Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

(Updated on 3 March 2016)

Table of Contents

Target 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder 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

No metadata received on current indicator formulation.

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

From Universal Postal Union (UPU):

In the sections below, the UPU provides metadata regarding a postal component on the quality of infrastructure should other indicators be considered for the measurement of Target 9.1. The indicator on quality of the postal infrastructure would be the following: "Average parcel shipping time/parcel shipping time standard, by country, both for domestic and international parcel services, and by product".

Definition and method of computation

"Average parcel shipping time/parcel shipping time standards, by country, both for domestic and international parcel services, and by product": this is the level of reliability of domestic or international parcel delivery services and for different products exchanged between countries.

This ratio is determined after dividing the average parcel shipping time by the standard shipping time expected for parcels delivery at the national or international level, and at the product level depending on data availability.

An alternative way of computing a similar quality of service ratio would be to use the percentage of parcels actually delivered within the quality standard, i.e. within the standard for shipping times. The standard for shipping time is the expected end-to-end transit time and is often expressed as the posting day + one, two , three, four or five days depending on the country geography and distance between countries.

Rationale and interpretation

With the strong development of national and international e-commerce, the quality of the postal and parcels delivery services is becoming a major concern for millions of enterprises and consumers transacting online. It is sometimes considered as a major hurdle by these market players and one of the challenges for trade facilitation, particularly for micro, small and medium-size enterprises interested in internationalizing their activities.

Source and data collection

The official data will start to be collected by the UPU in 2016 through the UPU Postal Statistics questionnaire. However, it is already possible to estimate the abovementioned shipping times through the UPU's international tracking systems for parcels and postal items enabling real-time analysis of billions of data records.

Disaggregation

The possibility of accessing tracking systems data enables the maximal disaggregation level from a geographic perspective, with detailed information available for any location involved in international postal and parcels exchanges within a country.

Comments and limitations

UPU tracking systems are currently limited to international postal and parcel transactions only. The official data to be collected in UPU's Postal Statistics questionnaires is covering domestic postal items up to two kilogrammes only. However, data collection on this issue could be expanded to items up to fifty kilogrammes in the coming three to five years.

Gender equality issues

The proportion of male or female recipients of postal items could be estimated by sampling postal traffic in each country.

Supplementary information

Postal, parcel and express delivery networks are dealing with at least half a trillion economic transactions every year. Furthermore, post offices represent the largest physical retail network in the world with over 650,000 offices worldwide.

References

UNCTAD. (2015). Information Economy Report 2015. Unlocking the Potential of E-commerce for Developing Countries. UNCTAD. At: http://unctad.org/en/PublicationsLibrary/ier2015_en.pdf

UPU Postal Statistics website: http://www.upu.int/en/resources/postal-statistics/about-postal-statistics.html

Targets for which indicators are relevant

2.3, 11.2

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

From UNIDO:

Definition and method of computation
Manufacturing value added (MVA) is the total value of goods and services net of intermediate consumption. It is generally compiled as the sum of the value added of all manufacturing activity units in operation in the reference period. It can be presented in percentage to gross domestic product (GDP) as well as per capita for any reference year. MVA growth rates are given at constant prices.

Rationale and interpretation
MVA is a well-recognized and widely used indicator by researchers and policy makers to assess the level of industrialization of a country. MVA measures the contribution of manufacturing to economy. The indicator is exceptionally good for international comparison. Share of MVA in GDP establishes the role of manufacturing in the economy. In other words, this indicator specifies the contribution of the manufacturing sector to total production. MVA per capita is the basic indicator of a country's level of industrialization adjusted for the size of the economy. And finally, the MVA growth provides insight into the general direction and magnitude of growth for the manufacturing sector. In practice, it is a measure of the rate of change that an economy's MVA goes through from one year to another at constant prices.

Sources and availability
Currently UNIDO maintains the World MVA database which contains data for about 200 economies. Data are presented at constant and current prices.

Disaggregation
Data can be presented for country groups (LDCs, LLDC) and the world regions. Value added can also be presented by sector (ISIC)

Indicator 9.2.2: Manufacturing employment as a proportion of total employment

From ILO:

Definition and method of computation
This indicator is computed as the number of persons employed in the industry sector divided by total employment. Employed persons are defined as all those of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit. The industry sector comprises mining and quarrying, manufacturing, construction and public utilities (electricity, gas and water).

Rationale and interpretation
The industry sector, which is largely composed of manufacturing, is central to the economy given its significant contribution to national product and employment. It impacts also other aspects of life such as health and the environment. The industry sector being a major source of job creation (directly and indirectly), the study of trends and patterns of the share and growth of employment in industry can reveal valuable information on the labour market configuration and the situation in terms of social cohesion.

Sources and data collection
Household surveys (LFS, HIES, LSMS, Integrated HH surveys, etc.), Official estimates, Establishment surveys.

Disaggregation
Data are available by gender or by occupation.

Comments and limitations
There are a variety of issues affecting cross-country comparability, including but not limited to differences in the definition of working-age, different sources, measurement differences, conceptual variation, survey coverage and collection methodology.

Gender equality issues
As this indicator is disaggregated by sex, it is well-suited for analysis of gender equality issues.

Data for global and regional monitoring
The ILO produces global and (flexible) regional estimates of employment by industry, disaggregated by sex, including disaggregated data on manufacturing.

Supplementary information and references
For details, refer to the Resolution concerning statistics of work, employment and labour underutilization, available at: http://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms_230304.pdf

Responsible entities
ILO with UNIDO inputs.
Current data availability
The ILO has data on the share of employment in industry for 175 countries. The coverage for annual growth rates which would require consecutive annual data points is more limited.

From UNIDO:

Definition and method of computation
Employment is defined as a work performed for pay or profit. The value is obtained by summing up the number of employed in all manufacturing activities. The manufacturing employment indicator is presented in absolute terms as well as relative to total employment.

Rationale and interpretation
This indicator represents the contribution of manufacturing in job creation. It is universally important indicator. For industrialized countries it represents sustained growth, for developing countries it shows the ability of manufacturing to absorb surplus labour from traditional sectors. Compared to the indicator 9.2.1 it measures the labour productivity – another key indicator for measuring technological progress.

Sources and availability
Manufacturing employment data are widely available from the industrial survey results. UNIDO's INDSTAT database contains employment data for 170 countries. Total employment data (for calculation of percentage) are available in ILO database.

Disaggregation
Data can be presented for country groups and the world regions. Gender disaggregated data are available.

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

From UNIDO:

Definition and method of computation: value added is the total value of goods and services produced by an industry in the given reference period. The indicator is computed as the total value added of small scale industries (as defined in the survey) divided by the total value added of industries of all sizes and multiplied by 100.

Rationale and interpretation

Small scale industry plays an important in the economy of all countries which can be established with the small amount of investment. Such industries are based on processing local raw materials. It generates employment and self-employment. Their share in total value added best describes the size and structure of small industry. This indicator is also well-correlated with other indicators such as the income and employment generated by small scale industry.

Source and availability

Data are obtained from the household and establishment-based surveys. Limited data are available in UNIDO database.

Disaggregation

Data can be disaggregated by industry and by regions.

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

From UNIDO:

Definition and method of computation

Number of small industries receiving financial services is presented in percentage of the total number of small industries.

Rationale and interpretation

Small scale industries have limited access to financial services, whereas their need to loan is acute. This indicator shows how widely financial institutions are serving the small industries. This indicators together with suggested indicator 1 reflects the main message of target 9, 3 which intends to balance the contribution of small industry to their access to financial services.

Sources and availability

Data are not readily available with international sources. Limited data can be derived from the World Bank enterprise survey but there is no data available in regular time series.

NSOs can compile the indicator from the survey data and records of the financial institutions.

Disaggregation

Data can be presented by region

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

From UNIDO:

Definition and method of computation

CO2 emission per unit of value added is a ratio indicator between the carbon emission and value added. Carbon emission is estimated from the data on energy consumption.

Rationale and interpretation

Carbon emission per unit of value added is a universal indicator for measuring the impact of industrial production on environment. It captures the intensity of energy use, energy efficiency of production technology and most importantly use of fossil fuels. This indicator can also be presented as CO2 emission per unit of output.

Sources and availability

Energy consumption and value added data are available for more than 150 countries from UNIDO MVA database and UNSD energy database as well as International Energy Agency (IEA) database. Emission data are directly reported by NSOs in many cases.

Limitations;

Estimates of emission are missing sometime due to the lack of breakdown by energy sources.

Disaggregation

Data can be presented by country, country groups and by industrial sector

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

From UNESCO:

Definition and method of computation;
The OECD Frascati Manual provides the relevant definitions for research and experimental development, gross domestic expenditure on R&D and researchers.
Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications. (FM §63)
Intramural expenditures are all expenditures for R&D performed within a statistical unit or sector of the economy during a specific period, whatever the source of funds. (FM §358)
Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned. (FM §301)
Although an OECD manual, the application is global. The Frascati Manual is currently under revision, with the next edition to be released in October 2015. The new edition of the Manual will be a truly global manual. There will be some changes to the definitions provided above, but these are not substantial.
Rationale and interpretation;
The indicator is a direct measure of R&D spending referred to in the target.
Sources and data collection;
Data are collected through national R&D surveys, either by the national statistical office or a line ministry (such as the Ministry for Science and Technology)
Disaggregation;
R&D expenditure can be broken down by sector of performance, source of funds, field of science, type of research and type of cost.
Researchers can be broken down by sector of employment, field of science, sex and age, all in head counts and full-time equivalent.
Comments and limitations;
(will follow)
Gender equality issues;
Researcher data can be broken down by sex, allowing to track gender parity.
Data for global and regional monitoring;
OECD and Eurostat collect data from their member countries. The UNESCO Institute for Statistics (UIS) imports these data into its global database, and collects the data directly from all other countries in the world, in partnership with RICYT in Latin America and NEPAD in Africa. Data are currently available for 137 countries.
Supplementary information;
None
References
Frascati Manual: www.oecd.org/sti/frascatimanual and
http://www.uis.unesco.org/Library/Documents/OECDFrascatiManual02_en.pdf
UIS Data centre: http://data.uis.unesco.org/Index.aspx?DataSetCode=SCN_DS&popupcustomise=true&lang=en

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

No metadata received on current indicator formulation.

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

From OECD:

Definition and method of computation

Total net official development assistance (ODA) to economic infrastructure (purpose code 200). Data expressed in US dollars at the average annual exchange rate.

Rationale and interpretation

ODA is the accepted measure of international development co-operation. In this case it captures aid in support of projects and programmes to improve the economic infrastructure of developing countries, which is taken to include the sectors of transport and storage, communications and energy, as well as banking, business and other services.

Sources and data collection

Data are compiled by the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development from returns submitted by its member countries and other aid providers. Data are available here.

Disaggregation

The data are generally obtained on an activity level, and include numerous parameters. They can thus be disaggregated by provider and recipient country; by type of finance, and by type of resources provided. Some data are also available on the policy objectives targeted by individual projects.

Comments and limitations

The data only cover official concessional support from donor countries.

Gender equality issues

The data include a "gender equality" marker which identifies individual projects that have a clear gender dimension.

Data for global and regional monitoring

Data are available for essentially all high-income countries, and for an increasing number of middle-income aid providers.

Supplementary information

See here for detailed sectoral coverage.

References

OECD, 2014 Official Support for Private Sector Participation in Developing Country Infrastructure.

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

From UNIDO:

Definition and method of computation

Classification of industry by technological intensity is based in R&D intake in manufacturing output. Higher the share of R&D expenditure higher the level of technological intensity. MHT sectors are classified at 3-digit level of ISIC. Above indicator is calculated as the relation of the sum of the value added of MHT to the total value added of manufacturing.

Rationale and interpretation

This indicator captures the innovation and technology endowment in manufacturing. It reveals the level of production technology in manufacturing of an economy, which makes it highly policy relevant indicator.

Sources and availability

Data are available from the annual industrial survey. INDSTAT database of UNIDO contains time series data for more than 170 countries.

Disaggregation;

Data can be presented separately for each MHT sector as well as by region and country group.

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

From ITU and Partnership on Measuring ICT for Development:

Definition and method of computation:
The indicator *percentage of the population covered by a mobile network*, *broken down by technology*, refers to the percentage of inhabitants living within range of a mobile-cellular signal, irrespective of whether or not they are mobile phone subscribers or users. This is calculated by dividing the number of inhabitants within range of a mobile-cellular signal by the total population and multiplying by 100.

The indicator is based on where the population lives, and not where they work or go to school, etc. When there are multiple operators offering the service, the maximum population number covered should be reported. Coverage should refer to broadband (3G and more) and narrowband (2G) mobile-cellular technologies and include:

- 2G mobile population coverage: Mobile networks with access to data communications (e.g. Internet) at downstream speeds below 256 kbit/s. This includes mobile-cellular technologies such as GPRS, CDMA2000 1x and most EDGE implementations. The indicator refers to the theoretical ability of subscribers to use non-broadband speed mobile data services, rather than the number of active users of such services.
- 3G and above mobile-population coverage: Refers to the number of mobile-cellular subscriptions with access to data communications (e.g. the Internet) at broadband downstream speeds (defined here as greater than or equal to 256 kbit/s). The indicator refers to the theoretical ability of subscribers to use broadband speed mobile data services, rather than the number of active users of such services. This includes all high-speed mobile-cellular telephone subscriptions with access to data communications, and includes mobile-cellular technologies such as WCDMA (UMTS) and associated technologies such as HSPA, CDMA2000 1x EV-DO, mobile WiMAX 802.16e and LTE. It excludes low-speed mobile-broadband subscriptions and fixed (wired) Internet subscriptions.

As technologies evolve and as more and more countries will deploy and commercialize more advanced mobile-broadband networks (4G, 5G etc.), the indicator will include further breakdowns.

ITU collects data for this indicator through an annual questionnaire from national telecommunication regulatory authorities or Information and Communication Technology (ICT) Ministries, who collect the data from licensed mobile-cellular operators. However, they are likely to have different levels and locations of coverage. Another method would be to request each operator's coverage maps, which can be overlaid with maps showing the population of the country.

Rationale and interpretation
The percentage of the population covered by a mobile cellular network can be considered as a minimum indicator for ICT access since it provides people with the possibility to subscribe to and use mobile-cellular services to communicate. Over the last decade, mobile-cellular networks have expanded rapidly and helped overcome very basic infrastructure barriers that existed when fixed-telephone networks – often limited to urban and highly populated areas - were the dominant telecommunication infrastructure.

While 2G (narrowband) mobile-cellular networks offer limited (and mainly voice-based) services, higher-speed networks provide increasingly high-speed, reliable and high-quality access to the Internet and its increasing amount of information, content, services, and applications. Mobile networks are therefore essential to overcoming infrastructure barriers, helping people join the information society and benefit from the potential of ICTs, in particular in least developed countries.

The indicator highlights the importance of mobile networks in providing basic, as well as advanced communication services and will help design targeted policies to overcome remaining infrastructure barriers, and address the digital divide. Many governments track this indicator and have set specific targets in terms of the mobile population coverage (by technology) that operators must achieve.

Sources and data collection
This indicator is based on an internationally agreed definition and methodology, which have been developed under the coordination of ITU, through its Expert Groups and following an extensive consultation process with countries. It is also a core indicator of the Partnership on Measuring ICT for Development's Core List of Indicators, which has been endorsed by the UN Statistical Commission (last time in 2014).

ITU collects data for this indicator through an annual questionnaire from national regulatory authorities or Information and Communication Technology Ministries, who collect the data from Internet service providers. By 2014, data on 2G mobile population coverage were available for about 144 countries, from developed and developing regions, and covering all key global regions. Data on 3G mobile population coverage were available for 135 countries. ITU publishes data on this indicator yearly.

Disaggregation
Based on the data for the *percentage of the population covered by a mobile network*, *broken down by technology*, and on rural population figures, countries can produce estimates on rural and urban population coverage. ITU produces global estimates for the rural population coverage, by technology.
Comments and limitations
Some countries have difficulty calculating overall mobile-cellular population coverage. In some cases, data refer only to the operator with the largest coverage, and this may understate the true coverage.
Data for global and regional monitoring
ITU produces regional and global aggregates for the '*percentage of the population covered by a mobile network*, *broken down by technology*.

Year-end data are released in December of the following year through the ITU World Telecommunication/ICT Indicators Database.
References:
- ITU Handbook for the collection of Administrative Data on Telecommunications/ICT, 2011 (and revisions and new indicators)

Targets for which indicator are relevant:
1.4, 2.3, 2.c, 9.1, 11.b, 13.1,