

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



The Sustainable Development Goals Extended Report 2022

Note: The Statistics Division of the United Nations Department of Economic and Social Affairs (UNSD) prepares the annual The Sustainable Development Goals Report, also known as the glossy report, based on storyline inputs submitted by UN international agencies in their capacity as mandated custodian agencies for the SDG indicators. However, due to space constraints, not all information received from custodian agencies is able to be included in the final glossy report. Therefore, in order to provide the general public with all information regarding the indicators, this 'Extended Report' has been prepared by UNSD. It includes all storyline contents for each indicator as provided by the custodian agencies and is unedited. For instances where the custodian agency has not submitted a storyline for an indicator, please see the custodian agency focal point information linked for further information.

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Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

Indicator 9.1.1: Proportion of the rural population who live within 2 km of an all-season road

Custodian agency(ies): World Bank

Indicator 9.1.2: Passenger and freight volumes, by mode of transport

Aviation has been in its gravest moment in history with collapse in air travel demand globally. Its recovery has been vulnerable and volatile, severely hampered by the resurgence of outbreak across regions alongside stricter travel restrictions.

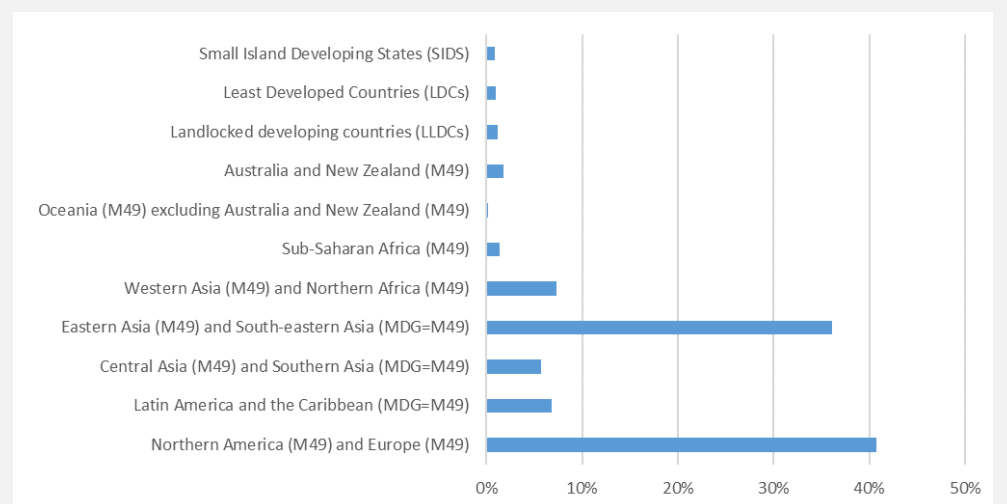
In 2016, the air transport industry supported a total of 65.5 million jobs globally, and the direct and indirect global economic impact of air transport is estimated at \$2.7 trillion, which is equivalent to 3.6 per cent of the world gross domestic product (GDP). In 2018, USD 6.8 trillion worth of goods were expected to be transported internationally by air, representing 35 per cent of world trade by value, despite representing less than 1 per cent by volume.

Air transport also plays a pivotal role for many States and represents a lifeline for Landlocked Developing Countries (LLDCs) and Small Island Developing States (SIDS). It facilitates their access to regions and the world by overcoming infrequent alternative transport services or poor infrastructure of other forms of transportation. During times of natural calamities air transport plays a critical role in the speedy and reliable transportation of essential supplies.

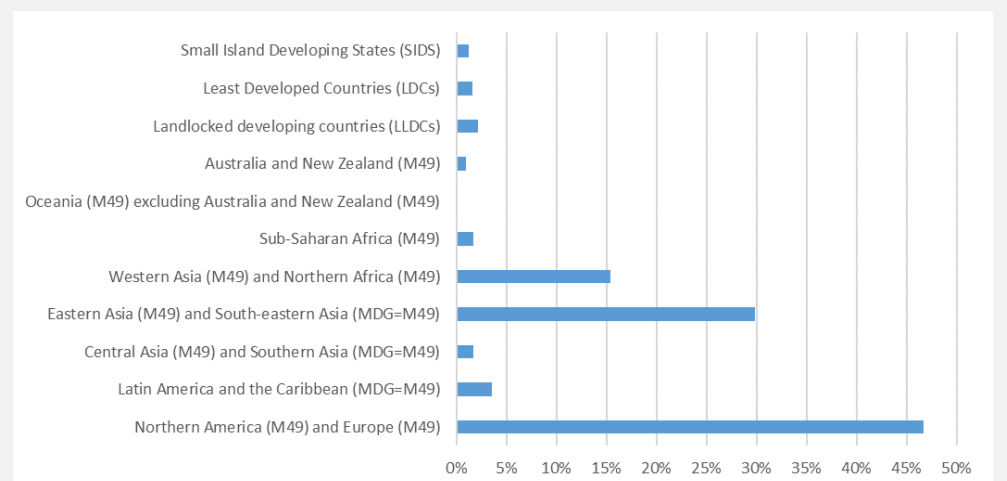
International passenger traffic suffered a dramatic 60 per cent drop over 2020, bringing air travel totals back to 2003 levels. ICAO reports that as seat capacity fell by 50 per cent last year, passenger totals dropped by 60 per cent with just 1.8 billion passengers taking to the air during the first year of the pandemic, compared to 4.5 billion in 2019. Its numbers also point to airline financial losses of 370 billion dollars resulting from the COVID-19 impacts, with airports and air navigation services providers (ANSPs) losing a further 115 billion and 13 billion, respectively.

Following a 60 per cent contraction in 2020, global air passenger traffic has recovered modestly but remained well below the pre-pandemic levels. The impact of the pandemic continues to weigh disproportionately on domestic and international travel, with the former recovering at a faster pace. In 2021, domestic traffic has recovered to 68 per cent of the 2019 levels, while international traffic remained weak at merely 28 per cent. In contrary to the passenger traffic, air cargo traffic has already exceeded the pre-pandemic levels from the beginning of 2021 and maintained a robust growth. This upturn has been underpinned mainly by the recovery in economic activities alongside the roaring e-commerce amid the pandemic.

Passenger number, share by region, 2020



Cargo tonnes, Share by region, 2020



Additional resources, press releases, etc. with links:

- ICAO Economic Impact Analysis of COVID-19 on Civil Aviation: <https://www.icao.int/sustainability/Pages/Economic-Impacts-of-COVID-19.aspx>
- ICAO COVID-19 Air Traffic Dashboard: <https://www.icao.int/sustainability/Pages/COVID-19-Air-Traffic-Dashboard.aspx>
- ICAO Air Transport Monthly Monitor: <https://www.icao.int/sustainability/Pages/Air-Traffic-Monitor.aspx>
- ICAO Guidance on Economic and Financial Measures: <https://www.icao.int/sustainability/Pages/Economic-and-financial-measures.aspx>
- Press release: <https://www.icao.int/Newsroom/Pages/2020-passenger-totals-drop-60-percent-as-COVID19-assault-on-international-mobility-continues.aspx>

Custodian agency(ies): ICAO,ITF-OECD

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

Indicator 9.2.1: Manufacturing value added as a proportion of GDP and per capita

Global manufacturing activity reached the above pre-pandemic level but the recovery remains incomplete and unequal

Global manufacturing production grew by 7.2 per cent in 2021 after a drop of 1.3 per cent in 2020 and surpassed its pre-pandemic level. However, the recovery remains incomplete and unequal. While high-income countries benefitted from massive policy support for firms and households and rapid rollout of effective vaccines, manufacturing in least developed countries stagnated owing subdued and volatile global demand and disruption to global trade, in addition to tighter domestic economic policies.

Despite the pandemic disruptions, the global share of MVA in total GDP increased from 16.2 per cent in 2015 to 16.9 per cent in 2021. Strong global demand for Asian manufacturing and exports drove the fast economic recovery in the region. Both Eastern Asia and South-eastern Asia expanded their share from 26.1 to 26.8 per cent and 21.0 to 21.1 per cent from 2015 to 2021, respectively. Although LDCs managed to increase their share from 11.3 in 2015 to 12.8 per cent in 2020, their share dropped back to 12.5 per cent in 2021.

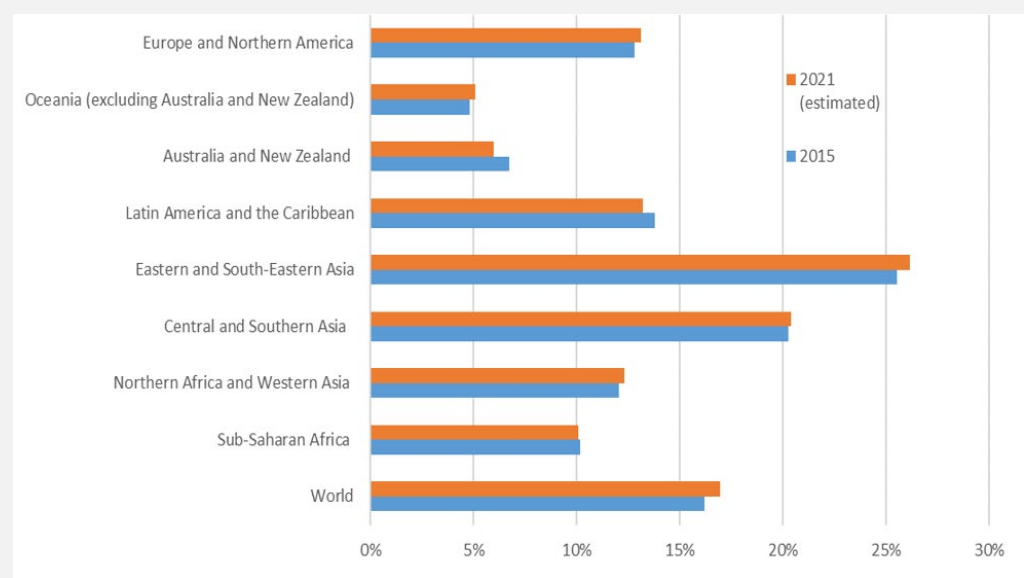
Uneven recovery of employment and income across different population groups is increasing inequalities within countries. The same trend is being followed in manufacturing among countries, as reflected by MVA per capita. While Europe and Northern America reached their all-time high of \$5,006 in 2021, MVA per capita in LDCs decreased to \$134 comparable to the value in 2018. The recovery prospects for LDCs thus remain uncertain jeopardizing their achievement of many SDG targets by 2030.

A fair distribution of vaccines within and between all countries as well as a sufficient vaccination rate are essential for reducing the ongoing COVID-19 spread and strengthening the overall recovery.

Manufacturing growth (%)



Share of manufacturing value added in GDP, 2015 and 2021 (percentage)



Additional resources, press releases, etc. with links:

- <https://www.unido.org/news/current-pandemic-trends-bring-more-uncertainty-economic-prospects>
- https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/publication/WESP2022_web.pdf
- <https://www.oecd.org/economic-outlook/>

Custodian agency(ies): UNIDO

Indicator 9.2.2: Manufacturing employment as a proportion of total employment

Prospects on recovery of manufacturing jobs remain fragile and uneven

The 2020 COVID-19 outbreak significantly disrupted labour markets around the world on a historically unprecedented scale. Global employment in 2020 declined more for women, youth, and the medium- and low-skilled. Prolonged lockdowns and travel bans, unthinkable before the pandemic, have disrupted supply chains, leading to negative consequences for direct and indirect employment linked to production networks.

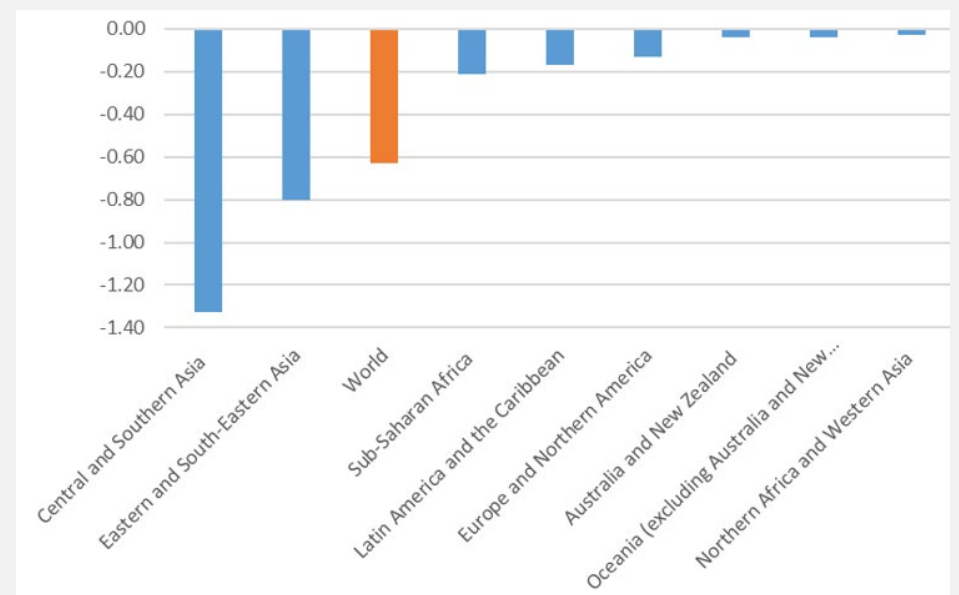
The manufacturing sector was among the sectors hit most severely at the start of the pandemic, initially via supply chain disruption, imposed containment measures and then by a decline in demand. Because of the pandemic, nearly one in three jobs in manufacturing supply chains globally are likely to have undergone termination, a reduction in working hours or payment, or other worsened conditions. The global share of manufacturing employment in total employment thus decreased significantly from 13.7 per cent in 2019 to 13.1 per cent in 2020. All SDG regions experienced declines in the share of manufacturing employment, albeit to varying degrees. A major downturn was registered in Central and Southern Asia by 1.3 percentage points, and Eastern and South-Eastern Asia by 0.8 percentage points. In contrast, Northern Africa and Western Asia witnessed only a negligible decline.

The impact has been particularly pronounced in middle-income countries that have long leveraged participation in production chains as a source of employment and growth. The decline in manufacturing employment in middle-income countries was 8.9 per cent in 2020, compared with 3.4 per cent in low-income and 3.9 per cent in high-income countries.

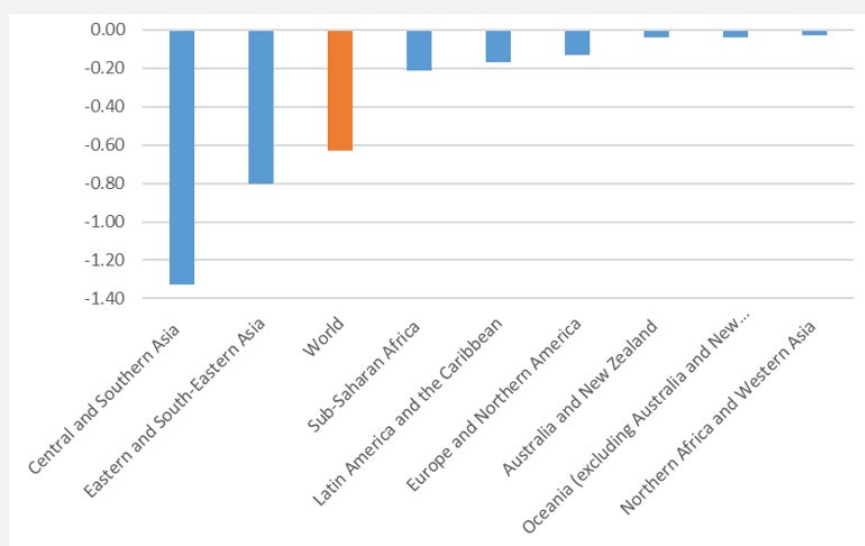
Some of the worst impacts were felt in garment supply chains, which employ large shares of women workers. Women, especially young women, have been among the worst affected, and their recovery has also been among the slowest.

In 2021, the recovery in manufacturing employment continued to be fragile and often uneven. Despite the economic activity rebound, global manufacturing employment did not reach the pre-pandemic levels yet. Fiscal stimulus and vaccination played a crucial factor in determining labour market recovery in 2021. Moreover, a growing productivity gap between developing and advanced economies is jeopardizing the positive contribution to inclusive growth and the creation of decent jobs. To achieve a fairer and more inclusive recovery of the global labour market, it is essential to address inequality in vaccinations, especially in lower-income countries.

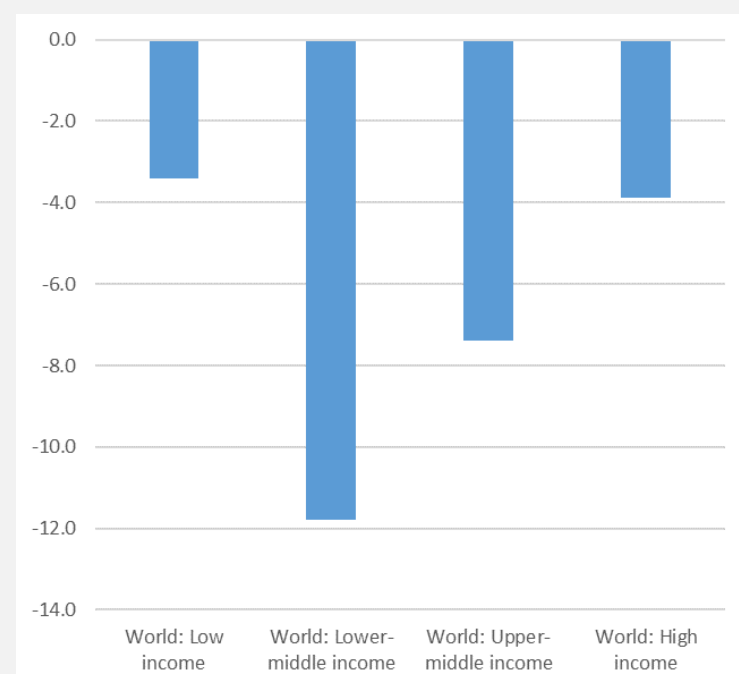
Change in manufacturing employment share in 2019-2020 (%)



Growth of manufacturing employment, 2019-2020, by income group (percentages)



Growth of manufacturing employment, 2019-2020, by sex and income group (percentages)



Additional resources, press releases, etc. with links:

- ILO Monitor: COVID-19 and the world of work. Eighth edition https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_824092.pdf
- ILO World Employment and Social Outlook: Trends 2022 https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_834081.pdf

Custodian agency(ies): UNIDO

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

Indicator 9.3.1: Proportion of small-scale industries in total industry value added

Indicator 9.3.2: Proportion of small-scale industries with a loan or line of credit

Limited access to financial resources makes small businesses more vulnerable to economic shocks

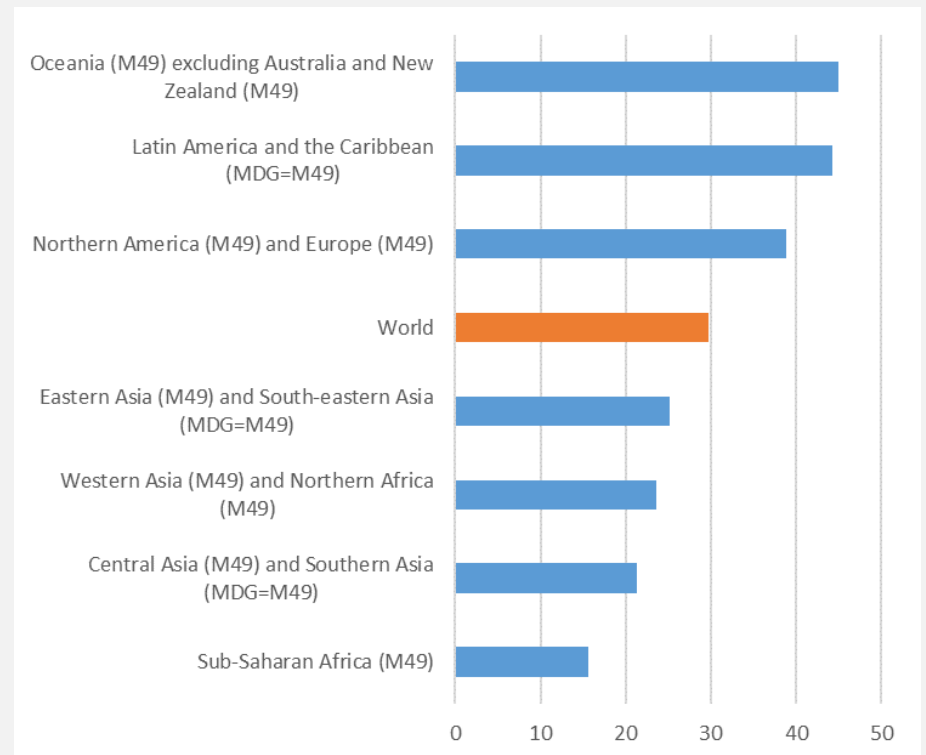
Micro, small and medium-sized enterprises have always been a backbone of the economy providing a wide range of employment opportunities and a source of income. The COVID-19 pandemic hit all entrepreneurs as lockdowns and workspace closures were imposed to contain the spread of the virus. However, small businesses were hit much harder as they are more vulnerable to economic downturns than larger ones. This typically stems from their smaller scale, limited financial resources, and greater supply chain dependencies.

Many small businesses experienced declines in employment and working hours, some collapsed during 2021 as economic activity waxed and waned in response to resurgent virus waves and containment measures. Small enterprises in low- and lower-middle-income countries are particularly vulnerable, as they benefit less from government assistance programmes. Moreover, small informal enterprises have fared worse in the pandemic than formal ones, partly because they have been unable to access formal lines of credit or COVID-19-related government support.

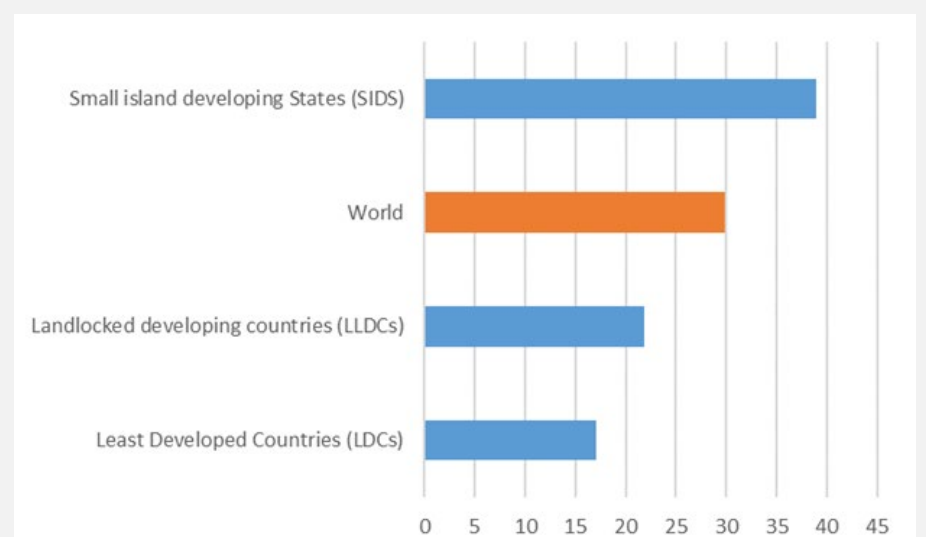
Small businesses operating in manufacturing and manufacturing-related services faced significant challenges due to the decline in demand and supply chain disruptions. According to the most recent available data, almost one in three small manufacturing enterprises has a loan or line of credit. However, access to credit remains uneven across countries and regions of the world. Sub-Saharan African countries and least developed countries (LDCs) suffer the most from a lack of credit. Only 15.7 per cent and 17.0 per cent, respectively, have access to financial services, which is well below the global average. On contrary, Latin American and Caribbean and Oceania (excluding New Zealand and Australia) have the largest proportions of small manufacturing firms with a loan or line of credit – 44.2 per cent and 45 per cent respectively.

The COVID-19 pandemic has significantly reduced the number of small-scale industries with sufficient credit and many of them are thus facing existential challenges. To achieve the SDG 9.3 Target on increasing the access of small-scale industries to affordable credit, policymakers may need to focus on developing and implementing programmes for an easier access to formal lines of credit, increasing financial literacy among small-scale business owners and target lending programs to underserved communities.

Proportion of small-scale industries with a loan or line of credit (%) - by region



Proportion of small-scale industries with a loan or line of credit (%)



Additional resources, press releases, etc. with links:

- OECD SME and Entrepreneurship Outlook 2021 <https://www.oecd-ilibrary.org/sites/6039c015-en/index.html?itemId=/content/component/6039c015-en>
- ICT SME COMPETITIVENESS OUTLOOK 2021 https://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/ITC_SMECO-2021.pdf
- ILO WESO Trends 2020 https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_834081.pdf

Custodian agency(ies): UNIDO

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

Indicator 9.4.1: CO2 emission per unit of value added

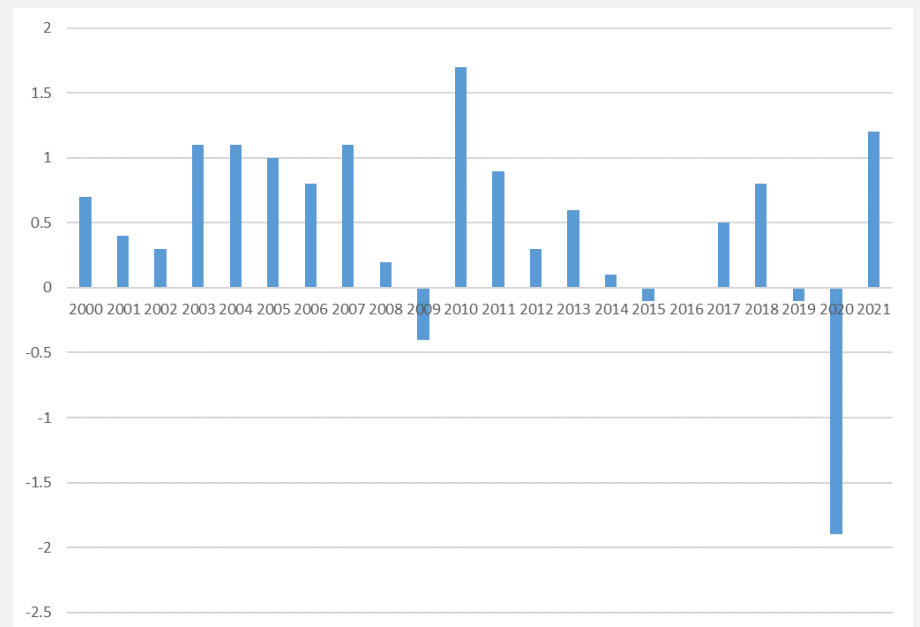
Global carbon dioxide emissions rebounded in 2021, reaching their highest ever level

The 2020 COVID-19 outbreak, which led to global social and economic disruption, had an impact on how energy is produced, supplied, and consumed around the world. Global carbon dioxide emissions declined by 5.2 per cent in 2020, or almost 2 billion tons – the largest ever decline and almost five times greater than the 2009 decline that followed the global financial crisis. Global carbon dioxide emissions fell further than energy demand in 2020 owing to the pandemic hitting demand for oil and coal harder than other energy sources while demand for renewables increased.

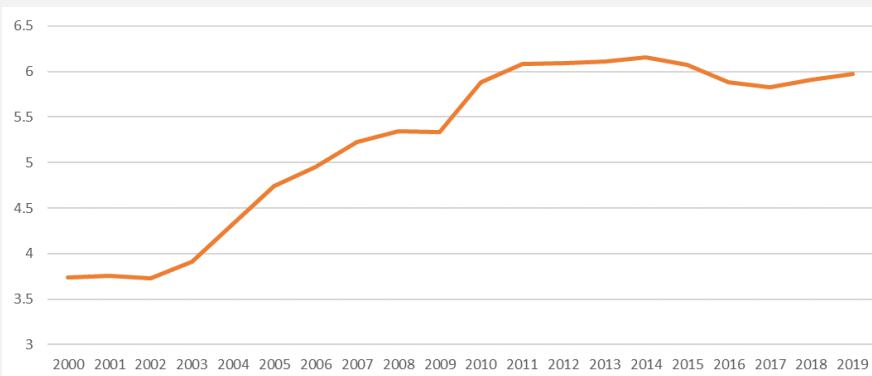
The gradual phasing-out of restrictions as well as widespread vaccination campaigns boosted the economic recovery resulting in increased energy demand in 2021. Global energy-related carbon dioxide emissions rose by 6 per cent as demand for coal, oil and gas rebounded, reaching their highest level ever and completely wiping out the pandemic-related reduction seen in 2020. In 2019, global CO2 emissions from manufacturing accounted for almost 18 per cent of total CO2 emissions from fuel combustion. Although CO2 emissions from manufacturing declined sharply in 2015-2017, they reverted the trend from 2017 onwards.

The global manufacturing CO2 emissions intensity continued to decline from 0.50 kg/USD in 2015 to 0.43 kg/USD in 2019. However, there is a wide disparity among regions. For example, the manufacturing CO2 emissions intensity in Central and Southern Asia remains much higher than in Europe and Northern America, 1.27 kg/USD and 0.21 kg/USD in 2019 respectively.

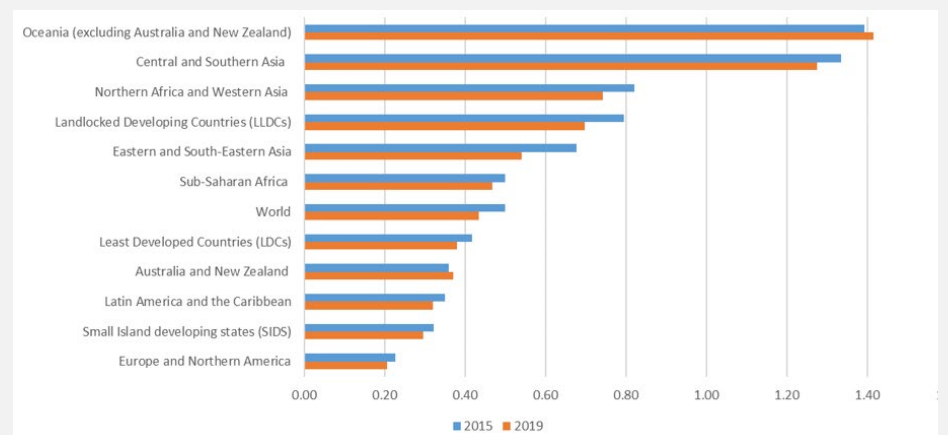
Changes in global energy-related CO2 emissions



Carbon dioxide emissions from manufacturing industries (Gt)



Carbon dioxide emissions per unit of manufacturing value added (kilogrammes of CO2 per constant 2015 United States dollars)



Additional resources, press releases, etc. with links:

- <https://www.iea.org/reports/greenhouse-gas-emissions-from-energy-overview>
- <https://www.iea.org/topics/global-energy-review> <https://www.iea.org/reports/world-energy-outlook-2021>
- https://www.unido.org/sites/default/files/files/2021-09/SDG_report_2021_final.pdf

Storyline author(s)/contributor(s): Petra Kynclova, UNIDO; Pouya Taghavi, IEA

Custodian agency(ies): UNIDO, IEA

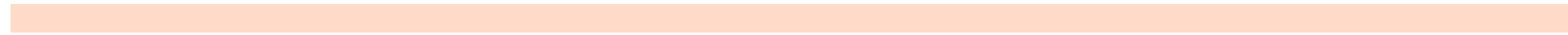
Target 9.5: Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

Indicator 9.5.1: Research and development expenditure as a proportion of GDP



[Custodian agency\(ies\):](#) UNESCO-UIS

Indicator 9.5.2: Researchers (in full-time equivalent) per million inhabitants



[Custodian agency\(ies\):](#) UNESCO-UIS

Target 9.a: Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States

Indicator 9.a.1: Total official international support (official development assistance plus other official flows) to infrastructure

Total official flows for the economic infrastructure on a growing trajectory

Total official flows from all donors for economic infrastructure in developing countries represented 20% of all aid and reached USD 63.0 billion in 2020, which represents a growth of 35% since 2010.

Within this total, the main sectors assisted were transport (USD 19.7 billion), the energy sector (USD 18.3 billion) and the banking and financial services sector (USD 18.1 billion).



Storyline author(s)/contributor(s): Yasmin Ahmad, OECD

[Custodian agency\(ies\):](#) OECD

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

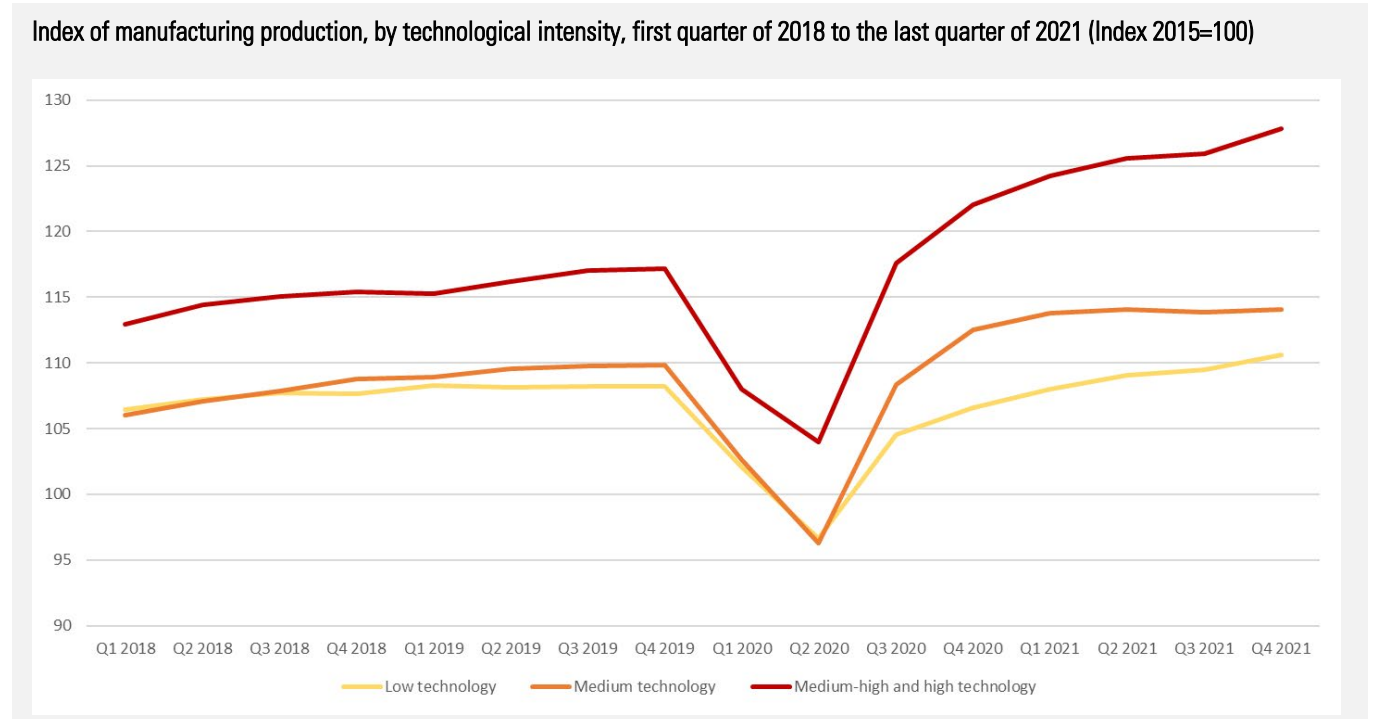
Indicator 9.b.1: Proportion of medium and high-tech industry value added in total value added

Higher technology industries had a better performance and drove the manufacturing recovery

The medium- and high-technology manufacturing products accounted for 45.1 per cent in 2019. The share of medium- and high-technology manufacturing in total manufacturing in Northern America and Europe was 47.7 per cent compared to 21.4 per cent in sub-Saharan Africa when the global economy was hit by the COVID-19 pandemic. The 2020 coronavirus outbreak had a tremendous impact on the manufacturing sector. As the impacts differ by its respective industries, the recovery paths follow varying speed and intensity.

Higher technology industries had a better performance and therefore recovered faster, mainly attributable to the output of computers, electronics and optical products, electrical equipment, as well as pharmaceuticals. Most of the industries using medium- and high-technology have already reached pre-pandemic levels, except for motor vehicles and other transport equipment. Production of motor vehicles is facing larger challenges worldwide due to supply chain disruptions of resources and intermediate goods.

In comparison, some lower-technology industries such as clothing or coke and refined petroleum products, remain below their pre-pandemic production levels. Manufacturing of basic consumer goods such as food products has followed a stable growth trajectory with limited losses since the beginning of the pandemic.



Additional resources, press releases, etc. with links:

- <https://www.unido.org/news/current-pandemic-trends-bring-more-uncertainty-economic-prospects>
- <https://www.oecd.org/economic-outlook/>

Storyline author(s)/contributor(s): Petra Kynclova, UNIDO

Custodian agency(ies): UNIDO

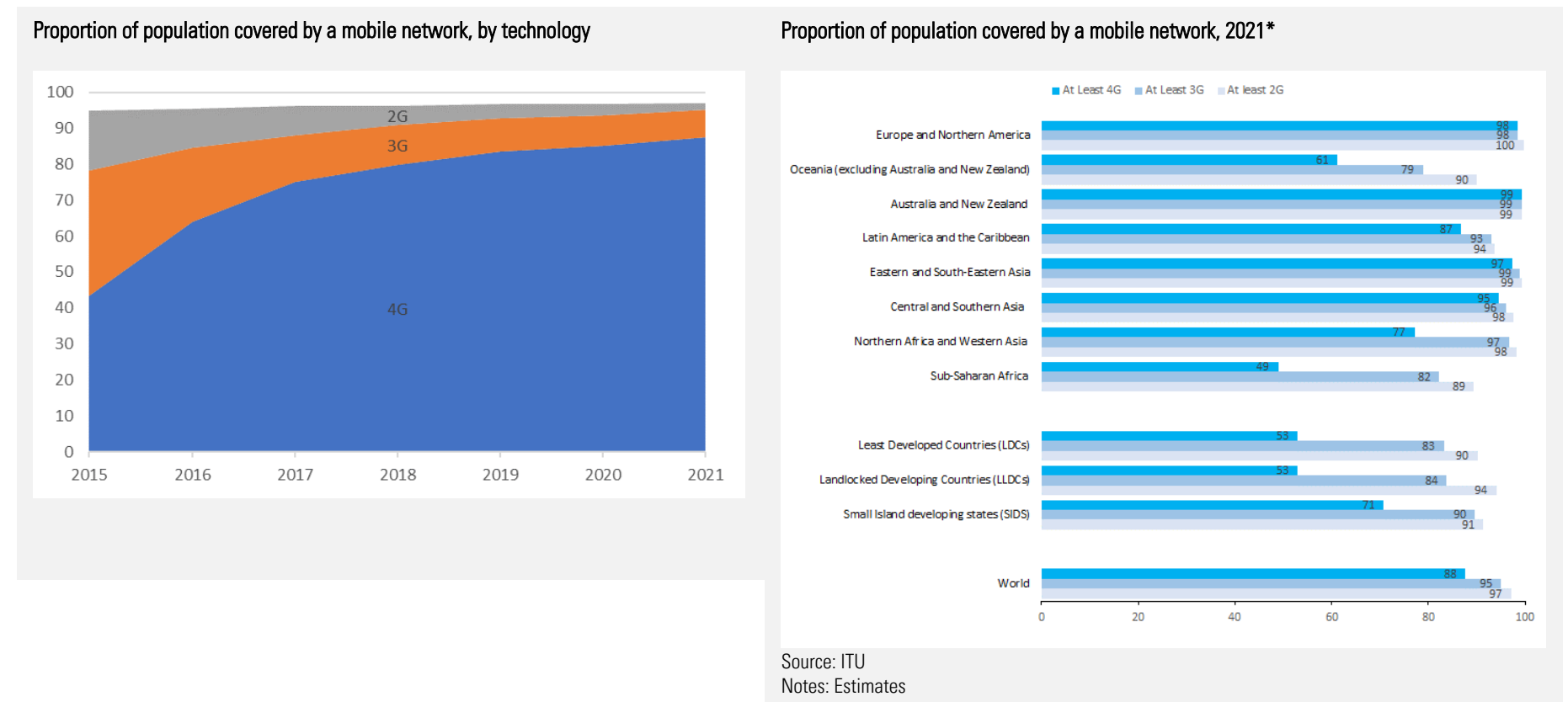
Target 9.c: Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020

Indicator 9.c.1: Proportion of population covered by a mobile network, by technology

Most of the world population is covered by a mobile-broadband signal, but blind spots remain

In most developing countries, mobile broadband (3G or above) is the main way—and often the only way—to connect to the Internet. It is a necessary condition, but not a sufficient one, as potential users face several other barriers to connectivity. Ninety-five per cent of the world population now has access to a mobile broadband network. Between 2015 and 2021, 4G network coverage doubled to reach 88 per cent of the world’s population. However, the coverage gap remains significant in LDCs and LLDCs, where 17% of the population remains without any access to a mobile broadband network, thereby falling short of target 9.c to “significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.”

While virtually all urban areas in the world are covered by a mobile broadband network, many gaps persist in rural areas. In LDCs, 14% of the rural population has no mobile network coverage at all, and another 12% has only 2G coverage. This means that more than a quarter of the population cannot access the Internet.



Additional resources, press releases, etc. with links:

- ITU, Measuring digital development: Facts and Figures 2021, see <https://www.itu.int/itu-d/reports/statistics/facts-figures-2021/>
- ITU, Digital Development Dashboard, available at <https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx>

Storyline author(s)/contributor(s): Martin Schaaper, ITU

Custodian agency(ies): ITU