ITU Publications

International Telecommunication Union
Development Sector

Measuring digital development
Facts and figures
2020

ITU

Foreword

This new edition of *Measuring Digital Development: Facts and Figures* comes at an extraordinarily challenging time for the international community. With the COVID-19 pandemic wreaking havoc on lives, societies and economies around the world, many of our daily activities have moved online, throwing a sharp spotlight on global connectivity. If you are reading this, it means you are online – but what about the billions of people still not fortunate enough to be able to connect?

Facts and Figures 2020 reveals that people in rural areas continue to face greater challenges than people in urban areas in terms of remaining connected during the lockdown, especially in developing economies. Large swathes of the rural landscape are still not covered by mobile broadband networks, and fewer households in these areas have access to the Internet.

Also worrying, the rollout of communications infrastructure is slowing. Since growth in communications infrastructure deployment was already showing signs of slowing in 2019, it is still too early to tell whether growth has stalled because of the pandemic, or whether there are other factors at play.

This new edition of *Facts and Figures* also finds that mobile cellular subscriptions have been declining for the first time in history, and that growth in mobile broadband subscriptions is levelling out. Here, as before, it is not certain if this a result of the COVID-19 crisis: it will be interesting to see what happens once the world finally reverts to a more normal state of affairs.

On a more optimistic note, our research confirms that, where connectivity is available, and affordable, young people are enthusiastic adopters of technology and have relatively high levels of Internet use. While overall just over half of the global population is using the Internet, among young people aged 15 to 24 this rises to almost 70 per cent. This is particularly encouraging in view of the fast-growing youth demographic in much of the developing world, where digital technologies have the potential to become a major accelerator of economic growth and development and an important driver of progress towards the 17 Sustainable Development Goals.

I am particularly pleased that, for the first time, this new edition of *Facts and Figures* contains statistics on Small Island Developing States (SIDS) and Landlocked Developing Countries (LLDCs), in addition to our data on the 47 UN-designated Least Developed Countries (LDCs).

This important new edition, released at a time of unprecedented global uncertainty, explores what we know and can predict about those connected and those not connected – but with some reservations. Under normal circumstances, ITU's expert team of statisticians uses the data submitted by Member States for the previous year to make predictions for the current year. However, with COVID-19 profoundly changing the use of digital devices and services, past trends are less useful for predicting present or future phenomena (see 'Methodology' for more details).

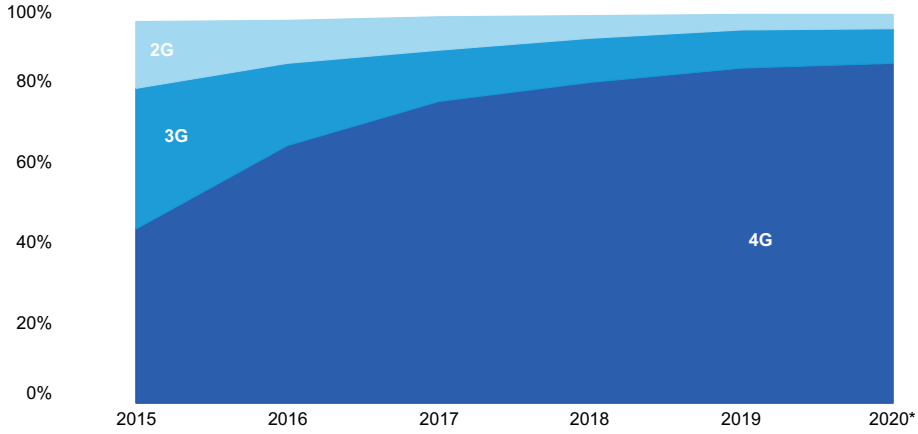
Nevertheless, progress made prior to the pandemic will have influenced how well-prepared different parts of the world have been to face the challenges posed by COVID-19 and its associated disruptions to normal life, including the challenge of switching from 'physical' to 'digital'. In the current context, this edition of *Facts and Figures* presents a mix of findings on digital readiness and resilience that offer a new perspective on the impact and importance of connectivity to every nation's economy.

Doreen Bogdan-Martin
Director, ITU Telecommunication Development Bureau

Contents

Rollout of mobile-broadband networks slowing down in 2020

Population coverage by type of mobile network, 2015-2020*



* ITU estimate. Source: ITU

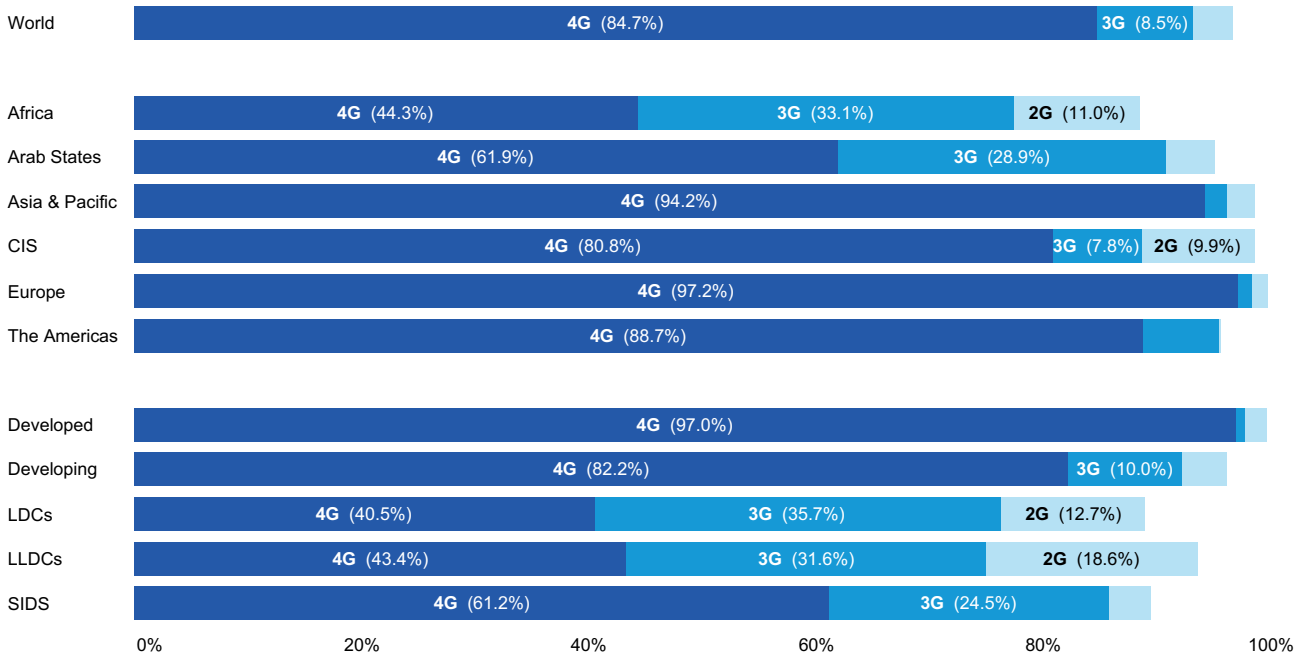
Globally, almost 85 per cent of the population will be covered by a 4G network at the end of 2020.

Between 2015 and 2020, 4G network coverage increased two-fold globally.

Annual growth has been slowing down gradually since 2017, and 2020 coverage is only 1.3 percentage points higher than 2019.

Ninety-three per cent of the world population has access to a mobile-broadband network, less than half a percentage point higher than a year ago.

Population coverage by type of mobile network, 2020*



* ITU estimate. Source: ITU

Note: The values for 2G and 3G networks show the incremental percentage of population that is not covered by a more advanced technology network (e.g. 93.2% of the world population is covered by a 3G network, that is 8.5% + 84.7%).

In most regions, more than 90 per cent of the population has access to a mobile-broadband network (3G or above).

Africa and CIS are the regions facing the biggest gap, where respectively 23 and 11 per cent of the population have no access to a mobile-broadband network.

In 2020, Africa achieved 21 per cent growth in 4G rollout, while growth was negligible in all the other regions.

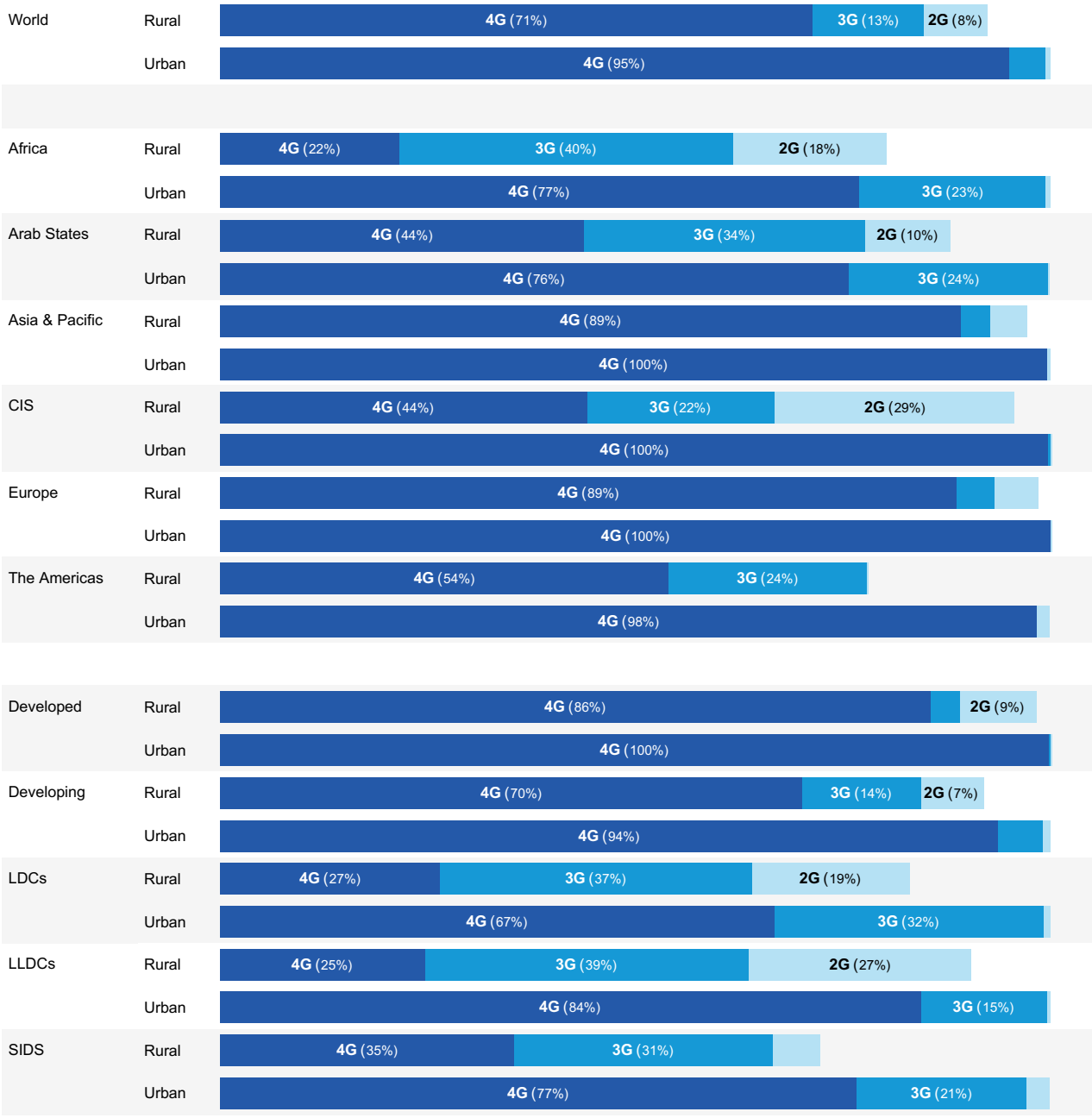
About a quarter of the population in LDCs and LLDCs, and about 15 per cent of the SIDS population do not have access to a mobile-broadband network, coming short of SDG Target 9.c to significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.

Mobile-broadband network coverage: Developing countries' rural areas still penalized

Population coverage by type of mobile network and area, 2020*

While virtually all urban areas in the world are covered by a mobile-broadband network, many gaps subsist in rural areas.

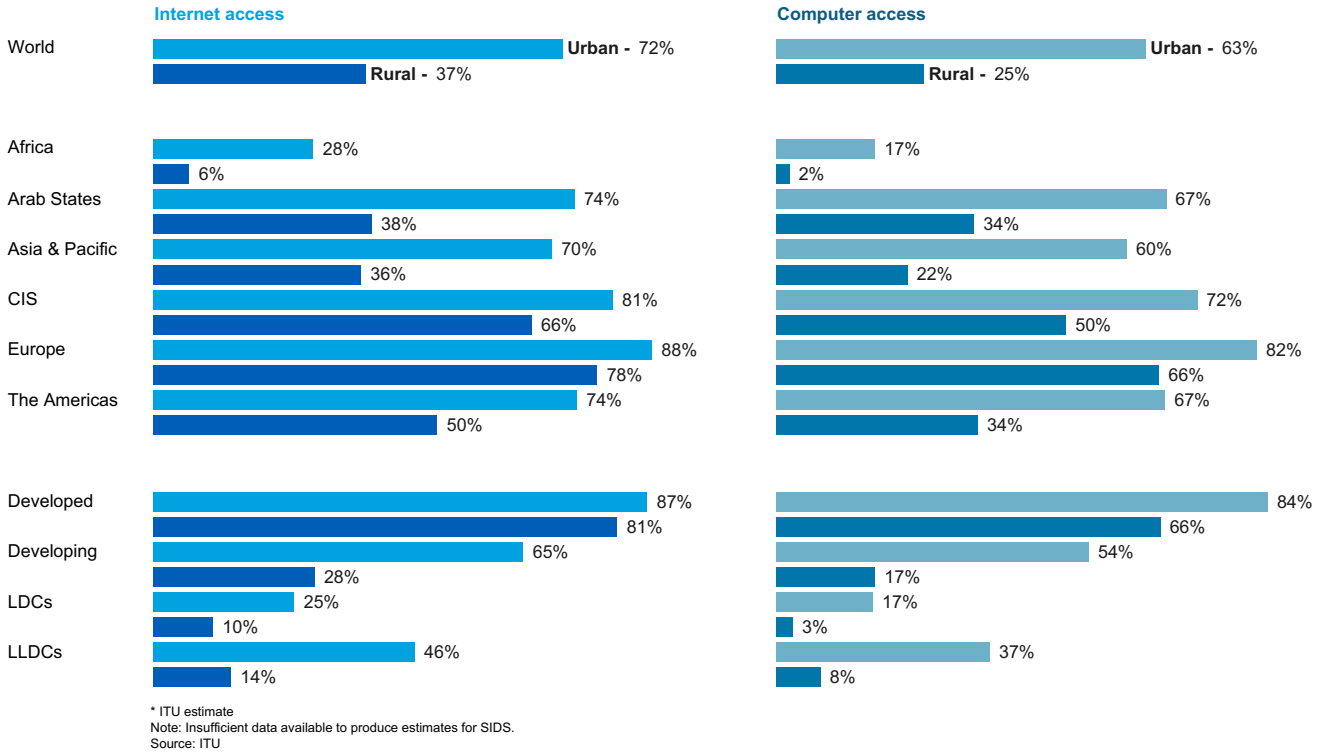
In LDCs, 17 per cent of the rural population has no mobile coverage at all, and 19 per cent of the rural population is only covered by a 2G network.



* ITU estimate. Source: ITU

Internet access at home in urban areas twice as high as in rural areas

Percentage of households with computer and/or Internet access at home, 2019*



* ITU estimate
Note: Insufficient data available to produce estimates for SIDS.
Source: ITU

Globally, about 72 per cent of households in urban areas had access to the Internet at home in 2019, almost twice as much as in rural areas (nearly 38 per cent).

The urban-rural gap was small in developed countries, but in developing countries urban access to the Internet was 2.3 times as high as rural access.

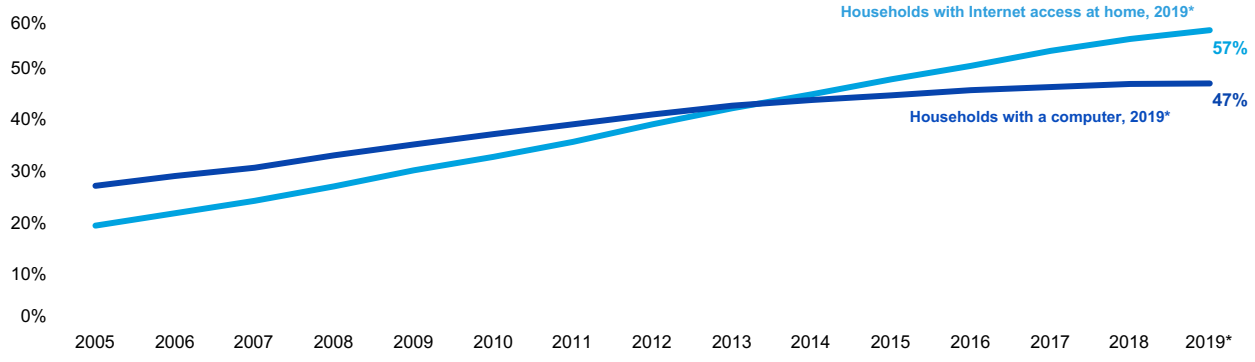
In Africa, only 28 per cent of households in urban areas had access to the Internet at home, but that was still 4.5 times as high as the percentage in rural areas, which stood at 6.3 per cent.

In the other regions of the world, household Internet access in urban areas stood between 70 and 88 per cent, while access in rural areas ranged between 37 and 78 per cent.

A similar picture emerges for households with a computer, but since computers are no longer the main gateway to the Internet, across the board the percentage of households with a computer is smaller than the percentage of households with Internet access.

The urban-rural gap is bigger though in household computer access than in Internet access.

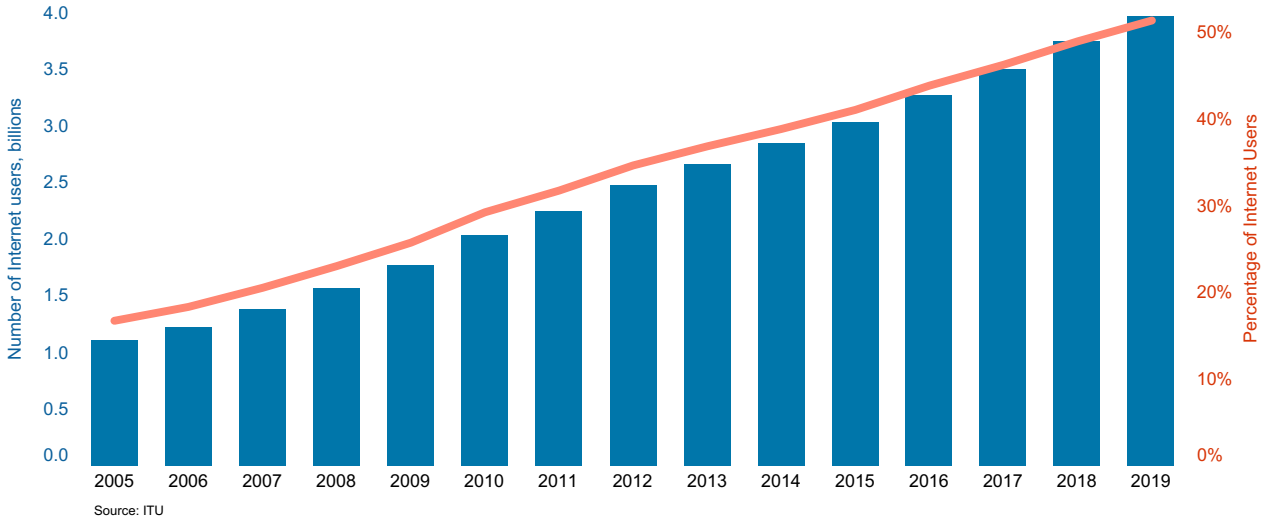
Percentage of households with Internet access at home and with a computer, 2005-2019*



* ITU estimate. Source: ITU

Almost seventy per cent of the world's youth are using the Internet

Individuals using the Internet



Source: ITU

At the end of 2019, just over half of the world population was using the Internet, but this proportion increases to over 69 per cent among youth (aged 15-24 years).

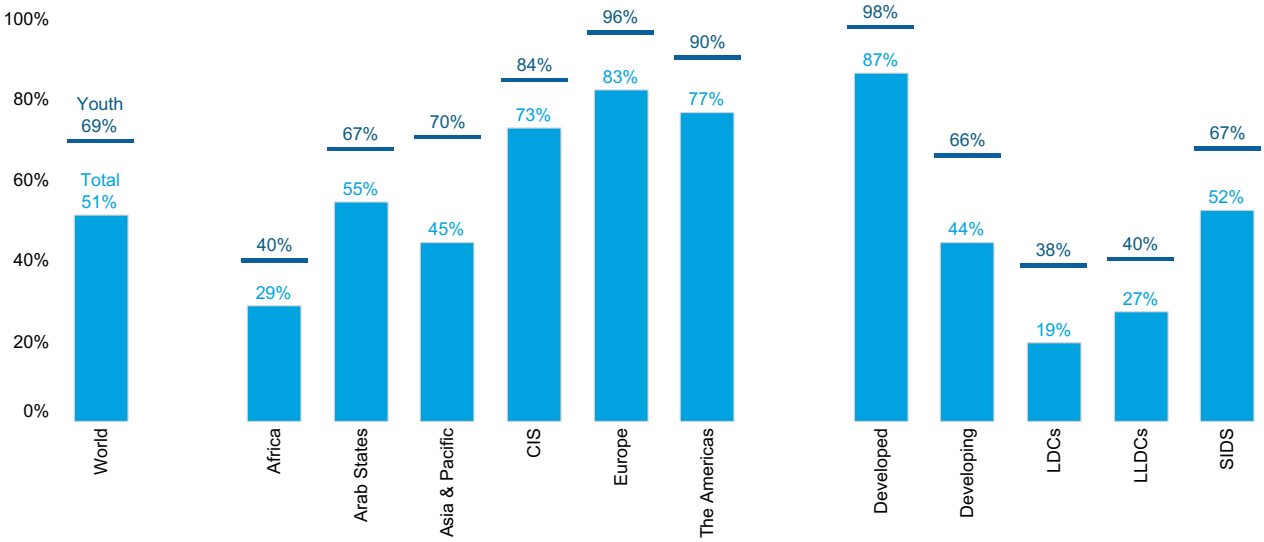
This also means that 369 million young people and 3.7 billion people in total were offline

In developed countries, virtually all young persons were using the Internet.

In LDCs, the overall share of people using the Internet is half of the corresponding share for young people, which itself is only 38 per cent of all youth.

Asia and the Pacific is the region with the highest youth/overall ratio, implying the potential for older age groups to catch up with younger ones in this region in their Internet use.

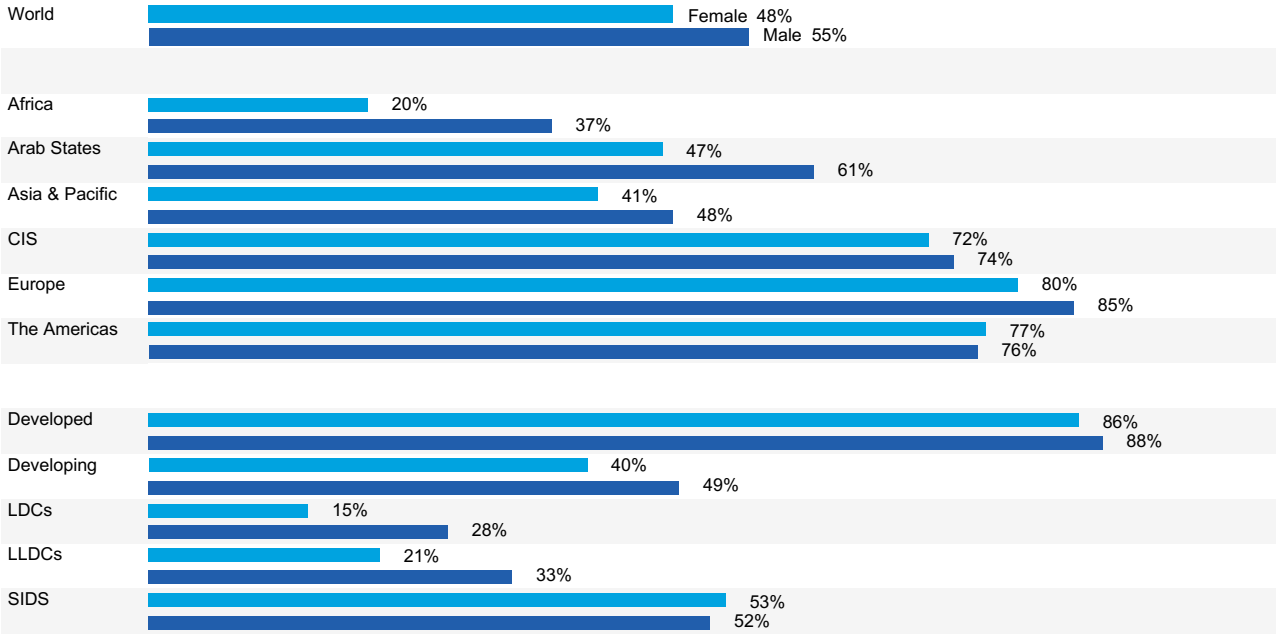
Percentage of individuals using the Internet, 2019*



* ITU estimate. Source: ITU
Note: youth means 15-24 year old individuals using the Internet as a percentage of the total population aged 15 to 24 years.

Internet gender gap large in developing countries

Percentage of female and male population using the Internet, 2019*



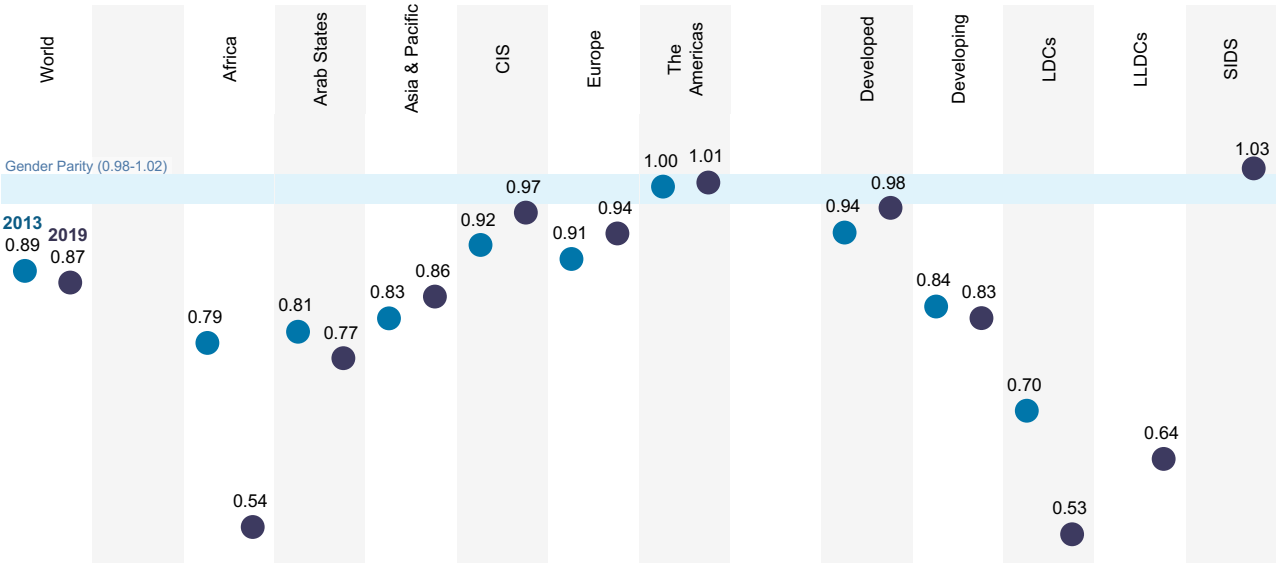
* ITU estimate. Source: ITU

In 2019, it is estimated that globally 55 per cent of the male population was using the Internet, compared with 48 per cent of the female population.

That translates into a gender parity score of 0.87, where the target is total parity, meaning a value of 1.

Since 2013, the gender parity score has decreased slightly, although not as severely as had been reported last year, owing to the availability of new data for a range of countries, including revised data. This new data also indicates that global Internet use was a little lower than previously thought.

The Internet user gender parity score (%), 2013 and 2019*

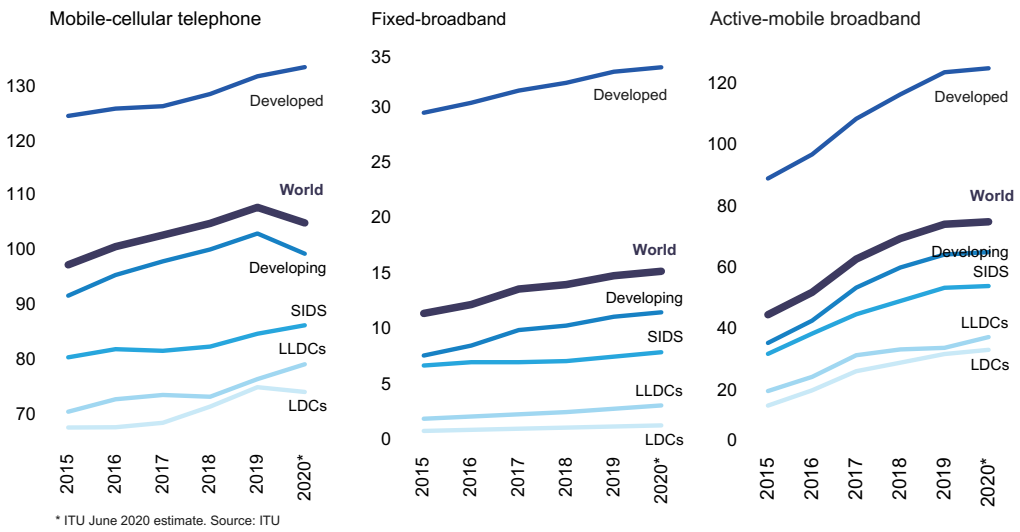


* ITU estimate. - Source: ITU

Note: The gender parity score is calculated as the proportion of women who use the Internet divided by the proportion of men. A value smaller than one indicates that men are more likely to use the Internet than women, while a value greater than one indicates the opposite. Values between 0.98 and 1.02 reflect gender parity.

Mobile-cellular subscriptions declining in 2020

Mobile-cellular telephone subscriptions per 100 inhabitants, by development status



* ITU June 2020 estimate. Source: ITU

The total number of mobile-cellular telephone subscriptions declined for the first time in history.

Further research is needed to understand whether this is caused by the disruptions related to the COVID-19 pandemic, or whether this can be explained by other socio-economic forces.

In the middle of 2020, there were an estimated 105 mobile-cellular subscriptions per 100 inhabitants, down from 108 in 2019.

This decline was driven by developing countries, where the number of subscriptions went down from 103 in 2019 to 99 in the middle of 2020.

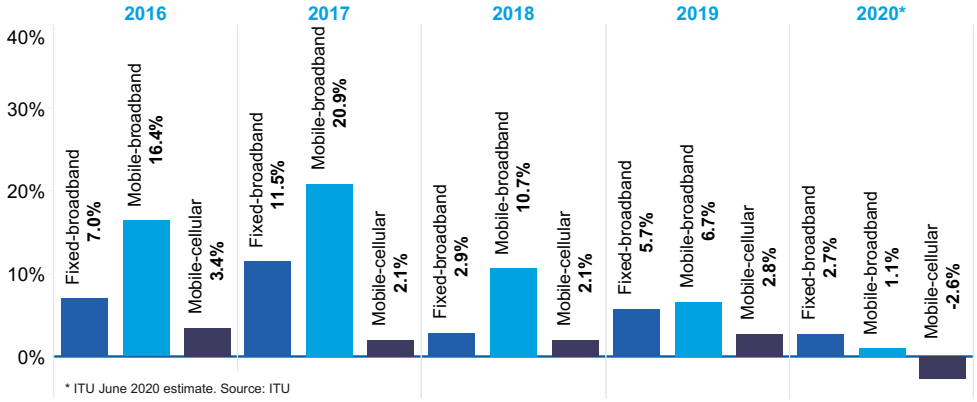
In developed countries though, the trend was still upwards.

Global year-on-year growth in the number of subscriptions per 100 inhabitants, %

The number of active mobile-broadband subscriptions stood at 75 per 100 inhabitants in 2020.

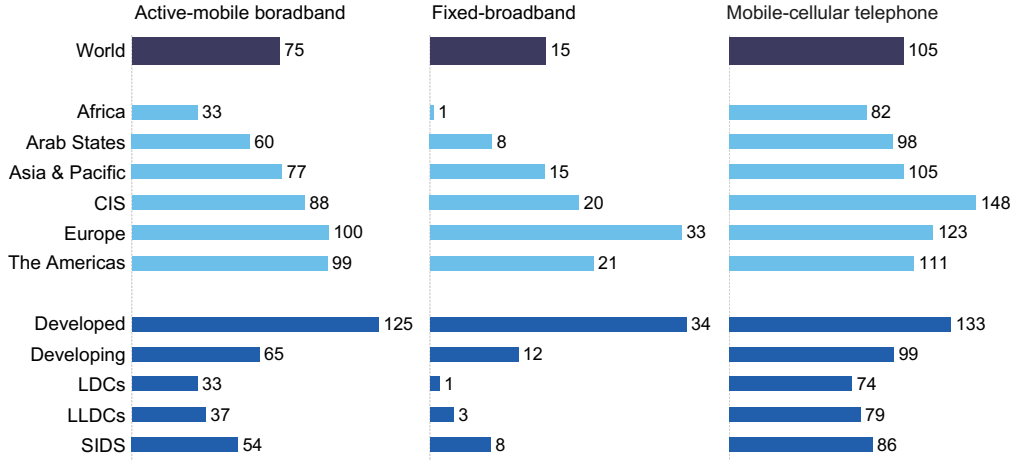
After substantial growth in previous years, this was only 1.1 per cent higher than in 2019.

Growth in fixed-broadband subscriptions slowed down as well, to 2.7% in 2020.



* ITU June 2020 estimate. Source: ITU

Mobile-cellular, fixed-broadband and active-mobile broadband telephone subscriptions per 100 inhabitants, 2020*



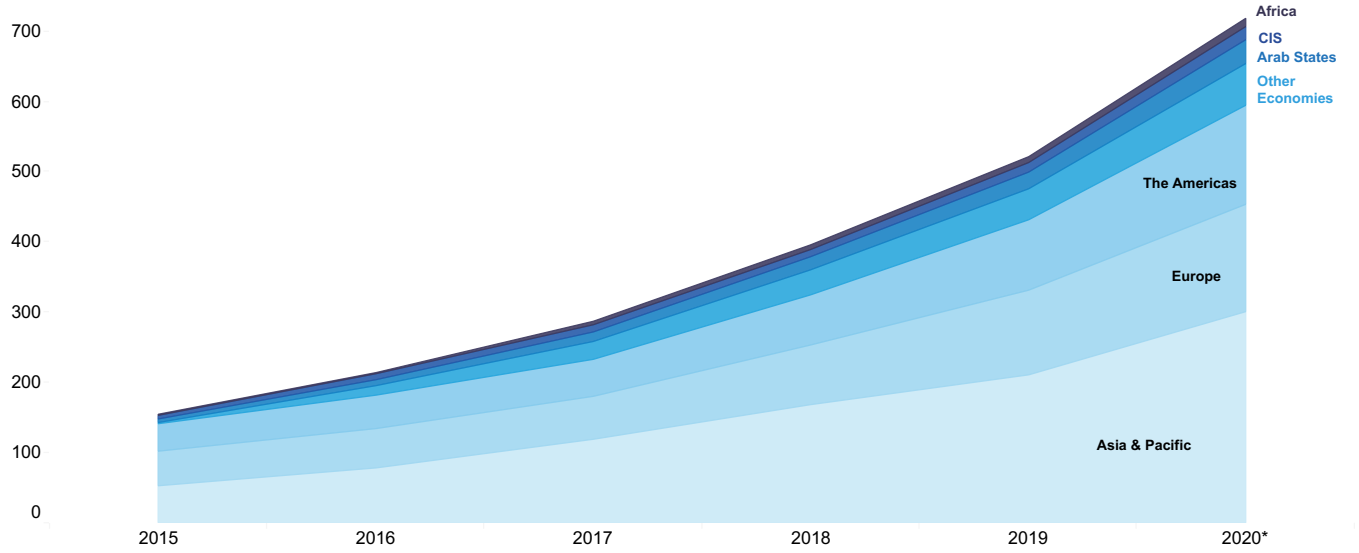
* ITU June 2020 estimate. Source: ITU

The CIS region has the highest number of mobile-cellular subscriptions, while Europe and the Americas lead the way in mobile-broadband.

The gaps between the regions are largest for fixed-broadband subscriptions and smallest for much larger for mobile-broadband subscriptions than for mobile-cellular subscriptions.

International bandwidth usage continues to grow during COVID-19 crisis

International bandwidth by region, Tbit/s**



* ITU estimate based on information for the first half of 2020. Source: ITU.
** 1 Terabit = 1'000'000 Megabit.

International bandwidth usage growth accelerated in 2020.

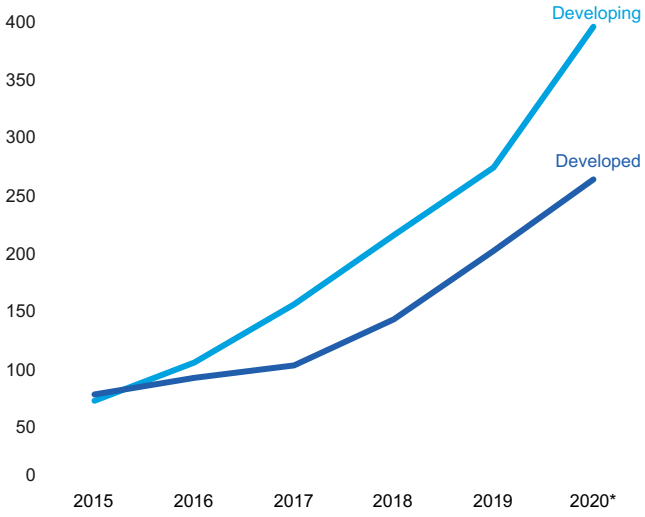
As networks around the world were put to the test during the COVID-19 pandemic, increased Internet traffic first caused first a temporary drop in speed in many countries, but international bandwidth usage is estimated to have grown globally by 38 per cent, exceeding the growth rate of the previous year **by 6 percentage points**.

The highest international bandwidth use occurs in Asia and the Pacific, with over 300 Terabit per second, followed by Europe (over 150 Tbit/s) and the Americas (over 140 Tbit/s).

Growth of international bandwidth usage in developing countries outstripped growth in developed countries.

Among special regions, highest growth can be observed in the LLDCs.

International bandwidth by development status, Tbit/s**



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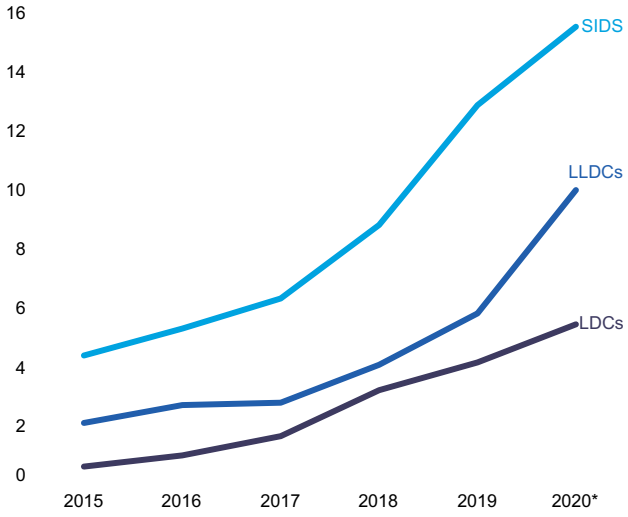
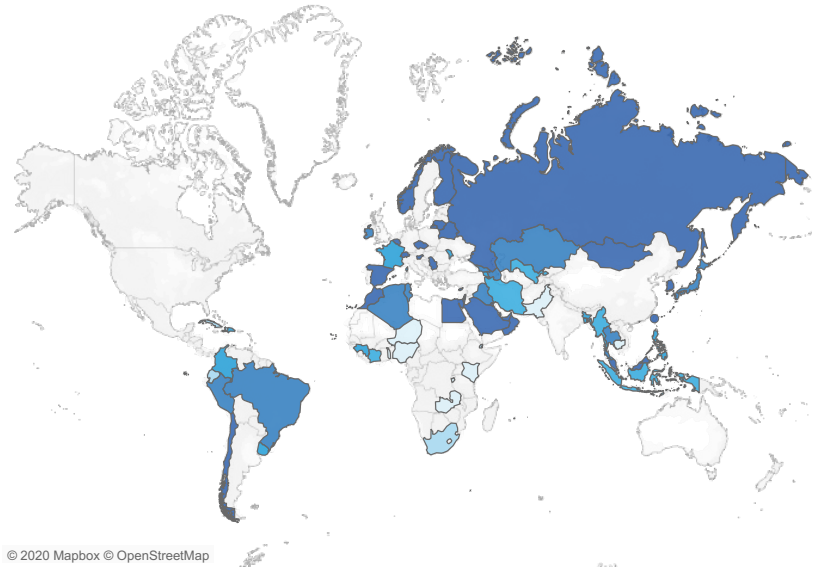
International bandwidth by development status, Tbit/s**



* ITU estimate based on information for the first half of 2020. Source ITU.
** 1 Terabit = 1'000'000 Megabit.

Mobile phone ownership widespread, but gender disparities remain

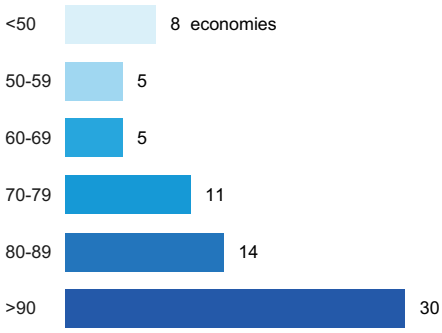
Percentage of individuals owning a mobile phone, latest year in 2017-2019



In 8 economies out of the 73 for which data are available, less than half the population owns a mobile phone.

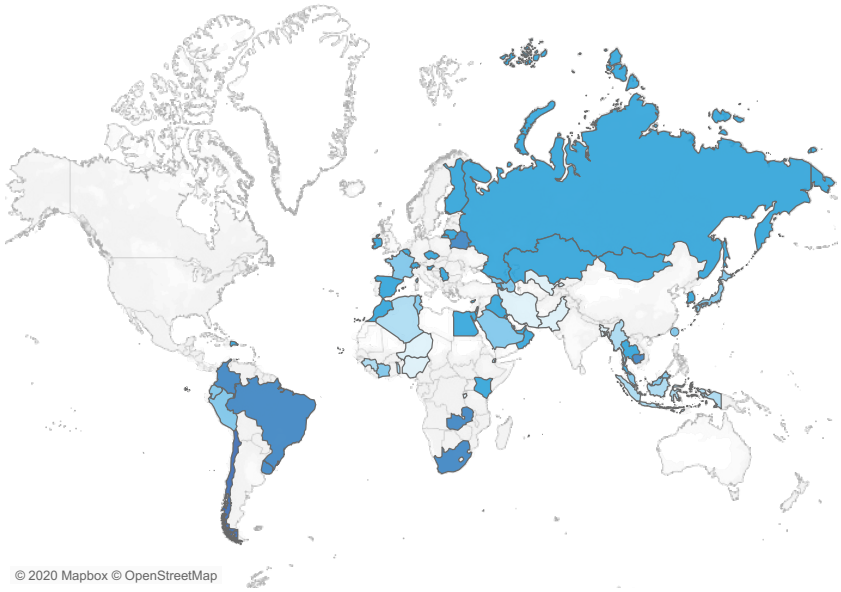
On the other hand, in 44 economies, more than four-fifths of the population owns a mobile phone.

In particular in a number of Arab countries, virtually everyone possesses one.



Source: ITU

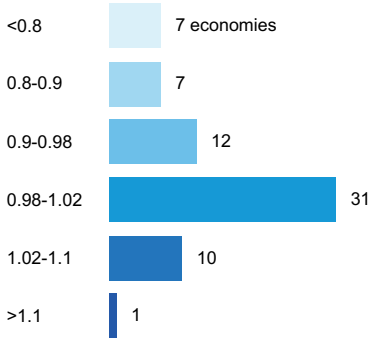
Gender parity score for mobile phone ownership, 2017-2019*



Ownership of mobile phones has been shown to be an important tool to empower women.

In almost one third of the economies for which data are available (31 out of 69), women's mobile phone ownership is close to parity with that of men.

In 12 of these 69 economies, the proportion of women owning a mobile phone is larger than the proportion of men, while there are 26 countries for which male mobile phone ownership is substantially higher than that of women.



* The gender parity score is calculated as the proportion of women who own a mobile phone divided by the proportion of men who own a mobile phone. A value smaller than 1 indicates a larger proportion among men than among women. A value greater than 1 indicates the opposite. Values between 0.98 and 1.02 reflect gender parity.

Note: The designations employed and the presentation of material on the two maps above do not imply the expression of any opinion whatsoever on the part of ITU and of the Secretariat of the ITU concerning the legal status of the country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries. The base map is the UNmap database of the United Nations Cartographic Section.

Source: ITU

Low ICT skills remain a barrier to meaningful participation in a digital society

Insufficient skills are often mentioned as an impediment to effective ICT use.

Because self-reporting of individuals' ICT skills may be subjective, ICT skills are measured based on whether an individual has recently performed a particular activity that requires a certain level of skills. For this reason, ICT skill statistics reflect underlying levels of ICT use in each country.

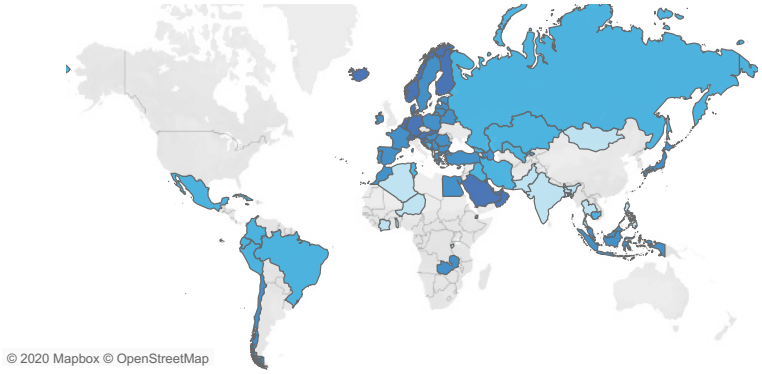
In 40 per cent of the countries for which data are available, less than 40 per cent of individuals reported having carried out one of the activities that compose basic skills in the last three months, e.g. sending an e-mail with an attachment.

In 70 per cent of the countries, less than 40 per cent of individuals had done one of the standard skills components, such as creating an electronic presentation with presentation software.

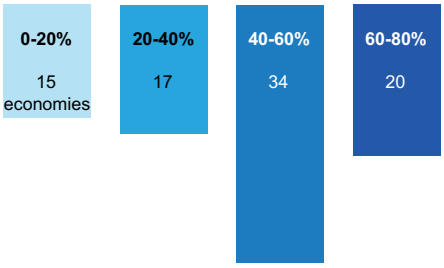
In only 15 per cent of the countries had more than 10 per cent of individuals written a computer program using a specialized programming language in the last three months.

The available data indicates that there are large differences in skill levels between different age groups, and between occupations, but relatively smaller differences between men and women, especially at younger ages.

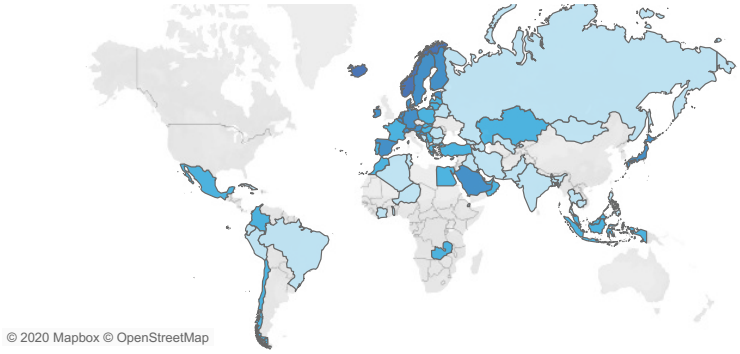
Percentage of people with basic ICT skills, latest year available in 2017-2019



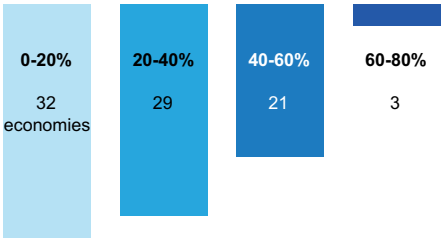
Distribution of economies according to the proportion of their population having **basic** skills



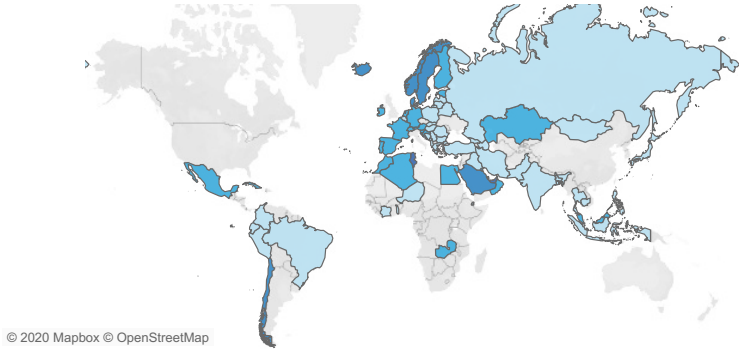
Percentage of people with standard ICT skills, latest year available in 2017-2019



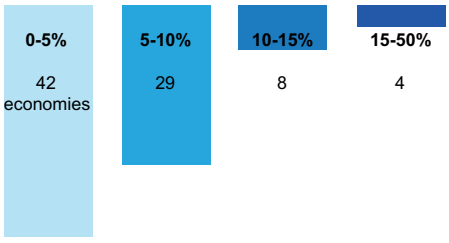
Distribution of economies according to the proportion of their population having **standard** skills



Percentage of people with advanced ICT skills, latest year available in 2017-2019



Distribution of economies according to the proportion of their population having **advanced** skills



Source: ITU.

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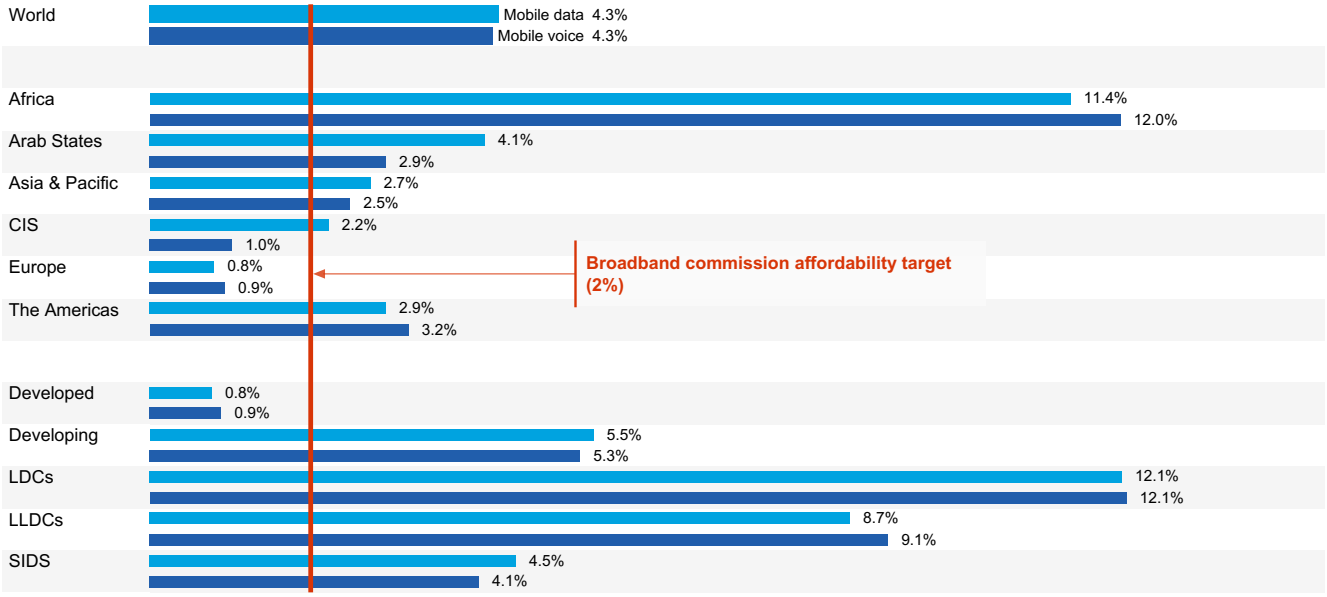
ICT services become more affordable, but barriers to Internet uptake remain

Affordability of ICT services increasing, but barriers to Internet uptake remain

Mobile-voice and mobile-data basket prices as a % of GNI p.c., 2019



Source: ITU

Cost of a data-only mobile broadband package, as a % of GNI p.c., 2019

Average prices for the mobile-voice basket and the mobile-data basket are very similar, across levels of development and regions, but due to the vast disparities in purchasing power, mobile telephony and Internet access remains too expensive for many in the developing world.

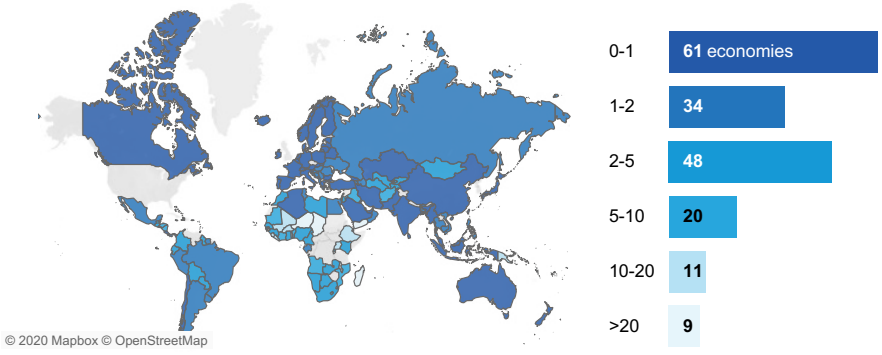
In 2018, the UN Broadband Commission for Sustainable Development set as a target for 2025 that entry-level broadband services should be made affordable in developing countries, corresponding to less than 2 per cent of monthly GNI p.c.

The average cost of a mobile-data basket of 1.5 GB in developing countries, LDCs, LLDCs and SIDS was substantially above this target.

The gaps in the mobile broadband adoption and Internet use between developed and developing countries are much larger than the gap in mobile-cellular uptake, and even more so between LDCs and developed countries.

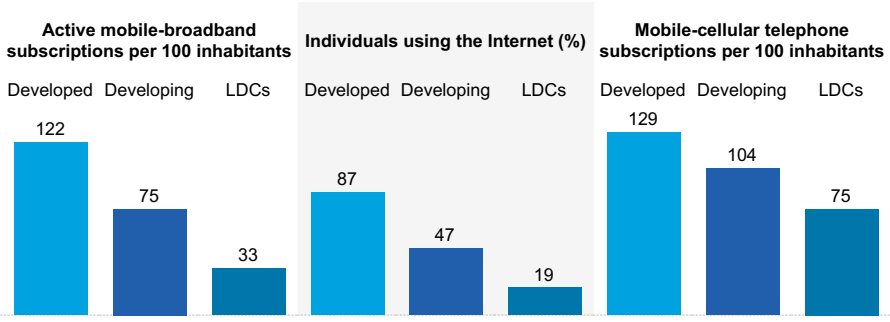
This suggests that affordability is just one among many factors hampering Internet uptake in developing countries and LDCs.

Refer to Measuring digital development: ICT Price Trends 2019 for more information.



Note: see map note on previous page.

Mobile-cellular subscriptions, Active mobile-broadband subscriptions and Internet users, by level of development, 2019*



Source: ITU

The impact of COVID-19: anecdotal evidence from selected countries

COVID-19: Anecdotal Country evidence from selected countries

The COVID-19 pandemic has caused a number of challenges to statistical operations in countries.

In addition to problems such as staff sickness, and lockdowns, there are also problems specific to measuring people's ICT use: this should normally be achieved via face-to-face interviews, since contacting interviewees via ICTs (phone or Internet) could bias the results obtained. However, face-to-face surveys have been cancelled in many countries for health reasons.

Moreover, use of ICTs is one of the key ways in which people can overcome or mitigate some of the challenges faced during the pandemic, so changes to people's behaviour regarding their ICT use are anticipated, though difficult to accurately predict in advance.

Nevertheless, some countries have published data showing certain impacts of COVID-19, albeit that given the constantly evolving circumstances, these results may only reflect the situation in each country at the specific moment that the data was collected.

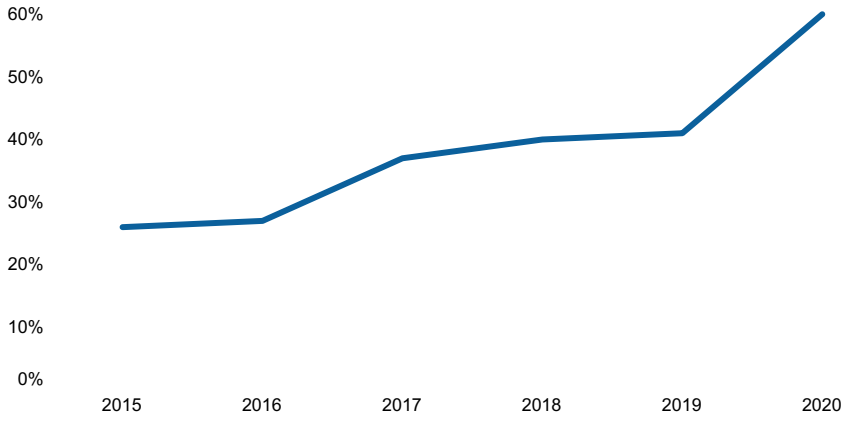
This non-exhaustive collection of results provide some glimpses of some of the impacts occurring this year.

Austria: Individuals using the Internet for calls or video calls (%)

© Mapbox © OSM

In Austria, the percentage of individuals using the Internet to make audio or video calls jumped from 41 to 60 per cent between 2019 and 2020.

Note: Individuals aged 16 to 74 years
Source: Statistics Austria



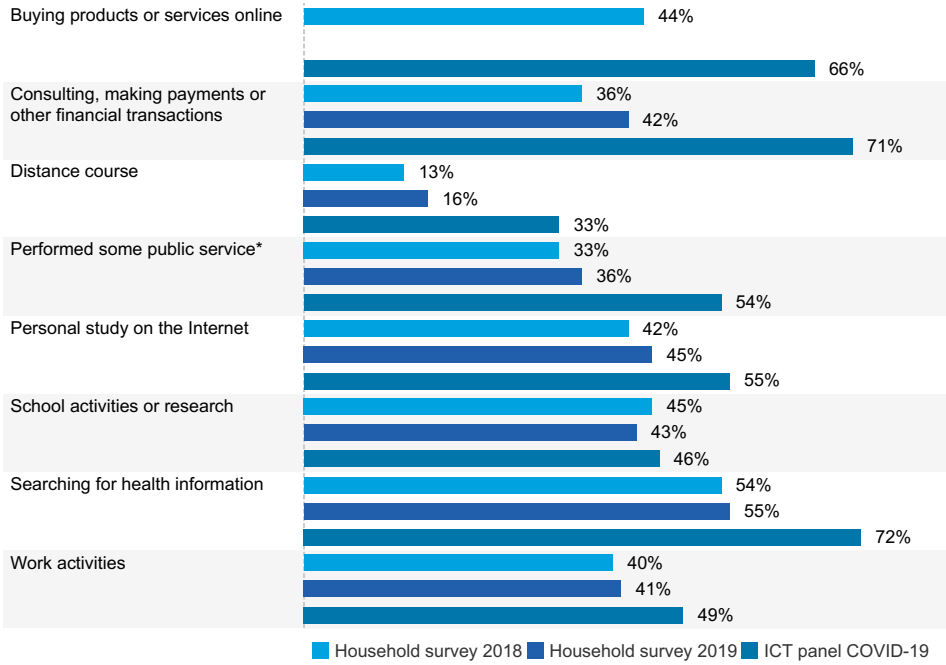
Brazil: Selected online activities (% of Internet users)

© Mapbox © OSM

In Brazil, a big increase was reported in Internet users searching for health information; performing some form of public service; consulting, making payments or conducting other financial transactions; and buying products or services online in 2020.

* Data for household survey 2018 and 2019 have a 12-month reference period, while the reference period for the COVID-19 panel was three months.
Internet users aged 16 years and over.

Source: CETIC Brazil

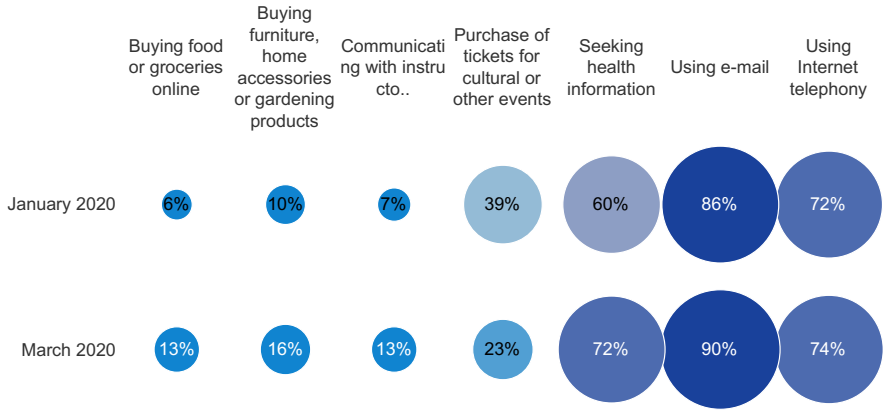


The impact of COVID-19: anecdotal evidence from selected countries

Ireland: Selected activities on the Internet of Internet users (%)

In Ireland, more than one in eight (13 per cent) Internet users surveyed in March 2020 made purchases online of food or drink from shops or meal-kit providers, more than twice the corresponding figure for January (6 per cent).

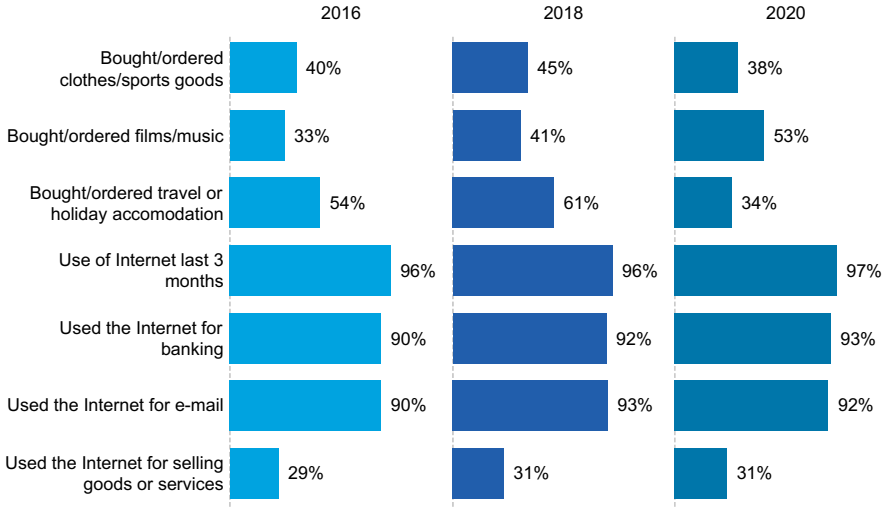
Note: Individuals aged 16 to 74 years
Source: Central Statistics Office Ireland



Norway: Selected activities on the Internet of individuals in Norway (%)

In Norway, the percentage of individuals who bought or ordered films or music online, increased from 41 per cent in 2018 to 53 per cent in 2020, while the corresponding figure for buying or ordering travel or holiday accommodation decreased from 61 to 34 per cent.

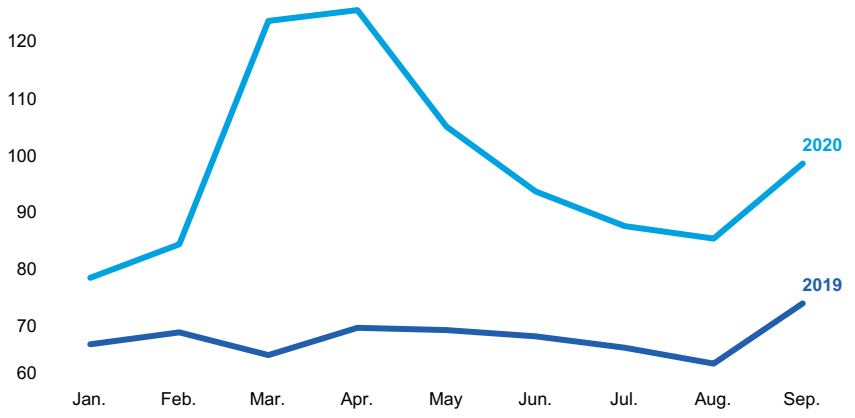
Note: Individuals aged 16 to 79 years
Source: Statistics Norway



Italy: Average daily data traffic on fixed networks (download + upload), petabytes

In Italy, the average daily data traffic on fixed networks increased by 44.4 per cent in 2020 compared with 2019, with spikes in March and April 2020, when the country went into a national lockdown. For mobile networks, the increase in the average daily data traffic was 56.4 per cent.

Source: Agcom, Italy



Methodology

Mobile population coverage (2G/3G/4G and above) – end 2020 estimates

The indicator percentage of population covered by a mobile signal (2G/3G/4G and above) in urban or rural areas refers to the percentage of a country's inhabitants that live within urban or rural areas and are served by a mobile telephone signal (2G/3G/4G and above), irrespective of whether they use the service – either as a subscriber or a user who is not a subscriber. The indicator measures the theoretical ability to use mobile cellular (or mobile broadband) services, not the actual use or level of subscription.

The indicator percentage of population covered by a mobile signal (2G/3G/4G and above) in urban or rural areas indicator is based on the indicator percentage of the population covered by a mobile signal, which is collected by ITU as part of a large collection of telecommunication indicators. Data are collected from telecommunications operators and, for most countries, aggregated at the national level by telecommunication/ICT regulators and Ministries who provide information annually to ITU. The indicator is widely available for both developed and developing countries. Data are also available for a number of years, thus providing useful information on assessing the evolution of mobile networks overtime.

While the split of this indicator into urban and rural is not collected by most countries, the data were estimated based on the assumption that populations in urban areas are all covered by a mobile signal. Using the percentage of population living in in urban areas published by the World Bank, the 2020 data on the rural population coverage by mobile signal were estimated by subtracting the urban population from the country's total population covered by a mobile cellular signal.

Finally, the 2020 data on the proportion of rural population covered by a mobile cellular signal (2G/3G/4G and above) were estimated by dividing the number of rural inhabitants within range of a mobile cellular signal by the total rural population and then multiplying by 100.

Internet access and use estimates

One of the main challenges in the estimation of global and regional figures for individuals' Internet use, and households access to computers and Internet, is that for these indicators, we rely upon household interview surveys as the source for these data. In general, the number of economies having household survey data on ICT access and use tends to be lower than for telecoms indicators, because relatively few countries conduct such surveys, owing to their cost and the complexity of their implementation.

In addition, the available data often refer to a time period one or more years beforehand. This is important in the context of ICT statistics, because of the relatively rapid pace of change in this domain compared to other social statistics derived from surveys. For these reasons, the measurement of household ICT statistics is somewhat like hitting a moving target, which in turn motivates the use of forecasting approaches to estimate current Internet use from previous years' survey data.

One of the main assumptions of forecasting methods is that future trends tend to mirror past trends for the indicator in question. However, as is mentioned elsewhere in this report, the global coronavirus pandemic appears to have disrupted some of the normal patterns and trends in ICT statistics. It is also intuitive that people's behaviour in using ICTS (or not using them) may change in reaction to the new situation, given that ICTs offer a way of overcoming these challenges, such as working or learning without physical contact with other people. On the grounds that a step change in these indicators may occur in 2020, which cannot be quantified beforehand in its magnitude, the decision was made to estimate values up to 2019 (pre-COVID), rather than attempting to produce estimates for 2020.

The estimation work was separated into work to estimate overall values (without subdivision) of:
- The proportion of individuals using Internet;
- The proportion of households with Internet access; and
- The proportion of households with a computer.

For each of these indicators for each economy, the data values up to 2019 were used if available (with any breaks in the series of values being interpolated). If not, then data from before were used to separately forecast to 2019 for each of these indicators for each country. The data used to accomplish this were obtained from official ITU data collected from its members, as well as data from other sources, including Multiple Indicator Cluster Surveys, Demographic and Health Surveys, and from the surveys of Research ICT Africa, LIRNEAsia.

Based on the real data points or estimates, multiple-country aggregate values for these indicators are calculated based on a weighted average of the values for individual countries. In the case of Internet use the weighting was the population of each economy, while for the proportion of households with Internet or computer, the weighting was the number of households in each economy.

The subdivisions of these overall values into different breakdowns were estimated separately. To subdivide the indicators on households with Internet and with computer by location breakdown (urban or rural), available data on the proportion of households with Internet (or computer) in urban areas (%u) and rural areas (%r) is used to compute the ratio of these two figures (i.e., %u / %r), and this quantity is estimated for those remaining countries without real data. This ratio is then combined with data on countries' numbers of households and their urbanisation to derive estimated values for %u and %r separately, as well as the number of households with access (to a computer or Internet). Global and regional results are calculated by weighting the figures for individual countries by the number of households in each country.

For the subdivision of individual's Internet use (by male/female and youth/overall) is estimated by the same process described above for the household access indicators, although the weighting of aggregate results is based on the countries' population figures rather than the number of households.

Methodology

Mobile-cellular, mobile-broadband and fixed-broadband subscription estimates

June 2020 data on subscriptions were compiled from data published on regulators' and ministries' website as well as data published by the country's main operators, in terms of subscriptions. When the data of the main operator of the country was used, the operator reported number of subscriptions was divided by its market share to obtain the total number of subscriptions in the country for a particular service. In the absence of annual reports, subscription data were estimated from industry analyses and news articles issued by the operator through its press releases, or by leading newspapers in the country.

Data from these sources include the absolute number of subscriptions, market shares, penetration and growth rates, which were used to derive the country estimates using the same method applied to operators' data. For countries where data are not available from administrative sources of the country or from annual and industry reports, subscriptions data were estimated using univariate time series analyses applied to the data from the last 10 years.

The univariate time series analyses were done by decomposing the time series of penetration data of a particular service to its trend and residual component to obtain the autoregressive integrated moving average (ARIMA) models. The resulting ARIMA models were used to make the 2020 point prediction for each country and service.

International bandwidth usage estimates

The basic assumption of the estimation is that international bandwidth is a function of total bandwidth demand in a country, which may be computed by multiplying the number of Internet users by their average bandwidth use. Since very few countries publish monthly statistics on international bandwidth usage and given the extraordinary nature of Internet activity in 2020 due to the COVID-19 pandemic, the estimations made use of proxy indicators. ITU statistics on fixed broadband subscriptions were combined with crowd-sourced statistics on download speeds published by Ookla **[1]** for 115 economies.

After eliminating possible noise from the weekly Ookla speedtest data series due to the shock on the networks caused by the sudden shift to remote working and education settings, average and median download speed change ratios were estimated between country-specific initial and end periods of four weeks, corresponding to the end-2019 baseline and a stabilized mid-year 2020 (June-July) situation. This smoothing method helped obtain a crude proxy indicator that potentially underestimates the full effect of the traffic increase during the strictest social distancing measures typically occurring over March-May 2020 in many countries, where speed data showed volatility, driven by a host of factors related to network resilience and fast-changing Internet use practices.

In order to address these and further uncertainties in the definition of the start and end periods as well as in the indicator definition (average or median download speed change), a 'benefit of the doubt' approach was used that selected the maximum of the smoothed growth ratios obtained across alternative definitions and extrapolated for the full year.

The thus obtained global average international bandwidth usage increase of about 38 per cent is about 14 percentage points higher than the baseline growth obtained from time-series models, in the absence of COVID-19 effects. It should be noted that Ookla data is not available for all economies of interest (in these cases, the time series forecast providing the best fit was applied), and its reliability varied across countries, most notably for LDCs. Furthermore, due to speed data quality, the explanatory power of the model is stronger in countries where fixed broadband Internet is dominant.

Finally, results are also potentially sensitive to significant changes in broadband subscriptions during the year.

[1] URL: https://www.speedtest.net/insights/blog/tracking-covid-19-impact-global-Internet-performance/ (Retrieved: September 2020)

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