GLOBAL CONNECTIVTY REPORT 2022

CHAPTER 2. THE JOURNEY TO UNIVERSAL AND MEANINGFUL CONNECTIVITY

Michael Kende, Sonia Livingstone, Scott Minehane, Michael Minges, Simon Molloy, and George Sciadas,
ICT Data and Analytics Division of the ITU Telecommunication Development Bureau, Geneva, Switzerland

DOI: 10.36724/2664-066X-2022-8-3-29-37

ABSTRACT

The Global Connectivity Report 2022 takes stock of the progress in digital connectivity over the past three decades. It provides a detailed assessment of the current state of connectivity and how close the world is to achieving universal and meaningful connectivity, using a unique analytical framework. It goes on to showcase solutions and good practices to accelerate progress. The second part of the report consists of seven thematic deep dives on infrastructure, affordability, financing, the pandemic, regulation, youth, and data. Chapter 2 relies on the framework for universal and meaningful connectivity and the associated targets for 2030, developed by ITU and the Office of the Secretary-General's Envoy on Technology, to analyse the current state of digital connectivity globally and progress towards reaching the targets by 2030. The framework considers usage by various stakeholders (universal dimension of connectivity) and the five enablers of connectivity (meaningful dimension of connectivity): infrastructure, device, affordability, skills, and safety and security. The assessment reveals that the world is still far from universal and meaningful connectivity. Infrastructure needs to be rolled out or improved to bridge the coverage gap. There are still significant differences between and within countries in network availability and quality. Fixed broadband is a costly investment and is not available or is unaffordable for many. Mobile broadband offers greater flexibility and is less expensive, and most rely on this technology to go online. But in many rural areas of developing countries, only 3G is available, when meaningful connectivity requires 4G. The coverage gap, currently at 5%, is dwarfed by the usage gap: 32% of people who are within range of a mobile broadband network and could therefore connect, remain offline. Data compiled by ITU make it possible to classify the offline population based on who they are and where they live. The main reasons cited by people for not using the Internet are the lack of affordability, of awareness about the Internet, of need, as well as the inability to use the Internet. Globally, connectivity became more expensive in 2021 due to the global economic downturn triggered by the COVID-19 pandemic. After years of steady decline, the share of income spent on telecommunication and Internet services increased in 2021. The global median price of an entry-level broadband plan in the majority of countries amounts to more than 2% of the gross national income per capita, which is the affordability threshold set by the Broadband Commission for Sustainable Development. People should not be forced to use the Internet. However, evidence suggests that introducing people to the Internet usually entices them to stay online. Based on activities people reported, use of the Internet leads to an improved social life, with the use of social networks, making Internet calls and streaming video the most common activities.

KEYWORDS: *ITU, Digital onnectivity, Internet of Things (IoT).*

CHAPTER 2.
THE JOURNEY TO UNIVERSAL AND MEANINGFUL CONNECTIVITY

2.1. Measuring digital connectivity

Universal connectivity means connectivity for all, measured across four categories: people, households, communities, and businesses. Meaningful connectivity is a level of connectivity that allows users to have a safe, satisfying, enriching, and productive online experience at an affordable cost and with a sufficiently large data allowance. Meaningful connectivity is reliant on the "connectivity enablers" of infrastructure, affordability, device, skills, and safety and security (Figure 2.1). Much of what is set out in this chapter builds from this framework.

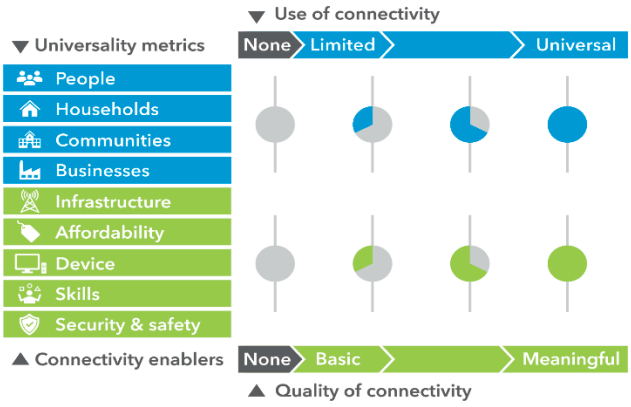

Figure 2.1. Framework for universal and meaningful connectivity

This chapter uses this framework and its targets to assess the state of digital connectivity around the world and how close the world is to achieving universal and meaningful connectivity. Table 2.1 shows the targets and where the world currently stands on these targets.

2.2. The state of digital connectivity

This section provides an overview of Internet use, broken down into three categories: individuals, households, and schools.

Individuals' use of Internet

The headline indicator to assess universal connectivity is the percentage of individuals using the Internet. Some individuals however choose not to use the Internet – so while the universality target in this context is a penetration rate of 100% for the population aged 15 and above, this is considered "met or nearly met" when the share is 95% or higher.

The World Wide Web was invented in 1989 and the Internet is a relatively young technology. In 1994, an estimated 20 million people browsed the Internet, less than half a % of the world population. Penetration grew at double-digit rates until 2010, when it reached a 29% penetration rate.

Table 2.1
Aspirational targets for 2030 and current situation

Indicator	Target	Current situation globally[a]	Number of countries meeting the target[b]
Internet users (% of population)			
Aged 15 and above	100%	63%[c]	13/151[c]
Gender parity ratio (1 = parity)	1	0.92	40/112
Households with Internet access (%)	100%	66%	13/126
Schools connected to the Internet (%)	100%	40% (primary)	42/93
		51% (lower sec.)	50/94
		66% (upper sec.)	50/97
Businesses using the Internet (%)			
0 employees or more	100%	n.a.	6/24
> 10 employees	100%	n.a.	23/47
Mobile network coverage (% of population)			
3G	100% for the most advanced technology already in use in the country with minimum coverage of 40%	95%	2/29[d]
4G		88%	66/157
5G		n.a.	n.a.
Fixed-broadband speed (% of subscriptions)			
>10 Mbit/s	100%	91%	25/150
School connectivity			
Min. download speed (Mbit/s per school)	20	n.a.	8/24
Min. download speed (kbit/s per student)	50	n.a.	n.a.
Minimum data allowance (GB)	200	n.a.	n.a.
Entry-level broadband subscription price			
% of gross national income per capita	2%	1.9% (mobile)	96/185
		3.5% (fixed)	64/174
% of average income of bottom 40 percent of earners	2%	2.5% (mobile)	50/110
		6.0% (fixed)	21/106
Individuals using a mobile phone			
Gender parity ratio (1 = parity)	1	n.a.	29/56
Individuals owning a mobile phone (% of population)			
Aged 15 and above	100%	n.a.	22/78
Gender parity ratio (1 = parity)	1	n.a.	30/72
Population aged 15+ with basic digital skills (%)	70%	n.a.	8/77
Gender parity ratio (1 = parity)	1	n.a.	5/70
Population aged 15+ with intermediate digital skills (%)	50%	n.a.	11/76
Gender parity ratio (1 = parity)	1	n.a.	5/70

Notes: n.a. = not available (global situation cannot be assessed due to limited data coverage).
a: Data are either for 2021, 2020, or the latest year available in the last four years; more details are provided in this chapter.
b: Among countries for which data is available. *x/y* means that in *x* out of *y* countries for which data are available the target has been achieved or almost achieved (see text for details).
c: Percentage of total population instead of population aged 15 and above.
d: Number of countries where coverage of 4G has not reached 40 per cent of the population.
See ITU and OSET (2022) for details.
Sources: ITU; UNCTAD (retrieved May 2022); UNESCO-UIS database (retrieved February 2022).

Figure 2.2 shows growth in the number of people using the Internet from 1994, the year when the first ITU World Telecommunication Development Conference (WTDC) was held.

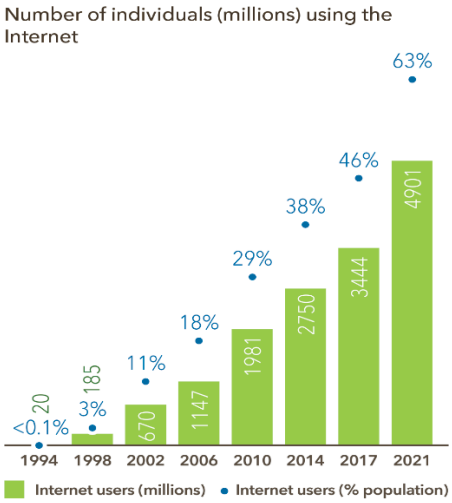

Figure 2.2. Growth of Internet use between 1994 and 2021 (Source: ITU)

Growth continued gradually until the effects of the COVID-19 pandemic sparked a surge in Internet use and in 2020 an estimated 466 million people began using the Internet for the first time, an increase of 10.3% in penetration. By the end of 2021, 4.9 billion people were online, some 63% of the world population.

Figure 2.3 shows Percentage of the population using the Internet, 2021.

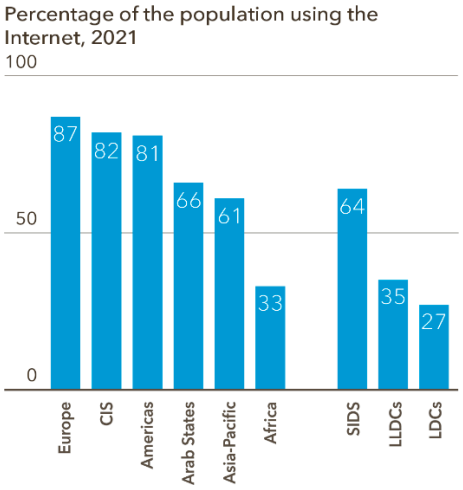

Figure 2.3. Internet penetration around the world
(Note: CIS = Commonwealth of Independent States Source: ITU)

Analysis shows that countries that were first to reach 10% Internet use in the 1990s grew at a faster rate on average than in subsequent decades.

Household access to the Internet

The growth of the percentage of households with Internet access evolves in parallel with the percentage of individuals using the Internet. However, having Internet access at home does not mean that all household members are able to use the Internet with a quality connection, if at all. For example, when schools were closed in many countries, around two-thirds of children and young people aged 25 years or less (about 2.2 billion) did not have fast and reliable, fixed Internet access at home (UNICEF and ITU 2020).

Many households with broadband Internet access rely on a mobile-broadband connection at home, often inadequate for data-intensive activities such as remote schooling. For instance, in Morocco, Thailand, and Uzbekistan, over 70% of households accessed Internet via mobile broadband only. Interestingly, in the 27 countries that provide data on Internet access by service, there is no link between income levels or the rate of Internet access and the choice of subscribing to a mobile-broadband connection only. This implies that there are other factors influencing the choice of service used to access the Internet. In some areas, for example, a mobile-broadband connection may be faster than a fixed-broadband connection, and therefore the preferred option.

Access to the Internet in schools

It is essential that schools have access to the Internet. Young people need digital skills to enter the labour market as many jobs involve working with ICTs and schools play a crucial role in teaching students these skills. Teaching can also be enhanced by the multitude of resources available on the Internet, including open educational resources – of critical importance for children who do not have adequate Internet access at home. Moreover, schools without Internet access were unable to move their teaching online when forced to close during the pandemic. With these benefits in mind, the target for connected schools is set to 100%. Data collected by UNESCO for 2020 show that around the world, 40% of primary schools and 66% of secondary schools had access to the Internet in 2020. In LDCs, these numbers were 28% and 35%, respectively. In 42 of 93 countries for which data were available, the target has been met for primary schools. For secondary schools, the target has been met in 50 countries (available data from 94 countries for lower secondary and 97 countries for upper secondary).

Giga is a joint ITU-UNICEF initiative that seeks to connect every school to the Internet and every young person to information, opportunity and choice.9 Giga maintains a real-time map of school connectivity to identify demand for infrastructure and funds, measure progress towards increasing Internet access, and continuously monitor global connectivity. So far, 1 million schools in 42 mostly lower-income countries have been mapped by Giga from an estimated 6 million schools worldwide. Data from UNESCO show that 43% of those schools do not have any connectivity. For 24 countries, the average download speed per school is available as well. In eight of those countries, seven small island developing States (SIDS) in the Caribbean plus Brazil, the average download speed was above 20 Mbit/s.

2.3. Divides in connectivity

Since 1994, the Internet has developed from a collaboration network for academics to an indispensable tool for work, communication, education, entertainment and more.

For most people, it is hard to imagine life without the Internet. The COVID-19 pandemic has highlighted how important it is to have access to fast and affordable Internet. Indeed, in the first year of the pandemic, growth in the percentage of Internet users was the highest in a decade.

In 2021, an estimated 2.9 billion people were still offline. The bulk of the global offline population, 1.7 billion people, lives in Asia-Pacific and was concentrated in China and India, followed by Africa with 738 million people offline. The combined offline population in the other four regions was 470 million people [1-5].

As the map in Figure 2.5 shows, in percentage terms, Africa was the least connected region in 2020, with 67% of the population offline, followed by Asia-Pacific (39%) and the Arab States (34%).

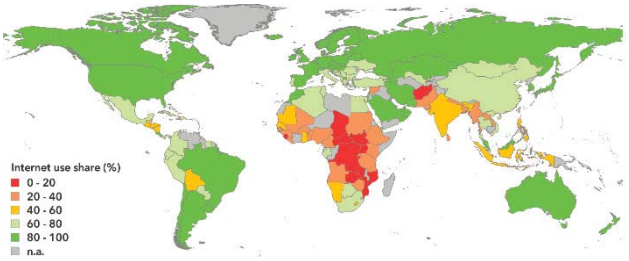

Figure 2.5. The global digital divide

Note: The designations employed and the presentation of material on the map do not imply the expression of any opinion whatsoever on the part of ITU and of the secretariat of 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)

The income divide

Several gaps emerge when looking at the socio-economics of the offline population. A country's level of development, proxied by its gross national income per capita, strongly correlates with Internet penetration. As further illustration of the digital divide across countries, Figure 2.6 shows the breakdown of the 2.9 billion people still offline by income group and by country. High-income countries (blue tiles) account for 16% of the world's population, but they account for only 4% of the total offline population. Low-income countries (orange tiles) account for just 7% of the world's population, yet they account for 14% of the offline population.

Despite an estimated sevenfold increase in Internet use in low-income countries since 2005, Internet use in these countries remains far below that of higher-income countries, reaching only 22% in 2021. In contrast, high-income countries, at 91% penetration, are close to universal usage12 and the gap between upper-middle-income countries and high-income countries is closing rapidly. While the difference was 41 percentage points in 2005, by 2021 this gap had shrunk to 15 percentage points. Internet use in lower-middle-income countries nearly doubled from 2017 to 2021, reaching 50%.

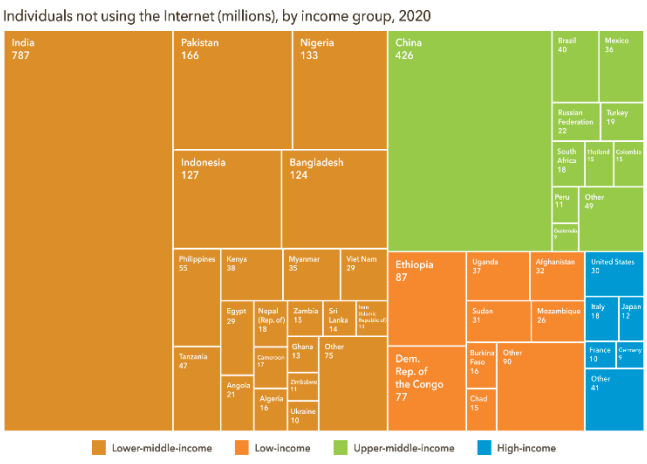

Figure 2.6. Development level and the offline population

Note: Size of the tiles represent the country's share in the world's offline population (Source: ITU)

The urban-rural divide

Globally, the share of Internet users is estimated to be twice as high in urban areas as in rural areas in 2020. An urban-rural divide exists in all regions but the higher the overall Internet use, the smaller the urban-rural gap. In Europe, for example, which is close to universal usage, urban use was less than 10% higher than rural use. This contrasts sharply with Africa where Internet use in urban areas was almost 3.5 times as high as use in rural areas. Lower rural usage is partly a result of a lack of infrastructure, but there are additional factors at play. Rural areas usually have lower income levels, and the population often has lower levels of education and lower levels of ICT skills, all of which are negatively correlated with Internet use.

The gender divide

Globally, more men (62%) were using the Internet in 2020 than women (57%). Men were more likely to use the Internet than women in all regions, except the Americas.

The gender gap is significantly smaller in countries where a higher proportion of the population uses the Internet, and a higher gender gap exists in countries with low Internet use. In countries where everyone is using the Internet, by definition there must be gender parity.

The gender parity ratio (GPR) is calculated as the proportion of women using the Internet divided by the proportion of men using the Internet. 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 as established in the 2030 targets.

Lower GPR values are most pronounced in LDCs and LLDCs, illustrating that low levels of Internet use are strongly correlated with low income levels. However, in line with increasing Internet use rates, the number of low GPR values has been shrinking in recent years.

The education divide

Education is another important determinant of Internet use. For those countries for which data were available, 94% of people with a completed tertiary education were using the Internet, about 9 percentage points higher than those with completed upper secondary or post-secondary non-tertiary education. In contrast, those with a primary or lower secondary education are much less likely to use the Internet than those who have reached a higher level of education [6-10].

2.4. Barriers to connectivity

Understanding why people and households do not use the Internet is critical for designing effective, targeted interventions. In this context, household ICT surveys provide invaluable insight. Since the pertinence of some of the reasons depends on the level of Internet access in countries, the results are plotted against the share of households without Internet access.

The most cited barriers in the 49 countries providing data included: Do not need the Internet; Cost of the equipment is too high; or Cost of the service is too high. Thirty-three countries cited Do not need the Internet as the main reason as did more than 50% of respondents in 27 countries. More than 80% cited this reason in the Czech Republic, Egypt, Republic of Korea, and Ukraine. Fifty% of respondents in seven countries cited both the high cost of equipment and the high cost of service.

Not exempt from such concerns, 55% of high-income countries also cited the high cost of equipment and services as well as 82% of households without Internet access in those countries. Several countries such as Brazil and the United Arab Emirates featured a large share of respondents who cited having access elsewhere as a reason for not having access at home. Privacy and security concerns as well as cultural reasons also play a part in countries such as Brazil and Switzerland.

2.5. Enablers of connectivity

To achieve universal usage, all barriers to connectivity need to be overcome. Figure 2.1 shows that barriers can be transformed into connectivity enablers. For example, replacing a slow and expensive connection with a fast and affordable one will enable people to go online as often and for as long as they wish, and teaching the necessary ICT skills will enable meaningful use of the Internet as a satisfying, enriching, and productive experience.

Infrastructure

The network is a precondition for Internet use. For decades, Internet access has been available over the fixed line telephone network. Originally using a modem to access the Internet, which incidentally would block the telephone line from making or receiving calls, people today use technology and network infrastructure that have improved the experience immeasurably, enabling high-speed fixed and mobile broadband networks that deliver always-on Internet access in most countries.

Although more people use mobile networks than fixed networks to connect to the Internet, the latter remains important. For example, fixed-broadband networks generally have a higher data capacity than mobile networks, and download limits are higher than similarly priced mobile-broadband plans. They are faster and are more reliable than 3G or 4G networks, making them more suited for high-bandwidth activities such as games and video calls. However, fixed-broadband networks are very expensive to roll out, maintain and upgrade, depending on the geography and extension of the territory to be covered.

The topology of many fixed-broadband networks consists of fibre-optic rings with access points from which homes and businesses are connected.

In this case, for network deployment to be efficient and profitable, there needs to be a high geographic concentration of households and businesses. Figure 2.7 shows that the vast majority of people do not have access to fibre-optic networks because of their location, in fact only 2.3 billion people (29%) lived within 10 kilometres of a fibre-optic network in 2021. It is worth noting too that living within 10 kilometres of a fibre-optic network is no guarantee of a connection for many reasons, not least being the absence of a point of presence (PoP), optical-line terminal or fibre-optic drop to connect the network to the home or office (ITU 2020b).

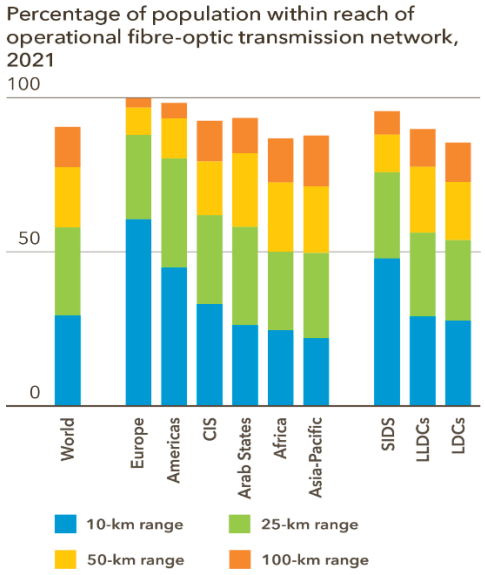

Figure 2.7. Fixed-network coverage
Note: CIS = Commonwealth of Independent States (Source: ITU)

In Europe, more than 60% of the population lives within 10 kilometres of a fibre-optic network, while the reach of fibre-optic networks in the Asia-Pacific region is only 22%, Africa is 25%, and the Arab States is 26%.

For a household to access a fixed network, a "last mile" connection is needed to bring that network to the home. For the past few years, ITU has collected data on the number of households covered by a fixed network. Figure 2.8 (left-side panel) shows that in Africa only 7% of households can potentially subscribe to a fixed network (for LDCs this figure is just over 1%), whereas in other parts of the world almost all households have access to a fixed network.

No access to a fixed network obviously impacts the number of fixed-broadband subscriptions (Figure 2.8, right-side panel). In Africa and in LDCs and LLDCs, few subscribe to fixed broadband services. In the Arab States, where only 40% of homes are served by fixed-network services, only 9 out of every 100 inhabitants subscribe to fixed broadband. The highest proportion of fixed-broadband subscriptions is found in Europe, where 35 out of every 100 inhabitants subscribe to fixed broadband, and since fixed broadband is usually shared with all family members, this means that most households have a fixed-broadband connection.

The breakdown by speed provides an indication about the quality of the subscription, although it might also reflect cost.

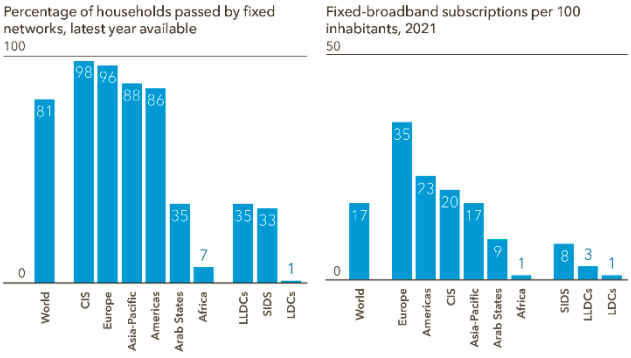

Figure 2.8. Fixed-broadband coverage
Note: CIS = Commonwealth of Independent States (Source: ITU)

The framework for universal and meaningful connectivity sets a target of at least 10 Mbit/s for all fixed-broadband subscriptions by 2030. In Asia-Pacific and Europe, this target has almost been met, with respectively 95 and 94% of fixed-broadband subscriptions reaching 10 Mbit/s or faster. In LLDCs, only 39% of subscriptions were high speed, and although in LDCs the situation was better, this was mainly because 70% of fixed-broadband subscriptions were high speed connections in Bangladesh, which has a very high weight in the group aggregate (Figure 2.9).

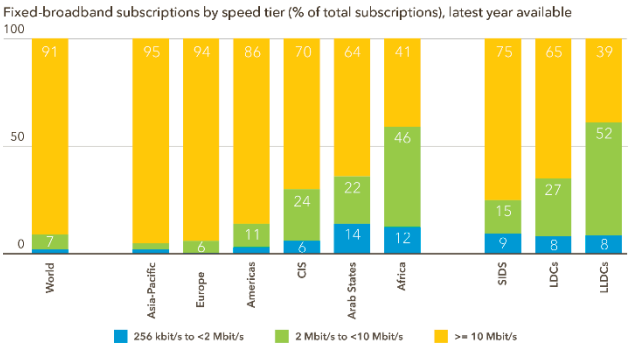

Figure 2.9. Fixed broadband speed
Notes: Values equal to or less than 3 are not labelled due to space considerations. CIS = Commonwealth of Independent States (Source: ITU)

Mobile broadband networks are not just a supplement to fixed networks but are the main gateway to the Internet for many users, given the availability and cost issues associated with fixed-broadband networks. Except for optical fibre, 4G can offer average download and upload speeds equivalent to fixed-broadband connections.

Another framework target for universal and meaningful connectivity aims to extend coverage of the mobile-broadband network to the world's population.16 Globally, 95% of the population is within reach of a mobile broadband network (at least 3G) and 88% has access to a 4G network. The flattening curve in the evolution of 3G coverage underlines the challenge of connecting the rest of the population: 3G coverage doubled from 40 to 80% between 2010 and 2015 but has increased only by 15 percentage points since, and has barely changed in the past three years. Even coverage by 2G technology, which is being phased out, never exceeded 97% of the world's population.

Similar to SDG Target 9.c, which aimed to significantly increase access to ICTs and provide universal and affordable access to the Internet in least developed countries by 2020, the target set out in the framework for universal and meaningful connectivity intends to extend coverage to the entire world population by a mobile network of the latest technology (currently 4G) by 2030.

Although the SDG indicator does not specify a technology, Asia-Pacific and Europe have already met the target of universal 4G coverage, and the Americas and CIS regions are close to meeting it. However, Africa (49%) and the Arab States region (70%) are struggling to reach universal coverage for 4G.

Combining data on coverage and Internet usage makes it possible to distinguish between those who are not using the Internet because of a lack of infrastructure, and those not using the Internet for other reasons. The coverage gap refers to the lack of access to a mobile or fixed network, and the usage gap refers to the number of people not using the Internet minus those without access to a network (coverage gap). For example, in Asia and the Pacific, the coverage gap affects only 2% of the population, whereas the usage gap concerns 37%. This is consistent with the findings that affordability and skills are bigger barriers to connectivity than the lack of Internet availability.

While most urban areas in the world are covered by a mobile-broadband network, gaps persist in rural areas. In Africa, almost 30% of the rural population cannot access the Internet, 18% of the rural population has no mobile-network coverage, and another 11% has only access to a 2G network. The coverage gap is almost as significant in the Americas, where 22% of the rural population is not covered at all and another 4% is covered only by a 2G network.

This disaggregation underlines how much usage and coverage gaps vary depending on location. This has important implications for policy prioritization. For example, in rural areas of the CIS region, the usage gap is negligible, almost everyone uses the Internet. In rural Africa, only 15% of the population uses the Internet and the coverage and usage gaps are almost the same size, whereas in Africa's urban areas, mobile-broadband coverage is almost universal and only a usage gap exists.

Despite the lack of access to a mobile-cellular network in some parts, the world has witnessed tremendous growth in the use of the mobile phone. In 1994, there were 56 million mobile-cellular subscriptions worldwide, less than one for every 100 inhabitants. Mobile-broadband subscriptions have grown from 4 per 100 inhabitants in 2007 to 83 per 100 inhabitants in only 14 years.

The rise in Internet use has been accompanied by an explosion in data usage, but this has been unevenly distributed. For example, international bandwidth usage saw a 30% increase from 719 Tbit/s in 2020 to 932 Tbit/s in 2021. The highest regional total for international bandwidth use was in the Asia-Pacific region at over 400 Tbit/s, twice as high as in Europe (204 Tbit/s) and in the Americas (180 Tbit/s).

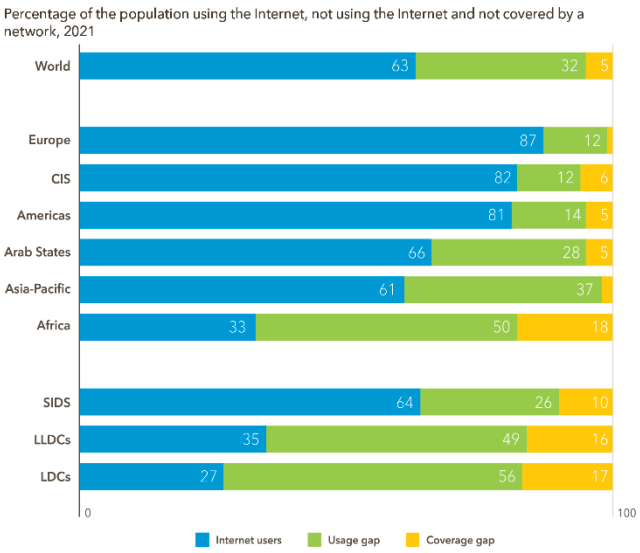

Figure 2.10. Coverage gap and usage gap
Notes: The coverage gap is the percentage of the population that does not have access to a mobile or fixed network. The usage gap is the percentage of the population not using the Internet minus the coverage gap. Values equal to or less than 3 are not labelled due to space considerations. CIS = Commonwealth of Independent States (Source: ITU)

However, it is on a per-user basis that the digital divide becomes apparent (Figure 2.11, right-side panel). In Europe, bandwidth usage stood at 340 kbit/s per Internet user, followed by the Americas at 214 kbit/s and the Arab States region at 174 kbit/s. In Africa, on the other hand, international bandwidth usage was 60 kbit/s. In the LDCs, it was just 34 kbit/s per Internet user.

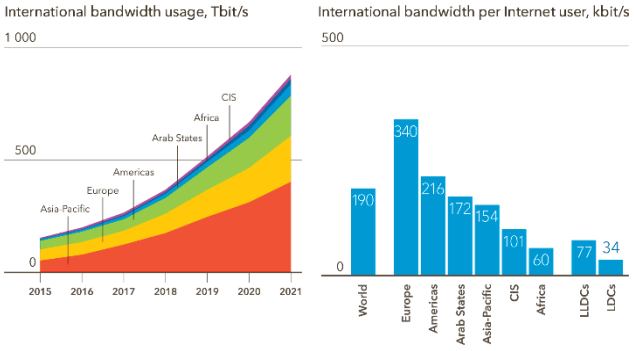

Figure 2.11. Growth in international bandwidth
Note: CIS = Commonwealth of Independent States (Source: ITU)

The global speed divide

Users generally judge their broadband quality on their experience of connection speeds. The three time points (2020, 2021, and 2022) in the chart refer to the emergency, recovery, and 'new normal' phases of the Covid-19 pandemic and reflect, through the median upload and download speeds, differences in connection quality experienced by consumers as well as revealing how the gaps have evolved across regions over that time. The widest connection quality gap is between Europe (and high-income economies in general) and the rest of the world in both fixed and mobile networks. Interestingly, there is a divide between countries depending on which network provides faster speeds. In low- and lower-middle-income economies, mobile broadband offers the faster alternative (this is the case across African countries), while in high-income economies, fixed-broadband speeds are 30-50% faster. Two years after the start of the pandemic, as networks adapted capacity, speeds measured on fixed networks overtook those on mobile – this global trend has been driven by the Americas, the CIS, and the Asia-Pacific regions.

While mobile networks provide a comparable alternative to fixed networks in most parts of the world concerning download speeds, there is a clear gap between the upload speeds provided by the two technologies. Mobile upload speeds measured in the different regions are surprisingly similar, remaining around the global median of 10-12 Mbit/s (highest in Europe at 15 Mbit/s in 2022, lowest in Africa at 8 Mbit/s in 2020). Users on fixed networks, on the other hand, could benefit from 2-3 times faster upload speeds than those in the same region using mobile networks. This difference is particularly important when it comes to using cloud computing or video conferencing services.

Affordability

After years of steady decline, the share of income spent on telecommunication and Internet services increased across the world in 2021, mainly as a result of the global economic downturn triggered by the COVID-19 pandemic (ITU and A4AI 2022). In many economies, the long-standing trend of gradually declining prices for such services was outweighed by a steep drop in average GNI levels in 2020.

In 2021, only 96 economies met the 2% target with regard to the data-only mobile broadband basket in 2021 (seven fewer than in the previous year), and only 64 economies met the target with respect to the fixed broadband basket (two fewer than in the previous year).

Furthermore, only 50 out of 110 countries for which these data are available met the 2% target for the bottom 40% in 2021. Due to its high costs, fixed broadband is out of reach for the bottom 40% in most regions, except Europe. Mobile broadband is more affordable, but there are many countries where even if the basket is affordable for the average earner, the bottom 40% would need to pay more than 2% of GNI per capita, and in 22 out of the 110 countries with data available, they would face costs over 10% of GNI per capita.

Chapter 5 on affordability of ICT services offers an in-depth assessment of the price of ICT services and devices, and sets out policy options for improving affordability.

Devices

Until the early 2010s, computers were the Internet device of choice. Now however, mobile devices (smartphones and tablets) are a viable alternative, although not a perfect substitute. Indeed, while the share of households with Internet access has been exhibiting a steady growth over the past 15 years, the growth of households with a computer has slowed since the early 2010s as mobile devices became more popular.

The framework for universal and meaningful connectivity recognizes how inexpensive most basic mobile phones are while also taking into account that computers allow for a richer experience. The framework examines the use and ownership of mobile phones, while recognizing that mere access to a device (as opposed to ownership) imposes constraints – including when and for how long the user can be online. The framework sets a target only for mobile phone ownership, which allows someone to go online at any time, rather than first having to ensure a mobile phone is available.

The high cost of mobile telephones in low-income countries is reflected in the low share of individuals owning a mobile telephone. Despite the fact that in many countries mobile phone ownership is very high, there remains a significant number of countries where only some can afford a mobile phone. In eight of 78 countries for which there are data, less than 50% of the population owned a mobile phone, far short of the target of universal ownership. A mobile phone is often the only means of Internet access – so there is a strong correlation between Internet use and mobile phone ownership.

According to A4AI data, the average cost of a smartphone in these countries was 41% of monthly GNI per capita. In 22 countries, universal ownership (i.e. over 95%) was achieved, while in an additional 11 countries this percentage stood between 90 and 95%. The average cost of a smartphone in these countries were 8.8 resp. 14.5% of GNI per capita.

Reaching gender parity is also a target for all individual-based indicators. When universal ownership is reached, gender parity is reached. But for many countries, universality remains a distant prospect and the gender divide for ownership persists. In 30 countries out of 72 for which data is available, gender parity has been reached. In 13 countries, more women than men own a mobile phone, while in 29 countries the opposite is the case [11-12].

Digital skills

Section 2.4 revealed the barriers to using the Internet for individuals such as the high costs of equipment and services, lack of need of the Internet, and not knowing how to use it. These results confirm the importance of ICT skills as an enabler of meaningful connectivity. In the framework for universal and meaningful connectivity, there are two skills-related targets: by 2030, at least 70% of individuals should have basic ICT skills, and at least 50% should have intermediate ICT skills.

It is difficult to measure the general level of ICT skills in a country. The best way is through assessment tests, such as the International Computer and Information Literacy Study (ICILS). These assessments are expensive to run however and are therefore administered in few countries and only periodically.

Surveys offer an alternative. One approach is to ask people to assess their proficiency for certain skills, although studies show that self-assessment is a poor measure. A study by the ECDL Foundation (2019) for example, "revealed that people tend to overestimate their abilities and that significant digital skills gaps exist in all of the analysed countries. Moreover, young people have digital skills gaps that are just as wide as in the rest of society".

The approach adopted by Eurostat and ITU is to ask survey respondents whether they have undertaken certain tasks or activities using digital devices. The activities are categorized as basic ICT skills, as intermediate ICT skills and as advanced ICT skills.22 This approach assumes that people who have performed certain tasks have the corresponding skills – and avoids bias.

The data show there is a long way to go to reach the skills-related targets. In only eight of 77 countries for which data is available, 70% or more of the population have basic ICT skills. And in just 11 out of 76 countries, 50% or more of the population have intermediate skills.

For basic skills, in only five out of 70 countries, gender parity has been reached. In 12 countries, a greater share of women have basic skills than men. Similarly, for intermediate skills, gender parity has been reached in five countries and has been exceeded in ten countries (gender parity score above 1.02). For advanced skills (although not a target) two countries could boast gender parity, in one country there was a female majority, but in 59 countries there was a male majority.

Another driver of differences in ICT skills is age. For the 51 countries reporting data, children less than 15 years of age tend to have fewer ICT skills, although this is to be expected since skills are more in demand for tasks undertaken more regularly by adults. Similarly, fewer of those in the 75+ age group have ICT skills than in the general population. This is due in part to the large number of retired individuals in this age group, but also mirrors the gap seen in rates of Internet use.

Individuals in the 15-24 and 25-74 age groups show higher rates of using ICT skills, with those aged between 15 and 24 showing the highest rates for basic, intermediate and advanced skills for all countries providing data. This is consistent with Internet usage rate statistics.

Content

Content does not feature in the framework for universal and meaningful connectivity as it does not directly influence the quality of connectivity.

In recent years, 68 countries have provided some data on how Internet users are spending time on the Internet. Comparing this data to GNI per capita shows a very steep uptake in activities such as Internet banking, acquiring health and government information, reading, and purchasing goods or services as countries' incomes increase. This may reflect the increased availability of online services in richer countries. For most activities, there is a flattening off where countries are considered 'high income' by the World Bank, indicating that countries do not need to be wealthy for their residents to have a rich online experience.

A different pattern emerges when looking at the share of those using social networks and making calls. Here similar levels of participation are seen across income levels,

illustrating the primacy of communication for Internet users. The analysis suggests that such activities are less dependent on the government and level of development of a country [13-14].

Analysis of data from 52 countries suggests that Internet activity connected to information and e-commerce is strongly related to education. This trend stands out for Internet banking, purchasing/ordering goods and services, and researching government information. However, there is a divide in Internet users accessing health information by education level, a factor that may have some bearing on disparities in health outcomes. In contrast, activities related to communication and entertainment are less tied to education level.

2.6. Conclusions

Achieving universal and meaningful digital connectivity requires a rethinking of what being connected means. The analytical framework introduced in this chapter aims to prompt a major mindset shift, by identifying the key determinants of universal and meaningful connectivity, the relevant indicators to track, and the main targets to chase.

Connectivity is much more than the possibility of connecting. ITU data show that having access does not necessarily translate into usage. While 95% of the world's population is within the footprint of a broadband network, only two-thirds are online. Out of the 151 countries for which data are available, only 13 have met the universality target (at least 95% of the population online). The usage gap is much wider than the coverage gap. This not only means priorities are shifting but that the challenge has grown. It is not only about building up infrastructure for universal access but also about addressing the many barriers that deter or prevent one third of humanity from going online: lack of money, of skills, of knowledge, of devices.

Lowering these barriers enough so that everyone gets online is an enormous challenge. Moving from basic connectivity to meaningful connectivity requires clearing all the barriers, making the challenge more daunting. For instance, having access to a device may be enough to go online, but owning a device is a necessary condition (but not sufficient) for enjoying meaningful connectivity. Similarly, an Internet subscription may be barely affordable but not offering enough data or bandwidth to allow for a meaningful experience.

The assessments based on disaggregated data reveal that the world's offline population is unevenly distributed across regions, countries, and population groups, creating multiple digital divides such as generation, gender, location, income, education. Measuring and understanding these divides will focus efforts and help to design more effective interventions targeting specific connectivity areas and population groups.

Similarly, one must go beyond global or regional figures, which may be misleading. The global coverage gap and the digital gender gap have almost been bridged, thus wrongly suggesting that these issues have become less pressing. But there are countries where 3G coverage does not exceed 40% of the population (mostly living in urban areas) and 4G has yet to be rolled out. Similarly, while in high- income countries a digital gender gap hardly exists anymore, in countries with low Internet use, men are significantly more likely to use the Internet than women.

Finally, measuring connectivity and how close countries and regions are to achieving universal and meaningful connectivity requires good data, which unfortunately are not universally available, affecting the quality of assessment. This data divide mirrors the income digital divide: the less developed a country, the less data available. Low-income countries that stand to benefit the most from digital development are those that know the least about their state of digital development. Improving data coverage and quality must be part of any digital development strategy for an extended discussion about data poverty and options to address it).

References

[1]. https://www.un.org/en/content/digital-cooperation-roadmap.

[2]. https://www.w3.org/ History/1989/proposal.html.

[3]. https://en.unesco.org/themes/building-knowledge-societies/oer.

[4]. https:/ gigaconnect.org.

[5]. www.projectconnect.world.

[6]. https://en.wikipedia.org/wiki/Trojan_Room_coffee_pot).

[7]. For income groups, the World Bank classification is followed: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

[8]. R. Chen, 2021. "A Demand-Side View of Mobile Internet Adoption in the Global South". Policy Research Working Paper 9590, Background Paper for the World Development Report 2021. http://documents1.worldbank.org/curated/en/492871616350929155/pdf/A-Demand-Side-View-of-Mobile-Internet-Adoption-in-the-Global-South.pdf.

[9]. ECDL Foundation. 2019. "Perception & reality. Measuring digital skills gaps in Europe, India and Singapore". https://icdl.sharefile.com/share/view/se6434a0cd064b8d8.

[10]. ITU. 2020a. Manual for Measuring ICT Access and Use by Households and Individuals. Geneva. https://www.itu.int/en ITU-D/Statistics/Pages/publications/manual.aspx.

[11]. ITU and A4AI. 2022. "Policy Brief: The affordability of ICT services 2021". https://www.itu.int/en/ITU-D/Statistics/ Documents/publications/prices2021/ITU_A4AI_Price_Brief 2021.pdf

[12]. ITU and UN-OHRLLS. 2021. Connectivity in the Least Developed Countries: Status report 2021. Geneva: ITU, https://www.itu.int/en/myitu/Publications/2021/09/17/11/46/Connectivity-in-the-Least-Developed-Countries-Status-report-2021.

[13]. ITU and United Nations Office of the Secretary-General's Envoy on Technology (OSET). 2022. "Achieving Universal and Meaningful Digital Connectivity: Setting a Baseline and Targets for 2030". Background document. https://www.itu.int/itu-d/ meetings/statistics/wp -content/uploads/sites/8/2022/04/Universal Meaningful DigitalCon nectivityTargets2030_BackgroundPaper.pdf.

[14]. UNICEF and ITU. 2020. "How many children and young people have internet access at home? Estimating digital connectivity during the COVID-19 pandemic". UNICEF: New York. https://www.itu.int/en/ITU-D/Statistics/Pages/ youth _home _internet_access.aspx.