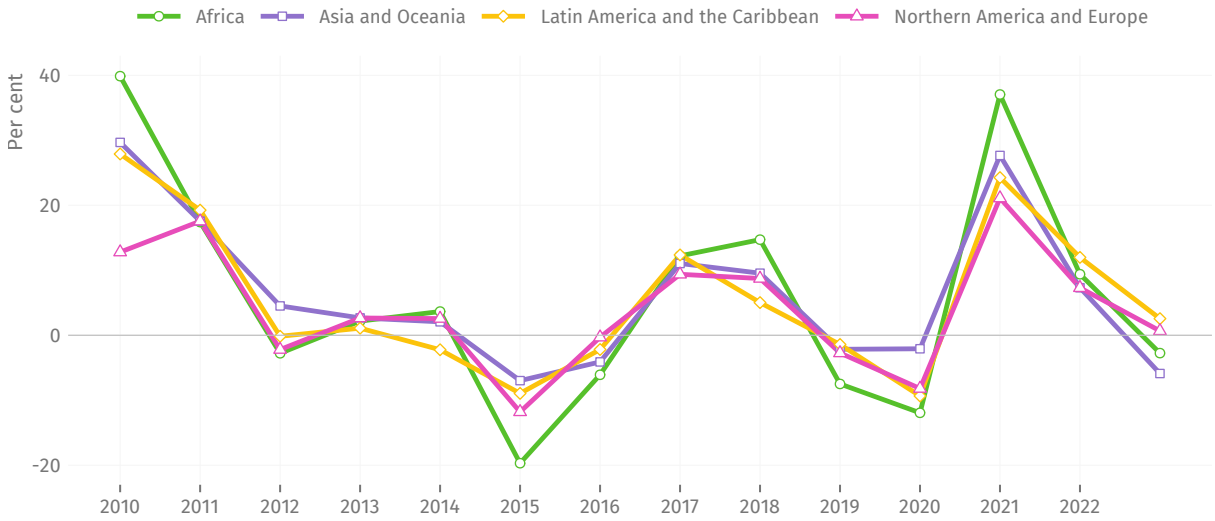
In recent years, the growth rates of exports by region have followed similar fluctuation patterns, with Africa affected by a higher volatility, as shown in Figure 3.18. In 2021, as the global economy recovered from the pandemic's impact, manufacturing exports surged in all regions. That year, Africa climbed to the top spot with a growth rate of 37.0 per cent, followed by Asia and Oceania with 28.7 per cent. Thereafter, all regions suffered a deceleration and in occasions even fell in negative territory. Indeed, manufacturing exports in Asia and Oceania fell by 5.9 per cent and by 2.6 per cent in Africa in 2023, while growth in the other two regions barely remained above 0 per cent.



Manufacturing exports from Africa have been affected by a higher volatility

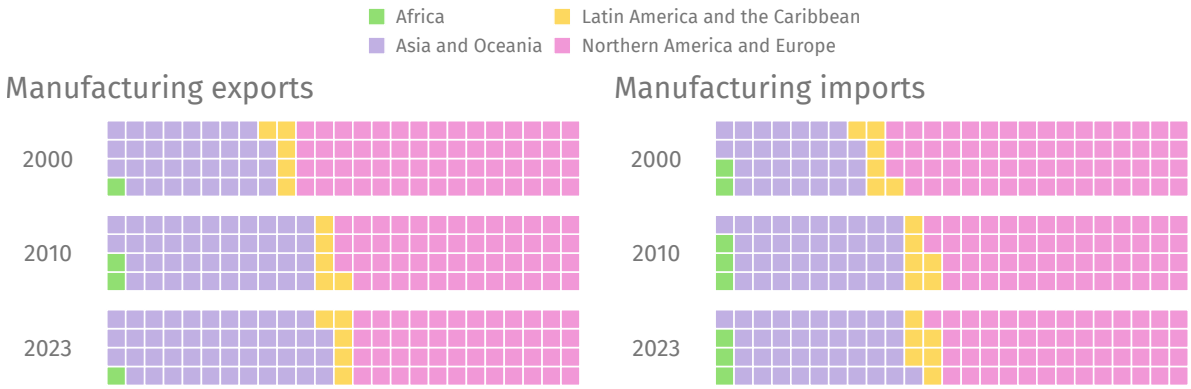
Figure 3.19 depicts the long-term shifts in the distribution of manufacturing trade by regions more clearly. While the region of Northern

Figure 3.18 | Growth rate of manufacturing exports by region



Source: [42]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 3.19 | Share of manufacturing trade by region



Source: [42]
Note: One square represents a share of 1 per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

America and Europe has closely followed the dynamics of global trade, even though at more subdued rates, its share of global manufacturing exports decreased from 59.1 pers cent in 2000 to 46.6 per cent in 2023, against the gains of Asia and Oceania, which increased from 33.6 per cent to 46.1 per cent over the same period. A parallel trend can be observed in manufacturing imports. Both Africa and Latin America and the Caribbean have remained with low, but relatively stable shares.

The share of MHT manufacturing exports in total manufacturing exports is a marker for a country's success in the technological upgrading of manufacturing. A snapshot of exports by technology intensity during 2023 is presented in Figure 3.20. This map illustrates the relevance of these type of exports across the world. Among the regions displayed, four regions are characterized by a share of MHT manufacturing ex-

The share of
higher-tech products
in manufacturing exports is a marker of the
technological upgrading
of manufacturing

ports higher than 50 per cent, namely Europe, Eastern Asia, Northern America, and Latin America and the Caribbean. By contrast, African manufacturing exports have the lowest proportion of MHT exports, especially in Sub-Saharan Africa.

MHT exports remain mostly concentrated in both Asia and Oceania and Northern America and Europe. Indeed, these two regions combined accounted for almost 95 per cent of global MHT exports in 2023, although their joint share has gradually decreased from 96.7 per cent in 1995. These outcomes in manufacturing trade mirror the production structure by technological intensity described in Section 3.2 (Figure 3.12).

Northern America and Europe and **Asia and Oceania**
account for almost
95% of global higher-tech manufacturing exports

In addition, Figure 3.21 shows the most recent trends of this indicator. Latin America and the Caribbean has gradually improved its performance in this variable, increasing from 51.8 per cent in 2010 to 56.5 per cent in 2023. In Africa, the share of MHT products has also benefited from a rising trend, although from a lower starting point, as mentioned above.

An idea about the trade balance in MHT manufactures can be inferred by comparing the two panels of Figure 3.21. The region of Northern America and Europe remains a net exporter of these products, although its surplus has been shrinking in recent years. Asia and Oceania have also transitioned to net exporters of MHT products. A trade deficit in this type of products persists in Latin America and Caribbean, and especially in Africa.

Top 5 MHT exporters and their share in global MHT exports in 2023

1. China (17.4%)
2. Germany (9.9%)
3. United States (8.4%)
4. Japan (4.4%)
5. Republic of Korea (3.9%)

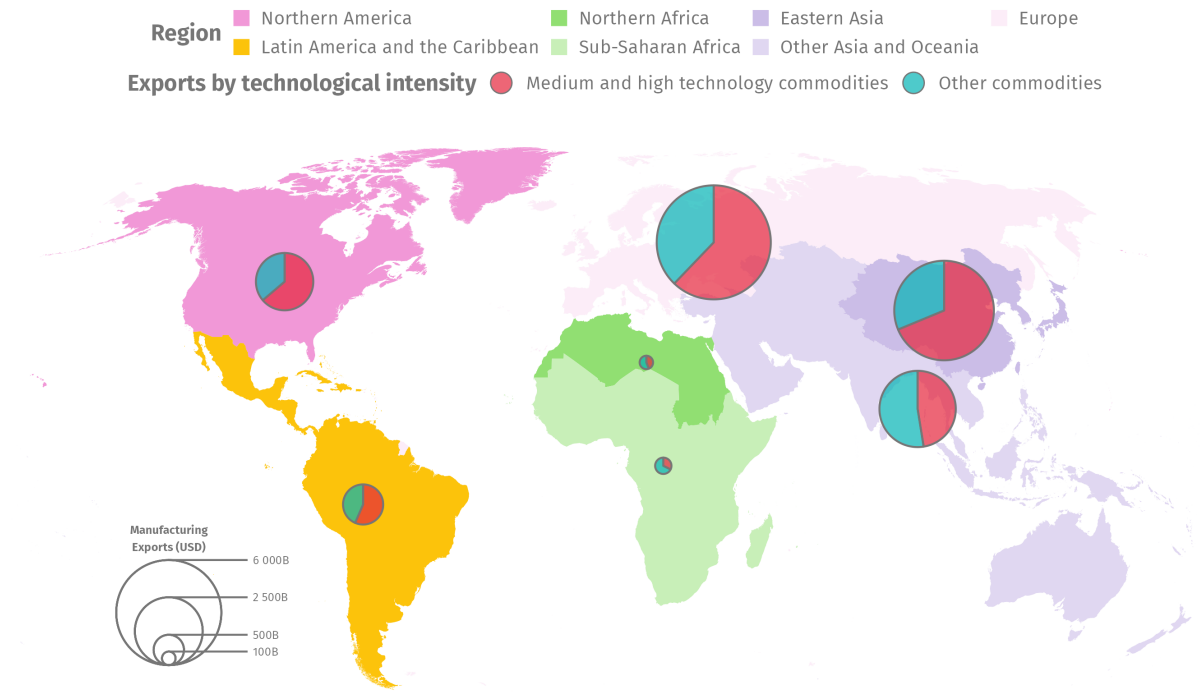
Figure 3.22 depicts the proportion of manufactured goods in total country exports. Northern America and Europe is the most homogeneous region. Exports of most countries in this region are mostly composed of manufacturing goods with only four exceptions: Greenland, Iceland, Norway and the Russian Federation. Eastern and South-eastern Asia also include mostly manufacturing exporters. The rest of Asia and Oceania as well as Latin America and the Caribbean are more varied. Africa is also a continent of contrasts, ranging from economies with a high proportion of manufacturing goods in exports (Botswana, Eswatini, Mauritius, Morocco, Tunisia) to economies with low shares of manufacturing exports (Angola, Chad, Guinea-Bissau, South Sudan).

Top 5 MHT importers and their share in global MHT imports in 2023

1. United States (15.2%)
2. China (9.5%)
3. Germany (6.5%)
4. China, Hong Kong SAR (3.9%)
5. Netherlands (3.3%)

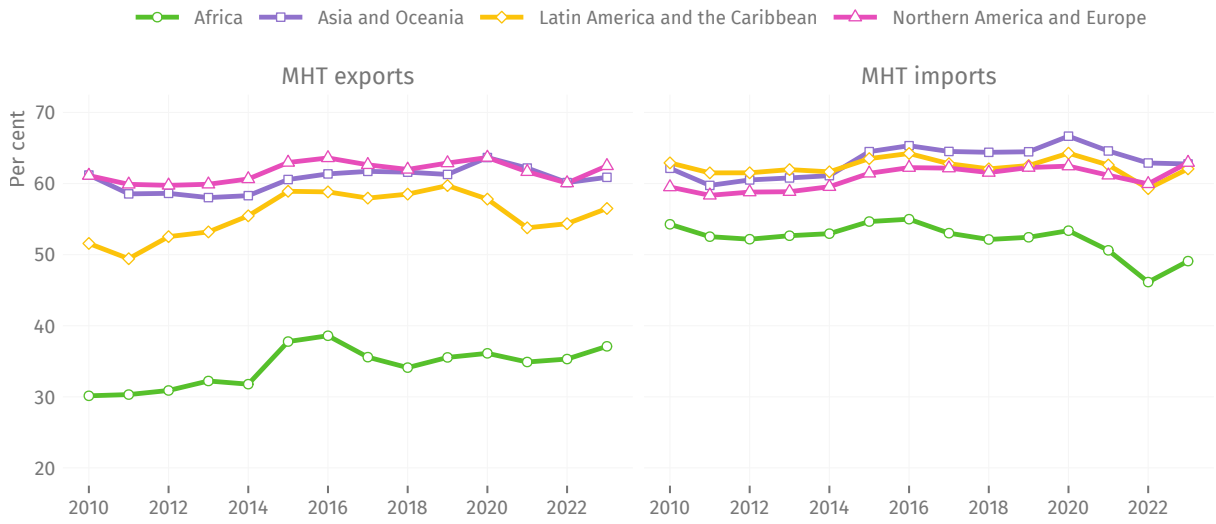
Figure 3.23 presents the largest exporters of manufactured goods in the world. China, Germany and the United States of America consistently ranked in the top three from 2010 to 2023. The rest of the top ten includes a mix of Eastern Asian economies (China Hong Kong SAR, China Taiwan Province, Japan, and the Republic of Korea) and European economies (France, Italy, the Netherlands, and the United Kingdom). The only exceptions have been Mexico from Latin America and Singapore from South-eastern Asia sporadically making an appearance in the top ten.

Figure 3.20 | Regional manufacturing export composition by commodities according to technological intensity, 2023



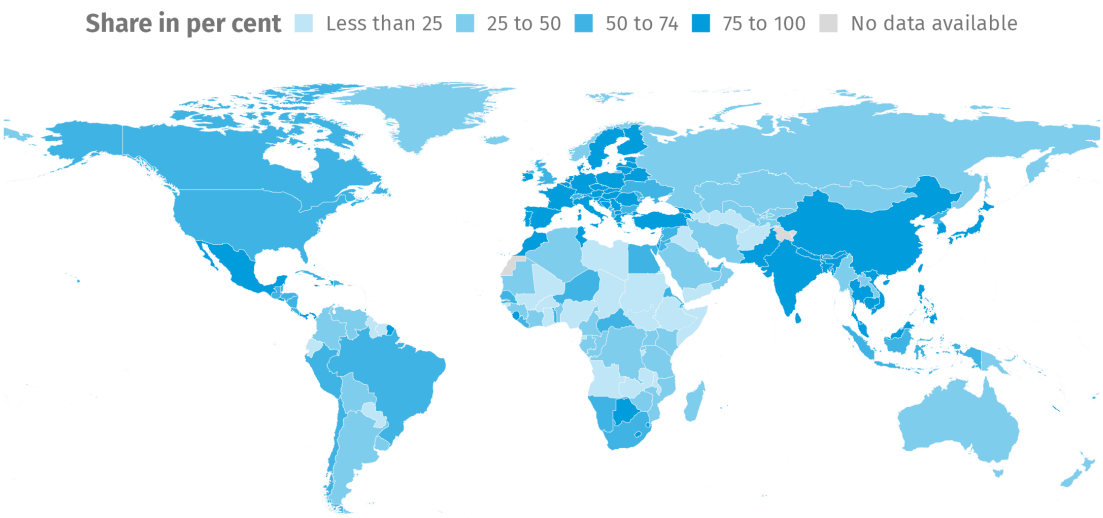
Source: [37; 38]
Note: The pie charts embedded in the regional map show the exports of manufacturing goods according to their technological intensity, as defined in Annex Table E.2.2.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 3.21 | Share of MHT products in manufacturing trade by region



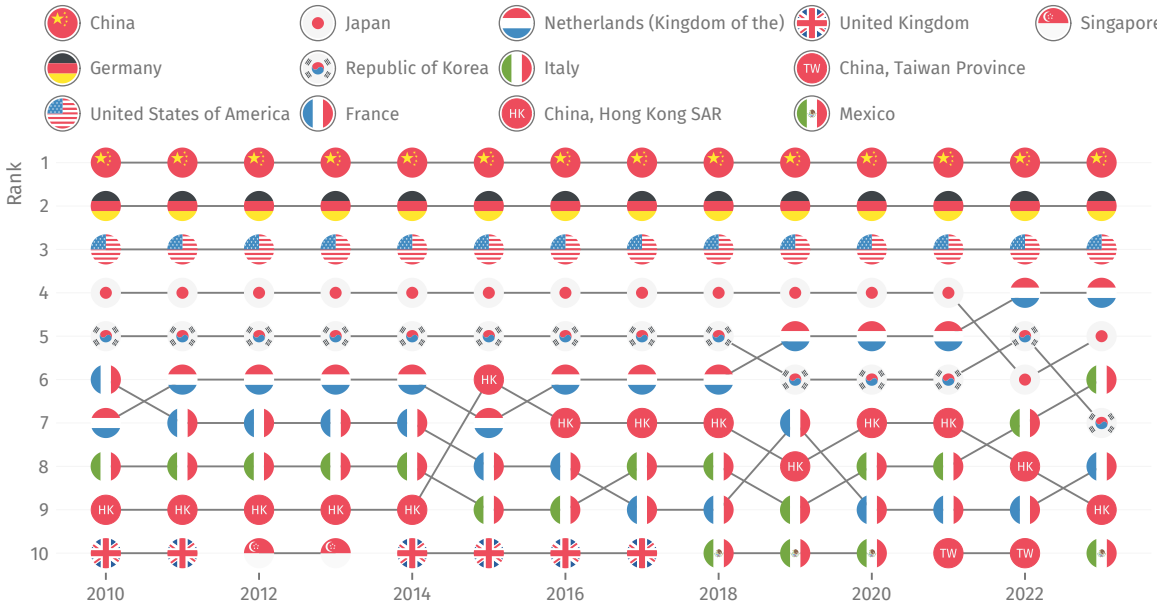
Source: [42]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 3.22 | Average share of manufacturing exports in total exports, 2013–2023



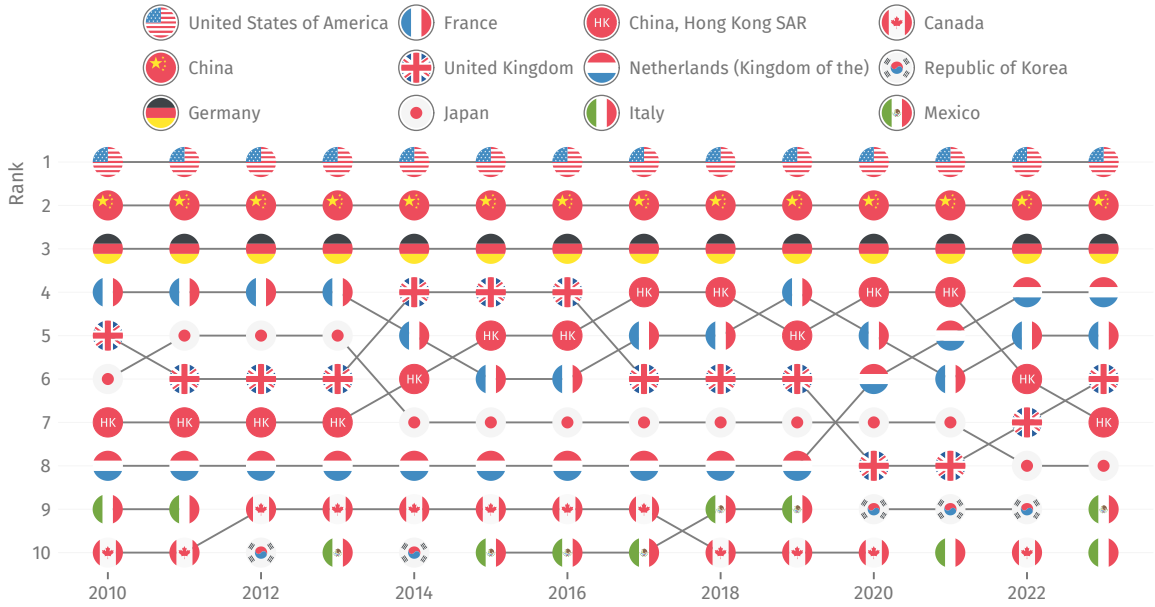
Source: [42]
Note: The map shows simple averages by country, calculated using available yearly data for the period from 2013 to 2023. Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 3.23 | Top ten economies in terms of manufacturing exports



Source: [42]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 3.24 | Top ten economies in terms of manufacturing imports



Source: [42]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

The ranking of the top ten economies in terms of manufacturing imports is similar to that of exports, as shown in Figure 3.24. From 2010 to 2023, the United States has stood as the world's largest manufacturing importer, followed by China and Germany. The rest of the top ten is concentrated in Eastern Asia and Europe, with only a few exceptions. The major differences with the top ten exporters are the placement of Canada as the ninth or tenth largest importer of manufactures from 2010 to 2020, and the presence of Italy in the top ten in 2023.

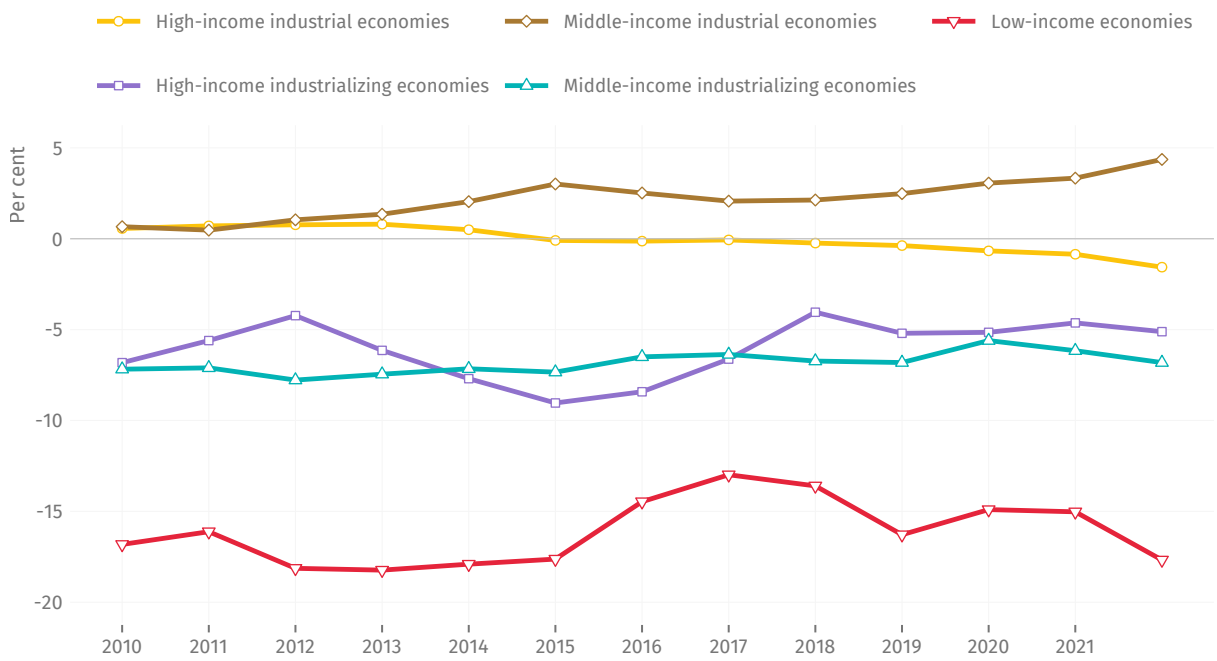
Middle-income industrial economies is the only country group with a consistent **manufacturing trade surplus**

3.3.3 Trade balance

The earlier description of manufacturing exports and imports has made reference to the manufacturing trade balance in different country groups.[i] Figure 3.25 directly shows the trade balance positions according to UNIDO country groups. Middle-income industrial economies is the only country group that has been able to maintain a manufacturing trade surplus in recent years. Moreover, this surplus has gradually expanded from 0.7 per cent of their GDP in 2010 to 4.4 per cent in 2022. High-income industrial economies followed the opposite trajectory: from a surplus in 2010, the margin gradually shrank until it turned into a manufacturing trade deficit equivalent to 1.6 per cent of their GDP in 2022. This means that high-income industrial economies have become net manufacturing importers. The other three country groups have consistently registered deficits from 2010 to 2022. In particular, more than 17 per cent of the GDP of low-income economies is needed to cover their growing manufacturing trade deficit.

[i] To facilitate inter-group comparisons, trade balances are expressed in relative terms, as a share of GDP of the respective country group.

Figure 3.25 | Trade balance in manufacturing goods as a share of GDP, by country group



Source: [10; 42]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

3.4 Manufacturing employment and labour productivity

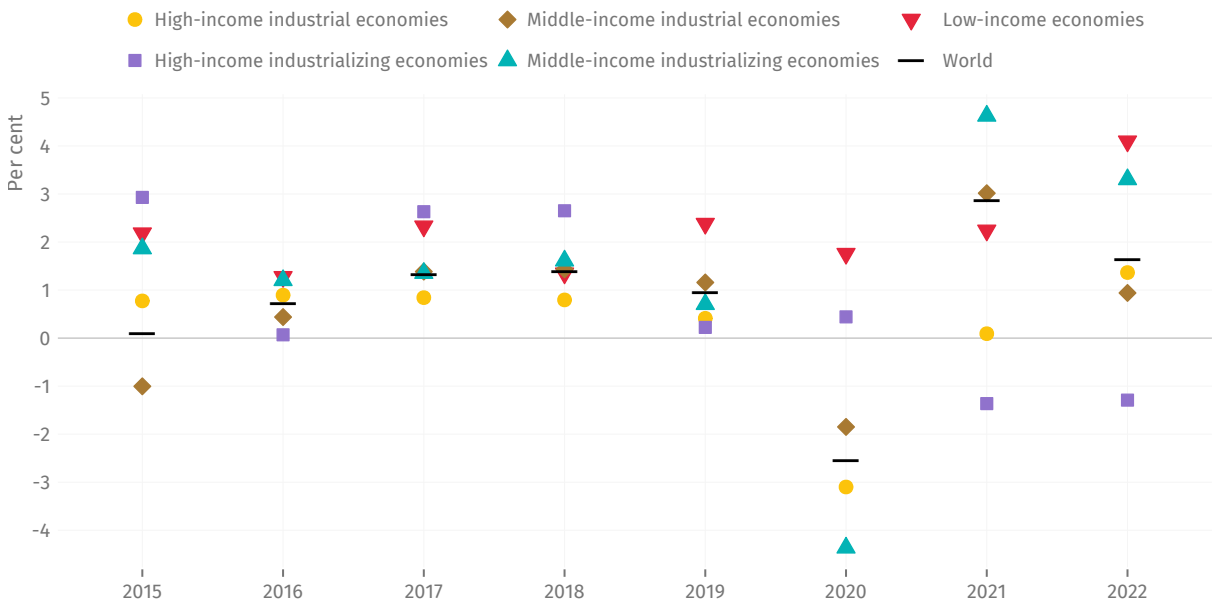
In recent years, the global economy faced a significant slowdown, driven by geopolitical tensions, persistent inflation, and rapid interest rate hikes by central banks, which curbed economic activity and investment, including in industry. Despite these challenges, job growth remained resilient, with unemployment rates falling below pre-pandemic levels and labour force market participation recovering. However, wage growth lagged behind inflation, leading to a decline in real wages and an increase in global poverty, especially among workers in extreme and moderate poverty. Labour market imbalances, such as shortages in key sectors and uneven participation rates, have persisted, exacerbated by lower average working hours and weak productivity growth. These ongoing challenges pose risks to both economic recovery and social progress [43].

Economic instability and the recent crises severely impacted manufacturing empoyment

The manufacturing sector, having a significant potential to create jobs [2], has also been noticeably impacted by recent crises. Indeed, while global manufacturing employment increased by 6.5 per cent, climbing from 448 million in 2015 to 477 million persons in 2022, its contribution to total employment declined from 14.3 per cent in 2015 to 14.1 per cent in 2022.

Figure 3.26 presents the year-over-year growth rates of manufacturing

Figure 3.26 | Year-over-year growth rates of manufacturing employment by country groups



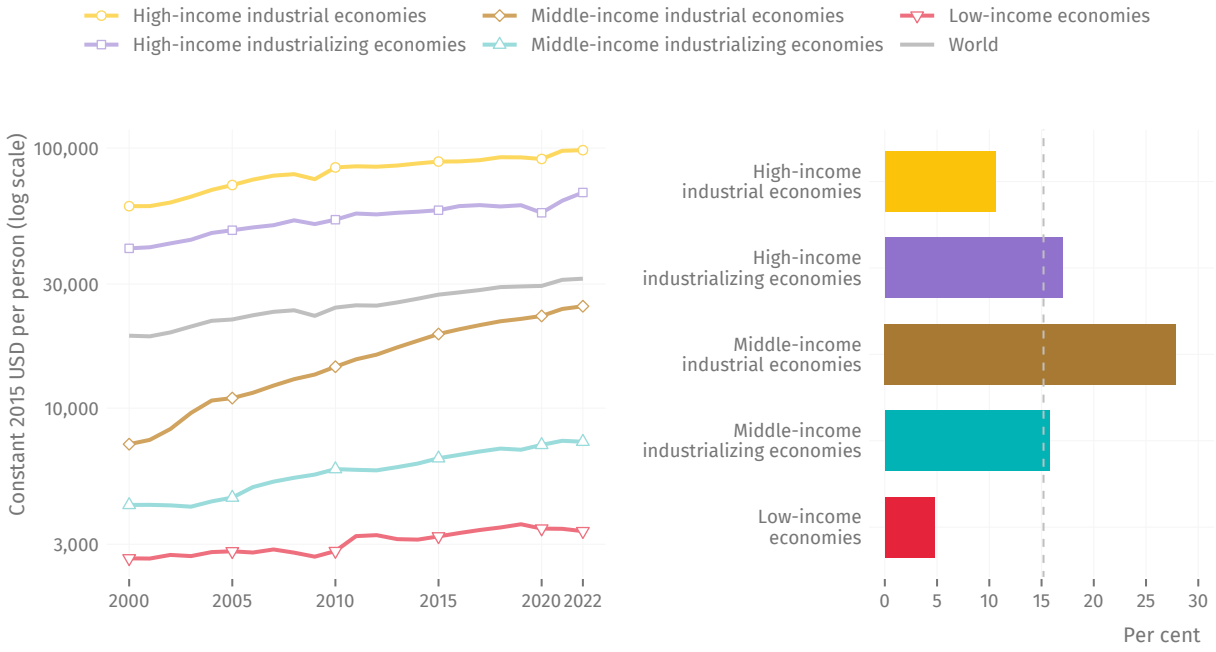
Source: [44]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

employment by UNIDO country classification. While global manufacturing employment growth remained positive in 2022, it slowed compared to the previous year, with a growth rate of 1.7 per cent, down from 2.9 per cent in 2021. A similar trend was observed in middle-income economies: in 2022, employment in middle-income industrial economies and middle-income industrializing economies grew by 0.9 per cent and 3.3 per cent, respectively, compared to 3.0 per cent and 4.6 per cent the previous year. Employment growth in high-income industrializing economies continued declining in 2022, with a decrease of 1.3 per cent, similar to the 1.4 per cent decline recorded in 2021. High-income industrial economies and low-income economies were the only two groups to experience an acceleration of manufacturing employment: the former saw a growth rate of 1.4 per cent in 2022, an increase of 1.3 percentage points since 2021, while the latter recorded a growth rate of 4.1 per cent in 2022, up by 1.9 percentage points from the previous year.

Figure 3.27 illustrates the evolution of labour productivity, measured as MVA per person employed, across different income groups. As the left-side of the figure shows, all groups except low-income economies reached a record high in 2022. Although labour productivity in low-income economies did not peak in 2022, it has shown some growth since 2015, as indicated by the right-hand side of the figure. However, their gains have lagged behind other country groups, further increasing their productivity gap.

The **share of manufacturing employment** in total employment **decreased** from 14.3% in 2015 to **14.1%** in 2022

Figure 3.27 | MVA per person employed by country group (left-side chart) and the corresponding growth rates between 2015 and 2022 (right-side chart)



Source: [10; 44]
Note: The y-axis of the left-side chart has been log transformed.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

In fact, all income groups experienced growth between 2015 and 2022, with middle-income industrial economies standing out due to a significant increase of 27.9 per cent, steadily closing the gap to high-income economies. The second-highest growth rate in 2022 was achieved by high-income industrializing economies, achieving a 17.0 per cent increase compared to 2015, followed closely by middle-income industrializing economies at 15.8 per cent, high-income economies at 10.6 per cent, and low-income economies at 4.8 per cent.

The low labour productivity in low-income economies can be attributed to key factors such as limited access to advanced technologies, low capital intensity, shortage of skilled labour, a focus on low-value-added industries and weak institutional support [2].

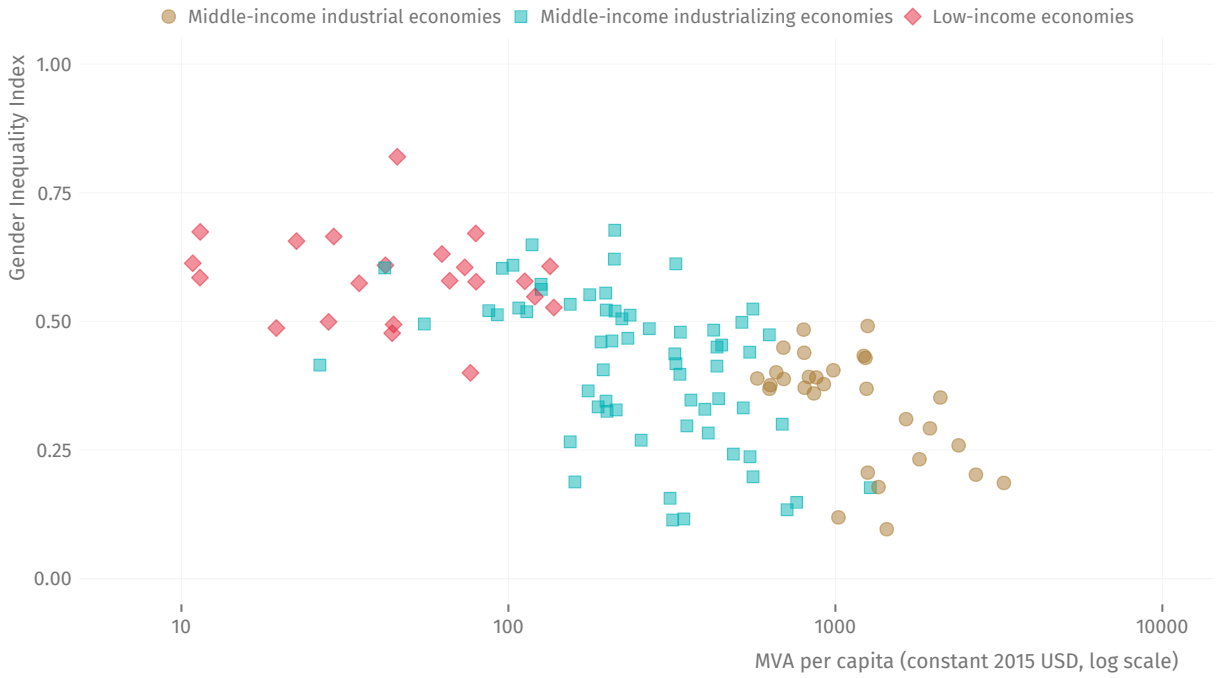
Labour productivity reached a record **high** in all groups except low-income economies

3.5 Women in manufacturing

Advancing gender equality remains one of the most important challenges for sustainable development, and past studies have highlighted the important role that manufacturing plays in improving women's well-being [25]. Figure 3.28 shows a clear negative correlation between a country's level of industrialization, indicated by MVA per capita, and gender inequality, measured by the Gender Inequality Index. In

The Gender Inequality Index is a composite measure of gender inequality, quantifying gender-based disadvantage in three dimensions: reproductive health, empowerment and participation in the labour market. This indicator is produced by UNDP [15].

Figure 3.28 | Relationship between MVA per capita and the Gender Inequality Index in low- and middle-income economies, 2022



Source: [10; 15]
Note: The horizontal axis is in logarithmic scale. The Gender Inequality Index is a composite measure of gender inequality. It ranges from 0 to 1, with higher values indicating a higher level of gender inequality; for more information, see [15].
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

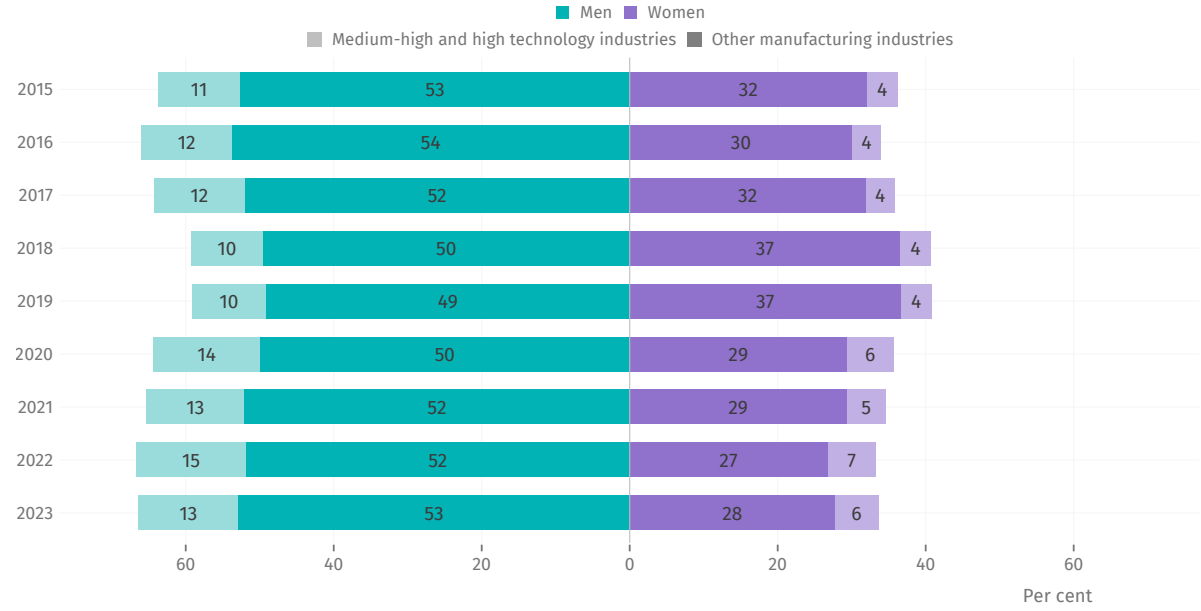
the figure, higher levels of industrialization are associated with lower levels of gender inequality.

Although this correlation is strong, gender inequality in manufacturing remains significant, with women frequently concentrated in low-productivity sectors. Indeed, Figure 3.29 illustrates the gender distribution of employment by MHT and other manufacturing industries. This graph highlights that the share of women in MHT industries is less than half that of men. Furthermore, women's representation in other manufacturing sectors has significantly declined since the COVID-19 pandemic and has yet to return to pre-pandemic levels. This section describes the latest trends in manufacturing employment disaggregated by sex, and the disparities that persist between women and men in the sector.

Women
are more likely
to be employed in
low-productivity sectors

In recent years, women's employment in the manufacturing sector has seen notable progress, although the gains have not been universal. Figure 3.30 shows a comparison between the growth rates of manufacturing employment by sex and UNIDO country groups. In 2021, global manufacturing employment of both women and men recovered strongly after the significant decline recorded during the COVID-19 crisis. Nonetheless, female employment growth in the sector surpassed that of men, with rates of 3.0 per cent and 2.8 per cent, respectively. However, this trend reversed in 2022, as male employment grew by 1.9 per cent, outpacing the 1.3 per cent growth for women. In high-income

Figure 3.29 | Distribution of global manufacturing employment by sex and industry groups (technological intensity)



Source: [45]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

and middle-income industrializing economies, female employment growth remained positive and exceeded that of males in 2022. However, in middle-income industrial and low-income economies, female employment declined by 0.08 per cent and 0.24 per cent, respectively, while male employment increased by 2.0 per cent and 7.4 per cent. These outcomes underscore the pronounced gender disparities in manufacturing employment in some cases, particularly in low-income economies, where the gap between men and women in manufacturing keeps widening.

On a regional level, Africa and Northern America stood out as the only two regions where both female and male manufacturing employment growth accelerated between 2021 and 2022, with rates of 4.0 per cent and 4.3 per cent for women, and 5.9 per cent and 2.3 per cent for men, respectively. In Asia, manufacturing employment growth for both men and women decelerated, registering 2.2 per cent for women and 1.1 per cent for men, down by 2.1 percentage points and 0.8 percentage points with respect to 2021, respectively. Latin America and the Caribbean also experienced a slowdown, with female manufacturing employment growth falling from 7.7 per cent in 2021 to 6.1 per cent in 2022, and male manufacturing employment from 5.9 per cent in 2021 to 3.9 per cent in 2022. Europe experienced declines in manufacturing employment across both genders, with female manufacturing employment dropping by 3.4 per cent and male manufacturing employment by 3.6 per cent in 2022. Similarly, Oceania saw decreases in both female and male manufacturing employment, falling by 5.0 per cent and 2.5 per cent, respectively, after a brief

Globally, the share of women in **higher-tech industries** accounts for less than **half** that of men

Figure 3.30 | Year-over-year growth rates of manufacturing employment by UNIDO country group and sex

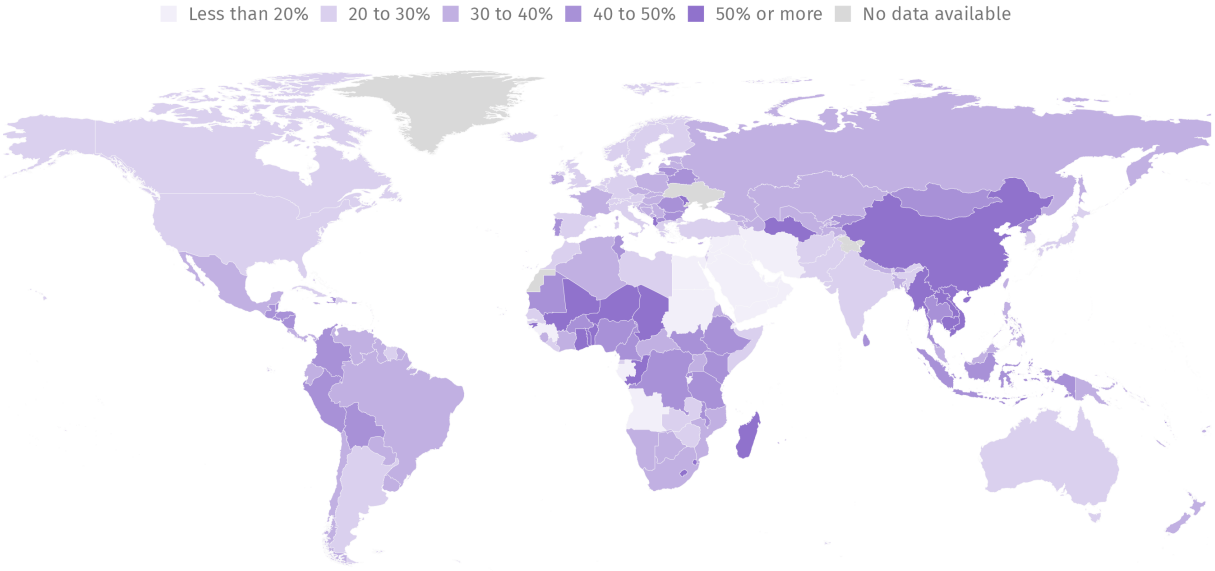
Source: [44]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

recovery in 2021.

While the overall increase in female employment in manufacturing indicates progress toward closing the gender gap, further action is imperative to achieve true gender parity. As illustrated by Figure 3.31, the manufacturing sector still remains heavily male-dominated with women's representation still below 50.0 per cent in most countries. Indeed, according to International Labour Organization (ILO) estimates, women's share of manufacturing employment started at 42.8 per cent in 2000 and remained fairly stable over the next decade, fluctuating between 42.0 per cent and 42.9 per cent over these years, with a peak of 42.9 per cent in 2007. However, after 2010, there was a slight

Acceleration
of female manufacturing employment is indispensable to achieve true **gender parity**

Figure 3.31 | Share of women in total employment in manufacturing, 2022



Source: [44]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

decline in female representation, reaching 42.0 per cent by 2015 and remaining around that level through 2022 [44].

Global initiatives have been launched to address the gender gap in manufacturing, with prominent examples such as the *Women in Manufacturing (WiM)* initiative, founded in the United States in 2011. *WiM* supports women in the industry through professional development, networking, and career resources, currently serving members from around 65 countries. The largest international presence is in Europe (38 per cent), followed by Asia (27 per cent), Canada and Mexico (23 per cent), South America (9 per cent), Africa (2 per cent), and Australia (1 per cent) [46]. Similarly, in 2022, the *Women in Manufacturing UK Initiative (WiM UK)* was established with the goal of raising female participation in the United Kingdom's manufacturing sector to 35 per cent by 2035, adding over 200,000 women to the workforce [47]. *WiM UK* focuses on addressing labour shortages and gender gaps through mentorship, professional development, and partnerships with industry and policymakers, emphasizing flexible work arrangements and leadership opportunities to create a more inclusive environment.

In emerging economies, such as India, the *Women in Manufacturing India* initiative offers mentorship, skill development and leadership training for women in the manufacturing sector, aiming to close the gender gap and promote women into higher technical and management roles. It collaborates with industries like automotive, electronics, and chemicals to help women advance into senior positions within manufacturing companies [48]. The *SheTrades* initiative, which con-

Woman's representation in manufacturing still below 50% in most countries

nects women entrepreneurs to global markets, including manufacturing industries like textiles, electronics, and food processing, provides training, access to finance, and networking opportunities for women [49]. In Kenya, *SheTrades* has helped female-led small and medium enterprises in manufacturing meet international export standards. *WEConnect* connects women-owned businesses in manufacturing to multinational corporations, facilitating their integration into global supply chains and enhancing women's representation in higher-value manufacturing sectors [50]. In Mexico, *WEConnect* has supported women-led businesses in automotive parts manufacturing by helping them improve production processes and meet international procurement standards.

Global initiatives have been launched to address the gender gap in manufacturing

The European Union (EU) has enacted policies aimed at closing gender gaps, not only in manufacturing but also in the science, technology, engineering, and mathematics (STEM) fields, which are essential for many advanced manufacturing roles [51]. Programs like *Horizon Europe* include specific initiatives aimed at increasing female participation in innovative industrial sectors [52]. Initiatives like these are especially significant in today's rapidly evolving technological landscape, as they strive to bridge the digital divide and equip women with the skills needed to navigate emerging technologies in a male-dominated industry. This effort can help mitigate concerns about artificial intelligence (AI) and automation technologies, which tend to exacerbate employment inequality favouring highly skilled male employees [53; 54; 55].

Africa and Northern America are the only regions where both female and male manufacturing employment accelerated

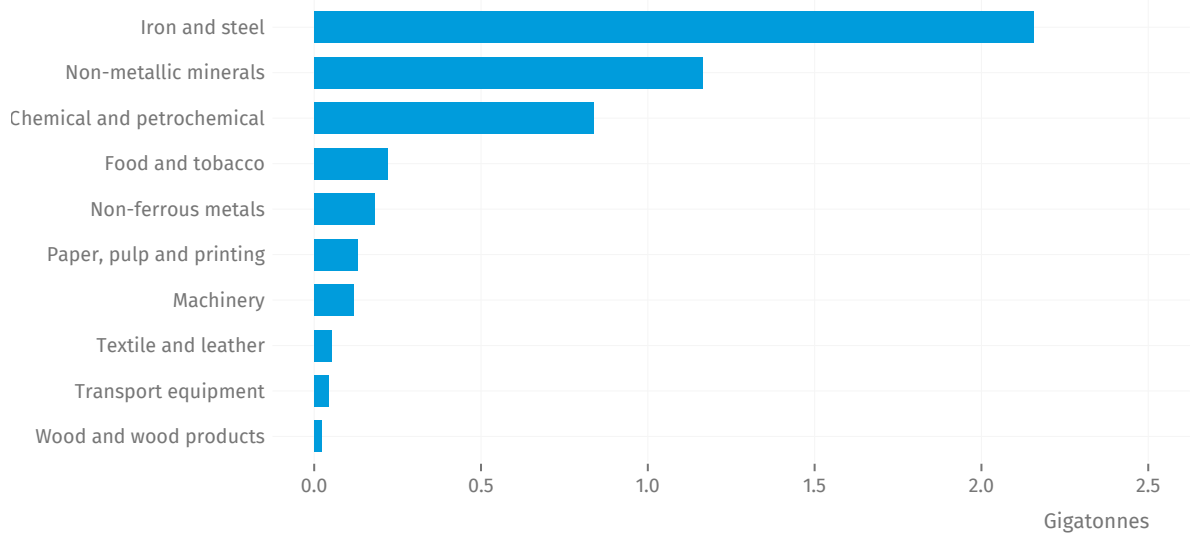
Despite these efforts, women in manufacturing still face substantial challenges, including underrepresentation in leadership roles, wage disparities, and cultural barriers. Dedicated policies focused on enhancing gender equality, particularly in areas such as digital and emerging technologies, are crucial for closing the gender gap in manufacturing. These policies should aim at providing equitable opportunities, training, and support for women, enabling them to fully participate and advance in these rapidly evolving sectors [56].

3.6 Environmental impact of manufacturing

Iron & steel, non-metallic minerals and the chemical sectors collectively account for the largest portion CO_2 emissions

Manufacturing industries are key drivers of global economic growth but are also significant contributors to environmental degradation, including in terms of greenhouse gas (GHG) emissions that contribute to air pollution and climate change. Figure 3.32 illustrates CO_2 emissions from fuel combustion across various manufacturing subsectors and shows that key industries, including iron and steel production, non-metallic minerals and the chemical and petrochemical sectors, collectively account for the largest portion of these emissions.

Figure 3.32 | CO_2 emissions from fuel combustion by manufacturing industry, 2021



Source: [57]
Note: Iron and steel (ISIC Rev. 4 group 241 and class 2431); non-metallic minerals (ISIC Rev. 4 division 23); chemical and petrochemical (ISIC Rev. 4 divisions 20 and 21); food and tobacco (ISIC Rev. 4 divisions 10 to 12); non-ferrous metals (ISIC Rev. 4 group 242 and class 2432); paper, pulp and printing (ISIC Rev. 4 divisions 17 and 18); machinery (SIC Rev. 4 divisions 25 to 28); textile and leather (ISIC Rev. 4 divisions 13 to 15); transport equipment (ISIC Rev. 4 divisions 29 and 30); wood and wood products (ISIC Rev. 4 division 16). The sector *Non-specified industry* in the International Energy Agency (IEA) database, which accounts for 1.1 Gt and is included in the manufacturing sector in UNIDO's calculations, has been excluded from the chart. Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Iron and steel, essential for infrastructure, construction and the automotive industries, is among the most carbon-intensive sectors due to its heavy reliance on fossil fuels. In 2021, it was the largest source of CO_2 emissions in manufacturing, responsible for 2.3 Gt. In particular, according to the World Steel Association, producing one ton of steel generates around 1.9 tons of CO_2, significantly impacting global GHG levels [58].

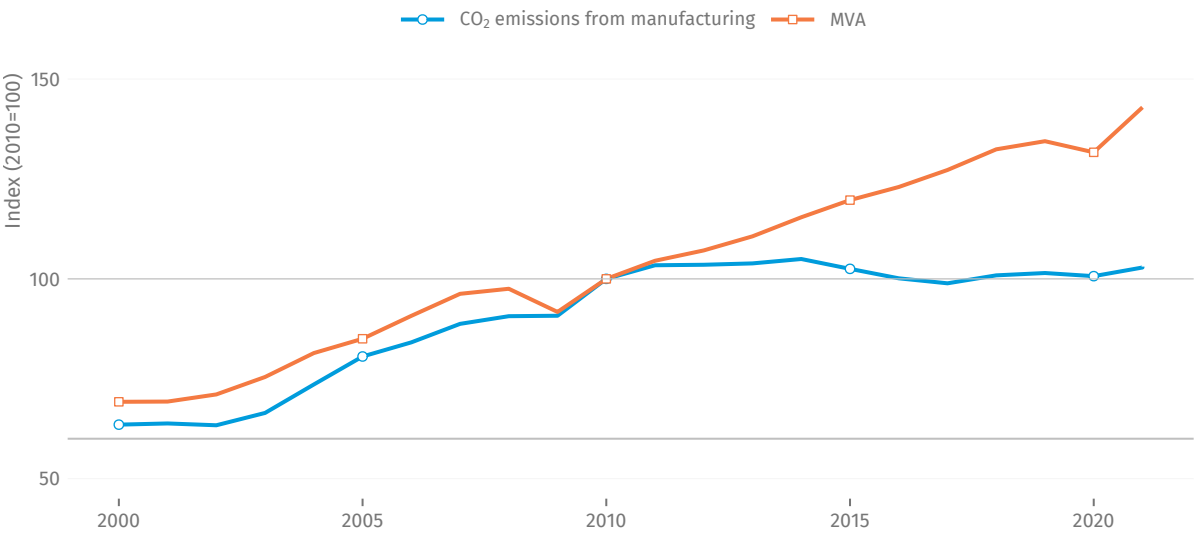
The non-metallic minerals sector, which includes cement, ceramics, and glass production, ranked second in global manufacturing emissions, releasing over 1.2 Gt of CO_2 in 2021. Within this sector, cement production is a major contributor, driven by the high demand for concrete infrastructure. Indeed, while the emissions intensity of cement production has remained steady since 2018 at just under 0.6 tons of CO_2 per ton of cement, emissions must decrease by an average of 3 per cent annually through 2030 to meet the net zero scenario target [59].

The chemical and petrochemical industries, producing fertilizers and other essential chemicals, emitted over 0.83 Gt of CO_2 in 2021. This sector is highly energy-intensive, with emissions stemming from fossil fuel combustion but also chemical reactions during production processes.

While other manufacturing sectors emitted less than one Gt of CO_2

Circular economy principles such as **recycling** and **reusing materials** can help reduce manufacturing's **environmental impacts**

Figure 3.33 | Global MVA and CO_2 emissions from manufacturing



Source: [10; 57]
Note: Due to their different measurement units, both series have been converted to an index with base year 2010. Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

each, they still pose environmental challenges, particularly regarding resource consumption and waste generation. For example, the textile industry is a significant user of water and chemicals, while the paper industry contributes to deforestation and water pollution. Adopting circular economy principles, such as recycling and reusing materials, could help reduce the environmental impacts of these sectors.

In recent years, there has been a noticeable decoupling of CO_2 emissions from manufacturing activity. As shown in Figure 3.33, despite the steady growth in MVA , CO_2 emissions from manufacturing have gradually declined since 2011. Mitigation strategies as well as the increasing relative importance of higher-technology industries have been crucial in reducing both energy and carbon intensity, contributing to lower GHG emissions. The growing affordability of low-emission technologies has provided numerous alternatives across manufacturing sectors.

Nonetheless, the pace of emissions reduction driven by efficiency improvements and technological advancements has not kept up with the rising emissions from increasing global manufacturing activity. Demand for energy-intensive products like crude steel and cement continues to grow, fuelled by urbanization and industrialization. Consequently, while the growth rates of CO_2 emissions and manufacturing activity are starting to diverge, this progress remains insufficient to fully mitigate the environmental impacts of the manufacturing sector and achieve global climate goals [60; 61].

While this section primarily addresses the environmental impact of the manufacturing sector in terms of CO_2 emissions due to data availability,

Decoupling
of CO_2 emissions and
manufacturing
activity
since 2011

Manufacturing
impacts the environment through
resource-intensive
practices,
such as
water use
material extraction
significant land use

it is important to acknowledge the role of other GHG, such as methane and nitrous oxide, which are also significant contributors to climate change. Methane, for instance, has a global warming potential 27-30 times greater than CO_2 over a 100 year period, while nitrous oxide has a global warming potential 273 times that of CO_2 for a 100 year timescale [62]. Focusing solely on CO_2 emissions overlooks these potent gases, which are often released during industrial processes and the production of chemicals. Additionally, the environmental impact of manufacturing goes beyond GHG emissions and includes resource-intensive practices, such as excessive water use, pollution from industrial waste water, material extraction, and significant land use. The transportation of manufactured goods also adds to the sector's overall environmental footprint, contributing further to GHG emissions and resource depletion.

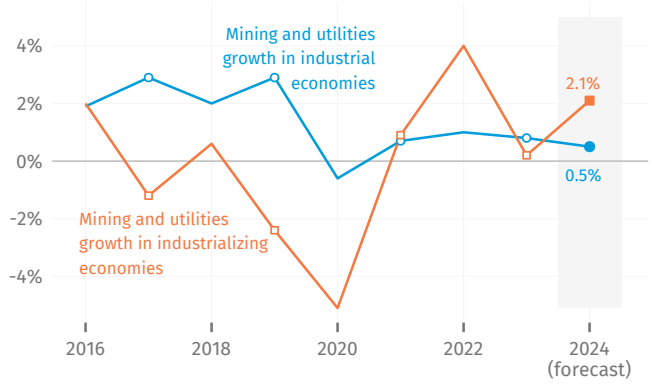
A comprehensive approach to alleviating the environmental effects of manufacturing must account for these broader impacts. However, such an approach is currently hampered by a lack of detailed data on various environmental factors beyond CO_2 emissions. This data gap is a major challenge for developing effective mitigation strategies, such as the adoption of circular economy practices that promote recycling and resource efficiency, as well as improved waste management and cleaner production methods. In order to reduce the sector's environmental footprint, it is critical to enhance data collection and integrate diverse environmental considerations into manufacturing policies to facilitate the development of robust strategies that not only lower GHG emissions but also address issues like water pollution, material waste, and resource overuse.

Statistical tools
are vital for informed
sustainability
policies

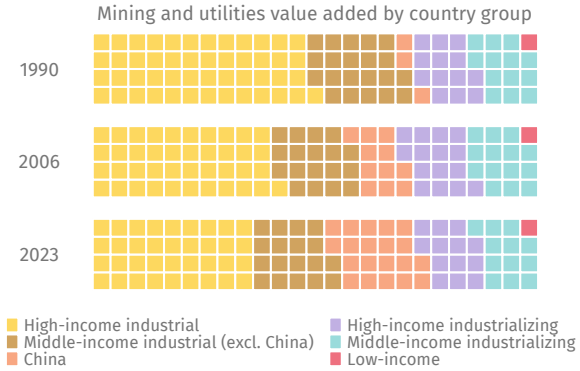
4 Mining and utilities in the spotlight

4 Mining and utilities in the spotlight

Key figures

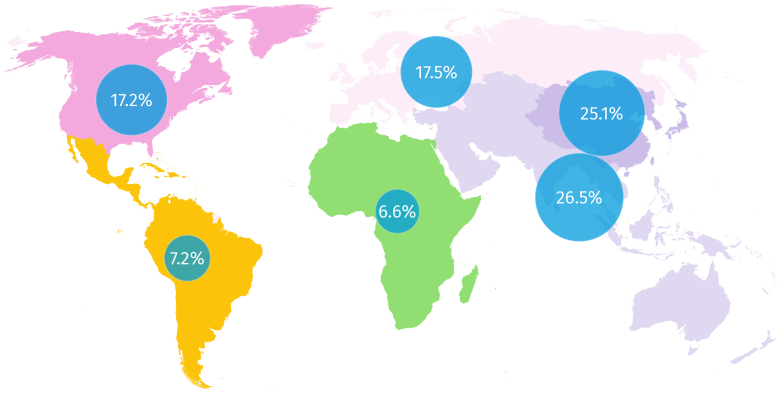


Growth rates of mining and utilities value added in industrializing economies follow a more volatile path than in industrial economies.

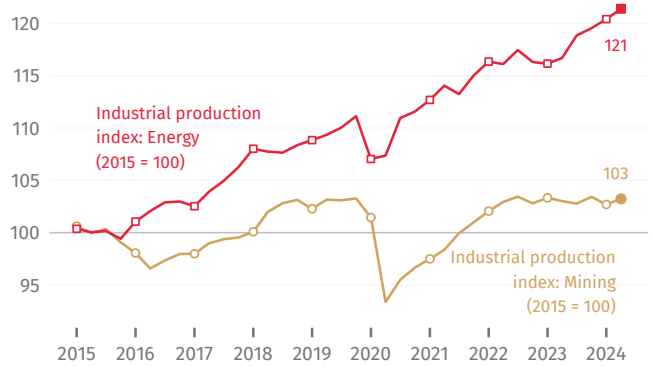


The weight of China in global mining and utilities value added has increased at the detriment of high-income industrial economies.

Regional contribution to world mining and utilities value added, 2023

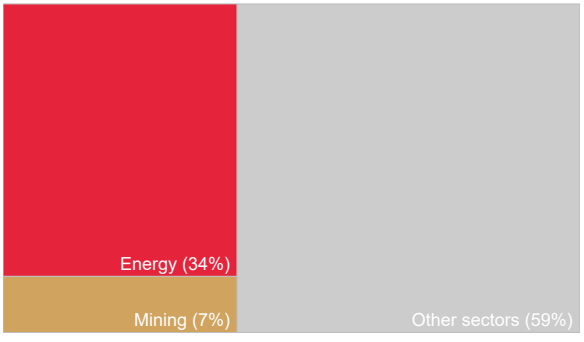


Regional contributions to world mining and utilities value added in 2023:
> Africa (6.6%)
> Latin America and the Caribbean (7.2%)
> Northern America (17.2%)
> Europe (17.5%)
> Eastern Asia (25.1%)
> Other Asia and Oceania (26.5%)



Energy production expanded by 21% from 2015 to the second quarter of 2024, while mining production has experienced narrower growth.

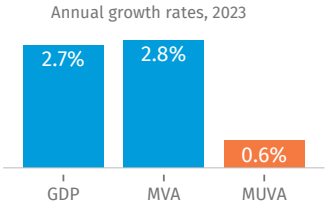
Estimated greenhouse gas emissions by sectors, 2023



Energy generation and mining activities are responsible for an estimated 41% of global greenhouse gas emissions.

4.1 Current trends and distribution of world mining and utilities

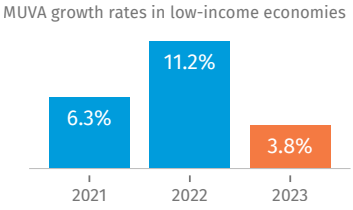
This chapter focuses on the combined mining and utilities sector, with a similar structure as the preceding chapter on manufacturing. The first section focuses on short- and long-term developments of the global production of mining and utilities. A more detailed analysis of the evolution of production in mining and utilities will follow in Section 4.2. Finally, the last section discusses the main environmental issues arising from this sector.



Global mining and utilities recorded a subdued growth in 2023

4.1.1 Annual production in mining and utilities

Figure 2.3 already compared the trajectories of the different industrial sectors. It highlighted the weaker performance of the mining and utilities sectors in comparison to the manufacturing sector and the broader economy. The mining and utilities sectors still grew moderately by 1.7 per cent in 2022, but in the following year a more subdued growth of 0.6 per cent was registered. The output of the sector is expected to rise by 0.9 per cent in 2024.



Low-income economies achieved a strong growth in mining and utilities, although it also decelerated in 2023

The annual growth rates of mining and utilities value added (MUVA) by country group of the last three years and the forecast for 2024 are shown in Table 4.1. Low-income economies were able to achieve comparably higher growth rates than other country groups in recent years. In 2023, this group registered an impressive growth of almost 4 per cent, followed by middle-income industrializing economies (2.7 per cent). It is expected that the output of these two groups will increase by an even higher rate in 2024. Similar to the manufacturing sector, China remained the world's largest producer in the combined mining and utilities sector, with a share of global MUVA reaching 20.1 per cent. Nevertheless, the country's output growth decelerated in recent years, resulting in a MUVA growth of 3.7 per cent and 1.2 per cent for 2022 and 2023, respectively. In 2024, the output of China's mining and utilities sectors is forecast to shrink. Before 2020, China reached annual growth rates beyond 6 per cent in this sector.

Top 5 countries with the largest mining and utilities sectors and their global MUVA share in 2023

1. China (20.1%)
2. United States (14.3%)
3. Russian Federation (3.9%)
4. Saudi Arabia (3.9%)
5. Japan (3.3%)

In 2023, the United States of America remained the second largest country after China, with a global share of 14.3 per cent. The following countries in the top five report weights of global MUVA below 5 per cent: the Russian Federation and Saudi Arabia, both with a share of 3.9 per cent, followed by Japan with 3.3 per cent. Compared to manufacturing, activity in the mining and utilities sectors is distributed more equally among a larger number of countries.

Table 4.1 | Growth rate of MUVA by country group

	2021	2022	2023	2024f
	Per cent			
World	0.8	1.7	0.6	0.9
Industrial economies				
High-income industrial economies	-4.7	-1.1	0.0	0.8
Middle-income industrial economies	6.9	3.0	1.5	0.2
Middle-income industrial economies (excl. China)	3.1	2.2	1.8	1.4
China	10.6	3.7	1.2	-0.8
Industrializing economies				
High-income industrializing economies	-0.4	6.1	-2.4	0.7
Middle-income industrializing economies	1.9	1.0	2.7	3.2
Low-income economies	6.3	11.2	3.8	5.2
Other groups				
Least developed countries (LDCs)	0.8	9.7	4.7	5.8

Source: [10]
Note: 2024f refers to UNIDO's forecasts for the year 2024.
Data used to create this table can be downloaded at the UNIDO Statistics Portal.

Another discrepancy compared to the manufacturing sector appears in the relative importance of mining and utilities in GDP at the country level, as shown in Figure 4.1. Many African economies depend on the mining and utilities sectors to a significant degree. Some countries in this continent registered shares of MUVA on their total economy beyond 30 per cent, including Chad, Congo and South Sudan. Similarly, several economies in Western Asia, including Iraq, Kuwait, Qatar and Oman, also showed high shares of MUVA in GDP. In other regions, the weight of mining and utilities in GDP remains below 10 per cent for the majority of countries, with only a few exceptions, such as Azerbaijan, the Bolivarian Republic of Venezuela, Guyana, Kazakhstan, Norway, Papua New Guinea and the Russian Federation.

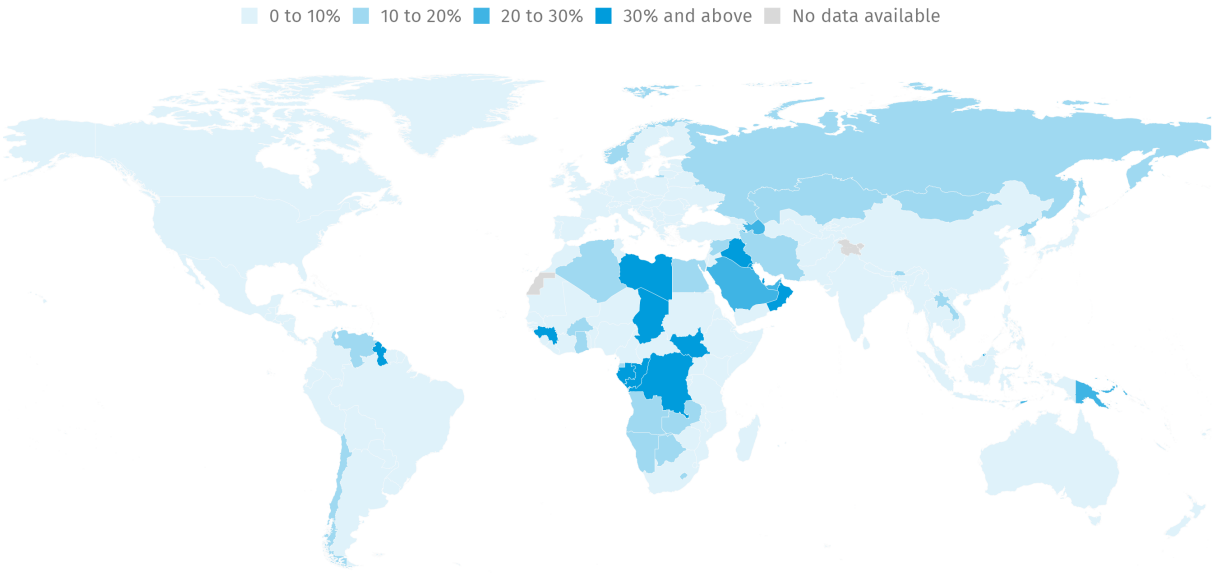
High economic importance of mining and utilities in Africa and Western Asia

Industrial sectors also differ in terms of the stability of their regional distribution. As seen in Chapter 3, the regional allocation of manufacturing activity has undergone profound changes in recent decades. In contrast, activity in the mining and utilities sectors remained comparatively stable. Nonetheless, as shown in Figure 4.2, a shift from Northern America and Europe towards Asia can still be observed, but at a slower pace than for the manufacturing sector. The shares of Africa (6.6 per cent in 2023) and Latin America and the Caribbean (7.2 per cent in 2023), on the other hand, have remained relatively constant.

Africa accounted for 6.6% of global MUVA in 2023

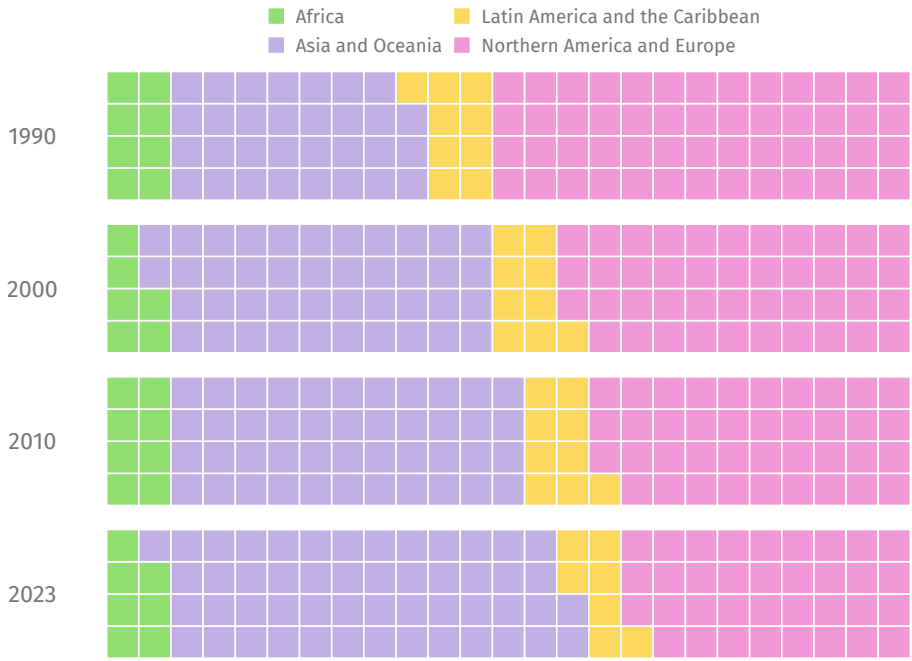
In 2023, Asia and Oceania accounted for an estimated 51.5 per cent of global MUVA, followed by Northern America and Europe with a share of 34.7 per cent. This distribution of MUVA across world regions partially reflects the role of natural endowments, but also of policies that prioritize the sectors' development.

Figure 4.1 | MUVA as proportion of GDP by country, 2023



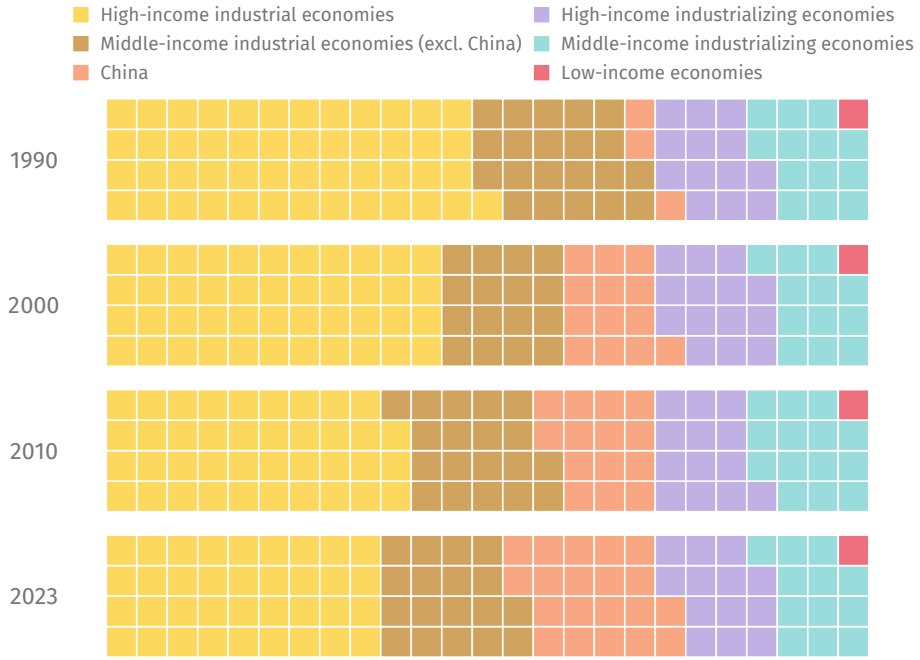
Source: [10]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 4.2 | MUVA as proportion of world MUVA by region



Source: [10]
Note: One square represents a share of 1 per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 4.3 | MUVA as proportion of world MUVA by country group



Source: [10]
Note: One square represents a share of 1 per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 4.3 focuses on the global distribution of mining and utilities by country groups. Again, these shares have remained remarkably stable, with the exception of China's increasing weight at the expense of other industrial economies. This country's global share in this sector increased from 3.5 per cent in 1990 to 20.1 per cent in 2023. The largest group in 2023 consisted of high-income industrial economies, with a share of 36.5 per cent, followed by China and other middle-income industrial economies (18.0 per cent). In contrast, the smallest group, low-income economies, accounted for only 1.2 per cent of global MUVA, but showed exceptionally high growth rates in recent years, including a 11.2 per cent expansion in 2022 and a 3.8 per cent growth in 2023.

In 2023, China was responsible for one fifth of global MUVA

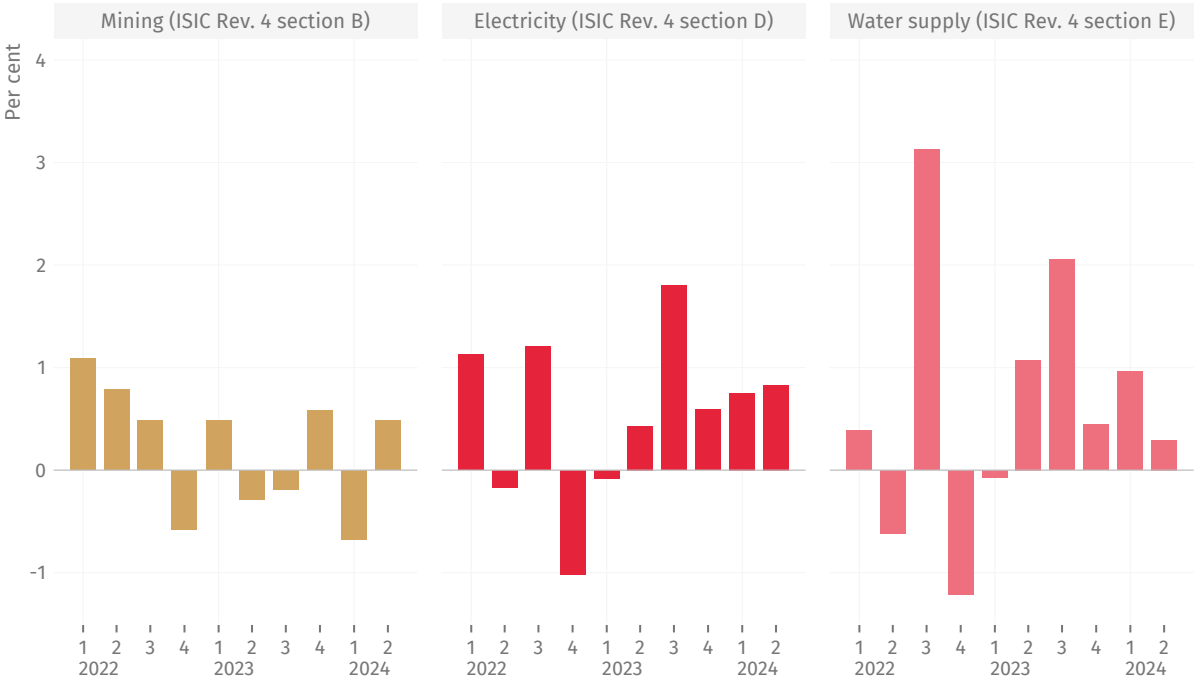
4.1.2 Quarterly production in mining and utilities

As described before, UNIDO also collects and publishes sub-annual IIP data allowing a more detailed and timely analysis of the different industrial sectors, compared to the annual national accounts data described previously. Nevertheless, it has to be noted that the quarterly data availability reflects the trade-off between country coverage and higher frequency.

The latest developments of the mining and utilities sectors can be seen in Figure 4.4. Global mining and quarrying (ISIC Rev. 4 section B)

Quarterly mining and utilities production index in UNIDO databases covers 100 countries representing 80% of global value added

Figure 4.4 | Quarter-over-quarter growth rates of mining and utilities sectors



Source: [18]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

continued on a volatile path, although following a gradually decreasing production trend since the beginning of 2023. In all likelihood, global initiatives to reduce the industry's environmental impacts, as outlined in Section 4.3, will further reinforce the unstable trajectory in future. At the same time, new technologies, especially regarding energy, batteries, machinery and transportation, might fuel demand for minerals and metals, and therefore boost the sector's production levels in the future.

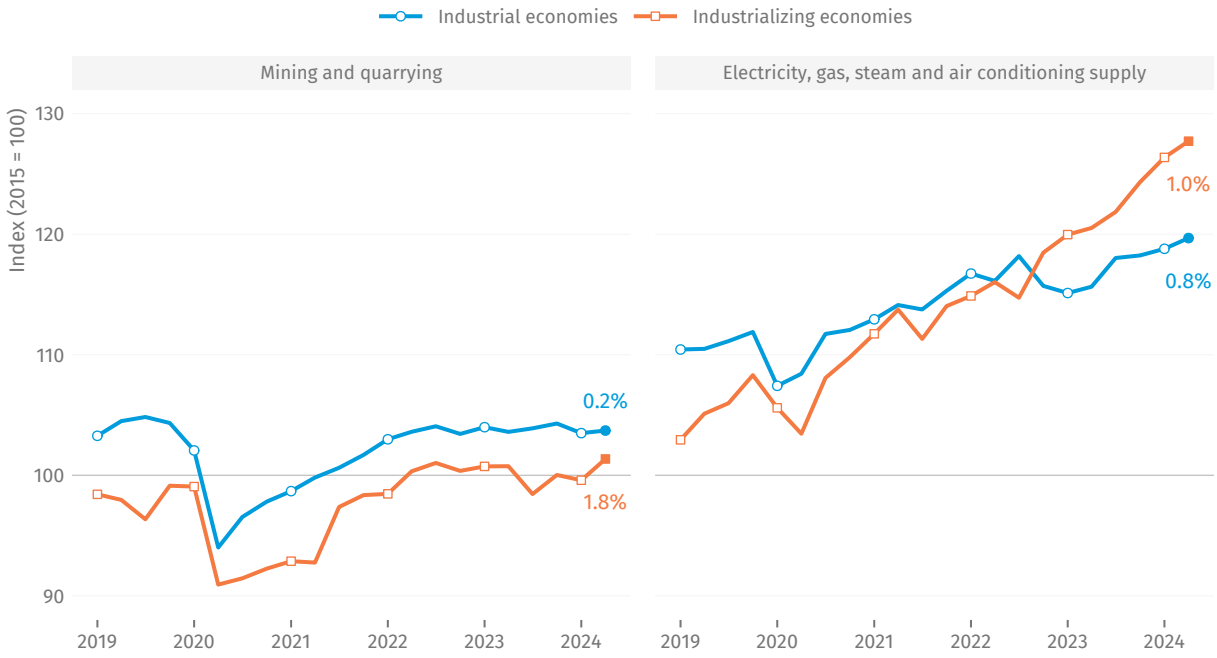
Initiatives towards **green industry** might lead to increased **volatility in the mining sector**

The utilities sectors also experienced a significant variability since 2022, although in general following an upward trend. As the figure illustrates, electricity (ISIC Rev. 4 section D) and water supply (ISIC Rev. 4 section E) saw volatile developments in the past two years. Starting with 2023, both sectors recorded relatively higher and more stable production growth. The water supply sector, in particular, showed a greater dynamism with comparably higher growth rates. The trajectories of the different sectors over a longer time horizon were already discussed in detail in Section 2.1.

Figure 4.5 presents the trends observed in the mining and electricity sectors for industrial and industrializing economies. Due to the limited availability of quarterly data for water supply, a country group disaggregation cannot be supported and this sector is therefore excluded from the chart. Mining and quarrying faced stagnating production levels for both country groups, although with a higher volatility for industrializing economies. The production of electricity and other

Mining followed a **subdued trend** in recent periods, while **electricity** grew at a **steady pace**

Figure 4.5 | Indices of production in the mining and electricity sectors by country group



Source: [18]
Note: The labels indicate the most recent quarter-over-quarter growth rate, corresponding to the second quarter of 2024. Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

utilities classified in ISIC Rev. 4 section D showed a higher dynamism in industrializing economies, while in industrial economies a significant deceleration has been observed since early 2022, most likely as a consequence of the various challenges faced by these economies, which directly impact the sector's supply and demand.

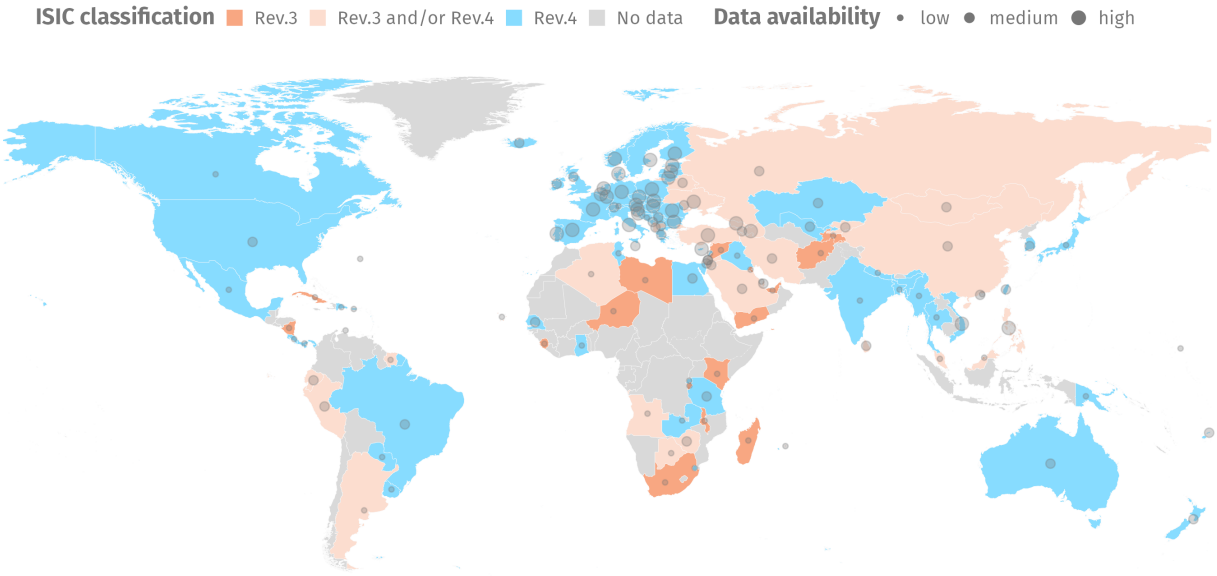
Within the group of high-income industrial economies Australia, the United States and the United Kingdom show the highest value added per capita from mining activities

4.2 Structure and transformation of mining and utilities industries

This section presents the use and limitations of structural business statistics (SBS) to study developments in the mining and utilities sectors. UNIDO Statistics collects the relevant data through the *General Industrial Statistics Questionnaire* directly from NSOs, via the Statistical Office of the European Union (Eurostat), or from other official sources. Previous editions of the *Yearbook* have already emphasized data availability and classification issues that sometimes hamper comparability of more granular analysis of mining and utilities industries. Figure 4.6 summarizes the availability of country data in INDSTAT[i] for the combined mining and utilities sector covering the period from 2008 onward. Significant gaps in the number of reported data cells can occur, due to either nonexistent economic activity in a specific industry or statistical disclosure control (SDC) by NSOs. The latter affects the mining and utilities sectors to a higher degree, because

[i] Previously, UNIDO produced a separate Mining and Utilities Statistics Database (MINSTAT). Since 2023, it was integrated into INDSTAT.

Figure 4.6 | Data availability by ISIC revision in the mining and utilities sectors, 2008–2021



Source: [37; 38]
Note: The category *Rev.3 and/or Rev.4* implies a change in data reporting between 2008 and 2021. The categories *low*, *medium* and *high* segment countries into three parts using terciles of available data cells during the same period.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

they are often dominated by a few large establishments or enterprises. That is why the number of data cells made available for public use is often limited. Moreover, the analysis of longer time series is also aggravated by classification revisions.

Given significant data gaps, regional or country group aggregates cannot generally be calculated. The analysis in this section only covers selected countries with sufficient data availability on the relevant ISIC Rev. 4 and/or ISIC Rev. 3 activities. Table 4.2 serves as an entry point to the analysis of mining and utilities. It presents the value added per capita of selected countries, displaying country-level trends and the different activity levels in these sectors from 2008 to 2021. For instance, within the group of high-income industrial economies, Australia shows the highest value added per capita resulting from mining and quarrying activities, followed by the United States of America and the United Kingdom. The latter saw a steep decline in the importance of this sector, with value added figures more than halved compared to 2008. Some high- and middle-income industrializing countries, like Azerbaijan, Norway, and Qatar stand out with significant mining activities too. Madagascar is the only low-income country for which a consistent time series between 2008 and 2021 for at least one ISIC section, namely electricity, gas and steam, can be shown. Nonetheless, UNIDO INDSTAT databases also contain data for specific years and variables for other low-income economies, like Afghanistan, Burundi, Niger or Rwanda. The reader is invited to explore these and more country data available in the UNIDO industrial statistics databases.

Value added figures from industrial statistics might differ from those reported in national accounts. A summary of the reasons explaining these deviations can be found in [63].

Azerbaijan is a middle-income industrializing economy that generates high value added per capita through mining activities

Table 4.2 | Value added per capita (in current USD) for ISIC sections (combined Rev. 3 and Rev. 4)

	Mining and quarrying		Electricity, gas, steam		Water supply; sewerage, waste management and remediation activities	
	2008	2021	2008	2021	2008	2021
High-income industrial economies						
Australia	2,831	6,328				
Austria	203	142	944	954	276	335
Belgium	46	24			331	400
China, Taiwan Prov.	32	18	55	343	120	183
Croatia	349	17	225	328	275	229
Czechia	307	126	803	691	185	225
Estonia	125	118	327	552	127	170
Finland	110	214	905	998	221	322
France	64	30	531	727	226	254
Germany	123	61				
Hungary	31	41	363	309	135	120
Ireland	199	130			159	148
Italy	145	54	466	639	232	357
Latvia	100	84	354	499	103	120
Lithuania	52	50	275	371	87	162
Luxembourg	97	66	762	843	243	288
Netherlands	787	350	495	541	301	264
New Zealand	625	308	702	831	184	354
Poland	335	258	362	531	113	185
Romania			203	197	66	102
Slovakia	81	33	699	429	108	150
Slovenia	98	64	499	496	224	261
Spain	79	40	558	573	192	264
Sweden	308	443	1,190	927	185	256
United Kingdom	1,012	429	700	612	454	465
United States	1,287	976				
Middle-income industrial economies						
Argentina	*337*	*387*	*116*	*86*		
Belarus	*56*	*50*				

Table 4.2 | Value added per capita (in current USD) for ISIC sections (combined Rev. 3 and Rev. 4) *(continued)*

	2008	2021	2008	2021	2008	2021
Brazil	102	231				
Bulgaria	91	180	199	343	68	81
China	212	376				
Iran	*39*	*592*				
Jordan	*186*	*126*				
Mauritius	*3*	*31*				
Russian Federation	*919*	*1,481*	*262*	*278*		
Serbia	79	198	167	262	64	94
South Africa	*498*	*522*				
Türkiye	78	82	74	160	34	21
Viet Nam	103	85	72	279	8	19
High-income industrializing economies						
China, Hong Kong SAR			683	594		
Denmark	2,274	295	794	904	284	457
Greece	47	24	220	410	68	73
Norway	24,566	21,432	1,792	2,471	228	234
Portugal	71	75	512	389	165	197
Qatar	*42,041*	*25,912*				
Middle-income industrializing economies						
Albania	*61*	*112*	*17*	*122*		
Azerbaijan	*2,881*	*1,877*	*57*	*63*		
Georgia	*26*	*40*	*71*	*146*		
Kosovo	74	101	68	196	18	31
Nicaragua	*9*	*19*	*15*	*11*		
North Macedonia	*50*	*106*	*99*	*94*		
Papua New Guinea	410	661	13	20	3	5
Low-income economies						
Madagascar			*5*	*4*		

Source: [37; 38]

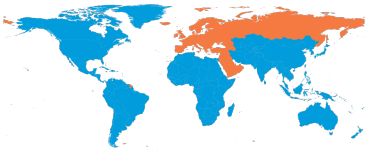
Note: A combined view on ISIC Rev.3 and ISIC Rev.4 is presented with the same column names, although the ISIC revision resulted in not perfectly comparable categories at section level. This also leads to more empty cells in the table for 'Water supply; sewerage, waste management and remediation activities'. Rows highlighted in italics font represent countries that reported data for at least part of the covered period in ISIC Rev.3. Data used to create this table can be downloaded at the UNIDO Statistics Portal.

The rest of this section focuses on selected economies in Europe and Western Asia. Both regions are characterized by a comparably high data availability, as shown in Figure 4.6. They will be presented in greater detail as an example of the insights that SBS data, and in particular INDSTAT, can provide. However, in addition to the data gaps mentioned above, differences in concepts, definitions, and coverage should also be considered, as described in the box below.

Conceptual issues
need to be considered, especially
in industrial sectors like
mining and utilities

Metadata in industrial statistics

Variables in the National Accounts Database [10] present an exhaustive contribution of MVA and MUVA to the GDP of a national economy. By contrast, INDSTAT databases [37; 38] are usually derived from establishments survey or census data. For the correct interpretation of such data, it is important to always consider the metadata along with the data values, since survey settings may not only vary between countries, but also between different years for the same country. All UNIDO databases include extensive metadata that should always be considered when interpreting and analysing the data.



While in most
European countries
the utilities sector
is the more prominent contributor
to MUVA,
some countries in
Western Asia
stand out with a large
mining sector

Analysis for selected economies in Europe and Western Asia

Figure 4.7 offers an extensive visual depiction of country-specific data across Europe and Western Asia, showcasing value added per capita generated in the mining and utilities sectors. To guarantee the broadest possible inclusion of countries, the figure utilizes data from the reference year 2018. Countries that exhibit a high value added per capita are distinctly emphasized.

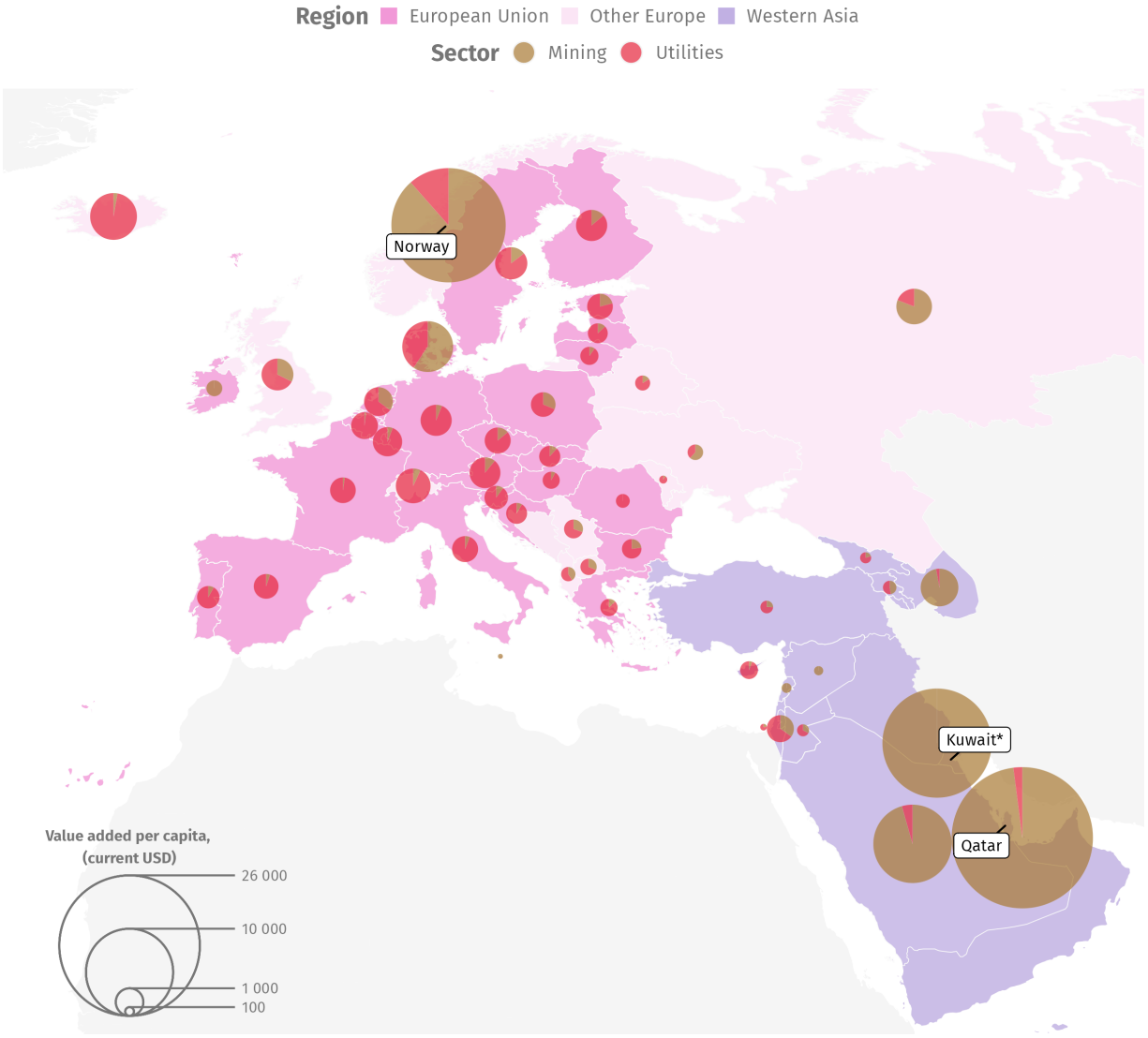
In most EU nations, the utilities sector emerges as the more prominent driver of value added generation. This is clearly depicted by pie charts superimposed on the regional map. Compliance with Eurostat's data collection and reporting standards ensures that the information is not only comparable but also adheres to ISIC Rev. 4. This alignment facilitates a unified representation of the EU's aggregate data.

In 2023, mining and utilities contributed to about 2.5 per cent of the EU's GDP, according to national accounts data [10]. Figure 4.8 shows a detailed analysis using SBS data [64]. The electricity, gas, steam, and air conditioning supply sector (ISIC Rev. 4 section D) was the biggest contributor in terms of value added and output, with value added showing a steady rise and increasing by nearly 60 per cent from 2011 to 2021. This sector also had the highest figures in gross fixed capital formation with investments in tangible goods picking up speed from 2019 to 2021, partly due to the EU's renewable energy targets [65].

European Union

Data on EU total refer to its current definition. Eurostat's estimates on EU total are not included in [37; 38], but the individual country data themselves are. Monetary values have been converted to USD by UNIDO. Also note that these SBS data refer to 'gross investment in tangible goods' instead of 'gross fixed capital formation'.

Figure 4.7 | Value added per capita for mining and utilities sectors in Europe and Western Asia, 2018

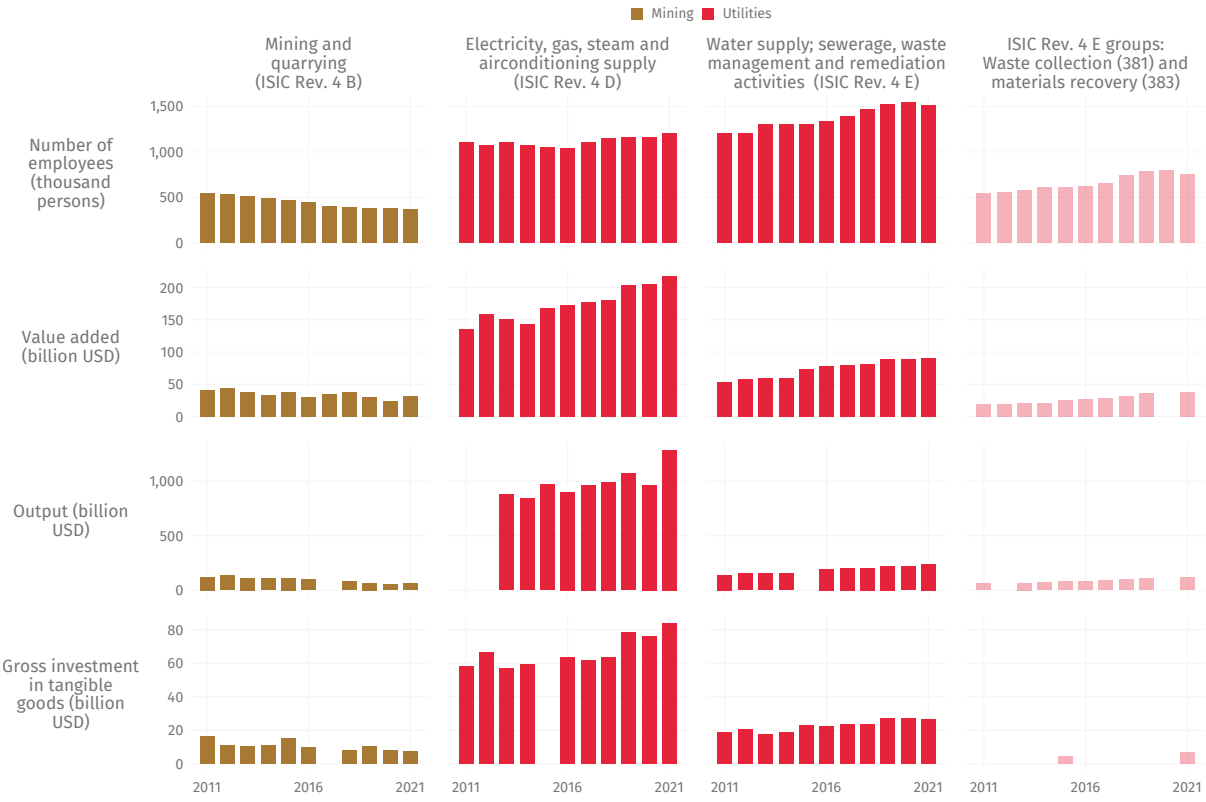


Source: [37; 38]
Note: Data for Kuwait refer to mining figures only.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

The planned green transition [66] is likely to significantly impact water supply, sewerage, waste management, and remediation activities (ISIC Rev. 4 section E) in the future as well. In particular, waste collection (ISIC Rev. 4 group 381) and materials recovery (ISIC Rev. 4 group 383) are expected to play key roles in the transition towards a circular economy, even if the increased dynamics from 2018 to 2020 suffered a setback in 2021. Nonetheless, since 2011, this ISIC Rev. 4 section E was already the largest employer among the industries shown, with 1.2 million workers. By 2021, employment increased by 25 per cent to 1.5 million, while the number of employees in the mining sector (ISIC Rev. 4 section B) dropped from 542,000 in 2011 to 370,000 in 2021, a decrease of nearly one-third.

Waste collection and materials recovery are expected to play key roles in the EU's transition towards a circular economy

Figure 4.8 | Development of selected mining and utilities industries (ISIC Rev. 4) in the EU for selected variables, 2011–2021



Source: [64]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

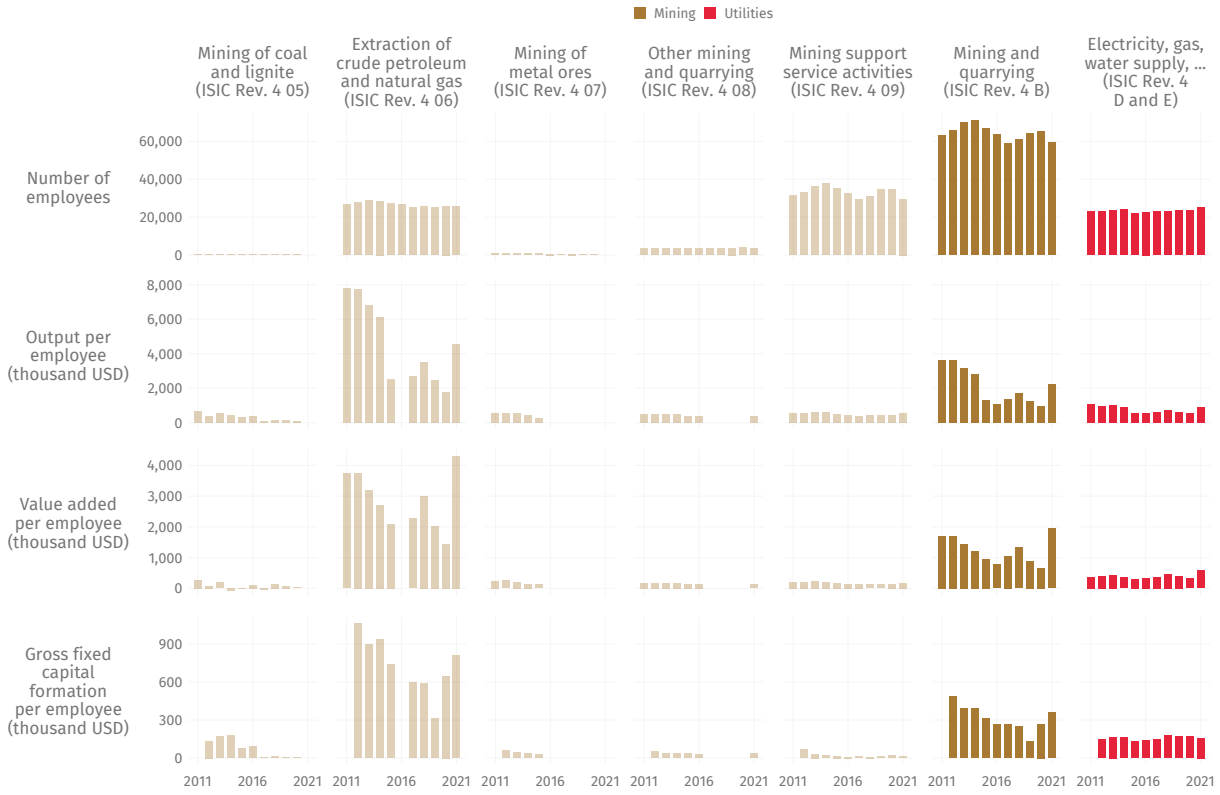
The diminishing importance of mining industries, as displayed in Figure 4.8, combined with the recent economic and geopolitical crisis, have shown the dependence of the EU on resources provided by other countries. At this point, it is crucial to consider that products from mining industries, like coke, gas and oil, are still important energy sources and therefore intermediate inputs in the electricity, gas and steam sector (ISIC Rev. 4 section D). Considering the strategic decision to diversify the sources of fuel commodities, other countries have become pivotal in future development considerations. Some of these nations are distinguished by their significant per capita value-added contributions from mining activities as shown in Figure 4.7. Among others, Norway is poised to become a cornerstone in the EU's strategy to secure a stable and sustainable supply of fuels and essential minerals.

Geopolitical crisis combined with a **diminishing** importance of **mining** industries, make other countries pivotal for the supply of fuels and minerals to the **EU**

The Norwegian government's commitment to developing the world's most sustainable mineral industry, as outlined in their recent mineral strategy [67], underscores this potential. The focus on accelerating mineral projects, emphasizing environmental considerations, positions Norway as a strategic partner in Europe's transition, as outlined in the European Green Deal [66]. While these decisions and strategies

Norway is committed to develop the world's most **sustainable mineral industry**

Figure 4.9 | Development of selected mining and utilities industries (ISIC Rev. 4) in Norway for selected variables, 2011–2021



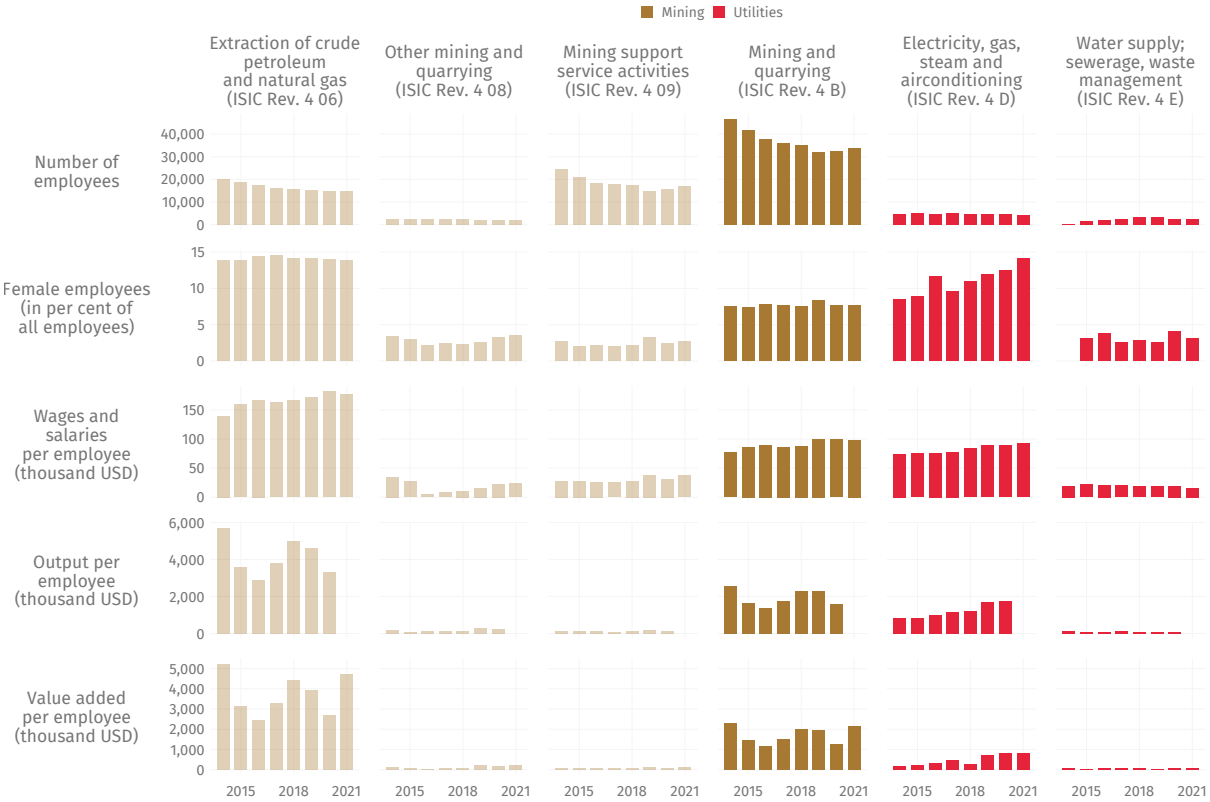
Source: [38]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

are mainly forward-looking and cannot be evaluated with currently available SBS data, they warrant an assessment of the most recent structure of Norway's mining and utilities sectors. Figure 4.9 shows the development of selected variables and ISIC industries from 2011 to 2021.

Mining and quarrying activities (ISIC Rev. 4 section B) hold significant economic value for Norway, engaging more than 2 per cent of the nation's workforce. While mining activities like coal and lignite extraction (ISIC Rev. 4 division 05), metal ore mining (ISIC Rev. 4 division 07), and other mining and quarrying (ISIC Rev. 4 division 08) play a lesser role, approximately half of the 60,000 employees are involved in oil and gas extraction (ISIC Rev. 4 division 06) and another substantial number works in support activities such as exploration and drilling (ISIC Rev. 4 division 09). Following some years of decreased productivity, measured in terms of output and value added per employee, the year 2021 saw a surge in crude oil and natural gas prices, attributed to the easing of pandemic restrictions and a rebounding global economy, which led to demand outpacing supply. Notably, the value added per employee in crude petroleum and natural gas extraction (ISIC Rev. 4 division 06) nearly tripled in 2021, soaring from 1.5 million USD in 2020 to 4.3 million USD in 2021, eclipsing previous maxima recorded in 2011 and 2012. The geopolitical developments of 2022 are anticipated to

Oil and gas extraction holds significant economic value for Norway

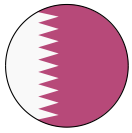
Figure 4.10 | Development of selected mining and utilities industries (ISIC Rev. 4) in Qatar for selected variables, 2014–2021



Source: [38]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

further amplify these measures of productivity, due to peaking gas and oil prices.

Among the countries shown in Figure 4.7, Qatar stands out with the highest value added per capita. The combined mining and utilities sector forms a cornerstone of Qatar's economy, and contributed 33.3 per cent to the GDP in 2023 according to national accounts data [10], despite following a gradually declining trend over the last two decades. A more detailed composition of these sectors, shown in Figure 4.10, reveals mining activities to be the predominant force behind this remarkable result, even if employment registered a decrease from 2014 to 2019, but stabilizing thereafter. Specifically, the workforce reduced from 47,000 in 2014 to 34,000 in 2021, with a share of female employment around 7 to 8 per cent. Thus, in 2021, a mere 1.7 per cent of the total national workforce was responsible for a significant portion of Qatar's GDP, contributing to its status as one of the economies with highest income per capita in the world. The primary driver of this economic prowess is the extraction of crude petroleum and natural gas (classified under ISIC Rev. 4 division 06), which also boosts high output and value added per employee as illustrated in Figure 4.10.



In Qatar
2%
of the national workforce
employed in
mining enterprises
contribute about
one third
to GDP

4.3 Environmental impact of mining and utilities

Environmental considerations in the mining and utilities sectors are increasingly critical, particularly given the sharp rise in global energy demand, which still depends to a great extent on mined resources like coal, crude oil, and natural gas. Additionally, the growing shift towards low-carbon technologies, such as solar panels, electric vehicle batteries, and energy storage solution, fuels an increased demand for minerals, including copper, lithium, manganese, and nickel, essential for these technologies. Similar to the environmental aspects of manufacturing covered in Section 3.6, this section offers a non-exhaustive exploration of environmental challenges and their impacts within mining and utilities. For a comprehensive assessment of the sectors' environmental impact, however, a more detailed set of indicators is necessary to capture the full scope of its effects on ecosystems and resource sustainability.

Energy-related CO_2 emissions reached 38 Gt

In the context of climate change, the energy sector emerges as a significant contributor. In 2024, energy-related CO_2 emissions reached 38 Gt [68]. Within the energy sector, heat and electricity generation is responsible for most emissions accounting for 34 per cent of GHG emissions [60].

The dominant greenhouse gas in mining is methane

Globally, mining activities are estimated to contribute around 7 per cent of total GHG emissions. Of this, approximately 1 per cent arises from direct CO_2 emissions and the remaining 6 per cent largely originate from fugitive methane emissions, which are unintentionally released during the extraction and handling of coal, oil, and natural gas. Several countries have introduced reduction targets for GHG emissions in the range of 0 to 30 per cent for 2030. However, these targets fall short of achieving the emissions reductions stipulated in the Paris Agreement, hence more aggressive policy measures are essential [69].

Mining activities often overlap with ecologically sensitive regions, creating extensive biodiversity impacts. Indeed, approximately 78 per cent of active mining sites are situated in biodiversity-rich areas and nearly half of these operations are within 20 kilometres of protected or sensitive zones, which exacerbates risks to wildlife and critical habitats [70]. The impacts extend beyond land use, as 16 per cent of critical mining operations are now located in water-stressed areas, placing additional strain on local water resources and increasing competition between industrial, agricultural, and community water needs [71]. This figure is expected to increase as clean energy transition ramps up.

Low-income countries often have insufficient wastewater management practices

Wastewater management in the utilities sector has substantial environmental implications, particularly in low-income countries, where over 85 per cent of wastewater released is untreated. This contrasts sharply with high-income countries, which have reduced untreated

wastewater levels to approximately 25 per cent. In lower-income areas, untreated wastewater contributes significantly to environmental pollution and public health risks. Addressing these disparities requires urgent infrastructure improvements, especially in rapidly industrializing regions where wastewater treatment capacity lags behind demand [72; 73].

78%
of active mining sites
are situated in
biodiversity hotspots

Mining generates over 100 billion tonnes of solid waste each year, significantly above municipal solid waste [74]. This waste comprises overburden, tailings, and hazardous chemical residues, which pose risks of soil and water contamination if not properly managed. Despite improvements in waste recovery and tailings management, challenges persist, particularly in middle- and low-income countries that are often unprepared to handle these environmental risks. A lack of effective waste management practices leaves economies vulnerable to the dangers of unregulated waste sites.

Mining
generates over
100 billion tonnes of
waste quantities

Additional environmental issues associated with mining and utilities include deforestation, soil erosion, and water pollution due to chemical run-off. As demand for minerals used in renewable energy technologies rapidly increases, it is crucial to manage this growth carefully to prevent worsening these environmental challenges [75]. Moreover, the Environmental Defense Fund's 2024 Global Methane Tracker, which tracks fugitive as well as non-fugitive emissions, raises ongoing concerns about methane emissions from fossil fuel industries, which significantly contribute to climate change due to this greenhouse gas's high potency [76].

5 Insights from 30 years of UNIDO industrial statistics

5.1 Introduction

Over the last three decades, the global industrial landscape has experienced a remarkable transformation. Manufacturing hubs have relocated away from the traditional industrial countries in the Global North, driven by the pursuit of lower production costs and taking advantage of improved industrial capabilities and infrastructure in emerging economies. Intangible assets and intellectual property have grown in importance as key production factors, while innovation, technology and knowledge have become even more vital for productivity. The mining and utilities sectors have diminished in relative importance, albeit they remain essential providers of critical minerals required for manufacturing, fulfilling the energy demands of the broader economy and supporting the shift towards more sustainable production practices centered on circularity and material efficiency. Moreover, the effects of industrial production on shared prosperity, equality and environmental sustainability have surfaced as central concerns.

Shared prosperity and **environmental sustainability** are now **central concerns** in industrial development

From a relative absence in policy discussions during the era of the Millennium Development Goals (2000–2015) and earlier, inclusive and sustainable industrial development (ISID) has re-emerged as a critical pathway for sustainable development. Recent development frameworks, such as the 2030 Agenda for Sustainable Development [16], the Doha Programme of Action for LDCs [1] and the Antigua and Barbuda Agenda for small island developing States (SIDS) [77] underscore the essential role of structural transformation, expansion of productive capacities and integration into international value chains. This has triggered a global resurgence of industrial policies [2].

Structural transformation and **ISID** are considered as key strategies in current **development frameworks**

For 30 years, the *International Yearbook of Industrial Statistics* has chronicled these changes through consistent, comparable data. Utilizing UNIDO's extensive databases, this publication highlights the most recent global trends in industrial development and offers a comparative analysis across regions and industries. To mark the 30th edition of the *Yearbook*, this thematic chapter reviews ten major transformations in global industry since the first edition was released in 1995. Drawing on official international data from UNIDO and partner organizations, the chapter compares past and present conditions, highlighting the main differences between industry *then* and industry *now*.

10 major transformations in **global industry** are highlighted in this chapter

Understanding these changes is essential for shaping future industrial policies that align with the SDGs. As industries continue to evolve amid rapid technological advancements and urgent environmental challenges, the ability to leverage comprehensive data and evidence-based analysis will be key to fostering resilient and sustainable industrial growth. The lessons drawn from the past 30 years offer valuable insights for driving equitable industrial progress.

5.2 Three decades of industrial development

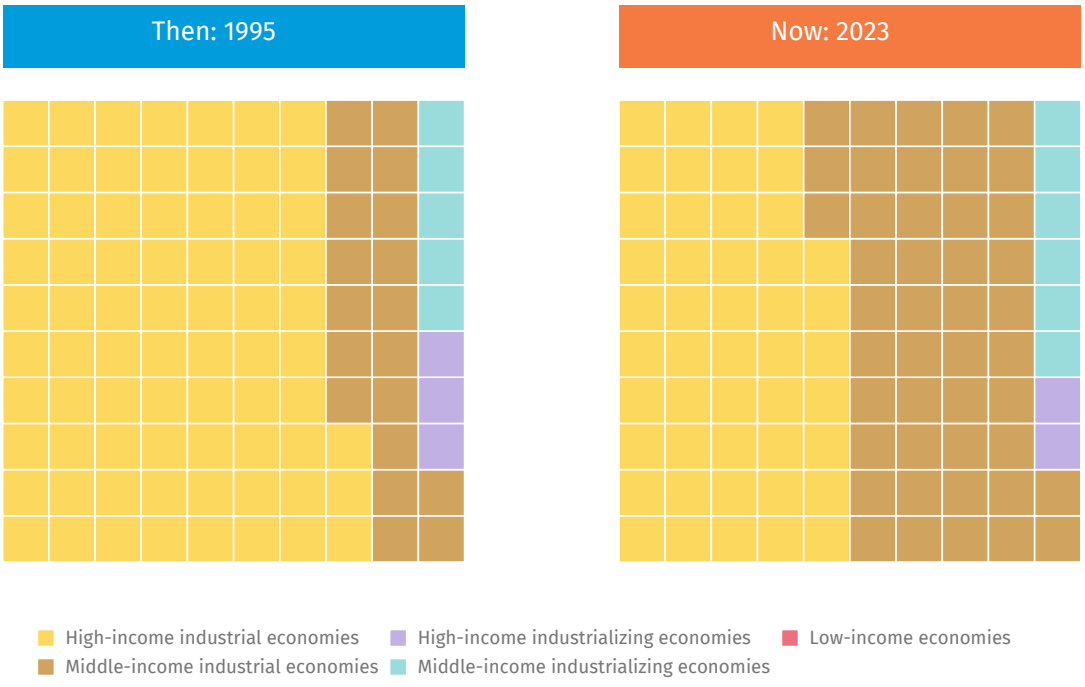
5.2.1 A global rebalancing of manufacturing production

One of the most noticeable trends in global manufacturing has been the shift in production from high-income economies, the traditional "industrialized world", to middle-income economies, particularly in Asia. Figures 5.1 and 5.2 illustrate this change. In 1995, 73 per cent of the world's manufacturing activity originated from high-income industrial economies, predominantly located in Europe and Northern America. By 2023, this share had decreased to 47 per cent. Conversely, the share of middle-income industrial economies climbed from 20 per cent to 45 per cent during the same period. Notably, the weight of Asia and Oceania in global MVA grew from 31 per cent in 1995 to 57 per cent in 2023, while all other regions experienced declines.

A significant share of **manufacturing production** has relocated to **middle-income economies**, especially in Asia

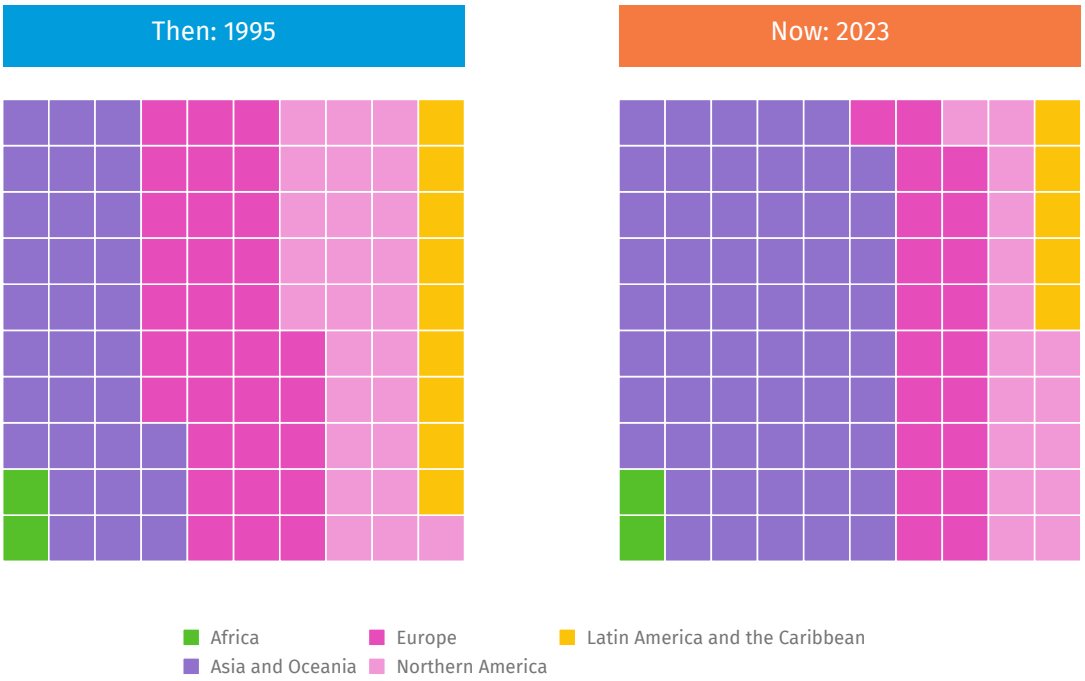
To a large extent, this rebalancing can be attributed to the emergence of China as a manufacturing hub. Figure 5.3 illustrates this fact. China's share in global manufacturing rose from less than 5 per cent in 1995 to nearly 32 per cent in 2023. Meanwhile, the share of other middle-income economies remained relatively stable. A cause of concern is that the global shift in manufacturing has not benefited low-income economies. Their share in global manufacturing was too small to appear in the figure for 1995 and it remained so in 2023.

Figure 5.1 | Distribution of global MVA by country group



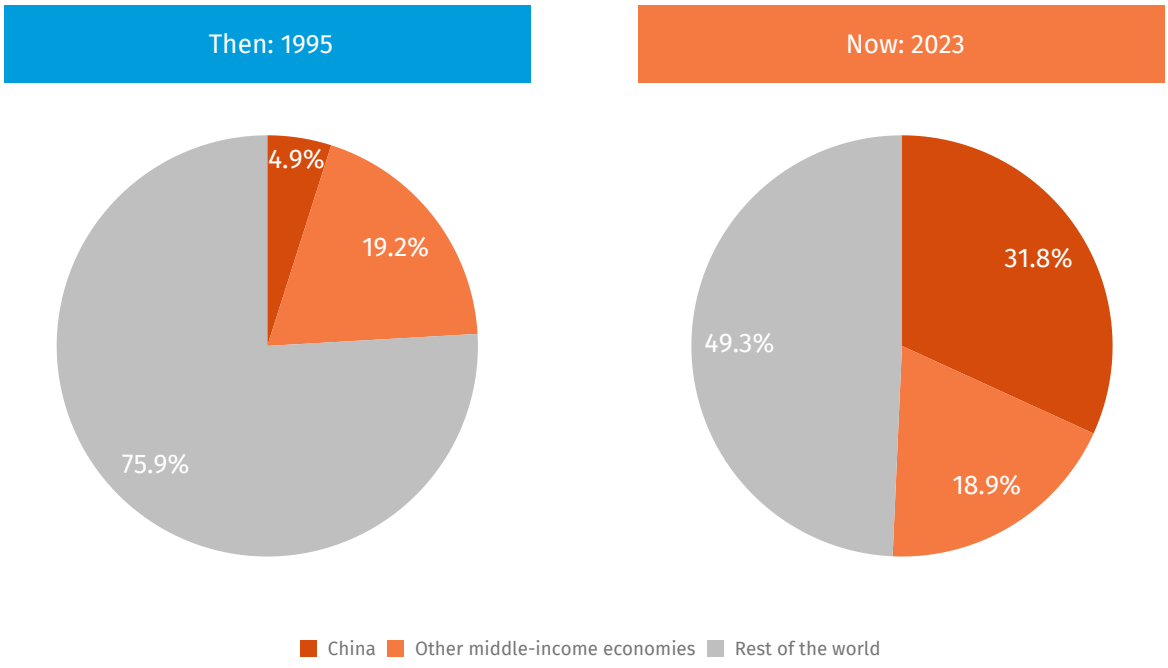
Source: [10]
Note: One square represents a share of 1 per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 5.2 | Distribution of global MVA by region



Source: [10]
Note: One square represents a share of 1 per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 5.3 | Share of middle-income economies in global MVA



Source: [10]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

5.2.2 Middle-income economies rise as the world's manufacturing powerhouses

The global rebalancing has led to the emergence of new manufacturing hubs worldwide. While the rise of China was so dominant that it overshadowed other examples, several other countries also benefited from this trend. Table 5.1 highlights the 20 economies with the largest shares of manufacturing.

In 1995, the United States held the position as the world's leading manufacturing power, accounting for almost one-quarter of global MVA. By 2023, this country had fallen to second place, surpassed by China. Remarkably, China's share of global MVA now stands at nearly double that of the United States. Other middle-income economies that joined China in the top 20 in 2023 were India, Mexico, Indonesia, Türkiye, the Russian Federation, Brazil and Thailand.

In the past three decades, many **middle-income economies** climbed in the global ranking of **manufacturing activity**

A comparison of the top manufacturers in 1995 and 2023 reveals that most middle-income economies either improved their rankings or maintained their positions, with Brazil and the Russian Federation being exceptions. On the other hand, most high-income economies saw their rankings decline, apart from the Republic of Korea, which climbed from 11th to sixth position, the United Kingdom, which remained at seventh place, as well as China Taiwan Province and Ireland, which appeared at 12th and 15th ranks, respectively.

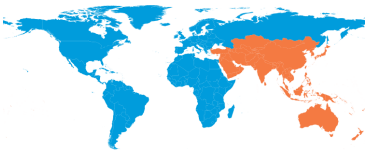
Table 5.1 | Top 20 global manufacturers

	Then: 1995		Now: 2023
1	United States (23.6%)	1	China (31.8%)
2	Japan (12.6%)	2	United States (15.0%)
3	Germany (8.4%)	3	Japan (6.6%)
4	China (4.9%)	4	Germany (4.6%)
5	Italy (4.7%)	5	India (3.2%)
6	France (3.2%)	6	Republic of Korea (3.0%)
7	United Kingdom (3.1%)	7	United Kingdom (1.9%)
8	Brazil (2.8%)	8	Italy (1.8%)
9	Mexico (2.5%)	9	Mexico (1.8%)
10	Canada (2.2%)	10	France (1.7%)
11	Republic of Korea (2.1%)	11	Indonesia (1.5%)
12	Spain (2.0%)	12	China, Taiwan Province (1.4%)
13	Russian Federation (1.6%)	13	Türkiye (1.4%)
14	India (1.5%)	14	Russian Federation (1.3%)
15	Switzerland (1.4%)	15	Ireland (1.3%)
16	Indonesia (1.4%)	16	Brazil (1.2%)
17	Australia (1.2%)	17	Switzerland (1.1%)
18	Argentina (1.0%)	18	Canada (1.0%)
19	Netherlands (1.0%)	19	Spain (1.0%)
20	Thailand (0.9%)	20	Thailand (0.8%)

Source: [10]
Note: The figures in parentheses show the share of global MVA.
Data used to create this table can be downloaded at the UNIDO Statistics Portal.

5.2.3 An even greater concentration of global manufacturing employment

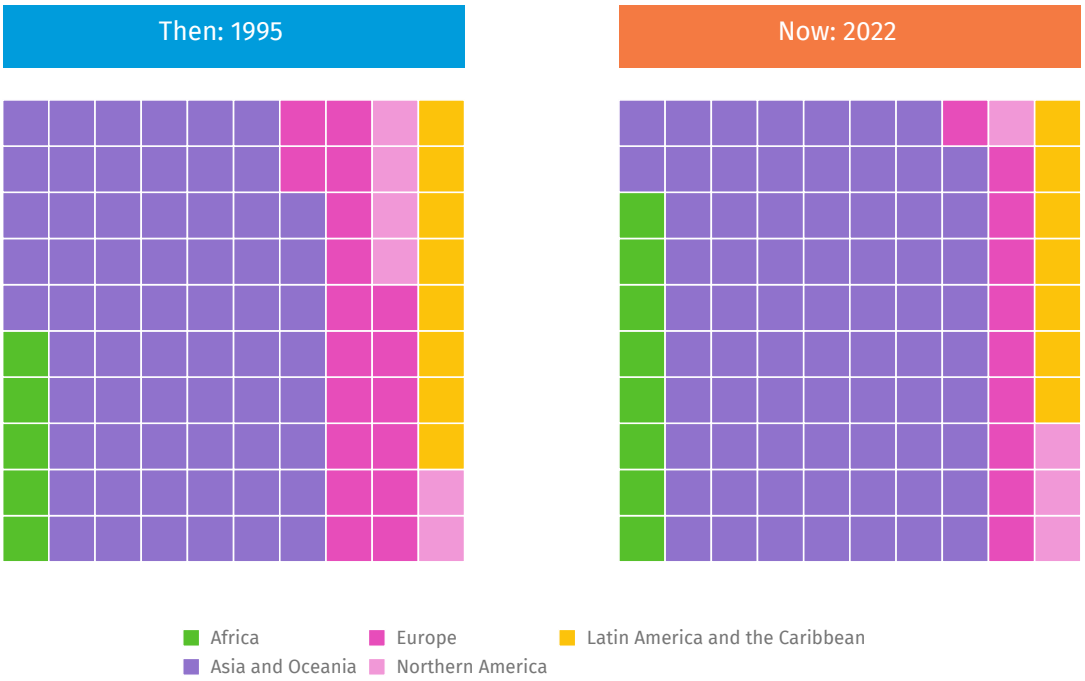
The concentration of manufacturing in Asia and Oceania is even more pronounced when considering employment. According to ILO estimates, in 1995 there were 355 million people employed in manufacturing across the world. Of this, 63 per cent were located in Asia and Oceania. By 2022, the latest year with available data, global manufacturing employment had reached 477 million people, 71 per cent of them working in this region [44]. This remarkable shift is illustrated in Figure 5.4. The graph also shows that Africa is the only other main region that increased its share in world manufacturing employment. In 2022, 8 per cent of global employment in manufacturing was in African economies, an increase of three percentage points from 1995.



7 out of 10
manufacturing workers worldwide are located in
Asia and Oceania

During the same period, the number of manufacturing employees in Latin America and the Caribbean grew in absolute figures, from 27 million to 36 million. However, this expansion was outpaced by the significant progress registered in Asia and Oceania and Africa, resulting in a slight decline for Latin America and the Caribbean, from 8 per cent to 7 per cent. In contrast, manufacturing employment in Europe and Northern America fell both in absolute numbers and as a share of the global total. By 2022, these two regions represented only 10 and 4 per cent of global manufacturing employment, respectively.

Figure 5.4 | Distribution of global manufacturing employment by region



Source: [44]
Note: One square represents a share of 1 per cent.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

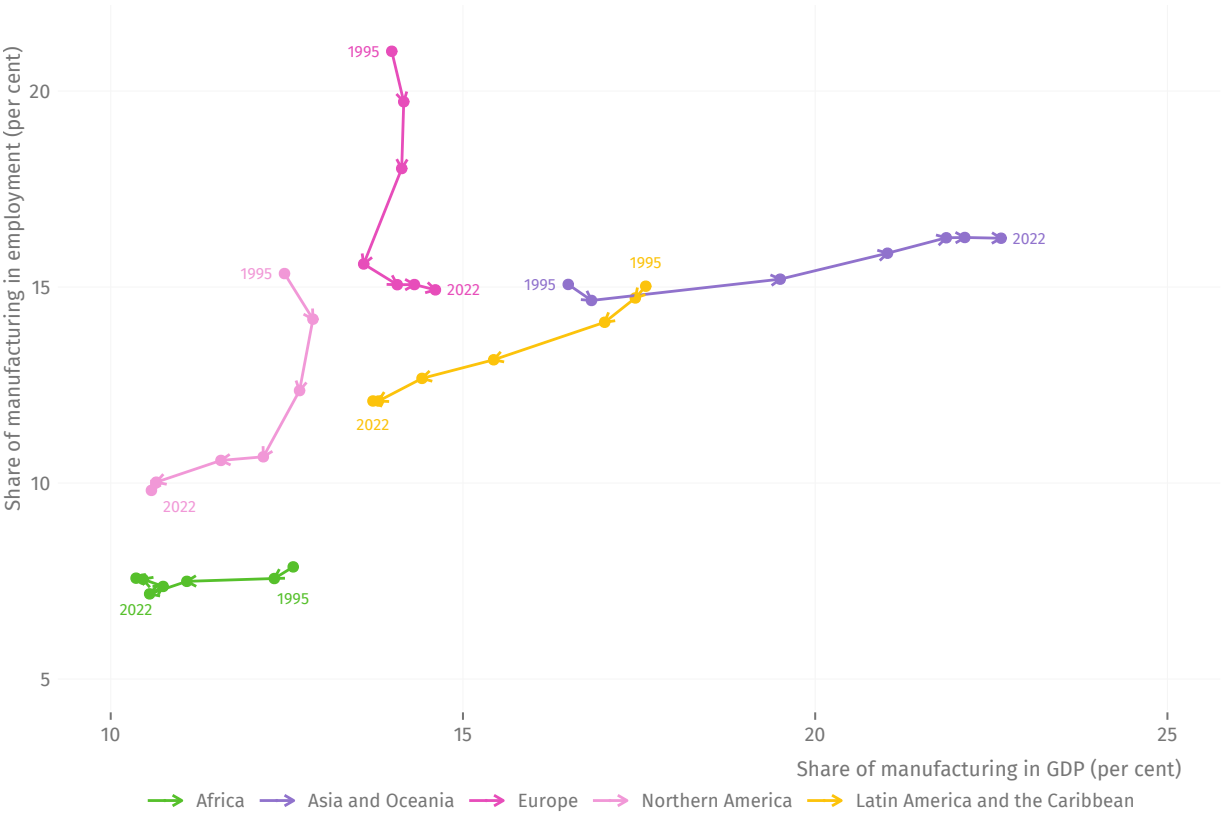
5.2.4 Most regions are following a deindustrialization path

Two commonly used markers of structural transformation are the share of manufacturing in GDP and total employment. These ratios reflect the direct influence of this sector on the domestic economy. Figure 5.5 traces the evolution of these indicators across major world regions over the last three decades. The graph shows that the only region clearly following an industrialization path is Asia and Oceania, where the share of manufacturing in both GDP and employment has increased over the last decades. In 2022, this region achieved the highest scores in the world for both indicators.

Several world regions may already be following a deindustrialization trend

In contrast, the Americas are undergoing a deindustrialization process, with a deterioration in both indicators. This is especially critical in Latin America and the Caribbean, where the share of manufacturing in GDP declined from 17.6 per cent in 1995 to 13.8 per cent in 2022, and from 15.0 per cent to 12.1 per cent in terms of employment. In Africa, the share of manufacturing in GDP is declining, although the sector has maintained its weight in employment. Conversely, while manufacturing employment has declined in Europe, the sector's share of GDP has slightly increased, highlighting the continued importance of manufacturing in the continent's economy.

Figure 5.5 | Evolution of structural transformation indicators by region



Source: [10; 44]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

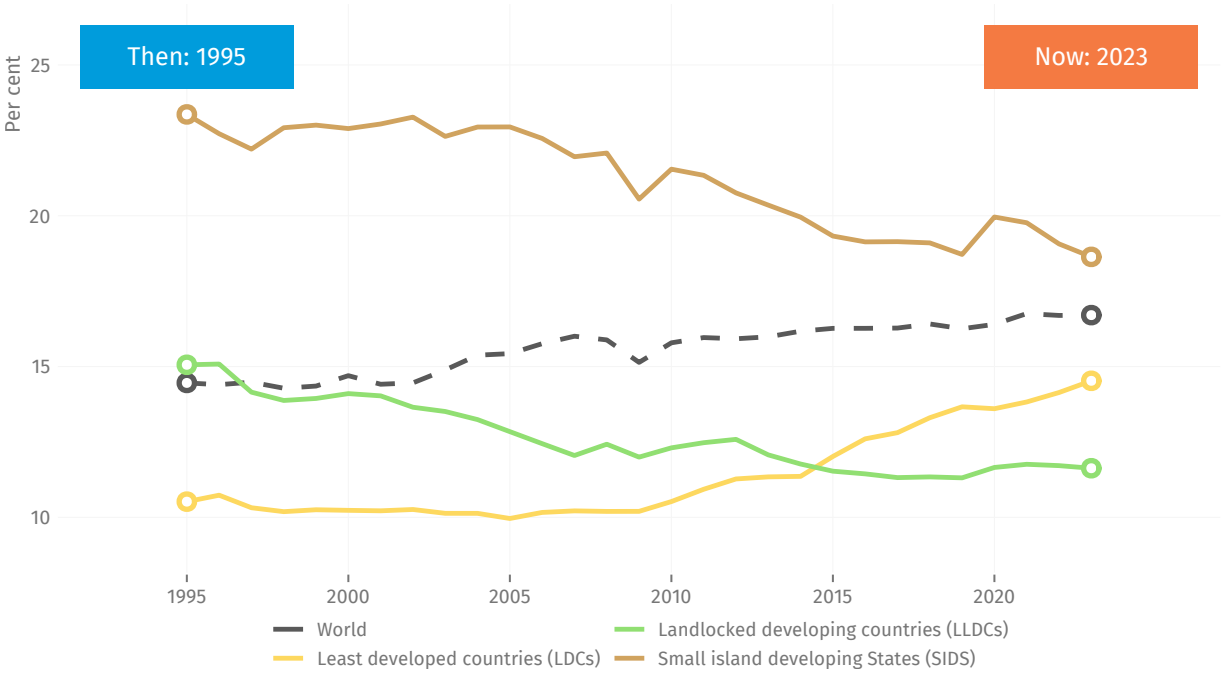
5.2.5 Vulnerable countries face persistent industrialization challenges

As discussed at the beginning of the chapter, structural transformation and the integration into international value chains are well-established strategies for achieving resilient economic growth. This is particularly important for countries with specific vulnerabilities, which could leverage industry as a pathway to sustainable development. Figure 5.6 illustrates the evolution of MVA as a proportion of GDP, a key marker of industrialization, for three groups of countries facing special development challenges.

In both landlocked developing countries (LLDCs) and SIDS, the relative size of the manufacturing sector within the economy has been declining over the past three decades. Only LDCs have shown a recent improvement in this indicator, with manufacturing recovering from a low point of 10.0 per cent of GDP in 2005 to 14.5 per cent in 2023. However, this positive trend may not be sufficient to meet SDG target 9.2.1, which aims to double the share of MVA in GDP for LDCs between 2015 and 2030. This target equates to a share of 24 per cent by 2030, which remains significantly above current levels. Moreover, as highlighted in Chapter 2.2, the recent improvement can be attributed to a few LDCs that have achieved significant progress. The positive outcome is therefore not uniformly shared across all economies in this group.

LDCs have achieved important progress towards SDG 9, but may still not meet the targets by 2030

Figure 5.6 | Share of MVA in GDP for selected country groups

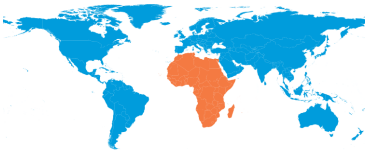


Source: [10]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

5.2.6 The changing role of industrial sectors in economic performance

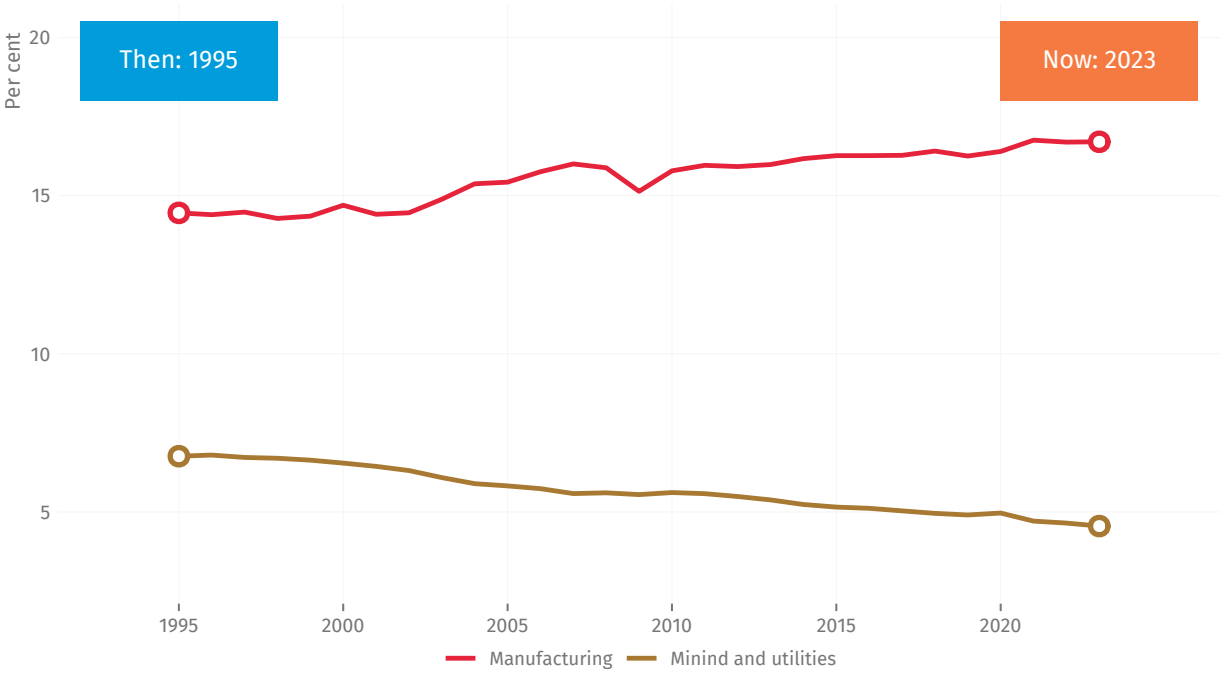
It is important to remember that, in official statistics, industry comprises several sectors: manufacturing, mining and utilities. Over time, manufacturing has established itself as the most significant industrial sector, due to its relative economic weight and its importance for sustainable development. Figure 5.7 shows that the share of MVA in the global economy has steadily risen over the past three decades, increasing from 14.5 per cent of world GDP in 1995 to 16.7 per cent in 2023. Conversely, the relative weight of the combined mining and utilities sector declined from 6.8 per cent to 4.6 per cent of GDP over the same period.

Despite their lower economic weight, mining and utilities remain crucial due to their strategic role in supplying critical minerals, energy, and sustainable production solutions necessary for future economic growth. In addition, these sectors continue to be significant in certain regions. Figure 5.8 shows the annual contribution of MVA and MUVA to GDP growth. While mining and utilities have a limited effect on overall economic growth in most regions, they are key contributors to GDP growth in Africa, where they often surpass the impact of manufacturing. However, they remain a volatile component of GDP. The graph also confirms the central role of manufacturing in sustaining economic growth in Asia and Oceania.



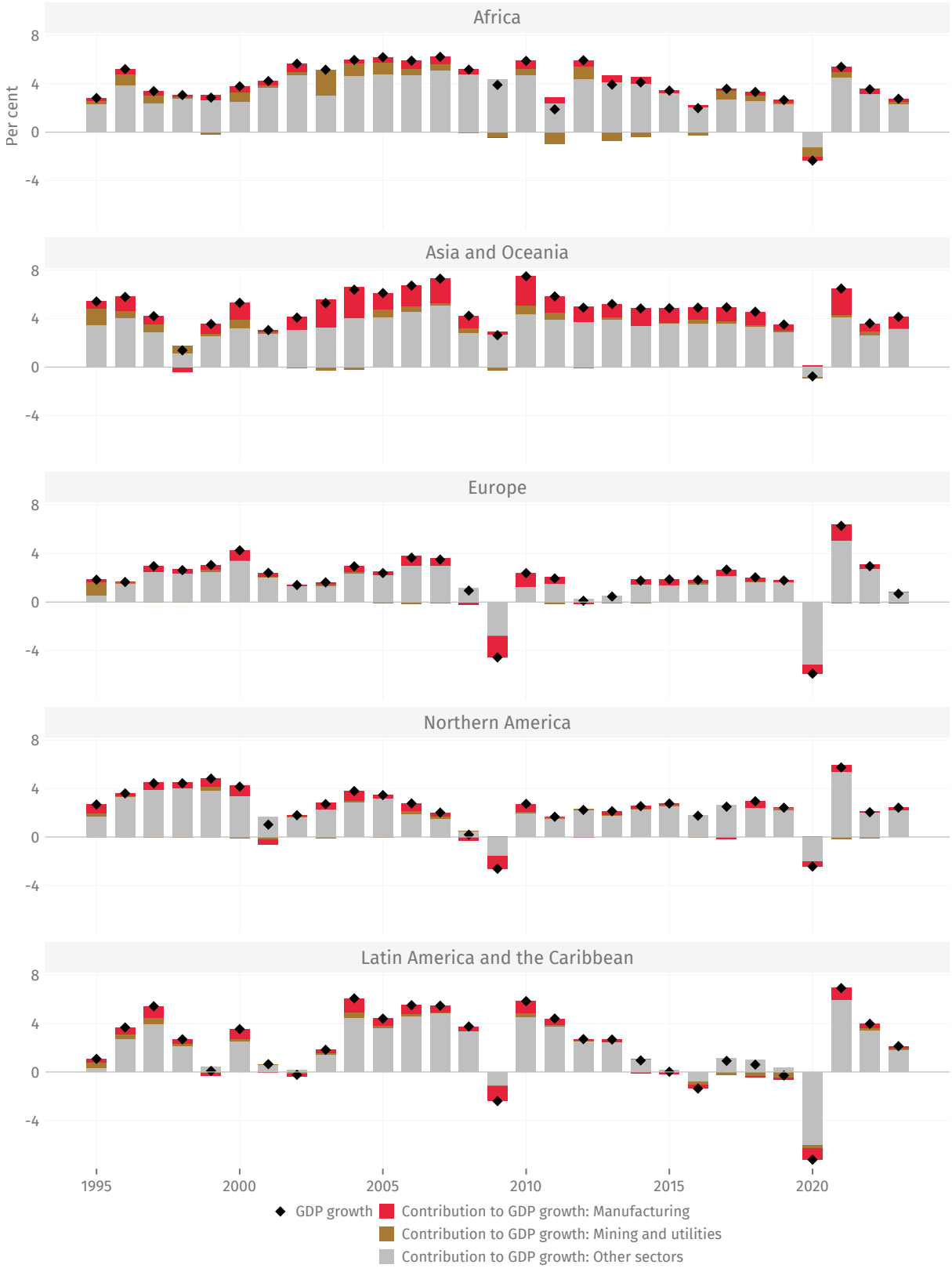
'Mining and utilities still contribute significantly to economic performance in Africa

Figure 5.7 | Proportion of MVA and MUVA in global GDP



Source: [10]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 5.8 | Contribution of manufacturing and mining and utilities to GDP growth by region



Source: [10]
Note: A sector's contribution to GDP growth depends on its own growth rate, calculated over the values in constant 2015 USD, and its respective weight in GDP.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

5.2.7 A brave new high-tech world in manufacturing

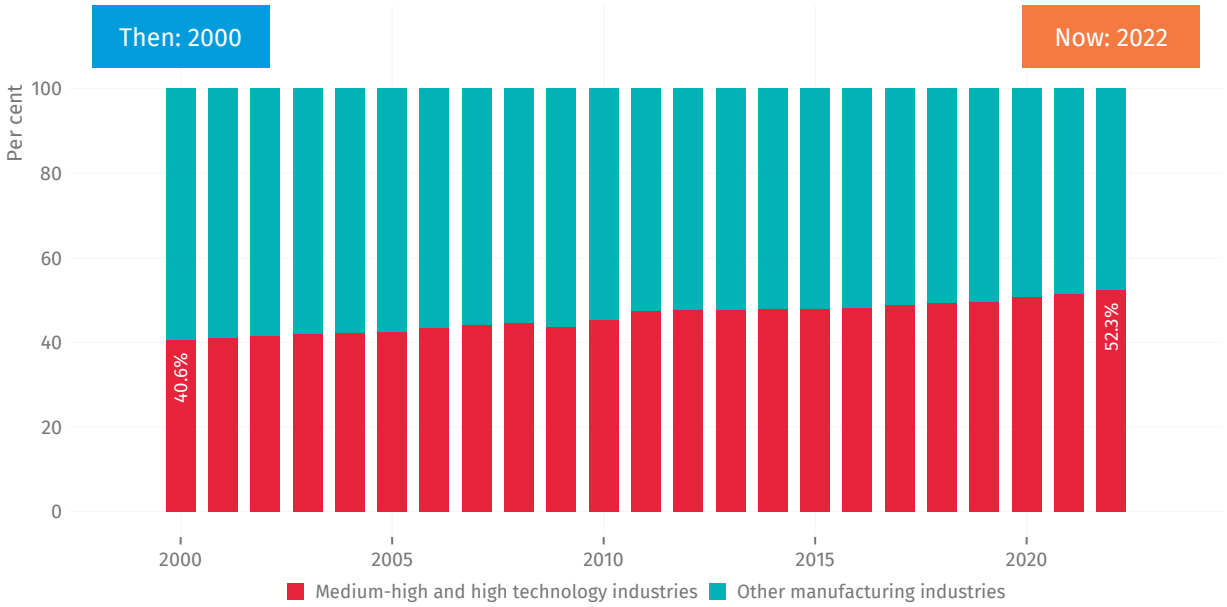
Another "megatrend" in manufacturing over the past three decades has been the gradual progression towards industries and processes driven by technological advancements and innovation. Although this concept is challenging to quantify and data are limited, several indicators offer valuable insights. One such metric is the share of MHT industries in MVA (see Figure 5.9). Globally, this indicator has consistently increased since 2000, the earliest year with reliable data. MHT industries accounted for more than half of global MVA for the first time in 2020, continuing to grow until reaching 52.3 per cent in 2022. This trend has been observed worldwide, with the exception of Africa, as shown in Figure 5.10. Notably, nearly 60 per cent of European MVA was generated by MHT industries.

Figure 5.11 offers further detail. At the global level, only four industries increased their share of MVA, all of them were classified as MHT. This shift was spearheaded by the manufacturing of computer, electronics and optical products, whose share rose from 5.8 per cent in 2000 to 13.1 per cent in 2022. The pharmaceuticals industry also demonstrated strong growth. Conversely, the motor vehicles sector was the lowest performing among MHT industries during this period. However, the most significant losses were seen in lower-technology industries, such as the manufacturing of food products, fabricated metal products and petroleum-related products.

Annex Table E.2.1 lists the manufacturing industries classified as MHT.

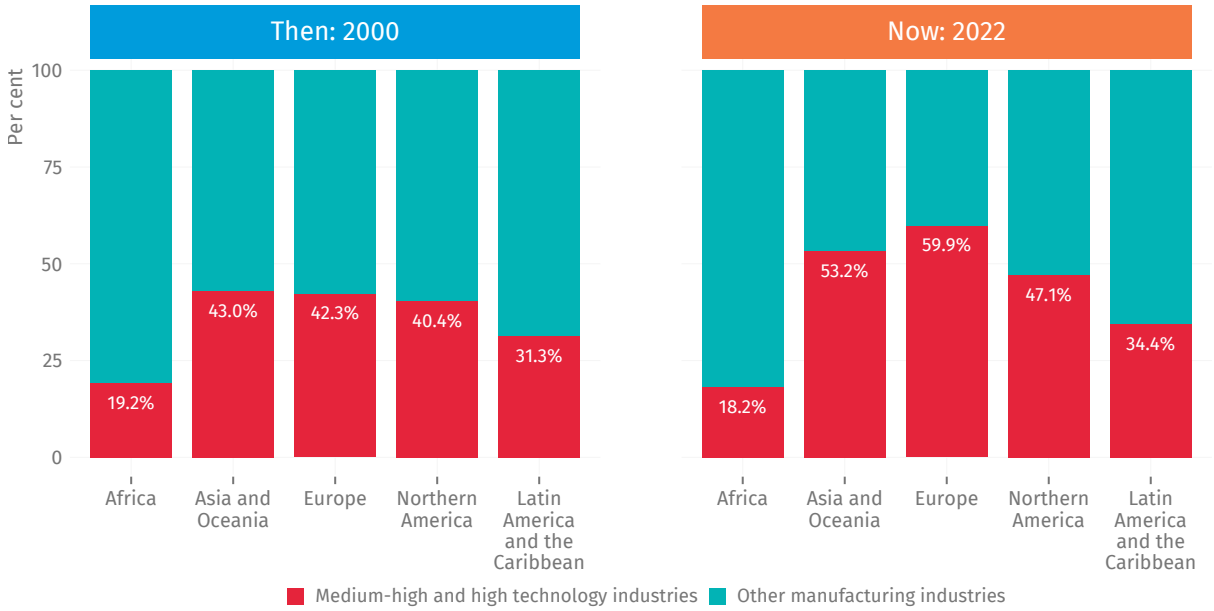
Computer, electronics and optical products
is now the largest manufacturing industry globally

Figure 5.9 | Composition of global MVA by industries according to technological intensity



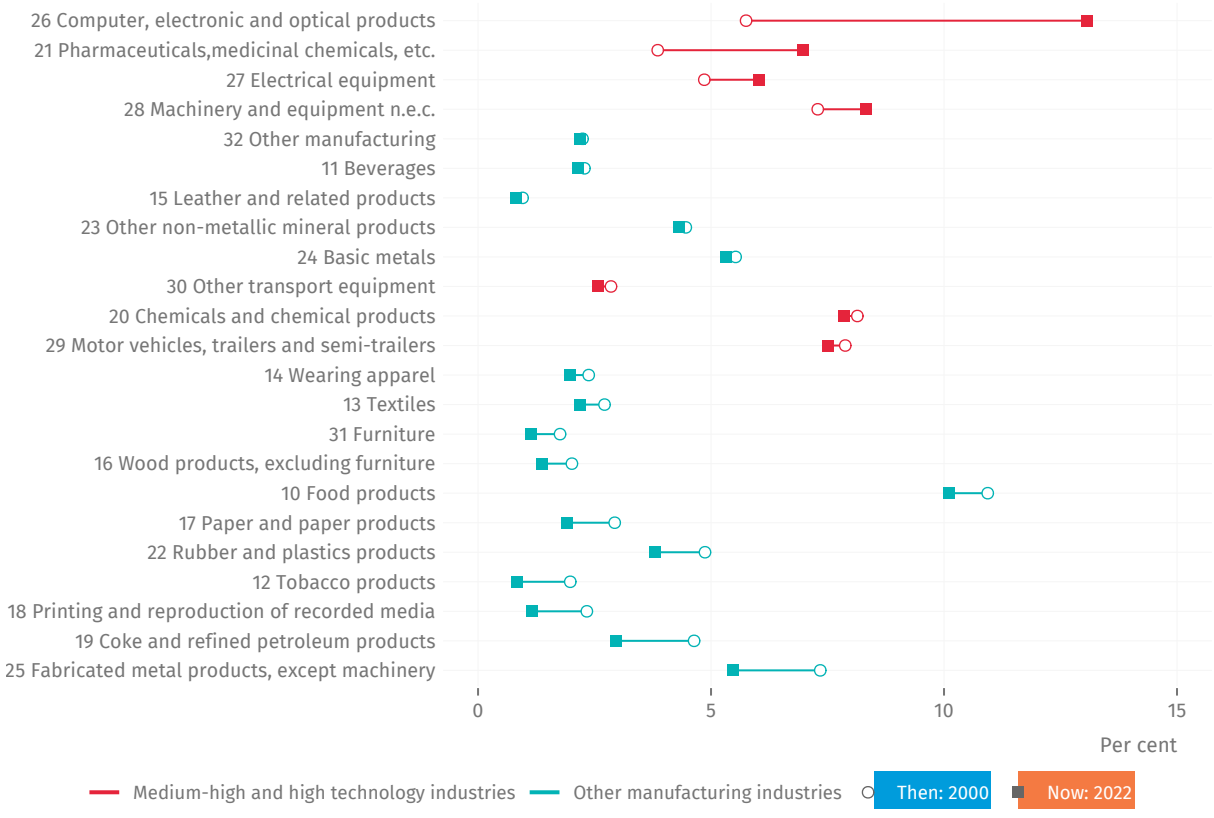
Source: [37; 38]
Note: The classification of ISIC Rev. 4 industries by technological intensity is listed in Annex Table E.2.1.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 5.10 | Composition of MVA by industries according to technological intensity and region



Source: [37; 38]
Note: The classification of ISIC Rev. 4 industries by technological intensity is listed in Annex Table E.2.1.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 5.11 | Share of manufacturing industries in global MVA



Source: [37; 38]
Note: The classification of ISIC Rev. 4 industries by technological intensity is listed in Annex Table E.2.1. Industries are sorted according to the change between 2000 and 2022 in descending order.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

5.2.8 A growing high-technology trade deficit

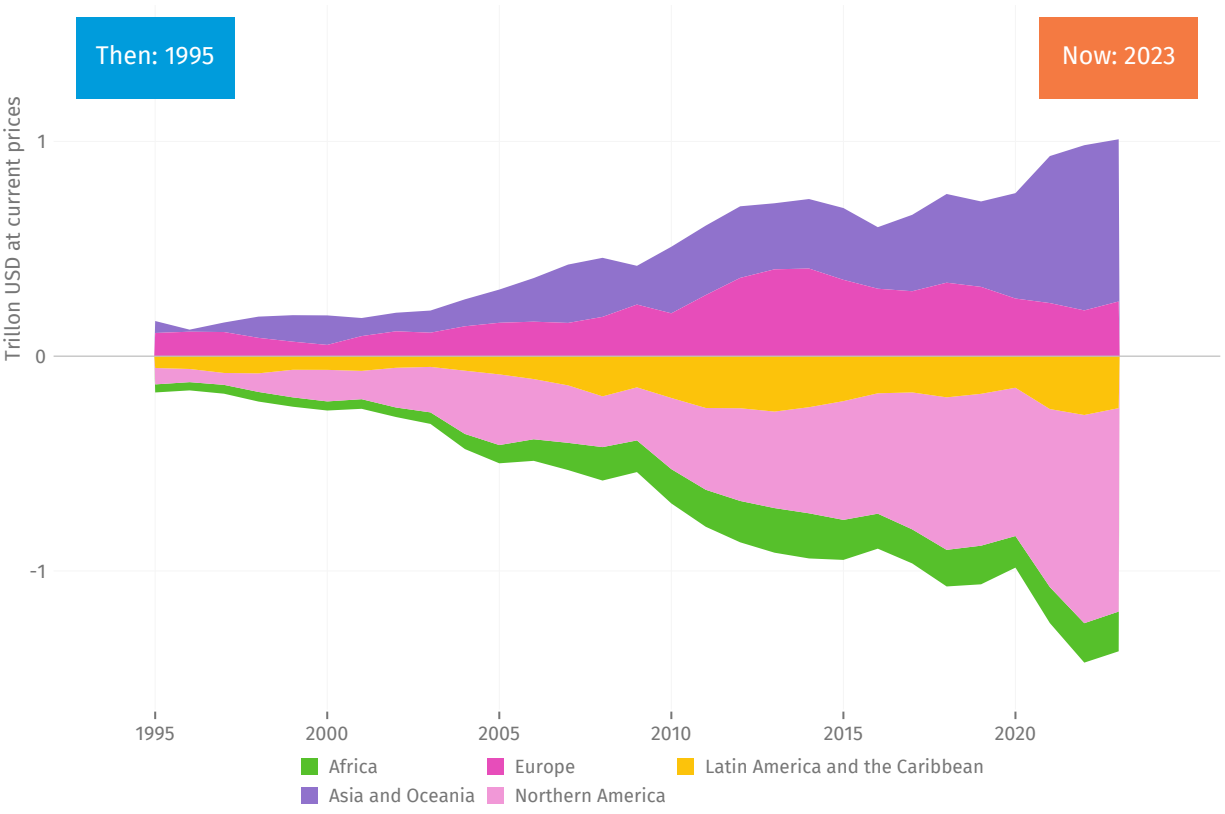
Figure 5.10 in the previous section showed that Europe and Asia and Oceania were the only two regions where the share of MHT industries in MVA exceeded 50 per cent. This trend is mirrored in the regions' export baskets. Figure 5.12 illustrates the trade balance of higher-technology products. Values above zero indicate a regional MHT surplus, meaning that a region exports more MHT manufacturing products than it imports.

Annex Table E.2.2 includes the full list of higher-technology manufacturing commodities.

The graph shows that both Europe and Asia and Oceania achieved an MHT trade surplus. However, while Europe's surplus has been shrinking in recent years, the surplus in Asia and Oceania has continued to grow. The other three regions remained as MHT importers throughout the entire period. The higher-technology trade deficit of Northern America increased notably in recent years. This result is particularly significant for Africa and Latin America and the Caribbean. While importing high-technology capital goods could be beneficial if it leads to an enhanced production in the future, the deficit also represents a substantial drain on resources for these regions. These trend underscores the challenges faced by regions with persistent deficits in building their technological capabilities and fostering local innovation.

Only two regions maintain a **trade surplus** in higher-technology manufactures: **Asia and Oceania** and **Europe**

Figure 5.12 | Trade balance in higher-technology manufacturing products by region



Source: [42]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

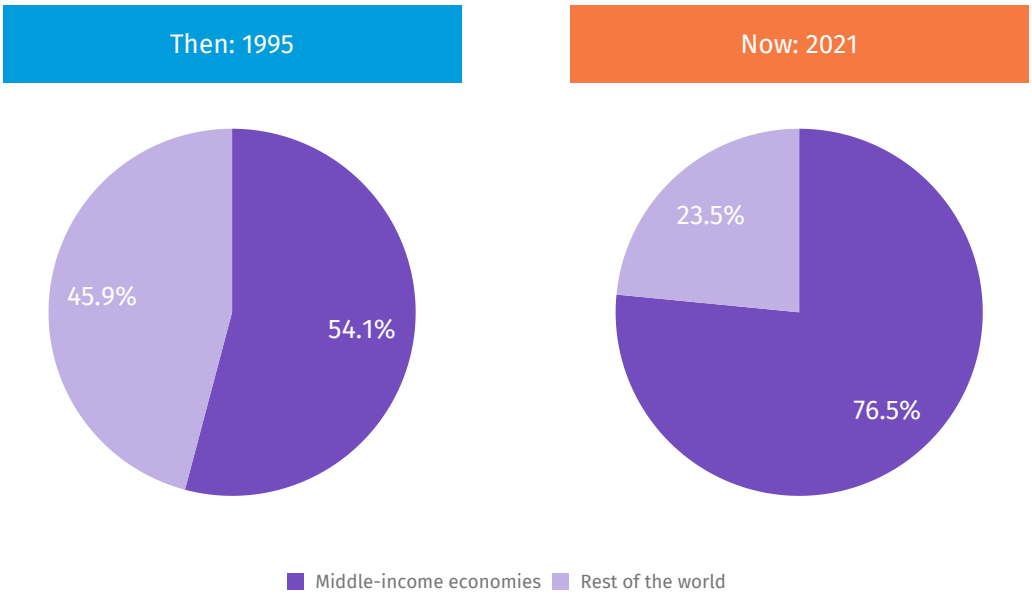
5.2.9 The decoupling between manufacturing activity and CO_2 emissions

The relocation of manufacturing activity to middle-income economies, particularly in Asia, has also led to a shift in the sector's environmental impact. Using CO_2 emissions as a proxy for total GHG emissions and overall environmental impact, Figure 5.13 shows that middle-income economies have become the main origin of pollution associated with global manufacturing. While these countries accounted for 54.1 per cent of the sector's global CO_2 emissions in 1995, their share had risen to 76.5 per cent by 2021, the most recent year with complete data. By contrast, low-income economies contributed only 0.19 per cent of worldwide CO_2 emissions from manufacturing in 2021.

One of the most significant trends in recent years has been the apparent decoupling between manufacturing activity and emissions. Despite continuous growth in global manufacturing activity, the latest data indicate that CO_2 emissions from the sector plateaued in 2011 and have remained relatively stable since then. Figure 5.14 breaks down these trends by region. In both Europe and Northern America, CO_2 emissions from manufacturing have decreased, reaching levels 22.4 per cent and 20.1 per cent below their 1995 level by 2021, respectively. In Latin America and the Caribbean, after rising until 2011, emissions from manufacturing have also begun a gradual decline. In Africa and particularly in Asia and Oceania, CO_2 emissions from the sector have stabilized despite a robust manufacturing expansion, although they have yet to show an absolute decrease.

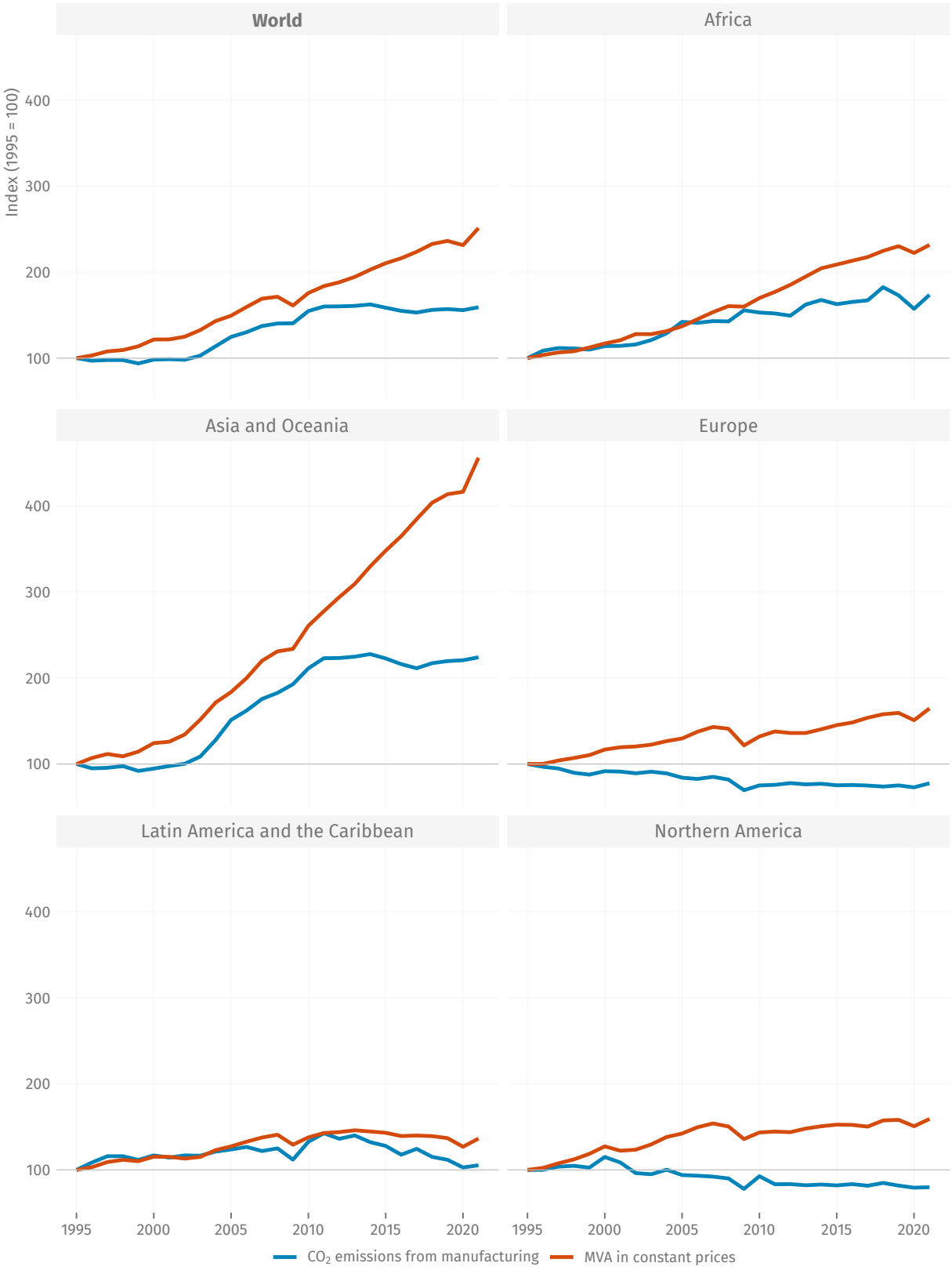
Manufacturing activity and CO_2 **emissions** started diverging first in Europe, then in other regions

Figure 5.13 | Distribution of global CO_2 emissions from manufacturing by income group



Source: [10]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 5.14 | Trends in global MVA and CO_2 emissions from manufacturing by region



Source: [10; 57]
Note: Due to their different measurement units, both series have been converted to an index with base year 1995 to facilitate comparison.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

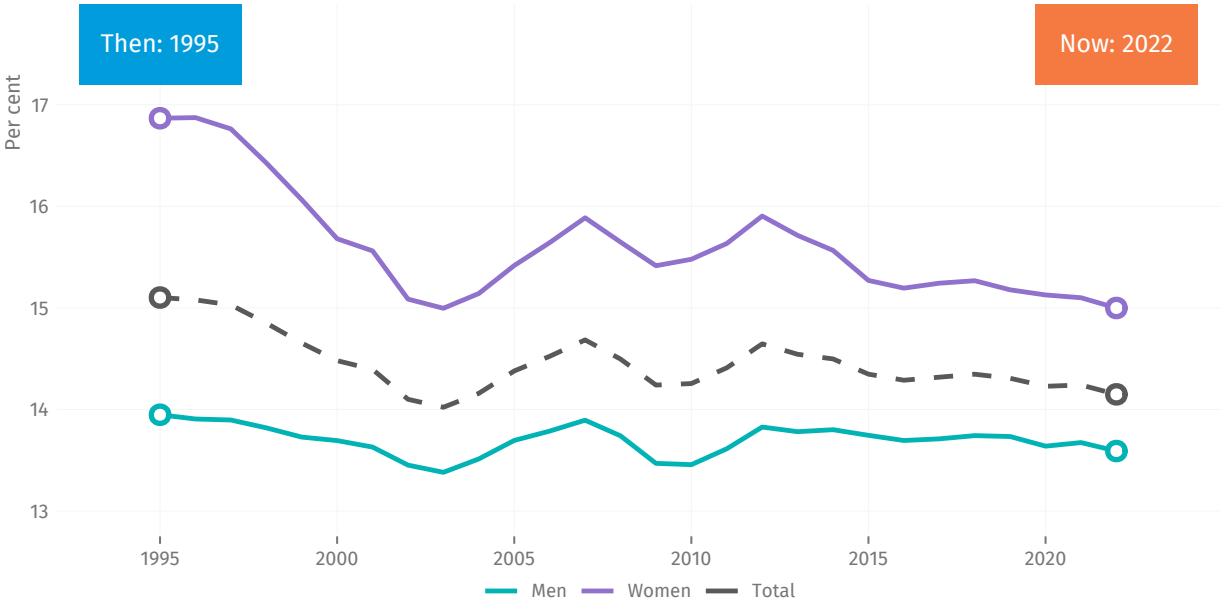
5.2.10 Uneven job growth and persistent gender disparities in manufacturing

Despite robust growth in manufacturing, the sector has not generated jobs at the same pace as the broader economy. Consequently, the share of manufacturing in total employment gradually declined from 15.1 per cent in 1995 to 14.1 per cent in 2022, as shown in Figure 5.15. This change has affected women and men differently. Globally, women tend to be employed in manufacturing at higher rates than men. In 1995, 13.9 per cent of male workers were in manufacturing, compared to 16.9 per cent of female workers, resulting in a three-percentage-point gap. However, as employment shifted away from manufacturing, women exited the sector at a faster rate. By 2022, the gap had narrowed to just 1.4 percentage points, indicating that recent changes have had a greater impact on women.

Figure 5.16 presents further evidence disaggregated by region. The bars show the difference between the growth rates of female and male manufacturing employment, with a bar above zero indicating a higher growth for women. In Asia and Oceania, where manufacturing employment continues to grow strongly, most bars are below zero, indicating that the growth has predominantly benefited men. In Europe and Northern America, where manufacturing employment is declining, most of the bars are also below zero, showing that women have been disproportionately affected. In the other two regions, clear trends are less apparent, although the panel for Africa indicates that male employment growth in the sector has outpaced that of women in recent years.

Recent changes in manufacturing seem to have a greater impact on **women's employment**

Figure 5.15 | Global share of manufacturing employment in total employment by sex



Source: [44]
Note: Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

Figure 5.16 | Difference between the growth of manufacturing employment for women and men by region

Source: [44]
Note: The bars show, for each region and year, the difference between the growth of manufacturing employment for women and men. Values above zero indicate years when manufacturing employment of women increased at a higher rate than manufacturing employment of men.
Data used to create this figure can be downloaded at the UNIDO Statistics Portal.

5.3 Concluding remarks

Over the past three decades, global industry has undergone significant shifts, marked by the relocation of manufacturing hubs from high-income to middle-income economies, particularly in Eastern Asia. This change has reshaped the global industrial landscape and brought substantial benefits to many economies. However, the gains for low-income economies and some regions have remained limited, enhancing persistent inequalities.

Recent industrial transformations, including rebalancing, globalization and technological innovation

Advanced technologies and innovation have become pivotal determinants of productivity and manufacturing growth. The marked increase of MHT industries' share in global MVA highlights this shift towards knowledge-intensive production. Yet, some regions continue to struggle with bridging the technological divide due to insufficient resources and limited innovation capacity.

The environmental impact of industrial activity has also emerged as a crucial factor. While there are encouraging signs of a decoupling between CO_2 emissions and manufacturing growth, emissions remain stalled at high levels. In addition, the environmental effects of industrial activity extend beyond air pollution, and also impact water resources, land use, and the efficiency of material and energy consumption.

Manufacturing activity on a double decoupling from CO_2 emissions and employment

A key concern is that employment has not kept pace with industrial growth, as evidenced by the declining share of manufacturing jobs in total employment. Gender disparities in manufacturing employment also persist. The expansion of new technologies risk exacerbating these issues.

The industrial transformations outlined in this chapter present both challenges and opportunities. While this chapter only describes global and regional trends, the data can also be analyzed at a more detailed level to identify the sources of these changes, the determinants of success or failure in industrial progress, and the impact that these changes have brought across different industries, enterprises, or population groups. Such granular analysis can inform the development of future industrial strategies.

Consistent, timely and granular statistics can guide the next generation of industrial policies

Consistent, timely statistical information is essential for guiding policy programmes effectively. However, this chapter notes that data gaps remain in some cases, particularly regarding the contribution of small firms, participation in global value chains, the determinants and effects of innovation activities, and the full environmental impact of industrial activity. Strengthening statistical capacities could support the development of next-generation industrial policies and lay the groundwork for a balanced and sustainable global industry.

Annexes

A Key industrial indicators

Table A.1 | Industrial indicators by country/area, latest available year

	MVA per capita 2023 *(2015 US$)*	MVA growth rate 2023 *(%)*	MVA share in GDP 2023 *(%)*	MHT share in MVA 2021 *(%)*	Industry value added share in GDP 2023 *(%)*	Manuf. share in exports 2023 *(%)*	MHT share in manuf. exports 2023 *(%)*	Manuf. trade balance 2022 *(% GDP)*	Manuf. share in employment 2023 *(%)*	Manuf. CO_2 intensity 2021 *(kg/US$)*	CIP Index 2022 *(rank)*
Afghanistan	28	-3.5	7.4	7.4	12.1	9.5	15.6	-30.6	6.4	...	148
Albania	361	4.3	6.9	4.3	12.7	80.1	15.8	8.1	10.9	1.32	122
Algeria	196	3.3	4.8	2.7	22.0	29.9	8.0	-6.7	10.7	1.67	100
Andorra	1,427	1.8	3.6	...	3.6	80.5	69.2	-41.5	...	...	...
Angola	213	3.8	7.2	3.6	21.8	9.1	18.7	-10.9	2.1	0.18	126
Anguilla	544	3.7	2.2	...	6.7	96.8	51.8	-49.1	2.4	...	...
Antigua and Barbuda	360	4.1	2.0	...	7.3	80.4	54.6	-38.2	4.6	...	...
Argentina	1,881	-3.1	13.4	27.3	18.1	33.3	44.3	-6.7	2.6	0.25	52
Armenia	590	7.7	11.2	4.7	18.7	65.6	30.9	-13.2	8.2	0.31	89
Aruba	998	11.1	3.0	...	6.7	85.2	52.4	-27.4	4.0	...	...
Australia	2,891	-0.6	5.1	28.9	13.2	43.5	13.1	-6.5	7.0	0.36	35
Austria	8,515	-1.2	18.6	44.4	21.5	86.4	61.6	-1.3	3.1	0.13	14
Azerbaijan	397	-0.1	7.2	14.5	28.8	7.6	43.5	-13.0	5.6	0.44	103
Bahamas	122	1.0	0.4	...	3.4	73.5	58.5	-20.2	2.8	...	140
Bahrain	3,719	2.6	15.8	24.6	29.5	71.5	20.7	19.3	11.9	0.40	66
Bangladesh	555	8.6	24.6	5.3	27.7	97.3	2.0	-3.7	11.3	0.25	65
Barbados	934	2.1	5.4	...	7.9	85.9	27.5	-25.3	2.8	...	117
Belarus	1,535	6.2	23.5	33.7	27.8	85.1	47.8	14.7	18.8	0.30	58
Belgium	5,420	1.0	12.1	48.6	13.8	85.4	57.9	4.7	11.4	0.30	13
Belize	449	2.1	7.0	...	10.2	68.2	5.6	-31.7	8.0	...	131
Benin	119	3.3	9.5	...	10.2	16.4	19.1	-18.5	14.2	0.32	...
Bermuda	455	-1.4	0.4	7.7	2.3	68.4	70.7	-12.3	1.7	...	146
Bhutan	194	3.6	5.6	...	19.9	49.6	58.3	-34.5	6.7	...	...
Bolivia (Plurinational State of)	329	2.5	10.3	11.7	20.0	35.4	6.6	-18.1	11.6	0.51	99
Bosnia and Herzegovina	788	2.9	12.2	16.6	17.7	86.5	31.5	-19.0	17.6	0.66	77
Botswana	432	3.7	5.9	28.7	23.0	96.2	4.7	2.9	6.5	0.07	87
Brazil	889	2.1	9.6	30.5	13.8	49.3	34.8	-4.3	11.5	0.46	42
British Virgin Islands	577	1.9	1.4	...	2.8	96.1	58.2	-17.3	2.5	...	...
Brunei Darussalam	5,311	1.5	18.5	3.3	55.5	59.7	9.6	31.5	5.9	0.16	57
Bulgaria	1,290	2.3	14.0	35.6	19.3	72.0	49.2	-9.7	18.3	0.68	50
Burkina Faso	82	4.8	11.0	...	21.8	7.9	29.5	-24.6	14.6	0.03	...
Burundi	28	1.4	10.6	2.8	11.8	26.6	9.9	-27.1	1.2	...	147

Table A.1 | Industrial indicators by country/area, latest available year *(continued)*

	MVA per capita 2023 *(2015 US$)*	MVA growth rate 2023 *(%)*	MVA share in GDP 2023 *(%)*	MHT share in MVA 2021 *(%)*	Industry value added share in GDP 2023 *(%)*	Manuf. share in exports 2023 *(%)*	MHT share in manuf. exports 2023 *(%)*	Manuf. trade balance 2022 *(% GDP)*	Manuf. share in employment 2023 *(%)*	Manuf. CO_2 intensity 2021 *(kg/US$)*	CIP Index 2022 *(rank)*
Cabo Verde	205	2.7	4.7	8.4	8.0	89.9	16.5	-32.0	9.6	...	143
Cambodia	289	8.6	19.2	0.3	22.5	80.8	15.5	-18.1	16.5	0.25	79
Cameroon	201	4.3	13.6	5.1	17.5	23.1	14.5	-12.0	9.6	0.05	124
Canada	4,047	-0.9	9.0	32.3	15.7	59.3	56.6	-6.8	9.0	0.35	21
Cayman Islands	752	3.6	1.0	...	3.5	97.8	94.7	-24.0	1.1	...	...
Central African Republic	75	1.8	18.9	...	19.7	51.6	28.7	-16.1	...	...	144
Chad	81	6.1	9.9	...	47.5	1.8	50.1	-11.6	7.0	0.16	...
Chile	1,510	-1.0	10.5	16.7	20.7	59.2	6.6	-8.9	9.8	0.18	47
China	3,459	5.4	28.6	48.5	33.6	94.9	61.6	8.7	28.7	0.61	2
China, Hong Kong SAR	453	-3.2	1.0	17.2	2.2	88.9	86.6	-9.9	2.4	0.58	90
China, Macao SAR	319	9.8	0.6	2.1	1.3	95.2	43.0	-59.8	1.6	...	137
China, Taiwan Prov.	9,610	-6.7	32.7	70.5	35.2	97.4	80.2	17.9	26.4	0.15	5
Colombia	808	-1.5	11.8	24.5	18.6	35.3	34.5	-13.8	10.5	0.34	69
Comoros	84	1.9	5.6	...	6.3	55.0	47.7	-20.8	5.2	...	...
Congo	126	2.3	7.3	2.4	46.7	14.8	27.4	-10.7	10.8	0.13	125
Cook Islands	321	4.6	1.4	...	-1.8	46.1	64.3	-41.0	3.3	...	...
Costa Rica	1,869	3.9	13.1	35.3	16.3	72.7	57.5	-10.1	12.2	0.12	64
Croatia	2,027	1.6	12.1	20.0	15.8	81.8	48.1	-17.8	16.8	0.26	54
Cuba	690	0.0	8.9	...	10.6	70.6	24.6	-3.3	9.3	0.59	109
Curaçao	366	3.6	2.5	...	7.5	81.4	29.9	-40.3	6.7	6.61	...
Cyprus	1,029	-0.7	4.8	20.0	6.6	86.4	51.9	-24.2	6.2	0.37	92
Czechia	5,056	0.1	25.4	47.2	27.2	95.1	72.3	7.9	25.3	0.24	15
Côte d'Ivoire	337	6.2	14.4	...	17.8	24.3	21.0	-10.9	9.6	0.15	94
Korea, Dem. People's Rep. of	100	2.0	17.3	...	32.8	90.6	28.3	-7.7	...	...	...
Congo, Dem. Rep. of	73	3.0	14.0	...	49.4	35.9	13.7	-5.9	5.8	0.00	...
Denmark	10,288	2.4	16.9	52.0	17.6	81.6	56.3	0.8	11.2	0.06	17
Djibouti	148	6.5	4.7	...	10.0	73.6	30.6	6.2	0.2	...	...
Dominica	251	-0.6	3.0	...	8.4	76.4	59.6	-33.9	7.8	...	...
Dominican Republic	1,238	2.3	14.0	...	16.4	76.8	48.1	-10.5	9.9	0.33	...
Ecuador	811	1.6	14.2	12.7	20.5	24.8	7.4	-18.2	10.1	0.20	83
Egypt	588	3.6	14.1	18.7	26.0	64.9	37.3	-9.6	12.6	0.54	67
El Salvador	647	3.4	14.6	...	19.2	92.0	18.2	-24.6	2.2	0.42	81
Equatorial Guinea	1,305	5.1	26.1	...	42.0	14.0	54.6	-17.5	...	0.52	...

Table A.1 | Industrial indicators by country/area, latest available year *(continued)*

	MVA per capita 2023 *(2015 US$)*	MVA growth rate 2023 *(%)*	MVA share in GDP 2023 *(%)*	MHT share in MVA 2021 *(%)*	Industry value added share in GDP 2023 *(%)*	Manuf. share in exports 2023 *(%)*	MHT share in manuf. exports 2023 *(%)*	Manuf. trade balance 2022 *(% GDP)*	Manuf. share in employment 2023 *(%)*	Manuf. CO_2 intensity 2021 *(kg/US$)*	CIP Index 2022 *(rank)*
Eritrea	44	2.6	6.1	10.2	15.9	53.2	8.7	-4.2	...	0.16	149
Estonia	2,860	-2.9	14.1	22.0	16.5	80.7	52.7	-10.9	17.2	0.07	49
Eswatini	1,328	6.9	33.8	2.0	35.6	89.0	19.2	6.3	11.6	0.18	85
Ethiopia	47	8.6	5.6	16.1	6.8	17.4	25.1	-12.9	3.2	0.79	142
Fiji	543	4.4	9.4	6.3	12.4	69.3	9.5	-37.7	5.6	...	120
Finland	6,480	-3.2	14.1	40.4	17.1	84.5	52.0	0.0	12.9	0.15	25
France	3,858	0.6	9.6	46.9	11.5	86.0	62.7	-3.8	11.1	0.17	12
French Polynesia	1,050	3.4	4.8	...	6.9	70.1	28.3	-31.3	6.2	...	...
Gabon	580	5.9	8.9	...	42.3	41.9	32.8	-2.8	...	0.34	91
Gambia	11	-0.3	1.5	...	4.1	58.4	12.7	-25.6	8.1	...	150
Georgia	444	8.9	7.8	10.8	13.5	87.8	59.8	-29.2	5.9	0.95	96
Germany	8,437	-3.2	19.7	58.0	22.4	89.9	73.4	6.6	18.3	0.12	1
Ghana	234	1.3	11.2	10.4	23.9	13.8	13.8	-13.9	11.1	0.31	118
Greece	2,109	1.0	10.0	16.5	13.3	77.7	29.5	-6.5	9.9	0.19	44
Greenland	1,224	4.2	2.4	...	5.9	32.5	35.9	-23.6	...	...	...
Grenada	378	5.3	4.0	...	7.6	65.1	55.6	-40.8	7.8	...	...
Guatemala	636	2.7	14.2	...	16.7	66.7	22.0	-18.2	13.7	0.24	72
Guinea	105	4.4	10.3	...	54.2	47.8	2.9	-2.5	2.8	...	...
Guinea-Bissau	63	2.6	9.0	...	9.8	16.3	12.0	-22.5	5.1	...	...
Guyana	311	3.8	1.4	...	71.0	5.3	55.3	-20.5	10.3	0.50	...
Haiti	206	-1.1	17.7	...	19.7	97.0	3.0	-12.8	1.4	0.25	134
Honduras	442	3.5	17.5	...	21.0	63.5	19.6	-27.0	12.8	0.18	97
Hungary	2,942	-0.7	18.3	49.9	19.7	91.3	78.1	5.2	21.0	0.22	28
Iceland	5,212	2.8	9.0	15.6	13.2	28.4	32.9	-24.7	9.3	0.02	75
India	346	8.1	15.3	41.9	19.2	87.3	37.9	-1.1	2.3	1.22	40
Indonesia	837	5.2	20.0	26.9	27.4	73.4	32.8	1.4	13.7	0.60	38
Iran	851	7.7	14.8	36.3	26.5	59.1	39.2	0.8	17.8	1.77	55
Iraq	119	-3.1	2.9	5.2	39.7	8.5	3.8	-14.7	6.2	2.82	150
Ireland	37,806	-8.8	40.7	65.0	41.9	95.4	59.5	14.8	10.7	0.02	3
Israel	5,561	0.1	12.4	57.4	14.0	86.6	69.1	-5.6	9.1	0.08	30
Italy	4,790	0.9	14.4	40.0	17.2	90.4	56.2	5.9	18.3	0.14	11
Jamaica	439	-0.1	8.3	...	11.7	80.5	2.7	-25.6	3.5	0.34	107
Japan	8,235	3.9	22.3	54.7	25.3	87.5	79.9	1.9	15.6	0.18	8

Table A.1 | Industrial indicators by country/area, latest available year *(continued)*

	MVA per capita 2023 *(2015 US$)*	MVA growth rate 2023 *(%)*	MVA share in GDP 2023 *(%)*	MHT share in MVA 2021 *(%)*	Industry value added share in GDP 2023 *(%)*	Manuf. share in exports 2023 *(%)*	MHT share in manuf. exports 2023 *(%)*	Manuf. trade balance 2022 *(% GDP)*	Manuf. share in employment 2023 *(%)*	Manuf. CO_2 intensity 2021 *(kg/US$)*	CIP Index 2022 *(rank)*
Jordan	700	2.7	18.1	18.8	22.5	74.0	37.8	-16.5	9.3	0.21	71
Kazakhstan	1,320	4.7	11.2	15.1	24.6	30.7	46.6	-2.8	6.8	0.94	61
Kenya	157	3.9	8.7	13.8	12.3	49.7	25.7	-13.4	6.8	0.35	111
Kiribati	59	0.5	4.0	...	5.4	26.7	82.4	-73.3	4.0	...	...
Kosovo	693	4.0	13.7	3.7	19.6	...	...	...	...	0.68	...
Kuwait	1,241	-7.3	5.3	31.9	40.5	68.1	36.7	2.8	5.6	2.00	62
Kyrgyzstan	203	4.0	16.8	2.3	20.7	37.3	26.3	-69.2	11.4	0.43	112
Lao People's Dem. Rep	243	6.2	8.7	...	26.8	47.5	30.8	-15.2	3.4	0.55	113
Latvia	1,981	-2.3	11.7	11.4	14.2	73.5	42.0	-10.2	12.6	0.16	56
Lebanon	171	-2.2	3.2	14.6	5.8	75.5	36.4	-33.0	10.8	0.51	110
Lesotho	182	3.9	18.8	...	31.5	92.2	6.8	-28.3	22.6	...	...
Liberia	22	-1.3	4.0	...	6.9	45.6	41.0	-20.1	1.7	...	...
Libya	161	5.2	2.4	...	44.0	6.8	13.9	-27.4	...	1.38	...
Liechtenstein	63,739	1.5	36.4	...	37.9	...	...	...	...	...	...
Lithuania	3,420	-0.5	18.7	29.5	21.0	85.7	43.4	5.1	15.9	0.13	39
Luxembourg	4,358	-5.9	4.1	13.8	5.0	85.8	45.9	-9.2	3.2	0.27	46
Madagascar	35	3.8	7.9	2.4	10.9	44.9	3.4	-20.6	5.4	0.00	135
Malawi	67	4.0	12.1	3.6	15.7	17.6	26.7	-10.2	3.8	...	141
Malaysia	2,742	3.2	24.1	42.2	33.0	88.0	65.2	16.5	16.8	0.41	20
Maldives	225	5.6	2.0	2.6	4.7	42.1	26.6	-44.7	9.7	...	145
Mali	139	6.4	16.3	...	17.2	7.0	54.8	-30.6	4.8	0.08	...
Malta	2,094	3.0	6.6	33.6	7.2	84.5	63.0	-24.4	10.2	0.03	73
Marshall Islands	78	14.3	1.3	...	5.4	92.8	83.6	11.7	4.3	...	...
Mauritania	96	3.1	5.8	...	13.5	40.2	2.5	-25.8	2.2	0.68	...
Mauritius	1,320	5.8	11.8	5.2	14.1	86.3	21.1	-25.6	11.2	0.22	93
Mexico	2,152	3.6	21.0	44.1	24.6	82.0	79.8	-2.0	16.6	0.16	19
Micronesia, Fed. States of	17	0.6	0.6	...	3.2	3.3	35.8	-53.4	2.4	...	...
Monaco	7,307	0.9	3.4	...	3.4	...	...	...	...	...	...
Mongolia	366	5.5	8.1	3.3	21.5	46.7	1.2	-24.0	8.3	1.28	105
Montenegro	321	4.2	3.9	10.0	9.7	48.6	36.8	-42.0	6.2	1.00	128
Montserrat	703	5.9	3.7	...	8.1	62.0	66.5	-39.7	2.5	...	...
Morocco	557	3.0	15.0	37.5	20.7	81.2	66.0	-18.5	11.0	0.31	60
Mozambique	45	5.0	7.3	...	17.1	26.7	8.5	-55.6	4.1	0.10	133

Table A.1 | Industrial indicators by country/area, latest available year *(continued)*

	MVA per capita 2023 *(2015 US$)*	MVA growth rate 2023 *(%)*	MVA share in GDP 2023 *(%)*	MHT share in MVA 2021 *(%)*	Industry value added share in GDP 2023 *(%)*	Manuf. share in exports 2023 *(%)*	MHT share in manuf. exports 2023 *(%)*	Manuf. trade balance 2022 *(% GDP)*	Manuf. share in employment 2023 *(%)*	Manuf. CO_2 intensity 2021 *(kg/US$)*	CIP Index 2022 *(rank)*
Myanmar	339	1.6	22.9	36.4	28.3	55.9	13.7	-9.7	1.6	0.12	84
Namibia	438	3.3	11.2	5.2	24.7	56.8	22.3	-26.2	7.2	0.00	101
Nauru	2,054	7.5	21.3	...	33.6	16.2	64.3	-45.9	1.4	...	...
Nepal	53	-3.6	4.9	10.3	7.9	82.8	11.2	-25.4	3.1	4.05	132
Netherlands	5,774	-0.2	11.7	49.6	13.8	78.6	57.2	8.1	8.3	0.20	10
New Caledonia	4,417	13.4	14.2	...	18.9	99.4	46.5	-0.6	3.4	...	...
New Zealand	3,880	-1.1	9.0	23.7	11.8	50.5	21.8	-11.1	8.6	0.25	48
Nicaragua	349	5.8	15.4	13.3	21.8	55.3	24.9	-31.5	11.5	0.23	95
Niger	41	0.9	7.4	10.8	15.9	24.8	32.8	-19.0	7.6	0.28	139
Nigeria	208	0.4	8.6	...	12.4	6.9	34.1	-10.5	12.9	0.31	98
North Macedonia	718	0.4	11.4	32.0	14.4	90.3	67.7	-13.1	19.6	0.79	74
Norway	4,788	-0.8	6.0	21.6	24.2	20.0	47.6	-10.1	7.0	0.21	41
Oman	1,485	2.5	8.6	45.0	39.8	57.1	40.9	0.9	13.2	1.83	53
Pakistan	192	-2.3	11.8	23.4	16.1	76.3	11.5	-7.1	14.9	1.44	80
Palau	125	1.0	1.0	...	3.4	60.2	74.3	-74.6	1.5	...	...
Panama	781	3.5	4.6	6.0	10.8	80.4	14.0	-6.1	7.7	0.43	...
Papua New Guinea	42	2.1	1.7	12.6	25.0	30.0	2.1	-5.7	1.2	...	130
Paraguay	1,251	2.5	19.5	20.7	26.9	21.2	33.3	-29.7	10.3	0.02	86
Peru	830	-2.4	12.7	9.2	21.8	51.9	5.5	-8.2	8.4	0.21	68
Philippines	724	4.9	19.3	29.3	23.3	89.4	80.9	-12.2	7.9	0.14	45
Poland	2,758	-0.5	16.9	30.0	20.8	88.1	54.7	2.6	18.7	0.30	23
Portugal	2,663	1.8	11.8	23.5	15.3	89.4	46.5	-5.4	16.6	0.19	37
Puerto Rico	12,610	-0.9	42.9	37.8	45.3	...	...	...	9.0	...	...
Qatar	5,097	1.3	8.7	60.1	42.0	45.9	15.9	3.2	5.1	1.16	43
Korea, Rep. of	9,047	0.8	26.5	64.4	29.1	96.7	72.8	10.3	15.6	0.14	4
Moldova, Rep. of	309	0.0	10.4	17.8	13.7	71.6	33.0	-29.8	7.5	0.78	106
Romania	2,178	1.8	17.6	34.5	20.9	85.1	62.5	-8.7	19.5	0.33	36
Russian Federation	1,410	4.0	13.5	26.4	24.2	51.4	31.5	1.8	14.0	1.28	34
Rwanda	80	7.4	8.1	7.3	11.0	41.2	10.3	-14.6	4.7	0.30	136
Saint Kitts and Nevis	712	1.3	3.3	...	5.1	89.8	81.1	-25.9	1.8	...	...
Saint Lucia	368	2.0	3.4	...	6.7	80.9	22.9	-22.1	6.0	...	138
St. Vincent and the Grenadines	405	2.9	4.4	...	8.6	88.1	85.2	-33.4	...	...	...
Samoa	208	7.4	5.2	...	8.2	77.3	69.0	-40.3	6.0	...	...

Table A.1 | Industrial indicators by country/area, latest available year *(continued)*

	MVA per capita 2023 *(2015 US$)*	MVA growth rate 2023 *(%)*	MVA share in GDP 2023 *(%)*	MHT share in MVA 2021 *(%)*	Industry value added share in GDP 2023 *(%)*	Manuf. share in exports 2023 *(%)*	MHT share in manuf. exports 2023 *(%)*	Manuf. trade balance 2022 *(% GDP)*	Manuf. share in employment 2023 *(%)*	Manuf. CO_2 intensity 2021 *(kg/US$)*	CIP Index 2022 *(rank)*
San Marino	15,829	1.9	32.6	...	32.6	...	...	...	25.4	...	...
Sao Tome and Principe	107	1.1	6.5	...	9.3	64.3	43.1	-29.4	6.4	...	...
Saudi Arabia	3,074	2.9	13.4	27.9	35.1	38.0	42.2	-0.3	8.9	0.93	33
Senegal	223	2.7	15.3	26.8	19.6	61.4	11.9	-22.2	15.3	0.39	102
Serbia	1,045	2.0	13.9	23.6	20.1	84.7	47.5	-4.1	18.2	0.36	59
Seychelles	918	5.4	6.1	...	9.2	66.5	19.6	-42.6	5.3	...	...
Sierra Leone	11	0.7	1.6	...	4.5	91.2	11.6	-16.9	4.1	...	...
Singapore	14,382	-0.9	21.7	85.5	22.9	89.6	71.1	14.9	9.0	0.16	9
Sint Maarten (Dutch part)	653	5.2	2.2	...	5.4	13.5	45.4	-57.5	...	...	...
Slovakia	3,786	3.0	20.1	45.1	23.2	94.8	73.7	12.7	22.2	0.39	29
Slovenia	5,456	1.8	21.3	30.8	23.8	91.4	72.1	16.4	22.6	0.15	32
Solomon Islands	184	2.0	10.4	...	13.1	84.3	1.5	-15.4	5.5	...	...
Somalia	11	3.8	2.2	...	2.8	10.1	9.1	-33.3	10.7	...	...
South Africa	645	-0.9	11.2	23.0	17.6	63.3	47.3	-4.7	9.4	1.04	51
South Sudan	9	-4.6	1.7	...	59.5	13.3	1.9	-21.9	1.0	0.23	...
Spain	3,087	1.7	10.9	34.8	14.0	77.6	57.1	-1.5	12.1	0.21	22
Sri Lanka	611	-2.9	16.4	8.6	19.8	78.3	13.2	-5.3	17.3	0.07	76
State of Palestine	281	-5.7	10.1	6.0	11.9	83.9	14.3	-26.8	12.4	0.04	114
Sudan	108	-8.9	7.6	...	13.6	5.1	25.2	-25.3	2.4	0.23	...
Suriname	995	1.9	13.9	12.9	18.1	20.0	16.1	-29.0	12.7	0.09	108
Sweden	7,478	-4.2	13.5	49.6	16.0	87.5	60.8	1.8	9.8	0.07	16
Switzerland	19,681	1.2	21.9	70.3	23.6	70.0	68.0	7.0	12.2	0.03	7
Syrian Arab Republic	19	2.2	2.3	...	13.1	62.9	24.1	-9.9	14.2	5.60	129
Tajikistan	269	7.8	19.1	2.8	26.5	53.5	9.9	-31.8	5.4	0.60	116
Thailand	1,675	1.8	26.2	39.9	31.2	86.2	61.0	7.2	15.7	0.46	26
Timor-Leste	27	2.0	1.7	...	26.2	17.4	13.8	-21.5	1.5	...	...
Togo	119	8.3	13.3	...	18.8	39.6	18.6	-23.4	14.3	0.17	...
Tonga	208	0.2	4.9	17.3	8.9	52.9	33.4	-44.7	17.9	...	150
Trinidad and Tobago	2,226	3.5	15.1	39.4	28.8	68.2	44.3	9.9	9.0	0.62	63
Tunisia	545	0.0	13.1	11.6	17.3	89.0	48.5	-12.0	19.2	0.76	70
Turkmenistan	1,688	-0.4	32.4	8.3	34.4	25.9	20.3	-0.6	...	0.05	...
Turks and Caicos Islands	120	-0.8	0.6	...	5.1	57.8	63.8	-27.3	1.4	...	...
Tuvalu	7	1.4	0.2	...	1.5	57.3	96.2	-31.4	10.4	...	...

Table A.1 | Industrial indicators by country/area, latest available year *(continued)*

	MVA per capita 2023 *(2015 US$)*	MVA growth rate 2023 *(%)*	MVA share in GDP 2023 *(%)*	MHT share in MVA 2021 *(%)*	Industry value added share in GDP 2023 *(%)*	Manuf. share in exports 2023 *(%)*	MHT share in manuf. exports 2023 *(%)*	Manuf. trade balance 2022 *(% GDP)*	Manuf. share in employment 2023 *(%)*	Manuf. CO_2 intensity 2021 *(kg/US$)*	CIP Index 2022 *(rank)*
Türkiye	2,496	5.1	17.4	33.2	20.2	86.6	44.1	-1.1	19.8	0.40	24
Uganda	139	4.0	16.2	10.6	21.9	37.9	16.9	-13.9	4.3	0.20	121
Ukraine	184	5.9	9.2	25.3	15.2	58.6	26.0	-11.4	13.2	2.80	82
United Arab Emirates	5,084	5.8	12.1	30.3	32.5	55.4	41.9	-8.5	8.6	1.50	27
United Kingdom	4,213	1.1	9.0	40.0	11.5	70.2	70.7	-7.6	7.8	0.11	18
Tanzania	95	5.6	8.3	6.6	14.7	23.9	15.9	-16.6	4.4	0.49	127
United States	6,763	2.3	10.7	45.5	13.4	71.9	65.4	-5.2	10.0	0.17	6
Uruguay	1,943	-0.8	10.4	16.1	13.6	33.7	32.5	-9.6	2.4	0.13	78
Uzbekistan	500	4.5	13.6	17.0	17.6	39.5	39.6	-23.3	8.9	0.77	88
Vanuatu	71	-0.9	2.6	...	5.7	55.4	8.3	-24.5	4.0	...	...
Venezuela (Bolivarian Rep. of)	89	2.0	2.3	...	18.6	24.9	30.2	-5.2	10.8	1.42	104
Viet Nam	990	8.1	26.3	38.3	31.3	89.6	56.6	8.4	21.7	1.09	31
Yemen	44	-0.9	9.2	2.1	15.1	37.5	29.5	-32.6	5.5	0.60	150
Zambia	109	3.9	8.4	10.1	23.8	19.9	32.6	-20.8	4.9	0.29	123
Zimbabwe	113	0.7	8.1	9.5	17.6	30.0	21.8	-21.0	4.9	0.75	119

Source: [10; 19; 36; 42]

Note: MVA per capita figures are in constant 2015 US dollars. Figures based on national accounts variables for 2023 are UNIDO estimates. CO_2 intensity is calculated as CO_2 emissions in kilograms per unit of MVA in constant 2015 US dollars. With the objective of maximizing data availability, the latest observed value for manufacturing share in employment is used: 2023 for 42.2 per cent of the cases, 2022 for 16.7 per cent, 2021 for 8.1 per cent, and before 2020 for the remaining cases. Regarding proportion of medium and high-tech MVA in total value added the latest observed values used are: 2021 for 54.7 per cent of the cases, 2020 for 11.7 per cent, 2019 for 8.0 per cent, and before 2020 for the remaining cases. Manuf. = manufacturing. Data used to create this table can be downloaded at the UNIDO Statistics Portal.

Table A.2 | Industrial indicators by country/area group, latest available year

	MVA per capita 2023 (2015 US$)	MVA growth rate 2023 (%)	MVA share in GDP 2023 (%)	MHT share in MVA 2021 (%)	Manuf. share in exports 2023 (%)	MHT share in manuf. exports 2023 (%)	Manuf. trade balance 2022 (% GDP)	Manuf. share in employment 2022 (%)	Manuf. CO_2 intensity 2021 (kg/US$)
Geographical regions									
World	1,912	2.8	16.7	46.1	78.6	61.1	-0.4	14.1	0.41
Africa	206	2.4	10.3	19.8	40.7	37.1	-11.8	7.6	0.51
Northern Africa	*413*	*2.6*	*11.3*	*22.6*	*51.5*	*44.0*	*-12.0*	*11.3*	*0.60*
Sub-Saharan Africa	*161*	*2.2*	*9.8*	*11.2*	*35.7*	*32.5*	*-11.8*	*6.9*	*0.46*
Asia and Oceania	1,819	4.4	22.7	48.0	82.9	60.9	4.0	16.2	0.56
Central Asia	*759*	*3.7*	*14.2*	*14.2*	*32.3*	*40.7*	*-9.2*	*10.0*	*0.67*
Eastern Asia	*4,003*	*4.4*	*27.0*	*51.6*	*93.6*	*68.8*	*7.6*	*20.9*	*0.49*
South-eastern Asia	*1,080*	*3.9*	*22.1*	*41.6*	*85.7*	*59.9*	*4.6*	*14.5*	*0.49*
Southern Asia	*359*	*7.1*	*15.6*	*34.8*	*83.2*	*32.7*	*-2.0*	*12.5*	*1.15*
Western Asia	*1,603*	*3.5*	*13.1*	*34.9*	*54.8*	*41.5*	*-3.8*	*11.6*	*0.70*
Oceania	*2,193*	*-0.5*	*5.6*	*29.7*	*44.3*	*14.3*	*-7.2*	*6.2*	*0.35*
Northern America and Europe	4,956	0.5	12.4	45.7	78.7	62.5	-2.5	12.9	0.21
Europe	*4,171*	*-0.8*	*14.4*	*47.5*	*81.6*	*62.2*	*0.9*	*14.9*	*0.23*
Northern America	*6,482*	*2.1*	*10.5*	*43.1*	*69.2*	*63.8*	*-5.3*	*9.8*	*0.18*
Latin America and the Caribbean	1,210	1.4	13.6	32.5	62.8	56.5	-6.4	12.1	0.28
Caribbean	*1,622*	*0.1*	*18.9*	*84.5*	*74.4*	*40.0*	*-6.7*	*8.0*	*0.45*
Central America	*1,735*	*3.6*	*19.3*	*41.0*	*80.8*	*74.7*	*-4.5*	*15.9*	*0.17*
South America	*949*	*0.0*	*10.7*	*26.4*	*45.0*	*26.5*	*-7.2*	*11.0*	*0.35*
Groups by income and stage of industrial development									
High income	6,018	0.6	13.6	49.1	78.8	64.5	-1.8	12.9	0.19
High-income industrial economies	*6,365*	*0.5*	*13.9*	*49.8*	*81.7*	*65.5*	*-1.6*	*13.4*	*0.16*
High-income industrializing economies	*2,895*	*2.1*	*9.9*	*34.9*	*62.3*	*56.8*	*-5.1*	*8.8*	*0.68*
Middle income	1,287	5.0	21.5	43.2	78.8	55.1	2.2	15.3	0.64
Middle-income industrial economies	*2,216*	*4.8*	*23.5*	*44.4*	*83.1*	*58.2*	*4.4*	*18.0*	*0.60*
Middle-income industrializing economies	*314*	*5.8*	*13.0*	*31.8*	*56.2*	*31.6*	*-6.8*	*11.4*	*0.95*
Low income	65	2.5	9.2	7.4	29.9	17.2	-17.7	5.5	0.30
Selected regional groups									
Common Market for Eastern and Southern Africa (COMESA)	183	3.1	11.2	17.6	46.2	33.2	-13.1	6.3	0.47
Economic Community of Central African States (ECCAS)	126	4.0	10.6	4.5	19.3	21.4	-10.2	6.4	0.14
Economic Community of West African States (ECOWAS)	183	1.9	9.7	23.2	18.2	18.2	-12.6	10.0	0.28
East African Community (EAC)	94	4.1	10.2	11.5	35.8	17.0	-13.8	5.6	0.25

Table A.2 | Industrial indicators by country/area group, latest available year *(continued)*

	MVA per capita 2023 *(2015 US$)*	MVA growth rate 2023 *(%)*	MVA share in GDP 2023 *(%)*	MHT share in MVA 2021 *(%)*	Manuf. share in exports 2023 *(%)*	MHT share in manuf. exports 2023 *(%)*	Manuf. trade balance 2022 *(% GDP)*	Manuf. share in employment 2022 *(%)*	Manuf. CO_2 intensity 2021 *(kg/US$)*
Southern African Development Community (SADC)	190	1.4	10.2	6.3	46.8	37.2	-10.0	5.8	0.68
Caribbean Community (CARICOM)	450	1.4	8.4	35.1	38.3	33.7	-13.5	6.8	0.41
Southern Common Market (MERCOSUR)	986	0.4	10.3	29.8	45.3	35.8	-5.4	11.4	0.39
United States Mexico Canada Agreement (USMCA)	5,387	2.2	11.1	44.5	71.6	67.2	-5.2	11.5	0.18
Association of Southeast Asian Nations (ASEAN)	1,082	3.9	22.1	41.6	85.7	59.9	4.6	14.5	0.49
Gulf Cooperation Council (GCC)	3,272	3.2	11.8	34.4	50.7	38.6	-1.1	8.1	1.17
Eurasian Economic Union (EAEU)	1,347	4.2	13.5	25.5	51.0	34.7	1.3	13.3	1.18
European Union	5,268	-1.6	15.5	48.5	86.6	62.9	2.6	16.3	0.15
Other groups									
Emerging industrial economies	1,574	5.7	25.9	46.4	91.7	57.2	6.5	16.4	0.66
Least developed countries (LDCs)	167	5.6	14.5	8.4	48.9	9.9	-12.6	7.7	0.29
Landlocked developing countries (LLDCs)	206	3.7	11.6	13.7	33.7	32.6	-14.4	5.9	0.58
Small island developing States (SIDS)	2,229	-0.2	18.6	62.6	85.0	68.5	1.6	7.6	0.25
BRICS	1,671	5.4	23.4	46.4	82.7	55.2	5.0	16.4	0.71
G20	2,156	3.0	16.8	46.4	80.4	61.4	-0.1	14.4	0.40
Org. for Economic Co-operation and Development (OECD)	5,376	1.0	13.7	47.8	79.9	64.3	-2.1	13.5	0.17
Org. of the Petroleum Exporting Countries (OPEC)	613	3.9	10.4	32.4	43.1	39.2	-4.8	11.4	1.21

Source: [10; 19; 42]

Note: MVA per capita figures are in constant 2015 US dollars. Figures based on national accounts variables for 2023 are UNIDO estimates. CO_2 intensity is calculated as CO_2 emissions in kilograms per unit of MVA in constant 2015 US dollars. With the objective of maximizing data availability, the latest observed values for manufacturing share in employment as well as proportion of medium and high-tech MVA in total value added are used to calculate the group aggregates. Manuf. = manufacturing.

Data used to create this table can be downloaded at the UNIDO Statistics Portal.

B Explanatory notes

Unless otherwise indicated, *manufacturing* refers to ISIC Rev. 4 section C, and the combined *mining and utilities* sector includes sections B, D and E of ISIC Rev. 4 [6].

ISIC code numbers are accompanied by a descriptive title. For example, the descriptive title of ISIC division 16 is "Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials". However, the description is sometimes shortened for space considerations. In this case, ISIC division 16 may be described simply as "Wood products, excluding furniture". A list of ISIC codes and their corresponding descriptive titles is given in Annex E.1.

In the presentation of statistical tables and visualizations, individual countries and areas are referred to as economies. They are listed alphabetically, unless another ranking is considered more appropriate. Economies are classified according to their stage of industrial development and their geographical regions. Additional country groupings may be used whenever necessary. For additional information on UNIDO's classification system, see Annex E. The list of economies according to the main country groups used in the *Yearbook* is provided in Annex E.3.

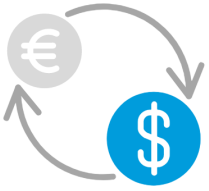
In some cases, data on economic activity and traded commodities are classified according to technological intensity. For more details on the sources of these classifications, as well as the lists of higher-technology industries and traded commodities, see Annex E.2.

Unless otherwise stated, data for China do not include data for China Hong Kong SAR, China Macao SAR and China Taiwan Province, which are presented separately.

References to dollars ($) are to dollars of the United States of America. National currencies have been converted into dollar equivalents by using period average exchange rates as published in [78] and other sources. Data converted into dollars by using current exchange rates

ISIC provides a comprehensive framework for collecting and reporting economic data for purposes of economic analysis, decision-taking and policy-making.

International Standard Industrial Classification of All Economic Activities



may be influenced by exchange rate fluctuations. Annual variations in data converted in that manner may not reflect movements in national currency data.

Growth rates and proportions are expressed in percentages. Periods set off by a hyphen (for instance, 2010–2022) include the beginning and end years. Apparent arithmetic discrepancies, such as disaggregated figures that do not add up to precise total aggregates, may result from the rounding of basic data or figures known to different degrees of precision.

Throughout this publication, three dots (...) indicate that data are not available or are not separately reported.

C Overview of methodological aspects

One of the most important objectives of UNIDO's statistical databases and regular publications, such as this *Yearbook*, is providing statistical information that facilitate international comparisons related to the manufacturing sector and the combined mining and utilities sector. Bearing in mind the requirements of international comparability when maintaining a common platform for global industrial statistics, the data presented were compiled using the international recommendations and the standards endorsed by the UN. Concepts and definitions are drawn from [6; 7].

ISIC is the recommended international reference classification of productive activities. Since the adoption of the original version in 1948, the majority of countries around the world have used ISIC as their national activity classification or have developed national classifications derived from it. Besides, it has become an essential tool for comparing statistical data on economic activities at the regional and international levels. The latest version of the classification ISIC Rev. 5 was endorsed by the UN Statistical Commission at its 54th session in March 2023. All economies are encouraged to introduce this new classification in the coming years, as far as individual requirements permit, in their industrial classification schemes.

In this publication, information on industrial sectors and their groups are still presented according to ISIC Rev. 4 [6], since this revision remains the most used classification of economic activities worldwide. Data reported in accordance with Revision 3 of ISIC (ISIC Rev. 3) [79] or other national/regional classifications of economic activities were converted to ISIC Rev. 4 using appropriate correspondence tables. In addition, UNIDO relies on imputations in case of missing data. The main objective is increasing the length of time series as well as the calculation of country group aggregates. Minor differences may arise due to data revisions or during the conversion or estimation processes. Users might therefore find discrepancies when comparing data of later years with those of earlier years, or when comparing different editions of the *Yearbook*.

ISIC

ISIC has provided guidance for developing national activity classifications since its adoption in 1948. It is an essential tool for international comparison of statistical data on economic activities.

UNIDO databases provide statistical indicators to facilitate long-term analysis of economic performance across borders

The *Yearbook* presents information sourced from a wide variety of data, including national accounts, structural business statistics, industrial performance indicators and short-term statistics. These official data compiled by UNIDO were originally collected by individual national authorities and NSOs through surveys and censuses conducted periodically, as well as from business registers and other administrative sources. The data collected were generally complemented with estimations made by national experts.

Quality dimensions of official statistics: Relevance, accuracy and reliability, timeliness and punctuality, accessibility and clarity, coherence and comparability

UNIDO relies on appropriate statistical benchmarking techniques to combine statistical information coming from multiple data sources in order to produce estimates with the highest degree of accuracy, reliability, coherence, and detail possible [7]. Statistical indicators are displayed in the *Yearbook* in terms of percentage distributions, cross-country averages, ratios and shares, real growth rates, and per capita measures. These indicators are constructed to facilitate regional, international and/or time-based comparisons.

National accounts

Industrial statistics based on the system of national accounts (SNA) provide a continuing flow of key information that is indispensable for the monitoring, analysis and evaluation of the performance of an economy over time. The main economic indicators presented in the *Yearbook*, including total value added of the manufacturing sector (ISIC Rev. 4 section C) and those for the mining and utilities sectors (ISIC Rev. 4 sections B, D and E) are obtained based on the SNA. They represent the net contribution of the respective sectors to GDP. Information on MVA and MUVA serve as significant benchmarks for measuring performance in those industrial sectors. In this publication, both MVA per capita and the share of MVA in GDP are used as markers of a country's level of industrialization and its progress towards structural transformation.

National Accounts

Statistics based on the SNA provide a continuing flow of key information that is indispensable for the monitoring, analysis and evaluation of the performance of an economy over time.

UNIDO obtains data on GDP, MVA and other national accounts aggregates mostly from the National Accounts Main Aggregates Database [80]. The database is compiled by the United Nations Statistics Division (UNSD) from official national accounts submitted by NSOs, supplemented with estimates generated by UNSD experts, whenever appropriate. It includes information for more than 200 economies and is updated annually in December. Complete information on the estimation methodology is available in [81]. The base year of these data is currently 2015.

UNIDO Statistics complements this database with other national and international sources, as needed. In addition, UNIDO generates esti-

mates of the main aggregates with the purpose of improving timeliness and facilitating comparability over time and across economies.

Population figures are based on data compiled by the Population Division of the United Nations Department of Economic and Social Affairs (DESA).

Index of industrial production (IIP)

Another important economic benchmark used in the *Yearbook* is the IIP. This index is one of the most used short-term indicators for monitoring economic trends. It facilitates assessments of industrial production growth in volume terms, free from the influence of price changes. For many economies, the index is available disaggregated by manufacturing industries at the 2-digit level. While the focus is primarily on the manufacturing sectors (ISIC Rev. 4 section C), it frequently includes information on the mining and utilities sector (ISIC Rev. 4 sections B, D and E) as well. The time series extend back to 2005. An overview of economies with available data is shown in Figure C.1.

Coverage of global value added by available quarterly IIPs

- Mining and quarrying (ISIC B): 81%
- Manufacturing (ISIC C): 97%
- Electricity (ISIC D) 79%
- Water supply (ISIC E): 40%

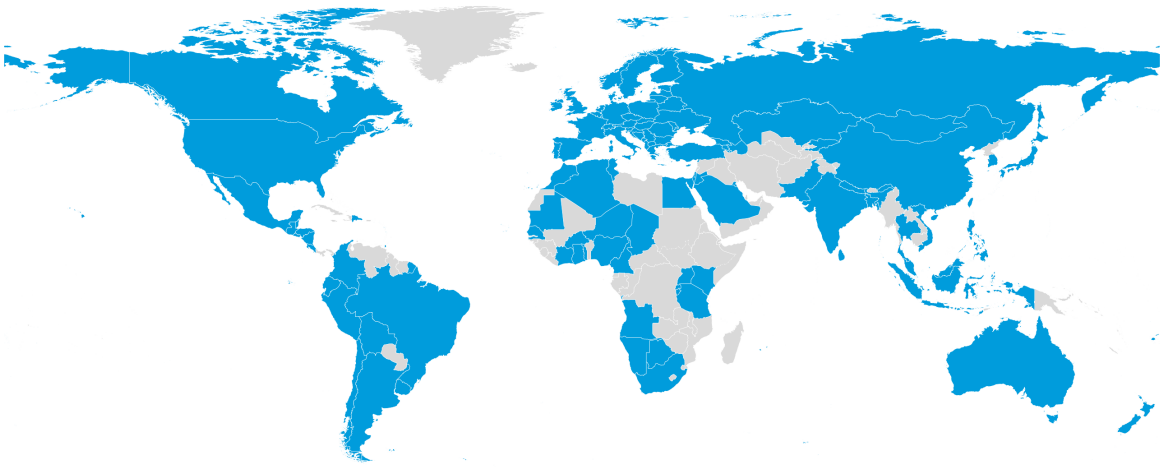
Features of the IIP and UNIDO's IIP databases

- The IIP measures the volume of industrial output in real terms, free from price fluctuations.
- It is one of the most important short-term statistics (STS), used to keep track of economic activity in industrial sectors, including manufacturing.
- It is usually available in quarterly and monthly frequencies, although with different coverage and level of detail.
- UNIDO regularly collects and harmonizes IIP data from across the world.
- It is available as the UNIDO Quarterly IIP database [18], with a coverage of almost 120 economies, and the UNIDO Monthly IIP database [82], which features 80 economies.
- Both databases include seasonally-adjusted data.

UNIDO databases include 81 economies (94% of global MVA) with monthly and quarterly IIP plus almost 40 additional economies with quarterly IIP only

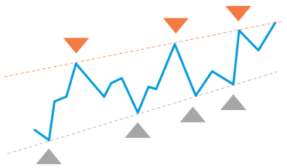
The information is compiled by UNIDO from NSOs' publications and other resources. When annual IIP data are required, it is either derived from the monthly or quarterly IIP, or collected directly from national sources if sub-annual data are not available. For the majority of European countries, information on IIP was obtained from Eurostat. Most national indices are calculated using the Laspeyres formula and a combination of volume extrapolation and deflation methods. The methodologies most commonly followed are described in [83].

Figure C.1 | Data availability of quarterly IIP indices, second quarter of 2024



It should be noted that short-term estimates are often influenced by seasonal- and calendar-related effects, which might hamper direct analysis of economic trends. UNIDO therefore conducts seasonal adjustment of the series, whenever necessary. These estimates are calculated by using the TRAMO/SEATS method in the JDemetra+ software [84].

Currently, the base year of indices in the IIP databases is 2015. If a country uses a different base year or a different classification system other than ISIC Rev. 4, the national indices are converted as appropriate. Further information on the methodology and the estimation procedure of these indices is available in [85; 86].



UNIDO IIP time series are **seasonally adjusted** to minimise the influence of seasonal- and calendar-related factors

Structural business statistics (SBS)

SBS provide important indicators concerning the detailed structure, economic activity, and performance of businesses over time, both at country and regional levels. These indicators are also presented in the *Yearbook*. The information was originally collected and reported by individual NSOs, covering a wide range of variables. The comprehensive data originating from SBS enhance assessment and comparison of industrial performance across countries at a relatively detailed level of economic activity. However, the major statistical indicators exhibited here focus mainly on the manufacturing sector and the combined mining and utilities sector at the 2-digit level of ISIC Rev. 4.

These statistics were collected by UNIDO through various sources.

SBS

A clear and comprehensive SBS methodological framework promotes production of industrial statistics with increased efficiency and high data quality, amidst today's dynamic business environment.

They include UNIDO's *General Industrial Statistics Questionnaire* sent annually to NSOs, data compiled jointly by regional and international organizations such as Eurostat and the Organisation for Economic Co-operation and Development (OECD), and relevant publications issued by individual national authorities.

Manufacturing output refers to the more refined or higher value merchandise for use or sale. It is the **end-product** of the industrial processes that use labour, machines, tools, chemical and biological processing or formulation.

It is well understood that individual national data compilation schemes vary, which could affect comparability across economies. Hence, national authorities are encouraged to adhere to UN's concepts and definitions on industrial statistics, whenever possible.

Production (output) is one of the most essential economic indicators in industrial statistics. Data reported on the census concept cover only activities of industrial nature. Whenever data based on census concept are not separately available, those derived from national accounts are used.

Output cannot be directly observed from the accounting records of enterprises/establishments [7]. The value of output in the case of estimates compiled on a production basis comprises:

a) the value of the sale of all products of the establishment;
b) the net change between the beginning and end of the reference period in the value of work in progress and stocks of goods to be shipped in the same condition as received;
c) the value of industrial work performed or industrial services rendered to others;
d) the value of goods shipped in the same condition as received less the amount paid for these goods; and
e) the value of fixed assets produced during the period by the unit for its own use.

Census and gross output

The difference between census output and gross output is the exclusion or inclusion of the output from the activities that are non-industrial in nature.

In the case of estimates compiled on a shipment basis, the net change in the value of stocks of finished goods between the beginning and the end of the reference period is also included. Gross output is equivalent to census output plus the revenue from activities of a non-industrial nature.

Valuation methods of output vary across countries/areas. The main difference is the inclusion or exclusion of taxes and subsidies on products and other taxes and subsidies on production.

- *Values at factor costs* exclude taxes on production (taxes that the producing units are liable to pay as a result of engaging in production) and includes subsidies on production (subsidies that resident enterprises may receive as a result of engaging in production, with the exception of direct subsidies on products).
- *Values at basic prices* equal values at factor costs including taxes on production and excluding subsidies on production.

Value at factor costs
excludes taxes on production and includes subsidies on production

Value at basic prices =
Value at factor costs + taxes on production - subsidies on production

- Finally, *values at producers' prices* equal values at basic prices plus taxes on products (which are those taxes payable per unit of a product, excluding value added tax (VAT)) minus subsidies on products (subsidies receivable per unit of a product) (for more details, see [63, p. 5]).

Value at producers' prices = Value at basic prices + taxes on products (excl. VAT) - subsidies on products

Another important economic measurement is value added. In SBS, the value added of manufacturing industries is a survey concept that refers to the given industries' net output derived from the difference of gross output and intermediate consumption/input. Items covered in the latter include:

a) value of materials and supplies for production, including the cost of all fuels and electricity purchased; and
b) the cost of services received (mainly payments for contract and commission work and repair and maintenance work).

If input estimates are compiled on a "received" rather than on a "consumed" basis, the result is adjusted for the net change between the beginning and the end of the period in the value of stocks of materials, fuel and other supplies. The estimates of value added are gross of depreciation and other provisions for capital consumption, unless otherwise stated. Similar to output, the valuation of value added may be at factor costs, at basic prices or at producers' prices, depending on the treatment of indirect taxes and subsidies as described above.

Beyond output, value added and employment are essential economic measurements

One more important statistical concept presented in UNIDO's databases and in this publication is employment. This is one of the central elements in the 2030 Agenda for Sustainable Development. Within the framework adopted at the 19th International Conference of Labour Statisticians in 2013, employment is defined as work performed in return for pay or profit [87]. It has long been recognized as a pathway to economic development, social inclusion and well-being. Estimates on the number of employees include both full-time and part-time workers, excluding working proprietors, active business partners, unpaid family workers, and home workers. The figures reported usually refer to the average number of workers during the reference year, obtained as the sum of the "average number of employees" during the year and the total number of other workers measured for a single period of the year.

Employment

Industrial statistics on employment are essential tools for measuring progress towards national and international policy goals.

National authorities may use the data on the number of persons engaged when those for the employees are not separately available. However, both terms are not interchangeable. Figures for persons engaged cover employees, working proprietors, active business partners, and unpaid family workers. It is worth noting that this publication also uses employment estimates obtained through household or labour force surveys; although these estimates are more timely and may provide a more complete coverage than employment estimates from

SBS, they are not available with the same granularity by industry of economic activity.

It must be noted that in this publication, aggregated national accounts data and SBS may be combined with the objective of providing comprehensive statistics for analysing and comparing industrial performance across country groups at a relatively detailed level of economic activity. For instance, it is possible to construct indicators with the combined information from the IIP and value added estimates obtained from SBS.

For each economy and industrial division, value added estimates were generated by applying IIP figures to the 2015 value added base weights. These weights were estimated by UNIDO using various national and international sources. For more country-specific SBS, readers can refer to the databases freely available at UNIDO [3].

SBS vs. IIP

SBS refer to low-frequency data (annual or less frequent) that are comprehensive but not very timely. IIP relates to high-frequency data (quarterly and monthly) that are timely but have less detail and reduced coverage.

Competitive Industrial Performance (CIP) Index

The CIP Index is a composite indicator that measures the capacity of countries/areas to increase their presence in international and domestic markets, while developing industrial sectors and activities with higher value added and higher technological level. It is constructed by combining eight variables across three dimensions:

a) *Capacity to produce and export manufactured goods.* This dimension captures a country's ability to increase the presence of its manufactured goods in international and domestic markets. It covers comparable measures of the country's manufacturing production and exports, namely MVA and manufacturing exports in per capita terms. These indicators allow for cross-country comparisons, independent of the differences in population or economy size.
b) *Technological deepening and upgrading.* The second dimension measures the technological complexity of manufacturing processes in a country by using two composite sub-indices. First, the degree of industrialization intensity that estimates the complexity of production processes. This indicator consists of the share of MVA originating from MHT industries and the share of MVA in GDP. Second, export quality, another composite indicator that measures the quality of the integration process of the country's manufacturing sector. This indicator is estimated based on the share of MHT manufacturing exports in total manufacturing exports and the share of manufacturing exports in total exports.

Three dimensions of the CIP Index

c) *World impact.* The third dimension serves as a proxy of economies of agglomeration, scope and scale present in a country's manufacturing sector. It captures the world impact based on two indicators: the country's share in world MVA and in world trade of manufactured goods.

All variables are first standardized to a [0, 1] interval. Scores for each dimension are obtained by calculating the geometric mean of the underlying variables. Finally, the overall CIP score is calculated as the geometric mean of the scores for the three dimensions. The higher the score in any of the variables, the higher the country's industrial competitiveness and its rank in the overall CIP Index. The detailed conceptual framework and methodology of the index is described in [88].

Shared blueprint for peace, prosperity for the people and the planet

Sustainable Development Goal (SDG) 9 indicators

Following the adoption of the 2030 Agenda for Sustainable Development, the global indicator framework for SDGs was developed by the UN Statistical Commission through its Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs). This was adopted by the UN General Assembly in July 2017 and is contained in the Resolution adopted by the General Assembly on Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development [89]. The latest reference metadata information for all SDG indicators is available in [90]. The current global SDG database can be consulted in [91].

SDG 9, one of the 17 global Goals, is composed of eight targets and 12 indicators aiming at building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation.

UNIDO is a custodian agency of six industry-related SDG indicators under Goal 9:

- 9.2.1 Manufacturing value added as a proportion of GDP and per capita
- 9.2.2 Manufacturing employment as a proportion of total employment
- 9.3.1 Proportion of small-scale industries in total industry value added
- 9.3.2 Proportion of small-scale industries with a loan or line of credit
- 9.4.1 CO_2 emission per unit of value added
- 9.b.1 Proportion of medium and high-tech industry value added in total value added.

SDG 9 aims to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

UNIDO has developed advanced tools for monitoring the performance of countries/areas towards achieving the industry-related targets of the SDG 9. These include an overall composite index, the SDG 9 Industry Index described below, as well as a progress metric and an outlook assessment. They have the objective of identifying lagging cases and thus support countries/areas in their successful implementation of ISID. The data and relevant analytical tools are available in the UNIDO Statistics Portal [19] and in UNIDO's Industrial Analytics Platform (IAP) [92]. Detailed methodological notes about these tools are available at [25].

What drives SDG 9 industry performance?
Check out the progress on
SDG 9 Industry Tracker

SDG 9 Industry Index

The SDG 9 Industry Index is a composite indicator that summarizes countries' performance on the industry-related Targets of SDG 9. It combines the information of the indicators for which UNIDO is the custodian agency and for which sufficient data are available.

A short explanation of the Index's calculation is presented below. A more complete description on the methodology can be found in [25; 93].

All five indicators are first normalized through the min-max method to standardize the variables for further data aggregation, as they have different measurement units. The normalization is applied with three caveats: (i) the minimum and maximum values for normalizing each indicator are calculated over the entire sample of observations, which consists of all countries with available information over the period from 2000 to the latest year; (ii) to avoid the excessive influence of outliers in the transformation, the observed minimum and maximum values are capped at three standard deviations from the mean; (iii) an inverse normalization is applied to SDG indicator 9.4.1 (CO_2 *emission intensity of manufacturing*), so that all normalized indicators follow the same direction. As a result of these steps, normalized indicators have a range of [0, 1], with zero indicating the case with the lowest performance and one indicating the case with the best performance. All normalized indicators have the same direction: a higher value indicates a better performance. Finally, since the normalization is calculated using common parameters, the resulting indicators can be used for comparisons across countries and time.

SDG indicators on small manufacturing firms lack sufficient data coverage to be included in the SDG 9 Industry Index

SDG 9 Industry Index is a summary measure of inclusive and sustainable industrial development as declared in the 2030 Agenda for Sustainable Development

The Index score is then calculated as the geometric mean of the five normalized indicators. Geometric aggregation allows to limit compensability among indicators. However, it has the disadvantage that a country with a value of zero in one normalized indicator (i.e., when it coincides with the minimum value observed in the sample) would have a composite Index equal to zero in that period. It is worth noting that

the five indicators are aggregated under an equal weighting scheme. This choice makes the Index transparent and facilitates interpretation [94]. Based on the Index score, ranks are also calculated to facilitate country comparison.

As described in the methodology summary above, the construction of the Index requires available information for all five indicators. The Index currently covers 135 countries for the period from 2000 to 2021.

Country/area classifications

UNIDO country classification is based on a combination of income groups and industrialization indicators

The main purpose of the UNIDO country classification is defining a relatively homogeneous set of country groups that have common features in terms of their stage of industrial development, determined by objective criteria derived from official indicators of industrial performance. It adheres to the basic principles of statistical classifications, as defined in [95]. The country groups are revised annually with the objective of reflecting countries' current economic situation, while the classification methodology remains stable. More information on the classification methodology can be found in [96].

The main country classification proposed by UNIDO divides countries/areas according to a combination of their income level and their stage of industrial development. It therefore relies on two parameters: (i) per capita income levels, sourced from the World Bank's 2024 income groups [97]; and (ii) structural transformation metrics (MVA per capita in constant USD and historical maximum of the share of MVA in GDP), calculated from UNIDO databases. This classification system allocates countries/areas among five groups:

Five UNIDO country groups: two groups of industrial economies and three groups of industrializing economies

- *High-income industrial economies*: Countries/areas that have achieved a high national income through a development path that resulted in highly industrialized economies.
- *High-income industrializing economies*: Countries/areas with a high income level but with relatively low levels of industrialization.
- *Medium-income industrial economies*: Countries/areas classified as medium-income economies that have already achieved positive outcomes in terms of structural transformation indicators.
- *Medium-income industrializing economies*: Countries/areas classified as medium-income but that still remain at comparatively low levels of industrialization; these are some of the economies that could benefit the most from prioritizing industrial development in their policy strategies.

- *Low-income economies*: Countries/areas that remain at low income levels and also underperform in industrial development indicators; these economies would greatly gain from an accelerated structural change process that could help them escape the development trap.

This classification has the objective of summarizing large amounts of country-level data into relevant insights and common trends observed in countries facing similar development challenges. The list of economies according to these five groups is included in Annex E.4.

A special economic group proposed by UNIDO is that of emerging industrial economies (EIEs). These are the most dynamic low- and middle-income economies in terms of their industrial performance. It includes economies that have continuously registered positive spells of growth in MVA. This group includes 15 economies in 2024: four middle-income industrial economies, seven middle-income industrializing economies and four low-income economies. The list is given in Annex Table E.5.1.

Countries/areas are also classified according to geographical region. UNIDO follows the UN Standard Country or Area Codes for Statistical Use (M49) [98]. According to this standard, all world economies are assigned to one of the several main regions, which are then further divided into subregions. These regional groupings are, inter alia, the main classification system used for SDG indicators. The complete classification is given in Annex E.3.

Finally, the report also considers the three country groups with specific development challenges, according to official UN lists. These are LDCs, LLDCs and SIDS, presented in Annex E.5.

Geographical regions follow the official UN classification of countries and areas for statistical use: M49 Standard

D UNIDO Statistics and the International Yearbook of Industrial Statistics

D.1 UNIDO Statistics

Following the recommendations of the United Nations Statistical Commission, UNIDO has the mandate to compile and disseminate international statistics on the manufacturing, mining and utilities sectors. This involves the regular collection, screening and validation of industrial data from official sources and presenting them according to harmonized definitions and classifications. UNIDO generates analytical indicators based on official data, which can be used to monitor a country's prevailing economic performance and progress in terms of ISID.

The statistics are disseminated through various databases available at the UNIDO Statistics Portal [3], as well as publications such as this *Yearbook*. These products offer statistical information to a wide range of users, including national governments, international development partners, academic and research institutions, as well as the business and statistical communities. Priority is given to quality assurance of statistics, especially in terms of international comparability and alignment with UN recommended concepts, definitions, classifications and coverage.

As a custodian agency of six industry-related indicators under SDG 9, UNIDO has been actively involved in the process of developing and monitoring the global indicator framework for the 2030 Agenda for Sustainable Development. UNIDO contributes to the *UN SDG Global Database* [91], reports to the IAEG-SDGs and collaborates with countries on improving data availability and quality for better tracking their progress towards the 2030 Agenda.

The organization cooperates closely with other international agencies, namely the ILO on employment; the IEA on CO_2 emissions; and the World Bank on access to finance, to produce data and compile the corresponding SDG indicators. Furthermore, UNIDO publishes the *SDG 9*

Open access to statistical products at the UNIDO Statistics Portal

UNIDO industrial statistics databases

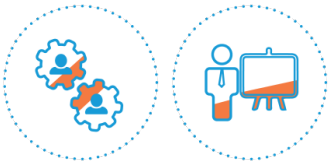
- INDSTAT [37; 38]
- IDSB [99]
- Quarterly/monthly IIP [18; 82]
- SDG 9 [19]
- National accounts [10]
- Manufacturing trade [42]
- CIP Index [36]

SDG 9 monitoring

Industry Index, benchmarking countries' performance towards achieving the industry-related targets of SDG 9 [93]. Countries can monitor their progress and prospects towards achieving industry-related SDG targets by using the *SDG 9 Industry Tracker*, which relies on the *SDG 9 Industry Index* and is supported by additional progress assessment measures [92]. These insights are summarized in a biennial UNIDO report, presenting progress achieved towards the industry-related targets of SDG 9 [19].

SDG 9 Industry Tracker

Industrial statistics are essential for formulating industrial development strategies and policies, analysing structural change and monitoring economic growth. UNIDO shares its expertise in industrial statistics with national and regional statistical offices by providing technical assistance and trainings on a wide range of topics. By implementing customized programmes to target countries' specific needs, UNIDO assists in strengthening the institutional capacity of NSOs and line ministries to collect industrial data, maintain business registers, set up short-term statistical indicators and information systems, carry out data analyses of industrial performance and track progress on SDGs. UNIDO furthermore provides capacity development activities on the usage of empirical data for economic analyses, which are relevant for promoting industrial development through evidence-based policymaking.



Technical assistance and trainings

D.2 The International Yearbook of Industrial Statistics

This *Yearbook* presents a summary of the most recent data in the manufacturing, mining and utilities sectors. It outlines the current performance and latest developments in industry, allowing the reader to analyse patterns of growth, business cycle fluctuations and longer term trends, including progress towards structural change, ISID and SDG 9. While the *Yearbook* focuses on aggregate global trends observed in industrial sectors, it also highlights the main regional trends and sector-specific developments. More detailed information for specific regions and country groups are presented in factsheets accompanying the *Yearbook*.

This publication relies on visualizations and short analytical texts to summarize the prevailing situation in global industry and to highlight key insights extracted from the data. It is essentially sourced from information that is available on UNIDO Statistics Portal [3]. Interested readers are invited to visit this online resource to access the full datasets and related statistical products.

All data featured in this *Yearbook* can be accessed at the UNIDO Statistics Portal

All data presented in this *Yearbook* were compiled bearing in mind the coherence of industrial statistics derived from various sources, the

requirements of international comparability, and the standards of this work endorsed by the UN Statistical Commission. Concepts and definitions were drawn from international recommendations applicable to industrial statistics [7] and the classification of economic activities according to ISIC [6].

This is the thirtieth edition of the *International Yearbook of Industrial Statistics*, published by UNIDO since 1995. For historical reference, this publication replaced two reports: the *Handbook of Industrial Statistics* [100], which was published biennially by UNIDO until 1992, and the *United Nations Industrial Statistics Yearbook Volume I (General Industrial Statistics)* [101], which was discontinued after its 1991 edition was published in 1993 by UNSD. These changes were introduced in line with the recommendations of the United Nations Statistical Commission at its twenty-seventh session.

International Yearbook of Industrial Statistics 2023

The present *Yearbook* and its two most recent editions feature several novelties compared to earlier editions. The new format represents an effort to modernize this long-standing publication, expanding its coverage to include all aspects of industrial statistics. It merges the contents of earlier editions of the *Yearbook* (see [102] for the last edition under the previous format) and the biennial report *World Statistics on Mining and Utilities* (see [103] for the last edition), at the same time expands its coverage to include the CIP Index, SDG 9 indicators and other industrial performance indicators.

The *Yearbook* will continue upgrading and expanding its coverage of ISID indicators in coming years, reaffirming UNIDO's role as the international reference point on industrial statistics.

E Classifications

E.1 International Standard Industrial Classification of All Economic Activities

Table E.1.1 | ISIC Rev. 4 B – Mining and quarrying

Division	Group	Description
05		Mining of coal and lignite
	051	Mining of hard coal
	052	Mining of lignite
06		Extraction of crude petroleum & natural gas
	061	Extraction of crude petroleum
	062	Extraction of natural gas
07		Mining of metal ores
	071	Mining of iron ores
	072	Mining of non-ferrous metal ores
08		Other mining and quarrying
	081	Quarrying of stone, sand and clay
	089	Mining and quarrying n.e.c.
09		Mining support service activities
	091	Support activities for petroleum
	099	Support activities for other mining, quarrying

Source: [6]

Table E.1.2 | ISIC Rev. 4 C – Manufacturing

Division	Group	Description
10		Food products
	101	Processing/preserving of meat
	102	Processing/preserving of fish, etc.
	103	Processing/preserving of fruit,vegetables
	104	Vegetable and animal oils and fats
	105	Dairy products
	106	Grain mill products,starches and starch products
	107	Other food products
	108	Prepared animal feeds
11		Beverages
	110	Beverages
12		Tobacco products
	120	Tobacco products
13		Textiles
	131	Spinning, weaving and finishing of textiles
	139	Other textiles
14		Wearing apparel
	141	Wearing apparel, except fur apparel
	142	Articles of fur
	143	Knitted and crocheted apparel
15		Leather and related products
	151	Leather;luggage,handbags,saddlery,harness;fur
	152	Footwear
16		Wood products, excluding furniture
	161	Sawmilling and planing of wood
	162	Wood products, cork, straw, plaiting materials
17		Paper and paper products
	170	Paper and paper products
18		Printing and reproduction of recorded media
	181	Printing and service activities related to printing
	182	Reproduction of recorded media
19		Coke and refined petroleum products
	191	Coke oven products
	192	Refined petroleum products
20		Chemicals and chemical products
	201	Basic chemicals,fertilizers, etc.
	202	Other chemical products
	203	Man-made fibres
21		Pharmaceuticals,medicinal chemicals, etc.
	210	Pharmaceuticals,medicinal chemicals, etc.
22		Rubber and plastics products
	221	Rubber products
	222	Plastics products
23		Other non-metallic mineral products
	231	Glass and glass products
	239	Non-metallic mineral products n.e.c.
24		Basic metals
	241	Basic iron and steel
	242	Basic precious and other non-ferrous metals
	243	Casting of metals

Table E.1.2 | ISIC Rev. 4 C – Manufacturing *(continued)*

Division	Group	Description
25		Fabricated metal products, except machinery
	251	Struct.metal products, tanks, reservoirs
	252	Weapons and ammunition
	259	Other metal products;metal working services
26		Computer, electronic and optical products
	261	Electronic components and boards
	262	Computers and peripheral equipment
	263	Communication equipment
	264	Consumer electronics
	265	Measuring,testing equipment; watches, etc.
	266	Irradiation/electromedical equipment,etc.
	267	Optical instruments and photographic equipment
	268	Magnetic and optical media
27		Electrical equipment
	271	Electric motors,generators,transformers,etc.
	272	Batteries and accumulators
	273	Wiring and wiring devices
	274	Electric lighting equipment
	275	Domestic appliances
	279	Other electrical equipment
28		Machinery and equipment n.e.c.
	281	General-purpose machinery
	282	Special-purpose machinery
29		Motor vehicles, trailers and semi-trailers
	291	Motor vehicles
	292	Automobile bodies, trailers and semi-trailers
	293	Parts and accessories for motor vehicles
30		Other transport equipment
	301	Building of ships and boats
	302	Railway locomotives and rolling stock
	303	Air and spacecraft and related machinery
	304	Military fighting vehicles
	309	Transport equipment n.e.c.
31		Furniture
	310	Furniture
32		Other manufacturing
	321	Jewellery, bijouterie and related articles
	322	Musical instruments
	323	Sports goods
	324	Games and toys
	325	Medical and dental instruments and supplies
	329	Other manufacturing n.e.c.
33		Repair and installation of machinery/equipment
	331	Repair of fabricated metal products/machinery
	332	Installation of industrial machinery/equipment

Source: [6]

Table E.1.3 | ISIC Rev. 4 D – Electricity, gas, steam and air conditioning supply

Division	Group	Description
35		Electricity, gas, steam & air conditioning
	351	Electric power generation, transmission
	352	Manufacture of gas
	353	Steam and air conditioning supply

Source: [6]

Table E.1.4 | ISIC Rev. 4 E – Water supply; sewerage, waste management and remediation activities

Division	Group	Description
36		Water collection, treatment and supply
	360	Water collection, treatment and supply
37		Sewerage
	370	Sewerage
38		Waste collection,treatment,disposal activities
	381	Waste collection
	382	Waste treatment and disposal
	383	Materials recovery
39		Remediation activities
	390	Remediation activities

Source: [6]

E.2 List of higher technology industries and traded commodities

Data on economic activity and traded commodities can be classified according to technological intensity. In the case of industries, the classification is based on research and development (R&D) expenditure relative to value added, also known as R&D intensity, as calculated by the OECD [104; 105]. In this publication, "higher technology" industries refer to the group of medium-high and high technology industries (MHT) given in Table E.2.1*. In the case of traded commodities, the classification is based on technological content as calculated in [41; 106]. In this publication, "higher technology" commodities refer to the group of medium and high technology commodities, provided in Table E.2.2

Table E.2.1 | Medium-high and high technology manufacturing industries by ISIC Rev. 3 and 4

	Description
ISIC Rev. 3	
24	Manufacture of chemicals and chemical products
29	Manufacture of machinery and equipment n.e.c.
30	Manufacture of office, accounting and computing machinery
31	Manufacture of electrical machinery and apparatus n.e.c.
32	Manufacture of radio, television and communication equipment and apparatus
33	Manufacture of medical, precision and optical instruments, watches and clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment, excluding 351 = Building and repairing of ships and boats
ISIC Rev. 4	
20	Manufacture of chemicals and chemical products
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
252	Manufacture of weapons and ammunition
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment excluding 301 = Building of ships and boats
325	Manufacture of medical and dental instruments and supplies

Source: [104; 105; 107]

* Although this classification includes both the 2-digit and 3-digit levels of ISIC Rev. 4, the majority of the analyses presented in this *Yearbook* is based on the 2-digit level of ISIC Rev. 4 because of data availability constraints. Nevertheless, whenever data at 3-digit level of ISIC Rev. 4 were available, they were also considered in UNIDO estimates. For detail country-specific SBS, readers can refer to the databases available at UNIDO [3].

Table E.2.2 | Medium and high technology commodities by SITC Rev. 3

	Description
SITC Rev. 3	
266	Synthetic fibres suitable for spinning
267	Other man-made fibres suitable for spinning; waste of man-made fibres
512	Alcohols, phenols, phenol-alcohols, and their halogenated, sulphonated, nitrated or nitrosated derivatives
513	Carboxylic acids and their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives
525	Radioactive and associated materials
533	Pigments, paints, varnishes and related materials
541	Medicinal and pharmaceutical products, other than medicaments of group 542
542	Medicaments (including veterinary medicaments)
553	Perfumery, cosmetic or toilet preparations (excluding soaps)
554	Soap, cleansing and polishing preparations
562	Fertilizers (other than those of group 272)
571	Polymers of ethylene, in primary forms
572	Polymers of styrene, in primary forms
573	Polymers of vinyl chloride or of other halogenated olefins, in primary forms
574	Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms
575	Other plastics, in primary forms
579	Waste, parings and scrap, of plastics
581	Tubes, pipes and hoses, and fittings therefor, of plastics
582	Plates, sheets, film, foil and strip, of plastics
583	Monofilament of which any cross-sectional dimension exceeds 1 mm, rods, sticks and profile shapes, whether or not surface-worked but not otherwise worked, of plastics
591	Insecticides, rodenticides, fungicides, herbicides, anti-sprouting products and plant-growth regulators, disinfectants and similar products, put up in forms or packings for retail sale or as preparations or articles (e.g., sulphur-treated bands, wicks and
593	Explosives and pyrotechnic products
597	Prepared additives for mineral oils and the like; prepared liquids for hydraulic transmission; anti-freezing preparations and prepared de-icing fluids; lubricating preparations
598	Miscellaneous chemical products, n.e.s.
653	Fabrics, woven, of man-made textile materials (not including narrow or special fabrics)
671	Pig-iron, spiegeleisen, sponge iron, iron or steel granules and powders and ferro-alloys
672	Ingots and other primary forms, of iron or steel; semi-finished products of iron or steel
678	Wire of iron or steel
711	Steam or other vapour-generating boilers, superheated water boilers, and auxiliary plant for use therewith; parts thereof
712	Steam turbines and other vapour turbines, and parts thereof, n.e.s.
713	Internal combustion piston engines, and parts thereof, n.e.s.
714	Engines and motors, non-electric (other than those of groups 712, 713 and 718); parts, n.e.s., of these engines and motors
716	Rotating electric plant, and parts thereof, n.e.s.
718	Power-generating machinery, and parts thereof, n.e.s.
721	Agricultural machinery (excluding tractors), and parts thereof
722	Tractors (other than those of headings 744.14 and 744.15)

723 Civil engineering and contractors' plant and equipment; parts thereof
724 Textile and leather machinery, and parts thereof, n.e.s.
725 Paper mill and pulp mill machinery, paper-cutting machines and other machinery for the manufacture of paper articles; parts thereof
726 Printing and bookbinding machinery, and parts thereof
727 Food-processing machines (excluding domestic); parts thereof
728 Other machinery and equipment specialized for particular industries; parts thereof, n.e.s.
731 Machine tools working by removing metal or other material
733 Machine tools for working metal, sintered metal carbides or cermets, without removing material
735 Parts, n.e.s., and accessories suitable for use solely or principally with the machines falling within groups 731 and 733 (including work or tool holders, self-opening die-heads, dividing heads and other special attachments for machine tools); tool holder
737 Metalworking machinery (other than machine tools), and parts thereof, n.e.s.
741 Heating and cooling equipment, and parts thereof, n.e.s.
742 Pumps for liquids, whether or not fitted with a measuring device; liquid elevators; parts for such pumps and liquid elevators
743 Pumps (other than pumps for liquids), air or other gas compressors and fans; ventilating or recycling hoods incorporating a fan, whether or not fitted with filters; centrifuges; filtering or purifying apparatus; parts thereof
744 Mechanical handling equipment, and parts thereof, n.e.s.
745 Non-electrical machinery, tools and mechanical apparatus, and parts thereof, n.e.s.
746 Ball- or roller bearings
747 Taps, cocks, valves and similar appliances for pipes, boiler shells, tanks, vats or the like, including pressure-reducing valves and thermostatically controlled valves
748 Transmission shafts (including camshafts and crankshafts) and cranks; bearing housings and plain shaft bearings; gears and gearing; ball screws; gearboxes and other speed changers (including torque converters); flywheels and pulleys (including pulley bloc
749 Non-electric parts and accessories of machinery, n.e.s.
751 Office machines
752 Automatic data-processing machines and units thereof; magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, n.e.s.
759 Parts and accessories (other than covers, carrying cases and the like) suitable for use solely or principally with machines falling within groups 751 and 752
761 Television receivers (including video monitors and video projectors), whether or not incorporating radio-broadcast receivers or sound- or video-recording or reproducing apparatus
762 Radio-broadcast receivers, whether or not incorporating sound-recording or reproducing apparatus or a clock
763 Sound recorders or reproducers; television image and sound recorders or reproducers; prepared unrecorded media
764 Telecommunications equipment, n.e.s., and parts, n.e.s., and accessories of apparatus falling within division 76
771 Electric power machinery (other than rotating electric plant of group 716), and parts thereof
772 Electrical apparatus for switching or protecting electrical circuits or for making connections to or in electrical circuits (e.g., switches, relays, fuses, lightning arresters, voltage limiters, surge suppressors, plugs and sockets, lamp-holders and junct

773 Equipment for distributing electricity, n.e.s.
774 Electrodiagnostic apparatus for medical, surgical, dental or veterinary purposes, and radiological apparatus
775 Household-type electrical and non-electrical equipment, n.e.s.
776 Thermionic, cold cathode or photo-cathode valves and tubes (e.g., vacuum or vapour or gas-filled valves and tubes, mercury arc rectifying valves and tubes, cathode-ray tubes, television camera tubes); diodes, transistors and similar semiconductor devices;
778 Electrical machinery and apparatus, n.e.s.
781 Motor cars and other motor vehicles principally designed for the transport of persons (other than motor vehicles for the transport of ten or more persons, including the driver), including station-wagons and racing cars
782 Motor vehicles for the transport of goods and special-purpose motor vehicles
783 Road motor vehicles, n.e.s.
784 Parts and accessories of the motor vehicles of groups 722, 781, 782 and 783
785 Motor cycles (including mopeds) and cycles, motorized and non-motorized; invalid carriages
786 Trailers and semi-trailers; other vehicles, not mechanically-propelled; specially designed and equipped transport containers
791 Railway vehicles (including hovertrains) and associated equipment
792 Aircraft and associated equipment; spacecraft (including satellites) and spacecraft launch vehicles; parts thereof
793 Ships, boats (including hovercraft) and floating structures
811 Prefabricated buildings
812 Sanitary, plumbing and heating fixtures and fittings, n.e.s.
813 Lighting fixtures and fittings, n.e.s.
871 Optical instruments and apparatus, n.e.s.
872 Instruments and appliances, n.e.s., for medical, surgical, dental or veterinary purposes
873 Meters and counters, n.e.s.
874 Measuring, checking, analysing and controlling instruments and apparatus, n.e.s.
881 Photographic apparatus and equipment, n.e.s.
882 Photographic and cinematographic supplies
884 Optical goods, n.e.s.
885 Watches and clocks
891 Arms and ammunition

Source: [41; 106]

E.3 Country/area classification by geographical region

Table E.3.1 | Country/area classification by geographical region

Africa	**Americas**	China, Hong Kong SAR	Northern Europe
Central Africa	Caribbean	China, Macao SAR	Denmark
Angola	Anguilla	China, Taiwan Province	Estonia
Cameroon	Antigua and Barbuda	Democratic People's Republic of Korea	Finland
Central African Republic	Aruba	Japan	Iceland
Chad	Bahamas	Mongolia	Ireland
Congo	Barbados	Republic of Korea	Latvia
Democratic Republic of the Congo	British Virgin Islands	South-eastern Asia	Lithuania
Equatorial Guinea	Cayman Islands	Brunei Darussalam	Norway
Gabon	Cuba	Cambodia	Sweden
Sao Tome and Principe	Curaçao	Indonesia	United Kingdom
Eastern Africa	Dominica	Lao People's Democratic Republic	Southern Europe
Burundi	Dominican Republic	Malaysia	Albania
Comoros	Grenada	Myanmar	Andorra
Djibouti	Haiti	Philippines	Bosnia and Herzegovina
Eritrea	Jamaica	Singapore	Croatia
Ethiopia	Montserrat	Thailand	Greece
Kenya	Puerto Rico	Timor-Leste	Italy
Madagascar	Saint Kitts and Nevis	Viet Nam	Kosovo
Malawi	Saint Lucia	Southern Asia	Malta
Mauritius	Saint Vincent and the Grenadines	Afghanistan	Montenegro
Mozambique	Sint Maarten (Dutch part)	Bangladesh	North Macedonia
Rwanda	Trinidad and Tobago	Bhutan	Portugal
Seychelles	Turks and Caicos Islands	India	San Marino
Somalia	Central America	Iran (Islamic Republic of)	Serbia
South Sudan	Belize	Maldives	Slovenia
Uganda	Costa Rica	Nepal	Spain
United Republic of Tanzania	El Salvador	Pakistan	Western Europe
Zambia	Guatemala	Sri Lanka	Austria
Zimbabwe	Honduras	Western Asia	Belgium
Northern Africa	Mexico	Armenia	France
Algeria	Nicaragua	Azerbaijan	Germany
Egypt	Panama	Bahrain	Liechtenstein
Libya	Northern America	Cyprus	Luxembourg
Morocco	Bermuda	Georgia	Monaco
Sudan	Canada	Iraq	Netherlands (Kingdom of the)
Tunisia	Greenland	Israel	Switzerland
Southern Africa	United States of America	Jordan	**Oceania**
Botswana	South America	Kuwait	Australia and New Zealand
Eswatini	Argentina	Lebanon	Australia
Lesotho	Bolivia (Plurinational State of)	Oman	New Zealand
Namibia	Brazil	Qatar	Melanesia
South Africa	Chile	Saudi Arabia	Fiji
Western Africa	Colombia	State of Palestine	New Caledonia
Benin	Ecuador	Syrian Arab Republic	Papua New Guinea
Burkina Faso	Guyana	Türkiye	Solomon Islands
Cabo Verde	Paraguay	United Arab Emirates	Vanuatu
Côte d'Ivoire	Peru	Yemen	Micronesia
Gambia	Suriname	**Europe**	Kiribati
Ghana	Uruguay	Eastern Europe	Marshall Islands
Guinea	Venezuela (Bolivarian Republic of)	Belarus	Micronesia (Federated States of)
Guinea-Bissau	**Asia**	Bulgaria	Nauru
Liberia	Central Asia	Czechia	Palau
Mali	Kazakhstan	Hungary	Polynesia
Mauritania	Kyrgyzstan	Poland	Cook Islands
Niger	Tajikistan	Republic of Moldova	French Polynesia
Nigeria	Turkmenistan	Romania	Samoa
Senegal	Uzbekistan	Russian Federation	Tonga
Sierra Leone	Eastern Asia	Slovakia	Tuvalu
Togo	China	Ukraine	

Source: [98]

E.4 Country/area classification by stage of industrial development

Table E.4.1 | Country/area classification by stage of industrial development

High-income industrial economies			
Australia	France	Malta	Slovakia
Austria	Germany	Nauru	Slovenia
Bahrain	Hungary	Netherlands (Kingdom of the)	Spain
Belgium	Ireland	New Caledonia	Sweden
Brunei Darussalam	Israel	New Zealand	Switzerland
Canada	Italy	Poland	Trinidad and Tobago
China, Taiwan Province	Japan	Puerto Rico	United Kingdom
Croatia	Latvia	Republic of Korea	United States of America
Czechia	Liechtenstein	Romania	Uruguay
Estonia	Lithuania	San Marino	
Finland	Luxembourg	Singapore	
High-income industrializing economies			
Andorra	Chile	Greenland	Portugal
Anguilla	China, Hong Kong SAR	Guyana	Qatar
Antigua and Barbuda	China, Macao SAR	Iceland	Saint Kitts and Nevis
Aruba	Cook Islands	Kuwait	Saudi Arabia
Bahamas	Curaçao	Monaco	Seychelles
Barbados	Cyprus	Montserrat	Sint Maarten (Dutch part)
Bermuda	Denmark	Norway	Turks and Caicos Islands
British Virgin Islands	French Polynesia	Oman	United Arab Emirates
Cayman Islands	Greece	Panama	
Middle-income industrial economies			
Argentina	Ecuador	Malaysia	South Africa
Belarus	Egypt	Mauritius	Sri Lanka
Brazil	El Salvador	Mexico	Suriname
Bulgaria	Equatorial Guinea	Paraguay	Thailand
China	Eswatini	Peru	Turkmenistan
Colombia	Indonesia	Philippines	Türkiye
Costa Rica	Iran (Islamic Republic of)	Russian Federation	Viet Nam
Dominican Republic	Jordan	Serbia	
Middle-income industrializing economies			
Albania	Dominica	Lesotho	Saint Vincent and the Grenadines
Algeria	Fiji	Libya	Samoa
Angola	Gabon	Maldives	Sao Tome and Principe
Armenia	Georgia	Marshall Islands	Senegal
Azerbaijan	Ghana	Mauritania	Solomon Islands
Bangladesh	Grenada	Micronesia (Federated States of)	State of Palestine
Belize	Guatemala	Mongolia	Tajikistan
Benin	Guinea	Montenegro	Timor-Leste
Bhutan	Haiti	Morocco	Tonga
Bolivia (Plurinational State of)	Honduras	Myanmar	Tunisia
Bosnia and Herzegovina	India	Namibia	Tuvalu
Botswana	Iraq	Nepal	Ukraine
Cabo Verde	Jamaica	Nicaragua	United Republic of Tanzania
Cambodia	Kazakhstan	Nigeria	Uzbekistan
Cameroon	Kenya	North Macedonia	Vanuatu
Comoros	Kiribati	Pakistan	Venezuela (Bolivarian Republic of)
Congo	Kosovo	Palau	Zambia
Cuba	Kyrgyzstan	Papua New Guinea	Zimbabwe
Côte d'Ivoire	Lao People's Democratic Republic	Republic of Moldova	
Djibouti	Lebanon	Saint Lucia	
Low income			
Afghanistan	Eritrea	Mali	Sudan
Burkina Faso	Ethiopia	Mozambique	Syrian Arab Republic
Burundi	Gambia	Niger	Togo
Central African Republic	Guinea-Bissau	Rwanda	Uganda
Chad	Liberia	Sierra Leone	Yemen
Democratic People's Republic of Korea	Madagascar	Somalia	
Democratic Republic of the Congo	Malawi	South Sudan	

Source: [96]

E.5 Other common country/area groups

Table E.5.1 | List of countries/areas included in Emerging industrial economies

Emerging industrial economies		
Bangladesh	Indonesia	Rwanda
Cambodia	Lao People's Dem. Rep	Somalia
China	Malaysia	Tanzania
Ethiopia	Maldives	Uganda
India	Myanmar	Viet Nam

Source: [96]

Table E.5.2 | List of countries/areas included in Least developed countries (LDCs)

Least developed countries (LDCs)		
Afghanistan	Guinea	Rwanda
Angola	Guinea-Bissau	Sao Tome and Principe
Bangladesh	Haiti	Senegal
Benin	Kiribati	Sierra Leone
Burkina Faso	Lao People's Dem. Rep	Solomon Islands
Burundi	Lesotho	Somalia
Cambodia	Liberia	South Sudan
Central African Republic	Madagascar	Sudan
Chad	Malawi	Tanzania
Comoros	Mali	Timor-Leste
Congo, Dem. Rep. of	Mauritania	Togo
Djibouti	Mozambique	Tuvalu
Eritrea	Myanmar	Uganda
Ethiopia	Nepal	Yemen
Gambia	Niger	Zambia

Source: [108]

Table E.5.3 | List of countries/areas included in Landlocked developing countries (LLDCs)

Landlocked developing countries (LLDCs)		
Afghanistan	Ethiopia	North Macedonia
Armenia	Kazakhstan	Paraguay
Azerbaijan	Kyrgyzstan	Rwanda
Bhutan	Lao People's Dem. Rep	South Sudan
Bolivia (Plurinational State of)	Lesotho	Tajikistan
Botswana	Malawi	Turkmenistan
Burkina Faso	Mali	Uganda
Burundi	Moldova, Rep. of	Uzbekistan
Central African Republic	Mongolia	Zambia
Chad	Nepal	Zimbabwe
Eswatini	Niger	

Source: [109]

Table E.5.4 | List of countries/areas included in Small island developing States (SIDS)

Small island developing States (SIDS)		
Anguilla	Grenada	Saint Kitts and Nevis
Antigua and Barbuda	Guinea-Bissau	Saint Lucia
Aruba	Guyana	Samoa
Bahamas	Haiti	Sao Tome and Principe
Barbados	Jamaica	Seychelles
Belize	Kiribati	Singapore
British Virgin Islands	Maldives	Sint Maarten (Dutch part)
Cabo Verde	Marshall Islands	Solomon Islands
Comoros	Mauritius	St. Vincent and the Grenadines
Cook Islands	Micronesia, Fed. States of	Suriname
Cuba	Montserrat	Timor-Leste
Curaçao	Nauru	Tonga
Dominica	New Caledonia	Trinidad and Tobago
Dominican Republic	Palau	Tuvalu
Fiji	Papua New Guinea	Vanuatu
French Polynesia	Puerto Rico	

Source: [110]

Table E.5.5 | List of countries/areas included in BRICS

BRICS		
Brazil	Ethiopia	Russian Federation
China	India	South Africa
Egypt	Iran	United Arab Emirates

Source: [111]

References

[1] United Nations. *Doha Programme of Action for Least Developed Countries*. Available at https://digitallibrary.un.org (accessed on Nov. 2024). 2022 (cited on pages 3, 96).

[2] United Nations Industrial Development Organization (UNIDO). *Industrial Development Report 2024 - Turning Challenges into Sustainable Solutions: The New Era of Industrial Policy*. Available at https://www.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2024 (cited on pages 3, 6, 40, 41, 43, 66, 68, 96).

[3] United Nations Industrial Development Organization (UNIDO). *UNIDO Statistics Portal*. Available at https://stat.unido.org (accessed on Nov. 2024). 2024 (cited on pages 3, 132, 137, 138, 144).

[4] United Nations Industrial Development Organization (UNIDO). *Industrial Development Report 2022: The Future of Industrialization in a Post-Pandemic World*. Available at https://www.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2021 (cited on page 3).

[5] University of Oxford. "Industry (n.), sense 5.a." In: *Oxford English Dictionary*. Available at https://www.oed.com/dictionary (accessed on Nov. 2024). 2023 (cited on page 4).

[6] United Nations. *International Standard Industrial Classification of All Economic Activities (ISIC), Rev.4*. United Nations, 2008 (cited on pages 4, 5, 124, 126, 139, 140, 142, 143, 160).

[7] United Nations. *International Recommendations for Industrial Statistics*. New York: United Nations, 2008 (cited on pages 4, 126, 127, 130, 139, 160, 161).

[8] United Nations Statistical Commission. *Report on the Fifty-Fourth Session (28 February–3 March 2023)*. Available at https://unstats.un.org (accessed on Nov. 2024). 2023 (cited on page 5).

[9] United Nations Statistical Commission. *Report on the Fifty-Fifth Session (27 February–1 March 2024)*. Available at https://unstats.un.org (accessed on Nov. 2024). 2024 (cited on page 5).

[10] United Nations Industrial Development Organization (UNIDO). *National Accounts Database*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2024 (cited on pages 5, 7, 8, 14–17, 40–43, 53, 55, 66, 68, 69, 75, 80–82, 88, 92, 97–99, 101–104, 108, 109, 121, 123, 137, 162).

[11] United Nations Industrial Development Organization (UNIDO). *Structural Change for Inclusive and Sustainable Industrial Development*. Available at https://www.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2017 (cited on page 6).

[12] United Nations Industrial Development Organization (UNIDO). *Industrialization as the Driver of Sustained Prosperity*. Available at https://www.unido.org (accessed on Nov. 2024). 2020 (cited on page 6).

[13] Ana Llena-Nozal, Neil Martin, and Fabrice Murtin. *The Economy of Well-being: Creating Opportunities for People's Well-being and Economic Growth*. OECD Statistics Working Paper. Available at https://www.oecd-ilibrary.org (accessed on Nov. 2024). Paris: Organisation for Economic Co-operation and Development, 2019 (cited on page 6).

[14] Sustainable Development Solutions Network. *Sustainable Development Report 2024: The SDGs and the UN Summit of the Future*. Available at https://dashboards.sdgindex.org/ (accessed on Nov. 2024). Dublin, Ireland: Dublin University Press, 2024 (cited on page 7).

[15] United Nations Development Programme (UNDP). *Human Development Report 2023/2024: Breaking the Gridlock*. Available at https://hdr.undp.org (accessed on Nov. 2024). New York: UNDP, 2024 (cited on pages 7, 8, 68, 69, 159).

[16] United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development*. General Assembly Resolution A/RES/70/1. Available at https://www.un.org (accessed on Nov. 2024). New York: United Nations, 2015 (cited on pages 9, 28, 96, 162).

[17] Jean-Pierre Cling and Clément Delecourt. "Interlinkages between the Sustainable Development Goals." In: *World Development Perspectives* 25 (2022). Article 100398 (cited on pages 9, 28).

[18] United Nations Industrial Development Organization (UNIDO). *Quarterly IIP Database*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2024 (cited on pages 18, 25, 45–48, 83, 84, 128, 137, 162).

[19] United Nations Industrial Development Organization (UNIDO). *SDG 9 Database*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2023 (cited on pages 19–24, 27, 121, 123, 134, 137, 138).

[20] Albert N. Link and Barry Bozeman. "Innovation Behavior in Small-Sized Firms." In: *Small Business Economics* 3 (3 1991) (cited on page 20).

[21] Organisation for Economic Co-operation and Development (OECD). *SMEs, Entrepreneurship and Innovation*. Available at https://www.oecd.org (accessed on Nov. 2024). OECD, 2010 (cited on page 20).

[22] Iza Lejárraga et al. *Small and Medium-Sized Enterprises in Global Markets: A Differential Approach for Services?* ECD Trade Policy Papers 165. OECD, 2014 (cited on page 20).

[23] World Bank. *Enterprise Surveys*. Available at http://www.enterprisesurveys.org (accessed in Jan. 2024). Washington, D.C., 2024 (cited on page 21).

[24] World Bank. *Enterprise Surveys: Manual and Guide*. Available at https://www.worldbank.org (accessed on Nov. 2024). Washington, D.C.: World Bank, 2023 (cited on pages 21, 22).

[25] United Nations Industrial Development Organization (UNIDO). *Statistical Indicators of Inclusive and Sustainable Industrialization: Biennial Progress Report 2021*. Available at https://www.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2021 (cited on pages 25, 68, 134).

[26] United Nations Industrial Development Organization (UNIDO). *Statistical Indicators of Inclusive and Sustainable Industrialization: Biennial Progress Report 2023*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2023 (cited on pages 25, 53).

[27] United Nations. *Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators*. Tech. rep. E/CN.3/2016/1. Available at https://unstats.un.org (accessed on Nov. 2024). New York: UN, Mar. 2016 (cited on page 28).

[28] United Nations. *Interlinkages of the 2030 Agenda for Sustainable Development: Background Document Prepared for the 50th United Nations Statistical Commission Session*. Tech. rep. New York: United Nations, 2019 (cited on page 28).

[29] United Nations. *Second Report of the Interlinkages Workstream: Background Document Prepared for the 51st United Nations Statistical Commission Session*. Tech. rep. New York: United Nations, 2020 (cited on page 28).

[30] R. Bali Swain and F. Yang-Wallentin. "Achieving Sustainable Development Goals: Predicaments and Strategies." In: *International Journal of Sustainable Development & World Ecology* 27.2 (2020), pp. 96–106 (cited on page 28).

[31] Ranjula Bali Swain and Shyam Ranganathan. "Modeling Interlinkages between Sustainable Development Goals Using Network Analysis." In: *World Development* 138 (2021), p. 105136 (cited on page 28).

[32] United Nations Industrial Development Organization (UNIDO). *Competitive Industrial Performance Index 2012/2013. The Industrial Competitiveness of Nations: Looking Back, Forging Ahead*. Available at https://www.unido.org (accessed on Nov. 2024). Vienna, 2013 (cited on page 29).

[33] United Nations Industrial Development Organization (UNIDO). *Competitive Industrial Performance Report 2016, Volume I*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2017 (cited on page 29).

[34] United Nations Industrial Development Organization (UNIDO). *Competitive Industrial Performance Report 2018*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2019 (cited on page 29).

[35] United Nations Industrial Development Organization (UNIDO). *Competitive Industrial Performance Report 2020*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2021 (cited on page 29).

[36] United Nations Industrial Development Organization (UNIDO). *CIP Competitive Industrial Performance Index Database*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2024 (cited on pages 29–32, 34–36, 121, 137).

[37] United Nations Industrial Development Organization (UNIDO). *INDSTAT, ISIC Revision 3*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2024 (cited on pages 44, 50–53, 55–57, 63, 85, 87–89, 105, 106, 137, 162).

[38] United Nations Industrial Development Organization (UNIDO). *INDSTAT, ISIC Revision 4*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2024 (cited on pages 44, 50–53, 55–57, 63, 85, 87–89, 91, 92, 105, 106, 137, 162).

[39] United Nations Industrial Development Organization (UNIDO). *International Yearbook of Industrial Statistics 2023*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2023 (cited on page 53).

[40] Invest Puerto Rico. *Benchmarking Puerto Rico's Pharma Sector*. Available at https://www.investpr.org (accessed on Nov. 2024). 2022 (cited on page 54).

[41] Lall, Sanjaya. "The Technological Structure and Performance of Developing Country Manufactured Exports 1985-98." In: *Oxford Development Studies* 28 (3 2000), pp. 337–369 (cited on pages 58, 144, 147).

[42] United Nations Industrial Development Organization (UNIDO). *Manufacturing Trade Database*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2023 (cited on pages 58–61, 63–66, 107, 121, 123, 137, 162).

[43] International Labour Organization (ILO). *World Employment and Social Outlook Trends*. Available at https://www.ilo.org (accessed on Sept. 2024). New York: ILO, 2024 (cited on page 66).

[44] International Labour Organization (ILO). *Employment by Sex and Age: ILO Modelled Estimates, Nov. 2023*. Available at https://www.ilo.org (accessed on Oct. 2024). 2023 (cited on pages 67, 68, 71, 72, 100, 101, 110, 111).

[45] International Labour Organization (ILO). *Employment by sex and economic activity - ISIC level 2*. Available at https://www.ilo.org (accessed on Oct. 2024). 2023 (cited on page 70).

[46] Women in Manufacturing Association. *Who is the Women in Manufacturing Association (WiM)?* Tech. rep. Women in Manufacturing Association, 2023 (cited on page 72).

[47] Jennifer Castañeda-Navarrete et al. *Women in UK Manufacturing 2024: Addressing Labour Shortages and Bridging the Gender Gap*. Tech. rep. Women in Manufacturing UK, 2024 (cited on page 72).

[48] Press Trust of India (PTI). *Domestic Automakers Accelerate Employment of Women in Shop Floors*. Tech. rep. The Economic Times, 2022 (cited on page 72).

[49] SheTrades. *What is the SheTrades Initiative?* Tech. rep. ITC SheTrades, 2024 (cited on page 73).

[50] WEConnect. *WEConnect Annual Impact Report 2023*. Available at https://weconnectinternational.org (accessed on Oct. 2024). WEConnect, 2023 (cited on page 73).

[51] European Commission. *A Union of Equality: Gender Equality Strategy 2020-2025*. Tech. rep. European Commission (cited on page 73).

[52] European Commission. *Horizon Europe*. Tech. rep. European Commission (cited on page 73).

[53] Thereza Balliester and Adam Elsheikhi. *The Future of Work: A Literature Review*. Research Department Working Paper 29. ILO, Mar. 2018 (cited on page 73).

[54] Guendalina Anzolin. *Automation and its Employment Effects: A Literature Review of Automotive and Garment sectors*. Background Paper 2. ILO, Oct. 2021 (cited on page 73).

[55] International Labour Organization (ILO). *The Future of Work and Lifelong Learning: Promoting Apprenticeships to Meet the Skills Needs of the Digital and Knowledge Economy*. Available at https://www.ilo.org (accessed on Nov. 2024). Switzerland: ILO, 2021 (cited on page 73).

[56] United Nations Industrial Development Organization (UNIDO). *Gender, Digital Transformation and Artificial Intelligence*. Available at https://www.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2023 (cited on page 73).

[57] International Energy Agency (IEA). *Detailed CO_2 estimates (Edition 2023)*. CO_2 Emissions from Fuel Combustion Statistics: Greenhouse Gas Emissions from Energy (database). Available at https://www.oecd-ilibrary.org (accessed on Nov. 2024). 2023 (cited on pages 74, 75, 109).

[58] World Steel Association. *Sustainability Performance of the Steel Industry 2004-2022*. Tech. rep. Available at https://worldsteel.org (accessed on Nov. 2024). World Steel Association, Nov. 2023 (cited on page 74).

[59] International Energy Agency (IEA). *Direct Emissions Intensity of Cement Production in the Net Zero Scenario, 2015-2030*. Available at https://www.oecd-ilibrary.org (accessed on Oct. 2024). 2024 (cited on page 74).

[60] Core Writing Team, H. Lee and J. Romero (eds.) *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Switzerland: IPCC, 2023 (cited on pages 75, 93).

[61] International Energy Agency (IEA). *World Energy Outlook 2023*. Paris: IEA, 2023 (cited on page 75).

[62] United States Environmental Protection Agency. *Understanding Global Warming Potentials*. Available at https://www.epa.gov (accessed on Nov. 2024). 2024 (cited on page 76).

[63] Martin Haitzmann and Valentin Todorov. *Value Added in Industrial Statistics and National Accounts: Equal in Theory, Different in Practice*. Working Paper 11/2020. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2020 (cited on pages 85, 131).

[64] Statistical Office of the European Communities. *Structural Business Statistics Data*. Available at https://ec.europa.eu/eurostat (accessed on Oct. 2024). Luxembourg, 2024 (cited on pages 88, 90).

[65] European Parliament and Council of the European Union. *Directive (EU) 2023/2413 Amending Directive (EU) 2018/2001 on the Promotion of the Use of Energy from Renewable Sources*. Available at https://eur-lex.europa.eu (accessed on Nov. 2024). 2023 (cited on page 88).

[66] European Commission. *The European Green Deal*. Available at https://ec.europa.eu (accessed on Nov. 2024). 2024 (cited on pages 89, 90).

[67] Industry Norwegian Ministry of Trade and Fisheries. *Norwegian Mineral Strategy*. Available at https://www.regjeringen.no (accessed on Nov. 2024). 2023 (cited on page 90).

[68] International Energy Agency (IEA). *World Energy Outlook 2024*. Paris: IEA, 2024 (cited on page 93).

[69] McKinsey & Company. *Climate Risk and Decarbonization: What Every Mining CEO Needs to Know*. Available at https://www.mckinsey.com (accessed on Nov. 2024). McKinsey & Company, 2020 (cited on page 93).

[70] World Wildlife Fund (WWF). *Living Planet Report 2024 – A System in Peril*. Gland, Switzerland: WWF, 2024 (cited on page 93).

[71] Shivani Lakshman. *More Critical Minerals Mining Could Strain Water Supplies in Stressed Regions*. Available at https://www.wri.org (accessed on Nov. 2024). 2024 (cited on page 93).

[72] United Nations Enviroment Programme (UNEP). *Global Waste Management Outlook 2024: Beyond an Age of Waste – Turning Rubbish into a Resource*. Nairobi: UNEP, 2024 (cited on page 94).

[73] World Bank (WB). *Global Water Security and Sanitation Partnership: Annual Report 2023*. Washington DC: World Bank, 2023 (cited on page 94).

[74] Maedeh Tayebi-Khorami et al. "Re-Thinking Mining Waste through an Integrative Approach Led by Circular Economy Aspirations." In: *Minerals* 9.5 (2019) (cited on page 94).

[75] IEA, IRENA, UNSD, World Bank, WHO. *Tracking SDG 7: The Energy Progress Report*. Washington DC: World Bank, 2024 (cited on page 94).

[76] International Energy Agency (IEA). *Global Methane Tracker 2024*. Available at https://www.iea.org (accessed on Nov. 2024). 2024 (cited on page 94).

[77] United Nations. *Antigua and Barbuda Agenda for Small Island Developing States*. Available at https://documents.un.org (accessed on Nov. 2024). 2024 (cited on page 96).

[78] International Monetary Fund. *International Financial Statistics (IFS)*. Available at https://data.imf.org (accessed on Nov. 2024). 2023 (cited on page 124).

[79] United Nations. *International Standard Industrial Classification of All Economic Activities (ISIC), Revision 3*. Statistical Papers Series M, No.4/Rev.3. Available at https://unstats.un.org/unsd (accessed on Nov. 2024). New York: United Nations, 1990 (cited on page 126).

[80] United Nations Statistics Division. *National Accounts: Analysis of Main Aggregates*. Available at https://unstats.un.org/unsd (accessed on Nov. 2024). 2024 (cited on page 127).

[81] United Nations Statistics Division. *Methodology for the National Accounts Main Aggregates Database*. Available at https://unstats.un.org/unsd (accessed on Nov. 2024). 2024 (cited on page 127).

[82] United Nations Industrial Development Organization (UNIDO). *Monthly IIP Database*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2024 (cited on pages 128, 137, 162).

[83] United Nations. *International Recommendations for the Index of Industrial Production*. Statistical Papers Series F, No.107. Available at https://unstats.un.org (accessed on Nov. 2024). New York: United Nations, 2010 (cited on pages 128, 160).

[84] Deutsche Bundesbank National Bank of Belgium and Eurostat. *JDemetra+ (Version 2.2.3)*. Available at https://cros.ec.europa.eu (accessed on Nov. 2024). 2017 (cited on page 129).

[85] United Nations Industrial Development Organization (UNIDO). *Seasonal Adjustment of IIP*. Available at https://stat.unido.org (accessed on Nov. 2024). 2023 (cited on page 129).

[86] United Nations Industrial Development Organization (UNIDO). *Quarterly and Monthly Reports on World Manufacturing Production: Methodological Note*. Available at https://stat.unido.org (accessed on Nov. 2024). 2023 (cited on page 129).

[87] International Labour Organization (ILO). *Statistics on Employment*. Available at https://ilostat.ilo.org (accessed on Nov. 2024). 2023 (cited on page 131).

[88] United Nations Industrial Development Organization (UNIDO). *Competitive Industrial Performance Report 2016*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2017 (cited on page 133).

[89] UN General Assembly. *Work of the Statistical Commission Pertaining to the 2030 Agenda for Sustainable Development*. Available at https://undocs.org (accessed on Nov. 2024). July 2017 (cited on page 133).

[90] United Nations Statistics Division. *Metadata Repository*. Available at https://unstats.un.org/sdgs (accessed on Nov. 2024). 2022 (cited on page 133).

[91] United Nations Statistics Division. *SDG Global Database*. Available at https://unstats.un.org/sdgs (accessed on Nov. 2024). 2022 (cited on pages 133, 137).

[92] United Nations Industrial Development Organization (UNIDO). *Industrial Analytics Platform: SDG 9 Industry*. Available at https://www.unido.org (accessed on Nov. 2024). Vienna, 2024 (cited on pages 134, 138).

[93] Petra Kynčlová, Shyam Upadhyaya, and Thomas Nice. "Composite Index as a Measure on Achieving Sustainable Development Goal 9 (SDG 9) Industry-related Targets: The SDG-9 Index." In: *Applied Energy* 265 (2020), p. 114755 (cited on pages 134, 138).

[94] Organisation for Economic Co-operation and Development (OECD). *Handbook on Constructing Composite Indicators: Methodology and User Guide*. Available at https://www.oecd.org (accessed on Nov. 2024). Paris: OECD Publishing, 2008 (cited on page 135).

[95] United Nations Statistics Division (UNSD). *UNSD Classification*. Available at https://unstats.un.org/unsd/classifications/ (accessed on Nov. 2024). 2024 (cited on page 135).

[96] United Nations Industrial Development Organization (UNIDO). *UNIDO Country Classifications*. Available at https://stat.unido.org (accessed on Nov. 2024). 2024 (cited on pages 135, 149, 150).

[97] World Bank. *World Bank Country and Lending Groups*. Available at https://datahelpdesk.worldbank.org (accessed on Nov. 2024). 2024 (cited on page 135).

[98] United Nations Statistics Division. *Standard Country or Area Codes for Statistical Use (M49)*. Available at https://unstats.un.org/unsd (accessed on Nov. 2024). 2024 (cited on pages 136, 148).

[99] United Nations Industrial Development Organization (UNIDO). *IDSB 2022, Revisions 3 and 4*. Available at https://stat.unido.org (accessed on Nov. 2024). Vienna, 2024 (cited on page 137).

[100] United Nations Industrial Development Organization (UNIDO). *Handbook of Industrial Statistics 1992*. Cheltenham, UK: Edward Elgar Publishing Limited, 1993 (cited on page 139).

[101] United Nations. *Industrial Statistics Yearbook. 1991. Vol. 1, General Industrial Statistics*. New York: UN, 1993 (cited on page 139).

[102] United Nations Industrial Development Organization (UNIDO). *International Yearbook of Industrial Statistics 2021*. Cheltenham, UK: Edward Elgar Publishing Limited, 2021 (cited on page 139).

[103] United Nations Industrial Development Organization (UNIDO). *World Statistics on Mining and Utilities 2020*. Cheltenham, UK: Edward Elgar Publishing Limited, 2020 (cited on page 139).

[104] Fernando Galindo-Rueda and Fabien Verger. *OECD Taxonomy of Economic Activities Based on R&D Intensity*. Working Paper 2016/04. Available at https://doi.org/10.1787/5jlv73sqqp8r-en (accessed on Nov. 2024). Paris: OECD, 2016 (cited on page 144).

[105] Organisation for Economic Co-operation and Development (OECD). *OECD Science, Technology and Industry Scoreboard 2003*. Available at https://doi.org/10.1787/sti_scoreboard-2003-en (accessed on Nov. 2024). Paris: OECD, 2003 (cited on page 144).

[106] United Nations Trade and Development. *UNCTADstat, SITC Rev.3 Products, by Technological Categories (Lall (2000))*. Available at https://unctadstat.unctad.org (accessed on Nov. 2024). 2023 (cited on pages 144, 147).

[107] United Nations Industrial Development Organization (UNIDO). *Industrial Statistics: Guidelines and Methodology*. Available at https://www.unido.org (accessed on Nov. 2024). 2010 (cited on page 144).

[108] Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States. *Profiles of LDCs*. Available at https://www.un.org/ohrlls (accessed on Nov. 2024). 2023 (cited on page 150).

[109] Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States. *List of LLDCs*. Available at https://www.un.org/ohrlls (accessed on Nov. 2024). 2023 (cited on page 150).

[110] Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States. *List of SIDS*. Available at https://www.un.org/ohrlls (accessed on Nov. 2024). 2023 (cited on page 151).

[111] ROSCONGRESS. *BRICS Joint Statistical Publication 2024*. Available at https://brics-russia2024.ru/ (accessed on Nov. 2024). 2024 (cited on page 151).

[112] United Nations. *System of National Accounts 2008*. New York: United Nations, 2010 (cited on page 159).

[113] United Nations Industrial Development Organization (UNIDO). *Lima Declaration: Towards Inclusive and Sustainable Industrial Development*. General Conference Resolution GC.15/Res.1. Available at https://www.unido.org (accessed on Nov. 2024). Lima, Peru: UNIDO, 2013 (cited on page 159).

[114] Antonio Andreoni and Shyam Upadhyaya. *Growth and Distribution Pattern of the World Manufacturing Output: A Statistical Profile*. Working Paper 02/2014. Available at https://www.unido.org (accessed on Nov. 2024). Vienna: UNIDO, 2014 (cited on page 160).

[115] United Nations Statistics Division. *National Accounts Main Aggregates Glossary*. Available at https://unstats.un.org/unsd (accessed on Nov. 2024). 2021 (cited on pages 161, 162).

[116] United Nations. *Fundamental Principles of Official Statistics*. General Assembly Resolution A/RES/68/261. Available at https://https://unstats.un.org (accessed on Nov. 2024). New York: United Nations, 2014 (cited on page 161).

Concepts and definitions

C | E | G | H | I | L | M | N | S | U | W

C

Competitive Industrial Performance (CIP) Index The CIP Index is an indicator developed by UNIDO to measure the capacity of countries/areas to increase their presence in international and domestic markets, while developing industrial sectors and activities with higher value added and higher technological level. It is a composite index constructed by combining eight variables across three dimensions. x, 3, 132

E

Economies of scale In economics, this term refers to the reduced cost per unit that arises from a higher production level. 5

Electricity, gas, steam and air-conditioning supply This sector refers to ISIC Rev. 4 section D. It includes the provision of electric power, natural gas, steam, hot water, air-conditioning supply and the like through a permanent infrastructure of lines, mains and pipes. This section also includes the operation of electric and gas utilities, which generate, control and distribute electric power or gas. 4, 17, 160

Emerging industrial economy (EIE) Economic group proposed by UNIDO that includes the most dynamic low- and middle-income economies in terms of industrial performance. It includes economies that have continuously registered positive spells of MVA growth in the last decades. The current list of EIEs is given in Annex E.5. x

G

Gross domestic product (GDP) GDP basically derives from the concept of gross value added. GDP is the sum of gross value added of all resident producer units plus the part (possibly the total) of taxes on products that is not included in the valuation of output, less subsidies on products [112, p. 34]. x, xii, 5

H

Human Development Index (HDI) Long-standing indicator measuring human development, defined as the process of expanding people's freedoms and opportunities and improving their well-being. The HDI is a composite index of three dimensions: 1) the ability to lead a long and healthy life, measured by life expectancy at birth; 2) the ability to acquire knowledge, measured by mean years of schooling and expected years of schooling; and 3) the ability to achieve a decent standard of living, measured by gross national income per capita. A higher HDI value indicates a higher human development level. This indicator is calculated and maintained by UNDP [15]. x, 7

I

Inclusive and sustainable industrial development (ISID) Economic growth of industrial sectors that creates shared prosperity for all and safeguards the environment. This concept is at the center of UNIDO's vision, as declared in the 2013 Lima Declaration [113]. x, 9, 96

Index of industrial production (IIP) Indicator that describes changes in the volume of goods produced in industrial sectors over time. Its main objective is to provide a measure of short-term changes in value added over a given reference period. However, since it is difficult to collect high-frequency data to accurately measure value added, gross output measures such as the value of production

or turnover data are commonly used. The IIP, being a volume index, is not influenced by price fluctuations [83, p. 11]. x, 17, 128

Industrial statistics Field of statistics related to the characteristics and economic activities of all resident units in the reporting country that are primarily active in the following productive activities:

a. Mining and quarrying (ISIC Rev. 4 section B);
b. Manufacturing (ISIC Rev. 4 section C);
c. Electricity, gas, steam and air-conditioning supply (ISIC Rev. 4 section D);
d. Water supply; sewerage, waste management and remediation activities (ISIC Rev. 4 section E).

Industrial statistics form part of the broader domain of structural and short-term business statistics [7, pp. 2 and 12]. 4, 85, 138, 139

Industry This term refers to the set of all production units engaged primarily in the same or similar kinds of productive activity [6, p. 9] The ISIC provides the international guidelines for cataloguing economic activity into specific industries, such as agriculture, mining, manufacturing or services. 4, 5

ISIC The International Standard Industrial Classification of All Economic Activities, abbreviated as ISIC, is a standard classification of economic activities arranged so that entities can be classified according to the activity they carry out. Currently, the fourth revision of ISIC [6] is the most commonly used, and it is the reference used throughout this *Yearbook*. The hierarchically structured ISIC Rev. 4 classification contains sections, divisions, groups and classes. The ISIC classification is maintained by UNSD. x, 4, 126

L

Landlocked developed country (LLDC) The UN created the LLDC category to designate countries whose socio-economic development prospects are seriously constrained by lack of territorial access to the sea, isolation from world markets, and high transit costs. The current composition of this group is listed in Annex E.5. x

Least developed country (LDC) The LDC category was established by the United Nations (UN) General Assembly in 1971. The UN defines LDCs as countries that have low-income levels and face severe structural impediments to sustainable development. The current composition of this group is listed in Annex E.5. x

M

Manufacturing This industry refers to ISIC Rev. 4 section C. It includes activities related to the physical or chemical transformation of materials, substances or components into new products, although such a definition cannot be used as the single universal criterion for determining what constitutes manufacturing (see [6] for mode details on activities included and not included in manufacturing). The materials, substances or components transformed are raw materials that are products of agriculture, forestry, fishing, mining or products of other manufacturing activities. Substantial alteration, renovation or reconstruction of goods is generally considered to be manufacturing. The output of a manufacturing process may be finished in the sense that it is ready for utilization or consumption, or it may be semi-finished in the sense that it is to become an input for further manufacturing. 4, 17, 128, 160

Manufacturing value added (MVA) This is a national accounts aggregate measuring the exclusive and exhaustive contribution of manufacturing to GDP [114, p. 5]. x, 6

Mining and quarrying This industry corresponds to ISIC Rev. 4 section B. It includes activities related to the extraction of minerals that occur naturally as solids (e.g., coal and ores), liquids (e.g., petroleum) or gases (e.g., natural gas). Supplementary activities aimed at preparing the crude materials for

marketing are also included, if they are undertaken in conjunction with mining, for example, crushing, grinding, cleaning, drying, sorting, concentrating ores, liquefaction of natural gas and agglomeration of solid fuels. 4, 17, 83, 128, 160

Mining and utilities value added (MUVA) This is a national accounts aggregate measuring the exclusive and exhaustive contribution of mining and utilities sectors to GDP. x, 79

N

National accounts System of accounts based on the internationally recommended system of national accounts (SNA) and that provide a coherent, consistent and integrated set of macroeconomic accounts, balance sheets and tables based on a set of internationally agreed concepts, definitions, classifications and accounting rules. They provide a comprehensive accounting framework within which economic data can be compiled and presented in a format that is designed for purposes of economic analysis, decision-taking and policy-making [115]. 85

S

Short-term statistics (STS) Infra-annual production-related statistics collected to monitor the business cycle. They are suitable for the short-term evaluation of supply, demand and production factors [7, p. 3]. Although available more frequently and in a timelier manner, they usually cover only some variables of interest and are published with a limited level of detail. 128

Small island developing State (SIDS) The UN has used the SIDS category since 1992 to designate economies that face unique challenges due to their remoteness, small population size, high transportation costs, and vulnerability to biodiversity loss and climate change. The current composition of this group is listed in Annex E.5. xi

Statistical confidentiality Principle 6 of the *Fundamental Principles of Official Statistics* [116] stresses that data collected by national statistical agencies are to be strictly confidential and used exclusively for statistical purposes. Many NSOs therefore implement national rules on statistical confidentiality. The two main reasons for declaring data to be of primary confidentiality are:

a. too few units in a cell;
b. dominance of one or two units in a cell.

The limits of what constitutes "too few" or "dominance" vary between statistical domains. Statistical confidentiality is ensured through appropriate methods:

Physical protection: data is securely stored and not accessible to anyone without explicit authorization.

Statistical disclosure control (SDC): methods for reducing the risk that statistical units are identified when the statistical data is being published, including:

Tabular data protection: for aggregate information on respondents presented in tables (using suppression, rounding, combinations and interval publication).

Microdata protection: for information on statistical units (using local suppression, sampling, recoding, top and bottom coding, rounding, rank swapping and microaggregation).

xi, 84, 161

Structural business statistics (SBS) These are production-related statistics that are collected and compiled to determine the structure, activity, competitiveness and performance of enterprises at national, regional and international levels. They generally provide annual information with respect to a reference year [7, p. 3]. Although available only annually and published with some delay, they usually cover a large number of variables at a highly granular level. Other common abbreviations used by NSOs are ABS (annual business statistics/survey) or AIS (annual industrial survey). x, 84, 129

Sustainable Development Goals (SDGs) The 2030 Agenda for Sustainable Development [16], adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its core are the 17 SDGs, which are an urgent call for action by all countries in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality and spur economic growth—all while tackling climate change and working to preserve our oceans and forests. xi, xii, 6, 133 **Goal 9** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. xiii, 3, 13, 18, 19, 25, 26, 28, 133, 134, 137, 138.

System of national accounts (SNA) A coherent, consistent and integrated set of macroeconomic accounts, balance sheets and tables based on a set of internationally agreed concepts, definitions, classifications and accounting rules [115]. xi, 127, 161

U

UNIDO industrial statistics databases UNIDO Statistics currently maintains a variety of databases, as described below. These can be accessed at the UNIDO Statistics Portal. 85, 137 The **IIP databases** (monthly and quarterly) [18; 82] contain data on the index of industrial production for the manufacturing as well as mining and utilities sectors. 128. The **Industrial Statistics databases (INDSTAT)** [37; 38] contain disaggregated data for selected variables on the mining, manufacturing and utilities sectors. 49, 84, 85, 88. The **Manufacturing Trade database** [42] contains aggregate data at the country, region and group level for variables related to the trade of manufactured goods. The database provides historical time series in current United States dollars (USD). The data are collected primarily from the United Nations Trade and Development (UNCTAD); other sources of official data may be used when appropriate. 59. The **National Accounts database** [10] contains aggregate data at the country, region and group level for several national accounts indicators related to industrial economic activity. 88.

W

Water supply; sewerage, waste management and remediation activities This industry, corresponding to ISIC Rev. 4 section E, includes activities related to the management (including collection, treatment and disposal) of various forms of waste, such as solid or non-solid industrial or household waste, as well as contaminated sites. Activities of water supply are also grouped in this section, since they are often carried out in connection with, or by units also engaged in, the treatment of sewage. 4, 17, 160

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