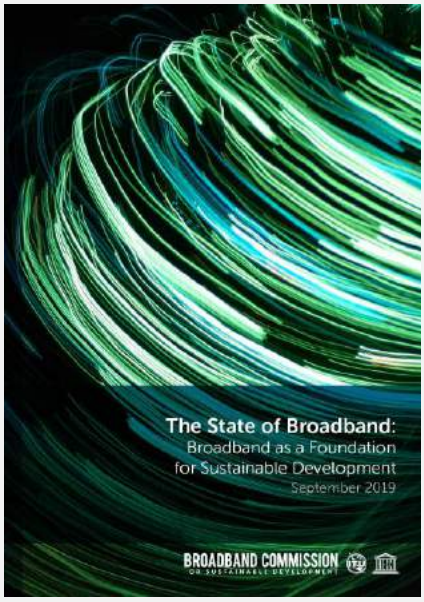
THE STATE OF BROADBAND 2019'
REPORT HIGHLIGHTS

INTERNET GROWTH IS SLOWING



ITU data shows a slowdown in overall adoption: growth in households with internet access at home was flat between 2018 and 2017 (growing at 8.9% over the previous year). Growth slowed in Least Developed Countries, at 17.5% growth in 2018 versus 19.1% growth in 2017.

The 2019 Inclusive Internet Index (Facebook/EIU) notes that global growth in the percentage of households connected to the internet slowed, rising only slightly to 54.8% from a level of 53.1% for the previous year. For low-income countries, household internet adoption improved by a mere 0.8% on average.

For individuals using the internet, global growth slowed in 2018, as well as slowing across developing countries.

THE PRICE OF BANDWIDTH IS FALLING

International internet bandwidth prices for IP transit have dropped an average of 27% (CAGR) from 2015 to 2018.

The price of mobile broadband plans has been progressively falling, particularly in developing countries. Average affordability of data (based on a 1GB plan) is best in South Asia at 1.2% of monthly income, and worst in Sub-Saharan Africa at 6.8% of monthly income – although on a positive note the latter represents a significant decline from 13.2% of monthly income in 2016.

While data has become cheaper, affordability of internet-enabled handsets remains a challenge, and the cost of devices has not significantly fallen; it remains a key barrier to mobile ownership and mobile internet adoption in low- and middle-income countries.

THE ONLINE USER-BASE IS GROWING

The active user count of some online social media communities is now larger than the populations of many sovereign nations. As of March 2019, Facebook's monthly active user community reached over 2.3 billion worldwide, with over 1.5 billion people logging into Facebook daily; Google has over 1.5 billion active users for its email product (Gmail); and China's WeChat has more than 1 billion active monthly users.

2025 TARGETS BROADBAND COMMISSION

Gaming platforms now boast over 2 billion active users; some individual games have tens of millions of daily active users.

INVESTMENT IS RISING IN EMERGING ECONOMIES

Capital investment in the global communications industry continues to rise and is larger than many countries' annual GDP. In 2016, global telecommunications capital investment (not including opex), stood at USD 354 billion, an increase of 4% from 2014 (USD 340 billion). According to the IMF, only 31 countries in the world had a larger GDP in 2016.

Capex growth is driven by increases in emerging countries which have rapidly increasing internet user bases and demand for data consumption. Some USD 23.5 billion of investment occurred in low and middle-income economies, while capex actually dropped by USD 10 billion in high income countries.

Mobile operators will invest around USD 1.3 trillion worldwide in mobile capex between 2019 and 2025. More than 75% of this will be spent on 5G networks.

Online service providers are fast becoming major investors in digital infrastructure, with over USD 75 billion spent each year on data centres, submarine cables and other facilities from 2014-17 – double the 2011-13 average.

INFORMATION & COMMUNICATION NETWORKS – GLOBAL OVERVIEW

Fixed & fibre

Globally, the number of fixed telephone connections as a percentage of total population peaked in 2006 at 19.2% worldwide (or 1.26 billion connections) and has been on the decline since.

Almost two-thirds of the global population (excluding North America) is now within at least 50km of an operational fibre point-of-presence.

Mobile

Wireless connections far outweigh fixed wired subscriptions. ITU estimates that by 2018, 96% of the global population had basic mobile cellular network coverage.

There are more mobile connections globally – at 8.16 billion – than people on the planet. This translates to an estimated 5.1 billion unique subscribers.

Almost 1 billion new mobile subscribers have been added in the 5 years since 2013 (average annual growth of 4.2%), but the speed of growth is slowing. An average annual growth rate of 2.0% between 2018 and 2025 would bring the total number of mobile subscribers to 5.8 billion (70% of the population).

Ever-faster network expansion is the rule in mid-level economies: It took 9 years for basic mobile network coverage (2G) to reach a 75% coverage threshold in lower-middle-income countries after reaching the 75% threshold in high-income countries; it took only 6 years for 3G networks in lower-middle-income countries to reach a threshold on par with high-income countries.

But…growth is slowing at the bottom of the pyramid: Mobile network coverage improved much more slowly for low-income countries, with a mere 22% improvement in 4G coverage compared with a 66% increase in lower-middle-income countries.

That said, in 2018 mobile operators in Sub-Saharan Africa accelerated the expansion of 3G networks, with population coverage increasing from 63% to 70%. More than 80 million people previously not able to access 3G networks are now covered. Mobile 2G coverage currently stands at 85% in Sub-Saharan Africa.

Of the 730 million people expected to subscribe to mobile services for the first time over the next 7 years, half will come from the Asia Pacific region and just under a quarter from Sub-Saharan Africa.

In 2018, 4G overtook 2G to become the leading mobile technology across the world, with 3.4 billion connections accounting for 44% of the total (excluding licensed cellular IoT). 4G will soon become the dominant mobile technology, surpassing half of all global mobile connections in 2019 and peaking at 62% in 2023.

5G is now a reality, with the Republic of Korea and the United States at the forefront of 5G deployment and more markets expected to launch by end 2019.

Undersea cables

There are now over 400 active undersea cables, comprising 1.2 million kilometres of fibre carrying approximately 99% of total global internet traffic.

Total international internet bandwidth has grown more than six-fold in less than a decade (2008 – 2016), rising from 30Tbps to 185 Tbps in 2016.

New undersea cable investments and upgrades have increased competition significantly, resulting in dramatic decreases in the price of international undersea bandwidth.

Satellites

There are over 4,980 satellites orbiting the earth; 775 of these are used primarily for communications.

The number of new satellites launched into space in the past two years alone has been at an all-time high, with 453 in 2017, and 382 in 2018.

There is a new focus by several companies, including new entrants affiliated with major global technology groups, to establish low-earth orbit (LEO) communications constellations.

CYBERSECURITY & ONLINE SAFETY

The number of cybersecurity breaches and cyber-attacks continues to increase. In 2017 there were at least 130 large-scale, targeted data breaches in the United States alone. These breaches are growing at estimates of over 25% per year. Approximately 24,000 malicious mobile applications are blocked every day.

There is an increasing threat from IoT botnets. In 2018, IoT bot activity represented 78% of malware network activity, or detection events, in carrier networks, and the average monthly infection rate in mobile networks was 0.31% (meaning 1 out of every 300 mobile devices had a high threat level of malware infection).

Overall trust in technology is at less than two-thirds of the general population (64%), and at only 50% for emerging technologies.

A recent survey of 25,000 internet users by the Centre for International Governance Innovation in partnership with UNCTAD and the Internet Society found that nearly 80%

of respondents are concerned about their online privacy, with over half (53%) stating they are more concerned than a year ago.

Online threats are particularly acute for women. In the US alone, 75% of victims of cyber stalking are women, and women are far more likely to be sexually harassed online than men.

THE ECONOMIC IMPACT OF BROADBAND

A landmark analysis by ITU shows that mobile broadband appears to have a higher economic impact than fixed broadband, and that the impact is greater in less developed countries than in more developed countries.

Globally an increase of 10% in fixed broadband penetration yields an increase of 0.8% in GDP, and an increase of 10% in mobile broadband penetration yields an increase of 1.5% in GDP. However, in more developed countries, the economic impact of fixed broadband is greater than in less developed countries.

A follow-up ITU study focusing on the Africa region suggests a 10% increase in mobile broadband penetration in Africa would yield an increase of 2.5% of GDP per capita.

CHRONIC BARRIERS TO ACCESS

A total of 43.5% respondents in low-income countries have pointed to poor connectivity as a barrier when trying to use the internet, compared to only 34.6% of those in upper middle-income and 25% in high-income.

In 2018, the 'rural mobile internet gap' was 40% in low- and middle-income countries; those living in rural areas were 40% less likely to use the mobile internet than those in urban areas. In Sub-Saharan Africa, the rural-urban gap is 58%.

At least 1.3 billion people are living in countries where entry-level mobile data plans (of 1GB per month) are not affordable (see Broadband Commission Target 2 below for definition of affordability).

A PERSISTENT DIGITAL GENDER DIVIDE

Gaps in access to the internet by the sexes appear to be narrowing slightly at a global level. There are a few countries where more women than men are participating online, such as in Argentina, China, Ireland and the Philippines.

However, at the country level, the digital gender divide is widest where mobile adoption is the lowest; across 10 countries in Africa, Asia and South America, women were found to be 30-50% less likely than men to use the internet to participate in public life.

80% of women in low- and middle-income countries own a mobile phone (including basic 2G phones), and 48% use mobile internet. That said, globally women are 23% less likely than men to use mobile internet. This gap is widest in South Asia, where women are 58% less likely to use mobile internet than men, followed by sub-Saharan Africa, where women are 41% less likely.

For years, the digital gender divide was assumed to be symptomatic of technical challenges: The thinking was that women would catch up with men when the world had cheaper devices and lower connectivity prices, due to the limited purchasing power and

financial independence of women compared with men. But while the cost of ICT access remains an urgent and salient issue, evidence indicates that this challenge is surpassed by educational gaps.

The proportion of women working in the digital sector continues to decline. In North America, the share of women in computing jobs (less than 25%) has been dropping over the past two decades.

In programming and software development jobs, in the US women hold about 18% of jobs, down from 37% in the 1980s. In the UK, women hold just 12% of programming and software development jobs – down from 15% a decade earlier.

At the same time, excess demand is a chronic problem. In the EU for example, there will be a predicted skills gap in excess of over 800,000 ICT jobs by 2020.

CLIMATE CHANGE

The ICT industry's own footprint has stayed flat for several years at 1.4% of global emissions, despite significant growth in the sector.

TRACKING PROGRESS: UPDATE ON THE BROADBAND COMMISSION TARGETS

Advocacy Target 1 Making broadband policy universal: By 2025, all countries should have a funded National Broadband Plan or strategy or include broadband in their Universal Access and Service definition.

A total of 164 countries worldwide now have a broadband plan, an increase from 159 last year.

Countries with a national broadband plan have higher fixed broadband penetration (2.5% higher) than countries without.

The impact of national broadband plans on mobile broadband adoption is even higher (7.4%).

Competitive markets are associated with broadband penetration levels some 1.4% higher on average for fixed broadband, and up to 26.5% higher on average for mobile broadband.

Advocacy Target 2 Making broadband affordable: By 2025, entry-level broadband services should be made affordable in developing countries at less than 2% of monthly gross national income (GNI) per capita

In 2017, 90 countries worldwide had mobile broadband prices (computer-based, 1GB) below 2% of monthly GNI per capita, whereas 69 countries have entry-level fixed broadband prices below 2% of monthly GNI per capita.

2025 BROADBAND TARGETS COMMISSION

ITU data indicate that, of the 99 countries analysed, 1GB of mobile broadband costs on average 5.76% of monthly income. Only 31 of those countries meet the '1 for 2' affordability threshold, whereby 1 GB of mobile data is priced at no more than 2% of average monthly income. This results in at least 1.3billion people (in these 99 countries alone) living in countries with unaffordable entry level mobile data plans for 1GB.

The GSMA estimates that for low- and middle-income countries (LMICs), more than half are still falling short of the target of broadband services costing less than 2% of monthly income per capita. For example, in Sub-Saharan Africa, the cost of 1 GB of data for the poorest 20% of the population is almost 40% of monthly income.

Advocacy Target 3 Getting people online: By 2025, broadband-internet user penetration should reach: a) 75% worldwide b) 65% in developing countries c) 35% in Least Developed Countries (LDCs)

According to the latest ITU data, global internet user penetration currently stands at 51% – considerably below the 75% target. Internet user penetration is 45% in developing countries, well below the 65% target, and in LDCs, internet adoption is at 20%, again below the 35% target.

Two regions have internet user penetration totals that are below the global average: Africa with internet user penetration of 24.4%, and Asia & the Pacific with internet user penetration of 47% (2018 data).

Advocacy Target 4 Digital skills and literacy: By 2025, 60% of youth and adults should have achieved at least a minimum level of proficiency in sustainable digital skills

Across the world in 2017it is estimated that less than 30% of the world's population was proficient in basic ICT skills.

Advocacy Target 5 Digital financial services: By 2025, 40% of the world's population should be using digital financial services

Some 2 billion adults are still without access to a bank account, but some 1.6 billion in this group do have access to a mobile phone

The number of people worldwide who have used digital financial systems in the previous 12 months increased from 42% of the global population to 52% in 2017 (women 46%; men 54%).

Advocacy Target 6 Getting businesses online: By 2025, improve connectedness of Micro-, Small- and Medium-sized Enterprises (MSMEs) by 50%, by sector

Currently, MSMEs have significantly lower levels of connectivity than large enterprises in the same sectors.

Advocacy Target 7 Achieving gender equality in access to broadband by 2025: By 2025, gender equality should be achieved across all targets.

The proportion of men using the internet is higher than the proportion of women using the internet in two-thirds of countries worldwide. The only region where a higher percentage of women than men are using the internet is the Americas.

Women's mobile phone ownership has increased significantly in low- and middle income countries since 2014, and 80% of women in these markets now own a mobile phone.

However, women are still 10% less likely than men to own a mobile, and 23% less likely than men to use the mobile internet.

The mobile gender gap varies by region and country, but is widest in South Asia, where women are 28% less likely than men to own a mobile and 58% less likely to use mobile internet.

Across low- and middle-income countries, female mobile owners spend on average 17% less than men on mobile services.

POLICY RECOMMENDATIONS FROM 'THE STATE OF BROADBAND 2019' FOR THOUGHTFUL APPROACHES TOWARDS MEANINGFUL UNIVERSAL CONNECTIVITY

1. Embed a focus on digital inclusion in broadband plans and digital economy efforts, paying attention to the challenges of marginalized communities and vulnerable populations, particularly women and children.
2. Amplify efforts to improve digital skills – including basic digital skills – to help users, SMEs and public sector agencies make the most of digital opportunities, as well as skills to distinguish online disinformation and other threats to the right to information, and so empower Internet users to avoid becoming either victims or unwitting distributors of disinformation.
3. Add public access policies into universal access and service (UAS) initiatives and national broadband plans, such as ensuring UAS policies explicitly include sites and locations where low-cost internet access may be facilitated (such as libraries, community centres, and areas of public gathering).
4. Support effective and innovative spectrum policies to improve broadband availability for underserved and marginalized groups.
5. Expand initiatives to map network coverage and infrastructure needs, developing priority lists for investment, including where subsidies are required.
6. Include measures to protect children online in national broadband plans.
7. Support international and national efforts to provide broadband connectivity to refugees and displaced individuals.
8. Include a focus on limiting environmental impacts and addressing climate change in national broadband plans.
9. Encourage and evaluate both sustaining, as well as disruptive, ICT innovations across technologies, business models, and regulations.
10. Promote the affordability of broadband by adopting appropriate policy and regulation.

'The State of Broadband 2019' report also includes a number of topical Insights from Broadband Commissioners.

2025 TARGETS BROADBAND COMMISSION